



# SLIMLINE 2 OCTO

## SERVICE PROCEDURE

This SlimLine 2 Service Procedure conveys a list of components and service procedures that reflect the SlimLine 2 as it was configured at the time of this writing (2/19/05).

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**SLIMLINE 2 OCTO SECOND STAGE**

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**GENERAL PROCEDURES**

**REFER TO ..... DOC. 12-2202**

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**SPECIFICATIONS****Torques**

P/N 4330	Coupling	100 to 120 in-lbs
LP Hose		50 to 60 in-lbs

**Opening Effort (IP = 144 psi)**

Preferred Set-up	1.5 to 2.0 inches of H <sub>2</sub> O
Acceptable	1.5 to 2.2 inches of H <sub>2</sub> O

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**TOOLS REQUIRED****Standard Tools**

Inch pounds Torque Wrench  
3/4" Crows Foot Wrench  
11/16" Crows Foot Wrench  
Standard Screwdriver - small  
3/32" Allen Key  
1/4" Open End Wrench  
Cotton Swab (Q-Tip)  
Soft Jawed Vise

**Specialty Tools**

P/N 40.2302	Christo-Lube MCG111 - 2 oz
P/N 40.3367	Poppet Tool
P/N 40.9315	Intermediate Pressure Gauge
P/N 40.9510	In-line Adjustment Tool
P/N 40.9520	O-ring Tool Kit
P/N 40.9650	Universal Front Cover Tool

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<b>TROUBLE SHOOTING</b>		
<b>SYMPTOM</b>	<b>POSSIBLE CAUSE</b>	<b>TREATMENT</b>
* <b>Free flow or leakage present.</b>	<ol style="list-style-type: none"> <li>1. Excessive LEVER ARM (9) height.</li> <li>2. Excessive Intermediate Pressure from First Stage.</li> <li>3. LEVER ARM (9) bent.</li> <li>4. Purge Button stuck down.</li> <li>5. Damaged or worn POPPET SEAT (5).</li> <li>6. Damaged ORIFICE (2).</li> <li>7. LOCK NUT (12) overtightened onto Shaft of POPPET (6).</li> <li>8. WASHER (10) bent or distorted.</li> <li>9. POPPET SPRING (7) weakened, worn, or incorrect part.</li> <li>10. ORIFICE (2) incorrectly adjusted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust ORIFICE (2) and LOCK NUT (12) to arrive at correct spring load tension and LEVER ARM (9) height. (Refer to Tuning Section.)</li> <li>2. Refer to First Stage Trouble-shooting Chart.</li> <li>3. Replace with new.</li> <li>4. Disassemble and clean or replace with new.</li> <li>5. Replace with new.</li> <li>6. Replace with new.</li> <li>7. Loosen to correct spring load tension and LEVER ARM (9) height. (Refer to Tuning Section.)</li> <li>8. Replace WASHER (10), SPACER (11), and LOCK NUT (12) with new.</li> <li>9. Replace with new.</li> <li>10. Turn in clockwise to adjust. (Refer to Tuning Section.)</li> </ol>
* <b>Excessive inhalation resistance.</b>	<ol style="list-style-type: none"> <li>1. LOCK NUT (12) overtightened onto Shaft of POPPET (6), causing excessive Spring tension.</li> <li>2. LOCK NUT (12) insufficiently tightened onto Shaft of POPPET (6), causing LEVER ARM (9) slack.</li> <li>3. LEVER ARM (9) bent.</li> <li>4. ORIFICE (2) incorrectly adjusted.</li> <li>5. Insufficient Intermediate Pressure from First Stage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loosen to correct spring load and LEVER ARM (9) height. (Refer to Tuning Section.)</li> <li>2. Tighten to correct spring load and LEVER ARM (9) height. (Refer to Tuning Section.)</li> <li>3. Replace with new.</li> <li>4. Adjust to correct contact. (Refer to Tuning Section.)</li> <li>5. Refer to First Stage Troubleshooting Chart.</li> </ol>
* <b>Rattle heard inside Second Stage.</b>	<ol style="list-style-type: none"> <li>1. LEVER ARM (9) slack present.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten LOCK NUT (12) onto Shaft of POPPET (6). (Refer to Tuning Section.)</li> </ol>
* <b>Little or no air flow when Purge Button is depressed.</b>	<ol style="list-style-type: none"> <li>1. LEVER ARM (9) slack present.</li> <li>2. LEVER ARM (9) bent.</li> <li>3. ORIFICE (2) incorrectly adjusted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten LOCK NUT (12) onto Shaft of POPPET (6). (Refer to Tuning Section.)</li> <li>2. Replace with new.</li> <li>3. Adjust ORIFICE (2) to correct contact. (Refer to Tuning Section.)</li> </ol>
* <b>Water entering Second Stage.</b>	<ol style="list-style-type: none"> <li>1. Tear in MOUTHPIECE (18)</li> <li>2. EXHAUST VALVE (14) distorted or damaged.</li> <li>3. DIAPHRAGM (15) distorted or damaged.</li> <li>4. FRONT COVER (17) not sufficiently tightened onto HOUSING (8).</li> <li>5. Cracked or damaged HOUSING (8).</li> <li>6. Mouthpiece TIE WRAP (19) loose or missing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace with new.</li> <li>2. Replace with new.</li> <li>3. Replace with new.</li> <li>4. Tighten until secure.</li> <li>5. Replace with new.</li> <li>6. Tighten or install.</li> </ol>

## DISASSEMBLY PROCEDURE

**△ NOTE:** Be sure to perform the steps outlined in the Initial Inspection Procedures Doc 12-2022 prior to disassembling the Regulator. Review the Troubleshooting Section to gain a better idea of which internal Parts may be worn, and to better advise your customer of the service that is needed.

1. Snip the TIE WRAP (19) that holds the MOUTHPIECE (18), and remove the MOUTHPIECE. Inspect the condition of the MOUTHPIECE to ensure that it is supple and free of any tears or corrosion. Discard if found.
2. Remove the LP HOSE (20) from the Second Stage, using an 11/16" open end wrench, while holding the Hex portion of the INLET COUPLING (3) secure with a 3/4" open end wrench.
3. To expose the DIAPHRAGM (17), remove the FRONT COVER RING (15) and FRONT COVER (16) by turning it off counter clockwise using a Front Cover Tool if necessary.
4. Grasp the DIAPHRAGM (17) by the raised Edges of the Center, and gently lift out with a slight upward twist to remove (Fig. 1). Inspect the DIAPHRAGM to ensure it is supple and free of any tears, corrosion, or other distortion. Discard if found.
5. Remove the INLET COUPLING (3) in a counter clockwise direction, using a 3/4" open end wrench, while hold ing the LEVER ARM (9) depressed (Fig. 2).
6. Remove and inspect the COUPLING O-RING (4) for any signs of decay. Discard if found.
7. Using a narrow slotted blade screwdriver, remove the ORIFICE (2) by turning it counter clockwise inside the INLET COUPLING (3). When it has disengaged completely from the Threads, press it out with the use of a cotton swab. Use caution to avoid nicking or scratching the Knife Edge of the ORIFICE as this is done. Remove and discard the ORIFICE O-RING (1). Inspect the ORIFICE carefully with the use of a magnifier to ensure that it is perfectly free of any scoring or nicks. If found, discard and DO NOT attempt to reuse.
8. Using a Poppet Tool, turn the POPPET (6) out of the LOCK NUT (12) in a counter clockwise direction while holding the LOCK NUT secure with a 1/4" Open End Wrench (Fig. 3). To avoid a sudden ejection as they are disengaged, continuously apply slight inward pressure with the Poppet Tool while turning the POPPET out.
9. Carefully remove the POPPET (6), POPPET SPRING (7), WASHER (10), LEVER ARM (9), SPACER (11), and LOCK NUT (12) from the HOUSING (8). Discard the WASHER and LOCK NUT, and DO NOT attempt to reuse them.
10. Examine the SPACER (11) for deterioration. Discard if found.
11. Examine the LEVER ARM (9) and compare with new to ensure that it is not bent or distorted in any way. Discard if distortion is found.



Fig. 1



Fig. 2



Fig. 3

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12. Examine the POPPET SPRING (7) with a magnifier and compare it with a new one to ensure correct tension and length. Discard if found to be weakened or corroded.
13. Remove the POPPET SEAT (5) from the POPPET (6) with the use of an O-ring Tool (Fig. 4). Discard, and DO NOT reuse it.
14. Using a soft probe, inspect the condition of the EXHAUST VALVE (14) to ensure it is supple and free of any tears or corrosion, and that it seals completely around the Seating Surface of the HOUSING (8). Examine the EXHAUST GRILL (13) to ensure that it is securely fastened onto the HOUSING.

**△ NOTE:** Provided that the EXHAUST VALVE (14) is in good condition and the EXHAUST GRILL (15) is intact, further Disassembly is not necessary. The HOUSING (8) may be cleaned with these parts assembled, as an Assembly. (Refer to the Cleaning Section.)

15. If further Disassembly is needed to replace the EXHAUST VALVE (14) or EXHAUST GRILL (13), the GRILL may be removed by inserting the blade of a small screwdriver into the Tab Slots on each side of the GRILL. Slight inward and upward pressure will disengage the Tabs (Fig. 5).
16. The EXHAUST VALVE (14) may now be removed by grasping it at the Flange and pulling straight out, snipping off the Retainer Stem if necessary. Discard and DO NOT reuse.
17. Inspect the overall condition of the HOUSING (8) to ensure it is free of any stress cracks or other distortions, and that the Threads are in good condition. Discard if distortion or bad Threads are found.



Fig. 4



Fig. 5

## REASSEMBLY PROCEDURE

**△ NOTE:** Prior to Reassembly, it is necessary to inspect all Parts, both new and those that are being reused. Check to ensure that O-rings are clean and supple, and that every Part and Component has been thoroughly cleaned and dried.

**⚠ WARNING:** Use only genuine Oceanic Parts, Subassemblies, and Components whenever Assembling Oceanic products. DO NOT attempt to substitute an Oceanic Part with another manufacturer's, regardless of any similarity in shape, size, or appearance. Doing so may render the product unsafe, and could result in serious injury or death of the user.

1. Replace the EXHAUST VALVE (14), if removed from the HOUSING (8) by gently pulling the Retainer Stem through the HOUSING until the Flange is inside the HOUSING and properly seated (Fig. 6).
2. If removed, replace the EXHAUST GRILL (13) into the Exhaust portion of the HOUSING (8) by aligning the Tabs with the Tab Slots in the HOUSING and snapping it into place with your fingers.
3. Place the POPPET SEAT (5) into the POPPET (6), with the side that is perfectly smooth facing out. Ensure that it is completely seated, flush with the inner rim of the poppet. DO NOT use adhesive.



Fig. 6

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4. Apply a light film of lubricant to each end of the POPPET SPRING (7) and place onto the POPPET (6). Fit the POPPET into the Pronged end of the Poppet Tool and insert the Shaft of the POPPET completely through the Inlet Tube of the HOUSING (8) compressing the SPRING until the Threaded portion of the Shaft is completely visible inside the HOUSING. Hold in position by grasping the Tool with your fingers and the Outer Rim of the HOUSING with your thumb (Fig. 7).
5. Examine both sides of the WASHER (10) to note that one surface is slightly rounded at the edge and smooth, while the other has a slightly upturned Lip around its outer circumference. Place the WASHER over the Threads of the POPPET (6) and onto the Shaft, with the Smooth Side facing up. Place the SPACER (11) onto the POPPET Shaft. Thread the LOCK NUT (12) clockwise onto the POPPET Threads with your fingertips.
6. Place the Forks of the LEVER ARM (9) over the POPPET Shaft between the WASHER (10) and the SPACER (11) (Fig. 9). Relax the POPPET (6) and watch to ensure that the LEVER ARM stands upright.
7. Using the 1/4" open end wrench to hold the LOCK NUT (12) secure, turn the POPPET (6) with the Poppet Tool until 3 threads are showing beyond the outer surface of the LOCK NUT (Fig. 10). Remove the tools, and depress the LEVER ARM (9) repeatedly to ensure smooth movement.

**⚠ CAUTION: It is very important that 3 Threads of the POPPET's Shaft are adjusted outside the LOCK NUT before proceeding further. The LEVER ARM may otherwise become caught on the end of the POPPET's Shaft, resulting in free flow.**

8. Lubricate and install the COUPLING O-RING (4) onto the INLET COUPLING (3). Install the COUPLING into the Inlet Tube of the HOUSING (8) with the Smaller Opening facing in. Turn clockwise using a 3/4" open end wrench **to a torque of 110 in/lbs.**
9. Lubricate and install the ORIFICE O-RING (1) onto the ORIFICE (2). Lubricate the Threads of the ORIFICE with a very light film of lubricant, and insert the ORIFICE into the INLET COUPLING (3) with the Knife Edge facing in (Fig. 11).

**⚠ CAUTION: Be careful to protect the delicate Knife Edge as this is done.**



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11

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10. Using a narrow shafted, slotted blade screwdriver, gently turn the ORIFICE (2) clockwise into the INLET COUPLING (3) until the Knife Edge is barely contacting the POPPET SEAT (5). DO NOT continue to turn the ORIFICE any further beyond this point, which will cause the LEVER ARM (9) to drop. Doing so will also damage the ORIFICE Seat requiring its replacement.

**△ NOTE:** For best sensitivity of touch during step 10, place your finger gently on the LOCK NUT (12) while slowly turning the ORIFICE (2). As soon as contact is made, you will feel the LOCK NUT begin to turn. Hold the screwdriver by the shaft rather than by the handle.

11. Place the DIAPHRAGM (15) inside the HOUSING (8) with the Raised Center facing up, and ensure that it seats flush at the Base of the Inner Threads (Fig. 12).
12. Place the FRONT COVER (17) onto the HOUSING (8) on top of the DIAPHRAGM (15), taking care to ensure that it is correctly seated.
13. Place the FRONT COVER RING (16) down over the FRONT COVER (17) and hand tighten clockwise until secure and in proper alignment, attained when the Oceanic logo faces the MOUTHPIECE (18) (Fig. 13). Use the Front Cover Tool, if necessary. DO NOT overtighten.
14. Secure the MOUTHPIECE (18) onto the HOUSING (8) with a TIE WRAP (19), positioning the Locking Tab of the TIE WRAP towards the LP HOSE (20).
15. Replace and lubricate the O-ring located inside the Second Stage Coupling End of the LP HOSE (20). Install the HOSE onto the Second Stage, and tighten to **a torque of 55 in/lbs** with an 11/16" open end wrench, while holding the Hex portion of the INLET COUPLING (3) secure with either a 3/4" open end wrench.



Fig. 12



Fig. 13

## FINAL TUNING AND TESTING

### FIRST STAGE TESTING

1. Perform the Leak detection Test specified in the Initial Inspection procedure.

**△ NOTE:** Refer to the Trouble Shooting section to determine the possible cause and treatment of any air leaks that may be found.

2. Connect the SlimLine 2 Second Stage LP HOSE to a Low Pressure Port of the First Stage. Ensure that all other Ports are sealed with Port Plugs, with the exception of an additional Low Pressure Quick Disconnect Hose.
3. Connect a recently calibrated Intermediate Pressure Test Gauge to the additional Low Pressure Hose, and connect the First Stage to a pure air source of 3,000 PSI (200 BAR).



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4. Slowly open the valve to pressurize the Regulator, and check the Test Gauge to ensure that the Intermediate Pressure is set as recommended in the Specifications for the First Stage used.

**△ NOTE: If the Intermediate Pressure is found to be other than recommended, refer to that Regulator's Trouble Shooting Section to determine possible cause and treatment.**

## TUNING

1. Prior to Tuning the SlimLine 2 Second Stage, check the following items:

A. 3 Threads on the Shaft of the POPPET should be visible inside the HOUSING extending past the outer end of the LOCK NUT.

**△ CAUTION: It is very important that 3 threads of the Shaft of the POPPET are adjusted outside the LOCK NUT before proceeding further. The LEVER ARM may otherwise become caught on the End of the POPPET's Shaft, resulting in an uncontrolled free flow.**

B. The FRONT COVER RING should be tightened securely and the FRONT COVER properly aligned on the HOUSING.

C. Connect an In-Line Adjustment Tool between the LP HOSE and INLET COUPLING.

D. The MOUTHPIECE should be cleaned and disinfected with warm, soapy water.

2. Pressurize the Regulator Assembly with a pure air source of 3,000 PSI (200 BAR), and listen to determine that a slight air flow is initially present. If necessary to initiate this air flow, turn the ORIFICE slightly out (counter clockwise) using the In-Line Adjustment tool.

**△ NOTE: While pressurized, the slotted blade of the In-Line Tool will be held away from the ORIFICE, and will therefore need to be pushed inward and held while turning it in either direction. Locate the slotted head of the ORIFICE by touch before attempting any adjustment.**

3. Use the In-Line Tool to turn the ORIFICE clockwise with very small fractions of a turn, just until air flow is no longer present, and pause to listen carefully for air flow or leakage after each adjustment.

**△ NOTE: Turning the ORIFICE further than necessary to stop air flow will result in LEVER ARM slack and excessive spring load tension, impairing proper performance.**

**△ CAUTION: Avoid cutting the POPPET SEAT with the Knife Edge of the ORIFICE by depressing the Purge Button while turning the ORIFICE in or out.**



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4. Hold the Second Stage with the MOUTHPIECE facing directly down, and gently shake it up and down. Listen carefully for any rattle that may be present, indicating LEVER ARM slack. If LEVER ARM slack is present, perform the following procedure:

- A. Remove the FRONT COVER RING, FRONT COVER, and DIAPHRAGM to gain access to the Valve Assembly.

- B. Purge the Regulator Assembly of air.

- C. Depress the LEVER ARM and hold it down to remove the INLET COUPLING from the HOUSING (with LP HOSE and In-line Adjustment Tool still attached), using a 3/4" open end wrench.

**△ NOTE: The Cone of the ORIFICE will now be exposed, protruding out through the INLET COUPLING, and must be protected to prevent damage to its delicate Seating Surface.**

- D. Use the 1/4" open-end wrench to turn the LOCK NUT clockwise 1/8 turn, while using the Poppet Tool to hold the POPPET secure. Use the correct method given in step 8 of the Reassembly Procedure to replace the INLET COUPLING after each adjustment, and again determine whether LEVER ARM slack is eliminated.

**△ NOTE: Avoid tightening the LOCK NUT any further than is necessary to eliminate LEVER ARM slack. It may be necessary to repeat step D several times to arrive at the correct setting.**

**⚠ CAUTION: Be careful to avoid over adjusting! If air flow returns, replace the LOCK NUT and POPPET SEAT with new, and start over after rereading the above procedures.**

5. Purge the Regulator Assembly of air to remove the In-Line Adjustment Tool and connect the LP HOSE directly onto the INLET COUPLING, using two wrenches as prescribed in the Reassembly Procedure.

6. Reinstall the DIAPHRAGM, FRONT COVER, and FRONT COVER RING, and pressurize the Regulator Assembly again with a pure air source of 3,000 PSI (200 BAR). Inhale lightly through the MOUTHPIECE. Air should flow easily and smoothly, without any hesitation or lag.

**△ NOTE: If hesitation or lag is detected, refer to the Troubleshooting Section to determine possible cause and treatment.**

7. Clean and disinfect the MOUTHPIECE in warm, soapy water before returning the Regulator to the customer.

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