

SRB 9710 | SRB 9910
OASIS | BLIZZARD
SECOND STAGE
SERVICE GUIDE



www.SherwoodScuba.com

INTRODUCTION

The instructions set forth in this document are intended to guide the experienced scuba equipment repair technician through the standard service procedure for this Sherwood regulator.

It is assumed that the technician possesses basic scuba equipment repair training, proper tools and the skill necessary to perform the service. If you have not received regulator service training provided by Sherwood Scuba specifically for this equipment, do not attempt to perform the service described in this document.

Service parts for Sherwood equipment are sold only to Authorized Sherwood Dealers.

Before attempting to perform service read this manual in its entirety. There are warnings and cautions contained in the manual that may affect your safety or the safety of the regulator user.

If you are uncertain as to whether you are qualified to perform this service contact your regional Sherwood Scuba Distributor for technical assistance.

USE OF WARNINGS, CAUTIONS AND NOTES



WARNING: Indicates a potentially hazardous condition or situation which, if not avoided, may result in serious injury or death.



CAUTION: Indicates a potentially hazardous condition or situation which, if not avoided, may result in minor injury. It may also be used to alert against unsafe practices.



NOTE: Indicates an important point or reminder.

REGISTRATION, INSPECTIONS AND SERVICES ON-LINE REGISTRY.

All Sherwood regulators have to be registered right after purchase, either by the end consumer or the dive center where the item was acquired. If the dive center is not capable to register the product for the end-consumer at the time of purchase, the sales associate from the dive center has to strongly encourage the end-consumer to register the product as soon as possible.

Effective immediately: recording inspections and services is required to ensure the proper continuity of the warranty process. Regardless of location, proper record keeping by the authorized dealer is required right after each inspection or service is performed.

When the regulator is going to be used for recreational purposes a year or 150 dives after purchase an inspection is required; a year after such inspection or when the regulator has completed 300 dives a full service is required. Time frames may be different when the regulators are going to be used for public service, rental or instructional use. Please contact your local Sherwood Sales representative for additional information to discuss particular cases and usage.

Website:

Using your dealer credentials at HYPERLINK "<http://www.sherwoodscuba.com>" www.sherwoodscuba.com locate the Product Warranty tab and follow the instructions:

WHEN TO SERVICE

This Sherwood regulator should be **inspected** for service **at least annually**. In most cases a simple inspection, and if needed, minimal adjustment not requiring the replacement of parts will be sufficient for continued use.

Guidelines for the Annual Inspection are included in this manual.

Sherwood regulators are designed and tested to perform acceptably under typical recreational diving conditions up to 300 hours of use.

If the regulator has been subjected to **more than 300 hours of use** or it has not received the benefit of careful post-dive cleaning and storage in a clean environment, a **standard service overhaul** is required.

In any case the Sherwood regulator described in this manual should receive a standard service overhaul **at least every two years** to maintain optimal performance. The standard service overhaul includes disassembly, cleaning, inspection, replacement of seals, lubrication, reassembly and adjustments.

Regulators that are used in extreme conditions, such as commercial use or rentals require more frequent service overhauls of at least every 3 to 6 months.

Sherwood Scuba offers a standard service kit that contains the parts recommended to be replaced in connection with the standard service overhaul.

ANNUAL INSPECTION GUIDELINES

1. Visually inspect the first and second stage for signs of damage or deterioration. Mouthpieces with tears or other damage should be replaced.
2. Retract hose protectors and inspect the hose over its entire length for signs of damage including blisters, deep cuts or separation at the crimped fittings. If these signs are present the hose must be replaced and standard service overhaul is recommended.
3. Insert a soft probe through the exit port of the exhaust cover and lift the Exhaust Valve to inspect it for cuts, tears or contaminated surfaces. Perform this examination from both sides of the Exhaust Cover to observe the entire perimeter of the Exhaust Valve. If damage to the Exhaust Valve is found a complete overhaul is recommended. If the Exhaust Valve or the sealing surfaces on the Housing are contaminated with debris, the Exhaust Cover must be removed and the surfaces must be cleaned. Instructions for removing and replacing the Exhaust Cover appear in the Second Stage Service Guide. As a final check of the Exhaust Valve apply a moderate suction (approximately minus 5 inches of water, moderate inhalation effort) to the second stage mouthpiece with the air supply closed and the second stage purged. If leakage is detected a complete overhaul is recommended.
4. Inspect the first stage filter for evidence of contamination. Discolored filters indicate previous contact with contaminated air. If evidence of contamination is present it is recommended that a standard service overhaul be performed. In addition you should advise the customer that the regulator has been exposed to contamination and that previously used air cylinders used should be inspected.
5. Install an intermediate pressure gauge into one of the available LP ports.
6. Pressurize the regulator to approximately 500 psi and inspect for leakage. Note intermediate pressure. It should not be greater than 150 psi. If no leakage is detected increase inlet pressure to 3000 psi. Again check intermediate pressure. It should not exceed 150 psi. If intermediate pressure is out of range 145 +/- 10 psi or leakage is present a standard service overhaul is recommended.
7. Test the purge function. If there is not a strong surge of air, a standard overhaul is recommended.
8. Gently submerge the entire regulator and look for bubbles that indicate leakage. If leakage is present a standard service overhaul is recommended.
9. If a test bench is available perform an inhalation test. Inhalation effort should not be greater than 2.0 inches of water at opening and less than 5.0 inches of water at 1.5 SCFM. If a test bench is not available perform a subjective breathing test. When properly adjusted the regulator should provide smooth and easy inhalation. If difficulty with inhalation is suspected a standard overhaul is recommended.

GENERAL COMMENTS

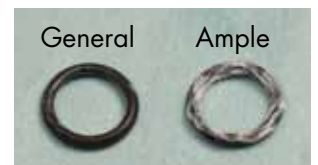


NOTE – Read this section before attempting to perform service.

1. Read the entire set of procedures that follows before starting to service. Steps taken out of sequence or without the knowledge of the proper procedure could damage the regulator or otherwise complicate the service process.
2. Refer to the Illustrated Parts List while performing service. Each part is identified with an item number the first time it appears in the text. Parts that are to be replaced with new parts in conjunction with an overhaul have encircled reference numbers.
3. Do not attempt to reuse parts that are designated for replacement. Retain discarded parts to show to the customer to illustrate that a full overhaul service has been completed.
4. Work in a clean properly equipped area. Cleanliness is essential for all regulator servicing and is critical for regulators that will be exposed to enriched air mixtures (Nitrox). Do not attempt to service if all required tools and a clean work area are not available.
5. Work on one regulator at a time taking care not to mix parts from other regulators. Use only genuine Sherwood parts. Parts that appear similar may have different features that are not easy to detect and may cause poor performance.
6. Be careful to protect the finish on all surfaces of the regulator during the service procedure. When holding parts in a vise use soft or padded jaws to prevent defacing surfaces.
7. O-rings are classified by the service they perform and are identified as either **static** or **dynamic**. **Dynamic** O-rings are those that are subjected to movement and the effects of friction which tend to shorten the useful life of the O-ring. **Static** O-rings are used to create a seal between non-moving parts and are not subject to the same wearing effects. **Static** O-rings have a longer useful life and are not replaced unless they show signs of deterioration or brittleness. Careful inspection of these O-rings is required before they are returned to service.

Lubrication of O-rings:

- a. All lubrication must be done with Tribolube 71 or Christolube MCG-111.
- b. General – O-rings in most instances should receive only enough lubricant to ensure they are supple. A light coating of lubricant should present a surface that glistens but without a defined layer of lubricant visible.
- c. Ample – When an ample application of lubricant is specified it generally applies to a dynamic O-ring subject to considerable motion or environmental conditions where a more generous application of lubricant might be beneficial. In this situation there should be a light film or layer of lubricant visible.



8. When removing O-rings use a plastic or a soft brass tool to lift the O-ring out of its groove. Do not use steel or other hard tools that might scratch sealing surfaces.
9. When instructed to use tools such as a hex key or a wrench, follow the standard convention to rotate clockwise to tighten and counterclockwise to loosen unless otherwise directed.
10. When instructed to tighten a part until snug, it means to apply torque just until the part stops moving freely and the torque requirement to advance it further rises markedly. When specific torque specifications are given there is a necessity to ensure that the part is tightened enough to retain position or to create a seal. Unless you are skilled at accurately estimating torque, a torque wrench should be used. Excessive torque may damage parts and require replacement.

ENRICHED AIR NITROX SERVICE

The Sherwood regulator presented in this manual has been designed and manufactured to allow the use of Enriched Air Nitrox (EAN) gas with an oxygen component not to exceed 40%.

In order to maintain this option the user must ensure that the regulator is protected from the introduction of hydrocarbons. The introduction of hydrocarbons into the regulator may increase the risk of fire when used with EAN.

When servicing the regulator, the technician must be aware of this requirement and exercise caution not to contaminate the regulator with hydrocarbons. This requires a clean workplace, free of oil, grease, debris and other contaminants. Additionally in order to return the regulator to EAN service, the overhaul procedure must have a cleaning provision to remove all hydrocarbons before the regulator is reassembled. Do not substitute parts or use lubricants other than Tribolube 71 or Christo-Lube MCG 111. Silicone lubricants are not acceptable and increase the risk of a fire hazard.



WARNING – The introduction of hydrocarbons, lint, dirt and other contaminants into the areas of the regulator subjected to high pressures (greater than 500 psi) and EAN mixtures containing more than 40% oxygen may constitute a fire hazard and may subject the user to serious injury.

FACILITY REQUIREMENTS

The service facility is perhaps the most important asset of any professional dive store. It should be clean, well lighted, and stocked with a complete inventory of parts and manufacturer's specialty tools for the products your store sells. As a minimum requirement, your service facility should be equipped with the following items:

- Ultrasonic Cleaner - Select the right size model that can keep up with the volume of regulators that your store services. A built-in timer and heater will help control the cleaning time and temperature of the solution, since most solutions work best when heated.
- Bench Mounted Padded Vise - A vise is sometimes needed to hold the regulator secure – especially when removing the first stage yoke retainer. Special care must be taken, however, to avoid damage that can result from improper use of this tool. Vise must be lined with soft material like rubber or wood. Be sure to follow the instructions provided in this manual.
- Magnification Lamp - Strong lighting and magnification are essential requirements for performing a thorough parts inspection - especially when locating the cause of a small leak.
- Quality Wrenches & Sockets - When working with chrome plated brass parts, it is especially critical to use the correct size wrench and to ensure that it fits properly over the part. The use of an adjustable wrench is very likely to cause damage to your customer's regulator, and should be strictly avoided at all times.
- Calibrated Inch-Pound Torque Wrench - it is important to follow the manufacturer's torque values whenever they are specified, in order to avoid overtightening or under tightening a part. This is especially important for smaller parts and fittings, when overtightening can easily damage the part.
- Calibrated Foot-Pound Torque Wrench - Torque wrenches that can be set for both inch-pound and foot-pound measurements generally tend to be less accurate than wrenches that are designed to measure torque within a specific range.
- Manufacturer's Specialty Tools - Specialty tools are critically important to performing each step of disassembly and reassembly according to each manufacturer's procedures. Sherwood specialty tools are required to perform service are listed on the following page.



FIRST STAGE

RECOMMENDED TOOLS AND SUPPLIERS

The specialty tools identified below may be purchased from your Sherwood Scuba Distributor. Common tools are available from several sources.

Common Tools

Open End Wrenches - 9/16", 5/8", 1/2"
 Box End Wrench – 3/4"
 Hex Keys 1/4", 5/32", 1/8"
 Small Flat Blade Screw Driver
 Torque Wrenches 25 ft-lb and 60 in-lb
 Flashlight
 Compressed Air Gun
 1/4" x 6" wooden dowel
 O-ring picks, plastic or soft brass
 Magnifier

Specialty Tools

First Stage Spanner	20-600-200
Yoke Retainer Socket	20-155-200
Breaker Bar	20-157-500
Snap Ring Pliers	10-101-500
3/8" Drive Extension	20-156-500
Schrader Valve Tool	12-100-500
Intermediate Pressure Gauge (0-300 psi)	20-510-100
Pressure Test Tool w/ Syringe	20-750-500
Blunt Probe	10-120-400
Brass Probe Set	10-102
Back up Ring Installation Tool	20-900-400



SECOND STAGE

RECOMMENDED TOOLS AND SUPPLIERS

The specialty tools identified below may be purchased from your Sherwood Scuba Distributor. Common tools are available from several sources.

Common Tools

Open End Wrenches - 9/16", 5/8", 1/2"
 Hex Tool 5/32"
 Small Flat Blade Screw Driver
 Diagonal Pliers (wire cutters)
 Torque Wrenches 25 ft-lb and 60 in-lb (25 N-m and 10 N-m)
 Flashlight
 Compressed Air Gun
 O-ring picks, plastic or soft brass
 Magnifier

Specialty Tools

Poppet/Orifice Installation Tool	20-900-100
Blunt Probe/Pick	10-20-400
In-Line Adjustment Tool	20-500-200
Height Gauge	20-900-250
Flat Screwdriver (5-piece set)	11-090-500

SECTION 2 DISASSEMBLY PROCEDURE

1. Use a 3/4" (19mm) open end wrench to stabilize the inlet connector (9) and a 5/8" (16mm) wrench to rotate the hose fitting nut counterclockwise to separate the hose assembly (26) from the inlet connector.

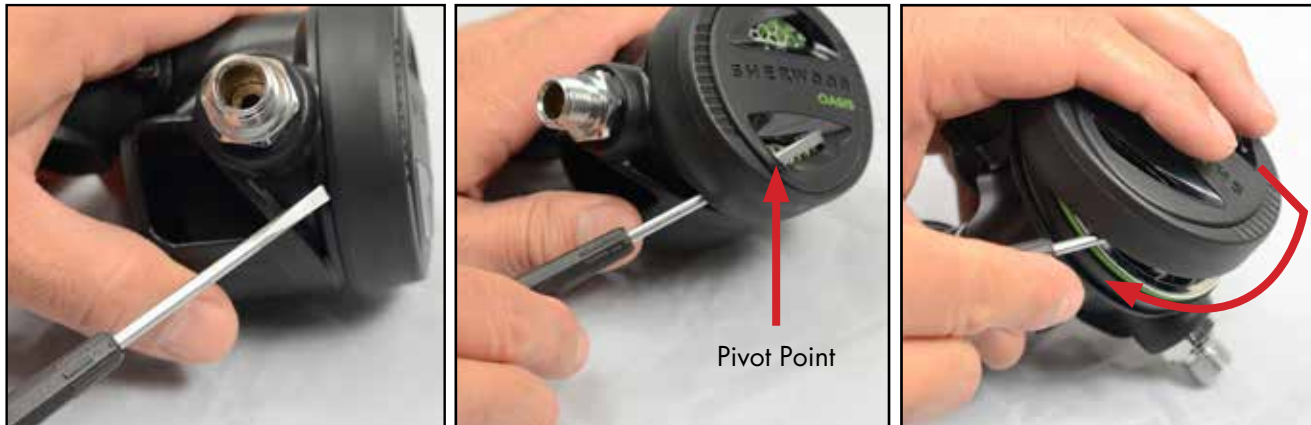


2. Remove the tie wrap (17) and mouthpiece (25).



CAUTION – When performing the next step to remove the Purge Cover be careful to avoid placement of the probe or screwdriver between the Housing and the Diaphragm Retainer. Incorrect placement of the screwdriver may increase the risk of damage to the Diaphragm requiring replacement of the part.

3. Remove the purge cover (22) by inserting a probe at the entry point on the housing and lift the edge of the cover. Slide the tool clockwise about the pivot point until cover comes loose. Make sure to hold the cover with your hand to keep the cover from flying off.



4. Remove diaphragm retainer (24) and diaphragm (23).
5. To remove the C-clip (18) first align the clip slot with the lower circular mark in the housing as shown. Using the small screwdriver, pry outward and downward slightly.



6. Push the access plug (14) to remove it from the housing.



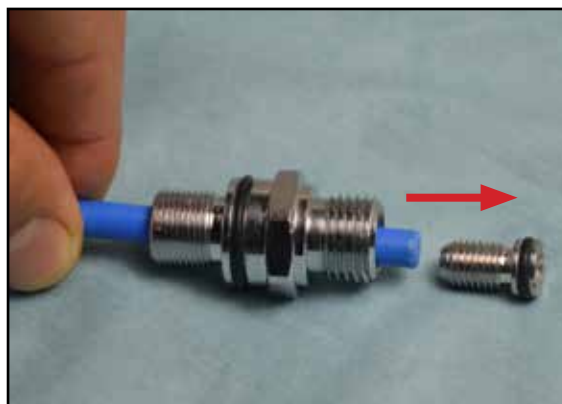
7. Remove the O-ring (11) from the access plug and set aside for cleaning (it will be reused).
8. Use a 3/4" (19mm) wrench to remove the inlet connector from the housing. Remove O-ring and set aside for cleaning.



9. Slide valve body (1) back and lift upward to remove it from the housing.



10. Use Orifice Installation Tool (20-900-100) to remove the adjustable orifice from the inlet connector. The adjustable orifice is threaded and must be rotated counterclockwise and then pushed with a blunt probe for removal.



11. Remove and discard O-ring (**10**).



12. Remove the exhaust tee (**16**) from the housing by removing the two screws (**15**).
13. Remove the exhaust valve (**13**) from the housing by grasping the valve and stretching the tab to release it from the housing.



14. Release some of the spring load by rotating the adjuster screw (**3**) counterclockwise.



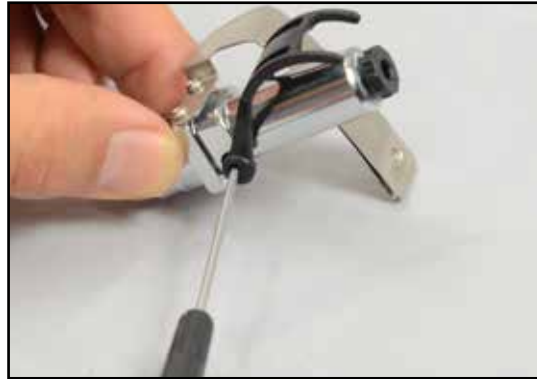
15. Gently lift one side of the lever off the cam and move to the side.



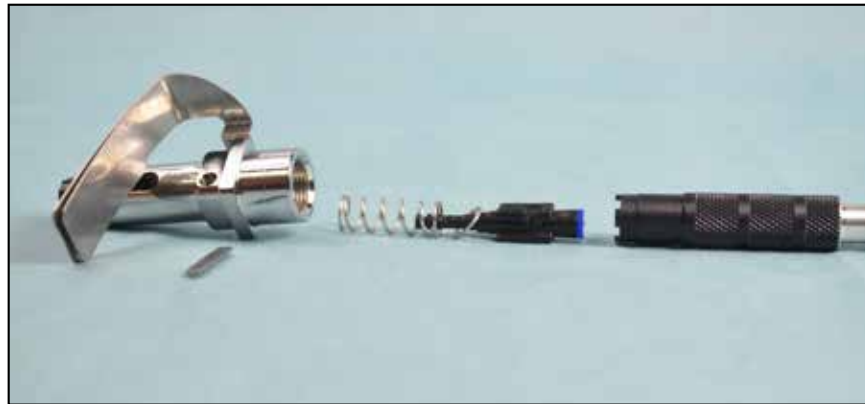
16. From the opposite side, push the cam slightly, only until the other leg of the lever is free



CAUTION – Do not push the cam all the way through or the poppet will shoot out at the end of the valve body.



17. Use tool 20-900-100 to push the poppet enough to compress the spring and relieve tension on the cam. Remove the cam slowly and release tension on the poppet. Remove the poppet, spring and thrust washer.



18. Remove Adjusting Screw by rotating it counterclockwise completely until it is out.



19. Grasp the Poppet Seat and pull to separate it from the Poppet. Discard the Seat.



This concludes the disassembly process. Proceed to Cleaning and Inspection before beginning reassembly.

SECTION 3

GENERAL CLEANING PROCEDURE

20. Thermoplastic, silicone rubber and anodized aluminum parts, such as diaphragms, accent trim, adjustment knobs, static O-rings, and thermoplastic housings.
- Soak in a solution of warm water and ordinary liquid dish detergent. Scrub with a soft nylon bristle brush to remove deposits.
 - Do not subject thermoplastic or rubber parts to ultrasonic cleaning or vinegar solutions.
 - Rinse with fresh water and blow dry with clean low pressure compressed air.
21. Chrome-plated Brass and Stainless Steel parts –
Use a commercial grade Ultrasonic Cleaner with LFW (Lawrence Factor Wash). LFW could be used diluted but at no less than 50% cleaner-water ratio to ensure good penetration and mineral build up removal. (Follow manufacturer's recommendations for your particular ultrasonic cleaner brand).

A heated ultrasonic cleaner will accelerate the cleaning process; most mineral buildup on heavily soiled metallic parts can be cleaned with a 10-15 minute treatment with LFW diluted at 50% on a heated ultrasonic cleaner.



WARNING – When heavy corrosion has developed, metallic parts will lose their chrome-plating after time. The use of an ultrasonic cleaner may accelerate such loss and a chrome “peeling” process will increase. If the parts you are intending to clean present heavy corrosion be cautious and continue monitoring the parts immersed in the ultrasonic cleaner periodically. Start the process by using the ultrasonic cleaner for only 2-3 minutes, extract the part (s) and evaluate the chrome-plating for peeling.

If in doubt clean using just warm water, soap and brush. If after a preliminary cleaning sealing surfaces present heavy pitting and substantial damage it is advisable to replace the whole part after the pre-inspection.

Alternatively the use of household vinegar or warm water and a brush could be considered as a method to clean metallic parts but be mindful that such processes may not go to deeper ends of some metallic parts such as small inner threads, channels, sealing surfaces, etc, and corrosion build up may remain. The use of an ultrasonic cleaner proves valuable when sealing or friction surfaces can't be reached easily.

Regardless of the method used, rinse all metallic parts right after the cleaning process thoroughly with fresh water and blow them dry with compressed air.

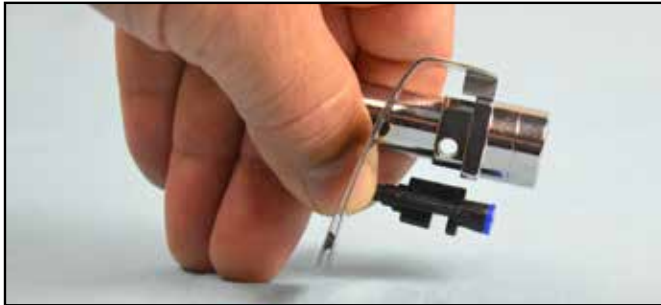
22. Hoses -
- Corrosion or mineral deposits on the metallic fittings on hoses may be cleaned using the procedure presented above provided that care is taken to just dip only the metal fittings at each the end of the hose into the cleaning solution. Take care to prevent entrance of the solution into the hose interior.
 - Rinsing should include flushing the interior of the hose with fresh water followed by drying with compressed air.

SECTION 4 REASSEMBLY PROCEDURES

23. Install a new poppet seat into the poppet.
24. Install the adjustment screw into the valve body with an initial insertion of only one and a half to two and a half threads showing. (Oasis & Blizzard).



25. Place spring (7) inside valve body (1).
26. Install Thrust Washer onto the Poppet and then use Poppet Installation Tool to guide Poppet and Thrust Washer into the Valve Body. Note that notch in the poppet must align with the cross hole in the valve body. After the poppet is aligned, insert the cam with the flat side facing toward the spring to capture the poppet.



27. Reinstall lever onto the cam – orient the lever properly as shown.



WARNING – Failure to install the lever with the proper orientation as shown will cause extremely poor performance and the cam to eventually dislodge from its position once the valve body is mounted into the housing. If the regulator is used with the wrong lever orientation it will lead to a dangerous catastrophic failure underwater.

28. Install the cleaned O-ring (**11**) onto the inlet connector. Note the O-ring groove is closest to the end with fine threads.
29. Install a new generally lubricated lubricated O-ring (**10**) onto the Adjustable Orifice and then insert the adjustable orifice into the Inlet Connector. Note that insertion is at the end of the inlet connector with the coarse threads. Use the Orifice Installation Tool 20-900-100 to thread the adjustable orifice rotating it clockwise until it comes to a stop. Then rotate the Adjustable Orifice counterclockwise two and a half turns. This will establish the approximate correct Demand Lever height after the Inlet Connector is installed.



30. Install the cleaned exhaust valve into the housing. Be certain that the tab is captured in the hole in the housing and that the exhaust valve fully closes.
31. Install the exhaust tee and secure with the two screws.
32. Install the valve body into the housing aligning the square feature on the valve body with the indexing feature in the housing.





CAUTION – Before performing the next step retract the Poppet from the Adjustable Orifice by fully depressing the Demand Lever. Rotation of the Adjustable Orifice without retracting the Poppet may result in damage to the Poppet Seat necessitating replacement of the seat.

33. Install the Inlet Connector into the housing taking care to depress the demand lever fully to retract the poppet to prevent contact with the adjustable orifice as the inlet fitting is rotated during insertion. Use a 3/4" (19mm) wrench to tighten. (Apply approximately 40 in-lbs (4.5 N-m) torque).
34. Install a cleaned and lubricated O-ring (**11**) onto the Access Plug and insert the Access Plug into the housing. Secure with the C-clip.
35. Remove the port plug from the Access Plug.



NOTE – The following information describes the recommended process for adjusting the Demand Lever height. This process requires the use of the In-line Adjustment Tool (20-500-200).

36. Temporarily attach the partially assembled second stage to a fully assembled and adjusted first stage with an intermediate pressure set at 140 +/- 10 psi (9.6 +/- 0.7 bar). Place the In-line Adjustment Tool 20-500-200 between the hose and the inlet connector.



37. Pressurize the regulator so that intermediate pressure acts on the second stage. The pre-set performed on step 29 will potentially lead to a slight air leak by the poppet until a final adjustment is made. Use the in-line Adjustment Tool to correct the air leak if present. Always depress the lever while orifice adjustments are made to prevent friction from the orifice against a static LP seat that could potentially damage it. If the 2nd stage is fully assembled and a re-adjustment is required depress the purge surface while performing the orifice rotation. Using the In-Line Adjustment Tool rotate the Adjustable Orifice counter clockwise until leakage is present, then rotate clockwise until leakage stops. Starting from the position where leakage just stops, continue rotating the Adjustable Orifice clockwise one-eighth of a turn. This should result in the opening effort to be within the recommended limits for this regulator.
38. Install the diaphragm and diaphragm retainer using alignment marks.



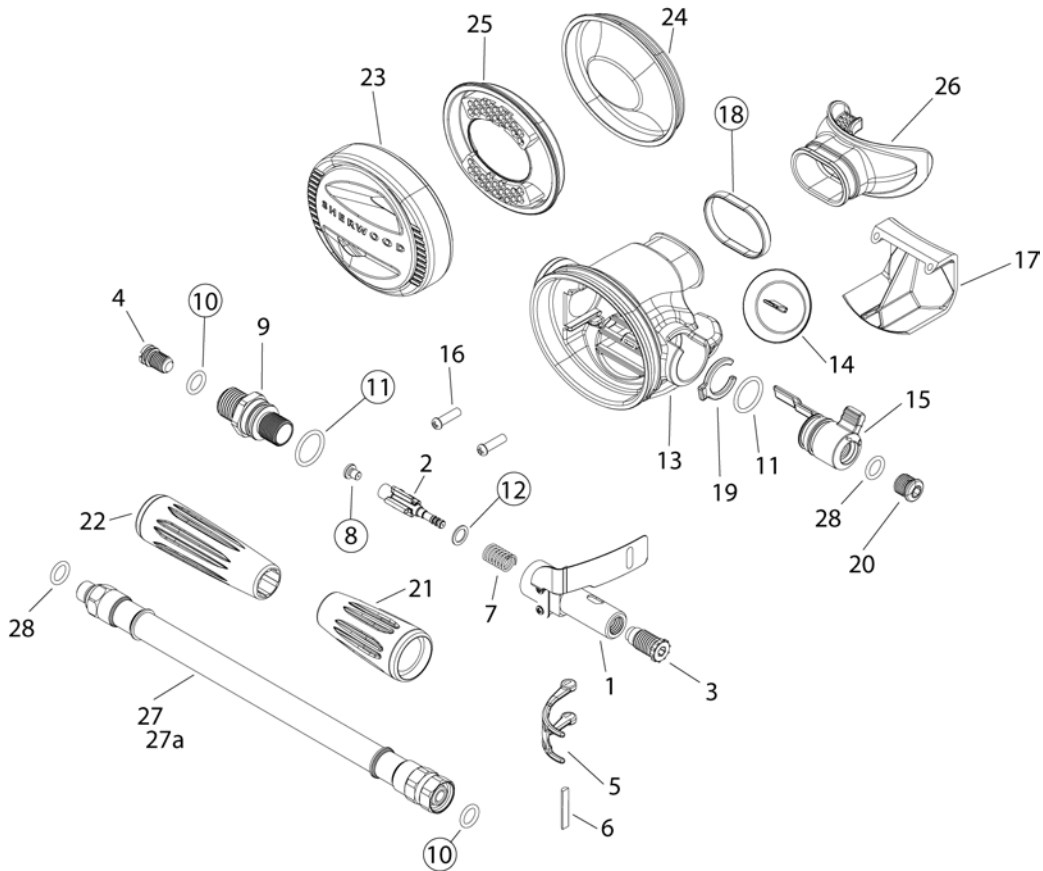
39. Install purge cover. If an air leak is detected when the purge cover is installed the demand lever may be set too high. Repeat step 37 if necessary.
40. Depressurize the regulator assembly and remove the In-Line Adjustment Tool. Install the hose assembly and tighten the swivel nut to approximately 40 in-lbs torque. Push the hose protector toward the housing to cover the hose fitting completely.
41. If you have access to a gauge for measuring 0 to 3 inches of water (0.75 kPa) attach the gauge and measure initial opening effort. It should be between.

BRUT	1.8 – 2.0
MAGNUM	1.6 – 1.8
OASIS	1.5 – 1.7
BLIZZARD	1.5 – 1.7

If it needs to be adjusted, insert the 5/32" (4mm) Hex Tool in the Adjustment Screw and rotate it clockwise to increase effort and counter clockwise to reduce opening effort.

42. Install the LP port plug into the access plug.
43. Install the Mouthpiece and secure with a tie wrap.

This concludes the reassembly procedure.

OASIS – BLIZZARD SECOND STAGE

ITEM	PART #	DESCRIPTION
1	SHV7014	Valve Body
2	SHV7020	Poppet
3	SHV7019	Adjustment Screw
4	SHV7016	Adjustable Orifice
5	SHV7015	Demand Lever
6	SHV7018	Lever Cam
7	SHV7017	Spring
8	SHV7005	Poppet Seat
9	SHV7013	Inlet Connector
10	SHV7071	O-ring
11	SHV7070	O-ring
12	SHV7021	Housing
13	SHV7006	Exhaust Valve
14	SHV7022	Access Plug

ITEM	PART #	DESCRIPTION
15	SHV7027	Screw
16	SHV7024	Exhaust Tee
17	SHV7026	Tie Wrap
18	SHV7025	C Clip
19	SHV7023	Port Plug, LP
20	SHV7032	Hose Protector, Short
21	SHV7031	Hose Protector, Long
22	SHV7095	Purge Cover
23	SHV7090	Diaphragm
24	SHV7012	Diaphragm Retainer
25	SHV7028	Mouthpiece
26	SHV7530	Hose Assembly w/ O-ring
27	SHV7075	O-ring