



# **ZETA**

## **SERVICE PROCEDURE**

**This Zeta Product Service Procedure conveys a list of components and service procedures that reflect the Zeta as it was configured at the time of this writing (5/23/02).**

**It also contains Supplemental Information intended to assist the Authorized Oceanic Regulator Service Technician who is servicing a Zeta configured with older components.**

## ZETA SECOND STAGE

## CONTENTS

TROUBLESHOOTING .....	2
DISASSEMBLY PROCEDURE .....	3
REASSEMBLY PROCEDURE .....	7
FINAL TUNING AND TESTING .....	11
PARTS LIST AND EXPLODED VIEW DIAGRAM .....	13
SUPPLEMENTAL INFORMATION .....	14

## GENERAL PROCEDURES

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

## SPECIFICATIONS

**Torques**

Control Valve Screw (p/n 5525) 20 to 24 in-lbs  
 Exhaust Cover Screws (p/N 4787) 4 to 6 in-lbs  
 LP Hose end fitting 50 to 60 in-lbs

**Opening Effort (IP = 140 psi)**

Preferred Primary Set-up 1.2 to 1.4 inches of H<sub>2</sub>O  
 Acceptable (Primary) 1.1 to 1.5 inches of H<sub>2</sub>O  
 Preferred Octopus Set-up 1.5 to 2.0 inches of H<sub>2</sub>O  
 Acceptable (Octopus) 1.5 to 2.2 inches of H<sub>2</sub>O

## TOOLS REQUIRED

**Standard Tools**

Ball Peen Hammer, Small  
 Inch Pounds Torque Wrench  
 3/32" Hex Key Socket  
 3/32" Allen Key  
 3/8" Open End Wrench  
 11/16" Open End Wrench  
 1" Open End Wrench  
 Soft Jawed Vise

**Specialty Tools**

P/N 40.2302 Christo-Lube MCG111 - 2 oz  
 P/N 40.5506 Servo Valve Seat  
 P/N 40.9411 Deep Wall Socket (1/4")  
 P/N 40.9412 Drift Pin Punch (1/16")  
 P/N 40.9413 Zeta Block  
 P/N 40.9520 O-ring Tool Kit  
 P/N 40.9650 Universal Front Cover Tool  
 P/N 40.9414 Deep Wall Socket (1")

**ZETA SECOND STAGE**

<b>TROUBLE SHOOTING</b>		
<b>SYMPTOM</b>	<b>POSSIBLE CAUSE</b>	<b>TREATMENT</b>
* <b>Freeflow</b>	<ol style="list-style-type: none"> <li>1. Second Stage adjusted too sensitively.</li> <li>2. Excessive intermediate pressure from First Stage.</li> <li>3. Debris trapped in orifice of MAIN VALVE DIAPHRAGM (23).</li> <li>4. Bent CONTROL VALVE LEVER (19).</li> <li>5. CONTROL VALVE LEVER (19) Seat damaged or worn.</li> <li>6. MAIN VALVE DIAPHRAGM (23) installed incorrectly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust. (Refer to Tuning section.)</li> <li>2. Refer to First Stage Troubleshooting chart.</li> <li>3. Replace with new.</li> <li>4. Replace CONTROL VALVE LEVER (19), ROLL PIN (16), and LEVER SPRING (18) with new and readjust Second Stage.</li> <li>5. Replace Lever, Pin, and Spring with new and readjust Second Stage.</li> <li>6. Reverse to face larger opening of orifice towards Hose.</li> </ol>
* <b>Air leakage detected from Control Valve orifice.</b>	<ol style="list-style-type: none"> <li>1. CONTROL VALVE LEVER (19) Seat damaged or worn.</li> <li>2. LEVER SPRING (18) damaged or obstructed.</li> <li>3. Bent CONTROL VALVE LEVER (19).</li> <li>4. CONTROL VALVE SCREW (22) damaged.</li> <li>5. CONTROL VALVE SCREW (22) loose.</li> <li>6. VALVE SCREW O-RING (21) damaged.</li> <li>7. Excessive intermediate pressure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace CONTROL VALVE LEVER (19) with new and readjust Second Stage.</li> <li>2. Clean or replace with new as needed.</li> <li>3. Replace with new.</li> <li>4. Replace with new.</li> <li>5. Tighten.</li> <li>6. Replace with new.</li> <li>7. Refer to First Stage Troubleshooting chart.</li> </ol>
* <b>Air leakage detected from CONTROL VALVE BODY (17).</b>	<ol style="list-style-type: none"> <li>1. CONTROL VALVE BODY (17) damaged.</li> <li>2. VALVE BODY O-RING (20) worn or damaged.</li> <li>3. INLET CHAMBER (27) damaged.</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> </ol>
* <b>Air leakage detected from ports of INLET CHAMBER (27).</b>	<ol style="list-style-type: none"> <li>1. MAIN VALVE DIAPHRAGM (23) worn or misseated.</li> <li>2. VALVE SEAT (24) damaged.</li> <li>3. VALVE SEAT O-RING (25) damaged or worn.</li> <li>4. Slight obstruction of MAIN VALVE DIAPHRAGM (23) Orifice.</li> <li>5. Excessive intermediate pressure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reseat or replace with new as needed.</li> <li>2. Replace with new.</li> <li>3. Replace with new.</li> <li>4. Clean or replace with new as needed.</li> <li>5. Refer to First Stage Troubleshooting chart.</li> </ol>
* <b>Excessive inhalation resistance.</b>	<ol style="list-style-type: none"> <li>1. Debris or corrosion present, prohibiting Main Valve or Control Valve operation.</li> <li>2. Second Stage incorrectly adjusted.</li> <li>3. Bent CONTROL VALVE LEVER (19).</li> <li>4. VALVE RETAINER (28) loose, prohibiting contact between CONTROL VALVE LEVER (19) Arm and ADJUSTMENT SCREW (8).</li> <li>5. COVER RING (2) loose, prohibiting contact between CONTROL VALVE LEVER (19) Arm and ADJUSTMENT SCREW (8).</li> </ol>	<ol style="list-style-type: none"> <li>1. Disassemble and clean.</li> <li>2. Readjust. (Refer to tuning section.)</li> <li>3. Replace with new and readjust Second Stage.</li> <li>4. Tighten until secure.</li> <li>5. Tighten until secure.</li> </ol>
* <b>Inconsistent performance - freeflow / excessive inhalation resistance.</b>	<ol style="list-style-type: none"> <li>1. Retaining Ribs of HOUSING (10) damaged or distorted.</li> <li>2. VALVE RETAINER (28) loose, prohibiting contact between CONTROL VALVE LEVER (19) Arm and ADJUSTMENT SCREW (8).</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace with new.</li> <li>2. Tighten until secure.</li> </ol>
* <b>Servo lag - delay in opening of Main Valve when Control Valve is actuated.</b>	<ol style="list-style-type: none"> <li>1. VALVE SEAT (24) damaged or worn.</li> <li>2. Debris trapped in Orifice of MAIN VALVE DIAPHRAGM (23).</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace with new.</li> <li>2. Replace with new.</li> </ol>
* <b>Excessive water entering Second Stage.</b>	<ol style="list-style-type: none"> <li>1. EXHAUST VALVE (11) distorted or damaged.</li> <li>2. Tear in MOUTHPIECE (15).</li> <li>3. Debris trapped beneath EXHAUST VALVE (11).</li> <li>4. Improperly installed or damaged DIAPHRAGM (9).</li> <li>5. Cracked or damaged HOUSING (10).</li> <li>6. ADJUSTMENT SCREW O-RING (7) worn or missing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace with new.</li> <li>2. Replace with new.</li> <li>3. Clean and remove.</li> <li>4. Disassemble, clean, or replace Diaphragm Assembly parts with new as needed.</li> <li>5. Replace with new.</li> <li>6. Replace with new.</li> </ol>

## DISASSEMBLY PROCEDURE

**△ NOTE:** Be sure to perform the steps outlined in the Initial Inspection Procedures (Doc. 12-2202) prior to disassembling the Regulator. Review the Troubleshooting Section on page 3 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. Remove the FRONT COVER (1) and COVER RING (2) by turning them in a counter clockwise direction, using a Universal Front Cover Tool if necessary, to remove. Inspect for signs of distortion or decay.
2. Remove the FRONT COVER (1) from the COVER RING (2) by pushing it straight through the COVER RING (2) from the front surface (Fig. 1). Discard either part if it requires replacement.
3. Remove the SPRING PLATE (3), PURGE BUTTON (4), and CONTROL PISTON SPRING (5), and examine them for signs of distortion, cracks, corrosion, or other damage. Discard if found.
4. Remove the Inhalation Diaphragm Assembly, which includes the CONTROL DIAPHRAGM (9), CONTROL PISTON (6), ADJUSTMENT SCREW O-RING (7), and ADJUSTMENT SCREW (8). Inspect (Fig. 2) the Assembly as detailed in steps A - C to determine whether further disassembly is necessary. If the Assembly passes this inspection, it may be cleaned fully assembled, as one part. Disassembly, if needed, may be performed without the use of tools.
  - A. Inspect the condition of the CONTROL DIAPHRAGM to ensure the silicone rubber is supple and free of any tears or corrosion.
  - B. Inspect the condition of the CONTROL PISTON to ensure it is free of any stress cracks, warping, or other signs of distortion.
  - C. Inspect the ADJUSTMENT SCREW to ensure the threads are in good condition, without any signs of distortion.
5. Remove the VALVE RETAINER (28) by turning it counter clockwise, using an adjustable face spanner wrench if necessary.
6. While holding the HOUSING (10) with one hand, firmly grasp the Low Pressure Hose at the Fitting with the other hand, and carefully pull the Valve Module straight outward until it disengages from the Retaining Ribs inside the HOUSING. Depress and hold the CONTROL VALVE LEVER (19) with a free finger of the same hand that is holding the HOUSING (Fig. 3). Rotate the Valve Module 90 degrees and pull it straight out of the HOUSING. Ensure that the CONTROL VALVE LEVER is depressed until the Valve Module is completely removed from the HOUSING.

**△ CAUTION:** If the CONTROL VALVE LEVER is not depressed while removing the Valve Module, it will catch on the inside of the HOUSING possibly damaging the CONTROL VALVE LEVER, PIN (16), or CONTROL VALVE SCREW (22) Orifice, requiring their replacement.

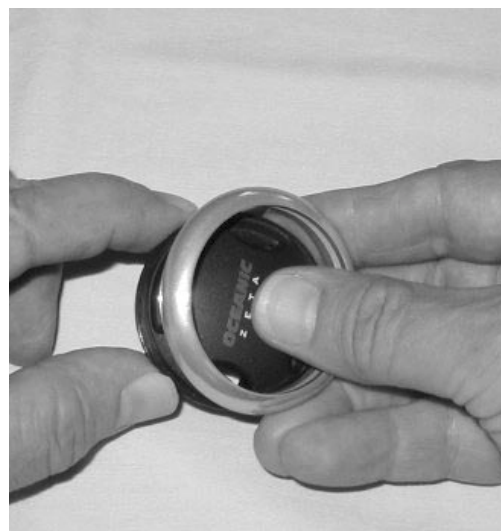


Fig. 1

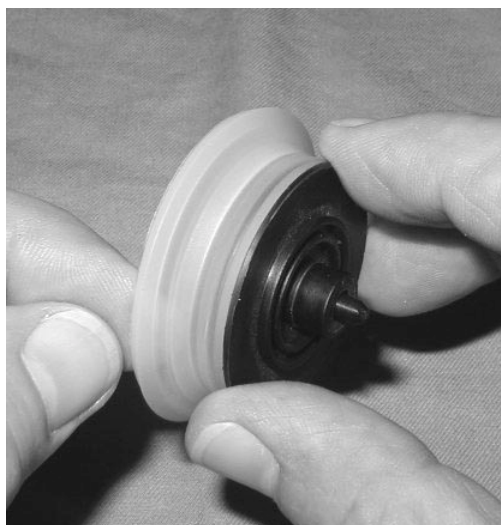


Fig. 2

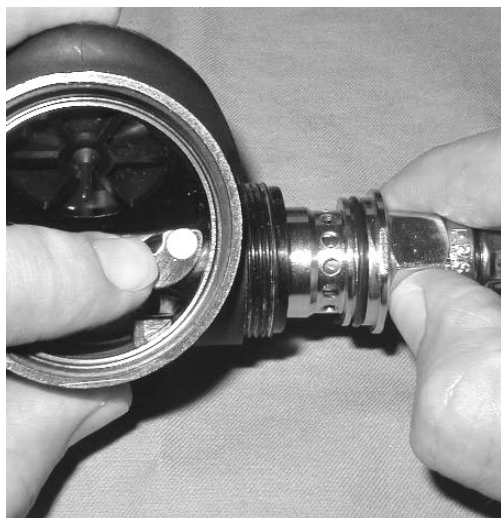


Fig. 3

## ZETA SECOND STAGE

**NOTE:** Refer to the Initial Inspection Procedure (Doc. 12-2202) to perform the Leak Detection Test before proceeding any further, if you have not already done so.

7. To remove the LP Hose, apply an 11/16" Open End Wrench to the Hex Portion of the End Fitting, and turn it counter clockwise while holding the INLET CHAMBER (27) secure with a 1" Open End Wrench (Fig. 4).
8. Remove the VALVE RETAINER (28) and HOSE PROTECTOR (29) from the Hose. Remove and inspect the O-ring found inside the Hose End Fitting for any signs of decay. Discard if found.
9. Secure the Oceanic custom Zeta Block in a soft jawed or padded vise with the large opening facing up. Insert the CONTROL VALVE BODY (17) into the Zeta Block with the Lever End facing down and the INLET CHAMBER (27) facing up (Fig. 5).
10. Remove the INLET CHAMBER by turning it counter clockwise with the Oceanic custom 1" Deep Wall Modified Socket seated securely over it (Fig. 6).
11. Remove and inspect the INLET CHAMBER O-RING (26) and VALVE BODY O-RING (20) for any signs of decay. Discard if found.

**CAUTION:** Pneumatic pressure must be used to remove the VALVE DIAPHRAGM (23). Use of a sharp metal instrument is to be completely avoided.

**CAUTION:** Failure to perform the procedure(s) described by Steps 12 and 13 will damage the VALVE SEAT (24) and/or the Seating Surface of the INLET CHAMBER (27), requiring replacement.

12. Using a standard Low Pressure Hose, connect the INLET CHAMBER (27) to a pure air source with an intermediate pressure of no more than 148 psi.
13. Wrap a clean cloth around the Open End of the INLET CHAMBER (27) to prevent the VALVE DIAPHRAGM (23) from exiting explosively, and gradually pressurize, allowing the pressure to increase until the VALVE DIAPHRAGM is unseated.

**CAUTION:** If the VALVE DIAPHRAGM (23) has not exited entirely beyond the threaded portion of the INLET CHAMBER (27), use your fingertips to remove the DIAPHRAGM from the INLET CHAMBER, using extreme care to avoid damaging the INLET CHAMBER.

14. Discard the VALVE DIAPHRAGM (23) and DO NOT attempt to reuse it.



Fig. 4



Fig. 5



Fig. 6



## ZETA SECOND STAGE

15. Remove the LP Hose from the INLET CHAMBER (27) and insert an Oceanic Servo-Valve Seat Tool through the Threaded End and press the VALVE SEAT (24) out (Fig. 7). Compare the VALVE SEAT with new and closely inspect for any signs of pitting or distortion that would prevent proper seating with the VALVE DIAPHRAGM (23). Discard if found.

16. Remove the VALVE SEAT O-RING (25) from the Stem of the VALVE SEAT (24) and inspect for any signs of decay. Discard if found.

**⚠ CAUTION:** Failure perform the procedure described by Step 17 will damage the Orifice of the CONTROL VALVE SCREW (22) and/or the Seating Pad of the CONTROL VALVE LEVER (19), requiring replacement.

17. Secure the Oceanic custom Zeta Block in a soft jawed or padded vise with the large opening facing up. Insert the CONTROL VALVE BODY (17) into the Zeta Block with the Lever end facing down and the Open end facing up.

18. Remove the CONTROL VALVE SCREW (22) by turning it counter clockwise using a 1/4" Deep Wall Socket (Fig. 8).

19. Remove and discard the VALVE SCREW O-RING (21) and DO NOT attempt to reuse it.

20. Closely inspect the CONTROL VALVE SCREW (22) with the use of a magnifier, checking for any signs of stress damage caused by unauthorized repair, either at the Slotted Head or just above the Threads. Also inspect the Orifice to ensure it is free of any scoring or nicks (Fig. 9). Discard if any defect is found, and DO NOT attempt to reuse.

**⚠ NOTE:** If no leakage was detected from the Control Valve Lever Assembly during the Leak Detection Test performed during the Initial Inspection Procedures, perform the following Inspection (Step 21) to determine whether further disassembly may be necessary.

**If it passed the Leak Detection Test and this Inspection (Step 21), Oceanic recommends cleaning it while fully assembled. If it does not pass either test, disassembly is required.**

21. Ensure that the LEVER SPRING (18) is present and securely in place, without any grit or debris inside it; examine the PIN (16) to ensure that it is not flared or distorted in any way; and examine the CONTROL VALVE LEVER (19) Arm and compare it with a new one to ensure it is not bent (refer to Fig. 10, page 7)



Fig. 7



Fig. 8



Fig. 9

## ZETA SECOND STAGE

22. To disassemble the Control Valve Lever Assembly, strictly adhere to the following procedure:

A. Place the CONTROL VALVE BODY (17) into a soft jawed or padded vise with the Leading Edge of the Lever Housing and the Rim of the large Threaded Inlet Opening in direct contact with the padded jaws of the vise, oriented so the PIN (16) is facing straight up (Fig. 11).

**CAUTION:** Tighten the vise only as needed to hold the CONTROL VALVE BODY (17) secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

B. Gently drive out the PIN (16) using a 1/16" drift pin punch with a point diameter of 1/16". Tap lightly on the punch with a small ball peen hammer until the PIN has exited (Fig. 12). If the PIN will not exit completely, use needle nose pliers to grasp the portion protruding, and pull it straight out. Discard, and DO NOT attempt to reuse it.

C. Remove the CONTROL VALVE LEVER (19) and LEVER SPRING (18), which can now drop out freely. Discard both, and DO NOT attempt to reuse either.

23. Snip the TIE WRAP (14) that secures the MOUTHPIECE (15), and remove the MOUTHPIECE. Inspect the MOUTHPIECE to ensure it is supple and free of any tears or corrosion. Discard if found.

24. Inspect the condition of the HOUSING (10) to ensure that the Body is free of any stress cracks and the threads are clean and free of any signs of damage or distortion, and the Ribs that retain the VALVE RETAINER (28) are intact and free of any signs of damage or distortion caused by improper removal of the LP Hose.

**NOTE:** If the EXHAUST VALVE (11) is in good condition and the EXHAUST COVER (12) is intact, the HOUSING (10) can be cleaned without further disassembly. Refer to the General Procedures section, Doc. 12-2202, for Cleaning.

25. If further disassembly is necessary to replace the EXHAUST VALVE (11) or the EXHAUST COVER (12), remove the EXHAUST COVER SCREWS (13) by turning them counter clockwise with a 3/32" hex key.

26. Remove the EXHAUST COVER (12) to expose the EXHAUST VALVE (11) and remove it by grasping it by the Flange and pulling it straight out, snipping the Retainer Stem off, if necessary. Discard and DO NOT attempt to reuse.



Fig. 10



Fig. 11

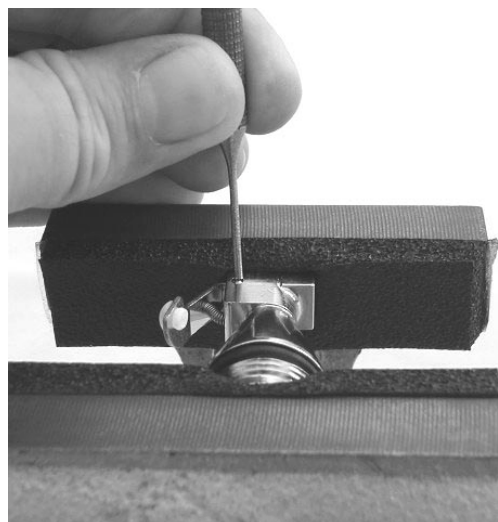


Fig. 12

## 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.

**△ NOTE:** If the CONTROL VALVE LEVER (19) has not been disassembled, proceed directly to step 8.

1. Holding the CONTROL VALVE BODY (17) by the large Threaded Inlet Opening, with the Spring Recess facing straight up, place the LEVER SPRING (18) directly into the Recess. Examine the CONTROL VALVE LEVER (19) to find the Spring Retaining Tab on its underside (Fig. 13), and lower the LEVER directly into the Lever portion of the CONTROL VALVE BODY, mating the Tab into the SPRING.

**△ CAUTION:** DO NOT apply pressure to the Ears of the CONTROL VALVE BODY during installation of the LEVER.

2. Using your index finger to hold the CONTROL VALVE BODY (17), push the CONTROL VALVE LEVER (19) into position, slowly compressing the LEVER SPRING (18). Continue to hold the LEVER in position while placing a 2.012 O-ring completely over the CONTROL VALVE BODY and onto the LEVER, to retain it in this position (Fig. 14).

3. Place the CONTROL VALVE BODY (17) into a soft jawed Oor padded vise with the Ends in direct contact with the padded jaws of the vise, oriented so the PIN (16) Opening is facing straight up.

**△ CAUTION:** Tighten the vise only as necessary to hold the CONTROL VALVE BODY (17) secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

4. Without squeezing it, grasp the PIN (16) firmly using a pair of tweezers, apply a very small amount of lubricant to the End, and position the lubricated End of the PIN (16) directly onto the Hole in the Flat Surface of the CONTROL VALVE BODY (17) (Fig. 15).
5. Using a small ball peen hammer, gently tap the PIN (16) into the Hole just until it is well seated, without protruding from the CONTROL VALVE BODY (17).



Fig. 13



Fig. 14



Fig. 15



## ZETA SECOND STAGE

6. Position the CONTROL VALVE LEVER (19) so that the Groove in the LEVER is perfectly aligned with the Dowel Pin Holes in the CONTROL VALVE BODY (17), ensuring that the PIN (16) can pass through the Lever Groove without any restriction. Using the ball peen hammer, gently tap the PIN completely through the Groove and into the Hole on the opposite side until seated flush on both sides. Ensure that the Slot in the PIN is visible and facing directly up.

**NOTE:** It may be necessary to tap the upper end through with the use of a drift pin punch to cause it to seat flush.

7. Carefully remove the 2.012 O-ring used to secure the CONTROL VALVE LEVER (19) to the CONTROL VALVE BODY (17), and depress the LEVER repeatedly to ensure smooth movement.

**CAUTION:** It is important not to squeeze, bend, or distort the PIN (16) in the process of installing it. If any distortion is visible or if the LEVER movement is not correct, remove and replace the LEVER.

8. Lightly lubricate and carefully install the VALVE SCREW O-RING (21) onto the CONTROL VALVE SCREW (22) over the Threaded End, guiding it down the Shaft until it seats against the Flat Lip of the Hex Fitting (Fig. 16).

**CAUTION:** Proper installation of the CONTROL VALVE SCREW (22) is crucial. Failure to correctly perform Steps 9 and 10 will result in damage to the CONTROL VALVE SCREW (22) Orifice and/or the Seating Pad of the CONTROL VALVE LEVER (17), requiring replacement. Closely adhere to the procedure.

10. Secure the Oceanic custom Zeta Block in a soft jawed or padded vise with the Large Opening facing up. Insert the CONTROL VALVE BODY (17) into the Zeta Block with the Lever End facing down and the INLET CHAMBER (27) facing up.

11. Insert the Threaded End of the CONTROL VALVE SCREW (22) directly into the opening of the CONTROL VALVE BODY (17) and turn clockwise to engage the Threads. Continue to tighten the CONTROL VALVE SCREW clockwise to a torque of 20-24 in-lbs using a 1/4" Deep Wall socket mounted on a hand driver (Fig. 17).

12. Remove the CONTROL VALVE BODY (17) from the Zeta Block and depress the LEVER repeatedly to ensure smooth movement.

13. Lubricate and install the VALVE BODY O-RING (20) onto the CONTROL VALVE BODY (17), and set the Assembly aside.

14. Lubricate and install the VALVE SEAT O-RING (25) onto the Stem of the VALVE SEAT (24).

15. Install the VALVE SEAT (24) into the INLET CHAMBER (27) (Fig. 18), pressing it in with your finger until seated.

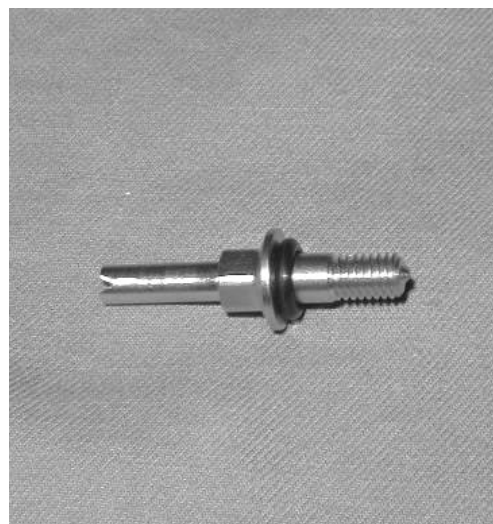


Fig. 16



Fig. 17



Fig. 18

## ZETA SECOND STAGE

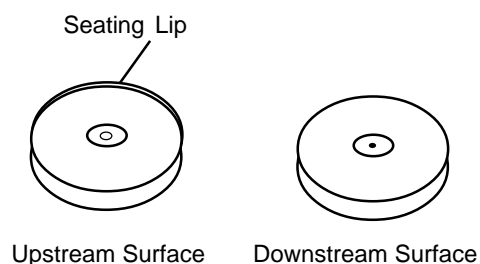
16. Lubricate and install the INLET CHAMBER O-RING (26) onto the INLET CHAMBER (27).
17. Close examination of the VALVE DIAPHRAGM (23) will show that the Orifice in the center of one side is larger than that on the other side (Fig 19). Position the DIAPHRAGM flat, directly over the large opening of the INLET CHAMBER (27) with the smaller opening of the orifice facing out.

**⚠ CAUTION: Installing the VALVE DIAPHRAGM (23) with the Larger Opening facing out will result in a perpetual free-flow when the Second Stage is pressurized, requiring disassembly and correction.**

18. Using a wooden dowel, gently tamp the Edges of the VALVE DIAPHRAGM (23) down inside the Internal Threads of the INLET CHAMBER (27), one Thread at a time. To facilitate an even seating of the DIAPHRAGM, rotate the INLET CHAMBER while doing this. Ensure it is well seated at the Base of the Threads.

**⚠ CAUTION: DO NOT force the VALVE DIAPHRAGM (23) into the INLET CHAMBER (27) in a manner that will damage either the Lip of the Inside Edge, or the Threads of the INLET CHAMBER. The use of a sharp instrument, such as a screwdriver, is to be strictly avoided.**

19. Secure the Oceanic custom Zeta Block in a soft jawed or padded vise with the large opening facing up. Insert the CONTROL VALVE BODY (17) into the Zeta Block with the Lever end facing down. Engage the INLET CHAMBER (27) and tighten using a 1" deep wall socket (Fig. 20). Tighten the INLET CHAMBER until it is secure and flush against the CONTROL VALVE BODY (Fig. 21).
20. Remove the Control Valve Assembly from the Zeta Block and set it aside.
21. If removed, replace the EXHAUST VALVE (11) into the HOUSING (10) by gently pulling the Retainer Stem through the HOUSING until the Retaining Flange is inside the Body and properly seated.
22. If removed, replace the EXHAUST COVER (12) onto the HOUSING (10), mating the Hinge Tab Recesses on the EXHAUST COVER with the Hinge Tabs on the HOUSING. Ensuring proper alignment, press the EXHAUST COVER down gently, causing it to snap into position. While holding the EXHAUST COVER secure, thread the two EXHAUST COVER SCREWS (13) into the HOUSING. Alternately tighten the SCREWS clockwise using a with a 3/32" hex key **to a torque of 4-6 in/lbs. DO NOT overtighten.**



VALVE DIAPHRAGM

Fig. 19



Fig. 20



Fig. 21

## ZETA SECOND STAGE

23. Lubricate and install the O-ring inside the Hose End Fitting. Ensure that the HOSE PROTECTOR (29) and the VALVE RETAINER (28) are on the Hose, and hold the INLET CHAMBER (27) Flange secure using a 1" open-end wrench. Install the Hose onto the INLET CHAMBER and tighten clockwise using an 11/16" open end wrench until completely secure.

**NOTE:** Before proceeding, perform the Leak Detection Test outlined in the Initial Inspection Procedures. This will help determine whether the Zeta is being properly reassembled. If any leakage is found, refer to the Troubleshooting Chart and perform the needed remedy before proceeding further.

24. Rotate the Valve Module 90 degrees and push it straight into the HOUSING (10). Once the CONTROL VALVE LEVER (19) is inside the HOUSING, rotate the Valve Module until the CONTROL VALVE LEVER is facing up. Align the Flat Surfaces of the CONTROL VALVE BODY (17) with the Retaining Ribs inside the HOUSING (10), and insert the Valve Module completely into the HOUSING, causing it to snap into place (Fig. 22).

25. Thread the VALVE RETAINER (28) clockwise by hand onto the Threaded Inlet portion of the HOUSING (10) and tighten using an adjustable face spanner wrench until secure. DO NOT over-tighten.

26. Install the Inhalation Diaphragm Assembly, which includes the CONTROL DIAPHRAGM (9), CONTROL PISTON (6), ADJUSTMENT SCREW O-RING (7), and ADJUSTMENT SCREW (8), into the HOUSING (10) with the ADJUSTMENT SCREW facing up.

27. Using a wooden dowel, tamp down the Edges of the DIAPHRAGM (9) to ensure it is well seated (Fig. 23).

28. Install the CONTROL PISTON SPRING (5) into the raised Lip of the CONTROL PISTON (6), then place the PURGE BUTTON (4) onto the end of the CONTROL PISTON SPRING oriented with the Splines facing up and out (Fig. 24).

29. Place the SPRING PLATE (3) over the top of the Purge Assembly so that the PURGE BUTTON (4) seats evenly into the Tube of the SPRING PLATE.

**NOTE:** The FRONT COVER (1) should not be installed in to the COVER RING (2) until Tuning and Testing is complete.



Fig. 22



Fig. 23



Fig. 24



## ZETA SECOND STAGE

30. Lightly lubricate the Threads of the COVER RING (2) and carefully seat it into the Threads of the HOUSING (10), then slowly turn it clockwise, ensuring that it is threading properly. Hand tighten until secure (Fig. 25). DO NOT overtighten.

**⚠ CAUTION: Forceful cross threading of the COVER RING (2) into the HOUSING (10) will impair the performance of the Zeta, and require replacement of the HOUSING.**

31. Place the MOUTHPIECE (15) onto the HOUSING (10) and secure it with a new TIE WRAP (14), positioning the Locking Tab of the TIE WRAP toward the VALVE RETAINER (28).

## FINAL TUNING AND TESTING

## FIRST STAGE TESTING

1. Perform the Leak Detection Test specified in the Initial Inspection procedure for the First Stage.

**⚠ 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 Low Pressure Hose of the Zeta Second Stage 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.
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 that recommended, refer to that Regulator's Troubleshooting Section to determine possible cause and treatment.**

## TUNING

1. Prior to tuning the Zeta, check the following items:
  - A. The VALVE RETAINER (28) is completely secured onto the HOUSING (10).
  - B. The ADJUSTMENT SCREW (8) inside the Inhalation Diaphragm Assembly has been turned out counter clockwise to avoid contact with the CONTROL VALVE LEVER (19).

**⚠ NOTE: Steps A and B are essential to ensure correct contact between the ADJUSTMENT SCREW (8) and CONTROL VALVE LEVER (19).**



Fig. 25



## ZETA SECOND STAGE

C. The MOUTHPIECE (15) has been cleaned and disinfected with warm, soapy water.

2. Without the FRONT COVER (1) installed, it will be possible to adjust the Zeta while it is pressurized (Fig. 26). Use a small slotted blade screwdriver to turn the ADJUSTMENT SCREW (8) clockwise (in) only until a slight flow of air can be heard coming from the Valve after the screwdriver has been removed.
3. Turn the ADJUSTMENT SCREW (8) counter clockwise (out) in increments no greater than 1/8 turn just until airflow is no longer present, pausing after each adjustment to listen for airflow or leakage.
4. When airflow is no longer heard, purge the Zeta repeatedly and/or inhale sharply through the MOUTHPIECE (15). Then listen carefully to check for any airflow that may have returned. Repeat step 3 if airflow has returned.
5. When air no longer flows or leaks when the Zeta is in its static mode, turn the ADJUSTMENT SCREW (8) counter clockwise (out) an additional 1/4 turn if it is to be used as a primary air source, or 1/2 turn if it is designated as an alternate air source, or octopus.

**△ NOTE: Slight variances to the recommended adjustment may be made upon the customer's request.**

6. Install the FRONT COVER (1) into the COVER RING (2), ensuring that the Lip at the Base of the FRONT COVER is completely seated into the Retaining Groove inside the COVER RING.
7. Fully depress the PURGE BUTTON (4) to initiate a heavy airflow.

**△ NOTE: If not present, disassemble and inspect the EXHAUST COVER (12) and Inhalation Diaphragm Assembly. Refer to the Troubleshooting Section if the cause is not apparent.**

8. Clean and disinfect the MOUTHPIECE (15) in warm, soapy water before returning the Zeta to the customer.

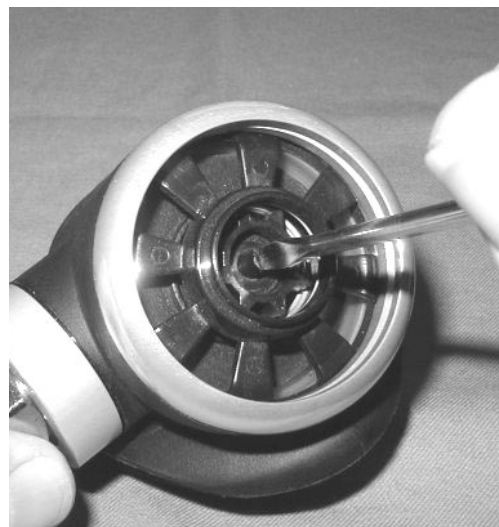
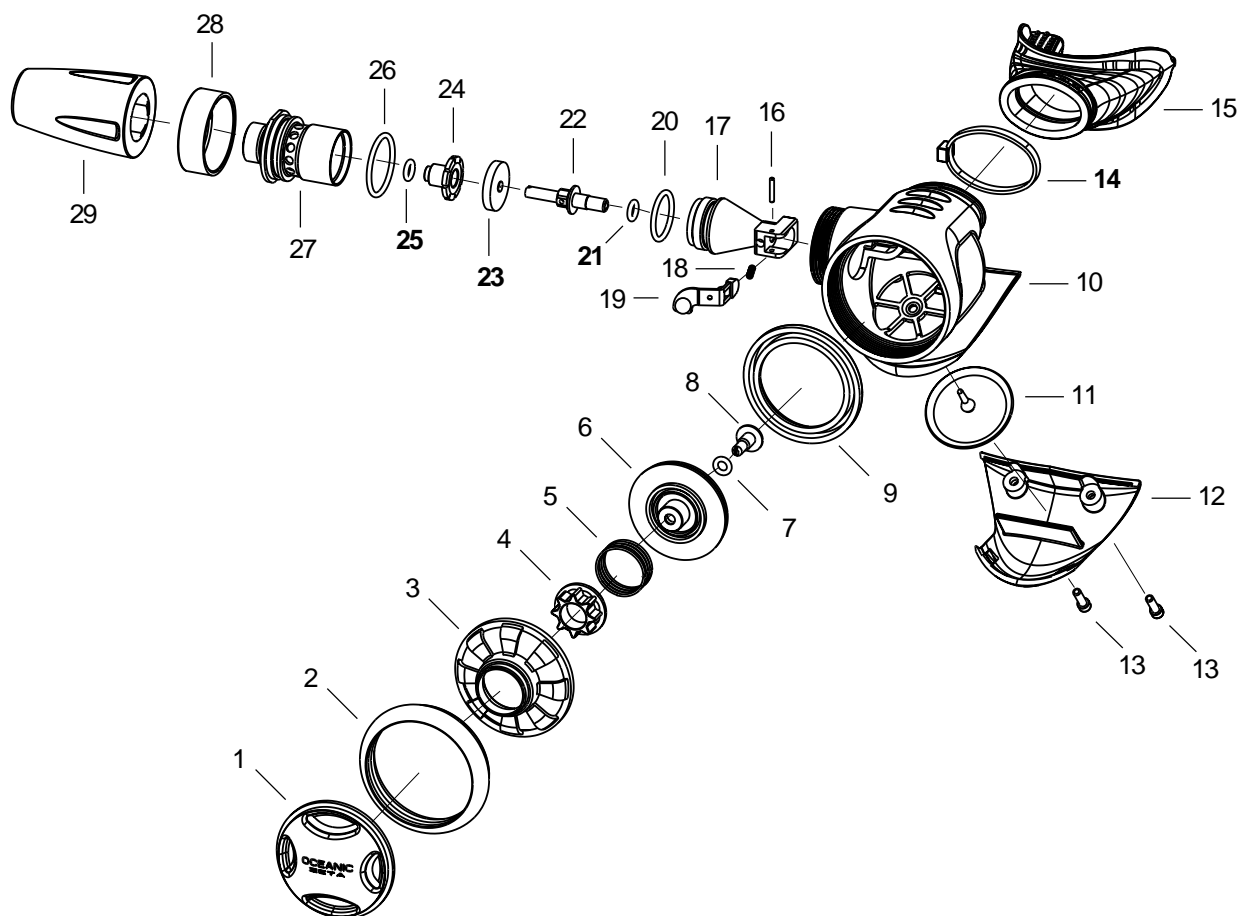


Fig. 26

## ZETA SECOND STAGE

Dia. No.	Part #	Description	Dia. No.	Part #	Description
1c	5503.07	COVER, FRONT (BK)	16b	5531	PIN
	5503.18	COVER, FRONT (NY)	17c	5509	BODY, CONTROL VALVE
2c	5519.07	RING, COVER (BK)		5509.29	BODY, CONTROL VALVE (TITANIUM)
	5519.23	RING, COVER (CL)	18b	3849	SPRING, LEVER
	5519.29	RING, COVER (TITANIUM)	19b	5532	LEVER, CONTROL VALVE
3c	5521	PLATE, SPRING		5532.29	LEVER, CONTROL VALVE (TITANIUM)
4c	5528	BUTTON, PURGE	20b	2.016	O-RING, VALVE BODY
5c	5522	SPRING, CONTROL PISTON	<b>21a</b>	<b>2.008</b>	<b>O-RING, VALVE SCREW</b>
6c	5505	PISTON, CONTROL	22c	5525	SCREW, CONTROL VALVE
7b	2.007	O-RING, ADJUSTMENT SCREW	<b>23a</b>	<b>3799</b>	<b>DIAPHRAGM, VALVE</b>
8c	5529	SCREW, ADJUSTMENT	24b	5508	SEAT, VALVE
9b	3776	DIAPHRAGM	<b>25a</b>	<b>2.008</b>	<b>O-RING, VALVE SEAT</b>
10c	5514	HOUSING	26b	2.019	O-RING, INLET CHAMBER
11b	6326	VALVE, EXHAUST	27c	5507	CHAMBER, INLET
12c	5501	COVER, EXHAUST	27c	5507.29	CHAMBER, INLET (TITANIUM)
13c	4787	SCREW, EXHAUST COVER	28c	5520.23	RETAINER, VALVE (AL)
<b>14a</b>	<b>1978.10</b>	<b>WRAP, TIE (BK)</b>		5520.07	RETAINER, VALVE (BK)
15c	07.5504	MOUTHPIECE, ZETA (long tab)	29c	5502.07	PROTECTOR, HOSE (BK)
	07.5523	MOUTHPIECE, ZETA (standard tab)		5502.18	PROTECTOR, HOSE (NY)
	07.5524	MOUTHPIECE, ZETA (small tab)	n/s	40.2100.031	HOSE, MAXFLO (31")
			n/s	40.2100.036	HOSE, MAXFLO (36")
			n/s	<b>40.6105</b>	<b>KIT, SERVICE PARTS (Includes all <b>Bold</b> items)</b> (2.011 O-RING is not used with the ZETA)



## SUPPLEMENTAL INFORMATION

Due to design enhancements that have been made since the Zeta was 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 13 can be used as a reference for older units.

### **P/N 40.9413 - ZETA BLOCK**

The Zeta Block is a custom made tool designed to hold the CONTROL VALVE BODY ASSEMBLY and prevent damage of the components during removal and installation of the INLET CHAMBER (Dia. No.27) and CONTROL VALVE SCREW (Dia. No. 22).

#### **Dia. No. 1 - FRONT COVER**

current p/n 5503

Does not have internal baffles.

Compatible with other new parts only.

older p/n - same

Replacement with the newer part is not required, but is allowed at your discretion.

Compatible with other old parts only.

#### **Dia. No. 6 - CONTROL PISTON**

current p/n 5505

Does not have a center hub step.

Compatible with other new parts only.

older p/n - same

Replacement with the newer part is not required, but is allowed at your discretion.

Compatible with other old parts only.

#### **Dia. No. 8 - ADJUSTMENT SCREW**

current p/n 5529

Compatible with other new parts only.

older p/n 3802

Replacement with the newer part is not required, but is allowed at your discretion.

Compatible with other old parts only.

#### **Dia. No. 10 - HOUSING**

current p/n 5514

Retaining ribs for the Control Valve Body (17) squared.

Compatible with other new parts only.

older p/n 5513

Replacement with the newer part is not required, but is allowed at your discretion.

Not compatible with new Control Valve Body (17). Must be replaced if the Control Valve Body is replaced.

## SUPPLEMENTAL INFORMATION (CONTINUED)

**Dia. No. 15 - MOUTHPIECE**

current p/n 07.5504

Bite tabs thinner.

Compatible with other old and new parts.

older p/n - same

Replacement with the newer part is not required, but is allowed at your discretion.

**Dia. No. 16 - PIN**

current p/n 5531

Solid, does not have a slot.

Compatible with other new parts only.

older p/n 3856

Has a slot.

Not compatible with new Control Valve Body (17) or Control Valve Lever (19).

Must be replaced if the Control Valve Body and Lever are replaced with current parts.

**Dia. No. 17 - CONTROL VALVE BODY**

current p/n 5509

Lever end squared

Not compatible with old Housing (10).

older p/n - same

Lever end rounded.

Replacement with the newer part is not required, but is allowed at your discretion.

Compatible with old Housing (10) only.

**Dia. No. 18 - LEVER SPRING**

current p/n 3849

Not compatible with old Control Valve Body (17) and Control Valve Lever (19).

older p/n 5510

Not compatible with new Control Valve Body (17) and Control Valve Lever (19).

Must be replaced if the Control Valve Body and Lever are replaced with current parts.

**Dia. No. 19 - CONTROL VALVE LEVER**

current p/n 5532

Not compatible with old Control Valve Body (17).

older p/n 5512

Not compatible with new Control Valve Body (17).

Must be replaced if the Control Valve Body is replaced with current part.

**Dia. No. 29 - HOSE PROTECTOR**

current p/n 5502

Internal hex dimension added.

Compatible with other old and new parts.

older p/n - same

Replacement with the newer part is not required, but is allowed at your discretion.