

Scubagaskets



SGS3 First Stage Service & Repair Manual

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Record of Revisions

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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 Scubagaskets 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 SGS3 first stage regulator. It is recommended that the technician perform 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 highlight 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 an action or situation that may result in serious injury or death for either the technician or the diver if not performed correctly.



A CAUTION highlights any action 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 50°F (10°C). 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 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).

Confirm that first stage Intermediate Pressure is within specification, without drift prior to lockup of more than 0.5 bar (7 psi). Any drift exceeding this amount, or continuous Intermediate Pressure creep, requires a complete service.

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 second stage control knob and venturi switch both operate smoothly. Any grittiness or sticking during operation should prompt disassembly and cleaning, and may warrant a full service.

Visually inspect the first stage filter for debris, discoloration or verdigris corrosion. Evidence of corrosion or obstruction warrants a full service, as corrosion or damage downstream from the filter may have occurred.

Visually inspect the second stage exhaust valve to see whether it is in good condition and whether the sealing surface is clean. Disconnect the hose and perform a gentle inhalation with the hose intake occluded, to confirm that there is no leak of air into the second stage case. Any leak requires a full second stage service.

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

Slide back the hose protector and confirm that the hose is not cracked or loose in the end crimp.

The infrequently used regulator:

Do not assume that the 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 other regulators. Proper disassembly and reassembly requires several specialty tools. For a complete list of tools required for service, see Table 2 (page 17).

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 a land is damaged, the part must be replaced. The only authorized steel o-ring pick is a double-hook pick, which is used only in a specific instance as described below.

LUBRICATION:

This regulator is delivered cleaned for use with Nitrox up to EAN40. Scubagaskets recommends the use of only [Crystal Lube®](#), Tribolube 71, [Christolube MCG-111](#) or equivalent. Liquid or spray lubricants are not authorized, and silicone-based lubricants are specifically prohibited. Use of an incompatible lubricant will restrict the use of this regulator to no other diving gas 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 thread load on the part. This may cause part failure during a dive, which may be fatal!

DISASSEMBLY:



CAUTION

Before disassembly, refer to the parts list on page 18, 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. Before disassembling the first stage, remove all hoses using an appropriate wrench. Consider padding the wrench or isolating the wrench from the regulator body with a piece of paper to protect the finish.

2A. **Yoke disassembly:** Unscrew and remove the Yoke Knob (40) by hand, and set it and the dust cap (39) aside. With the regulator body held in place with a [vice handle](#), use an 8mm socket hex key, or a 19mm short socket to unscrew the Inlet Fitting (35) and remove the Yoke (37) and Inlet Fitting from the regulator body. Remove the Saddle (33). Note that use of a socket may require an adaptor for a thin extension to fit through the yoke knob threaded opening.



2A. Using a small hex key, push out the filter (36) and o-ring (34).



2B. **DIN Disassembly:** Remove the dust cap, and insert a 6mm hex wrench into the inlet fitting (44). **Do not use a ball-end hex key.** With the regulator body held in place with a [vice handle](#), remove the Inlet Fitting. Remove the DIN handwheel (41). Remove both o-rings (42, 45) from the fitting and push out the filter (43).



CAUTION

It is important that the hex wrench be placed fully into the broach of the Inlet Fitting to prevent any damage to the part. Do not use impact to force release of the Inlet Fitting.

3B. If the DIN Inlet Fitting (44) is frozen in place due to salt crystals or previous over-torquing, use a [DIN Retainer Tool](#) to grasp the upper flange of the fitting and unscrew it with gradually increasing force. This may be best accomplished by firmly clamping the DIN Retaining Tool in a vice and unscrewing the body from the DIN Inlet Fitting.



4. Mount the regulator in a vice using a vice handle secured in a HP port. Using a hook spanner or a captive pin spanner, unscrew the environmental seal cap (1).



Maintain firm pressure on the pin of the hook spanner to prevent the pin from "skipping" out of the dimple and scratching the finish. Ensure that the pin of the spanner is at a right angle to the cap, by the choice of an appropriate diameter spanner or by padding the hook.



Ensure that the Diaphragm Clamp (xx) does not move while unscrewing the Environmental Seal Cap (xx). A second hook spanner or a [Captive Pin Spanner](#) may be needed to hold the Diaphragm Clamp in place. It is extraordinarily difficult to separate the Environmental Seal Cap from the Diaphragm Clamp once it is unscrewed from the Body (xx).

5. Push out the environmental seal (2) with a finger and set both parts aside.

6. Invert the regulator and allow the Transmitter (3) to fall out. If it remains in place, rotate it with a finger and tap the inverted regulator against a padded surface. Do not attempt to retrieve the Transmitter with a sharp tool.



7. Using a 6mm hex key, unscrew the Adjusting Screw (4) until it is loose, but do not completely remove it.



8. With the regulator held in place with a vice tool, use a [Captive Pin Spanner](#) to loosen the diaphragm clamp (7). Remove the spanner, invert the regulator and completely remove the diaphragm clamp and the loose pieces inside. The Spring Pad (6) may remain adherent to the diaphragm, and the plastic Shim (optional) may remain inside the Adjusting Screw. Carefully pick off the Pressure Pad with a fingernail, if necessary, and use a short blast of pressurized air to loosen the Shim. Do not use a sharp tool to remove either component.



9. Fully unscrew the Adjustment Screw from the Diaphragm clamp. Set the Diaphragm Clamp, Spring Pad, Spring, Shim and Adjustment Screw aside.



A Captive Pin Spanner is preferred for Diaphragm Clamp removal due to the force often required to loosen a corroded part. Having a captive pin reduces the risk of damaging the dimple in the clamp.

9. Temporarily place port plugs in **all but one** LP port. With your thumb, occlude the threaded recess where the Yoke or DIN connector was attached, and cup your fingers over the diaphragm. Using an air gun or air nozzle with a rubber tip, direct a short burst of hydrocarbon-free air into the open LP port. This will dislodge the diaphragm.



Alternatively, use a 3mm dowel to push the diaphragm out through one of the three thin bores in the regulator body after step 12. below. Then return to steps 10 and 11.

10. Lift out the diaphragm (8), and invert the regulator to allow the Valve Lifter (9) to fall free. If it sticks in place, carefully lift it out without bending the center pin.



11. Using a 4mm hex wrench, unscrew all remaining LP port plugs (16, 17, 28, 30, 48). Remove o-rings (15, 18, 27, 28, 47) from each port plug.



Use a 15mm open end wrench to hold the turret bolt in place when removing the 5th port plug.

11. With the regulator body secured with a vice handle in a HP port, use a 15 mm or adjustable wrench to loosen the Turret Bolt (26). Invert the regulator to avoid losing parts. Maintain pressure on the Turret Bolt while unscrewing, as it is spring loaded. When it is loose, carefully remove it from the turret and ensure that you account for all parts.



If the HP Seat (19, 20) is retained in the body, tap the regulator body against the palm of your hand to dislodge it. Do not grasp it with a metal tool.

12. Lift off the Turret (14), and carefully remove o-ring (13) from either the regulator body, or from inside the turret base.



13. Disassemble the Turret Bolt assembly, removing the HP Seat (19,20), the Seat Spring (21), o-ring (23), Thrust Washer (24) and o-ring (25).



14. Using a 2mm plastic or aluminum crochet hook, or the [Scubagaskets O-Ring Plastic Pick Tool Pointed-Hook ends](#), extract o-ring (22) from the balance chamber without touching the inner wall of the chamber with any metal tool.



Any scratch on the inner wall of the balance chamber will result in a HP gas leak, causing Intermediate Pressure Creep, and will require replacement of the entire Turret Bolt (26).

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

CLEANING:

All components should be washed first in a solution of warm (not over 120°F/50°C) water and mild detergent. Use a soft nylon brush to help remove any debris or loose corrosion. After initial washing with warm water and soap, all components should be thoroughly rinsed in clean fresh water.



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

If Nitrox use is anticipated, o-rings and service kit parts should be gently washed with a mild detergent solution and rinsed well with clean water. Nitrile gloves are appropriate for cleaning and reassembly.

After initial cleaning in warm soap and water, metal parts can be cleaned in ultrasonic cleaners using appropriate ultrasonic 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.



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 with any solution, rinse the parts thoroughly with clean water and air dry or blow dry with low pressure (30 psi) air. Only metallic parts should be immersed in a chemical cleaning solution.



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!



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 all cavities for nicks, scratches or pitting. Pay special attention to the volcano knife edge in the bore of the body. Examine the Springs (5 & 21) for signs of corrosion, pitting or cracks in the metal coils.

Examine the Turret (14) and Turret Bolt (26) for thread defects.

Examine the inner cavity of the Body (10) for scratches, pitting or any defects. Closely examine the Body (10) at the threads for the DIN or Yoke Inlet Fitting (35, 44) for cracking.

Examine the DIN or Yoke Inlet Fittings (35 or 44) for thread damage or evidence of cross-threading. Check the o-ring land at the Inlet Fitting end for any scratch, which may result in a HP leak.

Examine the DIN handwheel (41) threads for damage.

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:

- Identify each service kit o-ring using the sizer on page 19.
- Using the schematic as a guide, confirm that each replacement part is present



Only official Scubagaskets parts are permitted when reassembling any Scubagaskets product. Substitutions are not authorized, and may void the warranty. An aftermarket part may not match Scubagaskets specifications, 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.

INITIAL REASSEMBLY:



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



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.



All o-rings should be replaced at every service. New o-rings should be checked for contamination and/or defects. O-rings should generally 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.



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.

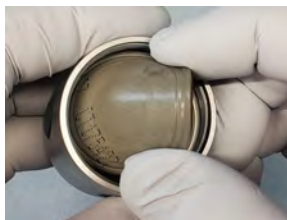


Wear nitrile gloves for reassembly when Nitrox will be used.

1. Inspect the Valve Lifter (9) and confirm that the center pin is straight. Install the Valve Lifter in the center hole of the regulator body.



2. Fold the diaphragm (8) gently into a convex bow, and seat the edge below the threads of the body. Work a blunt brass spade around the edge of the diaphragm to confirm that the diaphragm is not caught on a thread.



3. It is possible that the service kit will be supplied with a 1.2 mm thick diaphragm instead of the existing 1.5 mm part. If that occurs, the service kit will also include a large thin plastic thrust washer. Using the same technique as for diaphragm installation, bow and insert the thrust washer on top of the diaphragm, and seat it below the threads with your brass or plastic spade.

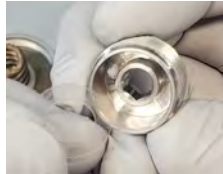
4. Place the Spring Pad (6) in the center of the diaphragm. Center the Main Spring (5) on the Spring Pad.



5. Determine the proper orientation of the Diaphragm Clamp (7) by test screwing the Environmental Cap (1) onto the Diaphragm Clamp. This side is the top. Lubricate the threads of the Spring Adjuster (4). **Do not lubricate** the threads of the Diaphragm Clamp.



6. Place two tiny dots of oxygen-safe lubricant in the recess of the Spring Adjuster as a temporary adhesive. Add the Spring Shim (if supplied) to the recess. Build the diaphragm clamp assembly by screwing the Spring Adjuster into the top of the Diaphragm Clamp until the threads just engage. Do not screw in the adjuster more than one turn.



7. Carefully lower the Diaphragm Clamp assembly onto the Body with the Main Spring centered so it enters the Spring Adjuster. Engage the threads in the regulator body. Hand tighten.



8. Mount the regulator in a vice by clamping a vice handle threaded into a high pressure port. Tighten the Diaphragm Clamp with a hook spanner or captive pin spanner until



a. metal-to metal contact between the Diaphragm Clamp and Body is reached, and the torque reaches 30 Nm, or

b. the torque reaches 30 Nm **before** metal-to-metal contact.



SPECIFICATION

Specification torque for the Diaphragm Clamp is 30 Newton-meters.



Torque-limited clamping before metal-to-metal contact will likely only be required if a 1.2 mm diaphragm is supplied, and a 0.8 mm thrust washer is added above it. Otherwise, metal-to-metal contact will provide adequate compression of the standard 1.5 mm diaphragm without a thrust washer..



Do not use a 1.2 mm diaphragm without a thrust washer. Compression will be inadequate for assured diaphragm retention.

8. Using a 6mm hex key, tighten the Spring Adjuster four (4) complete turns clockwise. This centers the Valve Lifter on the Body.



Failure to center the Valve Lifter with adequate spring tension may result in incorrect HP Seat position on first pressurization, resulting in Intermediate Pressure creep.

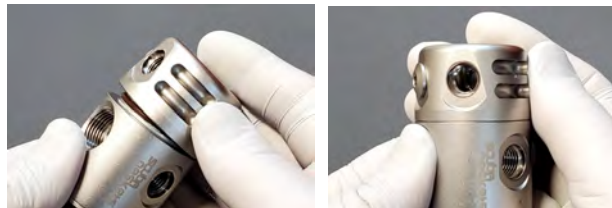
9. Smear a thin film of lubricant on the shaft of the HP Seat (19,20). Invert the Regulator Body and inspect the bore of the regulator Body to confirm that the pin of the Valve lifter is perfectly centered in the hole in the volcano.



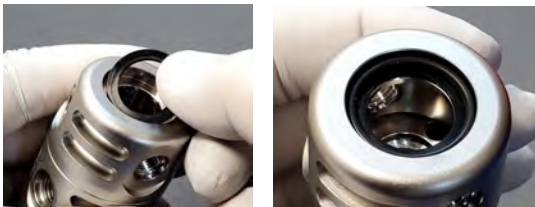
10. Drop the HP Seat carefully onto the pin of the Valve Lifter. Ensure that it is centered in the bore of the Body. Install a lubricated o-ring (13) onto the body, ensuring that it is not twisted.



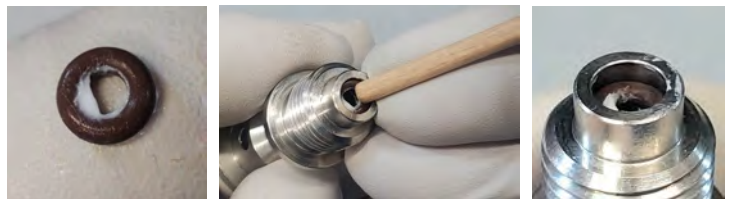
11. Set the Turret (14) on the body, and press firmly until o-ring (13) is forced up into the Turret. Inspect to confirm that there is no gap between the Body and the Turret.



12. Set the Thrust Washer (24) in the recess in the top of the Turret. Follow it with a lightly lubricated o-ring (25) on top of the thrust washer.



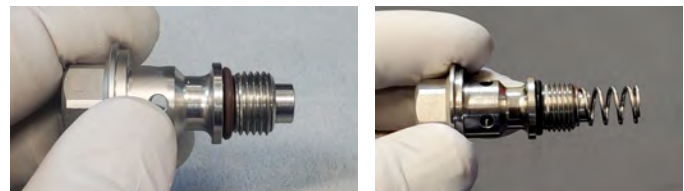
13. Heavily lubricate o-ring (22). Press o-ring (22) into the small recess in the end of the Fifth Port Assembly. Pressing lightly with a thin wooden dowel as needed, ensure that the o-ring lies flat in the recess.



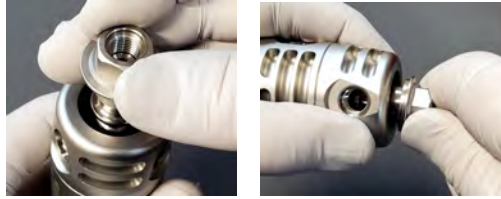
14. Using the **old** HP Seat, carefully insert it into the bore of o-ring (22) and slide the seat back and forth twice. Ensure that the shaft slides easily. Remove and discard the old HP seat.



15. Add a lightly lubricated o-ring (23) to the base of the threaded end of the Fifth Port Assembly. Do not lubricate the port assembly threads. Add the poppet spring (21).



16. Carefully centering the assembled Fifth Port in the Turret, pass the small end of the assembly onto the Poppet stem (20). Press the assembly down and carefully engage the threads in the Body. You may hear a click as the Poppet Spring (21) centers itself on the poppet. Screw in the port by hand.



17. Attach a 15mm socket to the hex of the Fifth Port and tighten to 15 Nm.



SPECIFICATION

Specification torque for the Fifth Port Assembly is 15 Newton meters.

18A. **Yoke Installation:** Insert the Filter (36) small end first into the bottom of the Yoke Inlet Fitting (35). Now insert an unlubricated o-ring (34) into the end so that it surrounds the filter and sits within the recess of the inlet fitting.



Do not lubricate the o-ring, nor use greasy gloves for filter insertion, as they risk clogging the filter with lubricant. A lubricated o-ring may allow displacement during Inlet insertion.

19A. Slide the Inlet Fitting (35) **up** inside the Yoke (37). Add the Saddle (33), concave side up. Holding the regulator body with the port for the inlet fitting facing **down**, screw the Yoke Inlet Fitting (26) **up** into the Main Body finger tight, to prevent displacement of o-ring (34). Now mount the Main Body in a vice with a vice handle screwed into a HP port.



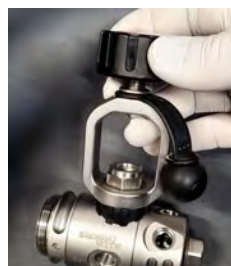
20A. Tighten the Yoke Inlet Fitting to the Main Body with an 8mm long hex socket. Torque the Inlet Fitting to 25 Nm.



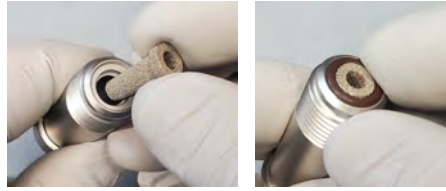
SPECIFICATION

The specification torque for the Yoke Inlet fitting is 25 Nm.

Install the ring of the dust cap (39) on the Yoke (37) and thread the Yoke Knob (40) into the Yoke.



18B. **DIN Installation:** Using clean hands or fresh gloves, drop the filter (43) into the bottom of the DIN Inlet (44), narrow end first. Press an unlubricated o-ring (42) into the recess at the end.



Do not lubricate the o-ring, nor use greasy gloves for filter insertion, as it risks clogging the filter with lubricant. A lubricated o-ring may become displaced during Inlet insertion.

19B. Set the DIN Handwheel (41) on the DIN Inlet Fitting, threads facing AWAY from the filter. Add the saddle (33) with the flat side facing the handwheel. Grasping the assembly, screw the DIN Inlet assembly **up** into the regulator body until it is finger tight, to prevent displacement of o-ring (42).



20B. Now tighten the DIN Inlet Fitting to 25 Nm with a [6mm hex socket and a torque wrench](#). Do not use a ball-end hex key. Before tightening, ensure that the hex key is fully inserted into the broach.



SPECIFICATION

The specification torque for the DIN Inlet fitting is 25 Nm.



Overtightening the Inlet Fitting risks fracturing the threads. Undertightening may result in o-ring (42) extrusion and HP gas loss, which may be fatal. Do not "guess" at the torque for this fitting.

21. Based upon your desired hose routing, add lightly lubricated o-rings (11, 32) to one or more HP port plugs, and lightly lubricated o-rings (15, 18, 27, 28, 47) to desired LP port plugs, using an [o-ring bullet](#) to protect the o-ring against damage from the threads. Use remaining service kit o-rings for hose reassembly. Using a 4mm hex key, tighten port plugs in the locations not used by hoses. A torque of 5 Nm is recommended to tighten port plugs and hoses.



22. Similarly, hoses should be tightened to the first stage in the desired locations with a torque of 5 Nm.

***This Concludes Initial Reassembly
Testing and Final Assembly Follows***

TESTING AND TUNING:

1. Connect an [Intermediate Pressure Gauge](#) (IP Gauge) with an over-pressure relief valve (OPV) on a hose to a low pressure port. If your gauge does not have an OPV, add a working second stage on a hose to a second low pressure port as a safety relief valve.

2. Attach the first stage to a tank filled to 206 bar (3000 psi). With one finger pressing the second stage purge button, slowly open the tank valve. If the Intermediate Pressure does not exceed 9 Bar, slowly release the purge button and carefully observe Intermediate Pressure. If the gauge rapidly exceeds 145psi (10bar), there is a high pressure leak. Quickly depress the purge button to protect the hoses, and immediately close the cylinder valve. Refer to Table 1, Troubleshooting Guide on page 16 to find the possible cause of the HP leakage.



WARNING

Failure to purge while shutting off the tank may result in LP hose and/or LP pressure gauge rupture, which could result in personal injury.

3. Using your gauge's OPV or your second stage, cycle the first stage under pressure several dozen times. The Intermediate Pressure should quickly rise to a consistent level **and stop**. If you observe a small and slow Intermediate Pressure increase which stops within specification, this is normal, and typical of a new HP seat. As the seat conforms to the piston knife edge, valve lockup should become crisp. This IP "drift" is limited to 0,5 bar.

4. If you observe a **continuous** slow (or rapid) rise in Intermediate Pressure, turn off the tank and consult the Troubleshooting Section. Your regulator will likely need disassembly and inspection to find and solve the HP leak.

5. After multiple cycles with the OPV or second stage, if the regulator has been assembled exactly as described above, Intermediate Pressure should be between 50 and 115 psi (3 and 8 bar) at 206 bar (3000 psi) tank pressure.

SPECIFICATION

The static Intermediate Pressure for the SGS3 First Stage with the second stage valve closed shall be between 9 and 9.5 Bar at 3000 psi tank pressure.

6. If the **stable** Intermediate Pressure is below specification, insert a 6mm hex key in the adjustment screw, and turn the adjuster clockwise in 1/4 turn increments until the IP is within 15 psi (1 bar) of the desired value. Purge the second stage with each adjustment. When within 15 psi of desired, now turn the adjuster clockwise 1/12 turn at a time, purging with each change. It is common for the IP gauge to jump markedly during adjustment, due to spring twist. However, the IP will settle after purging. Continue tiny clockwise adjustments until the desired IP is reached.

7. If the adjustment exceeds the desired value, or if **stable** Intermediate Pressure is above specification (but not continuing to creep), insert a 6mm hex key and turn the adjuster counterclockwise **ONLY** 1/12 turn at a time, purging the second stage after each adjustment. Continue making small changes until the IP reaches the desired value.



CAUTION

Making larger counterclockwise adjustments to lower IP without purging the second stage places undue stress on the diaphragm, which may cause it to dislodge.

8. Depressurize the system, repressurize and re-check IP. Readjust as needed.

***This Concludes Testing and Tuning
Final Assembly and Immersion Testing Follow***

FINAL ASSEMBLY:

Final Assembly of the SGS3 first stage regulator requires addition of the environmental seal. If you depressurize the system before installation of the seal, the transpiston drops, and a large air pocket will be left under the seal which will degrade performance and increase the likelihood that the seal might leak.



Always install the environmental seal with the first stage pressurized.

1. Pressurize the first stage and add the transmitter (3) by inserting the narrow shaft in the center of the adjustment screw (4).



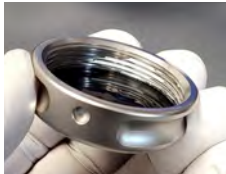
2. Press the environmental seal (2) into the inside of the environmental cap (1).



3. Ensure that the seal is below the level of the threads by running a blunt brass or plastic spade around the perimeter of the cap under the lowest thread.



4. Lubricate the threads of the cap.



5. While pressing lightly on the seal, screw the cap into place and tighten **lightly** with a hook spanner or [Scubagaskets Captive Pin Spanner](#). Do not tighten the cap with more than 8 Nm torque.



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 second stage regulator case has escaped.



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.

If there are no leaks, close the cylinder valve and depressurize the regulator. Remove the first stage from the tank and secure the dust cap in place. If a leak is detected, note the source of the leak and refer to Table 1, Troubleshooting Guide for possible causes and corrective actions. If you have questions, please contact the Scubagaskets technical department at info@scubagaskets.com.

This Completes Regulator Service










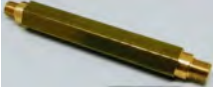




Table 1: Troubleshooting Guide

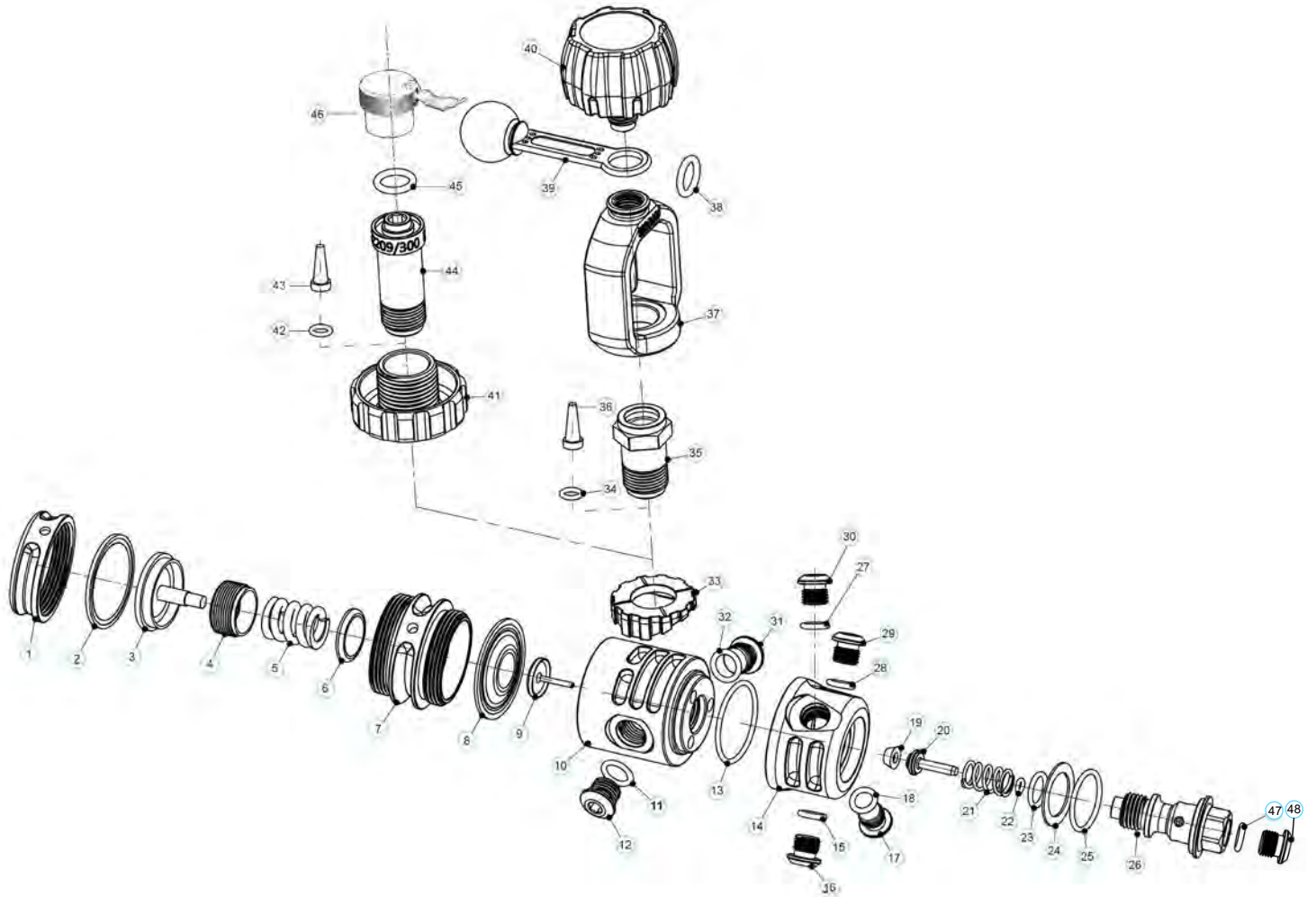
SYMPTOM	POSSIBLE CAUSE	TREATMENT
Restricted airflow/high inhalation resistance through entire system	1. Cylinder valve not completely open	1. Open valve and check fill pressure
	2. Cylinder valve requires service	2. Connect to a different cylinder
	3. Filter (36, 43) clogged	3. Replace filter (36) or (43)
	4. Insufficient Intermediate Pressure	4. See below
Low Intermediate Pressure outside specification	1. Low inlet pressure	1. Refill test cylinder
	2. Spring Adjuster (4) insufficiently tightened	2A. Screw spring adjuster clockwise (see page 14)
High, creeping Intermediate Pressure (may cause 2nd stage leakage or freeflow)	1. Debris caught between volcano knife edge and HP seat	1. Clean and reassemble
	2. HP seat (19) damaged or worn	2. Replace HP seat (19,20)
	3. Damaged volcano knife edge	3. Replace regulator body (10)
	4. Damaged balance chamber o-ring (22)	4. Replace o-ring (22)
	5. Scratched balance chamber sealing surface	5. Replace Turret Bolt/5th Port (26)
Stable high Intermediate Pressure outside specification	1. HP Seat wear	1. Replace HP seat (19,20)
	2. Main spring (5) excessively tightened	2. Unscrew spring adjuster (4) (see page 14)
Leakage of air from inlet fitting	1. Inlet fitting o-ring (34, 42) damaged	1. Replace o-ring (34, 42)
Leakage of air from the Turret Bolt	1. Turret Bolt/5th Port (26) is loose	1. Torque Turret Bolt/5th Port (26) to 15 Nm
	2. O-ring (25) is damaged or worn	2. Replace o-ring (25)
Drop of dynamic Intermediate Pressure during a second stage purge of >25psi	1. Tank valve is not fully open	1. Fully open tank valve
	2. Tank pressure is below 3000 psi	2. Attach full tank
	3. Filter (36, 43) is clogged	3. Replace filter (36) or (43)
	4. HP Seat shaft is dry	4. Lubricate HP seat shaft (20)



This table only lists some possible problems and recommended action. For more information, please contact the Scubagaskets technical department at info@scubagaskets.com for assistance with issues not mentioned here. Most of the symptoms in this list are cause for complete overhaul. Partial service should not generally be attempted, as few of the problems above are found in isolation.

Table 2: Recommended Tool List

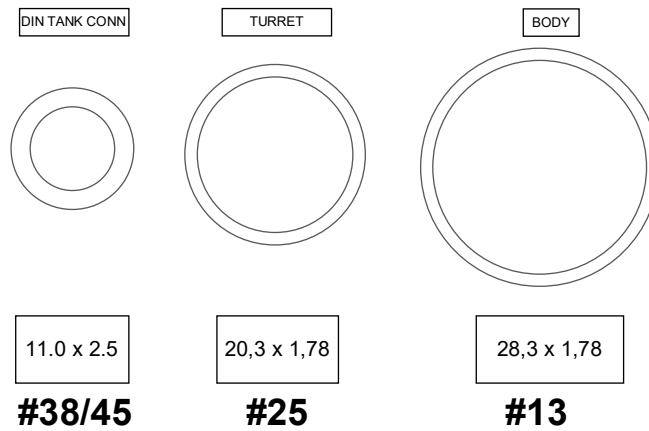
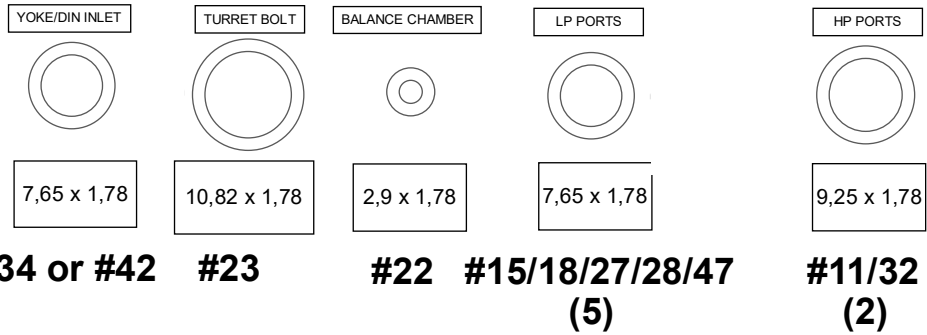
TOOL	DESCRIPTION	APPLICATION
	Intermediate Pressure Gauge (Scubagaskets Digital IP Regulator Tester Gauge)	Checking Intermediate Pressure (Medium Pressure) NOTE: needs an OPV if used without a second stage as a pressure relief
	Thin brass or plastic picks	Removal and installation of o-rings
	Air Gun attachment for bcd hose with rubber tip	Removal of Diaphragm Optional: see dowels below
	Hex Keys (4mm, 6mm & 8mm) (Straight shaft, NOT ball-end) (Scubagaskets HOTMH345-5900)	Remove and replace Port Plugs, Retaining Screw, HP Seat Carrier and DIN Inlet Fitting
	Hex Socket (6mm & 8mm) (Straight shaft, NOT ball-end) (Included in Scubagaskets torque wrench set below)	Tighten Turret Retaining Screw, HP Seat Carrier and DIN Inlet Fitting to specification torques
	Ultrasonic Cleaner	Metal parts cleaning/corrosion removal
	Plastic or aluminum 2.5 mm crochet hook, or Apeks style plastic hook tool (Scubagaskets O-Ring Plastic Pick Tool Pointed-Hook ends)	To remove Balance Chamber o-ring (xx)
	Blunt brass or plastic spade (Scubagaskets Reinforced O-ring Plastic Tool Double Flat ends - PLP-f-300)	To seat diaphragm and environmental seal below threads
	Angled Internal Circlip Pliers with 0.040" (1mm) tips (Yoke models only) (Scubagaskets Internal Circlip Pliers)	Removal and installation of Yoke Filter retaining Circlip (28) (Yoke models only)
	Torque Wrench (0-30 Nm) 3/8" socket tip (Scubagaskets Torque Tool with 3 Hex socket)	For accurate tightening of Inlet Fitting, and HP Balance Chamber/5th port
	Vice handle (Scubagaskets Universal Heavy Duty First Stage Holder)	To mount regulator in stable position for application of torque
	Open End Wrenches	To attach and remove hoses To remove HP Balance Chamber/5th port
	Universal Captive Pin Scuba Tool (Scubagaskets SPCH 26000)	To remove/replace Turret Cap (9)
	Universal DIN Retainer Tool (Scubagaskets TU Q 8000)	Removal of stuck DIN connector
	Thin Wooden Dowels 3 & 5 mm diameter	Diaphragm Removal Balance Chamber O-ring Seating



Ref #	Part #	Qty	Description	Ref #	Part #	Qty	Description
1	S3-01	1	Environmental Cap	22*	S3-22	1	<i>O-ring: 2.9 x 1.78 mm</i>
2	S3-02	1	Environmental Seal	23*	S3-23	1	<i>O-ring: 10.82 x 1.78 mm</i>
3	S3-03	1	Transmitter	24	S3-24	1	Washer
4	S3-04	1	Spring Adjuster	25*	S3-25	1	<i>O-ring: 20.3 x 1.78 mm</i>
5	S3-05	1	Main Spring	26	S3-26	1	Turret Bolt/5th Port
6	S3-06	1	Spring Pad	33	S3-33	1	Saddle
7	S3-07	1	Diaphragm Clamp	34,42*	S3-34,42	1	<i>O-ring: 7.65 x 1.78 mm</i>
8	S3-08	1	Diaphragm	35	S3-35	1	Yoke Connector
9	S3-09	1	Valve Lifter	36,43	S3-36,43	1	Filter
10	S3-10	1	Body	37	S3-37	1	Yoke
11,32*	S3-11,32	2	<i>O-ring: 9.25 x 1.78 mm</i>	38*	S3-38	1	<i>O-ring: 11 x 2.5 mm</i>
12,31	S3-12,31	2	HP Port Plug	39	S3-39	1	Yoke Dust Plug
13	S3-13	1	<i>O-ring: 28.3 x 1.78 mm</i>	40	S3-40	1	Yoke Knob
14	S3-14	1	Turret	41	S3-41	1	DIN Handwheel
15,18,27,28,47*	S3-15,18,27,28,47	5	<i>O-ring: 7.65 x 1.78 mm</i>	44	S3-44	1	DIN Connector
16,17,29,30,48	S3-16,17,29,30,48	5	LP Port Plug	45*	S3-45	1	<i>O-ring: 11 x 2.5 mm</i>
19,20*	S3-19,20	1	<u>HP Seat Assembly</u>	46	S3-46	1	DIN Dust Cap
21	S3-21	1	Poppet Spring				

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

First Stage



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