

WARNING

Failure to recognize or replace a faulty HP spring may lead to failure of the regulator to supply air. Use prudence and replace the HP spring regularly to maintain top performance in the regulator function.

5. Set the piston on its head with the stem facing straight up, and fit a genuine TUSA piston installation bullet into the piston stem.

CAUTION

Failure to use this bullet may result in cutting the piston stem o-ring (17) or damaging the sealing (knife) edge of the piston stem while performing the following step.

6. Carefully lower the HP piston (bullet first) into the main body (13) until the bullet and stem have passed through the piston stem o-ring (17). Refer to figure 5-8.



FIG 5-8

7. Grasp the piston and body together, preventing the piston from sliding back out, and turn over to allow the installation bullet to fall out in your hand.
8. Lubricate and install the o-ring (11) onto body (13).
9. Holding the body with your hand apply two (2) drops of high strength (red) Loctite to the threads of body (13) before installing cap (24). Quickly mate the cap (24) to the main body seating the thread properly. Grasp the body with one hand and turn the cap with the other in a clockwise direction until snug. For torque setting refer to Section 9.0 (24).
10. Install the new HP seat (10) into the body (13) ensuring that it bottoms out. Examine the condition of the HP seat looking for scratches, cuts, dings or dents near the diameter of the piston stem. DO NOT attempt to use the seat if any of these conditions are found. See Section 4.0 for important guidelines.
11. Pre assemble the filter assembly as follows:
 1. Place o-ring (8) into housing (9).
 2. Insert filter (7) into housing (9) on top of o-ring (8).
 3. Place filter retainer (6) into housing (9) and press into place with the end of a 5/16" allen wrench until firmly seated and making contact all around.
12. Install the filter assembly into main body, and hand tighten in a clockwise direction until snug. For torque setting refer to Section 9.0 (9).
13. Place the main body of the regulator into the jaws of a padded vise. Position the body so the yoke retainer portion is facing up. Insert o-ring (11) into o-ring groove.
14. Place the yoke (5) over the threaded portion of the main body (13).

NOTE

DO NOT overtighten the vise onto the soft brass parts of the first stage main body.

15. Holding the yoke retainer nut between thumb and forefinger, apply one drop only of high strength (red) Loctite to the middle threads of the yoke retainer nut. Quickly, mate the yoke retainer nut to the main body seating the threads properly. Immediately hand tighten. Using a 1" socket wrench or a slotted flat bar tool as shown in figure 5-10, begin a firm, steady, clockwise force tightening the yoke retainer nut. Refer to Section 9.0 for proper torque specifications.



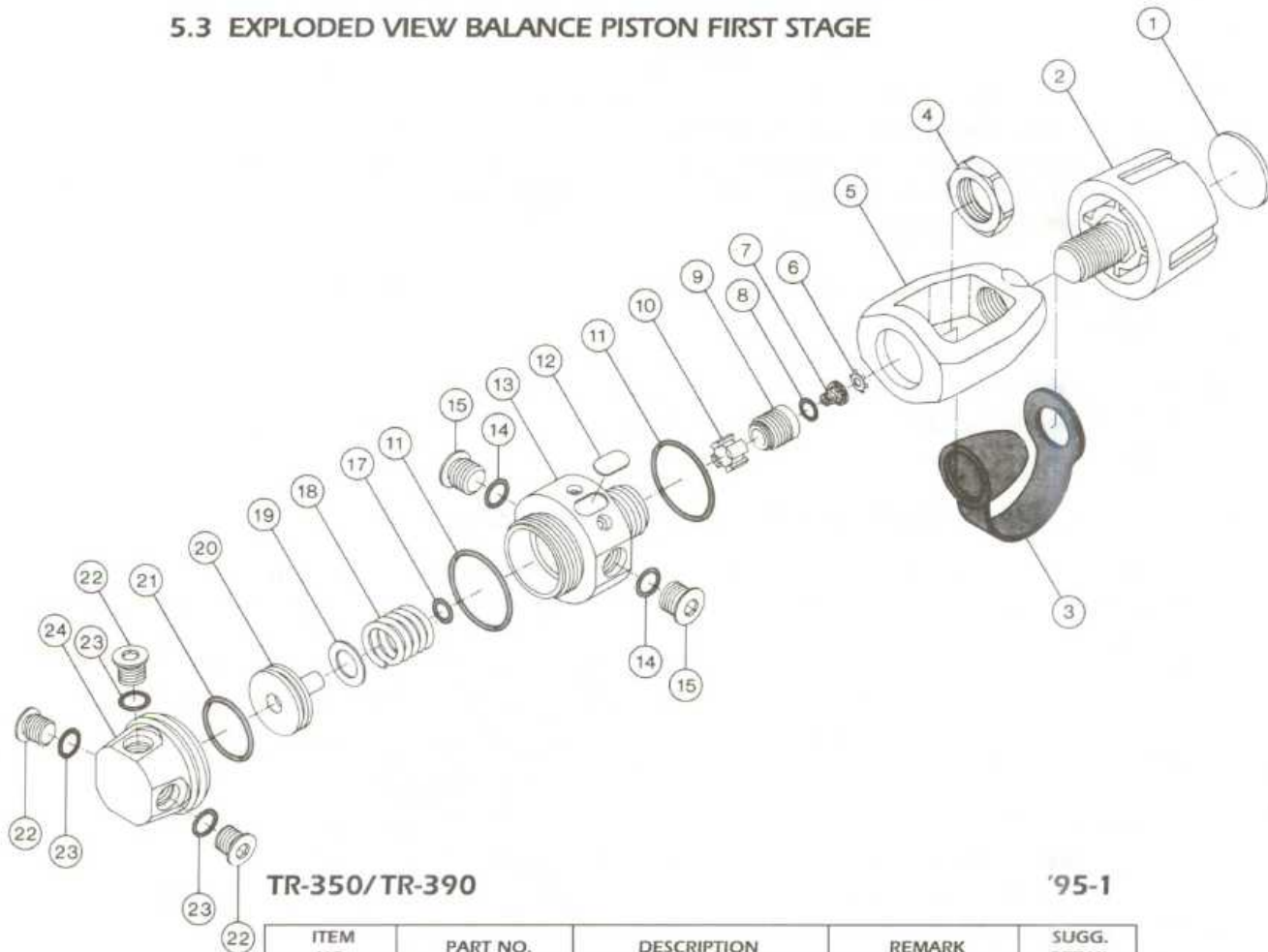
FIG 5-10

16. Lubricate and install all o-rings (23) & (14) onto all hoses and port plugs. Install the LP hoses and port plugs (22) into cap and the HP hose and port plug (15) into the main body, tightening until snug.
17. Install the dust cap (3) onto the yoke knob (2) and install these onto the yoke (5).

This concludes the assembly of the Balanced Piston First Stage. Refer to Section 8.0 for tuning and adjustment guidelines.

TR-350/TR-390 SINGLE HOSE BALANCED PISTON REGULATOR FIRST STAGE

5.3 EXPLODED VIEW BALANCE PISTON FIRST STAGE



TR-350/TR-390

'95-1

ITEM NO.	PART NO.	DESCRIPTION	REMARK	SUGG. RETAIL
1	TR401-39	EMBLEM		
2	TR401-40	KNOB		
3	TR401-38	DUST COVER		
4	11076	NUT-YOKE RETAINER		
5	0086	YOKE		
6	11077	RETAINER-FILTER		
7	11078	FILTER-AIR, H.P.		
8	0099	O-RING 2-010		
9	11084	HOUSING FILTER		
10	11075	SEAT H.P.		
11	0073	O-RING 2 x 28 2 ea.		
12	0193	DECAL SERIAL NO.	NOT FOR SALE	
13	11079	BODY 1st STAGE	NOT FOR SALE	
14	0088	O-RING 2-012 2 ea.		
15	0067	PLUG, H.P. 7/16 2 ea.		
16	N/A			
17	0194	O-RING 2-009		
18	11085	SPRING, H.P.		
19	0043	WASHER .015		
20	11081	PISTON		
21	0079	O-RING 2-020		
22	0068	PLUG, L.P. 3/8 3 ea.		
23	0074	O-RING 2-011 3 ea.		
24	11080	END CAP		

SECTION VI

DISASSEMBLY ADJUSTABLE SECOND STAGE

Refer all item numbers (99) to the exploded view for this regulator found at the end of this section.

NOTE

Prior to disassembly, record the results of the preliminary inspection, the in-water test, and the first stage intermediate pressure. Remember to retain all o-rings, filters or other components which need replacement in case the customer requests to view the parts. For part replacement, as part of the annual service, please return these parts to your TUSA factory distributor.

The words "RECORD FOR REPLACEMENT" will indicate all components to be handled in this manner.

Read and understand the Troubleshooting Section 4.0 to gain a better idea of which internal parts may be worn, and to better advise your customer of the service that is required.

6.0 DISASSEMBLY PROCEDURE TR-390 ADJUSTABLE SECOND STAGE

1. Remove the LP hose (14) from the second stage using only the following technique.

Grasp the hex portion of the inlet coupler (10) with a 3/4" open end wrench. Next, use an 11/16" open end wrench to loosen the LP hose nut in a counterclockwise movement. Refer to figure 6-1.

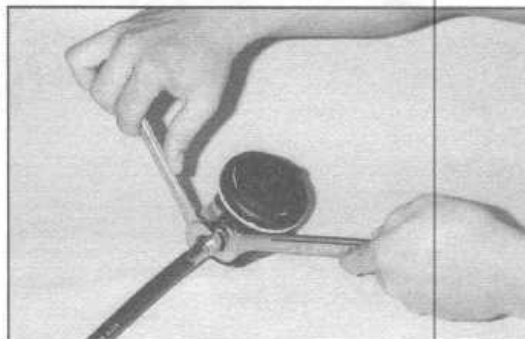


FIG 6-1

2. Examine both the threads of the inlet coupler and the hose nut for damage or severe corrosion. Record your findings. It is best at this time to also examine the LP hose o-ring (12) to determine replacement need. Remove and inspect the o-ring for signs of decay (see Section 4.0 INSPECTION TECHNIQUES for guidance). RECORD FOR REPLACEMENT.

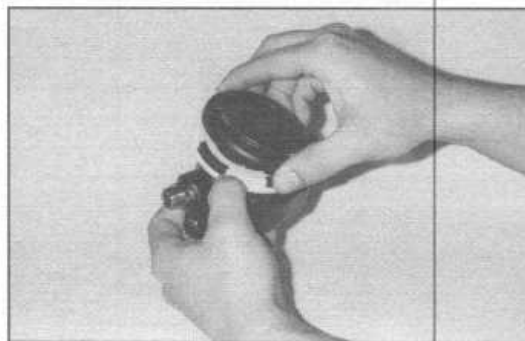


FIG 6-2

3. 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 counterclockwise. Refer to figure 6-2.
4. Remove the diaphragm retainer (23) by gently prying upwards all around until both the retainer & the diaphragm come off as an assembly. Remove and inspect the

diaphragm (24) for tears, decay, damage or excess debris at this time. RECORD FOR REPLACEMENT.

WARNING

Failure to recognize or replace a faulty diaphragm (24) may lead to failure of the regulator to supply air or severe leakage of water into the second stage. Use prudence and replace the diaphragm when necessary to maintain top performance in the regulator function.

5. Inspect the valve mechanism inside the regulator case (27). Look for sand, salt deposits, debris or other signs of poor maintenance. Actuate the demand lever (17) and the piston (28) several times to determine freedom of movement. Turn the adjustment knob (35) out completely until resistance is felt. Again actuate the demand lever to confirm easier movement than with the adjustment knob turned all the way in. Record your findings and proceed with the next step.
6. Turn the adjustment knob (35) all the way out (counter-clockwise as you view it) to unload the valve mechanism. Remove the hex head screw (3) from the adjustment knob using a 3/32" allen wrench. Remove the adjustment knob from the stem (31) and inspect the stem and the inside of the adjustment knob for corrosion or debris. Record your findings and proceed with the next step.
7. Remove the packing nut (34) using a 13/16" open end wrench and turning counter-clockwise. You will find the thrust washer (33) either inside the packing nut or on the stem (31). Inspect the thrust washer for signs of unusual wear or distortion and RECORD FOR REPLACEMENT if needed.
8. Carefully grasp the stem (31) between thumb and forefinger and gently pull this assembly out of the adjustment tube (25). Should you find this difficult, thread the hex screw (3) into the stem allowing a better grip. The secondary spring (29) and piston (28) can now fall out freely through the outer end of the adjustment tube. It may be necessary to press the piston through, using a blunt probe from the inner end. The piston spring follower (30) will remain threaded onto the stem.
9. Inspect the stem (31) for corrosion or debris in the thread and the groove containing the stem o-ring (32). Unthread the piston spring follower (30) remembering that it is a left hand thread. Check to make sure the threads of the piston spring follower are not stripped or damaged due to excessive turning force on the adjustment knob. Inspecting both the piston spring follower and the stem o-ring, record your findings and RECORD FOR REPLACEMENT if needed. Refer to figure 6-3.

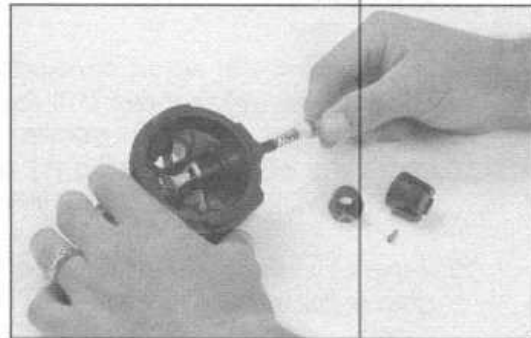


FIG 6-3

10. There is only one successful method to remove the adjustment tube (25) from regulator case (27). Refer to figure 6-4 and follow closely. Holding the regulator case in your left hand, place your right thumb inside the case locating on the shoulder of the adjustment tube. Place your middle finger on the end of the adjustment tube and push it into the case. The adjustment tube will now be easily manipulated downward past the demand lever valve assembly and out of the regulator case.

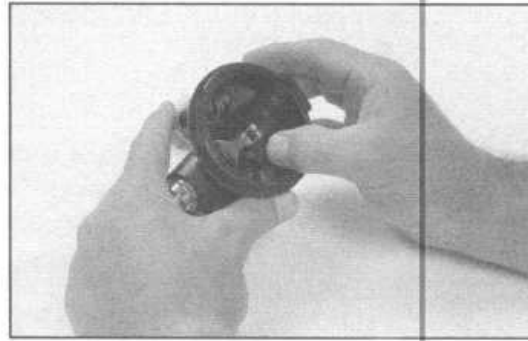


FIG 6-4

11. Inspect the adjustment tube for cracking, wear or chemical attack. Remove and inspect the adjustment tube o-ring (26) for any signs of decay. **RECORD FOR REPLACEMENT** if found.
12. Before removing the inlet coupler (10), depress and hold the demand lever (17) to keep the sharp sealing edge of the adjustment orifice (11) from cutting the poppet seat (8) as the inlet coupler is removed in a counter-clockwise direction using a 3/4" open end wrench.

13. Using a genuine TUSA in-line adjustment tool, remove the adjustment orifice (11) by turning it inside the coupler in a counter-clockwise direction. When it has moved completely beyond the threads, it may be necessary to press it out of the inlet coupler with a cotton swab, being careful not to damage its sharp sealing edge. Refer to figure 6-5.

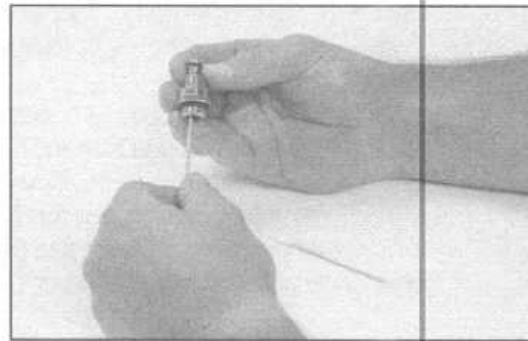


FIG 6-5

14. Inspect both the adjustment orifice (11) and the inlet coupler (10) looking for sand, salt deposits, debris, corrosion or other signs of poor maintenance. Remove both the adjustment orifice o-ring (12) and the inlet coupler o-ring (9) and inspect these items for any signs of decay. **RECORD FOR REPLACEMENT** if found.
15. Inspect the sharp sealing edge of the adjustment orifice (11) using a magnifying glass or microscope to ensure it is perfectly free of any scoring, nicks, dings, dents or pitting. **RECORD FOR REPLACEMENT**.

NOTE

Failure to recognize or replace a damaged adjustment orifice (11) may cost much time and effort trying to eliminate leaking or high inhalation efforts when rebuilding and tuning the second stage regulator. Use prudence and replace the orifice when necessary to maintain top performance in the regulator function. **DO NOT** attempt to "save" the orifice by buffing or polishing the dings out of the sealing edge. Doing so may lead to high inhalation efforts or accelerated corrosion of the orifice.

16. Using a genuine TUSA poppet retainer tool, push the inlet tube valve assembly (15) into the regulator case (27). Remove the inlet tube valve assembly noting the position of the flow port and its position with respect to the air deflector in the regulator case. Refer to figure 6-6.

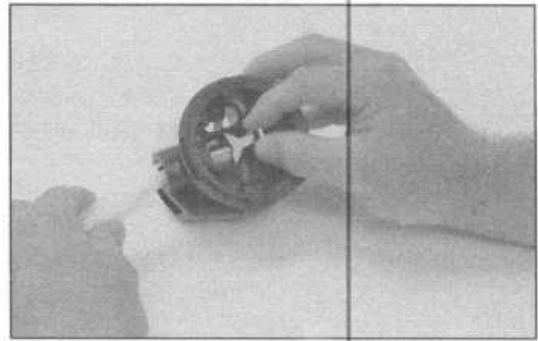


FIG 6-6

17. To remove the internal valve components from the inlet tube (15) refer to figure 6-7 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.

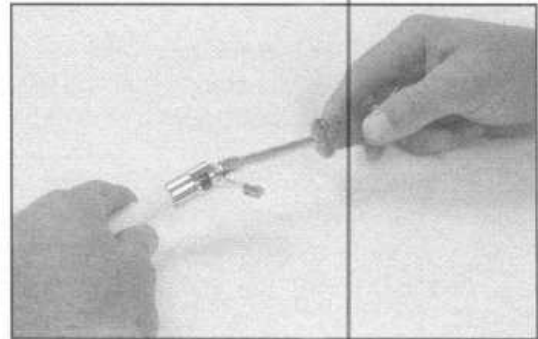


FIG 6-7

18. 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.

19. 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.
20. 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 conformational length. RECORD FOR REPLACEMENT if needed.
21. Remove the poppet seat (8) from the demand poppet (7) using a blunt 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.

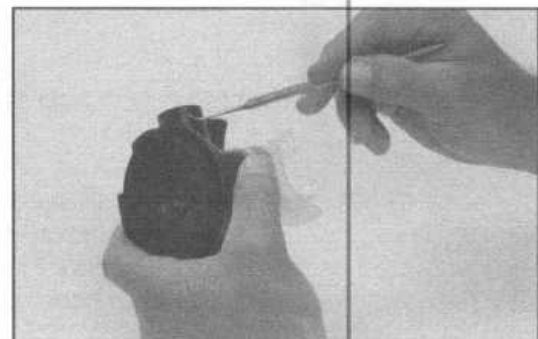


FIG 6-8

22. Inspect the overall condition of the regulator case (27) 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 6-8.

WARNING

Failure to recognize or replace a faulty regulator case (27) 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.

23. 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 (27). Examine the exhaust cover (4) to ensure that it is securely fastened onto the regulator case (27).

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 (27) may be cleaned with these parts assembled, as one part.

24. 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.
25. 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 TR-390 adjustable second stage. Please refer to the Section 11 for proper guidance on cleaning.

6.1 REPAIR & REPLACEMENT SCHEDULE

The following repair & replacement schedule is recommended for the TR-390 Adjustable & Non-adjustable second stage. TUSA recommends full replacement of all soft seals (o-rings & seats) according to service use and cycle life of the regulator as discussed in Section 3.0. Annual service required to maintain warranty status requires replacement of all soft seals at a minimum of 1 year.

Refer to figure 6-9 for a view of all soft seals and hardware.



FIG 6-9

6.2 ASSEMBLY ADJUSTABLE 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) where 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 (27) until it snaps into place.
2. Install the exhaust cover (4) to ensure that it is securely positioned onto the regulator case (27). 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. The larger end of the spring will enter the diaphragm cover (22). 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 seated flush with the outer rim of the poppet. We do not recommend using an old seat as proper adjustment and tuning of the regulator may be defeated.

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 6-10 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 6-10

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 6-11 as you relax the poppet, ensuring that the demand lever arm stands upright. Note the position of the flow port in the inlet tube and the demand lever.

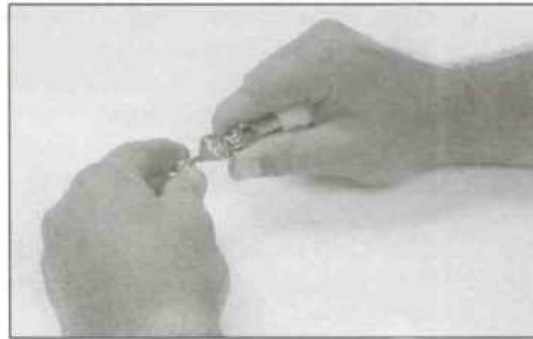


FIG 6-11

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 TUSA 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 6-12. Remove tools, and depress the demand lever repeatedly to ensure smooth movement.
9. Refer to figure 6-13 as you lower the inlet tube valve assembly (15) into the regulator case (27), 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 6-12

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.



FIG 6-13

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 (27), 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 (27) 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.

16. Lubricate and install the adjustment tube o-ring (26) onto the adjustment tube (25). There is one easy method to install the adjustment tube into the regulator case (27). Refer to figure 6-14 and follow closely. Holding the case in your left hand, lay the adjustment tube inside the case directing the threaded end through the outer opening. Ensure that the larger portion of the flange is facing toward you. Position your right thumb on the flange and your middle finger on the threaded end of the adjustment tube. The adjustment tube will now be easily manipulated upward past the demand lever valve assembly and into the adjustment tube port of the regulator case until the flange is fully seated.

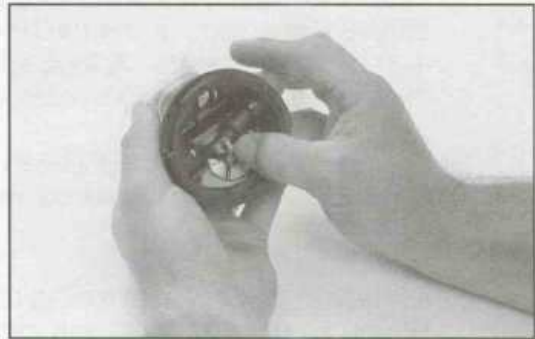


FIG 6-14

17. Once the adjustment tube flange is seated, it is important to ensure the o-ring is also properly seated. To do this, press the adjustment tube straight back inside the case, causing it to mate over the poppet shaft and locking nut. Inspect the o-ring (26) to ensure that it is correctly seated in its groove, and then press back again to ensure the flange is seated flush inside the case.
18. Check to ensure the threads of the piston spring follower (30) are not stripped or damaged from previous use. Lubricate and install the stem o-ring (32) onto the stem (31). Lightly lubricate the stem threads and install the piston spring follower with the recessed end facing out, remembering that it is a left hand thread. Thread the piston spring follower all the way in (counter-clockwise as you view it) to unload the valve mechanism. Insert the secondary spring (29) into the recessed end of the piston spring follower.

19. Insert the piston (28) into the adjustment tube, with the flat end making contact with the poppet shaft (7). Next, install the stem, follower & spring assembly into the adjustment tube. Refer to figure 6-15 noting the method of holding the adjustment tube flange with your thumb while pushing the stem into the tube to seat the stem o-ring (32).

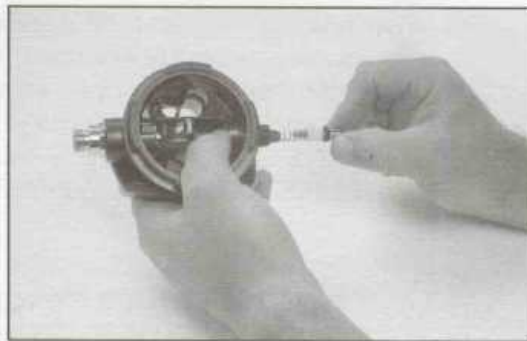


FIG 6-15

20. Install the thrust washer (33) onto the stem (31) making sure the thrust washer has been inspected for signs of unusual wear or distortion and replaced with new if needed.
21. Install the packing nut (34) using a 13/16" open end wrench and turning counter-clockwise to tighten snug. Torque specifications for this installation is 2 inch-pounds minimum to 4 inch-pounds maximum. DO NOT overtighten the packing nut.
22. Install the adjustment knob (35) onto the stem (31) aligning the hole with the threads in the stem. Install the hex head screw (3) into the adjustment knob using a 3/32" allen wrench. Torque specifications for this installation is 2 inch-pounds minimum to 4 inch-pounds maximum. DO NOT overtighten the hex screw.
23. Turn the adjustment knob (35) in completely until resistance is felt. Actuate the demand lever to confirm harder movement than with the adjustment knob turned all the way out.
24. 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 8.1 for guidance.

25. 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 figure 6-16.



FIG 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.

26. Install the diaphragm cover (22) by firmly placing it against the diaphragm retainer (23) located as shown 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.



FIG 6-17

27. Lubricate and install the LP hose o-ring (12) onto the LP hose (14) if needed. Install the hose onto the second stage using the following technique. Hand tighten the LP hose nut onto the inlet coupler (10). Grasp the hex portion of the inlet coupler with a 3/4" open end wrench. Next, use an 11/16" open end wrench to tighten the LP hose nut 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 figure 6-18.

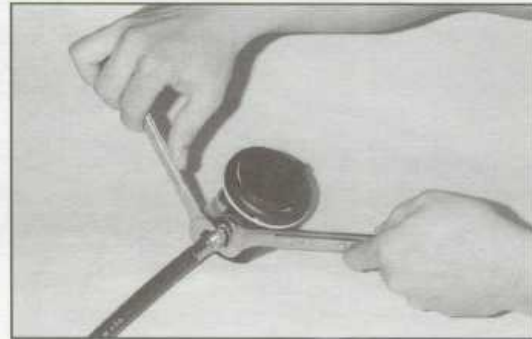


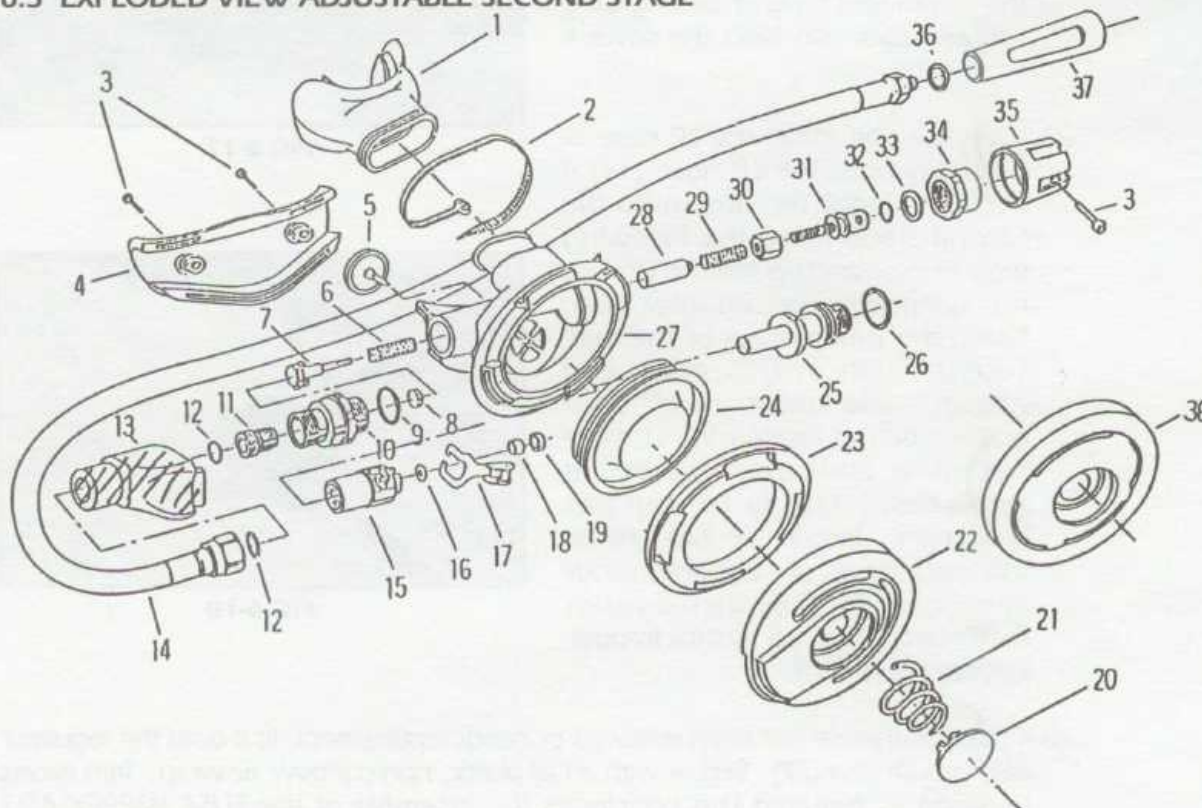
FIG 6-18

28. If the mouthpiece has been removed or needs replacement, fit it onto the regulator case mouth port (27). Secure with an all plastic, non-corrosive tie-wrap. Trim excess tie wrap as required. This concludes the assembly of the TUSA IMPREX AD2 adjustable second stage regulator. Please refer to the Section 8.1 for tuning & adjustment.

TUSA SERVICE PARTS LIST

TR-400/TR-390 SECOND STAGE

6.3 EXPLODED VIEW ADJUSTABLE SECOND STAGE



TR-400/TR-390

'95-1

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	TR-402-06	DEMAND SPRING		
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	(TR-400 ONLY)	
14	TR-402-14	L.P. HOSE	LENGTH-30'	
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		

ITEM NO.	PART NO.	DESCRIPTION	REMARK	SUGG. RETAIL
20	TR-402-20	PURGE BUTTON		
21	TR-402-21	PURGE SPRING		
22	TR-402-22	DIAPHRAGM COVER		
23	TR-402-23	DIAPHRAGM RETAINER		
24	TR-402-24	DIAPHRAGM		
25	TR-402-25	ADJ. TUBE		
26	ST-001-09	O-RING	2-016	
27	TR-402-27	CASE		
28	TR-402-28	PISTON		
29	TR-402-29	SECONDARY SPRING		
30	TR-402-30	PISTON SPRING FOLLOWER		
31	TR-402-31	STEM		
32	ST-001-21	O-RING	2-107	
33	TR-402-33	THRUST WASHER		
34	TR-402-34	PACKING NUT		
35	TR-402-35	DEMAND KNOB		
36	ST-001-05	O-RING	2-011	
37	TR-402-37	HOSE COVER		
38	TR-353-22	DIAPHRAGM COVER	(TR-390 ONLY)	

SECTION VII

DISASSEMBLY/ASSEMBLY NON-ADJUSTABLE SECOND STAGE

7.0 DISASSEMBLY PROCEDURE SS-350 SECOND STAGE

Refer all item numbers (99) to the exploded view for this regulator found at the end of this section.

NOTE

Prior to disassembly, record the results of the preliminary inspection, the in-water test, and the first stage intermediate pressure. Remember to retain all o-rings, filters or other components which need replacement in the event the customer requests to view the parts. For part replacement, as part of the annual service, please return these parts to your TUSA factory distributor. The words "RECORD FOR REPLACEMENT" will indicate all components to be handled in this manner.

Read and understand the Troubleshooting Section 4.3 to gain a better idea of which internal parts may be worn, and to better advise your customer of the service that is required.

1. Remove the LP hose (14) from the second stage using only the following technique. Grasp the hex portion of the inlet coupler (10) with a 3/4" open end wrench. Next, use an 11/16" open end wrench to loosen the LP hose nut in a counter-clockwise movement. Refer to figure 7-1.



FIG 7-1

2. Examine both the threads of the inlet coupler and the hose nut for damage or severe corrosion. Record your findings. It is best at this time to also examine the LP hose o-ring (12) to determine replacement need. Remove and inspect the o-ring for any signs of decay and RECORD FOR REPLACEMENT.



FIG 7-2

3. 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. Refer to figure 7-2.
4. Remove the diaphragm retainer (23) by gently prying upwards all around until both the retainer & the diaphragm come off as an assembly. Remove and inspect the diaphragm (24) for tears, decay, damage or excess debris at this time. RECORD FOR REPLACEMENT if found.

WARNING

Failure to recognize or replace a faulty diaphragm (24) may lead to failure of the regulator to supply air or severe leakage of water into the second stage. Use prudence and replace the diaphragm when necessary to maintain top performance in the regulator function.

5. Inspect the valve mechanism inside the regulator case (25). Look for sand, salt deposits, debris or other signs of poor maintenance. Actuate the demand lever (17) several times to determine freedom of movement. Record your findings and proceed with the next step.

6. Refer to figure 7-3 to remove the octopus port plug (27) from the regulator case (25). Using your thumb and finger, simultaneously depress two adjacent tangs of the octopus port plug. Remove the plug and the plug o-ring (26) inspecting both for decay. **RECORD FOR REPLACEMENT** if needed.



FIG 7-3

7. Before removing the inlet coupler (10), depress and hold the demand lever (17) to keep the sharp sealing edge of the adjustment orifice (11) from cutting the poppet seat (8) as the inlet coupler is removed in a counter-clockwise direction using a 3/4" open end wrench.

8. Using a genuine TUSA in-line adjustment tool, remove the adjustment orifice (11) by turning it inside the coupler in a counter-clockwise direction. When it has moved completely beyond the threads, it may be necessary to press it out of the inlet coupler with a cotton swab, being careful not to damage its sharp sealing edge. Refer to figure 7-4.

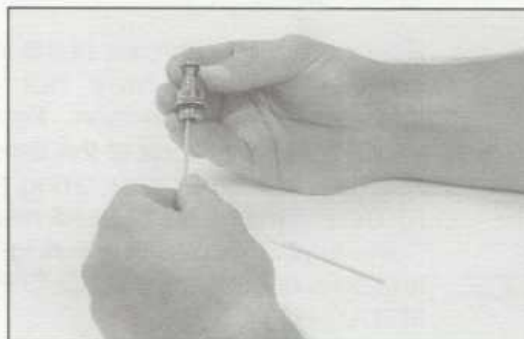


FIG 7-4

9. Inspect both the adjustment orifice (11) and the inlet coupler (10) looking for sand, salt deposits, debris, corrosion or other signs of poor maintenance. Remove both the adjustment orifice o-ring (12) and the inlet coupler o-ring (9) and inspect these items for any signs of decay. **RECORD FOR REPLACEMENT** if found.

10. Inspect the sharp sealing edge of the adjustment orifice (11) using a magnifying glass or microscope to ensure it is perfectly free of any scoring, nicks, dings, dents or pitting. **RECORD FOR REPLACEMENT** if found.

NOTE

Failure to recognize or replace a damaged adjustment orifice (11) may cost you much time and effort trying to eliminate small leaking or high inhalation efforts when rebuilding and tuning the second stage regulator. Use prudence and replace the orifice when necessary to maintain top performance in the regulator function. **DO NOT** attempt to "save" the orifice by buffing or polishing the dings out of the sealing edge. Doing so may lead to high inhalation efforts or accelerated corrosion of the orifice.