

ALPHA 7

SERVICE PROCEDURE

This Product Service Procedure conveys a list of components and service procedures that reflect the Alpha 7 as it was configured at the time of this writing (2/12/03).

It also contains Supplemental Information intended to assist the Authorized Oceanic Regulator Service Technician who is servicing an Alpha 7 configured with older components.

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ALPHA 7 SECOND STAGE

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GENERAL PROCEDURES

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

SPECIFICATIONS

Torques

P/N 4330	Coupling	100 to 120 in-lbs
P/N 4787	Exhaust Cover Screw	4 to 5 in-lbs
LP Hose		50 to 60 in-lbs

Opening Effort (IP = 140 psi)

Recommended Setup Range (Primary)	1.1 to 1.5 inches of Water
Recommended Setup Range (Octopus)	1.5 to 2.2 inches of Water
Acceptable Setup Range (Primary and Octopus)	1.0 to 2.5 inches of Water

TOOLS REQUIRED

Standard Tools

Inch Pounds Torque Wrench
1/4” Open End Wrench
11/16” Open End Wrench
3/4” Open End Wrench
Standard Screwdriver - small
Needle Nose Pliers
1/4” Nut Driver
3/32” Hex Key
Cotton Swab (Q-Tip)
Soft Jawed Vise
Dental Type Pick

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 40.9512	Modified 1/4" Open End Wrench
P/N 40.9520	O-ring Tool Kit
P/N 40.9650	Universal Front Cover Tool

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TROUBLE SHOOTING

SYMPTOM	POSSIBLE CAUSE	TREATMENT
*** Freeflow or leakage present.**	1. Excessive LEVER ARM (9) height. 2. Excessive intermediate pressure from first stage. 3. LEVER ARM (9) bent. 4. Damaged or worn POPPET SEAT (5). 5. Damaged ORIFICE (2). 6. LOCK NUT (12) overtightened onto POPPET Shaft (6). 7. WASHER (10) bent or distorted. 8. POPPET SPRING (7) weakened or worn. 9. ORIFICE (2) incorrectly adjusted.	1. Adjust ORIFICE (2) and LOCK NUT (12) to arrive at correct spring load tension and LEVER ARM (9) height. Refer to Tuning section. 2. Refer to First Stage Trouble-shooting chart. 3. Replace with new. 4. Replace with new. 5. Replace with new. 6. Replace with new and readjust. Refer to Tuning section. 7. Replace WASHER (10), SPACER (11), and LOCK NUT (12) with new. 8. Replace with new. 9. Turn in clockwise to adjust. Refer to Tuning section.
*** Excessive inhalation resis-tance.**	1. LOCK NUT (12) overtightened onto POPPET Shaft (6), causing excessive spring tension. 2. LOCK NUT (12) insufficiently tightened onto POPPET Shaft (6), causing LEVER ARM (9) slack. 3. LEVER ARM (9) bent. 4. ORIFICE (2) incorrectly adjusted. 5. Insufficient intermediate pressure from First Stage.	1. Replace with new and readjust. Refer to Tuning section. 2. Tighten to correct spring load and LEVER ARM (9) height. Refer to Tuning section. 3. Replace with new. 4. Adjust to correct contact. Refer to Tuning section. 5. Refer to First Stage Trouble-shooting chart.
*** Rattle heard inside Second Stage.**	1. LEVER ARM (9) slack present.	1. Tighten LOCK NUT (12) onto POPPET Shaft (6). Refer to Tuning section.
*** Little or no air flow when Purge Button is depressed.**	1. LEVER ARM (9) slack present. 2. LEVER ARM (9) bent. 3. ORIFICE (2) incorrectly adjusted.	1. Tighten LOCK NUT (12) onto POPPET Shaft (6). Refer to Tuning section. 2. Replace with new. 3. Adjust ORIFICE (2) to correct contact. Refer to Tuning section.
*** Water entering Second Stage.**	1. Tear in MOUTHPIECE (19). 2. EXHAUST VALVE (15) distorted or damaged. 3. DIAPHRAGM (16) distorted or damaged. 4. COVER RING (18) not tight on HOUSING (8). 5. Cracked or damaged HOUSING (8).	1. Replace with new. 2. Replace with new. 3. Replace with new. 4. Tighten until secure. 5. Replace with new.

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DISASSEMBLY PROCEDURE

NOTE: Be sure to perform the steps outlined in the Initial Inspection Procedures (Doc. No. 12-2202) 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 plastic TIE WRAP (20) that holds the MOUTHPIECE (19), 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 Hose 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. Using a Universal Front Cover Tool, remove the COVER RING (18) to expose the FRONT COVER (17) . By lifting it straight up and out, remove the FRONT COVER to expose the DIAPHRAGM (16).

4. Grasp the DIAPHRAGM (16) by the raised Edges of the Center, and gently lift it 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. Depress the LEVER ARM (9). While holding it down, remove the INLET COUPLING (3) in a counterclockwise direction using a 3/4" open end wrench (Fig. 2). Remove the COUPLING O-RING (4) from the INLET COUPLING and inspect for any signs of decay. Discard if found.

6. 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 (Fig. 3). Use caution to avoid nicking or scratching the delicate 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 it.

7. Using a 1/4" open end wrench, hold the LOCK NUT (12) secure, and turn the POPPET (6) out of the LOCK NUT in a counter clockwise direction using a Poppet Tool. To avoid a sudden ejection as the POPPET disengages from the LOCK NUT, apply a continuous slight inward pressure on the POPPET as it is turned.

8. Remove the POPPET (6), POPPET SPRING (7), WASHER (10), LEVER ARM (9), SPACER (11), and LOCK NUT (12) from the Housing using care to avoid losing the parts. Discard the LOCK NUT and WASHER.



Fig. 1



Fig. 2



Fig. 3

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9. Examine the LEVER ARM (9) and compare it with a new one to ensure that it is not bent or distorted in any way. Discard if distortion is found.
10. 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.
11. Remove the POPPET SEAT (5) from the POPPET (6) with the use of a dental probe and discard (Fig. 4). DO NOT attempt to reuse it.
12. Examine the internal threads of the HOUSING'S Inlet Tube (8) that holds the POPPET Assembly to ensure they are clean and in good condition. Refer to the Cleaning Section of the General Procedures (Doc. No. 12-2202) for instructions regarding the cleaning of these Threads.
13. Inspect the overall condition of the HOUSING (8) to ensure it is free of any stress cracks or other distortions, and that the Outer Threads are in good condition. Discard if distortion is found.
14. Using a soft probe, inspect the condition of the EXHAUST VALVE (15) 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 COVER (13) to ensure that it is securely fastened onto the HOUSING.

△ **NOTE: Provided that the EXHAUST VALVE (15) is in good condition and the EXHAUST COVER (13) is securely fastened, further disassembly is not necessary. The HOUSING (8) may be cleaned with these parts assembled, as one part. Refer to the General Procedures (Doc. No. 12-2202) for cleaning instructions.**

15. If further disassembly is needed, either to replace the DIAPHRAGM (16) or replace the EXHAUST COVER (13), remove the COVER SCREWS (14) by turning them counterclockwise with a 3/32" hex key and remove the EXHAUST COVER.
16. The EXHAUST VALVE (15) is now accessible and may be removed by grasping it by the Flange and pulling it straight out, snipping the Retainer Stem if necessary. Discard.



Fig. 4

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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. If removed, replace the EXHAUST VALVE (15) by gently pulling the Retainer Stem through the HOUSING (8) until the Retaining Flange is completely inside the HOUSING and properly seated (Fig. 5).

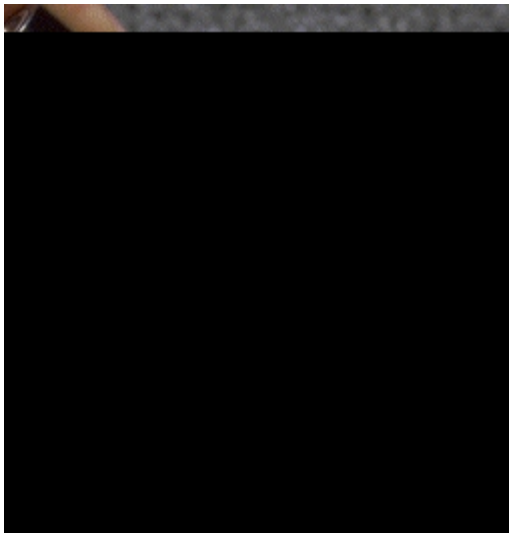


Fig. 5

2. If removed, replace the EXHAUST COVER (13) onto the Exhaust Tee portion of the HOUSING (8) and hold firmly in place while threading the COVER SCREWS (14) clockwise into the HOUSING. Using a 3/32" hex key, alternately tighten each SCREW **to a torque of 4-5 in/lbs**.

3. Replace 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.

4. Apply a light film of Lubricant to each End of the POPPET SPRING (7) and place it 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 POPPET SPRING until the Threaded portion of the Shaft is completely visible inside the HOUSING. Hold in this position by grasping the Tool with your fingers and the Outer Rim of the HOUSING with your thumb (Fig. 6).



Fig. 6

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 (6), between the WASHER (10) and SPACER (11) (Fig. 7). Relax the POPPET and watch to ensure that the LEVER ARM stands upright, above the Outer Rim of the HOUSING (8).

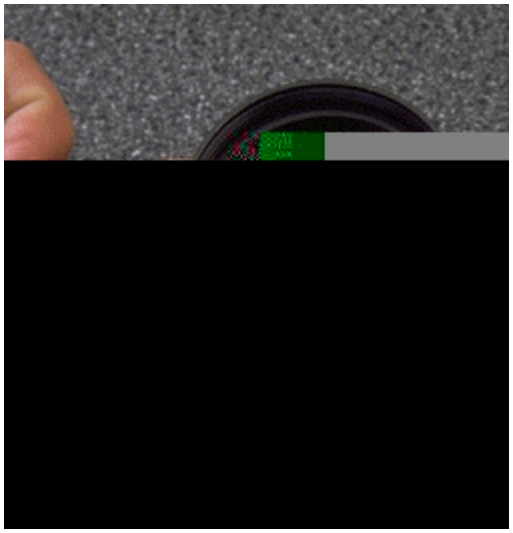


Fig. 7

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7. Using a 1/4" open end wrench, hold the LOCK NUT (12) secure, and turn the POPPET (6) clockwise with the Poppet Tool until 2 Threads are showing beyond the outer surface of the LOCK NUT (Fig. 8). Remove the tools, and depress the LEVER ARM (9) repeatedly to ensure smooth movement.

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** (Fig. 9).

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 of the ORIFICE facing in (Fig. 10).

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

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: This is an important preliminary setting for the ORIFICE. For best sensitivity of touch, hold the screwdriver by the shaft rather than the handle.**

11. Place the DIAPHRAGM (16) inside the HOUSING (8) with the raised Center facing up, and ensure that it seats flush at the base of the Inner Threads. Place the FRONT COVER (17) directly over the DIAPHRAGM and ensure that it seats flush.

12. Lightly lubricate the Threads of the COVER RING (18), then install it by rotating it in a clockwise direction into the HOUSING (8), taking care to ensure that the COVER RING is correctly seated on the Threads. Hand tighten until secure.

13. Secure the MOUTHPIECE (19) onto the HOUSING (8) with a new TIE WRAP (20), positioning the Locking Tab of the TIE WRAP towards the Hose.

△ **NOTE: Oceanic's patented orthodontic Mouthpieces are designed to accommodate the natural overbite of the human jaw. Ensure that it is positioned correctly.**

14. Lubricate and replace the O-ring inside the Second Stage Coupling End of the LP Hose. 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" or 13/16" open end wrench.



Fig. 8



Fig. 9

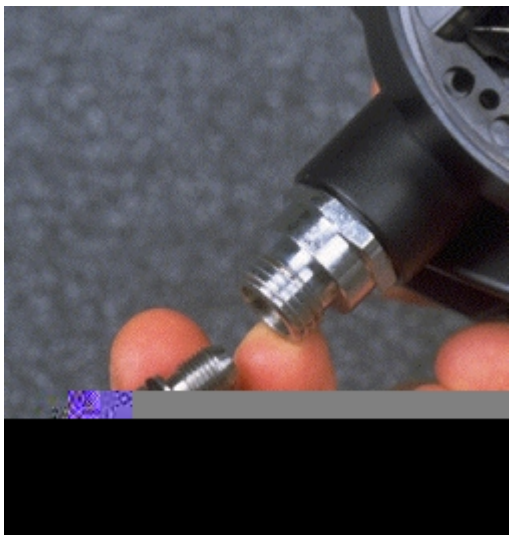


Fig. 10

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FINAL TUNING AND TESTING

FIRST STAGE TESTING

1. Perform the Leak Detection Test specified in the Initial Inspection Procedure (Doc. No. 12-2202).

△ **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 ALPHA 7 Second Stage Low Pressure 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 low pressure test gauge to the additional low pressure hose, and connect the first stage to a pure breathing gas source of 3,000 PSI (206 BAR).

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 being used.

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

TUNING THE ALPHA 7

1. Prior to tuning the ALPHA 7, check the following items:

   a. The demand DIAPHRAGM (16), FRONT COVER (17) and COVER RING (18) should be properly installed into the Housing, with the Front COVER RING (18) tightened until secure.

   b. Connect an In-Line Adjustment Tool between the Low Pressure Hose and INLET COUPLING (3).

   c. The MOUTHPIECE (19) should be cleaned and disinfected with warm, soapy water.

△ **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 the ORIFICE in either direction. Locate the Slotted Head of the ORIFICE by touch before attempting any adjustment.**

Clockwise turns of the In-Line Adjustment Tool turns the ORIFICE in toward the POPPET SEAT (19) increasing the Opening Effort.

Counter clockwise turns of the In-Line Adjustment Tool turns the ORIFICE out (away from the POPPET SEAT) reducing the Opening Effort.

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2. Pressurize the Regulator with a pure air source of 3,000 PSI (206 BAR) and listen to determine that a slight air flow is initially present.

3. Use the In-Line tool to turn the ORIFICE (2) clockwise with very small fractions of a turn, just until airflow is no longer present, and pause to listen carefully for airflow or leakage after each adjustment. Adjust the ORIFICE as required to achieve the desired Opening Effort.

NOTE: Turning the ORIFICE (2) further than necessary to stop airflow will result in LEVER ARM (9) slack and excessive spring load tension, impairing proper performance.

CAUTION: To avoid cutting the POPPET SEAT (5) with the Knife Edge of the ORIFICE (2), depress the Purge Button while turning the ORIFICE in or out.

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

   a. Remove the COVER RING (18), FRONT COVER (17), and DIAPHRAGM (16).

   b. Purge the Regulator of all air.

   c. Depress and hold the LEVER ARM (9) to remove the INLET COUPLING (3) (with Hose and In-Line Adjustment Tool still attached) from the Inlet Tube, using a 3/4" open end wrench.

NOTE: The Cone of the ORIFICE (2) will now be exposed, protruding through the INLET COUPLING (3), and must be protected to prevent damage to its delicate seating surface.

   d. Insert a 1/4" open end wrench into the HOUSING (8) to hold the LOCK NUT (12) secure, while using the Poppet Tool to turn the POPPET (6) clockwise 1/8 turn. Use the correct method given in step 9 of the Reassembly Procedure to replace the INLET COUPLING (3) after each adjustment, and again determine whether slack is eliminated.

NOTE: Avoid tightening the LOCK NUT (12) any further than is necessary to eliminate LEVER ARM (9) slack. It may be necessary to repeat step d. several times to arrive at the desired setting (Opening Effort).

5. Purge the Regulator of all air to remove the In-Line Adjustment Tool and connect the LP Hose directly onto the INLET COUPLING (3) using 2 wrenches as prescribed in Step 14 of the Reassembly Procedure.

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6. Replace the DIAPHRAGM (16), FRONT COVER (17), and COVER RING (18), and pressurize the Regulator again with a pure air source of 3,000 PSI (206 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 Trouble-shooting Section on page 3 to determine possible cause and treatment.

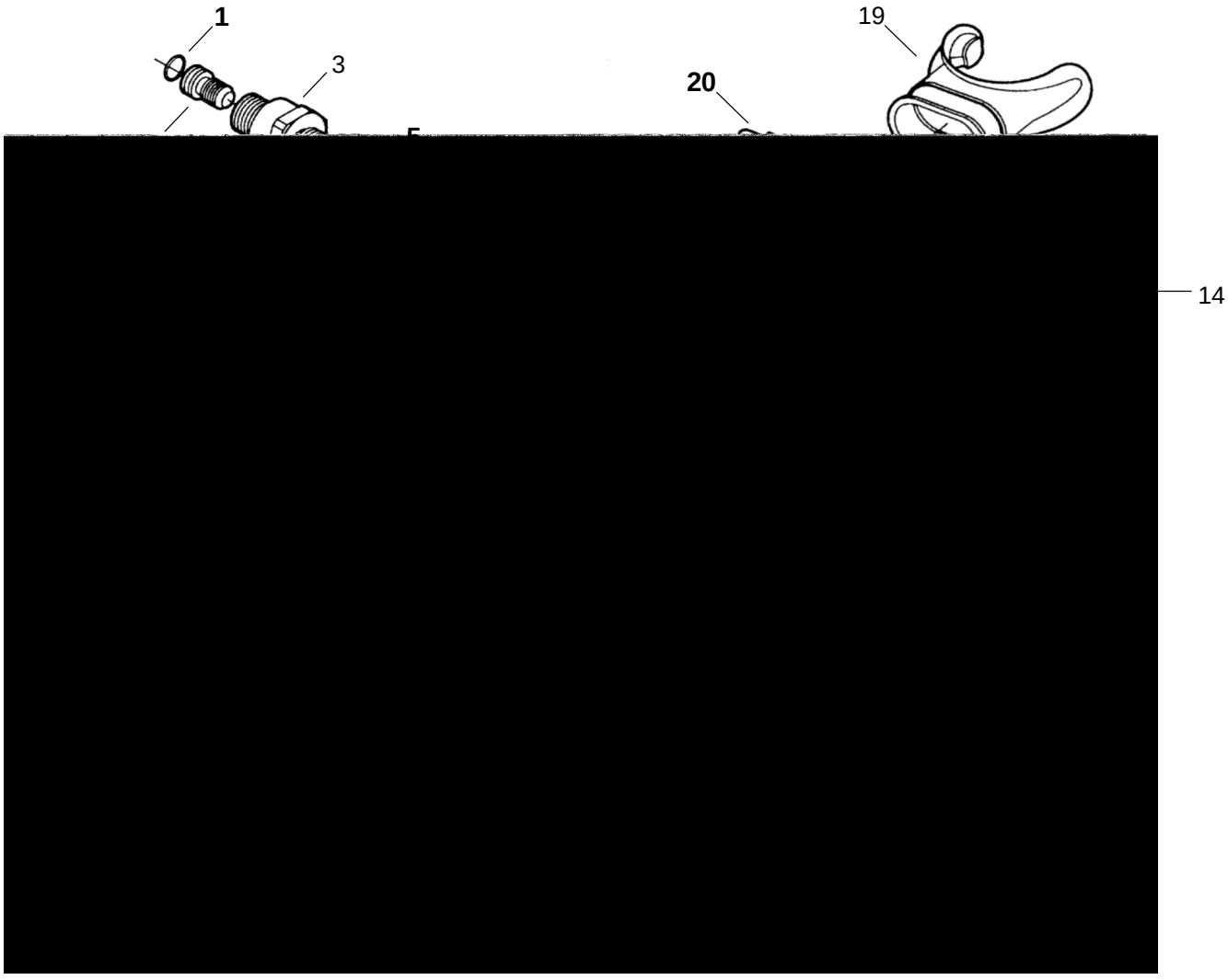
7. Clean and disinfect the Mouthpiece in warm, soapy water before returning the Regulator Equipment to the customer.

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ALPHA 7 SECOND STAGE

Dia. No.	Part #	Description
1a	**2.010**	**O-RING, ORIFICE**
2c	6621	ORIFICE
3c	4330	COUPLING, INLET
4b	3.906	O-RING, COUPLING
5a	**4340**	**SEAT, POPPET**
6c	4333	POPPET
7c	5074	SPRING, POPPET
8c	6431	HOUSING
9c	4587	ARM, LEVER
10a	**5117**	**WASHER**
11b	4335	SPACER
12a	**4336**	**NUT, LOCK**
13c	4859	COVER, EXHAUST
14c	4787	SCREW, COVER
15b	4576	VALVE, EXHAUST
16b	4575	DIAPHRAGM

Dia. No.	Part #	Description
17c	6436.07	COVER, FRONT (BK)
	6436.18	COVER, FRONT (NY)
18c	6437.23	RING, COVER (MACHINED)
	6435.07	RING, COVER (BK)
19c	4485.07	MOUTHPIECE (SILICONE - BK)
20a	**1978.10**	**WRAP, TIE (BK)**
N/S	40.2100.033	HOSE, MAXFLO (33")
N/S	40.2100.036	HOSE, MAXFLO (36")
N/S	40.6160	KIT, SERVICE PARTS (Includes all **Bold** items) (P/N 2.004 O-RING is not used with the Alpha 7)



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SUPPLEMENTAL INFORMATION

Due to design enhancements that have been made since the Alpha 7 was originally released, the unit being serviced may not have the same components previously described.

The intent of this Supplemental Information is to assist the Oceanic Regulator Service Technician with identification of previous component parts and provide guidelines for their reuse or replacement.

The exploded view diagram on page 11 can be used as a reference for older units.

Dia. No. 2 - ORIFICE

Refer to Blue Page, Doc. No. 12-2267 (8/1/00).

current p/n 6621
Grey color, non metallic material.
Compatible with all other parts.

older p/n 4332
Replacement with the newer part is not required, but is allowed at your discretion.
Compatible with all other parts.

Dia. No. 18 - COVER RING

current p/n 6437.23
Metallic material.
Compatible with all other parts.

older p/n 6437
Replacement with the newer part is not required, but is allowed at your discretion.
Compatible with all other parts.

current p/n 6435.07
Black color.
Compatible with all other parts.

older p/n 6437.07
Replacement with the newer part is not required, but is allowed at your discretion.
Compatible with all other parts.

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