

11. Using a genuine TUSA poppet retainer tool, push the inlet tube valve assembly (15) into the regulator case (25). Remove the inlet tube valve assembly noting the position of the flow port and it's position with respect to the air deflector in the regulator case. Refer to figure 7-5.

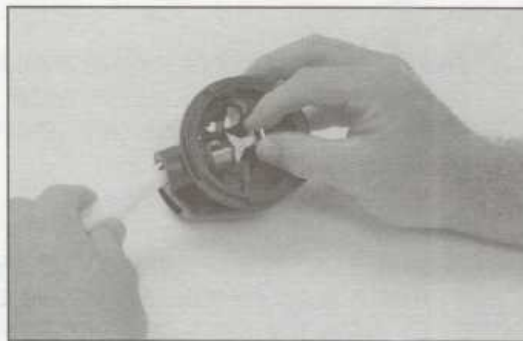


FIG 7-5

12. To remove the internal valve components from the inlet tube (15) refer to figure 7-6 and proceed as follows. Hold the demand poppet (7) with the poppet tool while turning the locking nut (19) with a 1/4" nut driver in a counter-clockwise direction. Continuously apply a slight amount of inward pressure on the demand poppet, to avoid sudden ejection as it disengages from the locking nut.



FIG 7-6

13. Carefully remove the demand poppet (7), demand spring (6), washer (16), spacer (18), demand lever (17), and locking nut (19) from the inlet tube. Discard the locking nut (19) as it cannot be reused. This is a mandatory replacement component.

WARNING

Failure to replace the locking nut (19) with a new unit may lead to failure of the regulator to supply air. Use prudence and replace the locking nut with a new unit every time it is fully removed from the demand poppet thread. This is necessary to maintain top performance in the regulator function.

14. Examine the demand lever (17) and compare with new to ensure that it is not bent, distorted or corroded in any way. Also examine the condition of the washer (16) and spacer (18) looking for evident wear marks from the demand lever, corrosion or distortion. **RECORD FOR REPLACEMENT** if needed.
15. Inspect the demand spring (6) and compare with new to ensure correct tension, length and lack of corrosion. Do not attempt to stretch the spring back into a conforal length. **RECORD FOR REPLACEMENT** if needed.
16. Remove the poppet seat (8) from the demand poppet (7) using an o-ring pick. Discard the seat and replace with a new unit. We do not recommend using an old seat as proper adjustment and tuning of the regulator may be defeated resulting in high inhalation efforts or leaking.
17. Inspect the overall condition of the regulator case (25) to ensure it is free of any stress cracks, distortion, chemical attack or discoloration. Examine the inlet tube valve port very closely looking for any sign of cracks or breakage. Refer to figure 7-7.



FIG 7-7

WARNING

Failure to recognize or replace a faulty regulator case (25) may lead to failure of the regulator to supply air, severe water leakage, or catastrophic failure. Use prudence and replace the regulator case when necessary to maintain top performance in the regulator function.

18. Using a soft probe, inspect the condition of the exhaust valve (5) to ensure that it is supple and free of any tears, decay, or degradation due to chemical attack. Ensure that it seals completely around the sealing surface of the regulator case (25). Examine the exhaust cover (4) to ensure that it is securely fastened onto the regulator case.

NOTE

Provided that the exhaust valve (5) is in good condition and the exhaust cover (4) is intact, further disassembly is not necessary. The regulator case (25) may be cleaned with these parts assembled, as one part.

19. If further disassembly is needed, either to replace the exhaust valve (5) or exhaust cover (4), remove both hex head screws (3) using a 3/32" allen wrench. The exhaust valve may now be removed by grasping it at the flange and pulling it straight out. RECORD FOR REPLACEMENT with a new exhaust valve.
20. The diaphragm cover (22), purge button (20) and purge spring (21) may also be cleaned with these parts assembled as one part. This of course depends on results of inspection and attempts to flush any debris under the purge button through the opening found in the back of the diaphragm cover. Should disassembly become necessary, carefully pry two adjacent tangs of the purge button until the force of the purge spring ejects the button from the cover.

This concludes the disassembly of the SS-350 second stage. Please refer to the Section 11.0 for proper guidance on cleaning.

7.1 REPAIR & REPLACEMENT SCHEDULE

The repair & replacement schedule for the SS-350 second stage is identical to the TR-390 adjustable second stage excluding omitted parts. Please refer to Section 6.1 for information.

7.2 ASSEMBLY PROCEDURE SS-350 SECOND STAGE

NOTE

Prior to assembly, ensure that all parts have been inspected (both new and those that are being reused) and are of top quality. Ensure that all o-rings are clean, supple and lubricated as described in Section 11.0. Double check to make sure all o-rings are of the proper size and are being handled and installed per this procedure.

1. Proceed with this step if the exhaust valve (5) or exhaust cover (4) were disassembled or replacement is needed, otherwise go to step 3. The exhaust valve is installed by pulling its retaining stem through the center hole in the regulator case (25) until it snaps into place.
2. Install the exhaust cover (4) to ensure that it is securely positioned onto the regulator case (25). Install both hex head screws (3) using a 3/32" allen wrench and tighten just past hand tight by 1/4 to 1/3 of a turn. Torque specifications for this installation is 2 inch-pounds minimum to 4 inch-pounds maximum. DO NOT overtighten.
3. Proceed with this step if the purge button (20) and purge spring (21) were removed from the diaphragm cover (22), otherwise go to step 4. Install the smaller end of

the purge spring onto the purge button first. The larger end of the spring will now enter the diaphragm cover first. Align the TUSA IMPREX logo with the cover and gently push the purge button until all 4 tangs snap into place on the back side of the cover.

4. This step involves the installation of the internal valve components into the inlet tube (15). First, install a new poppet seat (8) into the demand poppet (7). Use your finger to ensure that it is completely seated, flush with the outer rim of the poppet. We do not recommend re-using an old seat as proper adjustment and tuning of the regulator may be defeated resulting in high inhalation efforts or leaking.

WARNING

DO NOT use a silicone based lubricant on the poppet seat (8), exhaust valve (5), or the inhalation diaphragm (24) for any purpose including installation. These components are INCOMPATIBLE with silicone based lubricants and may lead to conditions resulting in potential failure of the regulator to supply air or severe leakage of water into the second stage. Use prudence and replace these components in the event of severe exposure to any silicone based lubricant. Replace these components when necessary to maintain top performance in the regulator function.

5. Place the demand spring (6) onto the end of the demand poppet (7). Refer to figure 7-8 and proceed as follows. Fit the poppet into the pronged end of the TUSA poppet retainer tool, and insert the poppet shaft completely through the open end of the inlet tube (15) until the threaded portion of the shaft is visibly through the other end. Hold in this position by grasping the inlet tube between thumb and forefinger and pulling it down onto the poppet tool, compressing the spring.

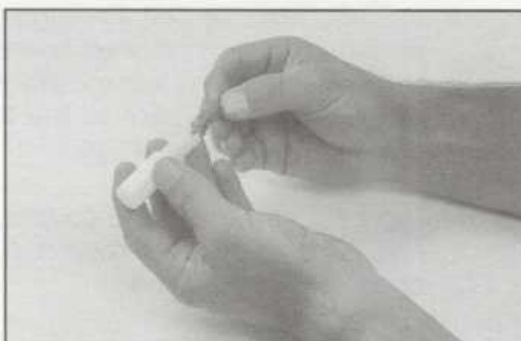


FIG 7-8

CAUTION

Use caution not to confuse or use the wrong demand spring when assembling all second stages, as each primary second stage spring exerts a different sealing force. Please refer to the appropriate schematic for correct part numbers.

6. Examine both sides of the washer (16) noting that one surface is slightly rounded and smooth at the edge, and the other has a slightly upturned lip around the outer circumference. Place the washer over the poppet shaft with the smooth side facing up, allowing it to drop inside the flange of the inlet tube (15).
7. Position the flow port of the inlet tube (15) facing straight up. Place the spacer (18) onto the poppet shaft, and thread the locking nut (19) until resistance is felt. Position the forks of the demand lever (17) over the poppet shaft so the demand lever arm is facing up. Refer to figure 7-9 as you relax the poppet, ensuring that



FIG 7-9

the demand lever arm stands upright. Note the position of the flow port in the inlet tube and the demand lever.

CAUTION

Make certain the flow port of the inlet tube is positioned as shown in the photo. Installation of the inlet tube into the regulator case with the flow port not positioned correctly will result in improper demand lever height and substantial decrease in air flow from the regulator.

8. Use the poppet retainer tool to hold secure the demand poppet. Use a 1/4" nut driver to turn the locking nut (19) until 3 to 4 threads of the poppet are exposed. Refer to figure 7-10. Remove tools, and depress the demand lever repeatedly to ensure smooth movement.

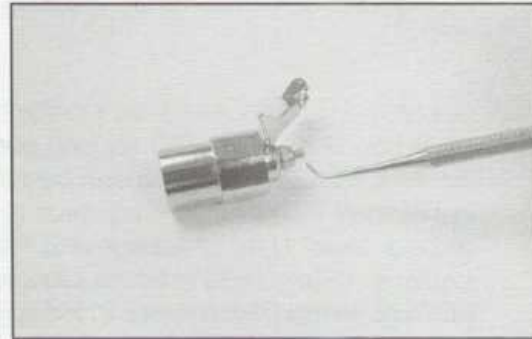


FIG 7-10

9. Refer to figure 7-11 as you lower the inlet tube valve assembly (15) into the regulator case (25), ensuring the demand lever is positioned correctly. Guide the inlet tube into the indexed (hex) tube of the case to the left, causing it to seat completely.

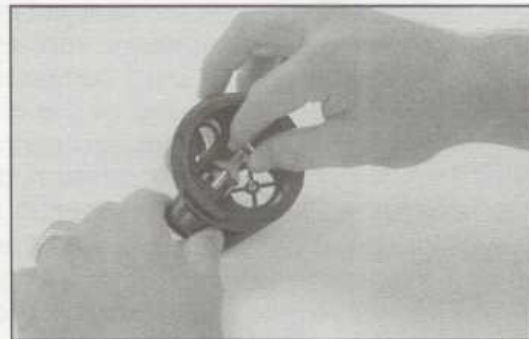


FIG 7-11

10. Lubricate and install the coupler o-ring (9) onto the inlet coupler (10), opposite of its hose end.
11. Lubricate and install the orifice o-ring (12) onto the adjustment orifice (11) being cautious not to damage the sharp sealing edge. If necessary, use a magnifying glass or microscope to verify it is free of any scoring, nicks, dings, dents or pitting.
12. Coat the threads of the adjustment orifice (11) with a very light film of lubricant, and insert into the hose end of the inlet coupling (10) with the sharp sealing edge facing out of the downstream end.
13. Using the TUSA in-line adjustment tool, turn the adjustment orifice (11) into the inlet coupling (10) until the sealing edge is flush with the outer surface of the coupling. DO NOT extend any further.
14. While holding the inlet tube assembly (15) firmly in the regulator case (25), turn the inlet coupling assembly engaging the threads of the inlet tube by hand until finger snug only. Apply a 3/4" open end wrench and mark the position of either the nut or the wrench to gauge additional movement. Turn the nut 30-45 degrees further, or 1/12-1/8 of a turn until very snug. Torque specifications for this installation is 30

inch-pounds minimum to 36 inch-pounds maximum (2.5 to 3.0 foot-lbs torque).

WARNING

DO NOT overtighten causing the regulator case (25) to crack in the inlet tube area. Excessive stress or cracking in this area of the regulator may lead to failure of the regulator to supply air, severe water leakage, or catastrophic failure. Use prudence and replace the regulator case when necessary to maintain top performance in the regulator function.

15. Using the TUSA in-line adjustment tool, slowly turn the adjustment orifice (11) clockwise until a slight resistance is felt or a slight movement of the demand lever (17) is noted. This indicates that it has made contact with the poppet seat (8). DO NOT continue to turn the orifice any further beyond this point, causing the demand lever to drop. Doing so will damage the poppet seat by creating an indentation in the seating surface from the sharp sealing (knife) edge of the orifice.



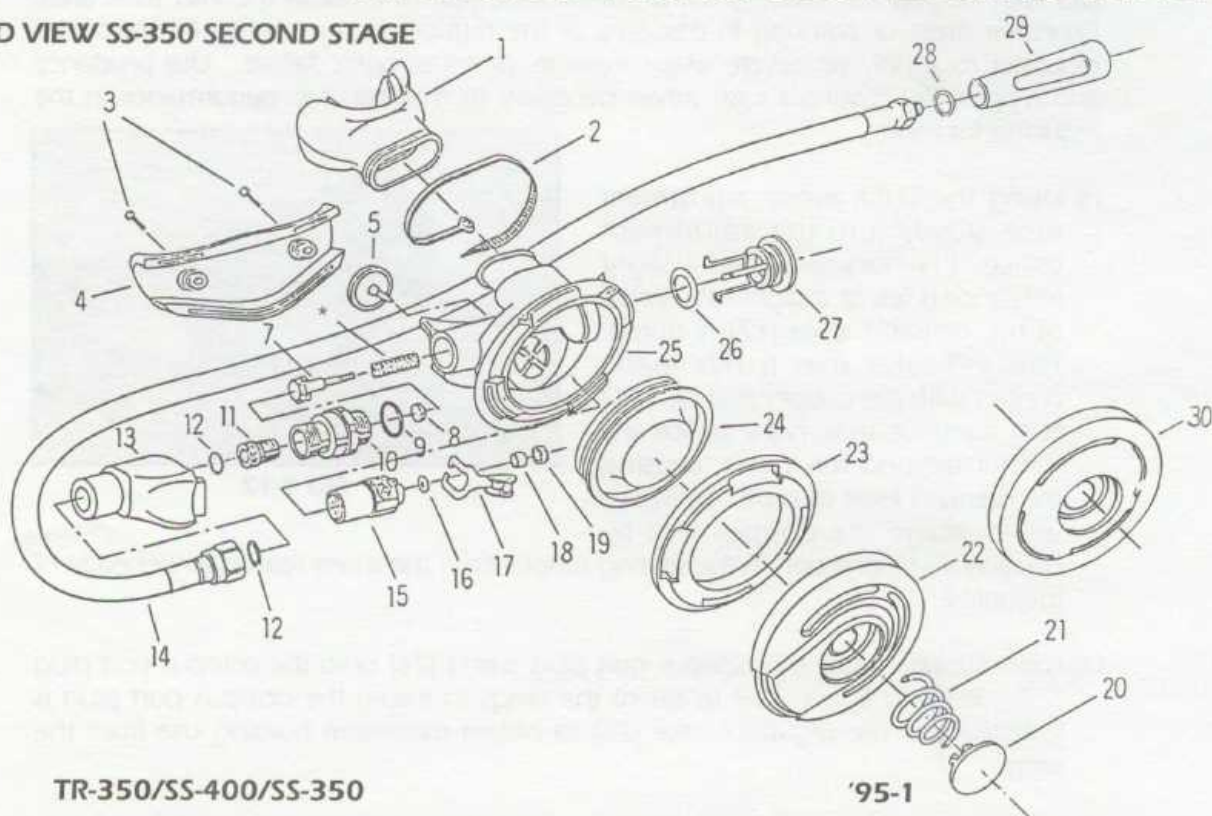
FIG 7-12

16. Lubricate and install the octopus port plug o-ring (26) onto the octopus port plug (27). Refer to figure 7-12 to orient the tangs to insure the octopus port plug is installed into the regulator case (25) to obtain maximum holding use from the tangs.
17. It is best to proceed with tuning the regulator to ensure proper demand lever (17) height. Ensure that no slack is present in the demand lever with the valve sealed against a 140 psi intermediate pressure air source. If demand lever slack is found, remove the inlet coupler (10) to tighten the locking nut using small fractions of a turn applied with the poppet retainer tool and 1/4" open end wrench. Repeat this procedure until all slack is eliminated. Refer to Section 8.2 for guidance.
18. All remaining steps for assembly of the SS-350 second stage are identical to the TR-390. Please refer to Section 6.2 commencing with step #25 and completing through to the end. Heed all notes, cautions, and warnings.

This concludes the assembly of the TUSA SS-350 IMPREX 2 second stage. Please refer to the Section 8.2 for tuning & adjustment.

TR-350/SS-400/SS-350 SECOND STAGE

7.3 EXPLODED VIEW SS-350 SECOND STAGE



TR-350/SS-400/SS-350

ITEM NO.	PART NO.	DESCRIPTION	REMARK	SUGG. RETAIL
1	TR-202-36	MOUTHPIECE		
2	ST-004-01	STRAP		
3	ST-003-15	HEX HEAD SCREW		
4	TR-402-04	EXHAUST COVER		
5	TR-402-05	EXHAUST VALVE		
* 6	SS-402-06	DEMAND SPRING	(SS-400, SS-350 ONLY)	
7	TR-402-07	DEMAND POPPET		
8	TR-402-08	POPPET SEAT		
9	ST-001-20	O-RING	3-906	
10	TR-402-10	INLET COUPLER		
11	TR-402-11	ADJ. ORIFICE		
12	ST-001-12	O-RING	2-010	
13	TR-402-13	JOINT GUARD	(SS-400 ONLY)	
14	SS-402-14	L.P. HOSE	LENGTH-33'	
15	TR-402-15	INLET TUBE		
16	ST-003-16	WASHER		
17	TR-402-17	DEMAND LEVER		
18	TR-402-18	SPACER		
19	ST-003-02	ADJ. LOCKING NUT		
20	TR-402-20	PURGE BUTTON		
21	TR-402-21	PURGE SPRING		
22	TR-402-22	DIAPHRAGM COVER	(SS-400 ONLY)	
23	TR-402-23	DIAPHRAGM RETAINER		
24	TR-402-24	DIAPHRAGM		
25	TR-402-27	CASE		
26	ST-001-09	O-RING	2-016	
27	SS-402-27	OCTOPUS PLUG		
28	ST-001-05	O-RING	2-011	
29	TR-402-37	HOSE COVER		
30	TR-352-22	DIAPHRAGM COVER	(SS-350 ONLY)	
* 31	TR-352-06	DEMAND SPRING	(TR-350 ONLY)	

* 6 SS-400/SS-350 only
31 TR-350 only

SECTION VIII

TUNING AND ADJUSTMENT

8.0 TR-350/TR-390 BALANCED PISTON FIRST STAGE TUNING

The first stage of the TR-350/TR-390 regulator is designed and constructed with features that do not necessitate adjustment of an intermediate pressure setting.

Properly assembled with the correct components the TR-350/TR-390 first stage is designed to provide a permanent intermediate pressure of 135 to 150 psi over a wide range of cylinder pressure.

This intermediate pressure setting, in conjunction with a properly adjusted second stage, will assure proper performance and ample air delivery of the TR-350/TR-390 regulator.

8.1 TR-390 ADJUSTABLE SECOND STAGE TUNING

Refer all item numbers (99) to the exploded view for this regulator found at Section 6.3.

1. Prior to tuning the second stage regulator, ensure that all cleaning, assembly and disassembly procedures have been followed closely. If the regulator is being tuned without previous disassembly, read Section 6.0 through 6.3 prior to tuning the regulator. Ensure that all in-water and visual test & inspection results have been documented.
2. To maximize performance and minimize the inhalation effort of the regulator, it is necessary to insure that the demand lever (17) height and adjustment orifice have been properly adjusted. It is most important to verify that all adjustments to the regulator are done using an intermediate air pressure source of 140 psi within 3 to 5 psi and a supply source between 2500 and 3000 psi. If adjustments to the regulator second stage are to be made with its own first stage, ensure beyond any doubt that the intermediate pressure is set properly and the tank valve or regulator panel valve is fully open through all testing.
3. A properly adjusted TR-390 adjustable second stage should free flow slightly when the demand knob (35) is turned out counter-clockwise as far as it can go. As the knob is turned inward clockwise, the adjustment assembly will augment the sealing force the demand spring (6), exerts onto the demand poppet (7), the poppet seat (8), and the adjustment orifice (11). It is important to understand this concept to properly adjust this type of regulator. The demand spring (6) cannot exert sufficient force onto the poppet seat, by itself, to seal the seat against the orifice with 140 psi air pressure on the other side. Additional sealing force is exerted onto the demand poppet through the action of the piston (28), the secondary spring (29), and the piston spring follower (30). As the demand knob is turned inward, enough sealing force is generated between the demand & secondary springs to stop air leakage past the poppet seat and orifice. At this point the inhalation effort should be minimal, approximately 3/4 to 1 inch water vacuum. Refer to figure 8-1.



FIG 8-1

4. Remove the diaphragm cover (22) by using your finger nail to gently depress the locking tang located on the diaphragm retainer (23) and twisting the cover 1/8 turn counter-clockwise.
5. Remove the diaphragm retainer (23) by gently prying upwards all around until both the retainer & the diaphragm come off as an assembly.
6. Proper tuning of the regulator may begin with an initial setting of the demand poppet with 3 to 4 threads showing beyond the outer surface of the locking nut (19). This setting pre-loads the demand spring (6) to apply a minimum sealing force. Refer to Section 6.2 for guidance.
7. Install a TUSA in-line adjustment tool onto the inlet coupler (10) and slowly turn the adjustment orifice (11) inward clockwise until a slight resistance is felt or a slight movement of the demand lever (17) is noted. This indicates that it has made contact with the poppet seat (8). DO NOT continue to turn the orifice any further beyond this point, causing the demand lever to drop. Doing so will damage the poppet seat by creating an indentation in the seating surface from the sharp sealing (knife) edge of the orifice.
8. Connect the TR-390 second stage (with the TUSA in-line adjustment tool installed) to a intermediate air pressure source of 140 psi and slowly turn the air supply on. Begin to turn the demand knob (35) clockwise inward until the second stage no longer leaks air. If air flow cannot be stopped with the knob, further disassembly is required to verify the poppet seat (8) and the adjustment orifice (11) are in acceptable or new condition. Refer to figure 8-2.

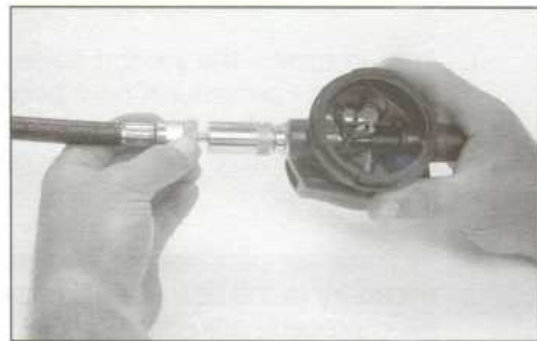


FIG 8-2

NOTE

While pressurized, the slotted blade of the TUSA in-line tool will need to be pushed inward and held while turning in either direction. Locate the slotted head of the orifice by touch before attempting any adjustment.

9. With the valve sealed against a 140 psi intermediate pressure air source, ensure that no slack is present in the demand lever by gently shaking the regulator up and down noting rattling or movement. If found, first attempt to remove slack by backing off the adjustment orifice by using the TUSA in-line adjustment tool. Also verify that the adjustment assembly is applying minimal augmented sealing force to the poppet by backing off on the demand knob.
10. If slack is still present in the demand lever, depressurize the regulator and proceed as follows. Remove the inlet coupler (10) from the regulator. Use a 1/4" open end wrench to hold the locking nut (19) secure, and turn the demand poppet with the TUSA poppet retainer tool to tighten the locking nut using small fractions of a turn. Refer to figure 8-3. Remove



FIG 8-3

tools, and depress the demand lever repeatedly to ensure smooth movement.

11. While holding the inlet tube assembly (15) firmly in the regulator case, turn the inlet coupler assembly engaging the threads of the inlet tube by hand until finger snug only. Apply a 3/4" open end wrench and mark the position of either the nut or the wrench to gauge additional movement. Turn the nut 30-45 degrees further, or 1/12-1/8 of a turn until very snug. Torque specifications for this installation is 30 inch-pounds minimum to 36 inch-pounds maximum (2.5 to 3.0 foot-lbs torque).

WARNING

DO NOT overtighten causing the regulator case to crack in the inlet tube area. Excessive stress or cracking in this area of the regulator may lead to failure of the regulator to supply air, severe water leakage, or catastrophic failure. Use prudence and replace the regulator case when necessary to maintain top performance in the regulator function.

12. Connect the TUSA in-line adjustment tool and apply an intermediate air pressure source of 140 psi by slowly turning the air supply on. Adjust the demand knob (35) until the second stage no longer leaks air. Verify that the adjustment assembly is applying minimal augmented sealing force to the poppet. With the valve sealed against a 140 psi intermediate pressure air source, again ensure that no slack is present in the demand lever by gently shaking the regulator up and down.

13. Repeat steps 9 and 10 until all slack is eliminated.

WARNING

Failure to remove all slack from the regulator valve assembly demand lever (17) may lead to minimal or no actuation of the purge button (20) system. Verification of the purging action is mandatory prior to certifying a regulator safe for use in diving activities.

14. Prior to removing the TUSA in-line adjustment tool, check to ensure that the valve assembly remains sealed with the diaphragm (24) installed. Use the following steps to replace the diaphragm onto the regulator. If leakage is caused by addition of the diaphragm & cover assembly, use the in-line adjustment tool to turn the adjustment orifice slightly inward to compensate. Again ensure that no slack is present in the demand lever by gently shaking the regulator up and down.

15. Place the diaphragm (24) inside the diaphragm retainer (23) ensuring that it seats flush with its base. Install this diaphragm & retainer assembly into the case with the retainer locking tang located adjacent to the inlet coupler (10). Gently push downward to firmly seat the diaphragm retainer all around the regulator case. Refer to Section 6.2, figure 6-16.

WARNING

DO NOT attempt to install the diaphragm retainer (23) and diaphragm (24) separately into the regulator case. The diaphragm retainer and diaphragm **MUST BE INSTALLED AS AN ASSEMBLY** into the case. Failure to install these in any fashion other than as an assembly, may lead to severe leakage of water into the second stage.

16. Install the diaphragm cover (22) by firmly placing it against the diaphragm retainer (23) located as shown in Section 6.2, figure 6-17. Twisting the cover 1/8 turn clockwise ensure that the diaphragm retainer locking tang fully engages and locks the cover it into place.

17. Purge the regulator of air to remove the in-line adjustment tool and connect the LP hose directly onto the inlet coupler. Grasp the hex portion of the inlet coupler with a 3/4" open end wrench. Use an 11/16" open end wrench to tighten the LP hose nut (14) in a clockwise movement approximately 1/12 to 1/8 turn past hand tight. Torque specifications for this installation is 12 inch-pounds minimum to 18 inch-pounds maximum (1.0 to 1.5 foot-lbs torque). Refer to Section 6.2, figure 6-18.
18. Grasp the LP hose (14) about mid length, and push the joint guard (13) forward, engaging the diaphragm cover (22) securely.19. Pressurize the regulator again and adjust the demand knob to verify its function as described in step 3. Subject the regulator to test air flow, cracking effort, and purging function. Inhale lightly through the mouthpiece to determine that air flows easily and smoothly, without any noticeable hesitation or lag.

NOTE

If hesitation or lag is detected, refer to the troubleshooting section to determine possible cause and treatment.20. Clean and disinfect the mouthpiece in warm, soapy water before returning to the customer.

CAUTION

Use caution not to confuse or use the wrong demand spring when assembling all second stages, as each primary second stage spring exerts a different sealing force. Please refer to the appropriate schematic for correct part numbers.

8.2 SS-350 NON-ADJUSTABLE SECOND STAGE TUNING

Tuning and adjustment of the SS-350 non-adjustable second stage is similar to the TR-390 with the exception that there is no adjustment tube assembly. Adjust and tune it as you would a TR-390 while keeping in mind that the demand spring for the SS-350 can exert all the sealing force required. Refer all item numbers (99) to the exploded view for this regulator found at Section 7.3.

CAUTION

Use caution not to confuse or use the wrong demand spring when assembling all second stages, as each primary second stage spring exerts a different sealing force. Please refer to the appropriate schematic for correct part numbers.

SECTION IX

TORQUE SPECIFICATIONS

9.0 TORQUE SPECIFICATIONS FOR TR-350/TR-390 BALANCED PISTON FIRST STAGE

The following specifications are to meet upon assembly of the TR-350/TR-390 Balanced Piston First Stage. Make certain you verify your torque wrench is calibrated in INCH-POUNDS only.

Remember: 1 FOOT-POUND = 12 INCH-POUNDS

ITEM NO.	DESCRIPTION	TORQUE (INCH-POUNDS)
9	Housing Filter	Hand+
4	Nut-Yoke Retainer	80-96 inch-pounds
15	HP Plug	Hand+
24	End Cap	75-90 inch-pounds
22	LP Plug	Hand+

9.1 TORQUE SPECIFICATIONS FOR TR-390 ADJUSTABLE SECOND STAGE

The following specifications are to be met upon assembly of the TR-390 Adjustable Second Stage.

ITEM NO.	DESCRIPTION	TORQUE (INCH-POUNDS)
3	Hex Head Screw	2-4 inch pounds
10	Inlet Coupler	30-36
14	LP Hose Nut	12-18 inch pounds
34	Packing Nut	2-4

9.2 TORQUE SPECIFICATIONS FOR SS-350 NON-ADJUSTABLE SECOND STAGE

Refer to Section 9.1 as all torque specifications for the SS-350 are identical to the TR-390.

SECTION X ASSEMBLY TOOLS

10.0 ASSEMBLY TOOLS REQUIRED FOR THE TR-350/TR-390 & SS-350 REGULATORS

The following tools are recommended for servicing the TR-350/TR-390 and SS-350 regulators. All tools listed are available from local sources. Special tools can be purchased upon request from the TUSA Technical Service Department using the indicated catalog number. Refer to Figure 10-1 below.

ITEM	CATALOG NO.	DESCRIPTION
1		Open end wrench, 1/4"
2		Open end wrench, 9/16"
3		Open end wrench, 11/16"
4		Open end wrench, 13/16"
5		Allen wrench 3/32"
6		Allen wrench 3/16"
7		Nut driver 1/4"
8		Socket 1" or slotted flat bar
9	TR-ADJ	In-line adjustment tool
10	SS-402-99	Poppet retainer tool
11		Straight spanner wrench
12	TR-401-99	Adjustable (nipple) spanner wrench
13	BULLET-350	Piston installation bullet
14		Torque wrench 0-96 in-lbs
15		Fastening tool, panduit clamp
16		Brush, nylon bristle
17		O-ring pick, nylon or soft brass
18		Strap wrench
19		Allen wrench 3/8"
20		Open end wrench, 1/4"
21		Crescent wrench, 10"
22		Locktite® #271



FIG 10-1

SECTION XI

LUBRICANTS, CLEANERS & SEALANTS GUIDANCE

11.0 GENERAL CLEANING METHODS

Authorized TUSA Service and Repair technicians shall heed all warnings on the service and cleaning of all plastic parts in order to prevent failures. The design and performance of regulators has advanced significantly within the last 10 years. Advances in Materials Science has led to the use of engineered plastic polymers and thermoplastic resin alloys replacing traditional metal components.

All metal parts used in TUSA regulators are made of either a corrosion resistant stainless steel or chrome plated brass. Handle all metal components with care to avoid scratches, dings or dents.

We recommend using a mild yet effective cleaning solution for removing all salt deposits, grease and dirt from all metal components. We recommend using a cleaning solution similar to Oakite #31 or VFC-23 and a small ultrasonic cleaner for most all parts plastic & metal. You may substitute a mild dish soap or diluted household grade of white distilled vinegar.

Other exterior cleaning can be accomplished using isopropyl (alcohol) where required. Use only clean lint-free wipes and cotton applicators for all cleaning requirements.

WARNING

DO NOT use any acids or hydrocarbon based cleaning solutions on any plastic or metallic components of the regulator. Some spray-on products may contain hydrocarbon based propellants which may chemically attack or otherwise degrade some of the materials used in the manufacture of the regulator.

DO NOT use any ARMOR-ALL or vinyl restoration type liquids in an attempt to improve the appearance of the regulator.

DO NOT use silicone based liquids, greases or sprays on the exterior surfaces of the regulator in an attempt to restore appearance.

DO NOT use any RTV silicone or silicone sealant type products to attempt repair on any regulator components.

DO NOT attempt to clean any parts by poking sharp objects into holes. Failure to heed these warnings may lead to damage or failure of regulator components.

11.1 LUBRICANTS AND SEALANTS

This regulator is approved for a food grade (pure) type of silicone grease or perfluoropolyether grease (CHRISTO-LUBE MCG 111) lubricant only. We recommend using a thread locking compound equivalent to Locktite No. 271. Sources for these compounds may be obtained from your TUSA Factory Service Center.

SECTION XII

SPECIAL APPLICATIONS GUIDANCE

12.0 PERFORMANCE SPECIFICATIONS

The performance specifications for the TR-350/TR-390 and SS-350 regulators are listed as follows and are subject to change without notice:

Weight:

First stage w/hose 27.75 oz. DRY
Second stage alone 7.94 oz. DRY Less than 0.2oz. WATER

Supply Pressure First Stage:

3300 psi YOKE or 4500 psi w/DIN Conversion

Intermediate Pressure:

135 to 150 psi over ambient pressure
@ supply pressure 2750 psi.

Breathing Resistance:

Inhalation 1.5 to 2.5 IN-H₂O @ 140 psi intermediate pressure
Exhalation effort 1.3 to 1.5 IN-H₂O
@ 2.5 liters/min tidal volume & 20 breaths/min (62.5 RMV)
(RMV = Respiratory Minute Volume)

12.1 MAXIMUM PERFORMANCE ADJUSTMENTS

To maximize performance of the regulator, it is necessary to insure that the intermediate pressure has been properly adjusted. The intermediate pressure delivered by the balanced piston design does vary slightly according to the supply (tank) pressure. Properly adjusted, the intermediate pressure should be within the 135 to 150 psi range with a supply source between 2500 and 3000 psi. If a regulator will be used exclusively in the 2250 to 2500 psi range, the first stage can be adjusted to deliver 140 psi at 2250 psi. This insures that the regulator will perform within specifications at lower supply pressures.

12.2 ENHANCED AIR MIXTURES & APPROVED MODIFICATIONS

DO NOT use this equipment in OVERHEAD ENVIRONMENT or for TECHNICAL DIVING (Enhanced Air Mixtures) without first obtaining proper training and certification. We encourage you to consult the proper training agencies to obtain instruction and certification on the use and modification of regulator equipment for such activities.

12.3 COLD WATER DIVING

DO NOT use this equipment when diving in water temperatures less than 40 degrees F (4.5 degrees C) without having the first stage modified or "Environmentalized". Conventional methods of back-filling the HP spring cavity with a high viscosity silicone grease are applicable to this first stage design. It is most important to guarantee that all air pockets and voids are removed from the HP piston stem area and the HP piston stem o-ring.

12.4 CONTAMINATED WATER DIVING

Sophisticated diving gear designed for use in contaminated water provides constant positive pressure inside the regulator case and utilizes redundant exhaust valve passages. The TR-390 and SS-350 are not designed to provide this requirement and therefore are not recommended for use in contaminated water diving.