Surface Supplied Pod Assembly (P/N 805-225) Maintenance Manual

Contents

1.1 General Information

1.1.1 Introduction

The design and function of the surface supplied pod regulator is directly related to the KMDSI balanced SCUBA second stage regulator (P/N 200-120). It, in turn, is based on the engineering behind the KMDSI 455 commercial regulator found on many of the current helmets and masks from Kirby Morgan. This pod regulator is balanced and fully adjustable and is ideally suited for surface supplied diving because of its wide range of adjustments allowing for variations in supply pressure to the diver, as well as physical attitude and current variations.

NOTE

This regulator is not equipped with a “Pre-dive/dive” mechanism. It is important to pay close attention to proper techniques to prevent regulator free flow.

This manual is primarily intended to provide factory trained, authorized repair technicians and factory trained professional divers with the technical information and guidance needed to perform normal service adjustments and corrective maintenance, as well as some important basic user information to ensure proper function and use. It is strongly recommended that overhauls and repairs be completed by KMDSI authorized technicians. Owners of the Balanced SCUBA Second Stage Regulator who elect to work on their own regulators should have the proper tools, training and experience in regulator design and repair, as well as a sound technical background associated with diver life support breathing components. All repair parts should be genuine Kirby Morgan parts and should only be obtained from authorized Kirby Morgan dealers. All authorized Kirby Morgan dealers will be found on our website www.kirbymorgan.com under “Support.”

1.1.2 Use of Kirby Morgan Original Replacement Parts

Users of Kirby Morgan life support equipment are cautioned to always use Kirby Morgan original replacement parts. Parts manufactured by third party companies can cause improper function, leading to accidents.

Look for the Kirby Morgan logo on Kirby Morgan products. This is your assurance that you are getting genuine Kirby Morgan replacement parts.

1.1.3 Safety Precautions

To ensure the best possible Surface Supplied Pod and regulator performance and to avoid damage to regulator components, use only KMDSI original factory replacement parts. To avoid damage to regulator components and Pod assembly, only the correct sizes and types of tools should be used. The use of adjustable wrenches should be avoided whenever possible to avoid damage to the regulator parts. Should you encounter technical difficulties in servicing a Kirby Morgan regulator, please contact Kirby Morgan or Dive Lab—www.divelab.com or (850) 235-2715—directly for assistance

1.1.4 Specifications

Second Stage Type: Downstream, balanced bias adjustable

Second Stage Body: Glass fiber reinforced nylon

Other misc. parts: ABS + PC, PPO + GF, PPS, ABS, Titanium, POM, Nylon, polyurethane, 300 series stainless steel, liquid silicone, PP, Buna N.

Optimum intermediate working pressure: 140 PSI ±15 PSI

1.2 Preventative Maintenance

1.2.1 Routine Maintenance

Routine maintenance is the best way to ensure long life and optimum performance for the Surface Supplied Pod Assembly

NOTE

If possible, rinse while pressurized and attached to an air supply. This will aid in preventing water from getting into the inlet valve. Purging the regulator after rinsing will aid in getting rid of of hidden water. Purging the regulator may cause free flow. This is easily stopped by slightly blocking the mouthpiece. If NOT pressurized, cap all exposed fittings using sealing caps. Do NOT depress the purge unless it is certain there is no water against the inlet valve (inside of diaphragm chamber).

1. At a minimum, the assembly should be thoroughly rinsed with fresh clean water after every dive. Mild liquid dish soap can be used to remove grime.

2. If possible, the entire assembly should be soaked in fresh warm water, between 80–120 °F (26–49 °C), for 15 minutes or longer. Cap the inlets sides using the supplied blue or red cap with O-ring seal to keep water out. Soaking in warm water will remove salt and mineral deposits more effectively than a fresh water rinse alone.

3. Allow the assembly to dry completely before storage. Do not leave the assembly sitting in direct sunlight. Shake the assembly to help remove water trapped inside.

4. Rotate the second stage regulator adjustment knob all the way out. This will help lengthen the life of the regulator seat.

5. Ensure the assembly is completely dry before storing. Store only in a clean, cool dry place.

1.2.2 Scheduled Maintenance

Do not assume that a regulator is in good working order because of infrequent use. Prolonged or improper storage can result in O-ring deterioration or internal corrosion, causing poor performance.

The minimum maintenance suggested for all KMDSI dive systems is an annual inspection and service. However, systems that are used frequently or under severely harsh environmental conditions should be serviced more often. Dive systems like this may require service every two to three months or more. Whenever a dive system has been inac-

tive for longer than three months, it should be carefully inspected and checked prior to use.

Tools Required:

- Ball End Hex Driver:
  5/64", 7/64" and 5/32"
- Open end wrenches:
  3/8", 5/8",11/16", 3/4", 7/8" and 15/16"
- Large Flathead Screwdriver
- Chopstick/Screwdriver
- Needle Nose Pliers
- TORX Driver
  T6 and T10
- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

We currently use the reference to lubricate using Christo-Lube® or equivalent oxygen compatible lubricate and would like to acknowledge Krytox®, Fluorolube® and Tribolube® as equivalent oxygen compatible lubricants.

1.2.3 Soft Good Kits

Always refer to M-48 appendices for scheduled maintenance. These can be located at the back of the user guides as well as under the support tab at KMDSI.com. All individual parts in this Pod assembly and sub-assemblies can be ordered separately, KMDSI has also created kits to be used whenever required, or for periodic and annual service.

1.2.3.1 Guidelines

O-rings should be lightly lubricated with oxygen compatible, NON-SILICONE lubricant, for example: Christo-Lube®, Tribolube® or equivalent in accordance with the operations and maintenance manual. SILICONE based lubricants are to be used ONLY on the Steady Flow and EGS O-rings and stems.

At a minimum all O-rings found in the Surface Supplied Pod should be replaced at least once a year. Components might require replacement more often than yearly if the assembly use is extreme, or if used in waters containing oil or chemical contamination. Daily cleaning and inspections as well as performing the monthly inspection will identify the need more accurately than simply placing a number of hours between overhaul. Store spare O-rings, valves and soft goods in a cool, dark, dry place. Avoid prolonged exposure to temperatures above 90 °F (32 °C) and/or exposure to ultra violet rays. Do not lubricate exhaust valves. Lubricating valves can cause dirt to stick, allowing leakage.

1.3 Main Tube Performance

To maintain optimum performance of the demand regulator, it should be checked for proper function and adjustment in accordance with the KMDSI Daily Set Up and Functional Checklist. See the Kirby Morgan® or Dive Lab websites for the latest checklists at www.kirbymorgan.com or www.divelab.com.

NOTE

When storing the mask for any length of time, ensure that the adjustment knob, for adjusting the regulator, is turned "out" fully counterclockwise to avoid stressing the bias spring. This will prolong the life of both the inlet valve, seat, and bias spring.

1.3.1 Test for Correct Adjustment—Purge Test

Tools Required:

- Regulated air supply, 135 psig (Usually through Standard Scuba Second Stage Hose)

Check the regulator for adjustment and proper function with the assembly complete, and attached to a regulated gas supply (can be done either through the Main or EGS inlets on the side block), adjusted to 135psig.

NOTE

If going through the EGS valve, the jumper hose assembly with one way valve must be installed to prevent gas escape.

1. Rotate the flex knob OUT, counter clockwise, until the knob stops and cannot be rotated anymore.

2. Turn the adjustment knob in ¾ complete turn.

3. Attach an L.P. regulated gas supply to the hose adapter on the side block.

4. Obstruct mouthpiece with finger or thumb.

5. Turn on gas supply slowly.

6. Confirm the supply gas is regulated to 135 psig.

7. Lightly depress the regulator purge cover several times (three–five) and ensure the gas flow is stable.

8. Listen for a slight hiss, indicating a very minor amount of gas escaping from the regulator.

9. Rotate knob in slightly (Clockwise) and verify hiss stops. The hiss should stop with a maximum of no more than an additional quarter turn (one full turn total). If hiss does not stop – Regulator requires internal component inspection and or adjustment.

NOTE

If the regulator continues to free flow with the mouthpiece blocked when testing, rotate adjustment knob in and/or open Steady Flow to stop the free flow condition.

1.3.1.1 Out Of Adjustment Condition

If no hiss is heard at the ¾ turn out position, rotate the adjustment knob out an additional ¼ of a turn, purge three–five times and listen or observe for slight hiss of gas escaping from the regulator. If no gas is escaping from the regulator the regulator requires adjustment.

To confirm the regulator is in proper adjustment, a very slight amount of gas must escape from the regulator when the adjustment knob is rotated **in the range of ¾ to only one turn in from the complete out position**. The range will verify proper regulator adjustment.

1.3.2 Adjusting the Main Tube

Tools Required:

- Regulated air supply, stable at 135 PSIG, through an attached standard scuba hose (as shown).
- ¼" Flat Blade Screwdriver
- Open End Wrench ¾" and ⅞" (Backup)

The quickest and easiest way to supply gas to the regulator for testing in between adjustments is to use a standard first stage scuba regulator with an open ended standard second stage supply hose. The female fitting will thread onto either the main or EGS hose adapter.

It is not necessary to remove the main tube from the mask to perform field maintenance, however, for scheduled overhauls the main tube should be completely removed from the mask and disassembled.

NOTE

If there is no audible hiss when testing for correct adjustment, the adjustable nipple will need to be turned out (counter clockwise). If there is too much gas escaping when testing the main tube, the nipple will need to be turned in (clockwise). Whatever direction is needed, make the adjustment in very small increments and re-check after each adjustment. Usually, 10 to 15 degrees rotation at a time or less will suffice.

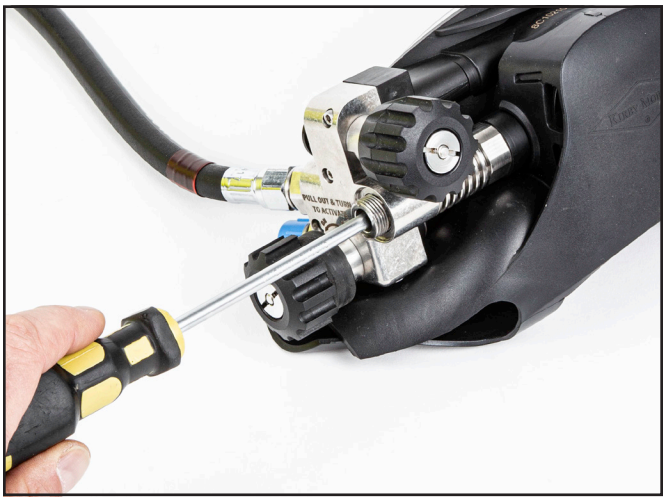
1. Turn off the gas supply and bleed internal pressure to the pod.

2. Remove the Cap from the Banjo Tube.

3. Confirm Steady Flow is closed.

4. Turn the adjustment knob all the way out (counter clockwise) then back in (clockwise) ¾ turn.

5. Insert a ¼" wide flat blade screwdriver into the slot in the end of the adjustable nipple to make adjustments as necessary.



Be sure to attach an L.P. gas supply and test the regulator between adjustments.

6. Make adjustments until the gas flow is heard, as previously mentioned, but ensure a backup wrench is used on the banjo tube every time the end cap is removed and re-tightened.

1.4 Removing the Surface Supplied Pod from the Mask

Tools Required:

- Ball End Hex Driver:
  7⁄64" and 5⁄32"
- Open End Wrench
  3⁄8"
- Large Flathead Screwdriver

The Surface Supplied Pod can be removed from the mask without removing the hood and mask strap, but removal of those components will make handling of the mask in this process a little easier.

The earphones will have to removed from the ear pockets on the hood which will include freeing the longer earphone cable that is secured between the lens body and jaw frame of the mask.

When installing or removing the Pod from the mask it is best done by loosening/tightening the fasteners in a progressive alternating pattern as to allow the Pod to move on an even plane either away from or towards the mask.

There are four points that secure the Surface Supplied Pod to the Mask.

1. Dislodge the lower hood retaining tab.

2. Using a 7⁄64" ball head hex driver, remove the regulator adjustment knob.

3. Using a 5⁄32” ball end hex driver, remove the fastener (longer screw) that secures the Weight to the mask.

4. Remove the two flathead screws with washers from the bottom leading edge of the Pod.

5. Use a 5⁄32 ball end hex driver to turn the fastener clockwise ½ to 1 turn. Next, using the ⅜" open ended wrench to prevent the hex nut from turning, remove the hex NUT near the side block by backing out on the Allen screw using the ball driver. Be Careful not to misplace the washer that is used with the nylon-insert lock nut.

6. Separate Pod from Mask.

NOTE

The Pod Gasket is a closely shaped alignment fit and with the Pod removed it can simply be removed by hand.

1.4.1 Weight

The weight can only be removed IF the Regulator Adjustment Knob has been removed.

Tools Required:

- Ball End Hex Driver: 5⁄32″

1. Remove the screws from the Weight.

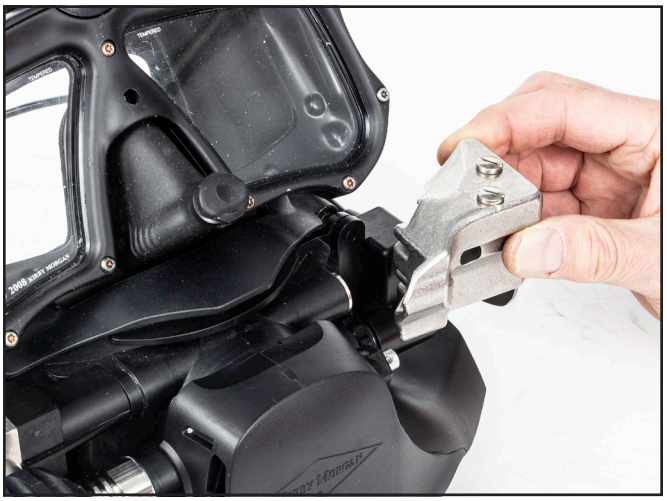
OBSERVE

There are two different screws. The shorter screw secures the weight to the pod and the longer screw secures the pod with weight to the mask. Note locations for future install

2. Gently remove weight from Pod.

NOTE

Ensure the long screw that secures weight to mask is removed from weight. The weight is pulled to the right of the center of the Pod and then forward and away to separate.

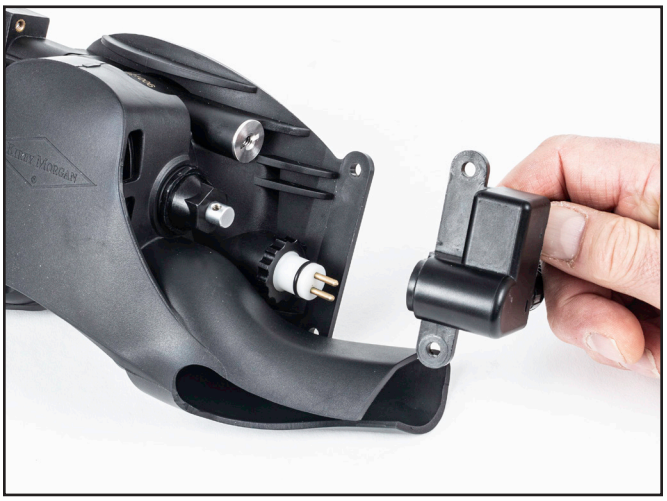


1.4.2 Communication Junction Module Assembly

Tools Required:

- None

When the pod is removed from the mask the Communications Junction Module Assembly is held in place by the weight with guard. With all pod attachment fasteners having been removed, the Communications Junction Module Assembly can simply be pulled straight out and away from the pod



1.4.3 Microphone with Wire Jumper Assembly and Oral Cup

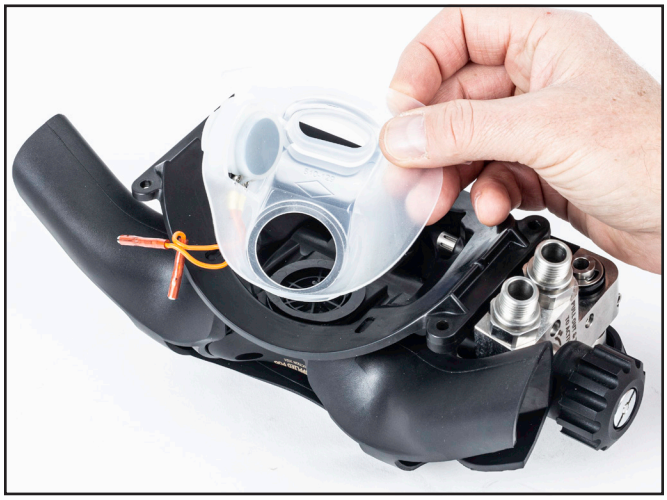
Tools Required:

- Needle Nose Pliers

1. Fold back the corner of the oral cup to expose the two pins entering the connector body.

2. Use needle nose pliers to remove the pins from the connector body. Attention should be applied to gripping the pins and **NOT THE WIRES** when removing.

3. Lift the corner edge of the Oral Cup out and away from mask.



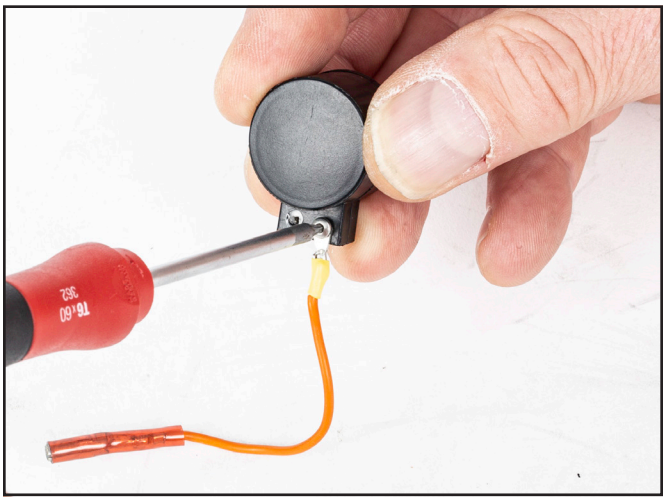
4. Lightly pull the microphone and its Shroud out and away of the Oral Cup while guiding the jumper wires out from the guide holes in the Oral Cup.

1.4.4 Microphone Element

Tools Required:

- T6 Torx Driver

1. Use T6 Torx driver to unscrew (counter clockwise) the two screws holding the microphone to the wire jumper.

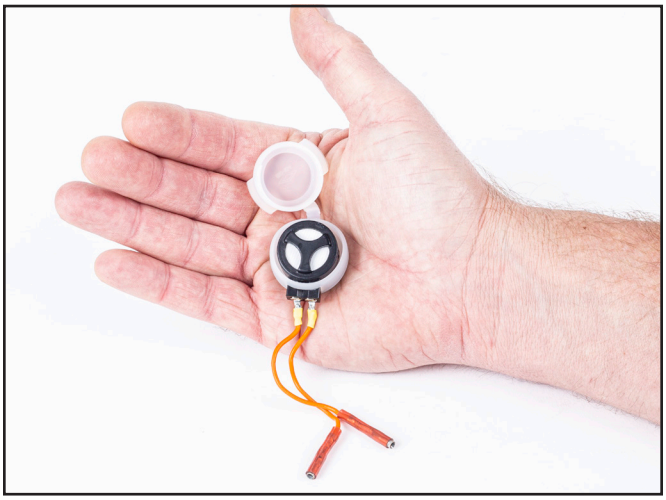


2. Remove the Microphone.

NOTE

When servicing the Pod and removing or replacing the Oral Cup it is best to leave the microphone in the Oral Cup and only separate the microphone assembly from the connector body, leaving the microphone attached to the wire jumper. Removing the microphone from the Oral Cup is NOT required on regular basis or mandatory for the Post-Dive.

The microphone element is captured by a shroud that is designed to help eliminate excessive harsh noise frequencies. It is removable, but not necessary when completing a post dive sanitization and inspection.



1.4.5 Folding Microphone Shroud

Tools Required:

- None

The Folding Microphone Shroud can be separat-

ed from the Microphone with or without the wire jumper secured to the Microphone.

1. Open shroud by unfolding two sides.

2. With Shroud open, carefully remove shroud from Microphone.

1.4.6 Connector Body

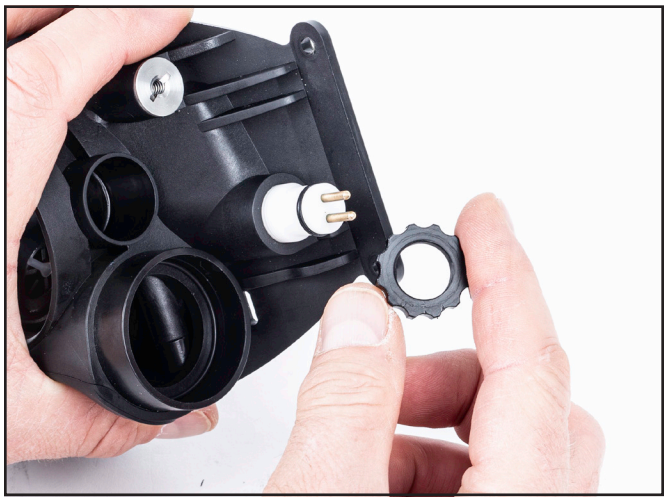
This can be done anytime the communication module is separated from the Pod.

Tools Required:

- None

The Connector Body is secured to the Pod with a Wheel Nut.

1. Rotate the Wheel Nut in a counter clockwise direction until wheel is free of threads found on the Connector Body.



2. Push body into Pod to free body from Pod.

NOTE

After removing the microphone and connector body, carefully check the connection points between the two assemblies for corrosion. Clean as necessary so they are prepared for reassembly.

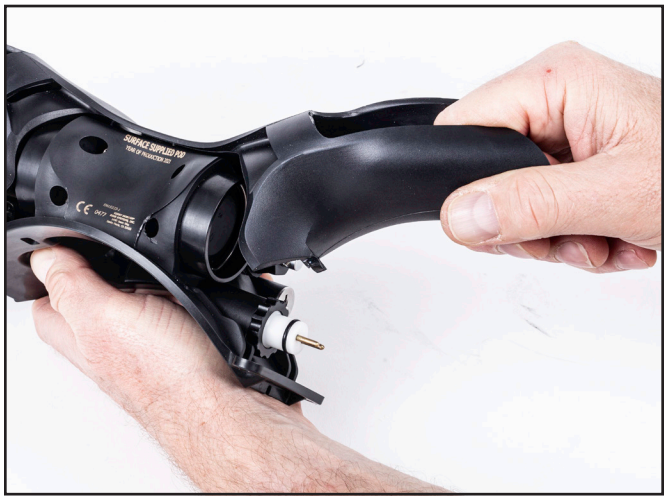
1.4.7 Regulator Exhaust Cover

Tools Required:

- None

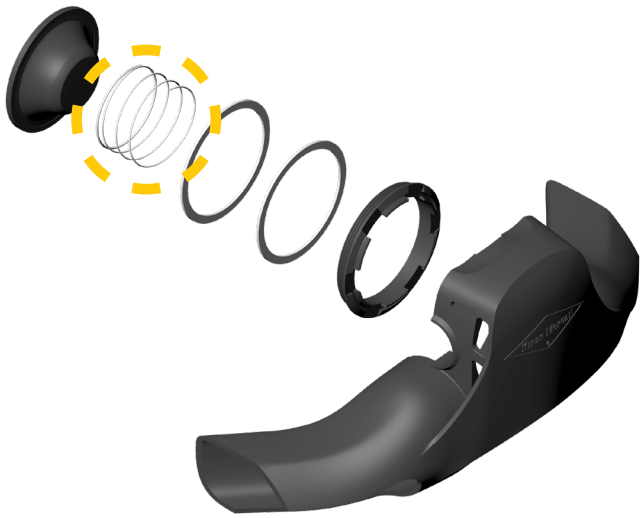
1. Apply a gentle pull force to the other edge of each of the exhaust whiskers.

NOTE This will dislodge the four tabs that fit into the lower section of the Regulator Pod Housing.



2. With the lower section of the cover free, wiggle the bulk of the cover while rotating the cover upward towards the top of the Pod, to free it from the retaining tab found at the top of the Regulator Pod Housing.

1.4.8 Assist Spring



The Assist Spring helps in stabilizing the regulator in all working depths and in all ventilation rates.

Tools Required:

- None

Once the Regulator Exhaust Cover is removed from the Pod the Assist Spring can simply be removed.

1.4.9 Diaphragm Retainer Ring and Associated Parts

Tools Required:

- Chopstick/Screwdriver

1. Lay the bar of the screwdriver or chopstick between the gaps found on the Diaphragm Retainer Cover.

2. Apply light downward force while turning in a counterclockwise direction.

3. Remove Diaphragm Retainer Cover, Diaphragm Washers and Diaphragm.

1.5 Side Block Removal and Disassembly

The Cap on the Main Tube along with three screws that secure the Side Block to the Side Block Mount Frame will have to be removed to separate the Side Block form the Pod. The Side Block can easily be taken off as a complete unit. The EGS and Steady flow knobs can remain in place when removing the Side Block from its mount frame.

1.5.1 Side Block

Tools Required:

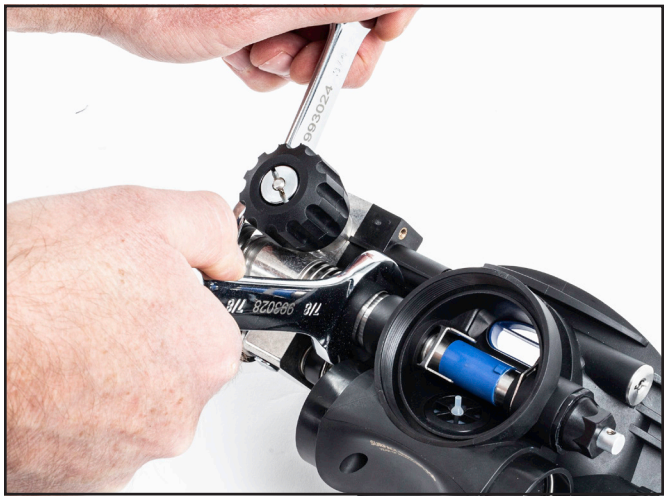
- Open End Wrenches: ¾″ and ⅞″
- Ball End Hex Driver: 7⁄64″

When removing the Side Block from the Pod attention should be focused on the small O-ring found on the inside face of the Side Block. Care should

be taken to either remove or secure in place to avoid misplacement.

If performing a complete overhaul, it is recommended to loosen both Hose Adapters with a ¾" open end wrench when the Side Block is secured to Pod. Reference "1.5.5 Hose Adapters" on page 16 for additional instructions.

1. Use ⅞" open ended wrench as a back-up on the Banjo Tube where it meets the Pod housing and remove the end cap using the ¾" open end wrench.



2. Use 7⁄64" ball end hex driver to remove the three screws and lock washers that secure the side block to the Side Block Mount Frame.

NOTE

The bottom screw is longer than the other two screws.

NOTE

To completely remove the bottom screw from the side block it is helpful to place the EGS knob half way between open and closed position. This allows more clearance for the screw to move to a manageable position. The side block can be removed without removing the longer screw if the screw threads are entirely free of the pod threads.

3. Slightly/slowly rotate the side block back and forth on the banjo tube while pulling straight away to separate Side Block from Pod.

Be mindful that the Side Block Mount Frame with Steady Flow Supply Tube might dislodge from the Pod when removing the side block from the Pod.

1.5.2 Steady Flow and EGS Knobs REMOVAL ONLY

Tools Required:

- Flat Blade Screwdriver

NOTE

Removing either knob if cleaning and maintaining the shaft sealing O-rings are unnecessary, and they can remain in place.

Important to note that these knobs can exchange locations. The knob with the smaller diameter and grip edge towards the inner end must be installed onto the emergency control (EGS) assembly. This will ensure a better grip when activating the emergency supply system.

1. Insert tip of screwdriver into open slot found on the lock nut and unscrew (counterclockwise) lock nut.

2. Remove Lock Nut, Spring and Knob.

1.5.3 Steady Flow Assembly

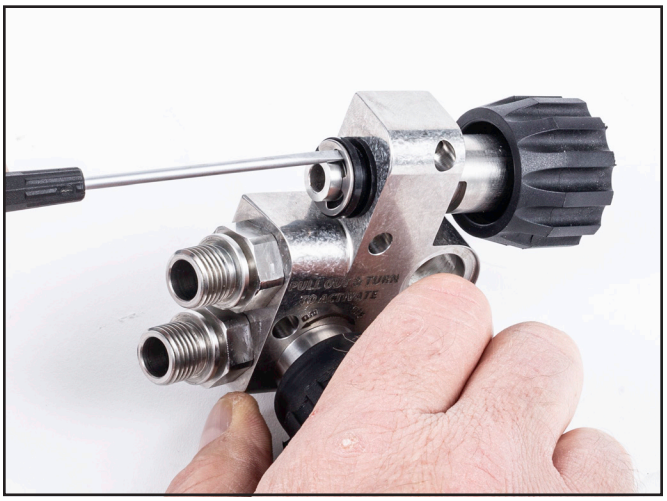
The Steady Flow Assembly can be removed as a complete assembly without removing the control knob.

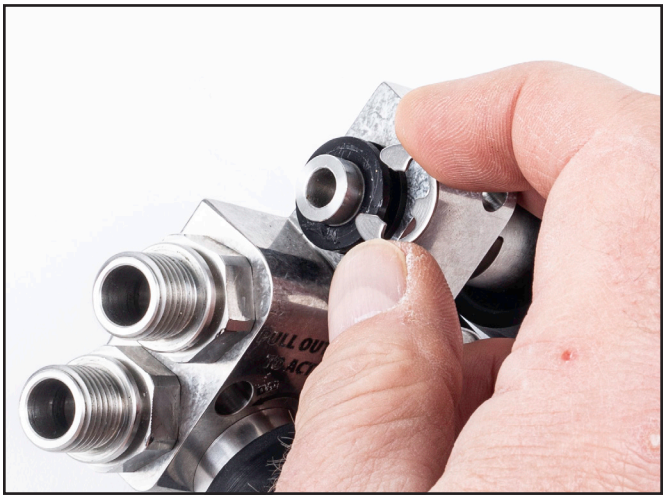
Complete service of the assembly can be accomplished with or without the Side Block secured to the Pod.

Tools Required:

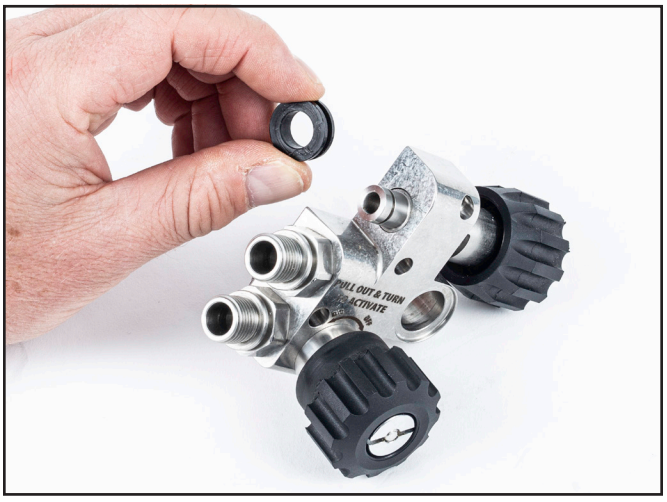
- Flat Blade Screwdriver

1. Insert the tip of a flat blade screwdriver into one the openings found on the Spring Clip and apply force to release the clip from the Steady Flow Control Stem.





2. Remove Spacer Washer.



3. Separate the Steady Flow Assembly from the Side Block.

4. Remove O-rings

NOTE

It is not necessary to remove the control knobs from the control stems other than to replace them. O-ring replacement can be done without removal of the knobs, The knob removal steps are simply noted for reference if needed.

5. With flat blade screwdriver unscrew lock nut from Steady Flow Control Stem.

6. Remove Lock Nut, Spring and Control Knob.

1.5.4 Emergency Control Knob

NOTE

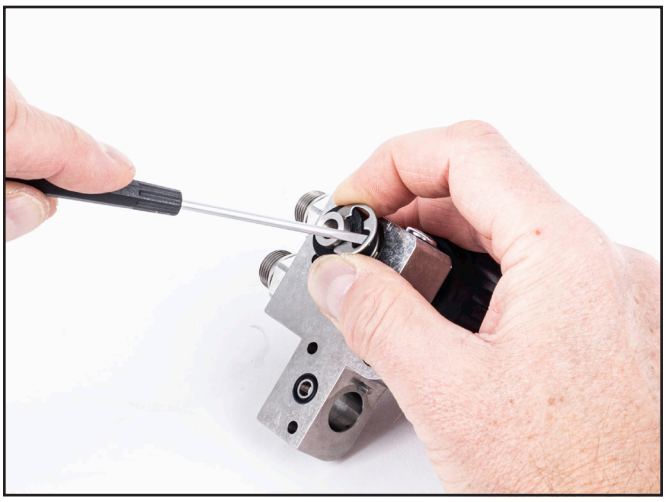
The retaining clip is spring loaded while assembled. Be aware that once the Spring Clip is removed the tension from the spring will force the Spring Cup away from the Side Block. Hold onto this cup when removing the clip!

Tools Required:

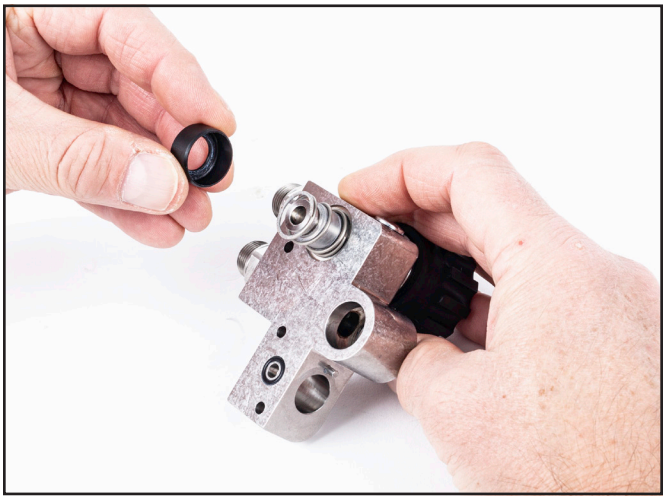
- Flat Blade Screwdriver

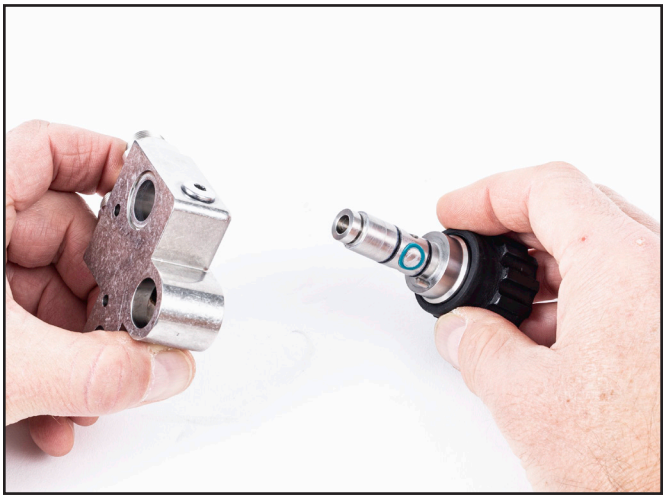
1. Firmly hold the Spring Cup in place.

2. Insert the tip of a flat blade screwdriver into one the openings found on the Spring Clip and apply force to release the clip from the EGS Control Stem.



3. With the Spring Clip, Spring Cup and Spring removed pull the complete assembly out and away from the Side Block.





4. Remove O-rings.

5. With one hand on the EGS Control Knob use a screwdriver to unscrew knob.

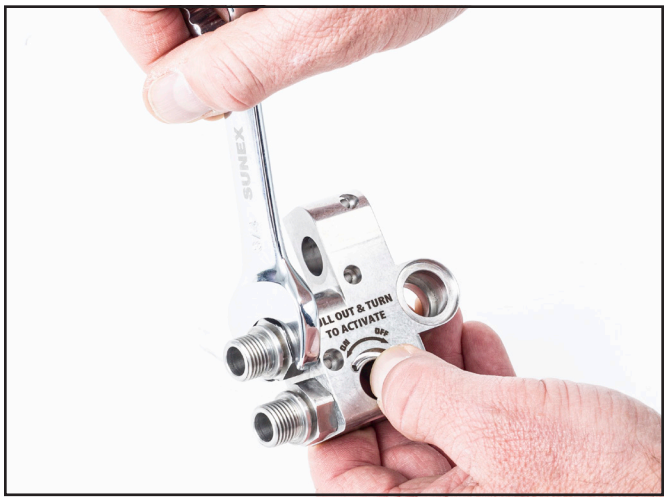
6. Remove Lock Nut, Spring and Control Knob.

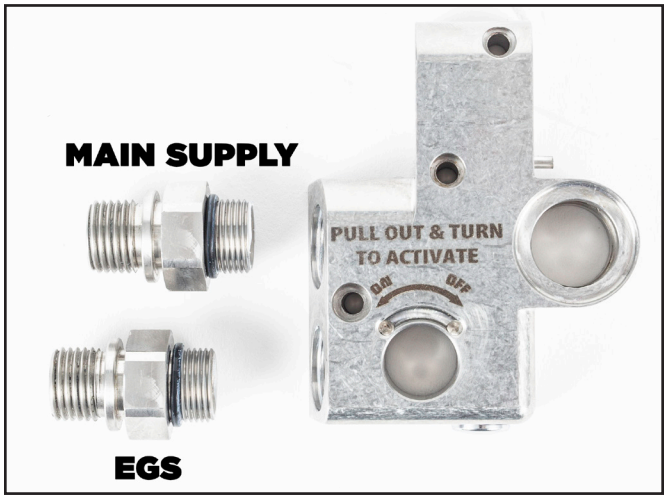
1.5.5 Hose Adapters

Tools Required:

- Open End Wrench:
  ¾″

1. The hose adapters are threaded into the side block and are removed and installed using the wrench in a standard manner. Each Hose Adapter uses a sealing O-ring. The adapters are identical so location is not critical.





1.5.6 Side Block Frame Mount

Tools Required:

- None

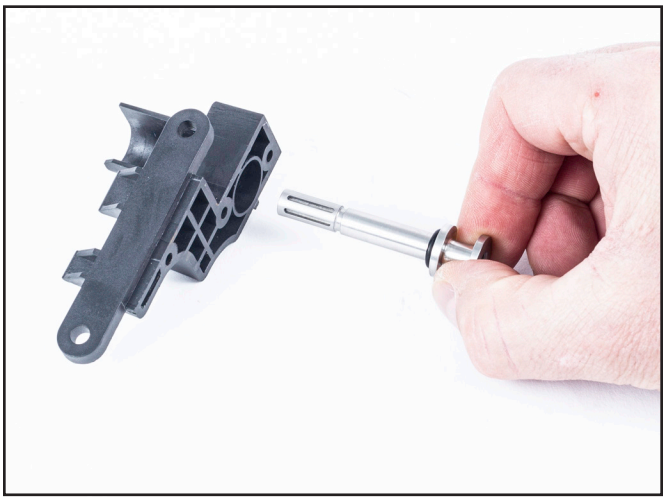
1. The Side Block Mount Frame is secured to the Pod by the Side Block Sub Assembly and is removed by simply pulling the frame away from the Pod when the Side Block is removed.

1.5.7 Steady Flow Supply Tube

Tools Required:

- O-ring Removal Tool

1. The Steady Flow Supply Tube is held in place by a retaining O-ring. The O-ring must be removed carefully to avoid damaging it as it slides across the slotted openings on the tube.



1.5.8 Muffler Screen

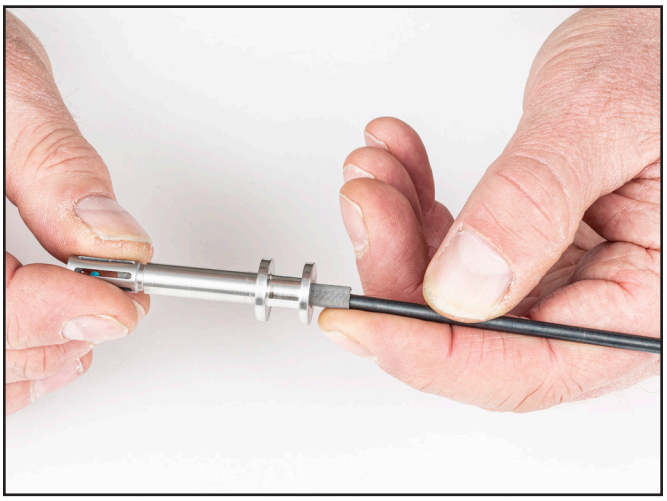
Tools Required:

- Pin or Small O-ring Pick
- Ball End Hex Driver:
  7⁄64″ or small diameter pin or drill bit

1. Use the pick to begin to slide muffler screen out of steady flow supply tube approximately ¼″.

2. Insert the 7⁄64″ Ball End Hex Driver or similar tool into the screen opening.

3. Pull screen completely out of tube by applying pressure to screen and using the inserted tool to maintain screen shape and purchase.



1.5.9 Banjo Tube

Tools Required:

- Open End Wrench:
  7⁄8″

1. Using 7⁄8″ wrench loosen the Banjo Tube from the Main Tube.

2. Complete removal by hand.

3. Remove three O-rings.

1.5.10 Main Tube

The procedure to completely remove the Main Tube is very similar to our Balanced SCUBA and 455 Regulators.

Tools Required:

- Open End Wrenches: 5⁄8″ and 15⁄16″
- Ball End Hex Driver: 7⁄64″
- Medium Flat Blade Screwdriver
- Tapered Wooden Dowel (e.g., Wooden Chopstick)

1. Using a flat blade screwdriver, insert the tip into the slot at the top of the packing lock clip and remove.

2. Using a 5⁄8″ wrench, loosen the end cap packing nut, but leave it in place.

NOTE

It is possible that the guide insert will also loosen up and the two components can be removed together. If not, a 15⁄16″ wrench will loosen the adjustment guide insert so it can be removed.

NOTE

This will allow the Main Tube to move enough to easily remove the main tube parts.

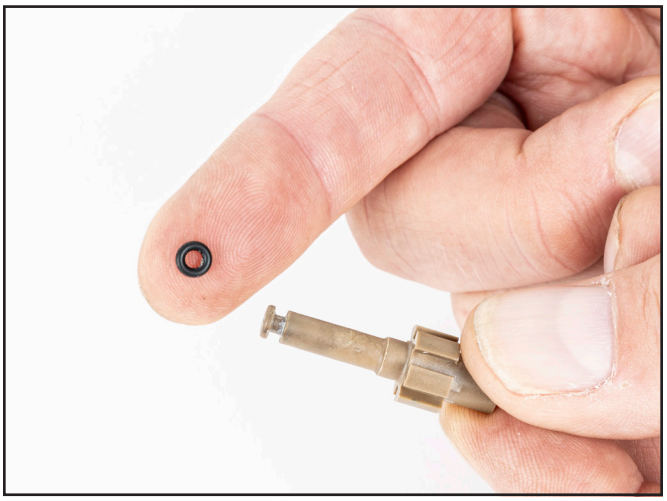
3. Using a 15⁄16″ wrench, loosen the adjustment guide insert and remove it. This will allow the Main Tube to move enough to easily remove the main tube parts.

4. Tilt assembly to retrieve Balance Spacer and Spring. O-ring on balance spacer may be lodged inlet valve and may require a slight pull to free spacer and spring.

5. Ensure the lever arm is in the down position then push on the threaded end of the main tube to dislodge this sub assembly.

6. Once the hex portion of the Main Tube is free from the cavity turn the main tube down to an angled position and then pull it straight out from the regulator Pod housing.

7. Remove the small O-ring and washer from the balance spacer.



NOTE

Only one O-ring is used in the end groove on the balance spacer. A small quantity of early production assembly parts had two grooves. Later parts have been modified to have only one groove molded on the part.

8. Remove the lever bearing clip from the main tube.

9. Remove the lever arm.

10. Remove the inlet valve assembly from the main tube. Separate the valve seat from the inlet valve.

11. Using a flat blade screwdriver unscrew the adjustable nipple all the way out to free the threads from the main tube.

12. Use the wooden dowel rod (chopstick) to push it free and separated from the Main Tube.

13. Remove the O-ring from the adjustable nipple.

14. Remove the O-ring from the main tube.

NOTE

DO NOT attempt to remove the blue colored flow sleeve. This has been locked into position and should not need removal. Changing its position will influence regulator performance, so it should not be moved.

15. Remove the end cap packing nut (this may require using the ⅝" and 15⁄16" wrenches) and remove the adjustment shaft. This will have the spring seat, O-ring, adjustment shaft spacer and thrust washer attached to it. Separate all of these parts.

16. Remove the O-ring from the adjustment guide insert.

1.5.11 Chamber Cover & Cover Gasket

Tools Required:

- T10 Torx Driver

1. Remove four screws that secure cover to Pod.

2. Remove sealing gasket.

1.5.12 Water Purge & Exhaust Valves (4)

The Surface Supplied Pod incorporates an exhaust system very similar to the system used in most of our helmets. In this system the demand regulator has a water purge valve that releases into a chamber that includes three exhaust valves. One

on both the Port and Starboard side of the Pod and one located at the base of the Pod.

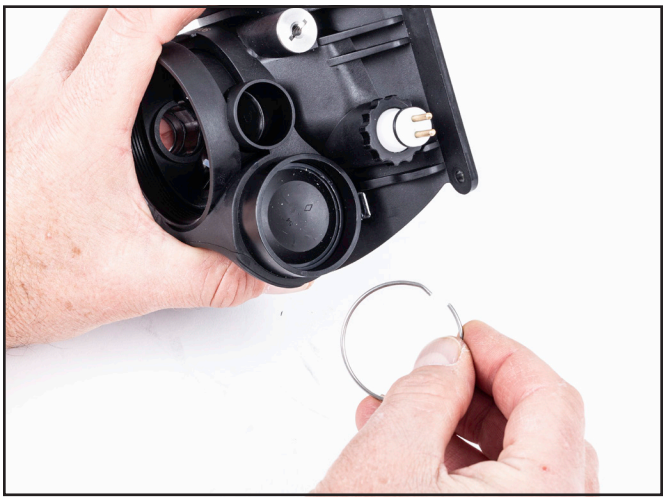
Tools Required:

- Flat Blade Screwdriver

NOTE

The Water Purge (small white) and Regulator Exhaust (main large) Valve do not use a removable valve insert, but install directly into the Regulator Pod Housing

1. By hand or with the aid of a flat blade screwdriver remove the Retaining Ring from its recessed groove.



2. Remove the Valve Insert with valve.

3. Remove O-ring

4. Remove valve from insert.

NOTE

If the Valve Insert has gouges, cracking or signs of damage it MUST be replaced.

5. Remove exhaust valve (BLACK) by hand.

6. Remove purge valve (small white) by hand.

1.6 Reassembly

1.6.1 Water Purge and Exhaust Valves (4)

Tools Required:

- None

1.6.1.1 Water Purge and Regulator Exhaust Valve

The Water Purge and Exhaust Valve do not use a removable valve insert, but install directly into the Regulator Pod Housing P/N 805-215. Ensure the silicone exhaust valve shows no signs of damage, brittleness or any deformities. The exhaust valve should lay flat against the seat. If conducting an Annual Overhaul, the exhaust should be replaced.

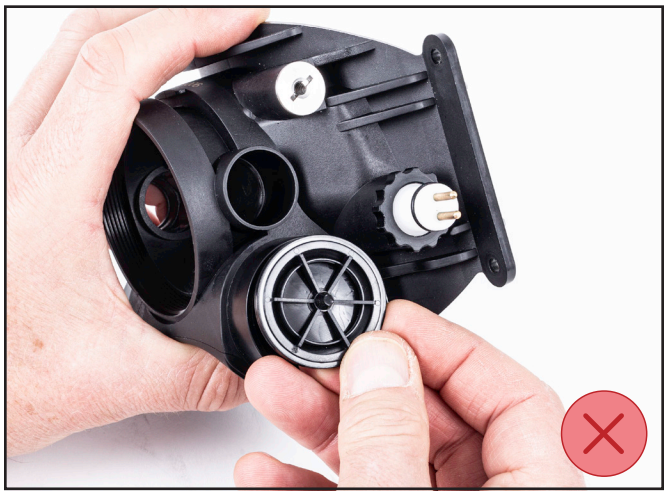
1.6.1.2 Port and Starboard Exhaust Valves

1. Inspect the interior of the Pod sealing surface and make sure that it is clean and no foreign matter to affect the O-ring and Valve Insert in making a proper seal.

2. Install the O-ring for the exhaust valve insert, into the Pod. **DO NOT LUBE.**

3. Install the new exhaust valve into the exhaust valve insert.

4. Install Valve Insert with Valve into Pod.



5. Install the Retaining Clip.

NOTE

When installed correctly the clip rests inside a slot and will not rotate. Check to ensure no interference between the retaining clip and exhaust valve.

1.6.2 Chamber Cover & Cover Gasket

Tools Required:

- T10 Torx Driver

NOTE

This gasket can be stretched. Avoid stretching the gasket as this may increase it's length and make it difficult to form completely into it's groove.

1. Fit Cover Gasket into recessed edge on Regulator Pod Housing. It can be helpful to fit the straight runs first and complete the installation by fitting the curved edges last. Inserting the curved sections can be assisted by wetting the gasket first with water. **DO NOT LUBE.** It is also important to refrain from stretching the seal when installing it.

2. Install the Chamber Cover and four screws. Tighten in a cross pattern until bottomed out to the recommended torque. See "Torque Specs" module.

1.6.3 Main Tube

1.6.3.1 Assembly of the Adjustment Packing Nut Subassembly

Tools Required:

- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

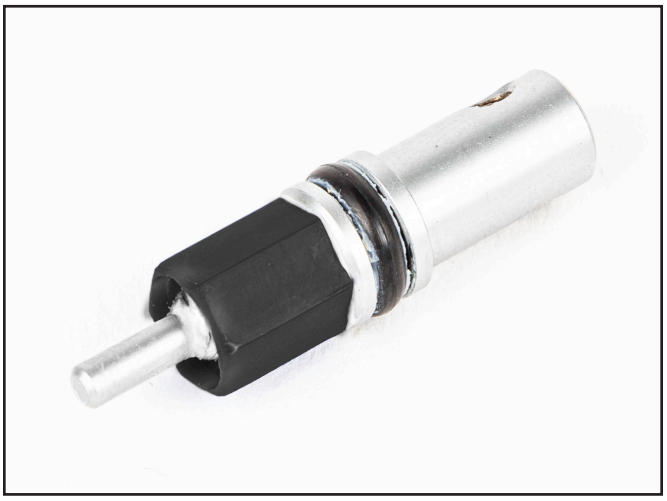
1. Lubricate the O-ring and install onto the adjustment guide insert.

2. Lubricate the O-ring and install onto the adjustment shaft.

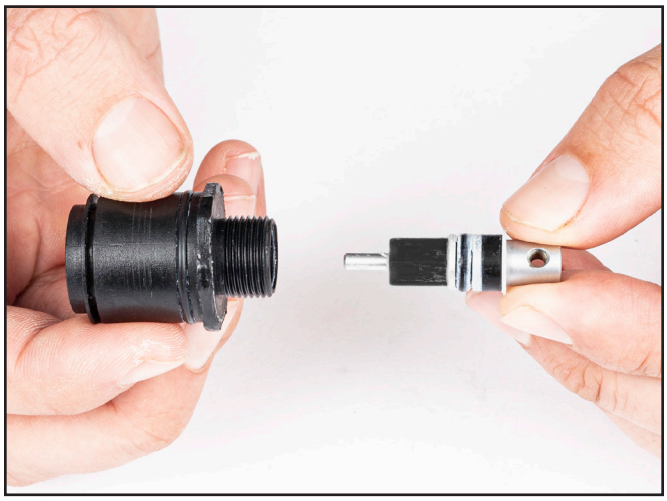
3. Look closely at the spring seat. One end is flat and the opposite end has a recess. Lightly lubricate the threads on the adjustment shaft and install the spring seat, flat end onto the threads of the adjustment shaft and thread it on all the way until it stops. Check the movement of the threads for smooth operation. Afterwards, when threaded all the way on, check again for smooth operation of the threads.

NOTE

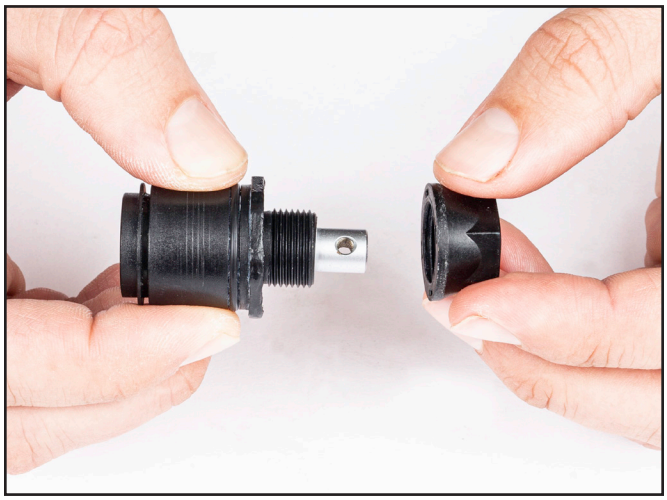
These are left hand threads.



4. Install the spacer and thrust washer onto the adjustment shaft. Insert all the components on this shaft into the adjustment guide insert and push all the way in.



5. Install the end cap packing nut over the adjustment shaft, onto the threads and hand tighten.



1.6.3.2 Assembly of the Balance Piston Subassembly

Tools Required:

- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

1. Install the washer onto the balance spacer.

2. Lightly lubricate the O-ring and install into O-ring groove found on the balance spacer. Lightly lubricate the O-ring after installation.

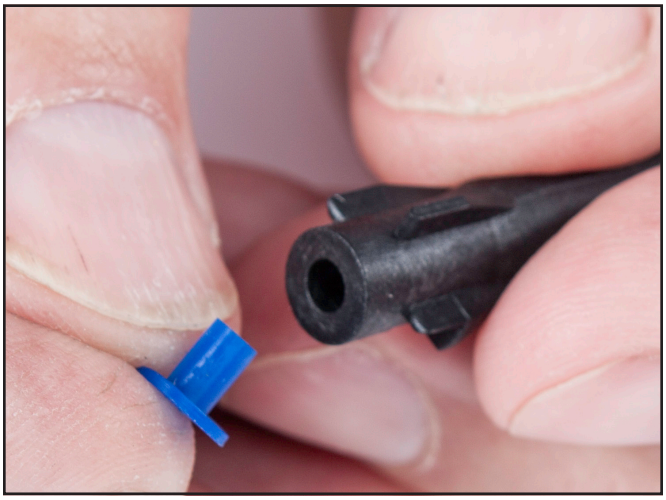
1.6.3.3 Inlet Valve Assembly

Tools Required:

- None

Check both the seat and the receiving hole for the seat in the inlet valve before installation, to make sure the balance hole goes all the way through without anything blocking this passage.

1. Install the valve seat onto the inlet valve. **DO NOT LUBRICATE THE VALVE SEAT.** Make certain there is no space between these two parts. The valve seat must be pressed all the way into the inlet valve.



Assemble the valve seat to the inlet valve.
DO NOT LUBRICATE THE SEAT.

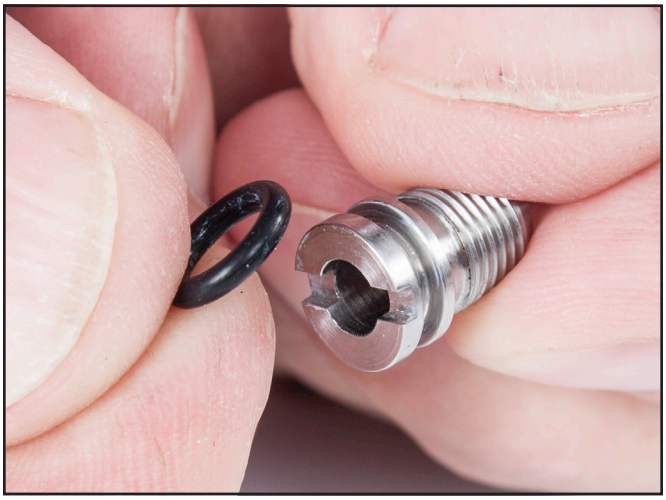
1.6.3.4 Assembly of the Adjustable Nipple Subassembly

Tools Required:

- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

1. Carefully inspect the sealing edge of the adjustable nipple using either a magnifying glass or using a fingernail against the edge while rotating the part to check for nicks or cuts.

2. VERY lightly lubricate the O-ring and install onto the adjustable nipple.



1.6.3.5 Assembly of the Main Tube Subassembly

Tools Required:

- Torque Wrench
- Open End Attachments: 5⁄8″ and 15⁄16″
- Medium Flat Blade Screwdriver
- Tapered Wooden Dowel (e.g., Wooden Chopstick)
- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

1. Lightly lubricate and install O-ring onto the main tube.

2. Install the O-ring onto the balance spacer and lubricate with Christo-Lube® or equivalent and set aside.

3. Insert the adjustable nipple into the main tube and using a medium flat blade screwdriver, thread the nipple all the way in, then back out three full turns.

Insert the adjustable nipple subassembly into the main tube.

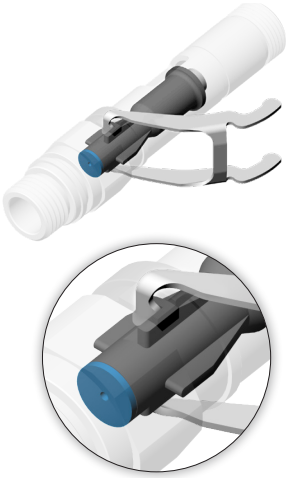
Note the orientation of the lever arm to the main tube. The arms of the lever arm with cross piece should lay on the side of the main tube that is solid. Note the hole for the bearing clip and venturi slots in the blue sleeve will be on the underside of the cross piece of the lever arm as shown.

4. Spread the arms of the lever just enough to install it onto the main tube.

NOTE

Study the features of the inlet valve assembly. There are four "wings" towards one end of the assembly and a bore that creates the balance chamber on the opposite end. The wings that align with the lever arm are the two that have an additional wall for the lever arm to bear on. The valve assembly should be inserted into the main tube with these walls toward the bottom of the regulator tube.

Notice the detail features on the inlet valve. The small ribs MUST face towards the bottom of the main tube to properly engage with the lever arm. **THIS IS CRITICAL!**



5. Apply extra lubrication to the O-ring on the balance spacer. Excess lubrication could possibly block the orifice and cause erratic regulator performance

6. With the spring in place, using the balance spacer with the O-ring and washer installed, insert the balance spacer into the stainless steel tube of the inlet valve until the O-ring on the balance spacer is just beyond the end of the stainless tube on the valve assembly.

7. Properly align the wings found on the inlet body and insert the inlet valve into the main tube, as previously noted.

NOTE

If this is done properly, the lever should lift up when pressure is applied. If it does not, the valve has not been inserted correctly.

The inlet valve should remain in place **while pinching the lever arms.** If it comes out, repeat the process until the valve stays in place.

NOTE

Confirm the balance spacer is properly aligned inside the main tube by pushing in on the end of the spacer, to see that the lever arm moves when pressure is applied.

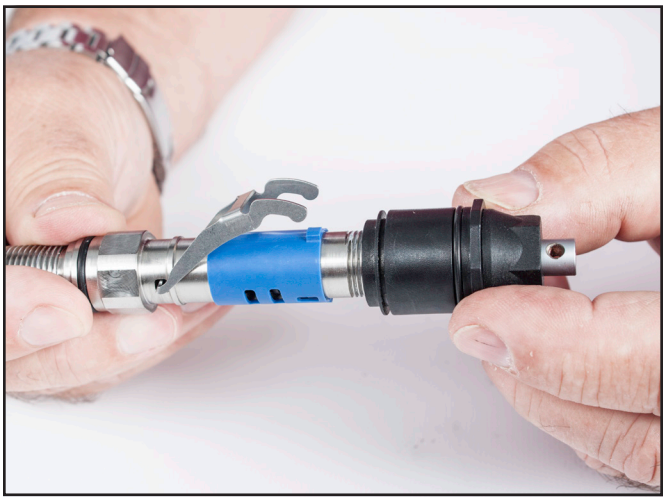
The inlet valve assembly should remain inside the main tube. This is an indication the lever arm and inlet valve assembly are properly aligned and engaged. If the inlet valve assembly comes out when removing the balance spacer, it was not installed properly. Repeat as necessary to gain proper installation.

8. The lever arm should raise up and down pressure and release put on the edge of the balance spacer.

9. Install the adjustment packing nut subassembly onto the end threads of the main tube, and engage about two full turns. This will allow enough easy movement of the lever arm so the lever bearing clip can now be installed.

NOTE

If this is done properly, the lever should lift up when pressure is applied. If it does not, the valve has not been inserted correctly.



10. While applying slight pressure to the lever arms Install the bearing clip onto the outside of the main tube and make sure the parts all align.

NOTE

FITTING THE BEARING CLIP

The multifaceted side of the bearing clip faces the hex side of the main tube. There is a locating pin on the clip that must engage the correct hole on the main tube. There are also small recesses on either side that the legs of the lever arm fit into.

11. Rotate the adjustment packing nut subassembly until it stops, then unscrew until three to four threads are showing. The lever arm should go down.

OBSERVE

The lever arm should rise up when rotating the packing onto the main tube.

1.6.3.6 Installing Main Tube into Regulator Pod Sub Assembly

Tools Required:

- Ball End Hex Driver: 7/64″
- Torque Wrench
- Open End Attachments: 5/8″, 7/8″ and 15/16″
- Medium Flat Blade Screwdriver
- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

IMPORTANT

The Regulator Exhaust Cover, Side Block, Diaphragm Retainer Ring with its associated parts all must be removed from the Pod.

NOTE

The Packing Nut should be screwed onto the end of the Main Tube with at least three or four threads exposed. This is about four full turns on the main tube. If the lever arm is in the up position the packing nut has been screwed in too far and must be unscrewed slightly.

1. Apply extra lubrication to the O-rings found on the threaded end of the Main Tube and Adjustment Guide Insert.

2. Insert the main tube assembly into the regulator housing. There may be slight resistance as the lever arm passes through the large side opening on the regulator housing. Push up slightly on the main tube, while pushing the tube inward. This will aid in clearing the lever arm through.

3. Push the main tube in far enough so the end of the main tube flat face, (the base of the threads), aligns with the outer flat on the side tube of the regulator Pod housing, as shown.

4. Lubricate O-rings on Banjo Tube.

5. Ensure the large face O-ring is in place at the large end of the banjo tube. Install the Banjo Tube and tighten with an 7/8″ attachment on a torque wrench.

6. Torque the opposite end hex of the end cap packing nut with a 5/8″ attachment on a torque wrench.

7. Push the locking clip in place. There must be resistance when installing this part. If it seems too loose, pliers to compress the legs together very slightly will improve the fit. Make sure it is fully engaged into its mating groove.

1.6.4 Installing Connector Body

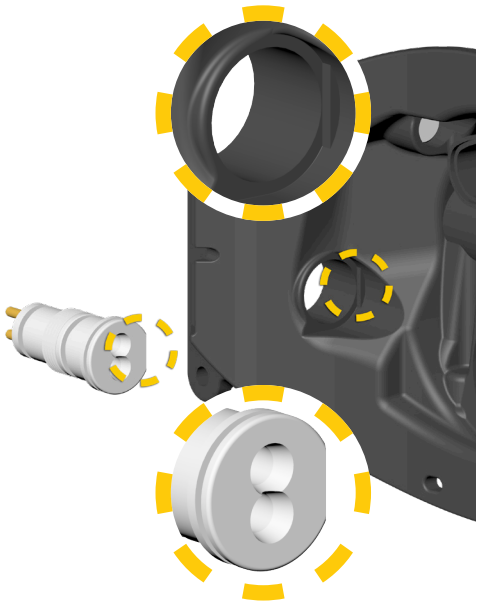
Tools Required:

- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

The Connector Body is secured to the Pod with a Wheel Nut.

1. Lightly lubricate O-rings

2. Push the Connector Body into lower left hole of the Regulator Pod Housing.



NOTE

The shape of the Connector Body creates a "clocking" design feature. When installed properly the body should have **only slight movement.** If the body can spin around it is not seated correctly and needs to clocked with additional rotation and inward pressure to be seated properly into the pod.

3. Rotate the Wheel Nut in a clockwise direction until wheel is bottomed out.

1.6.5 Muffler Screen

Tools Required:

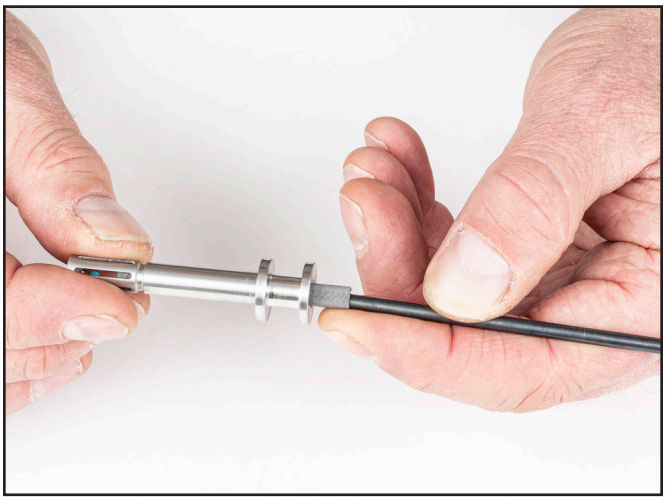
NOTE

Be sure the screen has been cleaned and is free of any debris that may limit gas flow through it.

- Ball End Hex Driver:
  7⁄64" or small diameter pin or drill bit

1. Insert the 7⁄64" Ball End Hex Driver or similar tool into one of the open ends of the muffler.

The 7⁄64" hex driver or similar tool is used to maintain the shape of the screen and assist in proper insertion.



2. Insert muffler into Steady Flow Supply Tube. Ensure muffler is pushed all the way down into the tube.

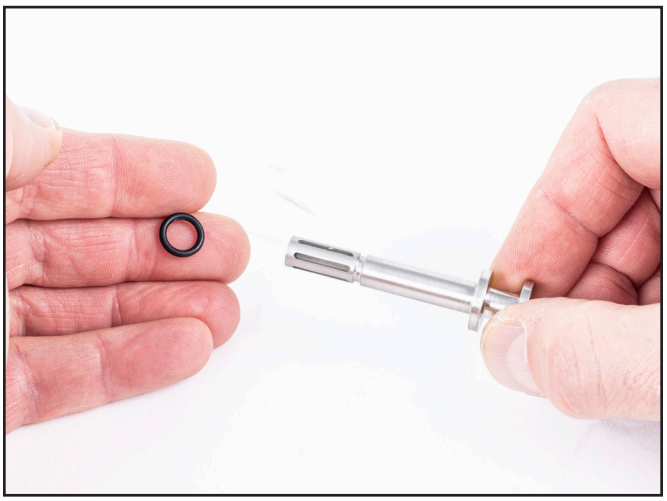
1.6.6 Steady Flow Supply Tube

Tools Required:

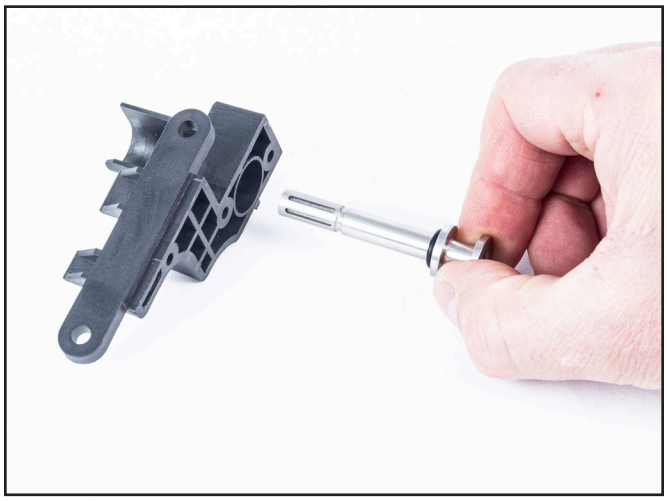
- Christo-Lube® or Equivalent Oxygen Compatible Lubricant

The Steady Flow Supply Tube is secured into the Sidelock Mount Frame by an O-ring. Two O-rings in total are found on the supply tube. Make sure the muffler screen has been re-installed before assembling.

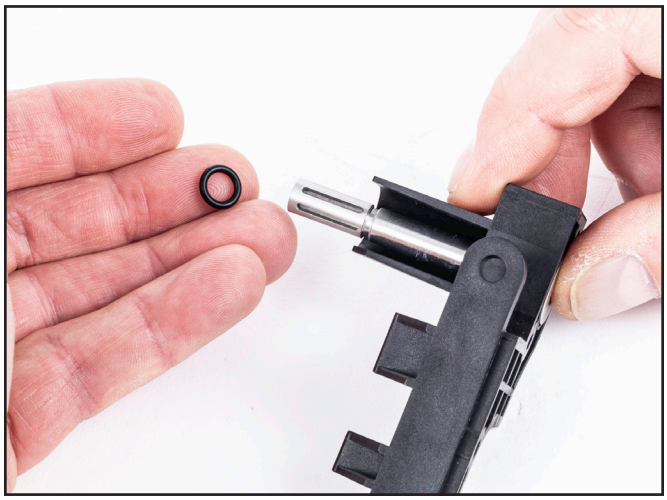
1. Slide O-ring onto supply tube The larger of the two going on first.

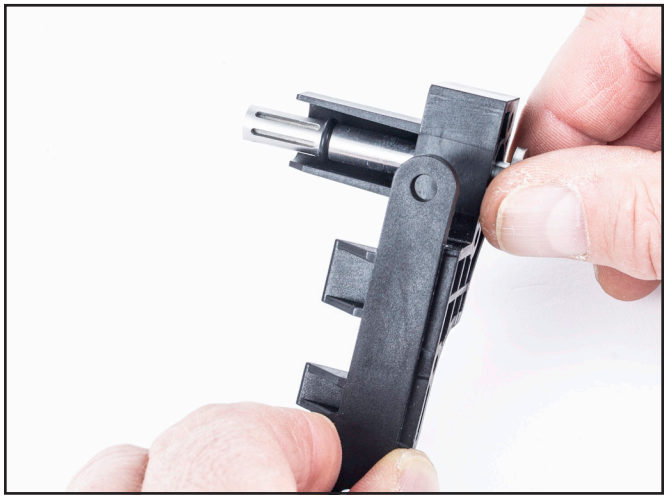


2. Insert tube into Side Block Mount Frame.



3. Carefully slide O-ring onto supply tube.





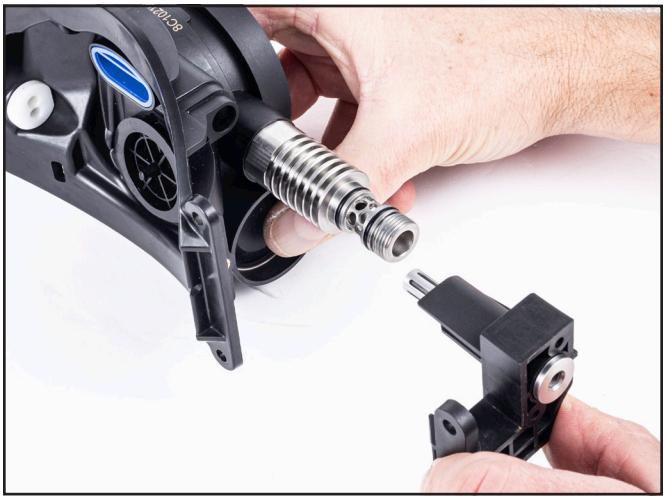
1.6.7 Side Block Mount Frame

Tools Required:

- None

The Mount Frame is secured and held in place to the Pod by the Side Block.

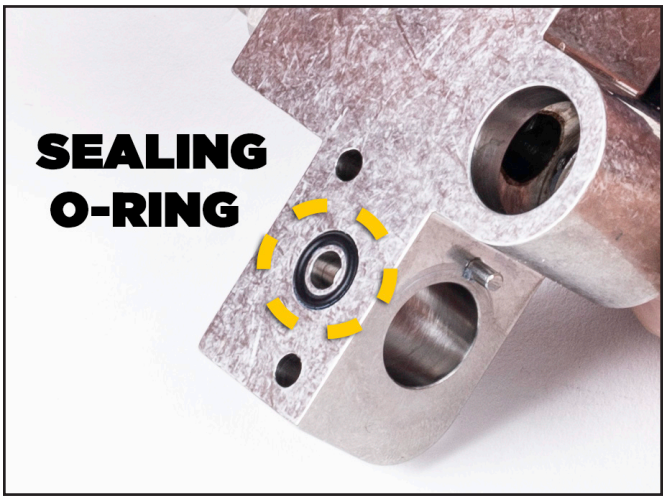
1. Slide Side Block Mount Frame onto Pod.



1.6.8 Side Block

It is recommended to build the Side Block Assembly completely before securing it to the Pod. Direct extra attention to the single sealing O-ring found on the inside face of the Side Block. This O-ring should be installed just prior to installing the Side Block to the Pod. This O-ring will seal to the face/end of the supply tube.

Before installing both control knobs, apply lubricant to the machined surfaces that will contact the O-rings on the stems.



1.6.8.1 Hose Adapters

Tools Required:

- Torque Wrench
- Open End Attachments: ¾″
- Dow Corning® Molykote® 111 O-ring Silicone Lubricant or Equivalent

1. Lightly lubricate O-rings and install them onto Hose Adapters; lightly lubricate the threads on both adapters.

2. Use ¾″ torque wrench to tighten Hose Adapters. Always reference the Torque Specs starting on page TORQ-1 of the modular manual.

1.6.8.2 Emergency Control Knob and Stem

The EGS Control Knob and Stem can be installed as a complete assembly without removing the control knob.

Tools Required:

- Dow Corning® Molykote® 111 O-ring Silicone Lubricant or Equivalent
- Flat Blade Screwdriver

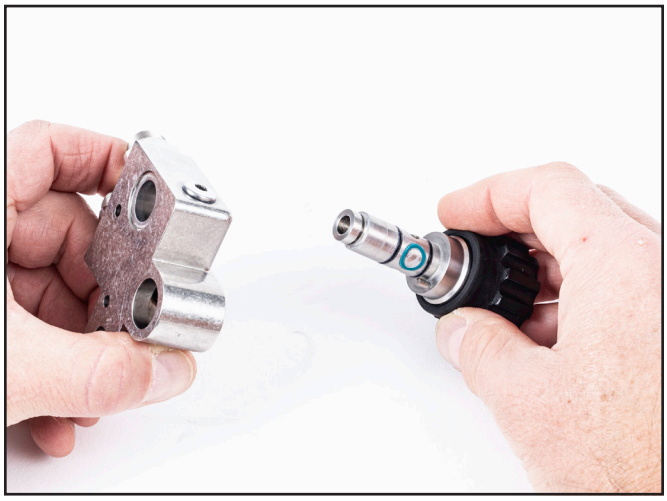
1. Lightly lubricate two black O-rings and install onto EGS Control Stem.

2. Lightly lubricate the two green O-rings and install onto stem.

NOTE

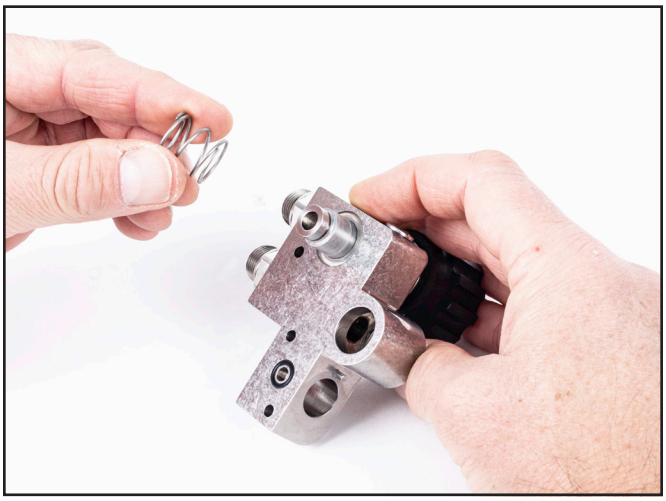
These two O-rings look identical to the two O-rings on the EGS stem. These are a softer material. Do NOT swap the O-rings from each stem assembly.

3. Insert stem into Side Block Body.

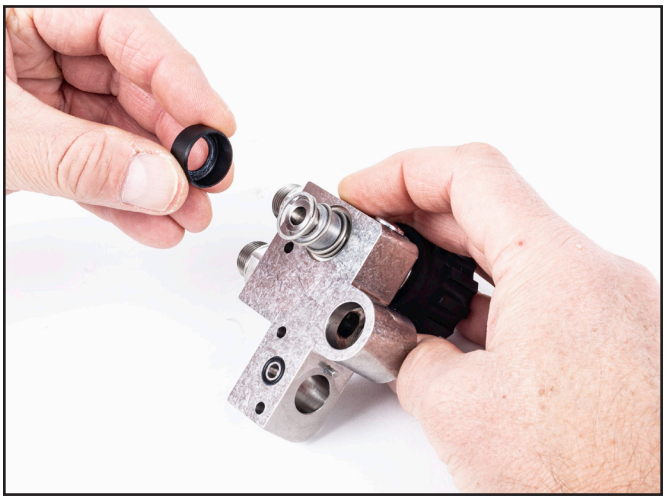


The EGS stem is spring loaded therefore pressure must be applied to knob side of the stem when assembling.

4. Place Spring onto backside of stem.



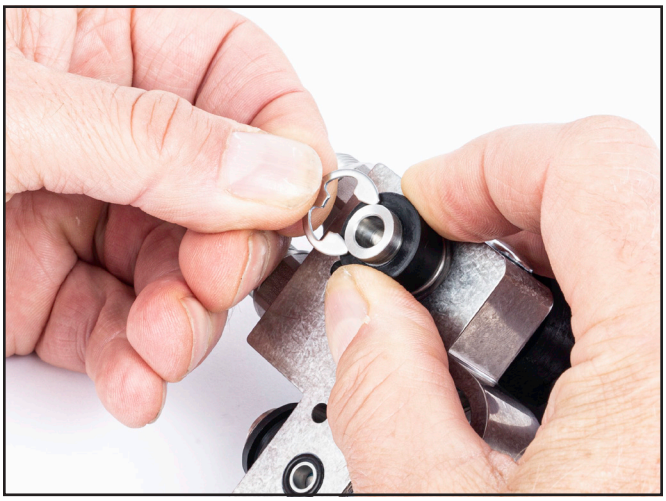
5. With pressure applied to the knob side of the stem place the open ended side of the Spring Cup onto stem to capture the spring.



6. Install Spring Clip into open grove on EGS Control Stem. Make sure the spring clip is properly captured and seated in the groove.

NOTE

When installing the Spring Clip resistance must be felt. If no resistance is felt when installing clip the open end of the clip MUST be loose. This can be done using pliers or similar tool.



7. If Knob not installed, install Knob, Spring and Lock Nut using a flathead screwdriver. Screw Lock Nut down until flush with Knob.

1.6.8.3 Steady Flow Assembly

The Steady Flow Assembly can be installed as a complete assembly without removing the control knob.

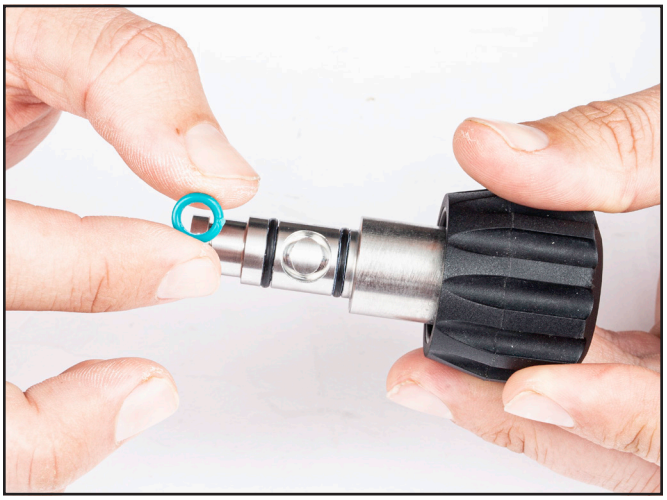
Complete service of the assembly can be accomplished with or without the Side Block secured to the Pod.

Tools Required:

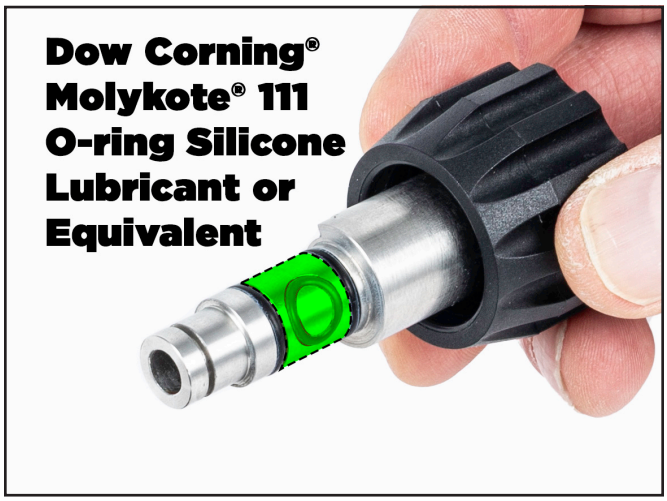
- Dow Corning® Molykote® 111 O-ring Silicone Lubricant or Equivalent
- Flat Blade Screwdriver

1. Lightly lubricate the two black O-rings and install onto stem.

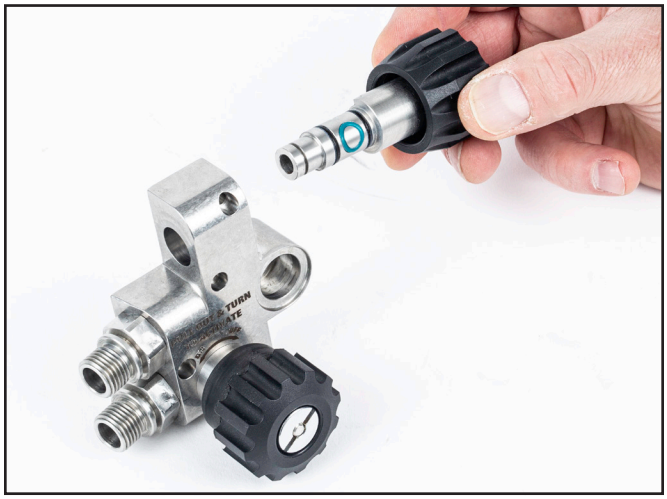
2. Lightly lubricate the single green O-ring and install onto stem.



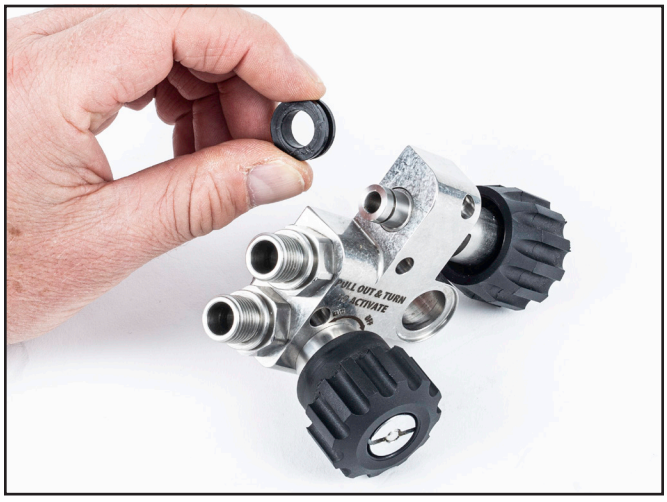
3. Apply layer of lubricant onto the stem, found between the two outer O-rings.



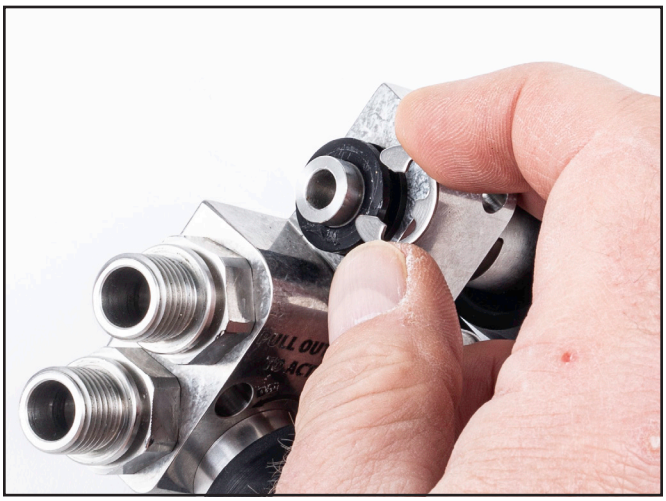
4. Insert Stem into Side Block.



5. Install Spacer Washer onto Stem.



6. Install Spring Clip into groove found behind Spacer Washer. Make sure the spring clip is properly captured and seated in the groove.



7. If Knob not installed, install Knob, Spring and Lock Nut using a flathead screwdriver. Screw Lock Nut down until flush with Knob.

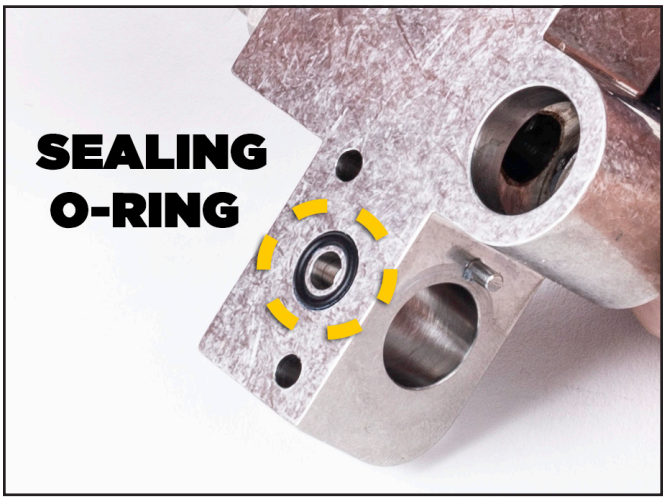
1.6.8.4 Side Block Body

It is critical that the sealing O-ring found on the inside of the Side Block be installed before connecting the Side Block to the Pod.

Tools Required:

- Torque Wrench
- Hex Attachment:
  7⁄64″
- Open End Attachments:
  3⁄4″
- Open Ended Wrench (back up wrench):
  7⁄8″

1. Install sealing O-ring into the groove found on the inside surface of the Side Block.



2. Verify that the Side Block Mount Frame and Steady Flow Supply Tube are in place and bring Side Block to Pod.

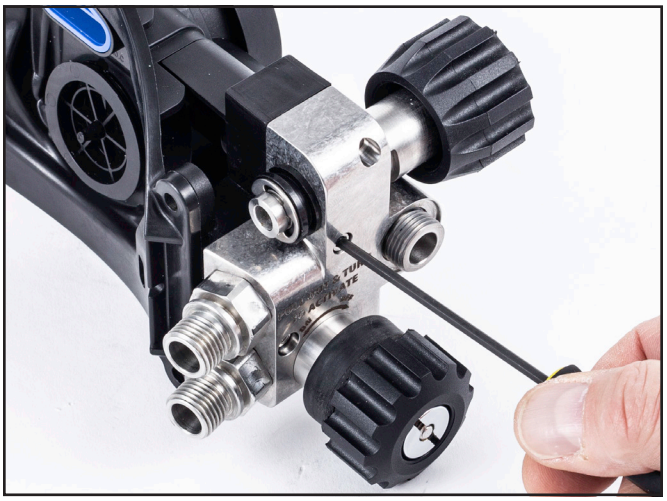
NOTE

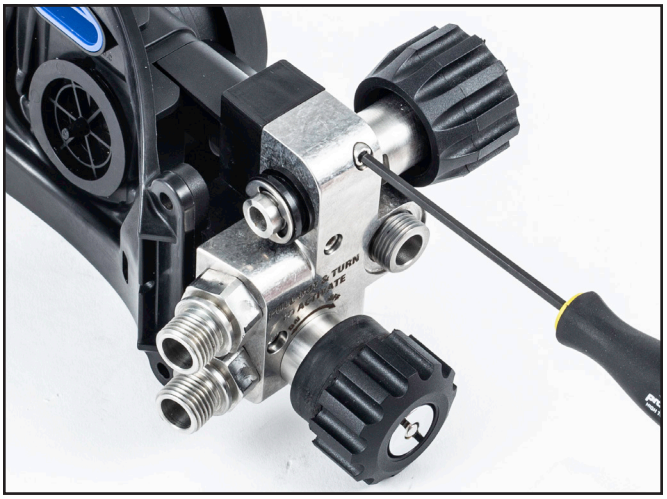
Attention to the O-rings on the Banjo Tube when installing the Side Block to the Pod is very important. Care should be made to position the Side Block in a straight on line into the side block to avoid possible damage to the O-rings on the Banjo Tube

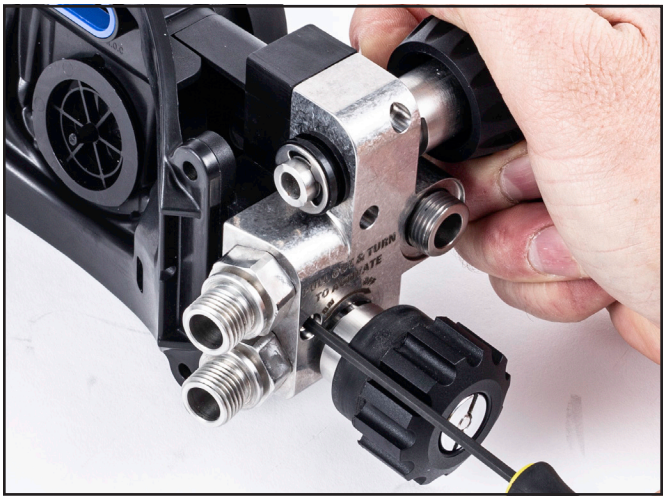
3. Insert the three screws with Lock Washers into Side Block and tighten in an alternating pattern until screws are snug.

NOTE

Start with two shorter screws and insert long screw last.







NOTE

When installing, tightening and torquing the longer bottom screw and washer on the side block it is helpful to place the EGS knob half way between open and closed position for greatest contact.

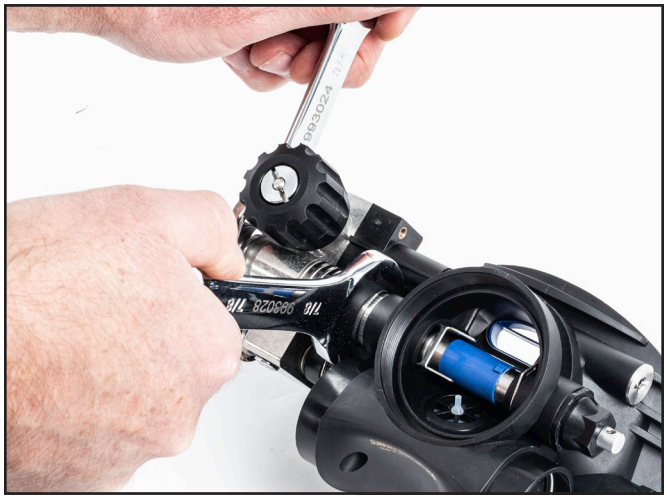
4. Torque all three screws with washers to specified torque.

5. Lubricate O-ring found on Cap and screw onto Banjo Tube.

6. Use ⅞" open ended wrench as a back-up on the Banjo Tube where it meets the Pod housing and torque the end cap using the ¾" open end wrench attachment to specified torque.

NOTE

Failure to use a ⅞" back up wrench may allow excessive torque to be applied to the regulator portion of the housing and cause damage .



Refer to "1.3.1 Test for Correct Adjustment—Purge Test" on page 4

1.6.9 Diaphragm and Associated Parts

Tools Required:

- None

1. Install the diaphragm, diaphragm washers (×2) and diaphragm retainer ring into regulator Pod.

2. Tighten the ring with the palm of the hand until this ring and the regulator housing top surface make contact. There should be no gap between these parts.

1.6.10 Oral Cup

Tools Required:

- None

The Oral Cup is secured into the Pod by a press and snap/capture fit. The leading edge around the Exhaust Valve and protrusions, found on each side of the inhalation hole are the key locations where the press fit is most important.

1. Place the Oral Cup into the Pod and press cup into an aligned position.

2. Get the circular lip on the oral cup started into the mating groove of the exhaust, and gradually work around the parts to insert the lip in place. The areas outside that have been inserted should be pressed in place as you go around. This will ensure the assembly stays mated and make the balance of the installation go easier.

3. Use your hand to ensure all protruding features of the cup are seating complete into the receiving channels of the Pod.

1.6.11 Microphone

1.6.11.1 Folding Microphone Shroud

Tools Required:

- None

The microphone element is captured by a shroud that is designed to refine the diver's voice transmission. There is a frontside and backside and the Microphone Wire Jumper Assembly can be secured to the microphone when it is captured by the shroud. It does not have to be removed to connect the wires to the microphone element.

1. Insert the neck of the element into the square opening found on the larger portion of the fold.

NOTE

BE SURE to orientate the element so the solid face of the microphone goes into the shroud and the open side, showing the white membrane is facing to open side of the shroud.

2. Close the lid of the shroud.

NOTE

The white microphone membrane should face the lid with the wings on the shroud.

1.6.11.2 Microphone Wire Jumper Assembly

Tools Required:

- T6 Torx Driver

1. Use T6 Torx driver to screw (clockwise) the two screws holding the wire jumper to the microphone.

NOTE

When screws are tight the alignment of the wires should be parallel with a little gap between the wires. This will allow proper fit into the Oral Cup.

1.6.11.3 Microphone into the Oral Cup & Connector Body

Tools Required:

- Needle Nose Pliers

NOTE

Make sure the solid side of the microphone element is facing the diver's mouth.
Make sure the microphone with shroud is positioned with the two small wings on the shroud, ready to push through the larger hole on the side of the oral cup. This will ensure the correct side of the microphone is facing the diver.

1. Thread the pins with wires through the two small holes on the Oral Cup.

2. Fit the microphone with shroud into the receiving hole until the wings on the shroud pass through the oral cup large hole that holds the microphone in place. Straighten the wires and pull out all the slack so microphone element is firmly secured into the microphone hole.

3. Fold in the corner of the Oral Cup and insert the pins into the Connector Body using the needle nose pliers.

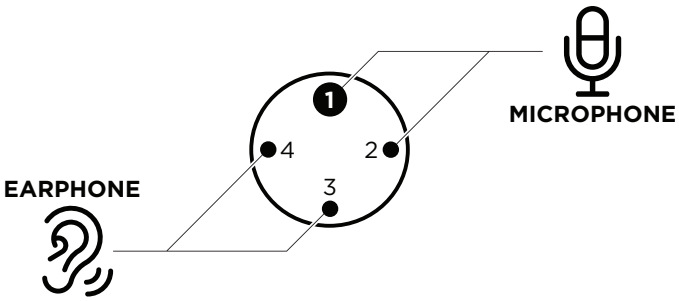
NOTE

The pins can be inserted to either hole of the connector body, as there is no polarity.

4. Perform a communication check.

1.6.11.4 Communication Junction Module Assembly

Your Surface Supplied MOD-1 has been wired for a 4-wire (Round Robin) type communication system. A 4-pin waterproof connector is used and is wired as shown. The view shown looks at the connector's pins, and pin 1 is the larger one. This 4-pin configuration is the factory KMDSI configuration and is the same used in all KMDSI helmets and BandMasks.

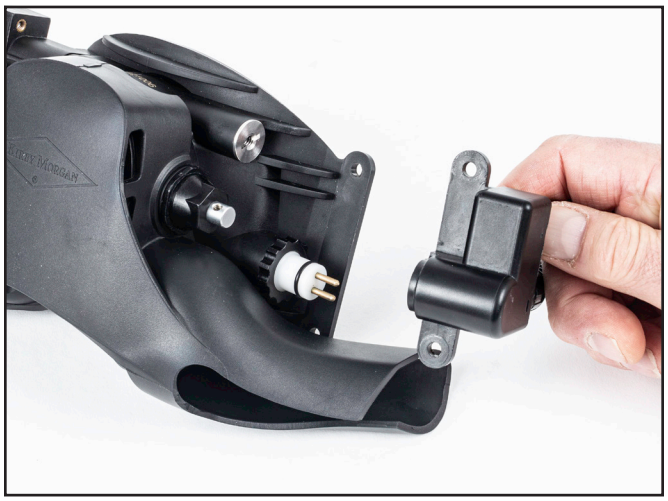


Tools Required:

- None

The Communications Junction Module Assembly is held in place by the weight with guard.

1. To install the module, line up the module to the two receiving pins on the connector body and push.



Ensure O-ring on Connector Body is not pinched by the module and extruding.

1.6.12 Weight

The weight can only be installed IF the Regulator Adjustment Knob has been removed.

Tools Required:

- Torque Screwdriver
- Torque Screwdriver Attachment: 5/32"

1. Install the weight onto the Pod.

2. Insert the screw and tighten it only enough to retain the weight but still allow slight movement of the weight.

1.6.13 Regulator Exhaust Cover and Regulator Adjustment Knob

The Regulator Exhaust Cover should be installed with the Regulator Adjustment knob removed.

Suggested Tools:

- Christo-Lube® or Equivalent Oxygen Compatible Lubricant
- Large Flat Blade Screwdriver
- Ball End Hex Driver: 7/64"

The order of installation should start at the top of the cover.

1. Lightly lubricate two bottom receiving holes on the Pod and corresponding tabs found on the bottom of the Regulator Exhaust Cover.

2. Fit the top of the cover into the indented portion at the top of the regulator Pod.

3. Gently pull both whiskers around and over the port and starboard exhaust valve openings while keeping the indented portion of the whisker and the mating tab aligned.

NOTE

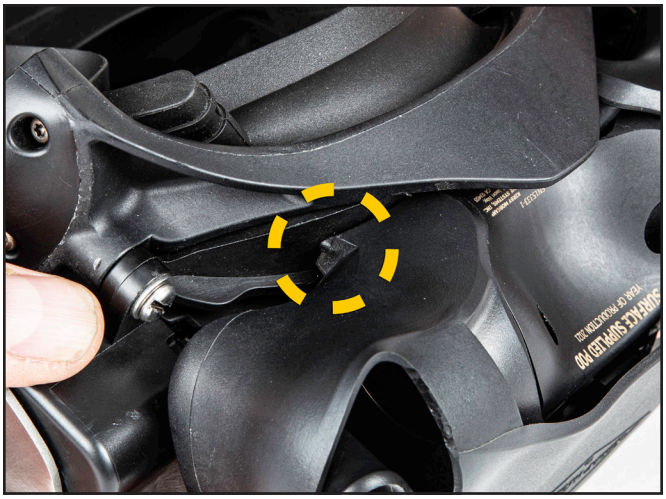
Ensure top portion of Regulator Exhaust Cover is still in the correct position.

4. Push exhaust cover flush around adjustment knob and Banjo Tube.

NOTE

Cover must not touch adjustment for proper operation.

5. Secure two bottom tabs of exhaust cover into receiving holes of the Pod.



NOTE

A flat blade screwdriver can be used to ensure complete insertion of the tabs.

6. Insert the two knobs on exhaust cover into corresponding holes on Chamber Cover.

7. Secure the Regulator Adjustment Knob.

1.6.14 Assist Spring

The Assist Spring assists in stabilizing the regulator in all working depths and in all ventilation rates.

Tools Required:

- Tongue Depressor or Other Non-Sharp Tool, If Needed.

Once the Regulator Exhaust Cover is installed onto the Pod the Assist Spring can simply be inserted into the open slot located on the bottom of the exhaust cover. The plastic tubing that covers one end of the Assist Spring should touch the diaphragm and the unprotected side of the spring will touch the exhaust cover.

1. Gently collapse the Assist Spring with the tubing side of the spring facing down.

2. Insert collapsed spring into the open slot on exhaust cover.

NOTE

Thrust the Assist Spring completely into the open slot to clear all of the Diaphragm Retainer Ring's upraised edges for proper fit onto the Diaphragm.

1.6.15 Mounting the Surface Supplied Pod to the Mask

NOTE

The microphone can be secured into the Oral Cup and plugged into the connector body with the Oral Cup properly secured to the Regulator POD Housing.

Tools Required:

- 5⁄32 Inch Ball End Hex Driver
- 3⁄8 Inch Open Ended Wrench
- Large Flathead Screwdriver
- Needle Nose Pliers

There are four fasteners that secure the Surface Supplied Pod to the mask.

1. Ensure Oral Cup is secured properly and the Pod Gasket is in the correct orientation and the side tabs are engaged onto the Pod Housing Sub Assembly.

Oral Cup removed for clarity.

NOTE

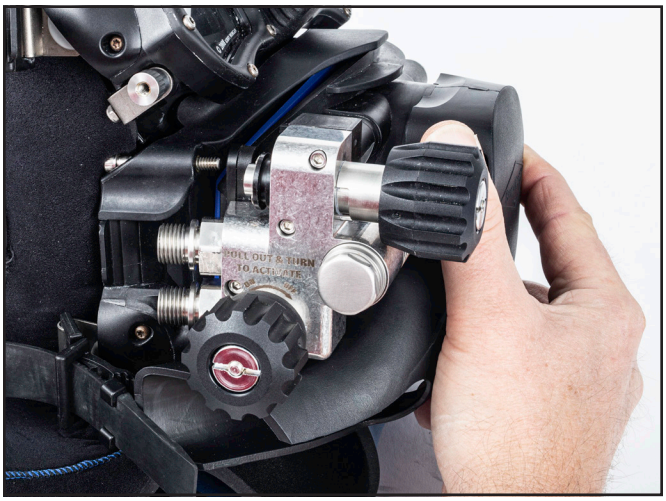
Pod Gasket must not interfere with microphone clearance and fit into the Oral Cup.

2. Starting from the back of the mask jaw frame, thread the longest mounting fastener into the upper right (starboard side of the mask) threaded insert. Thread the bolt far enough in until it is protruding past the front side of the threaded insert on the Jaw Frame, approximately 3⁄8".

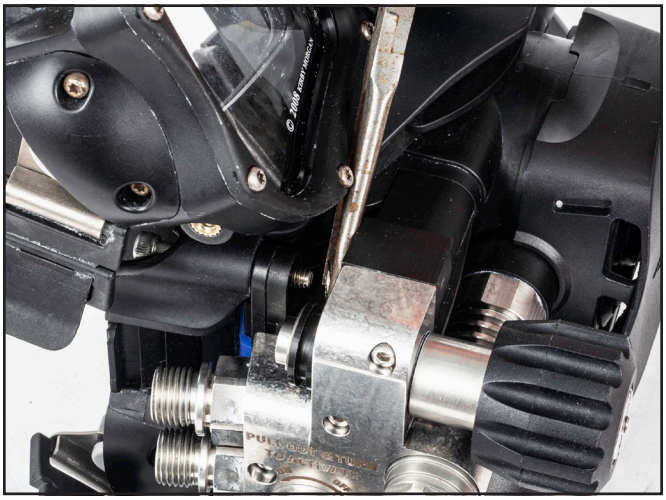
NOTE

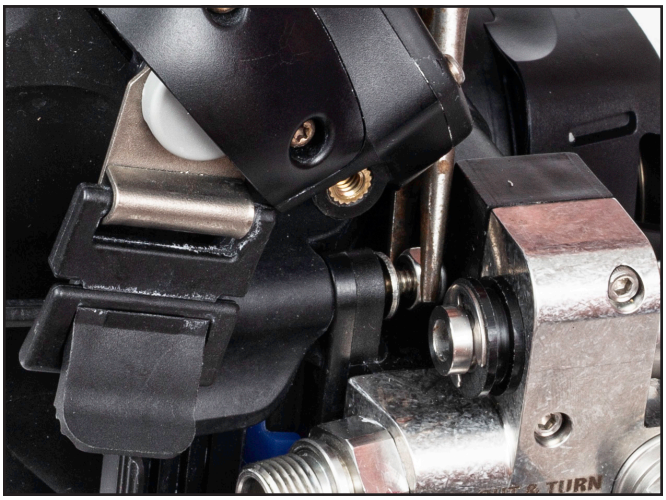
It can be helpful to pre-install the fasteners shown in steps 6 and 7. This can pre-align the communication module to the pod and make installation of these fasteners simpler.

3. Bring the Pod to the mask. Use the protruding screw as a guide pin to align the Pod to the mask.



4. Insert the flat side of the washer onto the bolt with the washer in place. If necessary, adjust the long fastener with the 3⁄32" driver until one to two threads are shown through the washer.





NOTE

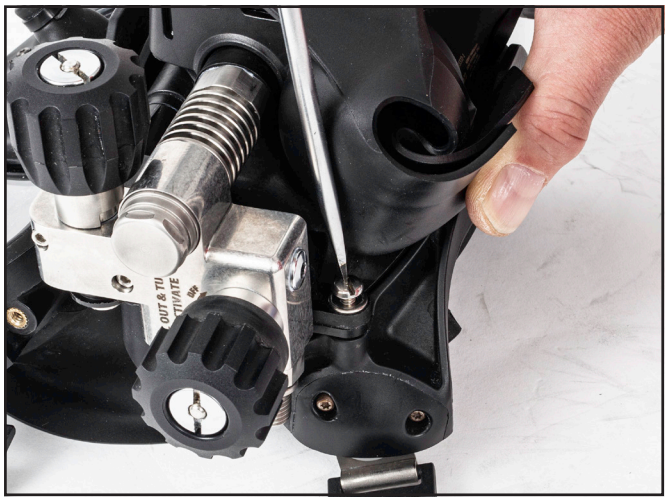
If too many threads are showing, it will make it very difficult to install and tighten the nylon locking hex nut. You should have just enough threads to allow starting the nut by hand.

HELPFUL HINT

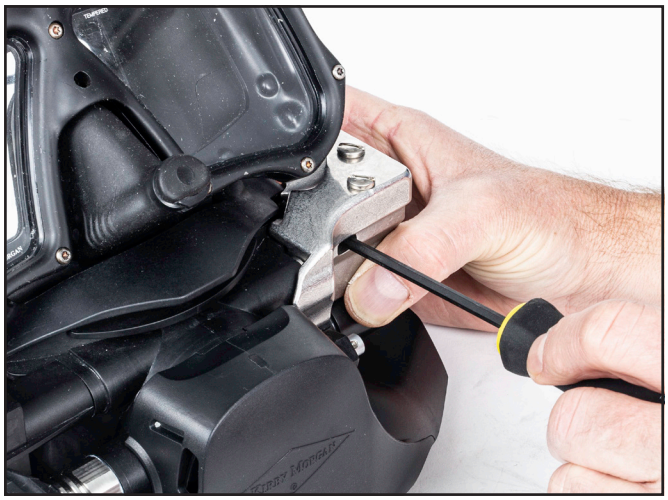
Due to the flexibility of the mask skirt, Simply folding the lens assembly rearward may offer additional clearance when installing this washer and nut.

5. Once the threads have engaged, use the 3⁄8"open end wrench on the nut while turning the hex driver enough to expose one or two threads coming through the nylon in the nut. If the threads don't come through the nylon enough, remove the 3/8" wrench and turn the hex drive counter clockwise about one turn. Replace the 3/8" wrench and continue turning the hex driver clockwise to get correct exposure through the nylon. Repeat this if needed.

6. Insert two bottom flathead screws with washers and engage into threaded inserts. Do not tighten down fully. It is usually necessary to fold back the exhaust shroud to gain enough access to the bottom screws.



7. Insert the bolt and engage threads. Do not tighten down fully.



NOTE

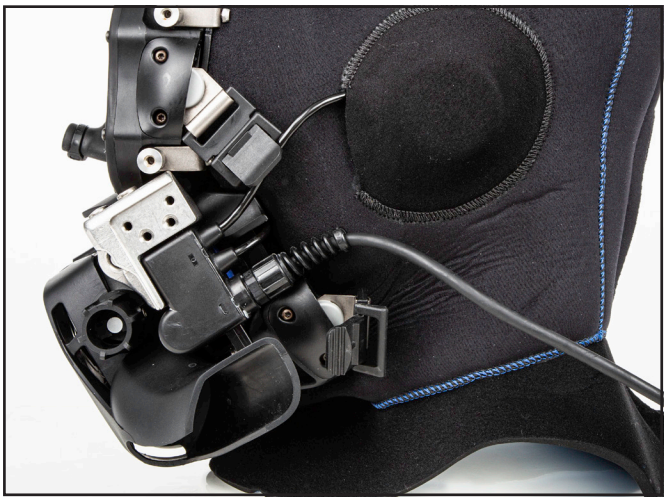
This action will pull this corner of Pod back into the mask's mating surface.

8. Completely tighten down the four corner fasteners until they are bottomed out **in a progressive alternating pattern as to allow the Pod to move on an even plane towards the mask.**

9. Rotate the 5⁄32″ driver in a counter clockwise direction until resistance is felt.

NOTE

The longer (right) earphone cable is routed to the other side of the mask between the lens body and jaw frame. This cable has the lowermost position coming out of the junction box and should be routed to the ear pocket first.



Guard Plate removed for clarity.

10. Push the base of the longer (right) earphone cable under the leading edge of the mask jaw frame.

11. Gently tilt the lens body away from the jaw frame and route the earphone cable across the mask and into ear pocket on the hood.

12. Insert short (left) earphone cable into ear pocket on hood. Gray side of earphone faces diver's ear.

1.6.16 Leak Test

A primarily leak test should be performed to ensure proper sealing between the pod and mask. This test is to be performed without a gas supply connected.

The hood and mask strap SHOULD not be installed.

1. Ensure any of the gas inlet port fittings are sealed before testing. Place the mask to the face and inhale.

If the mask does not build up reverse pressure and gas is entering into the system the pod may not installed correctly on the mask. Also make certain the gas inlet ports are sealed. Loosening the fasteners or removing the pod to readjust the pod gasket may be required. Perform a leak test after any adjustments.