



**DEEP SIX SIGNATURE
REGULATOR
TECHNICIAN SERVICE MANUAL**

DEDICATION

THIS MANUAL IS DEDICATED TO THOSE WHO CHOOSE TO GO THE EXTRA DISTANCE AND TAKE RESPONSIBILITY FOR THEMSELVES.

SERVICING YOUR OWN GEAR IS NOT ROCKET SCIENCE. IT DOES TAKE PATIENCE, ATTENTION TO DETAIL, A BIT OF TRAINING, AND THE RIGHT TOOLS.

FOR THOSE EXPLORERS WHO CHOOSE TO TAKE THIS PATH, DEEP SIX SALUTES AND THANKS YOU FOR YOUR SUPPORT AND LOYALTY.

DEEP SIX EXPEDITION DIVE GEAR IS PROUD TO PROVIDE YOU WITH THE TOOLS YOU NEED TO EXPLORE THE WORLD MOST NEVER SEE.

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OVERVIEW

The Deep Six Signature Regulator series consists of high performance components designed and manufactured to the exacting quality standards. They are suitable for use on the most demanding technical dives, as well as any dive within recognized recreational limits. From simple reef and quarry/lake dives to expedition level cave and wreck dives, these components will deliver superior performance and reliability.

The first stage, that reduces the pressure of the SCUBA cylinder, supplies intermediate pressure through five ports. Four surrounding the perimeter of the turret, at strategically placed angles for optimum hose routing, and one in the end of the turret. Whether diving a single cylinder, back mounted doubles, or sidemount, the first stage will allow the diver to make the most efficient use of these ports when selecting hose lengths for their particular needs.

Two high pressure (HP) ports on either side of the regulator body are placed at 90 degrees to the body to allow for better routing of the SPG's in either back mount or sidemount configurations.

The first stage is a balanced diaphragm style first stage. A balanced diaphragm system maintains a constant volume of air to the second stages as cylinder pressure decreases and as depth increases. When properly tuned and functioning a balanced diaphragm first stage will have the same ease of breathing throughout the dive regardless of cylinder pressure and depth. The Deep Six Signature Series excels in this.

The second stages are also balanced and adjustable for breathing effort. They make use of a breathing adjustment knob to allow the user to adjust breathing resistance. This allows the user to set the resistance level (cracking pressure) where the second stage starts to deliver air.

The second stages have venturi levers for reducing the risk of free flows in the event the stage is dropped. In the forward "pre-dive" position, the lever directs a supply of air to the inside face of the main second stage diaphragm. This has the effect of pushing the diaphragm out and allowing the lever to return to its normally closed position. In the rearward "dive" position the air supply is allowed to travel to the mouthpiece opening unrestricted.

The second stage makes use of a newly designed "turbo poppet" that provides a venturi effect in the air barrel for more efficient air flow and easier breathing.

In the following pages will be found, the disassembly, assembly, tuning, and troubleshooting steps for these components. Photos are used throughout to illustrate the procedures.

Please pay special attention to all critical points!

Whenever an item of extra importance needs to be observed a “Critical Point:” will appear followed by the necessary information. See below.

Critical Point: It is important that this be read and followed!

Included in this manual is a list of recommended/required tools for each disassembly, assembly, and testing section for all components. They are identified in each section where they are used. The schematics, with part numbers, are located in the rear of this manual along with a general troubleshooting guide and at the end of each section is a blank page for notes. Throughout the text, parts are referenced using the item number on the schematic in order to facilitate easy location of each individual part.

The schematics for the DIN and Yoke first stages use different ITEM numbers to identify the same part. In the text the DIN version will use a “D” in front of the item number to distinguish it from the Yoke version. A “Y” will be used to identify the Yoke drawing item number. Example (ITEM D10/Y12).

1. TOOL LIST

1. Adjustable Torque Wrench 3/8 drive 0-300 inch pounds range
2. In-line second stage adjustment tool – ScubaTools recommended or 5mm hex wrench
3. Soft Jawed Vise
4. 1st Stage Handle for HP and LP ports
5. 3/4 inch 3/8th drive socket for Yoke assembly *use with item 7
6. 13/16 inch 3/8th drive socket
7. ScubaTools 3/8th drive 3 inch extension –
SKU: 20- 156-500
8. 6mm 3/8-inch drive Hex Head male socket
9. 5mm hex head wrench
10. 4mm 3/8 drive hex socket
11. 2 Adjustable Wrenches
12. Brass Picks for removing O-rings
13. Intermediate Pressure Gauge
14. Magnahelic Gauge: 0 – 3 inches of water range or better
15. Christolube MCG 111 or Tribolube 71
16. 1.625-inch Pin spanner with .140 pin #6 ScubaTools (2 recommended)
17. 1.5-inch Pin Spanner with .140 pin #5 ScubaTools
18. 5 inch x 5-inch soft rubber pad
19. Soft Bristle Cleaning Brushes (Nylon)
20. Wooden or plastic dowels 1/8 – 3/16 diameter

2. GENERAL SERVICE CONCERNS

Before you commence the servicing of your Deep Six Signature Regulators, gather all the required tools, lubricant, service kits and clean the area.



Ensure the service area is free of all distractions that may cause you to lose track of where you are in the service procedure. Address any environmental concerns that may cause problems during the servicing of your regulators. Examples of these would be family pets, children, airborne dust and dirt, and unexploded goats.

Ensure that all required servicing/testing air supplies are available and at the proper test pressures, if not using a regulated supply from a single source. This would include the use of cylinders of compressed breathing air from a Grade E or better air supply.

The Deep Six Signature Regulators are designed to be used with Air or Enriched Air Nitrox with oxygen concentrations up to 100% at 2400 PSI and 80% at 3400 PSI. As such, only Grade E or better breathing air should be used for testing and servicing of the regulators.

In order to restore your Deep Six regulators to factory condition (O2 clean), oxygen cleaning and assembly procedures will be discussed in the cleaning and assembly chapters. This includes the cleaning solutions and appropriate personal preparations that are necessary.

Critical Point:

Never use air from a non-breathing air source!

Once the area has been made suitable for service and all required materials are present, servicing of the unit may begin.

Cleaning of the disassembled components should be done using clean fresh water, a degreaser that leaves no organic residue (clear Simple Green, dye free Dawn dishwashing liquid, or Blue Gold Cleaner are suggested), and a method to remove any corrosion.

This may include the use of an Ultrasonic Cleaner with a mix of 50/50 white vinegar to water or other suitable solution. An ultrasonic cleaner with a built-in heater is recommended.

It is also recommended to use lint free cloths for drying excess water on the parts and final drying using compressed air. For regulators that are going to be used with Oxygen percentages above 40%, a UV light to detect the presence of organic contamination is strongly suggested. Use of this light will be covered in the first stage assembly chapter.

Critical Point:

Drying with low pressure compressed air should always be done while holding parts securely to avoid loss of parts being dried and to avoid pressure related injuries.

NEVER USE HIGH PRESSURE TO DRY PARTS!

A note about using compressed air. In the USA, blowguns used in commercial applications (dive shop test bench for example) are regulated by the Occupational Health and Safety Administration (OSHA). Blowguns supplying more than 30 PSI at the outlet must be restricted to that level or have an outlet blockage device that allows excess pressure to vent safely. Usually accomplished by holes drilled near the tip that will direct the flow away from the blocked orifice. This is to prevent embolisms through the skin.

Once all components have been serviced and reassembled, in water testing in a controlled environment, such as a swimming pool, is highly recommended. This ensures that the unit is functioning properly. In water testing also helps to detect leaks and overall function of the system as a complete unit. Testing in a controlled environment is when you want to discover any service issues that may crop up.

Deep Six does not recommend testing your regulator service prowess on a big dive! While following this manual, using only genuine Deep Six Service Kits, and paying close

attention to detail should ensure success in servicing your regulator, what you are doing is replacing soft parts.

Those parts are tested to the highest quality standards, but failures are not unknown. Use common sense and be sure of your gear before taking it on any pinnacle or expedition level dives! Even if those expeditions are to your local quarry or shallow reef!

Following bench and water testing the unit should be re-evaluated as noted in Chapter 3 to determine that all pressures are stable and all connections secure to ensure your safety and enjoyment.

SCUBA diving is an extreme activity conducted in an alien environment. Don't take it lightly. Maintain your gear and yourself to the highest standards to ensure your safety.

3. Preliminary Testing

Preliminary testing of the Deep Six Signature Regulator components is necessary to identify any issues with the components and verify overall regulator function. The preliminary testing will include:

1. Overall Visual Inspection
2. Detailed Inspection of Hoses
3. Detailed Visual Inspection of Instrumentation
4. Checking of Intermediate Pressure
5. Checking of Cracking Pressure and Negative Pressure Test
6. Integrity of 1st Stage Body and Main Diaphragm Retainer
7. Second Stage Case Integrity

Overall Visual Inspection – This inspection is done to identify any issues that may affect the servicing of the unit. It is also done to ensure that pressurizing the system will pose no risk to the person servicing the regulator.

The service technician will check all connections to make sure the second stages are secure on the hoses.

The service technician will check that the hoses are secured on the first stage with no extruded O-rings.

The service technician will ensure that there are no cracks in the SPG face.

The service technician will ensure that the yoke or DIN assembly is secure and that the yoke knob is not damaged. DIN regulators require the servicing technician to inspect the captured DIN O-ring

They will also inspect the filter for signs of discoloration indicating water intrusion or use of contaminated air.

Detailed Inspection of Hoses – This inspection is done to ensure that it is safe to pressurize the system without risk of hose rupture.

The technician will check all hoses from end to end looking for evidence of bulging, splitting of the rubber outer casing, and dry rot indicated by cracking, stiffness, and flaking of the casing.

The technician will check all metal to rubber connections looking for evidence of separation, cracking, corrosion, or other defects. Any defects that are detected must be addressed before pressurizing the system to avoid injury to the service technician. The surest way to address this is to replace any questionable hoses.

Critical Point:

Any defects in a hose requires replacement of the hose before pressurizing the system! Failure to do so may result in serious injury or death!

Once the hoses have been inspected and determined to be intact, the inspection process may continue.

Detailed Visual Inspection of the SPG and connection – The technician will check the SPG for any signs of cracking of the face, water intrusion, and corrosion around the SPG to hose connection.



If using the Deep Six two gauge or three gauge console, it is necessary to remove the SPG from the boot.

Soaking the console in warm water may aid in removing the compass. It will also aid in pushing the SPG out of the console to check the high-pressure spool between the SPG and hose.



The high-pressure spool should be removed from the connection and the O-rings inspected. Ideally they should be replaced or, if there is any sign of excess wear or corrosion, the spool and O-rings should be replaced as a unit. Replacing the spool is the usual course of action taken since it ensures that the entire assembly is new and safe.

Critical Point:

The high-pressure spool and O-rings are a dynamic connection and require liberal application of lubrication to ensure proper operation and service life!

Following inspection of the SPG the depth gauge should be inspected for signs of cracks in the face, smooth operation of the maximum depth indicator, and that it is functioning properly. This can be done using a pressure vessel or by submerging the gauge in water deep enough to register a change.

At this time, it is also advisable to clean and dry the console boot.

Checking of Intermediate Pressure (IP) – The Intermediate Pressure (IP) of the system should be checked only after the preceding checks have been done to ensure technician safety.

Checking of intermediate pressure involves attaching an intermediate pressure gauge to the LP pressure inflator hose. The system is then pressurized by introducing high pressure air to the system through the 1st stage yoke or DIN connection while partially depressing the purge button on one of the second stages. This is done in the event that the IP is too high. Depressing the purge button slightly on the second stage is done to prevent further damage to the system.

Once the system has been pressurized the purge is released and the IP checked.

Normal operating range for the system is with an IP of 125-145 PSI. Ideally the system is operating at 135 PSI +/- 5 PSI. It should show no signs of “creep” or instability. Even though the unit will operate at the lower and higher ends of the acceptable range it should always be set for the optimal setting of 135 PSI with a 3000 PSI supply.

Critical Point:

“Creep” is demonstrated as the IP steadily increasing while the regulator is not in use. It is normal for the IP to drop 5-10 PSI during a breath or purge and then return to its operational setting. It is not normal for it to return to the setting and then continue to increase. This is usually a sign of a problem with the high-pressure seat.

If the system shows no sign of creep or IP instability it is generally not necessary to rebuild the 1st stage with some exceptions.

Critical Point:

If the IP is stable but the unit shows signs of internal corrosion or the filter shows evidence of contamination the unit must be rebuilt!

Other indications that the regulator may require rebuilding are small bubbles leaking from between the diaphragm retainer and main regulator body. Any sign of severe deformation of the environmental seal may also indicate a problem requiring service. Knowledge that the first stage has been flooded will also serve as notice that the unit must be rebuilt. Even fresh water contains dissolved minerals and other materials that, over time, may cause the regulator to malfunction due to internal corrosion.

Once the IP has been checked and the additional items noted in the inspection of the first stage, the second stage operation may be checked.

Checking of Cracking Pressure and Negative Pressure Test - The cracking pressure of both second stages is most accurately done with the use of a magnahelic gauge. It can also be done using a container of water and measuring the depth to which a stage can be submerged face down parallel to the water. This gives the technician an indication of the level of breathing effort at which the second stage will start to deliver air.

Normal operational range for the adjustable second stage is 1.0 to 2.2 inches of water. Less cracking pressure on the lower end may be desired by the diver to reduce breathing effort. However, factory initial settings should be set at the 1.1 value to allow for break-in of the second stage low pressure seat. Over several dives it will not be uncommon to see this initial setting drop to 1.0 or even .9 on the magnahelic. The same observation is likely to be made on a newly serviced regulator.

The negative pressure test is used to check the integrity of the main and exhaust diaphragms. This is done by turning the supply pressure off, purging the system, and attempting to take a normal breath from each second stage. The technician should be unable to draw any air through the second stages. If they are able to get a flow of air through them, the second stages should be removed from their hoses and the test repeated with a thumb over the hose opening to ensure the issue is with the second stage.

If they are able to draw air through the stage, the main and exhaust diaphragms need to be carefully inspected for damage or deterioration. Debris, salt build up, sand, grit, and cracks in the case will also allow air to be drawn through the second stage when the hose opening is covered. Carefully check all of these.

Integrity of First Stage Main Housing and Main Diaphragm Retainer – The first stage body (ITEM D10/Y8) and main diaphragm clamp (ITEM D33/Y31) should be checked for obvious signs of damage. They should also be inspected for signs of corrosion between them.

The main diaphragm clamp also houses the 6mm adjustment bolt (ITEM D32/Y30) for setting the intermediate pressure. This area and the interior of the ambient chamber between the main housing and main diaphragm clamp should be inspected for signs of corrosion or damage. This is accomplished by removing the environmental cap (ITEM D36/Y34) and silicone disc (ITEM D35/Y33), then removing the transpiston (ITEM D34/Y32). The environmental cap should only be hand tight. If it cannot be removed by hand, a number 6 pin spanner with .140 pin can be used to loosen it. If this is necessary, a second number 6 pin spanner should be used to hold the diaphragm clamp to keep it from coming loose.

Critical Point:

It is permissible, and advised, to use a small amount of lubricant on the threads of the environmental seal retainer. In addition the seal, transpiston, and environmental cap should be replaced while the regulator is pressurized! Once the cap has been hand tightened, the regulator can then be depressurized to ensure a proper seal.



Second Stage Main Housing Integrity – The integrity of the second stage main housing (ITEM 1) should be determined by looking for any obvious signs of damage. Scratches, gouges, missing parts, damaged exhaust ports, or loose cover retainer, or damaged cover may be indications that housing integrity has been compromised.

Perform the previously noted negative pressure test and test the operation of the purge cover. Look for cracks and/or missing sections. Operate the levers and adjustment knobs. They should move and turn smoothly with no sticking or feeling of grit being trapped in them.

Any indication of a problem with housing integrity should be addressed before beginning the service process. A compromised housing may will affect final testing of the system.

Critical Point:

A damaged housing, purge cover, or diaphragm cannot be repaired. They must be replaced.

After the technician has completed the preceding steps and identified those areas requiring service, the process of servicing the individual regulator components may begin.

Environmental seal, main diaphragm clamp, turret body removal concern. When the 1st stage is subjected to saltwater use on a regular basis, deposits of fine salt may lead to the environmental cap, main diaphragm clamp, and turret IP Cap (ITEM D21Y19) being hard to remove and require more than normal force to loosen. Should this be the case, the environmental cap can be removed after a dive outing, the threads cleaned, and a light coating of lubricant applied before replacing the cap while the regulator is pressurized. Then the regulator to should be depressurized after the seal is put back in place and the cap installed hand tight.

If the regulator presents this condition during servicing, the best way to loosen the cap and clamp is to soak that part of the 1st stage body in a solution of very warm water and white vinegar. Then using both pin spanners, place the regulator body on the rubber pad. Making sure it is secure, apply steady downward force on the spanners. Only in extreme circumstances should tapping of the spanners be required with a soft mallet while clamped in a bench vise. This method may necessitate replacement of the components due to the soft brass being deformed, therefore it should be avoided.

4. First Stage Disassembly and Cleaning

Disassembly of the 1st stage – Disassembly of the first stage is undertaken in the following steps after ensuring the system is depressurized if beginning the process on a bench valve or cylinder.

Note the position of all hoses and port plugs – document this. The easiest way to do this is to take a picture of the regulator system. Another acceptable method is to draw a diagram and keep that as a reference. Since it is likely you will only servicing your own regulators, this may or may not be an important consideration.

Remove all hoses and port plugs. Remove the Yoke knob (ITEM Y1) if using the yoke version. Insert a first stage handle into the appropriate port and secure the handle in a vise with the environmental seal facing up to allow you to access the main spring adjustment bolt (ITEM D32/Y30). Remove the environmental seal cap (ITEM D36/Y34), silicone disc (ITEM D35/Y33), and transpiston (ITEM D34/Y32). If difficult to remove, refer to page 11.



Unscrew the adjustment bolt at least 3 full turns to remove pressure on the mainspring (ITEM D31/Y29).



Using the Pin Spanner, loosen the clamp (ITEM D33/Y31). Do not remove it entirely yet! If difficult to remove refer to page 11.



Critical Point:

Be sure there is no tension on the mainspring that may cause the diaphragm retainer to spring off of the 1st stage body!

Remove the 1st stage from the vise and while holding the 1st stage upside down, unscrew the diaphragm clamp (ITEM D33/Y31) making sure no parts drop out.



Set the clamp, adjustment bolt (ITEM D32/Y30), mainspring (ITEM D31/Y29), spring seat (ITEM D29/Y27), and plastic washers (ITEM D30/Y28) assembly aside.



Remove the diaphragm (ITEM D28/Y26), and valve lifter (ITEM D27/Y25).



Note:

The diaphragm will be discarded. Under no circumstances is it to be re-used!

Place the 1st stage back in the vise diaphragm side down and perform the following operations:



Using a number 5 pin spanner, remove the turret assembly by loosening the IP Cap (ITEM D21/Y19) . Once loosened, unscrew it from the main body. If difficult to remove refer to page 11.



Using an 8 mm hex disassemble the turret to reveal the Teflon washer (ITEM D20/Y18), Swivel Retainer (ITEM D19/Y17), turret (ITEM D24/Y22), and the two O rings (ITEM D22 and 23/Y20 and 21) that seal the turret.



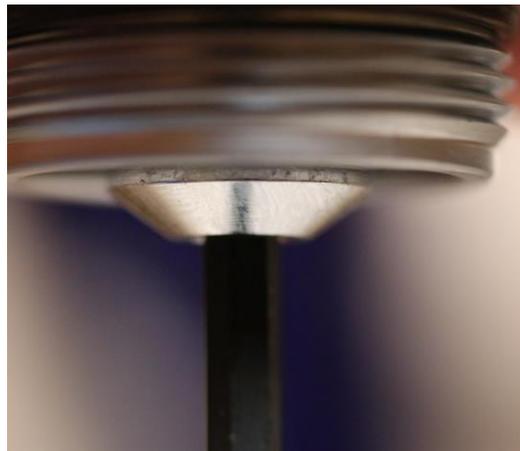
Remove the O rings from the turret and place them with the old parts to be replaced.



Using a 4mm hex socket, loosen the balance plug (ITEM D18/Y16).



Having loosened the plug, remove the 1st stage from the vise and turn the body diaphragm side up. Remove the balance plug from the main body. Remove the turret O-ring (ITEM D13/Y11) from the body.



Set the balance plug/High Pressure seat (ITEM D14/Y12) assembly aside.



Secure the regulator body using the 1st stage tool in the vise with the yoke or DIN fitting facing up.



Use the $\frac{3}{4}$ socket and 3-inch extension to loosen the yoke retainer (ITEM Y4).



Remove the yoke retainer.

The yoke retainer also contains the filter (ITEM Y5) and filter O-ring (ITEM Y6). Set these aside.

If using the DIN version perform the following steps:

Using the first stage handle, clamp the stage in a vise DIN fitting facing up as pictured below.

Loosen and remove the DIN retainer (ITEM D3) with a 6 mm hex wrench. Remove the O-rings (ITEM D2 and D12) from the DIN retainer.



Remove the DIN wheel (ITEM D5) and set it aside with the DIN retainer.

With a 13/16 wrench or deep socket loosen the DIN housing (ITEM D6). Remove the DIN housing.



The DIN housing holds the filter (ITEM D7), filter O-ring (ITEM D8) between the body and housing. Remove them and set them aside. They are replaced with the rebuild kit.

Take the balance plug and remove the high-pressure seat (ITEM D14/Y12).

Remove the valve spring (ITEM D16/Y14).



Using a brass or plastic pick, carefully remove the balance plug internal O-ring (ITEM D15/Y13), the thread O-ring (ITEM D17/Y15) on the bottom of the balance plug.

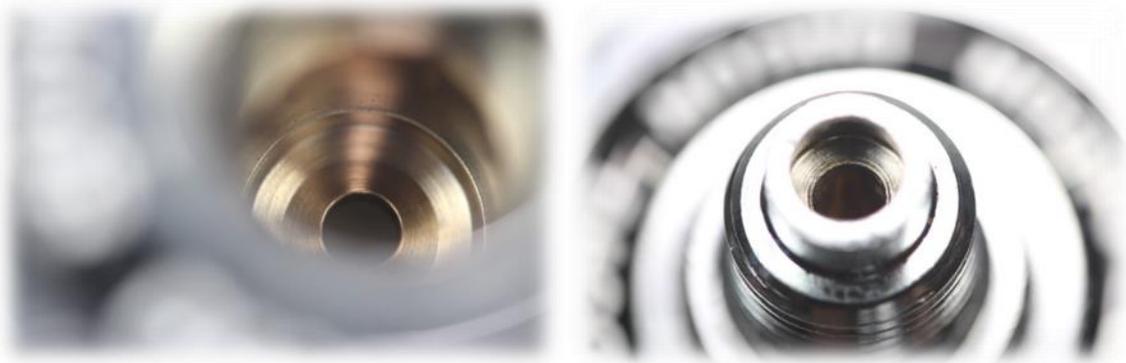


Critical Point:

Do not use a steel pick on the balance plug O-ring! Any scratch will compromise the inner surface and result in IP creep! If the inner surface is damaged in any way it must be replaced!

This completes the disassembly of the 1st stage. Carefully inspect all parts and separate the parts to be replaced from the non-replaceable parts. When inspecting the parts pay close attention to all threaded surfaces.

Look for signs of corrosion, sand, silt, salt or other foreign materials. Using a magnifying glass and bright light, inspect the machined orifice and internal sealing surface of the balance plug.



All parts should be cleaned using a degreasing agent and clean water. Any corrosion should be dealt with using the white vinegar/water solution and the ultrasonic. Old lubricants are best dealt with *before* attacking any corrosion. Once the corrosion has been dealt with, re-clean all of the affected parts with the degreasing solution and rinse with clean fresh water.

Using the Deep Six Signature Regulator with more than 40% Oxygen

The Deep Six Signature regulator is suitable for use with pure Oxygen (100%) up to 2400 PSI and 80% O₂ to 3400 PSI from the factory. To maintain this integrity during service of the 1st stage it is necessary, prior to the final cleaning and rinsing step, to put on clean, powder-free, nitrile or latex gloves and from that point on handle all parts with gloves on until the 1st stage is completely assembled.

Critical Point:

It is critical to ensure that no hydrocarbon contaminants are present on the work surface, tools, and that only oxygen compatible lubricants are used!

Oxygen cleaning – Cleaning your regulator for oxygen service is the next item we will address. In order to maintain oxygen service integrity careful attention must be paid to the following areas.

Work station – Before Oxygen cleaning of the regulator components takes place the work area must be clean and free of dirt, dust, and other contaminants. Clean, lint free towels and suitable covering should be used.

Tools – Assembly tools should be carefully washed using a suitable heavy perfume and dye free degreasing agent such as crystal Simple Green™ or Blue Gold Cleaner™. Following this they should be rinsed in clean, fresh water and dried thoroughly.

Once cleaned and dried, ideally, they should only be handled with powder free clean nitrile or latex gloves and not removed from the work area until all service has been completed.

Parts washing – All non-replaceable parts should be cleaned in the following manner. Using a suitable degreasing agent, thoroughly clean all parts. A nylon brush works well for this. Rinse all parts with clean, fresh water. If you are unsure of your water quality, consider using distilled bottled water.

Following the initial degreasing, remove any corrosion in an ultrasonic cleaner or scrubbing with a solution of 50/50 white vinegar and water. Next rinse the parts in clean fresh water. A clean colander/strainer or other container with the ability to drain greatly improves the rinse process since you can actually run water over them rather than soaking them.

Before removing the parts from the water or container, don fresh gloves and wash your hands using the degreasing cleaner. Now remove the parts from the rinse and degrease them again while wearing the clean gloves.

Rinse them to remove any traces of cleaner and set them on clean, lint free towels to soak up the excess water. Dry the parts with Oxygen compatible compressed air and set them on a clean surface.

Inspect the parts with a UV light to look for traces of hydrocarbons. This will require you to dim the lights in order to do this. Another method is to use the water-break test.

Fill a clean container with fresh water. Place the parts in the water and stir it up to get the water moving around the parts. Allow it to stand for 10 minutes. Inspect the water surface with a light. Look for any rainbow colored sheen or other contaminants floating on the surface. If any are present, the degreasing steps must be repeated.

Personal protection – In addition to clean, powder free, nitrile or latex gloves, make sure that you are not wearing any clothing that could transfer hydro-carbons or other contaminants to the work area.

If you have long hair or a full beard, you may want to consider a hat or even beard net to prevent hair from dropping on the work area or regulator parts. If you have a cold or are sneezing, do not sneeze or cough on the parts, tools, or work area!

Drying area – The drying area should be clean and dust free. You'll be using compressed air to dry parts and that will send any excess dust or dirt airborne, possibly resulting in some if it making its way into your regulator. The drying area should be made up of

clean lint free towels or other suitable surface to set dried parts on. A glass baking dish type container is ideal for putting dried parts in as it's easily cleaned and the sides keep items from being accidentally knocked on the floor.

Air used for drying of parts - Only O2 compatible air from a regulated air supply should be used to dry your parts.

Do not use a personal garage compressor or even small airbrush compressor!

If you are not using a test bench in a shop with a bench supply line, a scuba tank with O2 compatible air is acceptable.

Ideally, however, you should be taking an Oxygen Service course from a reputable instructor before servicing your regulator for use with high percentages of O2 breathing gas supplies.

Once the parts requiring cleaning have been cleaned and dried using clean compressed air, the assembly process may begin followed by testing and adjustment. It is also advisable, after noting their location on the 1st stage, to separate all the parts to be replaced and prepare for disposal of them. Before disposing of all the old parts place them in a suitable container to use as reference when opening the service kit.

5. First Stage Assembly

Pre-assembly procedure – Before starting the actual assembly of the 1st stage, to ensure cleanliness, it is necessary to don clean powder free latex or nitrile gloves. This allows the system to be assembled without contamination from skin oils. It also ensures that gloves that may have been damaged during cleaning and drying are not used.

Once gloves have been put on, all the cleaned parts of the regulator are laid out in the order of assembly along with the new 1st stage service kit. See the schematic for service kit content details. Pay close attention to O-ring designations.

Next, ensure all required clean tools are present and within reach of the technician to avoid having to get up and go to another location to get them. Having to retrieve tools is one way to lose parts or miss a step in the assembly process.

At this point we can begin to assemble the 1st stage.

Critical Point:

It is important to keep the area free of distractions during the assembly process to avoid mistakes!

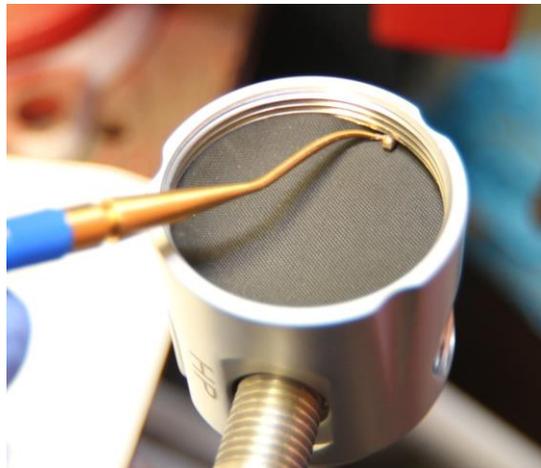
Taking the main regulator body (ITEM D10/Y8) in hand, diaphragm side up as seen below, install the lifter (ITEM D27/Y25) in the center hole stem down.



Next install the diaphragm (ITEM D28/Y26). The diaphragm is most easily installed by bending it slightly and inserting it into the groove below the threads.



The diaphragm may require the use of a blunt brass pick. Work one side in and as you press the diaphragm into place, work it into the groove all the way around the body. **DO NOT WRINKLE OR TEAR THE DIAPHRAGM!**



Damage to the diaphragm may result in the diaphragm not sealing properly and allow air to leak into the ambient chamber resulting in a failure of the 1st stage.

After the diaphragm has been installed set the body aside and assemble the diaphragm clamp (ITEM D33/Y31), main spring adjusting bolt (ITEM D32/Y30), main spring (ITEM D31/Y29), plastic washers (ITEM D30/Y28), and spring seat (ITEM D29/Y27).



The main spring adjusting bolt should be installed so that 3-4 threads are showing above the surface of the diaphragm retainer.



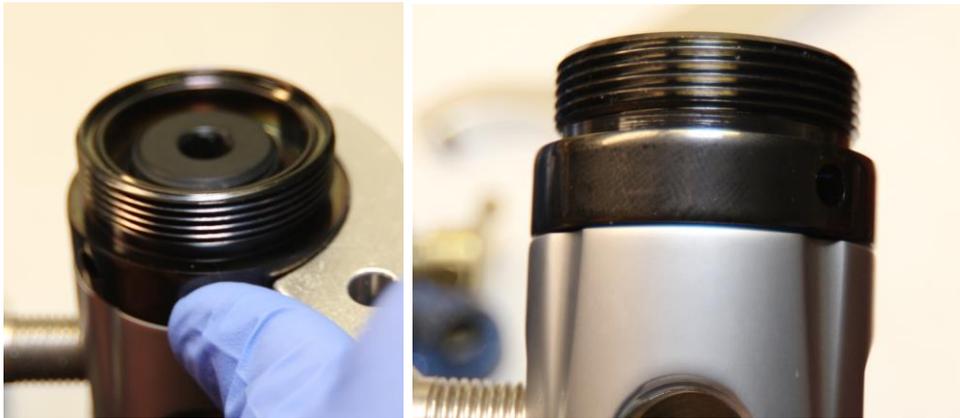
Stack one plastic washer, the main spring, second plastic washer, and the spring seat in the main spring adjusting screw as seen in the following image.



Take the 1st stage body with 1st stage tool installed and turn it upside down. Thread the diaphragm retainer assembly into the 1st stage body until it seats.



Using the #6 Pin Spanner tighten the diaphragm clamp assembly until there is no visible gap between the retainer and the body. *Due to the nature of the soft diaphragm, there is no torque specification. Make sure there is no gap and the connection is tight.*



Turn the 1st stage over and check the tension on the adjustment bolt. There should be just a slight amount of tension on the bolt. If there is no tension felt, use the 6mm hex socket to turn the bolt clockwise until slight resistance is felt. *Failure to do this may result in unnecessary pressure on the diaphragm when air is applied to it and unseat the diaphragm.*

If strong resistance is felt initially, back the adjustment bolt off and re-tighten until slight resistance is felt. Set the assembly aside.

Next take the balance plug (ITEM D18/Y16) and, using a fine tip syringe, apply lubricant to the groove that holds the HP seat O-ring. Lubricate the O-ring (ITEM D15/Y13) and install it in the groove. This may require you to insert the O-ring at a slight angle and, using a plastic or wooden dowel, work it into place.



Lightly lubricate the balance plug outer O-ring (ITEM D17/Y15) and slip it into place below the threads and into the space around the bottom of the balance plug. Set the

valve spring (ITEM D16/Y14) on the shoulder of the balance plug, place a drop of lubricant on the stem of the HP seat (ITEM D14/Y12) and carefully press it into the plug.



Press the seat gently a few times to ensure that it moves freely through the inner O-ring.

Note:

All O-rings that come into contact with supply pressure will be 90 duro.

Those that are subjected to the intermediate pressure are 70 duro.

See the schematic for details.

Take the 1st stage main housing and hold it with the balance plug opening down. It is critical that you maintain the housing in a vertical position. Set the balance plug on the 4mm hex socket and insert it into the 1st stage main housing. When you feel the plug make contact, apply pressure and turn the plug or the housing to engage the threads.



When the threads have been positively engaged continue to turn the housing or the plug until the plug is fully seated.

At this point place the 4mm hex socket on the torque wrench. Set the torque wrench to 80 inch pounds. Clamp the 1st stage, using the 1st stage handle, in a vise and torque the balance plug to the set 80-inch pound rating. Do not over torque the balance plug.

The next step is to install the turret assembly.

Turret Assembly. To install the turret assembly you need to reassemble the turret.



Taking the turret (ITEM D24/Y22), swivel retainer (ITEM D19/Y17), Teflon washer (ITEM D20/Y18), and two O-rings (ITEM D22 and 23/Y20 and 21), lubricate the O rings and place them in the grooves on the turret. Take the IP Cap (ITEM D21/Y19) and place it on the turret. Make sure that it rotates freely and is seated. Install the Teflon washer in the turret body. Using the 8mm hex wrench, tighten the swivel retainer to 150 inch pounds.



Take the turret/IP Cap assembly and screw it on to the main body that is secured in the vise after you have installed the body/turret O-ring (ITEM D13/Y11). Tighten with the pin spanner so that there is no gap between the two components and the connection is secure.

Critical Point:

Failure to torque parts to the designated values specified in this manual may result in damage to the system or failure of the system resulting in injury or loss of life!

Once the turret has been tightened take the yoke (ITEM Y3) and insert the yoke retainer (ITEM Y4) through it. Take the yoke retainer and insert the filter (ITEM Y5) from the 1st stage body side. Place the oring (ITEM Y6) on the shoulder of retainer. Set the saddle (ITEM Y7) on the yoke with the retainer passing through it. Place the dust cap (ITEM Y2) ring over the saddle. Taking the 1st stage housing in hand, screw the yoke assembly into it until it seats hand tight. Using the 1st stage handle, secure the 1st stage in a vise with the yoke assembly facing up. Using the ¾ inch socket and 3/8-inch drive extension tighten the yoke assembly to 230 inch pounds using the torque wrench.

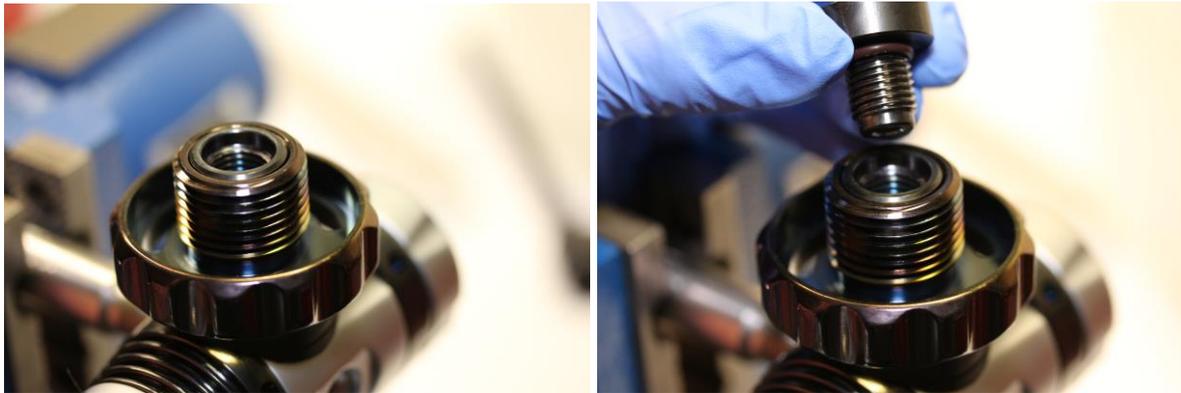


Following torquing the assembly, install the yoke knob (ITEM Y1). It is highly recommended to apply a thin coat of lube to the threads on the knob before screwing it in.

If servicing the DIN version, take the DIN housing (ITEM D6), filter (ITEM D7), and filter O-ring (ITEM D8) and place them through the saddle (ITEM D9). Screw the assembly into the main body hand tight.



Taking the torque wrench and crow's foot or 13/16 deep socket, tighten the DIN housing to 230 inch pounds.



Next set the DIN wheel (ITEM D5) on the housing. Place the 90 duro DIN retainer O-ring (ITEM D12) over the threads of the DIN retainer. Using the torque wrench and a 6mm hex, tighten the DIN retainer to 150 inch pounds. Install the DIN retainer/tank valve O-ring (ITEM D2).



At this point the Deep Six Signature first stage is ready for testing.

The Deep Six Signature 1st stage has 2 HP ports and 5 LP ports. In order to properly tune the system 2 LP ports and one HP port are required.

Carefully inspect the O-rings (ITEM D26/Y24) on the LP port plugs (ITEM D25/Y23). Replace any that appear worn or overly compressed. Inspect the HP port plug (ITEM D11/Y9) O-rings (ITEM D12/Y10) and replace if necessary. Install port plugs in one HP port and 3 LP ports. This completes the assembly of the 1st stage. It is now ready for testing. Testing will require a LP inflator hose, HP hose and SPG, and LP hose with second stage installed on the 1st stage.

6. First Stage Adjustment and Testing

Adjustment and testing of the newly serviced 1st stage will require an initial air supply pressure of 500 – 700 PSI. This supply can be from a regulated constant supply of breathing air or a SCUBA cylinder with the proper amount of pressure for the initial adjustment.

Once the supply source has been set up the system is mounted on the supply source. The adjustment procedure requires monitoring of the Intermediate Pressure using an Intermediate Pressure (IP) gauge. Secure the IP gauge to the LP inflator hose.

While holding the second stage and slightly depressing the purge button, slowly pressurize the system. As the system pressurizes the IP should start to increase. As the IP increases, let off of the purge button and allow the IP to settle.

With the adjustment screw 3-4 turns out the initial IP should be around 100 PSI +/- 10 PSI. If it is higher than that but below the normal 125-145 PSI operating range it is ok. If it's lower than 90 PSI, depressurize the system and turn the adjustment screw clockwise ¼ to ¾ turn to bring it up to the 100 PSI value.

At this point slowly purge or breathe the system and watch the IP. It should remain stable. If it begins to creep stop and refer to the troubleshooting section!

If the IP remains stable it is time to start bringing it up to the normal operating range.

While repeatedly depressing the purge button or breathing from the 2nd stage, slowly increase the IP by turning the adjustment screw clockwise in ¼ turn intervals.

Critical Point:

Only turn the adjustment screw when the purge button is depressed or on the inhale portion of the breathing cycle!

Failure to turn the adjustment screw only when the purge is depressed or on the inhale cycle may result in damage to the HP seat resulting in premature failure of the seat.

As the IP increases while turning the adjustment screw, stop on each turn and breathe or depress the purge button several times. Once the 1st stage IP has reached 135 PSI, breathe the system or depress the purge button 25-50 times to allow the HP seat to start to settle in.

Observe the IP during this time. Under normal conditions the IP will drop 5-10 PSI on each cycle and then return to the set value. After completing this cycle of inhale/exhale,

increase the supply pressure to 1500 PSI +/- 200 PSI. If using a SCUBA cylinder have one ready with this amount of pressure.

Cycle the system 25-50 times while monitoring the IP. A slight drop is normal. This is the HP seat forming the groove from the orifice. Watch for signs of creep or any other abnormal results.

Next increase the supply pressure to 2800-3000 PSI and cycle the system. The IP is likely to decrease further. After 25-50 cycles, using the 6mm hex socket increase the IP to 135 PSI. DO THIS ONLY WHEN THE PURGE IS DEPRESSED OR ON THE INHALE CYCLE!

Once the desired 135 PSI has been reached and is stable, cycle the system another 25-50 times.

Allow the system to set while pressurized for 5-10 minutes. There should be no evidence of creep. Cycle the system 25 -50 more breaths.

At this point the system should be leak tested. Install the transpiston (D34/Y32), silicone environmental seal (D35/Y33), and environmental cap (D36/Y34). A light coating of lubricant is recommended on the threads of the seal/body connection. This will inhibit corrosion and make future servicing/care easier. Once the seal is installed, if using a bench supply, turn off the supply pressure and depressurize the system. Place the system on a SCUBA cylinder and pressurize the system. While looking for bubbles from the 1st stage, submerge the valve and 1st stage completely in clean water.

Look for evidence of air leaks around the port plugs and hoses. Look for small bubbles coming from between the diaphragm retainer and 1st stage body as well as the turret/body assembly. If any are observed around the port plugs or hoses replace the O-rings and re-test.

If bubbles are observed between the diaphragm retainer and 1st stage body try to snug up the connection between them by using the 1st stage handle and #6 Pin Spanner. If this does not solve the problem the 1st stage diaphragm may have been damaged. This will necessitate rebuilding the 1st stage again using more care.

If no leaks are detected the 1st stage service is now complete.

7. Second Stage Disassembly and Cleaning

After removing the second stages from their respective hoses and completing the exterior inspection, the next step is to remove the faceplate assembly (ITEMS 23,24,25,26) from the second stage.



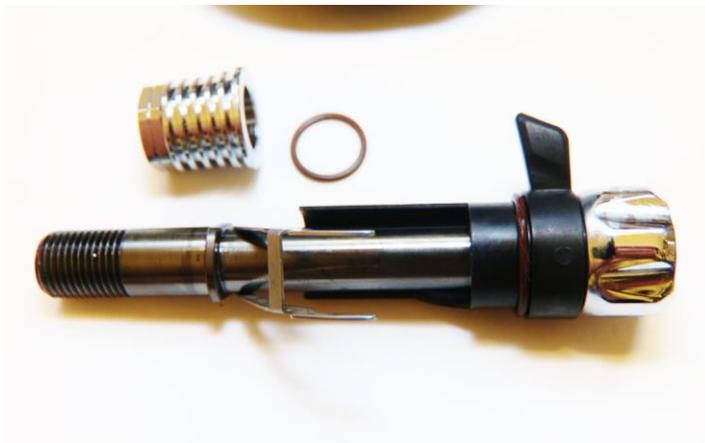
After removing the faceplate, remove the diaphragm (ITEM 22). Carefully inspect the diaphragm for holes or tears by holding it up to a bright light and gently stretching it slightly. Clean the diaphragm with mild soap and water, dry and set aside in an area where you will keep the other cleaned parts. If the diaphragm is damaged replace it with the one included in the service kit.



Using an adjustable wrench, or the proper size box wrench, loosen the heat sink nut (ITEM 27) on the end of the air barrel (ITEM 9) and remove it. Inspect it for signs of corrosion. If any are present, clean the corrosion in an ultrasonic or using a 50/50 white vinegar and water solution and nylon brush.

Rinse and dry the nut and set it with the clean diaphragm. There is an O-ring (ITEM 8) between the case and the heat sink nut that may come out as well. If not don't worry, it will come out in the next step.

While depressing the lever (ITEM 11), grasp the levered deflector knob (ITEM 7) on the side of the housing and in one motion, pull it and push on the hose side of the air barrel to remove the assembly.



Critical Point:

When the next step is being done, turn the adjustment knob (ITEM 18) to the least resistance position, counter clockwise, until it stops. This locks in the adjustment knob retaining pin (ITEM 10) until it is time to remove it.

Next while depressing the lever, slide the deflector knob assembly over the diaphragm lever and off of the air barrel. The assembly consists of the levered knob and an O-ring (ITEM 6)





Critical Point:

Make sure to do this over a clean surface! There is a stainless-steel pin as seen above that may drop out of the air barrel when you remove the venturi lever.

Turn the adjustment knob clockwise until you can slide the pin (ITEM 10) out of the air barrel. Remove the pin and place it in a secure location after checking it for signs of corrosion.

Remove the adjustment knob completely. Inspect it for signs of corrosion. There is an O-ring (ITEM 17) that is replaced during service. It is included in the service kit.



Once the adjustment knob has been removed the lever will drop.

Removing the balance cylinder (ITEM 16), piston (ITEM 13), main spring (ITEM 15) assembly can be accomplished by carefully removing the lever and gently pushing the assembly out through the adjustment knob end.



Inspect and clean the adjust tube/lever assembly. Set it aside. Remove the O-ring (ITEM 8) from the air barrel (ITEM 9) and set it with the other used parts to be replaced. Clean the adjust knob (ITEM 18) with a degreasing agent and water, deal with any corrosion as previously noted, rinse and dry. Place them in the cleaned parts area.

Using a 5mm hex key remove the orifice (ITEM 28). Remove the O-ring (ITEM 29) from the orifice and place with parts to be replaced. Clean and dry the orifice, inspect for damage to the knife edge, and set it with the other cleaned parts.



Remove the LP seat (ITEM 12) from the piston. Remove the piston from the balance chamber.



Remove the two small O-rings (ITEM 14) on the piston. Clean and dry the piston, balance chamber, and spring. Remove the O-ring (ITEM 6) from the deflector knob (ITEM 7). Clean and dry the knob.



Take the second stage housing, remove the mouthpiece (ITEM 3), using the mild degreaser and warm water, thoroughly clean it. Dry the case and look for signs of cracks, gouges, etc. Using a dowel, push on the exhaust diaphragm (ITEM 4) to check that it is supple and pliable with no tears or debris present. Inspect the exhaust cover (ITEM 5)



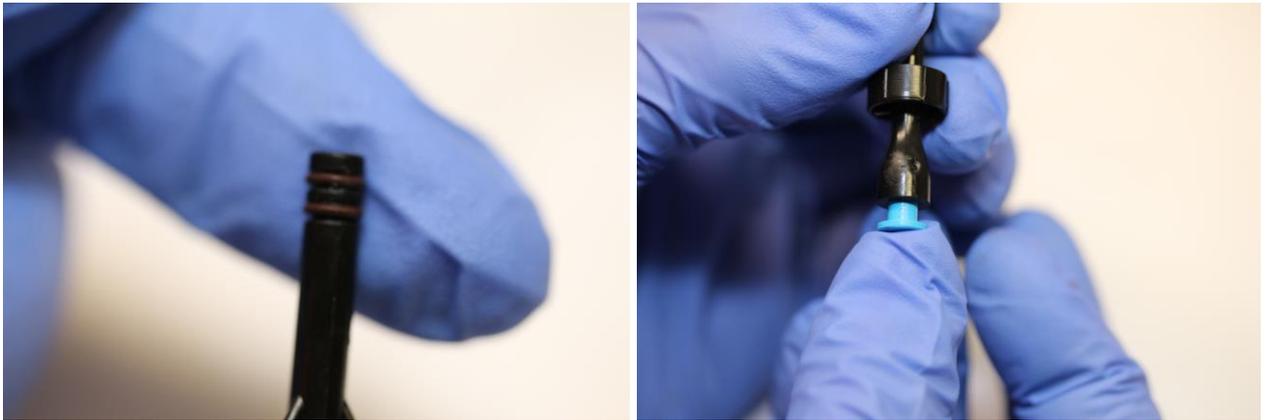
This completes the disassembly and cleaning of the second stage

8. Second Stage Assembly

Take all the cleaned and dried second stage parts and line them up in order of assembly. Open the service kit and place it in a suitable container to keep parts from being lost or misplaced.

Take the adjustment knob (ITEM 18), lubricate the proper O-ring (ITEM 17), and place it in the groove. Set this aside.

Take the clean piston (ITEM 13), balance chamber (ITEM 16), and spring (ITEM 15) and using the new LP seat (ITEM 12) and new 2 small piston O-rings (ITEM 14) assemble this unit. Lubricate the 2 small O-rings and place them in the grooves on the piston.



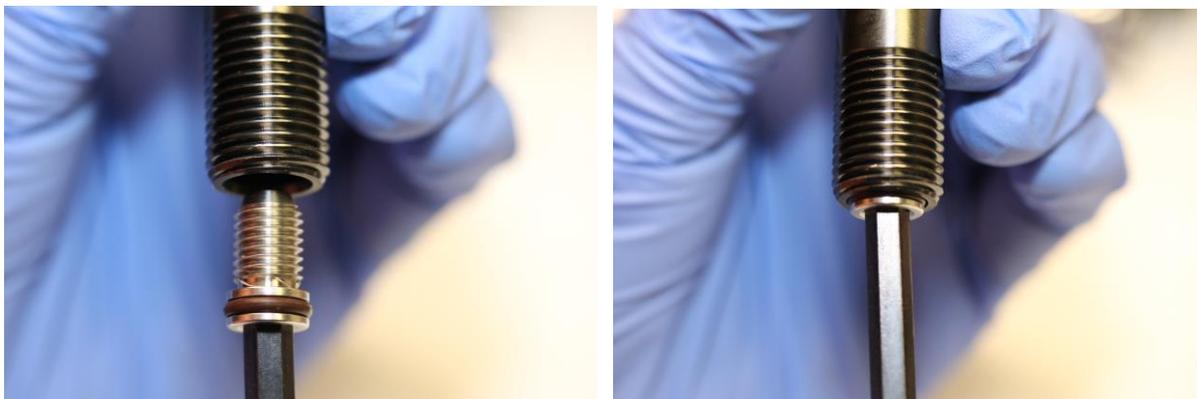
Take the LP seat and insert it into the hole on the end of the piston. Using a clean flat surface, if necessary, push the piston down onto the seat to make sure it is fully seated and no gap is visible. Normally the seat will not require using the flat surface.



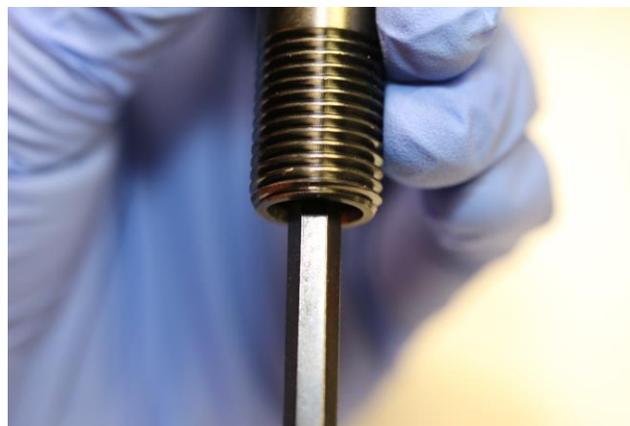
Set the spring on the shoulder of the balance chamber. Holding the balance chamber vertical, place the piston through the spring and into the balance chamber. Push down gently on the piston to make sure that it moves smoothly.



Set the assembly aside. Take the air barrel (ITEM 9), lever (ITEM 11), orifice (ITEM 28), and orifice O-ring (ITEM 29) and assemble the barrel/lever/orifice. Lubricate the orifice O-ring and place it in the groove on the orifice. Using the 5mm hex wrench, screw the orifice into the air barrel until the threads are engaged.



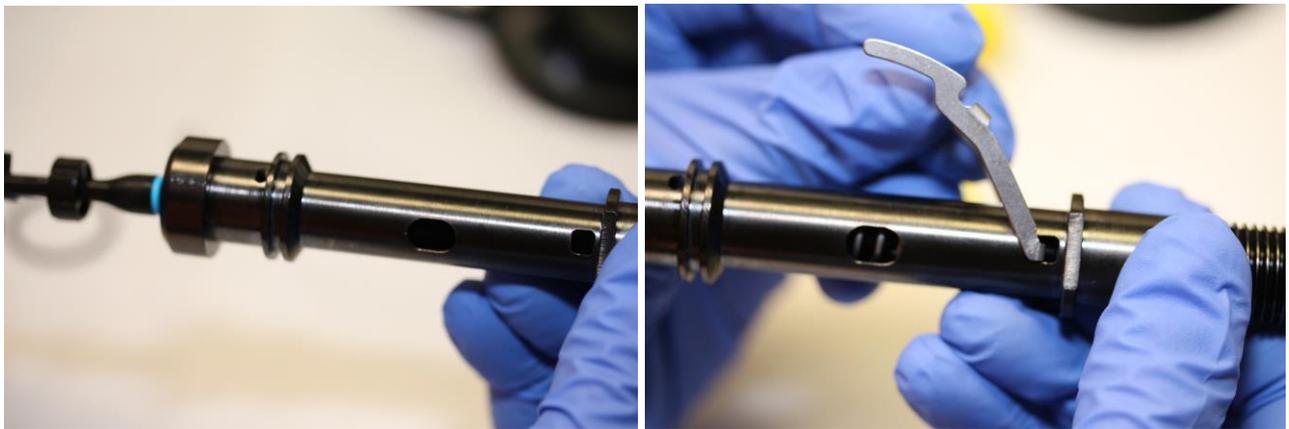
Turn the orifice in 2-3 turns once the threads have been engaged.



Take the air barrel external O-ring (ITEM 8), lubricate it, and place it in the groove on the air barrel.



Insert the piston assembly into the air barrel as shown. Note orientation of the hole.

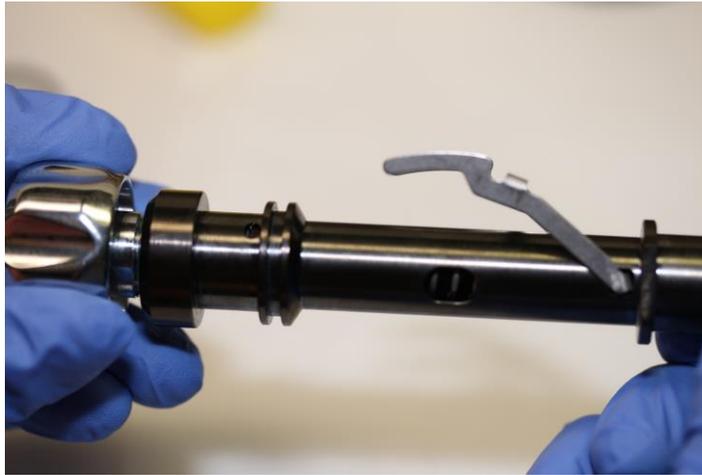


Carefully replace the lever into the holes in the air barrel. Again, note the orientation of the hole to the lever. This ensures that when the assembly is re-installed in the case the hole will be facing up when the lever is in contact with the diaphragm.

Once you have inserted the piston and replaced the lever, take the adjustment knob that you have previously prepared and insert it into the end of the air barrel. It will take a small amount of pressure to get it started.



Once it is started screw the assembly in. The lever should start to rise. If it does not go back and repeat the piston removal and assembly steps.



Screw in the assembly until you can see clearly through the hole for the retaining pin. Insert the pin and back off the knob until it stops.



Carefully the set the assembly on the bench.

Take the deflector knob and after lubricating and installing the larger O-ring (ITEM 6), place it on the deflector knob.



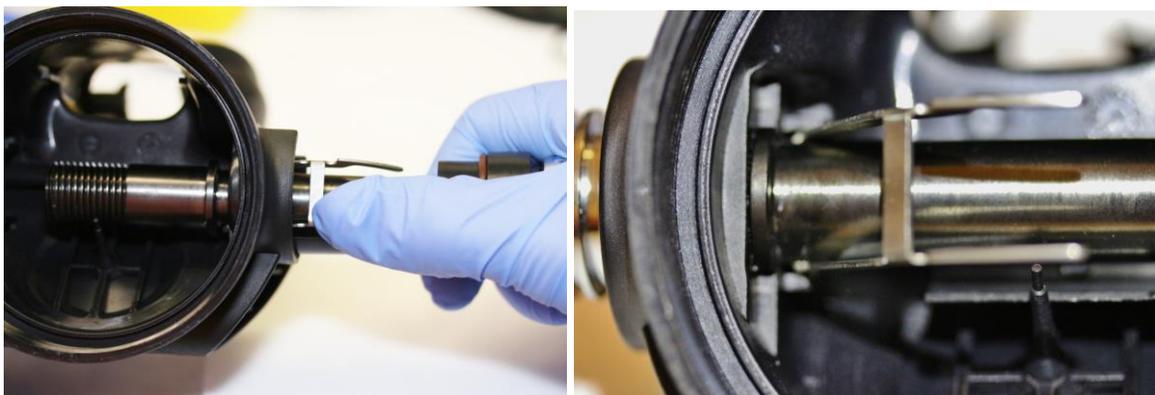
Holding diaphragm lever down, slide the deflector knob assembly over the air barrel from the orifice side. Take care not to bend the main diaphragm lever.



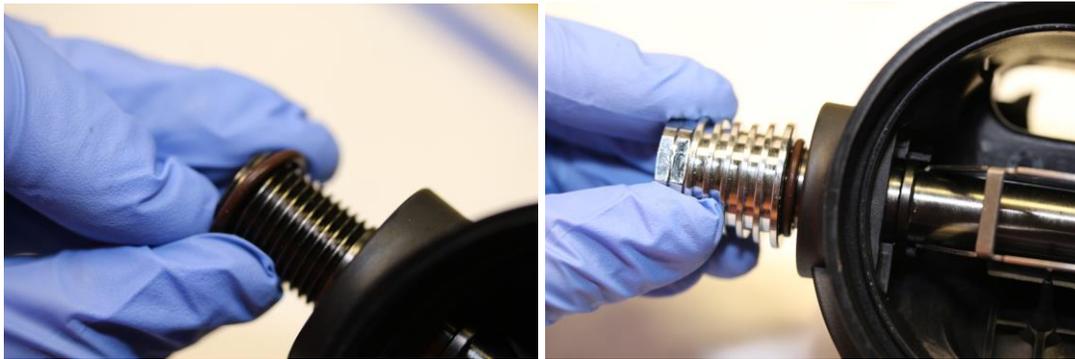
After having installed the deflector knob on the air barrel, slide the assembly into the second stage case. You will need to hold the lever down to ensure smooth insertion and to avoid damage to the lever.



Slide the assembly in until the flat flanges of the air barrel fit into the locking lugs of the case as shown.



Place the O-ring (ITEM 8) on the threaded side of the air barrel and slide it up against the case.



Secure the assembly using the heat sink nut. Thread it on hand tight to hold everything in place. Using the adjustable wrench or proper size box wrench, snug the nut up against the assembly.



Critical Point:

Do not over-tighten the nut! This may result in deformation of the case and damage to the case. Damage to the case requires replacement of the case!

It is now time to perform the preliminary adjustment to the second stage.

Using the 5mm hex wrench, hold the second stage body at eye level. While depressing the lever begin to turn the orifice using the hex wrench in stages. Turn approximately $\frac{1}{4}$ turn clockwise until the lever begins to move.

Do this with the breathing effort knob in the fully open, least resistance, position.

Critical Point:

Only turn the orifice when the lever is depressed. Failure to do this may result in damage to the low-pressure seat and reduced life span of the seat!

When the lever begins to move, turn the orifice until the lever is approximately even with the case rim as it is observed at eye level.

This completes the initial adjustment of the second stage. Install the main diaphragm as seen below.



Install the faceplate. This completes the assembly of the 2nd stage. Final adjustment and testing is covered in the next chapter.



9. Second Stage Testing

Final adjustment and testing of the second stage is accomplished using the in-line adjusting tool.

Secure the in-line adjusting tool to the second stage. Attach a LP regulator hose to the tool. Slide the knob on the tool towards the second stage and gently turn it while sliding until it engages with the orifice.

Attach the magnahelic using the proper fitting and slowly pressurize the system. Using the in-line tool adjust the cracking effort to 1.0-1.1 inches of water. Test the second stage by breathing it for 15-20 breaths. When you are satisfied that the cracking effort is set, continue to breathe the system and turn the adjustment knob clockwise (towards you) and observe the results. Normal cracking effort in the position offering the most resistance will be between 1.9 and 2.2 inches of water on the magnahelic.

Another way of testing if you do not have access to a magnahelic is to use a bucket, bowl, or sink with two to three inches of water in it. This method will require you to remove the inline tool each time you test it, but it is accurate and works well. It requires a ruler and a steady hand.

Take the adjusted second stage and while holding it upside down and parallel to the water surface, slowly submerge it. Using the ruler measure how far you have to submerge it to see a slight free flow take place. This is the cracking pressure in inches.

You can also get an approximate value by using your index finger. Place the first knuckle in line with the seam between the body and the faceplate. Holding it parallel again with the surface of the water, slowly submerge it and note where on your finger the regulator starts to slightly free flow. This joint is approximately an inch on most people and will get you close.

Once you have completed the adjustment, turn off the supply pressure to the system and purge the second stage. Make sure the system is completely depressurized. Pull the knob of the in-line tool back to that it is no longer engaged with the orifice. Unscrew the tool from the second stage. Unscrew the tool from the hose.

Connect the hose and second stage. Screw the hose on hand tight. Using two wrenches, to ensure the air barrel nut does not turn, snug up the hose to the second stage. **DO NOT OVERTIGHTEN!** If using a torque wrench the hose should be tightened to the second stage at no more than 30-35 INCH POUNDS!

Once the hose has been connected pressurize the system and re-check the cracking effort adjustment using the magnahelic. This completes the assembly and tuning of the second stage.

Note that is common after a few dives for the cracking pressure to drop slightly. *This is normal as the seat begins to take a set or form a groove from contact with the orifice.*

This drop can be compensated for by using the breathing effort knob or by slightly adjusting the orifice to be a little stiffer in the initial set up. Rather than having the second crack at 1.0 inches of water when the service is being performed set it for 1.1 or 1.2.

Optional service concerns – Exhaust Diaphragm

The exhaust diaphragm is usually not replaced during normal service. Should it require replacement the steps are as follows.

Remove the old diaphragm by stretching and cutting the extension that protrudes into the case with a pair of side cutters. Remove the exhaust port cover by carefully pressing the tab on the hose side of the cover in between the exhaust port fins.



Remove the old diaphragm. Make sure that the area around the exhaust is clean and free of any sand, silt, salt residue, or other debris.

Install the new diaphragm. Line up the extension and pull it through the opening that is designed to accommodate it.

Make sure the tab is pulled through far enough to engage the lip and is firmly seated. Using a dowel or other suitable item, test the diaphragm by pushing it gently around all the edges. Ensure that it falls back into place and is not rolled, twisted, or folded. Replace the exhaust port cover , taking care not to break the tabs on the cover.

10. SCHEMATICS

The schematics for the Deep Six Signature Regulator components are a key component in the servicing of the units. It is strongly recommended that the technician print these schematics and have them handy to use while going through the manual.

Every effort has been made to keep photographs on the pages with the text they apply to. Viewing the manual on a small tablet or smart phone may result in the photographs not corresponding to the text on the page being viewed.

Printing the entire manual is the easiest way to ensure that all photos and text are correctly displayed unless the technician has a full size laptop or desk top computer next in the service area.

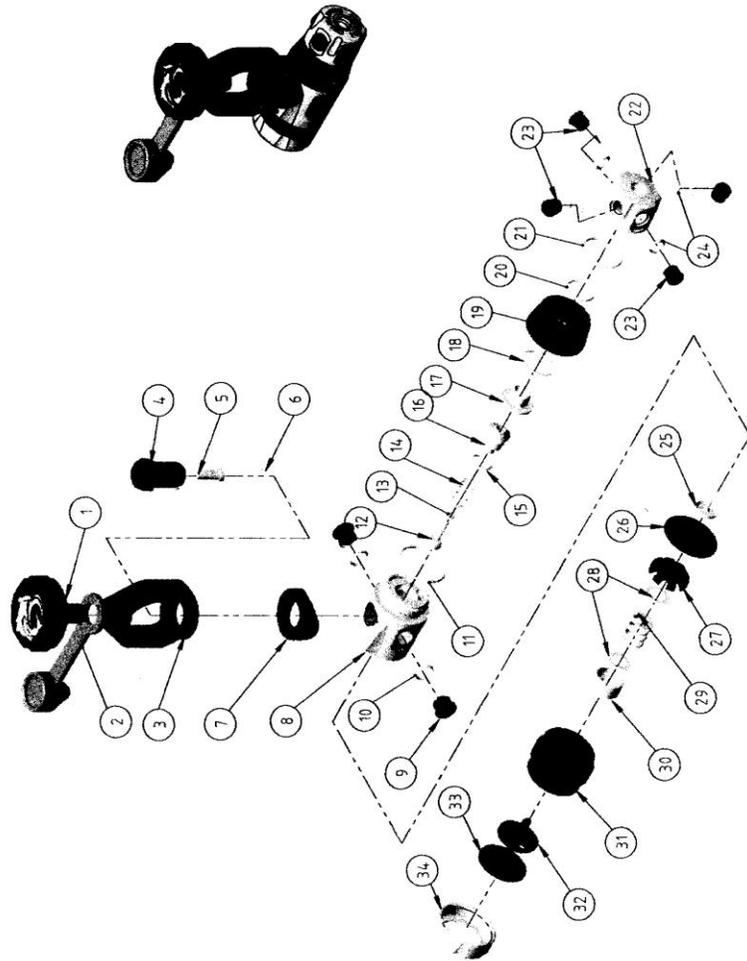
Deep Six Gear and the author of this text has made every effort to include additional knowledge and tips gained over years of experience to aid the technician in servicing these regulators. It is highly recommended that this manual and the instructions from your Deep Six Gear regulator technician instructor be followed. Any shortcuts that someone else suggests should be disregarded in order to avoid serious injury or death.

With these facts in mind, please take some time to become familiar with each schematic. The 1st stage schematics use different item numbers for the same part as previously noted. The second stage schematics use the same item and part numbers. The difference is that the colors of the second stages are different.

In addition to the photos here in the manual itself, additional pdf files of each schematic are located on the flash drive. If you choose not to print the drawings, it is suggested that you open the correct schematic in a second window on your device and either split the screen or flip between the two. This will allow you to avoid having to scroll through the pages and possibly making an error due to skipping a step.

ORG117YICAV-D6

- ITEM NO
- IC-01-012-09- 230 in/lbs
- IC-01-004-07- YOKER RETAINER 150 in/lbs
- IC-01-017-03- SWIVEL RETAINER 80 in/lbs
- IC-01-015-01- BALANCE PLUG 35-40 in/lbs
- IC-01-015-02- LP PORT PLUG 35-40 in/lbs
- IC-01-015-02- HP PORT PLUG



NO	ITEM NO	Description	QTY
1	IC-01-017-13-PVD-R	YOKE KNOB	1
2	IZ-ZG-341-0117-1-A	DC-3 DUST CAP	1
3	IF-01-002-01-PVD	23ZBaf YOKE	1
4	IC-01-012-09-PVD	YOKE RETAINER	1
5	IF-01-005-02	FILTER	1
6	IO-ASS568-011-04	011 O-RING N90 VITON	1
7	IC-01-017-14	D6 SADDLE YOKE	1
8	IC-01-017-09-PSC-R	D6 BODY	1
9	IC-01-015-02-PVD	HP PORT PLUG	2
10	IO-ASS568-012-04	012 O-RING N90 VITON	2
11	IO-ASS568-024-03	024 O-RING N70 VITON	1
12	IB-01-002-02-PAH	HP SEAT	1
13	IO-ASS568-006-06	006 O-RING N90 TEFLON	1
14	ID-01-002-02	VALVE SPRING	1
15	IO-ASS568-905-04	905 O-RING N90 VITON	1
16	IC-01-017-03	BALANCE PLUG	1
17	IC-01-004-07	SWIVEL RETAINER	1
18	IP-01-004-02	SWIVEL WASHER	1
19	IC-01-017-08-PVD	IP CAP	1
20	IO-ASS568-016-03	016 O-RING N70 VITON	1
21	IO-ASS568-021-03	021 O-RING N70 VITON	1
22	IC-01-017-07-PSC	SWIVEL TURRET	1
23	IC-01-015-01-PVD	LP PORT PLUG	4
24	IO-ASS568-011-03	011 O-RING N70 VITON	4
25	IC-01-017-05	VALVE LIFTER	1
26	IP-01-1010-03-01	1.40" DIAPHRAGM	1
27	IA-01-017-08	SPRING SEAT	1
28	IP-01-005-02	SPRING WASHER	2
29	ID-01-011-02	SPRING	1
30	IC-01-011-09-PBSC	ADJUST BOLT	1
31	IC-01-017-10-PVD	DIAPHRAGM CLAMP	1
32	IA-01-017-07-D6	D6 TRANSPISTON	1
33	IA-01-017-09	D6 SILICON DISK	1
34	IC-01-017-11-PSC	ENV CAP	1

VOITEL

SIZE: ORG NO A3 REV B
ORG117YICAV-D6
FILE NAME: C:\1-06-548304
PART FILE

SCALE: 1:2.5
 SHEET: 1 OF 1

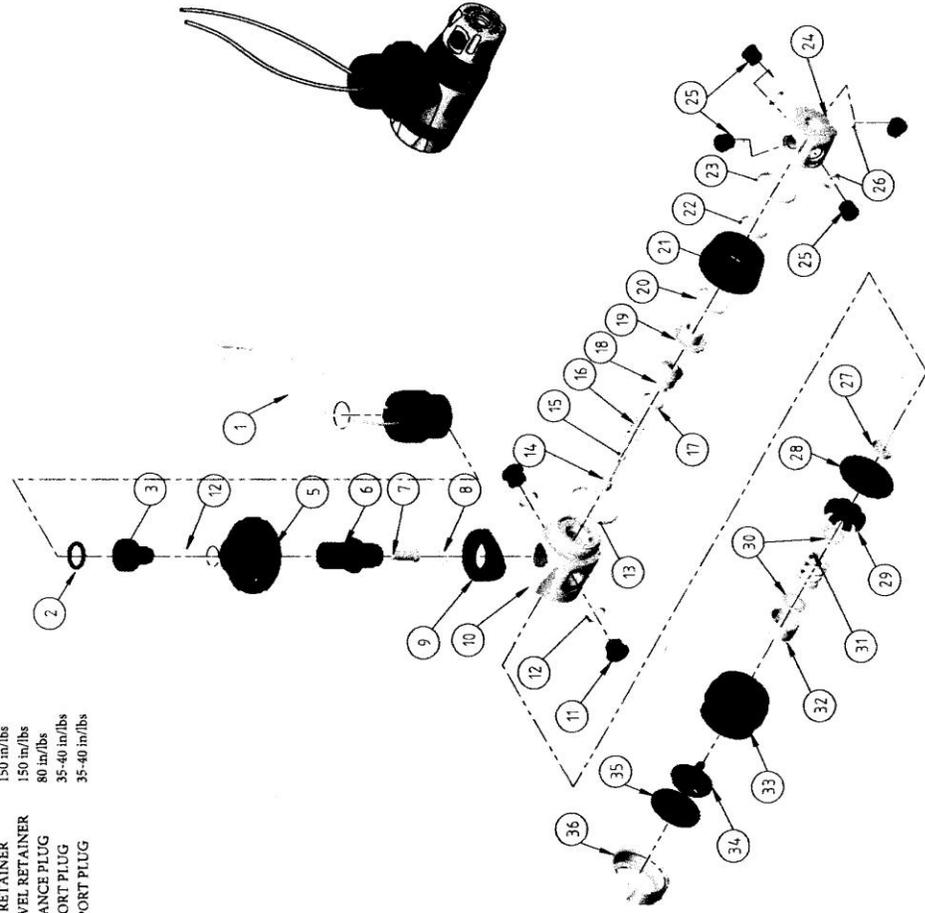
NAME: SCOTT
 DRAWN: 2017/10/17
 DATE:

0RG117D1CAV-D6

ITEM NO

- 1C-01-017-07- 230 in/lbs
- 1C-01-007-07- 150 in/lbs
- 1C-01-004-07- 150 in/lbs
- 1C-01-017-03- 80 in/lbs
- 1C-01-015-01- 35-40 in/lbs
- 1C-01-015-02- 35-40 in/lbs

NO	ITEM NO	Description	QTY
1	0Z-10-00080-01-D6	DIN DUST CAP(D6)	1
2	10-AS568-112-04	112 O-RING N90	1
3	1C-01-007-07-PVD	DIN RETAINER	1
5	1C-01-017-12-PVD	DIN WHEEL	1
6	1C-01-017-15-PVD	DIN HOUSING	1
7	1F-01-005-02	FILTER	1
8	10-AS568-011-04	011 O-RING N90 VITON	1
9	1C-01-017-14	D6 SADDLE YOKE	1
10	1C-01-017-09-PSC-R	D6 BODY	1
11	1C-01-015-02-PVD	HP PORT PLUG	2
12	10-AS568-012-04	012 O-RING N90 VITON	3
13	10-AS568-024-03	024 O-RING N70 VITON	1
14	1B-01-002-02-PAH	HP SEAT	1
15	10-AS568-006-06	006 O-RING N90 TEFLON	1
16	1D-01-002-02	VALVE SPRING	1
17	10-AS568-905-04	905 O-RING N90 VITON	1
18	1C-01-017-03	BALANCE PLUG	1
19	1C-01-004-07	SWIVEL RETAINER	1
20	1P-01-004-02	SWIVEL WASHER	1
21	1C-01-017-08-PVD	IP CAP	1
22	10-AS568-016-03	016 O-RING N70 VITON	1
23	10-AS568-021-03	021 O-RING N70 VITON	1
24	1C-01-017-07-PSC	SWIVEL TURRET	1
25	1C-01-015-01-PVD	LP PORT PLUG	4
26	10-AS568-011-03	011 O-RING N70 VITON	4
27	1C-01-017-05	VALVE LIFTER	1
28	1P-01-10-03-01	140" DIAPHRAGM	1
29	1A-01-017-08	SPRING SEAT	1
30	1P-01-005-02	SPRING WASHER	2
31	1D-01-011-02	SPRING	1
32	1C-01-011-09-PBSC	ADJUST BOLT	1
33	1C-01-017-10-PVD	DIAPHRAGM CLAMP	1
34	1A-01-017-07-D6	D6 TRANSPISON	1
35	1A-01-017-09	D6 SILICON DISK	1
36	1C-01-017-11-PSC	ENV CAP	1



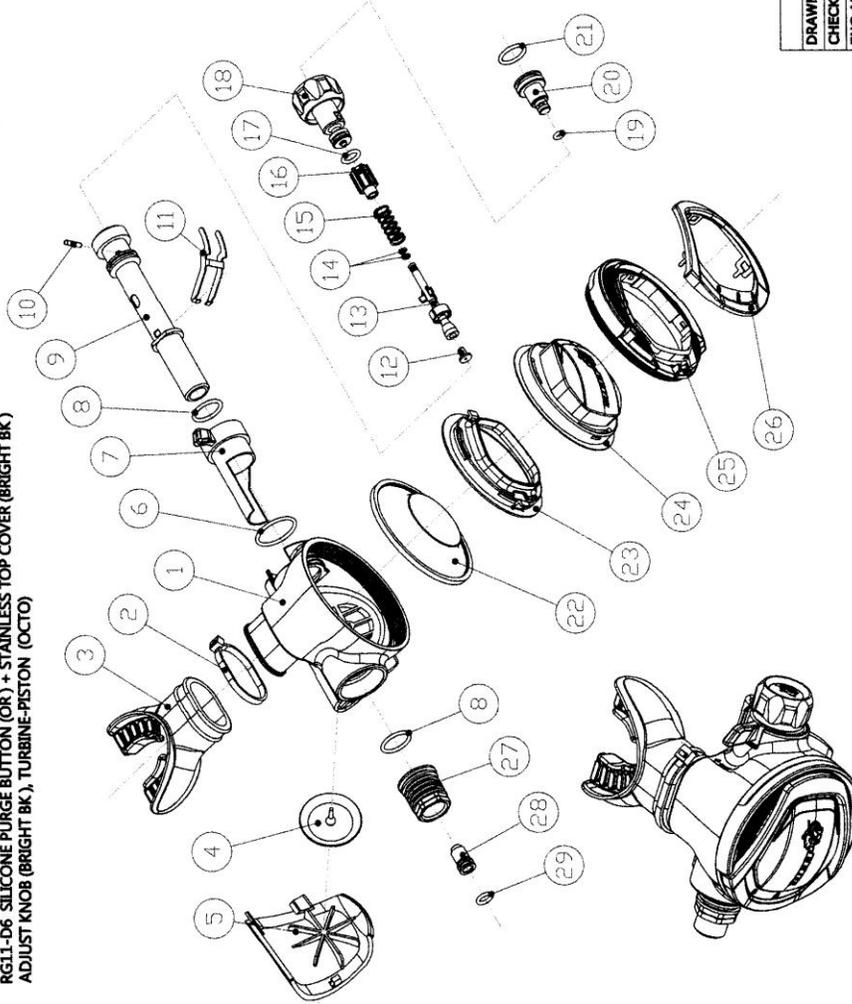
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FILE NAME
PART FILE

DRAWN SCOTT
DATE 2017/10/17

REV B
SCALE: 1:2.5
SHEET 1 OF 1

ORG211ABK3SQD6-OR

RG11-D6 SILICONE PURGE BUTTON (OR) + STAINLESS TOP COVER (BRIGHT BK)
 ADJUST KNOB (BRIGHT BK), TURBINE-PISTON (OCTO)



ORG211ABK3SQD6-OR PART LIST			
NO	ITEM NO	DESCRIPTION	QTY
1	1A-02-011-21-BK-CEN	MAIN HOUSING	1
2	1A-02-010-12-BK	NYLON TIE	1
3	1Z-10-00005-05-BK-OR	MOUTHPIECE	1
4	1A-02-010-02	EXHAUST VALVE	1
5	1A-02-011-04-OR	EXHAUST COVER (ORANGE)	1
6	10-AS568-019-03	VITON O19-N70 O-RING	1
7	1A-02-011-39-OR	DEFLECTOR KNOB, D6 (ORANGE)	1
8	10-AS568-015-03	VITON O15-N70 O-RING	2
9	1C-02-011-04-PVD	AIR BARREL (PVD)	1
10	1C-02-011-05	PIN	1
11	1Z-ZG-342-02006-WH	LEVER	1
12	1B-02-011-06	UP SEAT	1
13	1A-02-012-22	TURBINE PISTON	1
14	10-EKH-2.42X0.82-N70	TERFLON 2.42X0.82 N70 O-RING	2
15	1D-02-012-01	MAIN SPRING	1
16	1A-02-012-09-01	BALANCE CYLINDER	1
17	10-AS568-011-06	TERFLON O11-N70 O-RING	1
18	1C-02-011-22-01-PVD	ADJUST KNOB (PVD)	1
19	10-AS568-006-03	O-RING AS568-006 N70	1
20	1C-02-011-24	ADJUST KNOB PLUG	1
21	10-AS568-014-03	O-RING AS568-014 N70	1
22	1B-02-011-04	DIAPHRAGM	1
23	1A-02-011-41	COVER RETAINER, D6	1
24	1A-02-011-38	PURGE COVER, D6	1
25	1A-02-011-40-OR	TOP COVER, D6 (ORANGE)	1
26	15-02-011-01-PVD	TRIM RING, D6 (PVD)	1
27	1C-02-011-21-PVD	HEAT SINK NUT (PVD)	1
28	1C-02-011-23	CRUPTICE	1
29	10-AS568-010-03	VITON O10-N70 O-RING	1

** SERVICE KITS (REF)

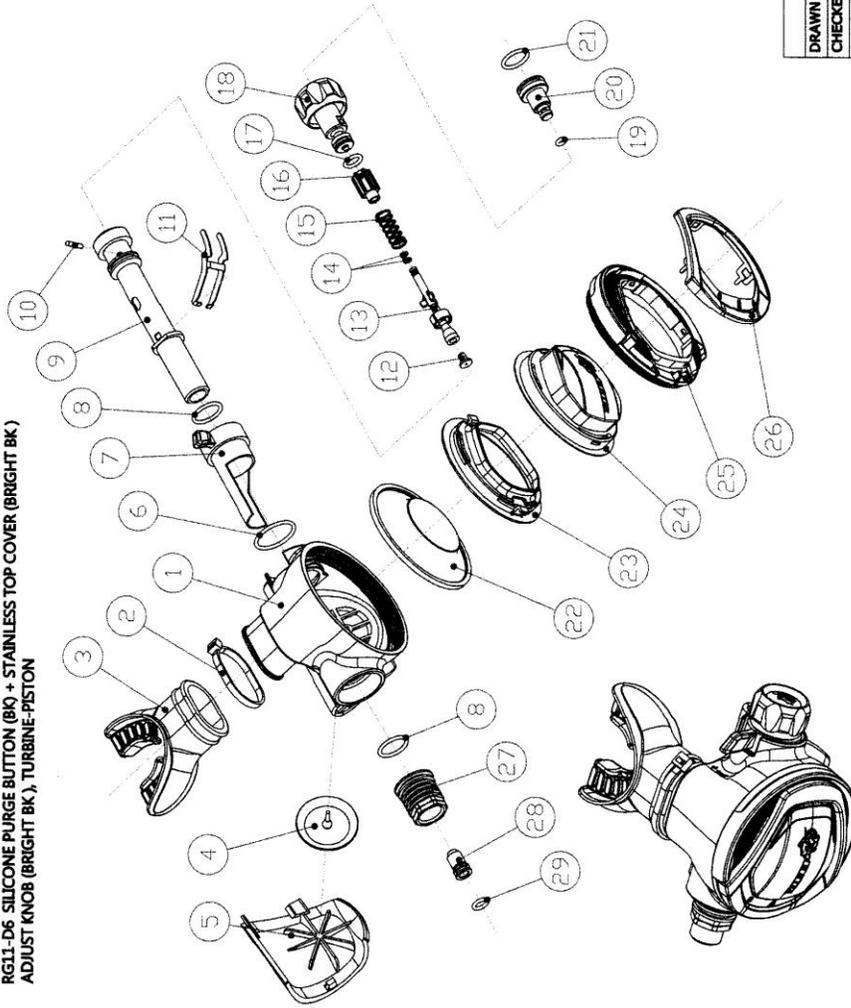
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EVAN	2017/10/17
CHECKED	
ENG APPR	
MGR APPR	
TITLE	
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SIZE DWG NO	REV
A3 ORG211ABK3SQD6-OR	B
FILE NAME: Org211abk3sqd6.asm	
SCALE: 1 PL ±0.1, 2 PL ±0.05	WEIGHT: SHEET 1 OF 1



REG-05 SILICONE PURGE BUTTON (OR) + STAINLESS TOP COVER (BRIGHT BK)
 ADJUST KNOB (BRIGHT BK), TURBINE-PISTON (OCTO)

ORG211ABK3SQD6-PVD

RG11-D6 SILICONE PURGE BUTTON (BK) + STAINLESS TOP COVER (BRIGHT BK)
 ADJUST KNOB (BRIGHT BK), TURBINE-PISTON



NO	ITEM NO	DESCRIPTION	QTY
1	1A-02-011-21-BK-CBN	MAIN HOUSING	1
*2	1A-02-010-12-BK	NYLON TIE	1
*3	1Z-10-00005-05-BK-OR	MOUTHPIECE	1
*4	1A-02-010-02	EXHAUST VALVE	1
5	1A-02-011-04	EXHAUST COVER	1
*6	10-ASS568-019-03	VITON O19-N70 O-RING	1
7	1A-02-011-39	DEFLECTOR KNOB, D6	1
*8	10-ASS568-015-03	VITON O15-N70 O-RING	2
9	1C-02-011-04-PVD	AIR BARREL (PVD)	1
10	1C-02-011-05	PIN	1
11	1Z-2G-342-0206-WH	LEVER	1
*12	1B-02-011-06	LP SEAT	1
13	1A-02-012-22	TURBINE PISTON	1
*14	10-ERM-2.42X0.82	TEFLON 2.42X0.82 N70 O-RING	2
15	1D-02-012-01	MAIN SPRING	1
16	1A-02-012-09-01	BALANCE CYLINDER	1
*17	10-ASS568-011-06	TEFLON O11-N70 O-RING	1
18	1C-02-011-22-01-PVD	ADJUST KNOB (PVD)	1
19	10-ASS568-006-03	O-RING ASS568-006 N70	1
20	1C-02-011-24	ADJUST KNOB PLUG	1
21	10-ASS568-014-03	O-RING ASS568-014 N70	1
22	1B-02-011-04	DIAPHRAGM	1
23	1A-02-011-41	COVER RETAINER, D6	1
24	1A-02-011-38	PURGE COVER, D6	1
25	1A-02-011-40	TOP COVER, D6	1
26	1S-02-011-01-PVD	TRIM RING, D6 (PVD)	1
27	1C-02-011-21-PVD	HEAT SINK NUT (PVD)	1
28	1C-02-011-23	ORIFICE	1
*29	10-ASS568-010-03	VITON O10-N70 O-RING	1

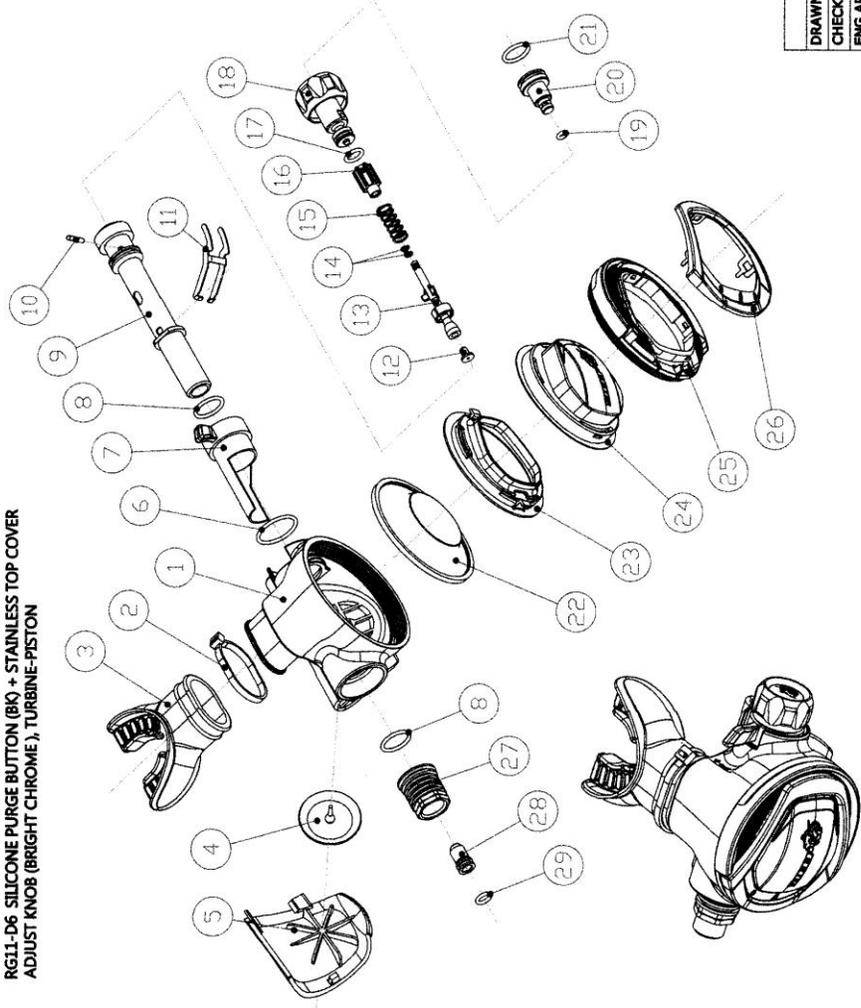
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DRAWN	NAME	DATE
CHECKED	EVAN	2017/10/17
ENG APPR		
MGR APPR		
TITLE		
ORG211ABK3SQD6-PVD		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS ANGLES ±0.5°		
SCALE:	1 PL ±0.1, 2 PL ±0.05	WEIGHT:
SIZE DWG NO	ORG211ABK3SQD6-PVD	REV
FILE NAME:	Org211abk3sqd6.asm	B
SHEET 1 OF 1		8



ORG211ABK3SQD6

RG11-D6 SILICONE PURGE BUTTON (BK) + STAINLESS TOP COVER
ADJUST KNOB (BRIGHT CHROME), TURBINE-PISTON



ORG211ABK3SQD6 PART LIST

NO	ITEM NO	DESCRIPTION	QTY
1	1A-02-011-21-BK-CEN	MAIN HOUSING	1
*2	1A-02-010-12-BK	NYLON TIE	1
*3	1Z-10-00005-05-BK-OR	MOUTHPIECE	1
*4	1A-02-010-02	EXHAUST VALVE	1
5	1A-02-011-04	EXHAUST COVER	1
*6	1O-ASS568-019-03	VTION 019-N70 O-RING	1
7	1A-02-011-39	DEFLECTOR KNOB, D6	1
*8	1O-ASS568-015-03	VTION 015-N70 O-RING	2
9	1C-02-011-04-PVD	AIR BARREL	1
10	1C-02-011-05	PIN	1
11	1Z-20-342-0206-WH	LEVER	1
*12	1B-02-011-06	LP SEAT	1
13	1A-02-012-22	TURBINE PISTON	1
*14	1O-EKN-2.42X10.82	N70 O-RING	2
15	1D-02-012-01	MAIN SPRING	1
16	1A-02-012-09-01	BALANCE CYLINDER	1
*17	1O-ASS568-011-06	TEFLON 011-N70 O-RING	1
18	1C-02-011-22-01-CD	ADJUST KNOB (CHROME)	1
19	1O-ASS568-006-03	O-RING AS568-006 N70	1
20	1C-02-011-24	ADJUST KNOB PLUG	1
21	1O-ASS568-014-03	O-RING AS568-014 N70	1
22	1B-02-011-04	DIAPHRAGM	1
23	1A-02-011-41	COVER RETAINER, D6	1
24	1A-02-011-38	PURGE COVER, D6	1
25	1A-02-011-40	TOP COVER, D6	1
26	1S-02-011-01-EP	TRIM RING, D6	1
27	1C-02-011-21-CD	HEAT SINK NUT (CHROME)	1
28	1C-02-011-23	ORIFICE	1
*29	1O-ASS568-010-03	VTION 010-N70 O-RING	1

*# SERVICE KITS (REF)

NAME	DATE
EVAN	2017/10/17

TITLE
REG11-D6 SILICONE PURGE BUTTON (BK) + STAINLESS TOP COVER ADJUST KNOB (BRIGHT CHROME), TURBINE-PISTON

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS	SIZE	DWG NO	REV
1 PL ±0.1, 2 PL ±0.05	A3	ORG211ABK3SQD6	B

FILE NAME	SCALE	WEIGHT
Org211abk3sqd6.asm		



11. Service Kit Parts

1st Stage

Dwg. Item	Part number	Item	Quantity
D7/Y5	1F-01-005-02	Filter	1
D8/Y6	1O-AS568-011-04	011 O-ring N90	1
D14/Y12	1B-01-002-02-PAH	HP Seat	1
D15/Y13	1O-AS568-006-07	006 O-Ring N90	1
D17/Y15	1O-AS568-905-04	905 O-Ring N90	1
D22/Y20	1O-AS568-016-03	016 O-Ring N70	1
D23/Y21	1O-AS568-021-03	021 O-ring N70	1
D28/Y26	1P-01-010-03-01	1.4-inch diaphragm	1
D20/Y18	1P-01-004-02	Swivel Washer	1
D30/Y28	1P-01-005-02	Spring Washer	2
D12/Y10	1O-AS568-012-04	012 O-Ring N90	3
D26/Y24	1O-AS568-011-03	011 O-Ring N70	3

2nd Stage

Dwg. Item	Part Number	Item	Quantity
2	1A-02-010-12-BK	Nylon Tie	1
3	1Z-10-00005-05-BK-GY	Mouthpiece	1
4	1A-02-010-02	Exhaust Valve	1
6	1O-AS568-019-03	Viton 019-N70 O-ring	1
8	1O-AS568-015-03	Viton 015-N70 O-ring	2
12	1B-02-011-06	LP SEAT	1
14	1O-EKM-2.4X0.82-06	Teflon2.4X.82 N70 O-ring	2
17	1O-AS568-011-06	Teflon 011-N70 O-ring	1
29	1O-AS568-010-03	Viton 010-N70 O-Ring	1

12. TROUBLE SHOOTING

Intermediate pressure too high or creeping up	Replace High Pressure Seat, Complete First stage rebuild required
Low Intermediate Pressure or difficulty breathing from second stage	Adjust intermediate pressure using the adjust screw while checking IP
Small bubbles from between Main Housing and Diaphragm Clamp	Clamp not sufficiently tightened or diaphragm requires replacement
Bubbles from Port Plugs or Hose connections	Replace defective O-ring and check for proper torque (35-40 Inch Pounds)
Bubbles from Balance Plug	Defective O-ring, Improper torque applied to Plug (90 inch pounds), Rebuild 1 st stage
Second stage slight free flow	Adjust breathing effort knob, adjust orifice, replace LP seat (rebuild 2 nd stage)
Second stage uncontrolled free flow	Check 1 st stage IP, check 2 nd stage lever, check 2 nd stage orifice adjustment, rebuild 2 nd stage
Second stage delivers no air	Improper IP adjust, Improper 2 nd stage rebuild – lever not engaged, rebuild 2 nd stage, check IP setting, inspect hoses for blockage

Environmental seal bulged	HP seat leaking, diaphragm leaking, seal replaced with regulator not pressurized
Environmental retainer seized	Usually caused by corrosion, soak in warm water and vinegar solution. Apply steady downward pressure on retainer and body on rubber pad with two pin spanners. Do not use mallet or sudden force!
Diaphragm clamp seized	Usually caused by corrosion, soak in warm water and vinegar solution. Apply steady pressure on clamp with body in vise using first stage handle or while using handle as above with rubber pad. Do not use mallet or sudden force!
Air escaping from Din/Yoke connection	Filter/ oring misaligned, o ring crushed, torn, or missing. Connection not torqued properly. Disassemble and reassemble with more care. Replace O-ring if necessary. Wrong duro o -ring has failed – must be 85-90 duro.
DIN retainer/housing comes loose	Improper torque applied. DIN housing must be torqued to 230 inch pounds. DIN retainer torqued to 150 inch pounds.
Yoke assembly loosening	Improper torque applied. Yoke retainer must be torqued to 230 inch pounds.
Regulator breathing wet	Check exhaust and main diaphragms. Ensure 1 st stage has not been flooded. Check hoses. Check hose connections.

