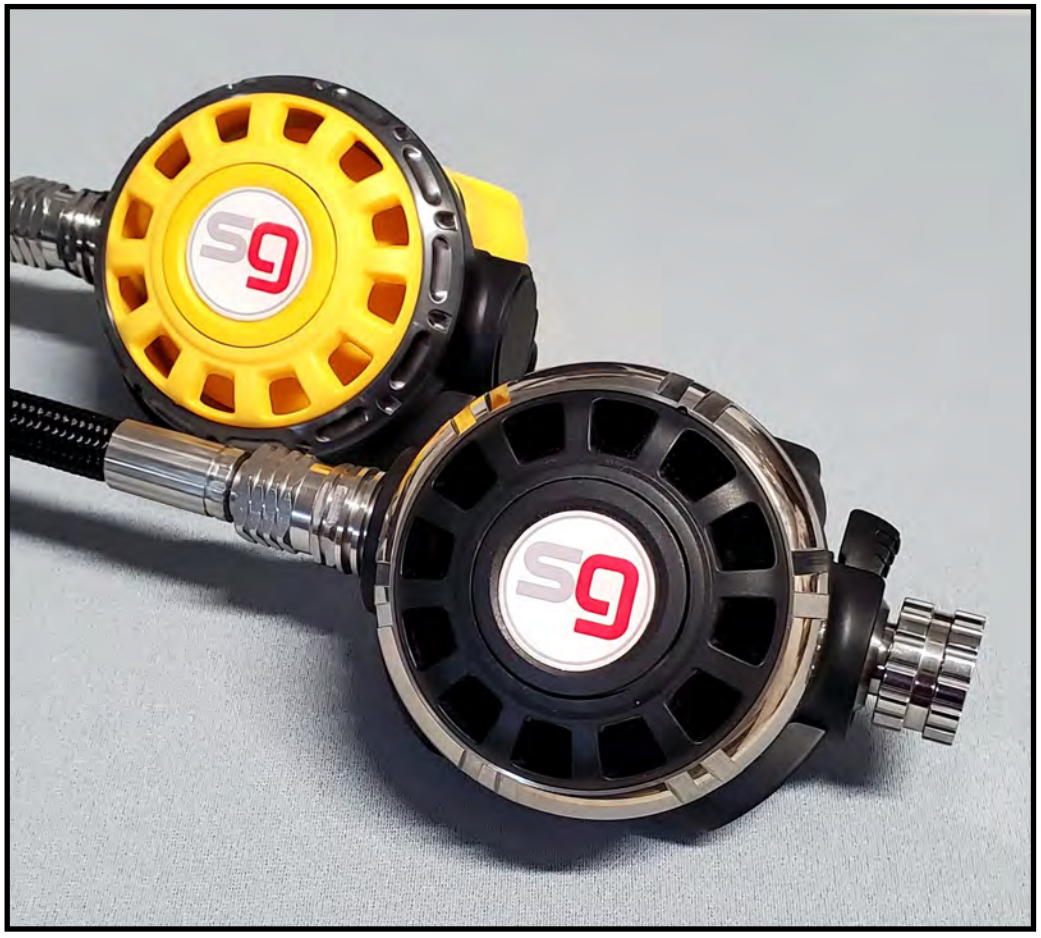
Scubagaskets



SGT4 Second Stage
SGT3 Octo
Service & Repair Manual

Table of Contents

Record of Revisions

1. Initial Release, May 2025

Written for Scubagaskets, Ltd. by
Robert Singler, NapaScuba, LLC.
May, 2025

INTRODUCTION

This manual is intended only to describe to experienced maintenance personnel the procedures for the proper service and repair of the Scubagaskets regulator products described in this manual. It should not be used as an instruction manual for regulator repair by untrained personnel or consumers. If you do not fully understand all of the procedures listed in this manual, do not attempt service.. The availability of replacement parts and Service Kits from Scubagaslets does not imply qualification to service scuba equipment. If you have questions about a listed procedure, please contact the Scubagaskets technical department at info@scubagaskets.com.

SAFETY PRECAUTIONS

This manual provides step-by-step instructions for the inspection, cleaning, reassembly and testing of the Scubagaskets SGT4 primary and auxiliary second stage regulators. It is recommended that the technician performs all steps in the order given, without skipping steps or taking shortcuts. Please read this manual in its entirety before starting service. Pay close attention to all WARNINGS, CAUTIONS, SPECIFICATIONS and NOTES that are intended to draw your attention to steps, techniques or procedures that may damage the equipment, or be dangerous to the technician or the diver, if not followed correctly.

Definition of Warnings, Cautions, Notes and Specifications:

A WARNING indicates a procedure or situation that may result in serious injury or death for either the technician or the diver if not performed correctly.

A CAUTION indicates a situation or technique that may result in potential damage to the product, or render the performance of the regulator outside of its specification limits.

A Note is used to emphasize an important point or tip that may improve the effectiveness of service.

A Specification is a limiting torque or pressure range limit that MUST be adhered to for safe function of the regulator. Deviation may result in damage to the equipment, serious injury to the technician or diver, or death.

DIVING CONDITIONS:

This Scubagaskets regulator is designed for use in water temperatures above 50ºF (10ºC). Cooler water may cause the regulator to be more sensitive to freeflow or freezing. Users of Scubagaskets regulators in conditions outside of those in which the regulator was certified are advised to obtain specific training in cold water diving to avoid serious injury or death.

MAINTENANCE SCHEDULE:

Regulators are subject to a variety of environmental factors that may affect product performance over time. A complete regulator service is required every two years, or every 100 dives, whichever comes first. An inspection is required annually, or every 50 dives, whichever comes first.

Inspections and overhauls must be documented in the Service and Inspection Record at the end of this Manual to maintain the product warranty.

PRE-SERVICE INSPECTION:

Pressurize the regulator set and immerse it in water. Document the absence of leaks from any regulator, hose or connection. If a leak is noted, perform the appropriate service (which may include a complete service).

Occlude the first stage gas inlet (or the hose connection if the second stage is disconnected) and gently inhale from the second stage mouthpiece. It should not be possible to draw air. Any leak must be investigated during service. While an exhaust valve fault or mouthpiece tear are most common, there are numerous other case seals which must be evaluated via a full service.

Visually inspect the mouthpiece for distortion, cracks or holes. Replace the mouthpiece as necessary.

Confirm that second stage opening force (cracking effort) is within specification. In the absence of a leak from the second stage, only retuning is required if opening force is outside specification, unless the service interval has passed.

Check that the Adjustment Knob and Venturi Lever both operate smoothly. Any grittiness or sticking during operation should prompt disassembly and cleaning, and may warrant a full service.

Visually inspect the second stage exhaust valve to see whether it is in good condition and whether the sealing surface is clean.

The infrequently used regulator:

Do not assume that a regulator is in good condition because it is not often used, or just because it has been well stored. Corrosion can occur from moisture present during storage, and o-rings naturally become distorted over time, which may result in a loss of seal. The second stage is particularly susceptible to loss of tune during storage, due to spring pressure on the low pressure seat.

WORK AREA AND TOOLS:

Regulators should be serviced and repaired in a clean, well-lit work area. As each regulator is disassembled, its parts should be separated from those of the other regulators. Proper disassembly and reassembly requires several specialty tools. For a complete list of tools required for service, see Table 2 (page 23).

O-RING REMOVAL:

Whenever removing an o-ring, care must be taken not to damage the surfaces of adjacent sealing lands. Tools used to remove o-rings must not have sharp edges that could scratch the metal sealing surface. Insertion of the point of an o-ring pick should always be performed nearly parallel to the o-ring. Scubagaskets strongly recommends that all o-ring removal tools be made of brass or plastic, except when otherwise specified.

Even a small scratch on the surface of an o-ring land can cause a leak. Once the land is damaged, the part must be replaced.

LUBRICATION:

This regulator is delivered cleaned for use with Nitrox up to EAN40. Scubagaskets recommends the use of only Crystal Lube®, Tribolube 71, Christo Lube MCG-111 or equivalent. Liquid or spray lubricants are not authorized, and silicone-based lubricants are specifically prohibited. Use of an incompatible lubricant will void the use of this regulator with any diving gas other than air. Do not lubricate threads unless specifically indicated.

WARNING Torque values for this regulator have been engineered for DRY threads, except where noted. Lubricating a thread engineered for dry torque application will increase the load on the part. This may cause part failure during a dive, which may be fatal!

DISASSEMBLY:

CAUTION Before disassembly, refer to the schematic on page 19, which shows all parts that are normally replaced during service. The specified parts should be replaced with new items and should not be reused, regardless of the age of the regulator or how many times it has been used since the last service.

1. Using a thin-profile 11/16 open end wrench, secure the heat exchanger (1) and remove the hose with a second wrench of appropriate size.

2. Using a thin brass or plastic pick, or a double-hook pick, remove the o-rings (27, 29) from inside the hose swivel and at the first stage end, being careful not to scratch the o-ring lands.

3. Inspect the hose crimps. The crimps should be free from damage and the hose should not rotate in the crimp. If it does, the hose must be replaced.

4. Unscrew the Retaining Ring (32) and lift out the Purge Cover (25). To avoid tearing the thin skirt of the diaphragm, use a **blunt** plastic pick or brass spade to gently break any seal between the case and the rim of the diaphragm (24), and then lift it out. Inspect the diaphragm by holding it up to a bright light and gently stretching it in segments. The diaphragm should be soft and undamaged, with no holes or tears. Replace the diaphragm if there are any signs of damage.

5. Loosen the heat exchanger (1) with an 11/16" open end wrench, and unscrew it **only approximately 3mm**. Do not completely remove the heat exchanger in this step.

6. Holding the regulator firmly in one hand, strike the heat exchanger with the palm of your hand to break the valve barrel free of any verdigris corrosion or salt crystals binding it to the case.


CAUTION Failure to take this simple step, and instead completely removing the heat exchanger, may cause sudden loosening of the valve barrel in step 9 below. This may damage the lever tips as they strike the opposite side of the case.

7. Now completely remove the Heat Exchanger (1), and if accessible, remove o-ring (2) from the threaded end of the valve barrel. If it cannot be easily retrieved, it can be retrieved from the case after step 9 below.

8. Before removing the valve barrel, turn the Adjuster Knob (13) counterclockwise until it stops. This locks the Knob Retention Pin (22) in place and prevents its unexpected loss when the Venturi Sleeve (11) is removed in a later step.

9. Depress the Lever (23) against the Valve Barrel (3). Grasping the Venturi Sleeve (11) or its lever, gently pull the entire assembly out of the case. Do not let the Lever strike the side of the case. Avoid pulling on the Knob Adjuster, as the Venturi Sleeve may remain in the case, potentially allowing the Knob Retention Pin to fall out and become lost. Retrieve o-ring (2) at this point if it has not yet been removed.

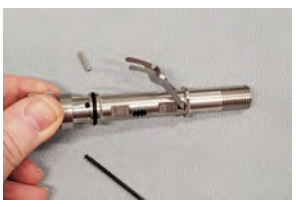

10. Slide the Venturi sleeve 1cm toward the lever. While depressing the Lever, rotate the Venturi Sleeve (11) 180º until its broad flange covers the lever, and slide it over the lever and off the Valve Barrel. Remove its o-ring (10).


11A. It is generally <u>not</u> necessary to remove the lever for service. Doing so risks bending the delicate legs and cracking a leg as the lever is reshaped. Instead, consider skipping to step 12 below.

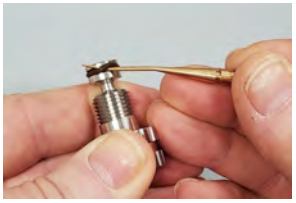
11B. If removal of the lever is desired, <u>carefully</u> pull one leg from the square hole in the Valve Barrel. Now lift the lever past the vertical position, and gently slide that leg up and over the barrel, until the other leg can be pulled free.

CAUTION The Lever (23) is extremely delicate. Deforming the lever may create a stress fracture in the metal if it is reshaped for reassembly. This may cause lever failure and valve shutoff during a dive, which may be fatal. Do not remove the lever unless you can do so without permanently deforming the legs. Do not reshape a bent lever.

12. Rotate the Adjuster Knob (13) one-half turn clockwise, and push the Knob Retention Pin (22) out of the Valve barrel with a thin tool. It may be necessary to soak this end of the valve barrel in warm diluted vinegar for 10 minutes to remove salt crystals if the pin is stuck.

13. Unscrew the Adjuster Knob completely, gently pulling it past the internal threads in the Valve Barrel. Remove o-ring (12) with a thin pick.

14. Unscrew the Microadjuster from the Adjuster Knob at least seven turns, using a 4mm hex key. Use a 2mm hex key to push out the microadjuster from the end, and remove o-ring (33) with a thin pick.


14. Turning your attention to the Valve Barrel, tilt it threaded end up, and the Balance Chamber (21) and Spring (20) may fall out. If not, handle the barrel carefully during poppet removal to avoid losing parts.

15A. If the lever has been removed, push a thin dowel through the hole in the Orifice (14) inside the threaded end of the Valve Barrel, and gently push out the poppet assembly (parts 16-21). If the Balance Chamber and Spring have already fallen out, simply push out the poppet.


15B. If the lever has not been removed, take a common zip-tie or other thin shim, and insert it between the Valve Barrel and one leg of the lever. Now loop the zip tie over the top of the barrel, and insert it (or a second thin shim) between the Valve Barrel and the other leg of the poppet. This will gently spread the legs of the lever approximately 1mm on each side, allowing the poppet to slide past. Now **gently** push a 3mm dowel through the hole in Orifice (14) and see if the poppet assembly (parts 16-21) falls free. If the poppet assembly does not push out, the lever must be removed.

16. Using a fingernail, remove the LP seat (16) from the Poppet (17). With a thin pick, carefully remove the inner o-ring (18) before the outer o-ring (19). Set the component parts aside.



17. Insert an orifice tool, or the slotted end of an Inline Adjuster into the threaded end of the Valve Barrel, engage it in the Orifice (14) slot, and unscrew the Orifice at least seven full turns.

CAUTION Failure to fully unscrew the threaded Orifice will make it impossible to push the Orifice from the Valve Barrel without tearing an orifice thread and damaging the knife edge.

18. Using a Scubagaskets Seat Extraction Tool or a 4-5mm wooden dowel, insert it in the Valve Barrel from the knob end until it catches on the knife edge. Gently push the Orifice from the Valve Barrel.

CAUTION Use of a metal tool to push out the Orifice may damage the knife edge and raise minimum cracking effort above specification, or make subsequent tuning impossible. If the knife edge is damaged, the Orifice must be replaced.

19. Remove o-ring (15) with a thin pick. Set the Orifice aside and store it protected from contact with metal parts or tools which may damage the knife edge.

20. Now carefully slide o-ring (4) out of its groove using the pinch technique and off the barrel.

21. Using a flat bladed tool (a stubby screwdriver is best), push in **no more than 1mm** on the small tab inside the right-hand exhaust port in the Case (5), and disengage the Exhaust Cover (7). The stubby screwdriver has the advantage of allowing you to brace your fingers against the case, to prevent excessive pressure on the exhaust cover locking tab. Lift the Exhaust Cover free and set it aside.

CAUTION The locking tab on the Exhaust Cover is quite stiff. **It will not flex more than 2mm without breaking**, requiring replacement of the cover.

22. Inspect the exhaust valve leaflets for damage. Clean the case where the leaflets seal. It is not necessary to remove the exhaust valve for service unless it is damaged.

23. (Optional) If it is necessary to remove the Exhaust Valve (6), cut the center barb on the inside of the case with side-biting snips. Do not attempt to pull the barb through the case from the outside, as that may break one or more spokes in the case.

24. Open the Mouthpiece Clamp (8). Slide the Mouthpiece (9) off the mouthtube on the case. Inspect for tears or holes, and set it aside.

The disassembly process is now complete.
Clean all parts before starting reassembly.

CLEANING:

All components should be washed first in a warm (<120°F/50°C) mild liquid detergent and water solution. Use a soft nylon brush to help remove any debris or loose corrosion. After initial washing with warm water and detergent, all components should be thoroughly rinsed in clean fresh water.

CAUTION Make sure all o-rings and other rubber or plastic parts are removed before cleaning with an ultrasonic cleaner or chemical bath.

NOTE A scented detergent may leave undesirable odors for an extended period after service. Always use a hypoallergenic or scent-free liquid detergent.

If Nitrox use is anticipated, o-rings and service kit parts should also be gently washed with a mild detergent solution and rinsed well with clean water.

After initial cleaning in warm liquid detergent and water, metal parts should be cleaned in ultrasonic cleaners using appropriate ultrasonic cleaning solutions.

If you don't have an ultrasonic cleaner, soak the metal parts in Chromesafe solution, stirring gently for 3-4 minutes. Metal parts can also be cleaned by soaking in a mild acetic acid solution (distilled household white vinegar diluted 1:1 with warm water) for 10-15 minutes at a time and reinspecting.

NOTE Exceeding the recommended cleaning time may damage plated parts. Do not clean parts longer than the time specified by the manufacturer of the solution used. After cleaning, rinse the parts thoroughly with clean water and allow to air dry, or blow dry with low pressure (30 psi) air. Only brass, brass plated and stainless steel parts should be immersed in an acid cleaning solution.

WARNING Protect hands and eyes when handling chemical cleaning solutions.

After cleaning, all parts should be thoroughly rinsed in fresh water and allowed to air dry, or dried with filtered low pressure (30 psi) air. Do not use a hardware store compressor for drying air!

WARNING In order to maintain this regulator suitable for use with oxygen concentrations above 21%, it is critical that drying air be free of hydrocarbons. Presence of an oil mist in pressurized drying air may create a fire hazard after reassembly and pressurization with Nitrox.

POST-CLEANING INSPECTION:

All parts should be carefully checked for damage. Strong magnification under bright light is best.

Check the Orifice (14) knife edge for nicks, scratches or pitting. Inspect the Spring (20) for rust, cracks or pitting.

Examine the square lever foot broaches in the valve barrel for irregularities.

Examine the Case (5) for cracks or damage to the alignment bosses where the Valve Barrel's threaded end is captured. Damage to these bosses from previous over-torqueing will change lever alignment and may require Case replacement.

Examine the sealing surface of every o-ring land for scratches or damage.

If any parts are visibly damaged, they must be replaced.

SERVICE KIT PARTS:

WARNING Only official Scubagaskets parts are permitted when reassembling any Scubagaskets product. Substitutions are not authorized and may void the warranty. Scubagaskets specifications may not match an aftermarket part, regardless of any similarity in size, shape or appearance. Using substitute parts may make the product unsafe and may result in serious injury or death.

In addition to all o-rings, the LP Seat (16) is replaced at every complete service:

The diaphragm (24), Poppet (17), Balance Chamber (21), Mouthpiece (9) and Mouthpiece Clamp (8) may be reused if undamaged.

To confirm the correct o-ring for replacement, match each service kit o-ring to the sizer on page 26.

REASSEMBLY:

WARNING In order to maintain this regulator suitable for use with oxygen concentrations above 21%, ONLY approved oxygen-compatible lubricants are permitted. Use of an unapproved lubricant may pose a hazard after reassembly and pressurization.

CAUTION Do not use any petroleum based lubricants or products, or any aerosol silicone sprays on any part of Scubagaskets regulators. The petroleum base or propellant gas may attack or weaken plastic or rubber parts.

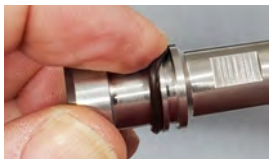
NOTE All o-rings should be replaced at every service. New o-rings should be checked for contamination and/or defects. O-rings should be coated with a thin film of approved lubricant prior to installation. Except where indicated, do not heavily lubricate any o-ring, as it serves only to attract dust and lint, and the lubricant will not be retained over time.

NOTE Before reassembly, it is important to check all parts (both new and reused) to ensure that every part is clean and free of any dust, corrosion or defects. Before applying lubricant to an o-ring, check to make sure it is clean, soft, and free of imperfections.

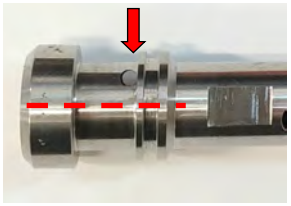
1. If the Exhaust Valve (6) is being replaced, pass the tail of the center axle through the spoked hole in the outside of the case until the barb pops fully through to the inside. Use side cutting snips to trim the excess stem, leaving about 2 mm of tail beyond the cone of the barb.

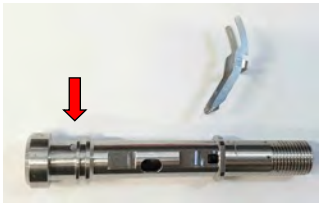
2. Install the Exhaust Cover by inserting **BOTH** tabs on the left side of the cover into their notches in the case. Press on the right side of the cover directly above the locking tab until you hear it click into place. Confirm that the cover is flush with the case, with no sharp raised edge.

3. Add o-ring (4) to the groove at the knob end of the barrel.



4A. **(Optional)** If the Lever (23) has been removed from the Valve Barrel (3), replace it now by holding the Valve Barrel with the hole for Pin (22) on the **upper** side of the barrel.





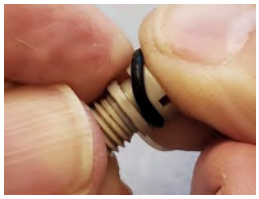
WARNING If the Valve Barrel is held with the pin hole on the **lower** side of the Valve Barrel, the Lever (24) will be installed on the wrong side!

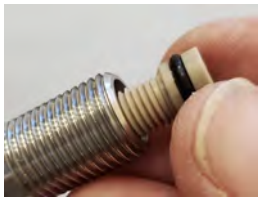
4B. **(Optional)** Place one foot of the new Lever (23) in the square broach on the threaded end of the Valve Barrel, with the crossbar uppermost. Lift the lever vertical and gently spread the other leg until its foot can be dropped into the square broach on the opposite side of the barrel.

WARNING Do not twist the lever legs on insertion. If the lever legs are no longer parallel, do not re-bend the legs to straighten them. The part must be replaced.

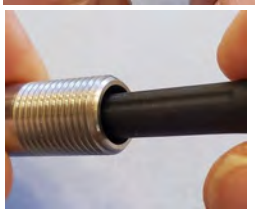
4C. **(Optional)** Confirm that the lever drops easily, flat against the Valve Barrel with no binding.

5. Add a lightly lubricated o-ring (15) to the Orifice (14). While avoiding any contact of the knife edge with the Valve Barrel, insert the Orifice carefully into the threaded end.





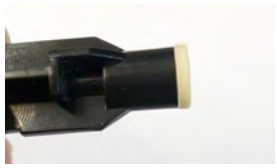
6. Initially UNscrew the Orifice in a counterclockwise direction with an Orifice Tool or the slotted end of an Inline Adjuster until you can feel the slight click as the first thread drops off the threads inside the barrel. This will prevent cross-threading.



7. Now screw in the Orifice clockwise **five full turns**.

CAUTION A cross-threaded Orifice is irreparably damaged and must be replaced.

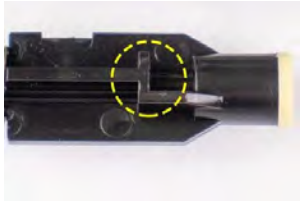
8. Install lightly lubricated o-rings (18, 19) onto the shaft of the Poppet (17). Press a new LP Seat (16) in the end of the Poppet, ensuring that it is flush with the poppet body, with no gaps.



9. Add a thin line of lubricant between o-rings (18, 19). This will serve as a lubricant reservoir for the poppet.

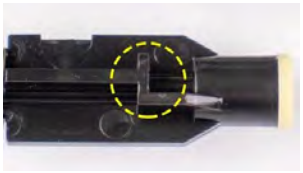
10. Thread a common Zip Tie between the lever leg adjacent to the square broach in the Valve Barrel. Now loop the Zip Tie up over the barrel, and down between the barrel and the other leg of the lever. Alternatively, use two thin 1mm shims between the lever legs and the Valve Barrel. This will gently spread the lever legs enough to allow insertion of the poppet assembly.

11A. Using the Scubagaskets Poppet Tool, push the poppet assembly until the "L" of the poppet reaches the oval hole. Confirm proper alignment.



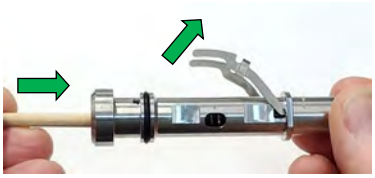
12A. Holding the Valve Barrel by its threaded end in your **RIGHT** hand, and looking through the oval opening in the barrel, slide the poppet tool into the Valve Barrel with your left hand. As you slide it into the barrel, watch the base of the "L" pass just across the top of the oval larger opening. Continue pushing approximately one inch until the "L" comes to rest against the lever feet. You may feel slight resistance as the poppet seat passes the feet. Now add the spring and balance chamber.

11B. Alternatively, assemble the Spring (20) and Balance Chamber (21) onto the Poppet. Orient the poppet assembly so the "L" in the poppet is oriented as shown.



12B. Holding the Valve Barrel by its threaded end in your **RIGHT** hand, and looking through the oval opening in the barrel, slide the poppet assembly into the Valve Barrel with your left hand. As you slide it into the barrel, watch the base of the "L" pass just across the top of the oval larger opening. Using a 6mm dowel, continue pushing approximately one inch until the "L" comes to rest against the lever feet. You may feel slight resistance as the poppet seat passes the feet.

13. Remove the Zip Tie. Press lightly on the end of the Balance Chamber with the dowel inserted into the Valve Barrel, and the lever should spring up. You should feel pressure against the dowel when you depress the lever.



WARNING If the Lever does not spring up with pressure on the Balance Chamber, or if you do not feel spring pressure against the dowel when you depress the Lever, the Poppet is not properly engaged with the lever feet. Remove the assembly and reinstall. Failure of the lever during a dive may be fatal.

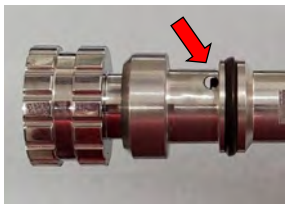
14. Assemble the Knob Assembly by adding a lightly lubricated o-ring (33) to the Microadjuster (34) shaft.

15. Slide the Microadjuster (34) into the Knob (13) and thread counterclockwise to avoid crossthreading until you feel a tiny click. Now thread clockwise until the tip protrudes 1mm from the small recess in the knob end.

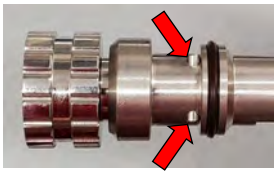
NOTE: The "+" and "-" sign markings on the Micro-adjuster may be counterintuitive. Plus (+) (counterclockwise) indicates easier valve opening (lower opening effort), while Minus (-) (clockwise) indicates harder opening (higher opening effort).

16. Add a lightly lubricated o-ring (12) to the Adjustment Knob (13). Heavily lubricate the threads of the knob.

17. Carefully push the Adjustment Knob assembly into the Valve Barrel and begin screwing it in. The Lever should rise. The end of the Adjuster will occlude the hole for the Knob Retention Pin (22). Continue screwing in the knob until you can see through the hole without any obstruction.



18. Insert the Knob Retention Pin (22) and center it in the barrel. **Unscrew the knob until the pin is trapped in place** to avoid losing it during the next step**.** Confirm that it remains centered in the barrel.

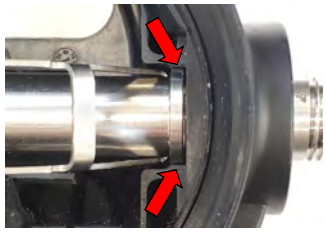


19. Add a lightly lubricated o-ring (10) to the Venturi Sleeve (11). Slide the assembly over the threaded end of the Valve Barrel, with the flange of the Venturi Sleeve covering the lever. Slide it as far as it will go, and then rotate the sleeve 180º and allow the lever to rise. Now fully seat the Venturi Sleeve against the knob end, where it traps the Knob Retention Pin in place. Rotate the sleeve until the hole in the barrel is fully visible.

If you cannot fully seat the sleeve, it is probably caught on one end of an uncentered Pin (22). Slide the Venturi Sleeve to one side. Loosen the knob clockwise a fraction of a turn, recenter the Pin, and unscrew the knob. Now reseat the Venturi Sleeve.

20. Grasping the entire valve assembly by the Adjuster Knob, slide it into the case. Depress the lever as it passes the case rim, and take care to not let the lever spring up uncontrolled as the lever tips clear the case. Continue inserting the valve assembly, adjusting the Venturi Sleeve Lever so that it passes into the notch in the case.

21. Ensure that the flats near the threaded end pass cleanly between the plastic bosses in the case, locking the assembly with the lever uppermost.



22. Add a lightly lubricated o-ring (2) to the threaded end of the Valve Barrel, outside the case. Slide it down against the case.

23. Lightly lubricate the barrel threads, add the Heat Exchanger (1) to the barrel and spin it down finger tight.

24. Tighten the Heat Exchanger with a torque of 3 Nm, using an 11/16" wrench. Do not overtighten.

SPECIFICATION Specification torque for the Heat Exchanger is 3 Newton-meters.

CAUTION Overtightening the heat exhanger will damage the critical alignment bosses in the case. If this occurs, the case will have to be replaced.

25. Sight carefully along the rim of the case and confirm that the lever tips are parallel to the rim. If not, gently rotate the barrel assembly with a 13mm wrench, or rotate the Heat Exchanger with an 11/16" wrench until the lever is perfectly vertical.

CAUTION Accidental rotation of the valve assembly so that lever tips are no longer vertical will degrade lever contact with the diaphragm and increase friction. This may dangerously alter second stage performance. Ensure that the lever tips are parallel to the case rim after tightening the Heat Exchanger or changing hoses.

26. Using an orifice tool, or an Inline adjuster threaded onto the Valve Barrel, screw in the Orifice until the Lever tips are just barely above the case rim.

27. Add the Diaphragm (25) to the case, confirming that it completely fills the rim with no gap. Confirm that the diaphragm does not "hang" from the lever tips. If the diaphragm edges do not reach the rim around its full perimeter, lower the lever 1-2mm by screwing in the orifice slightly.

WARNING A replacement diaphragm which has been in storage may shrink slightly due to the natural elasticity of the material. A diaphragm whose edge does not meet the rim perfectly may become dislodged during Purge Cover and Retaining Ring assembly. If the diaphragm does not fill the rim completely, gently stretch the outer rim in segments, periodically reinserting it into the case to check, until it perfectly fills the internal diameter of the case.

NOTE Confirm that your hands or gloves are not greasy when handling the diaphragm.

28. Confirm even and complete seating of the Diaphragm by gently tamping around its entire rim with a thin dowel.

29. Add the Thrust Ring (26) to the Diaphragm

30. Orient the Purge Cover (27) by finding the raised ridge along its rim, and lower the Purge Cover Ring (28) onto the Purge Cover by aligning the groove in the ring with the ridge in the cover. Lightly lubricating the threads, screw on the Purge Cover assembly hand tight. The SG logo may or may not align with the case.

31. Covering the threaded end of the Valve Barrel with your fingertip, gently inhale from the mouthtube to confirm a case seal. You should be unable to sense air entry during gentle inhalation. If air can be inhaled, consult Table 1 - Trouble-shooting Guide on page 22.

32. Fully unscrew the Adjuster Knob and set the Venturi Sleeve lever in the "+" position.

33. Add new o-rings (27) and (29) to your LP hose, using a Scubagaskets O-ring Installation Tool to prevent thread damage to the o-ring.

This Concludes Reassembly
Adjustment and Final Installation Follows

ADJUSTMENT:

1. Before proceeding with second stage adjustment, confirm that you have a first stage with a stable Intermediate Pressure. It is best to adjust your second stage with the first stage to which it will be connected. If adjusting a second stage for an unknown first stage, tune the test first stage to an Intermediate Pressure of 10 bar. Leave the Intermediate Pressure gauge attached.

2. Connect a LP hose on the first stage to an Inline Adjuster with a slotted end.

3. Connect the Inline Adjuster to the threaded end of the second stage.

4. Fully unscrew the regulator Adjuster Knob and set the Venturi Sleeve lever in the "+" position.

5A. Carefully open the tank valve and pressurize the first stage. If the second stage freeflows, engage the inline adjuster in the orifice and screw the Orifice in clockwise until the leak just stops. **Then add 1/12 clockwise turn (5 minutes on a clockface, or 30º) to the Orifice.**

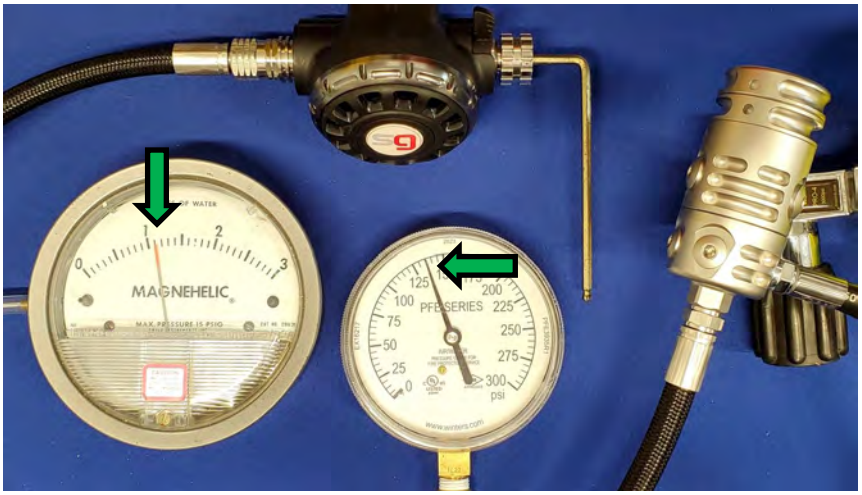
5B. Carefully open the tank valve and pressurize the first stage. If the second stage does NOT freeflow, engage the inline adjuster in the orifice and unscrew the Orifice counterclockwise until the valve leaks. Now screw the Orifice in clockwise until the leak just stops. **Then add 1/12 clockwise turn (5 minutes on a clockface, or 30º) to the Orifice.**

NOTE Always adjust the Orifice with the valve open.

6. Turn off the tank, depressurize the system and disconnect the In-line adjuster from the second stage. Reattach the second stage hose finger tight. Repressurize the system.

WARNING No further adjustments are made using the in-line adjuster. Additional turns to the orifice will drop the lever. This may provide inadequate gas flow at depth, which may be fatal.

7. Connect the mouthtube to a magnehelic and measure opening effort ("cracking effort") when the Intermediate Pressure first starts to drop.



SPECIFICATION Specification opening effort for the SGT4 Second Stage is between 1.0" and 1.4" WC.

8. If the opening effort is over 1.4" with the Adjuster fully unscrewed, the Spring (20) has likely caught on the neck of the Balance Chamber (21). Disassemble the regulator, remove the Adjuster Knob and reinsert the Balance Chamber. Complete reassembly and retest.

9. Set the opening effort as desired within specification by inserting a 4mm hex key in the Microadjuster. Rotate clockwise to raise opening effort; rotate counterclockwise to lower opening effort.

NOTE Diving the SGT4 below 1.0" of opening effort may result in slight freeflow in the face down position.

NOTE Consider waiting to install the mouthpiece until after subjective testing below.

The adjustment process is now complete.

FINAL INSTALLATION:

1. Disconnect the Inline Adjuster and attach the LP hose finger tight.

2. Attach a thin profile 11/16" wrench to the flats on the Heat Exchanger (1). Attach a second wrench to the hose nut. While ensuring that the Heat Exchanger does not rotate, tighten the hose nut to 5 Nm. If possible barrel rotation is suspected, remove the faceplate assembly and diaphragm, and confirm that the lever tips are parallel to the case rim. Adjust barrel position with a wrench.

WARNING Failure to hold the Heat Exchanger in position may allow rotation of the barrel as described in Step 24, page 14 above. This will cause degraded function of the lever, which may be dangerous.

IMMERSION TEST:

With the regulator set pressurized, completely submerge both the first and second stages and check for leaks. There should be no leaks, once trapped gas in the regulator has escaped. Some second stage leaks are extremely small, and prolonged immersion is recommended to see the late appearance of small bubbles.

NOTE Do not confuse bubbles from trapped air with a true leak. If there is an air leak, bubbles will continue to appear as long as the regulator is pressurized.

SUBJECTIVE TESTING:

Remove the regulator set from the water test container and after draining any residual water, confirm that the Venturi lever is in the "+" position. Firmly press the purge button. There should be a brisk and vigorous flow of air from the regulator. Now breathe normally from the mouthtube. There should be an easy flow of air, and no resistance to exhalation. The regulator may make a honking noise on the surface, but this is merely due to fluttering of the diaphragm in air which will not occur when submerged.

At this point, close the cylinder valve and depressurize the regulator. Remove the first stage from the tank and secure the dust cap in place.

Slide the Mouthpiece onto the mouthtube. The neck of the Mouthpiece has a shallow groove for the Mouthpiece Clamp. Place the Mouthpiece Clamp (8) loosely around the Mouthpiece (9). Orient the clamp so that the buckle is on the hose side. Engage and tighten the Mouthpiece Clamp. Confirm that it is centered in the mouthpiece groove.

This Completes Regulator Service

DISASSEMBLY OF THE SGT3 AUXILIARY SECOND STAGE (Octo)

Disassembly of the Auxiliary Secoond Stage (Octo) is similar to the primary, although the valve is simpler. Follow the steps below to disassemble this regulator.

Starting on page 5, follow all steps as listed through Step #7 on page 6. Follow all Cautions. Then continue as below.

8. With the case (6) braced against the work surface, press firmly inward and down on the two plug tabs (12) engaging the case.

9. The plug (12) should drop out of the case, or will be loose and can be removed.

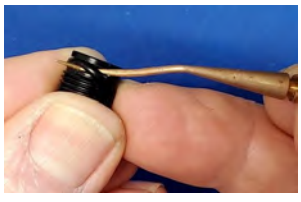
10. Depress the lever and slide the barrel inward as far as possible. At this point, spring tension will cause the barrel to catch on the bottom of the case.

11. Rotate the barrel 90 degrees, and keeping the lever flat against the barrel, slide it out of the case.

12. As the barrel slides free, o-ring (2) may fall out of the case, or can be retrieved and set aside.

13. While depressing the lever to prevent the seat from being cut against the orifice knife edge, unscrew the adjustment plug (5) seven full turns.

14. With the plug threads now disengaged, pull the plug from the barrel. Do not lose the balance chamber (20) or spring (19), which may fall free. Remove o-ring (4) from the plug



15. Lifting the lever past vertical, use a small dowel to push the poppet assembly from the barrel. If there is resistance, use a zip tie as described on page 7 to gently spread the lever feet to aid in poppet assembly removal.

16. Return now to second stage disassembly step 16 on page 7 to separate the poppet assembly components.
Follow steps 16 through 24, with the exception of step #20, which does not apply.

The disassembly process is now complete. Clean all parts before starting reassembly, by following the procedures described on pages 9 & 10. Follow all applicable Cautions, Warnings and Notes.

REASSEMBLY OF THE AUXILIARY SECOND STAGE (Octo)

Reassembly of the Auxiliary Secoond Stage (Octo) is similar to the primary, although the valve is simpler. Follow the steps below to reassemble this regulator.

Starting on page 10, follow all steps as listed through Step #9 on page 11, with the exception of Step #3, which does not apply. Follow all applicable Cautions, Warnings and Notes. Then continue as below.

10. Reasemble the poppet assembly by combining the poppet, spring and balance chamber.

11. With the lever past vertical, insert the poppet assembly.

12. Push the assembly past the lever feet. There may be slight resistance. If there is firm resistance, use a zip tie as described on page 12 to gently spread the lever feet to allow poppet insertion.

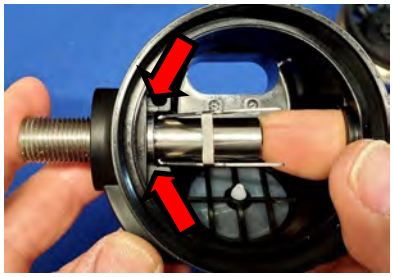
13. Add o-ring (4) to the Adjustment Plug (5), and lubricate the threads of the plug. Carefully insert the plug into the barrel, **o-ring end first**. Ensure that it is aligned with the axis of the barrel.

14. Making sure to not crossthread the plug with the barrel, carefully screw it in. Keep the lever depressed so that the orifice does not cut the low pressure seat. Continue screwing the plug into the barrel until it is <u>perfectly flush</u> with the end.

15. Now UNscrew the plug one half turn. A half thread should protrude from the end. This is your initial tuning position.

16. Insert the barrel into the case through the larger hole with the notch. Control the lever so that it does not spring up when it clears the inside of the case.

17. Ensure that the barrel seats tightly between the plastic alignment bosses in the case.



18. Add o-ring (2) to the threaded end of the barrel.

19. Spin on the Heat Exchanger (1) finger tight.

20. Carefully tighten the heat sink nut to 3 Nm. Confirm that the lever tips are parallel to the rim of the case.

SPECIFICATION Specification torque for the Heat Exchanger is 3 Newton-meters.

21. Insert the Case Plug (12), aligning the knurled protrusion with the notch in the case.

22. Confirm again that the lever tips are parallel to the edge of the case. If not, loosen the Heat Exchanger and retighten with the barrel held in place. With the lever properly aligned, press the plug firmly into place.

⚠ CAUTION Accidental rotation of the valve assembly so that lever tips are no longer vertical will degrade lever contact with the diaphragm and increase friction. This may dangerously alter second stage performance. Ensure that the lever tips are parallel to the case rim after tightening the Heat Exchanger or changing hoses.

23. Confirm that all four tabs are locked to the inside of the case.

Now return to Second Stage Assembly step #26 on page 14, and follow all steps #26-33, including Warnings and Notes. Described part numbers may vary from the Primary Second Stage Schematic, but their function is the same.

This Concludes Reassembly
Adjustment and Final Installation Follows

ADJUSTMENT:

Return to the Adjustment section on page 16.

Adjustment of the auxiliary second stage is the same as primary Steps #1-7, with the exception of Step #4, which does not apply. Similarly, Step #8 is unlikely with this design.

Step #9 is handled differently with this regulator, as described below.

9. Set the opening effort as desired within specification by removing the Case Plug (12) and inserting a flat blade screwdriver in the slot of the Adjustment Plug (5).

A flush Adjustment Plug is typically associated with a cracking effort of 1.5", while one turn out typically yields 1.1" WC.

Therefore, with the preliminary plug position of one half turn out from flush, a cracking effort of 1.3" is typically seen. Rotate clockwise to raise opening effort; rotate counterclockwise to lower opening effort.

Replace the case plug per steps 21 & 22 above.

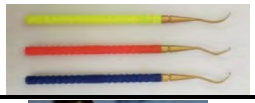
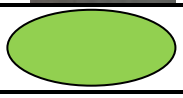
The adjustment process is now complete.
Return to page 17 for Final Installation, Immersion and Subjective Testing.

Table 1: Troubleshooting Guide

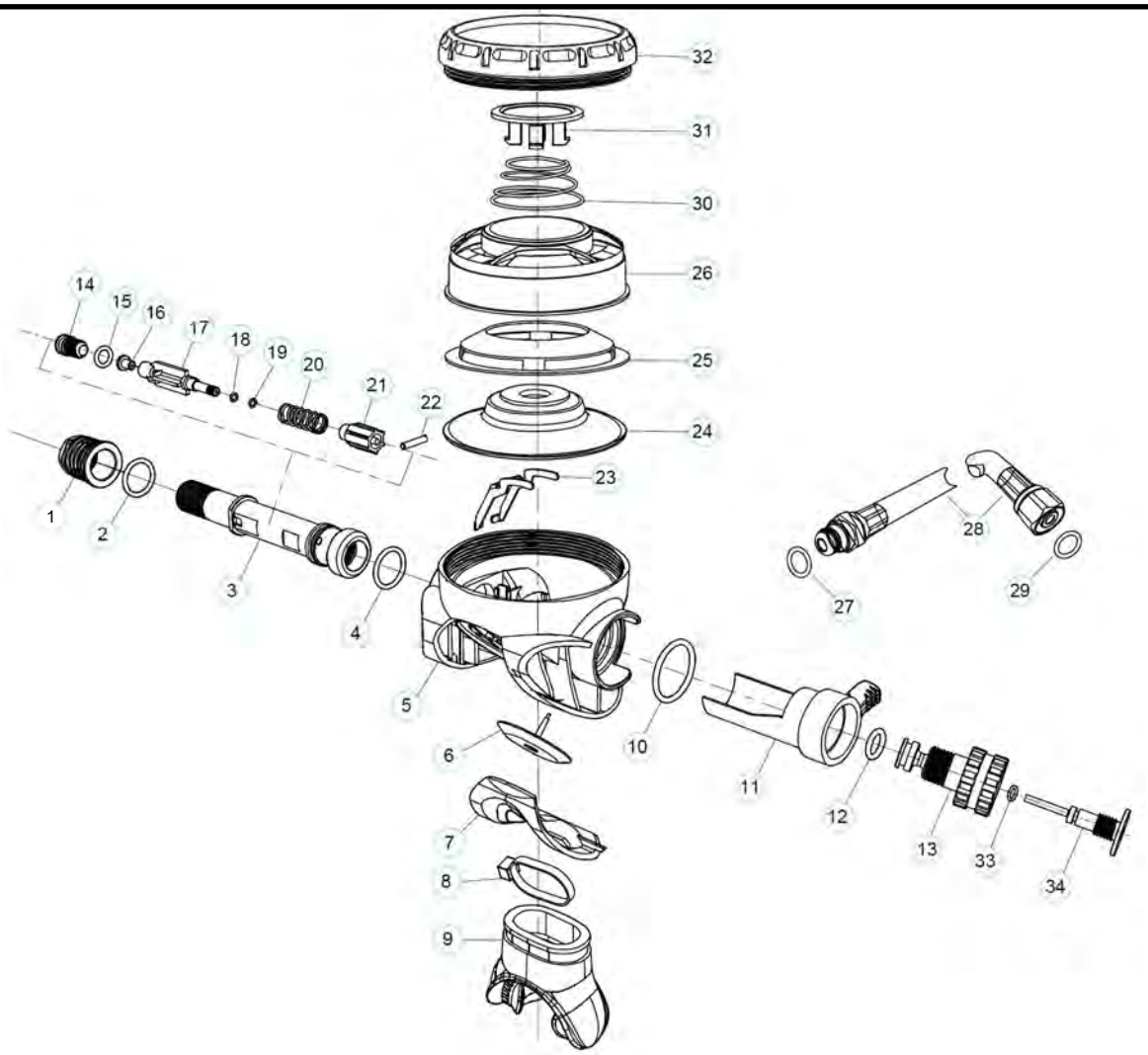
SYMPTOM	POSSIBLE CAUSE	TREATMENT
Opening Effort Below 1.0" With Knob Unscrewed	1. Orifice incorrectly adjusted	1. Readjust regulator as on page 16
	2. Microadjuster (34) too far out	2. Screw in Microadjuster (34)
Opening Effort Above 1.4" With Knob Unscrewed	1. Microadjuster (34) too far in	1. Unscrew Microadjuster (34)
	2. Orifice knife edge damaged	2. Replace Orifice (14) and LP Seat (16)
	3. Poppet spring (20) caught on neck of Balance Chamber (21)	3. Disassemble Adjustment knob and re-seat Balance Chamber (21)
Second Stage Air Leak or Free Flow	1. Extremely high IP from frst stage.	1. Refer to First Stage Troubleshooting Guide
	2. The LP Seat (16) is damaged.	2. Replace LP Seat (16)
	3. The LP Seat (16) was adjusted incorrectly or the lever (23) was set too high.	3. Readjust regulator as on pages 16-17
	4. The Orifice (14) is damaged.	4. Replace Orifice (14)
	5. The lever (23) is bent.	5. Replace Lever (23)
	6. The Orifice (14) sealing surface is damaged.	6. Replace Orifice (14)
	7. The Spring (20) is damaged.	7. Replace Spring (20)
	8. The poppet o-ring (18, 19) is damaged.	8. Replace o-ring(s) (18, 19)
	9. The Balance Chamber (21) bore is damaged.	9. Replace Balance Chamber (21)
	10. The venturi sleeve o-ring (10) is damaged.	10. Replace o-ring (10)
Low Purge Flow or Labored Breathing on full cylinder	1. The first stage has low IP.	1. Refer to First Stage Troubleshooting Guide
	2. The Orifice (14) was adjusted incorrectly and the Lever (23) is set too low.	2. Readjust regulator as on pages 16-17
	3. The LP hose is clogged or obstructed.	3. Clean or replace the LP hose
	4. The Lever (3) is bent or catching on the Valve Barrel (3).	4. Replace Lever (23)
Water Entering Second Stage	1. The Mouthpiece (9) is incorrectly ftted or damaged.	1. Refit or replace mouthpiece
	2. The Diaphragm (24) is damaged.	2. Replace diaphragm
	3. The Diaphragm (24) is improperly seated in the Case (5).	3. Remove purge cover (26-32) and thrust ring (25), check for any distortions, then properly reassemble diaphragm & cover
	4. The Exhaust Valve (6) is damaged.	4. Replace exhaust valve (6)
	5. The Case (5) is damaged.	5. Check exhaust valve seating surface. Disassemble and replace case
	6. The Heat Exchanger o-ring (2) is damaged.	6. Replace o-ring (2)
	7. The Venturi Sleeve (11), its o-ring (10), Valve Barrel o-ring (4), Adjuster Knob o-ring (12) or Microadjust o-ring (33) is damaged.	7. Replace part

NOTE This table does not list all possible problems. Please contact the Scubagaskets technical department at info@scubagaskets.com for assistance with issues not mentioned here.

Table 2: Recommended Tool List

TOOL	DESCRIPTION	APPLICATION
	Digital IP 2nd Stage Regulator Testing Gauge (IP test gauge) (Scubagaskets Digital IP Regulator Tester Gauge)	Checking opening effort
	Thin brass or plastic picks	Removal and installation of o-rings
	Inline Adjuster (Scubagaskets 2SSHT-80000)	Orifice Adjustment under pressure
	Orifice Adjuster (Scubagaskets SCU-SLO-3000)	Orifice installation and preliminary adjustment
	Rubberized Jar Grip	Removal of Retaining Ring
	Zip Tie	Poppet Removal without removing Lever
	Ultrasonic Cleaner	Brass & stainless steel parts cleaning
	Stubby Screwdriver	Removal of Exhaust Cover
	Side Cutting Snips	Removal and replacement of Exhaust Valve
	Blunt Brass or Plastic Spade or Pick	Stuck Diaphragm Removal
	Thin Wooden Dowels 3 - 6 mm diameter	Lever Engagement Testing Diaphragm Seating
	Seat Extraction Tool (Scubagaskets universal orifice seat tool)	Orifice Removal
	Open End Wrenches Thin Profile 11/16" wrench	Attach and remove hoses Attach Heat Exchanger
	Poppet Insertion Tool (Scubagaskets Scuba Tool for second stage poppet installation - Uni 2nd pop ins 3500)	Insert poppet Preserve alignment with lever feet
	LP Oring Installation Tool - (Scubagaskets HP and LP Oring Installation Tool Set)	Prevent thread damage to hose and port o-rings
	Bullet O-ring Installation Tool - (Scubagaskets Bullet O-ring Installation Tool for LP Femal Hose End)	To easily place the o-ring on the swivel end of the second stage hose.
	4mm Hex Key	To adjust the Microadjuster

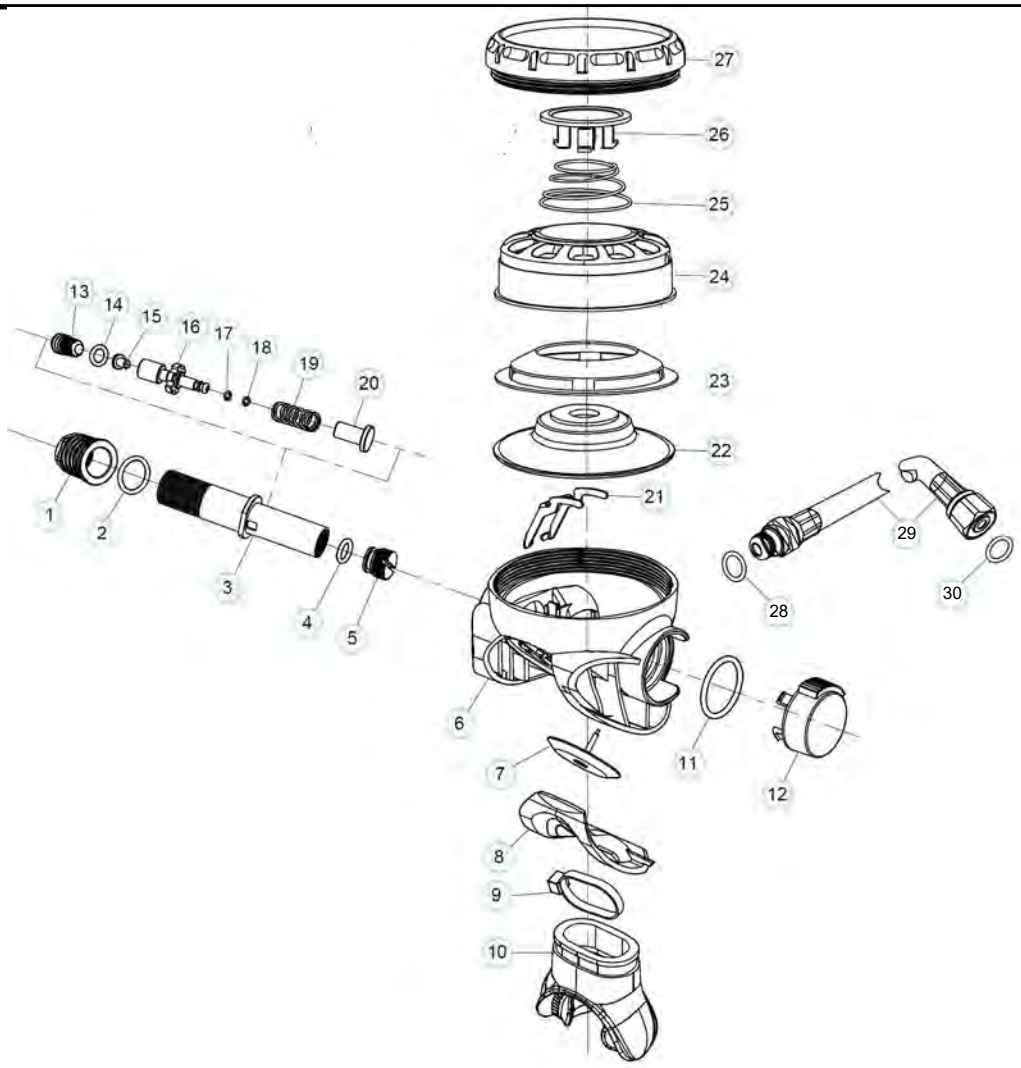
SGT4 2nd Stage Schematic



Ref #	Part #	Qty	Description	Ref #	Part #	Qty	Description
1	T4-01	1	Heat Exchanger	*18*,19**	*T4-18,19*	*2*	*O-ring: 2.2 x 1mm*
2,4**	*T4-02,04*	*2*	*O-ring: 14 x 2mm*	20	T4-20	1	Spring
3	T4-03	1	Valve Barrel	21	T4-21	1	Balance Chamber
5	T4-05	1	Case	22	T4-22	1	Knob Retention Pin
6	T4-06	1	Exhaust Valve	23	T4-23	1	Lever
7	T4-07	1	Exhaust Cover	24	T4-24	1	Diaphragm
8	T4-08	1	Mouthpiece Retainer	25	T4-25	1	Thrust Ring
9	T4-09	1	Mouthpiece	26	T4-26	1	Purge Cover
*10**	*T4-10*	*1*	*O-ring: 20 x 2mm*	*27**	*T4-27*	*1*	*O-ring: 7.65 x 1.78mm*
11	T4-11	1	Venturi Sleeve	*28*	T4-28	*1*	LP Hose
*12**	*T4-12*	*1*	*O-ring: 7.65 x 1.78mm*	*29**	*T4-29*	*1*	*O-ring: 6.07 x 1.78mm*
13	T4-13	1	Adjustment Knob	30	T4-30	1	Purge Spring
14	T4-14	1	Orifice	31	T4-31	1	Purge Button
*15**	*T4-15*	*1*	*O-ring: 6.35 x 1.78mm*	32	T4-32	1	Retaining Ring
*16**	*T4-16*	*1*	*LP Seat*	*33*	*T3-33*	*1*	*O-ring: 3.0 x 1.5mm*
17	T4-17	1	Poppet	34	T4-34	1	Microadjuster

* - Parts in *Italics* and marked with an asterisk are included in the Service Kit and must be replaced at each Complete Service.

SGT3 Octo Schematic

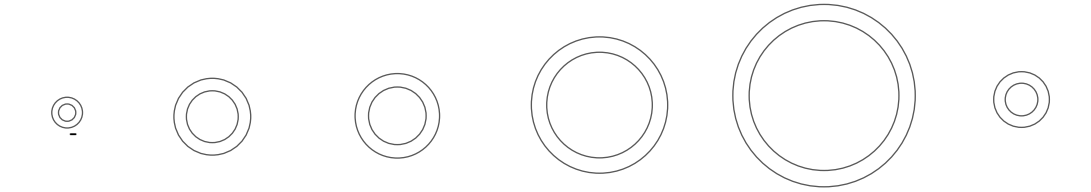


Ref #	Part #	Qty	Description	Ref #	Part #	Qty	Description
1	T3-01	1	Heat Exchanger	16	T3-16	1	Poppet
*2**	*T3-02*	*1*	*O-ring: 14 x 2mm*	*17*,18**	*T3-17,18*	*2*	*O-ring: 2.2 x 1mm*
3	T3-03	1	Valve Barrel	19	T3-19	1	Spring
*4**	*T3-04*	*1*	*O-ring: 7.54 x 1.78 mm*	20	T3-20	1	Balance Chamber
5	T3-05	1	Adjustment Plug	21	T3-21	1	Lever
6	T3-06	1	Case	22	T3-22	1	Diaphragm
7	T3-07	1	Exhaust Valve	23	T3-23	1	Thrust Ring
8	T3-08	1	Exhaust Cover	24	T3-24	1	Purge Cover
9	T3-09	1	Mouthpiece Retainer	25	T3-25	1	Purge Spring
10	*T3-10*	*1*	Mouthpiece	26	T3-26	1	Purge Button
*11**	*T3-11*	*1*	*O-ring: 20 x 2mm*	27	T3-27	1	Retaining Ring
12	T3-12	1	Case Plug	*28*	T3-28	*1*	*O-ring: 7.65 x 1.78mm*
13	T3-13	1	Orifice	29	T3-29	1	LP Hose
*14**	*T3-14*	*1*	*O-ring: 6.07 x 1.78 mm*	*30**	*T3-30*	*1*	*O-ring: 6.07 x 1.78mm*
*15**	*T3-15*	*1*	*LP Seat*				

* - Parts in *Italics* and marked with an asterisk are included in the Service Kit and must be replaced at each Complete Service.

SGT4 O-ring Sizer

Second Stage



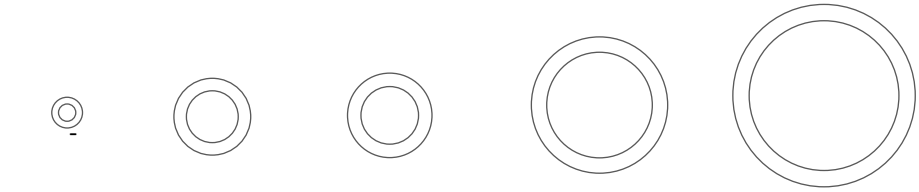
2.2 x 1.0	6.07 x 1.78-	7.65 x 1.78	14 x 2	20 x 2	3.0 x 1.5
#18, 19 (2)	#15	#12	#2, #4 (2)	#10	#33
POPPET	ORIFICE	ADJUSTER KNOB	VALVE BARREL	VENTURI SLEEVE	MICROADJUSTER

Reproduce this page so this line is exactly 100mm long

6.07 x 1.78	7.65 x 1.78
#29	#27
HOSE SWIVEL	HOSE END

SGT3 O-ring Sizer

Second Stage



2.2 x 1.0	6.07 x 1.78	7.65 x 1.78	14 x 2	20 x 2
#17, 18 (2)	#14	#4	#2	#10
POPPET	ORIFICE	ADJUSTMENT PLUG	VALVE BARREL	CASE PLUG SEAL

Reproduce this page so this line is exactly 100mm long

6.07 x 1.78	7.65 x 1.78
#30	#28
HOSE SWIVEL	HOSE END

Inspection and Service Record

Scubagaskets SGS3, Ser #_____ Purchase Date ____/____/_____
Scubagaskets SGT4, Ser #_____ Purchase Date ____/____/_____
Scubagaskets SGT3, Ser #_____ Purchase Date ____/____/_____

Date/ Dive Count	Technician	Inspection (I) Service (S)	Comments

Reproduce this page as needed for additional inspections

This page deliberately blank


The Science of Scuba O-Rings
scuba sg gaskets .com
Scuba Diving O-Rings
https://scubagaskets.com