



# Service Guide for the OMS Workhorse Regulator

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# Service Guide for the OMS Workhorse Regulator

## Introduction

This manual is to be used only by technicians authorized by Ocean Management Systems (OMS LLC). It is a guide to assist in the servicing of the OMS Workhorse Regulator and should be used only after the technician has received sanctioned training on servicing this specific regulator. It is necessary for the technician to have an understanding of basic regulator principles, compressed air safety, and the proper use of the tools required. This manual is not intended to be a complete regulator repair course.

**NOTE:** Many repair parts may be similar in appearance but have different physical or chemical properties. Use only parts from OMS repair kits for OMS regulators. Substituting parts can compromise the function of OMS regulators.

## General Guidelines

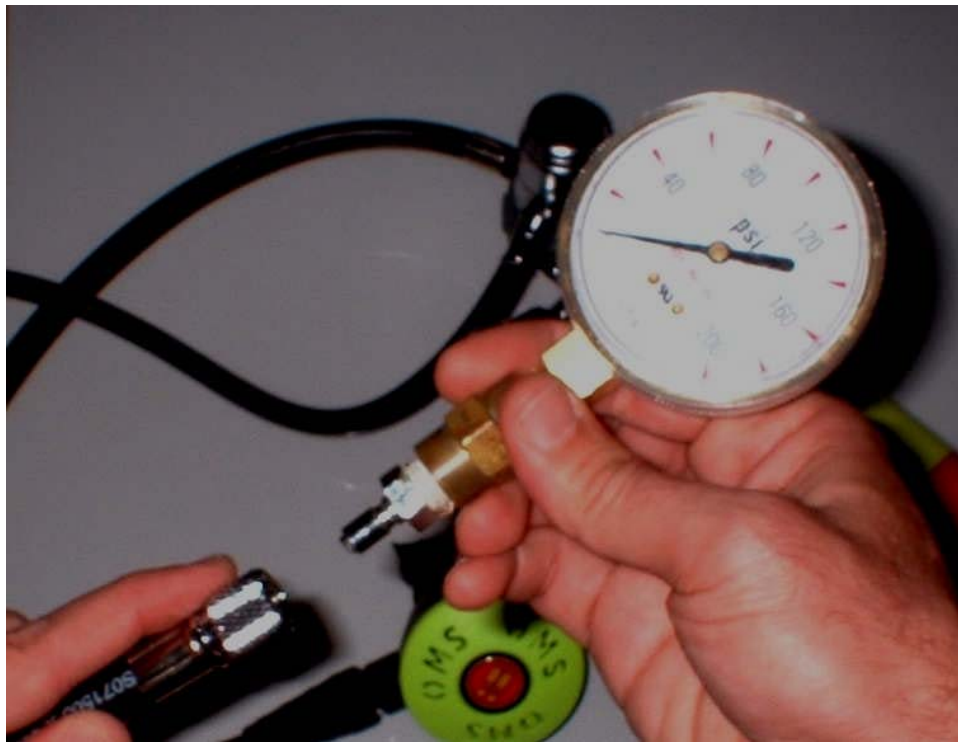
- OMS regulators should be serviced annually regardless of usage. There are seals under constant spring tension that must be replaced every year to insure peak performance. Regulators under heavy use conditions may require more frequent service.
- The customer should also understand the importance of a pre-dive inspection of external regulator parts like hoses and mouthpieces.
- The customer should be advised of the importance of post dive maintenance as outlined in the user manual.
- Moisture should never be allowed to enter the inlet of the first stage.
- Never depress the purge button of the second stage while submerged if there is no pressure from the first stage. This could allow water to enter the demand valve.
- The customer should understand that there are no 'user serviceable' parts or adjustments inside the regulator. Adjustments or repairs are to be performed only by authorized technicians.
- Never use aerosol products such as lubricants or cleansers on OMS regulators. Aerosol propellants can attack rubber and plastic parts.
- A technician encountering any unusual situations or conditions not outlined in this manual should contact OMS technical support immediately

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## Pre-service Inspection

The Workhorse Regulator from OMS consists of an unbalanced piston first stage and a downstream demand valve second stage. The first step in servicing the regulator is to assess its condition prior to servicing. Note the condition of the second stage housing, looking for any obvious cracks or other damage. Inspect the body of the first stage for corrosion or damage. Compromises in the chrome finish can allow corrosion to form causing pitting in the metal underneath. Any parts found to be worn and damaged should be replaced during the servicing. All the parts found in the service kit should be replaced annually regardless of condition.

Connect a quick disconnect BC hose to a low pressure port on the first stage then attach an intermediate pressure gauge (0-300 p.s.i.). When the regulator is pressurized to 200 bar (3000p.s.i.) the pressure at the low pressure port should read 135 p.s.i. Make a note of the intermediate pressure before servicing.



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## First Stage Disassembly

Use an open end wrench to disconnect the second stage hose from the first stage. Use an open end wrench to remove the high pressure console hose if present. Use an allen wrench to remove any remaining port plugs.



Secure the first stage (end cap up) in a padded vise being careful not to scratch or damage the chrome finish. You can also thread an expended CO2 cartridge into a low pressure port to provide a work handle.

Use a heavy strap wrench (or an appropriately sized pipe spanner) to remove the first stage end cap. There is spring tension under the cap so be careful as the end cap unthreads. Remove the end cap and grasp the exposed stem of the piston exposed inside.



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Remove the main spring, piston, and shims from the endcap. Inspect the first stage body, spring, and piston for cracks, corrosion or other damage. Replace if needed. Pay particular attention to threaded areas.



Use an allen wrench to remove the filter retainer from the DIN connector assembly.



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Once the filter retainer has been removed from the tip of the DIN connector assembly, the DIN handwheel should slide off the DIN connector body.



With the filter retainer removed, the conical filter should drop out of the DIN connector.

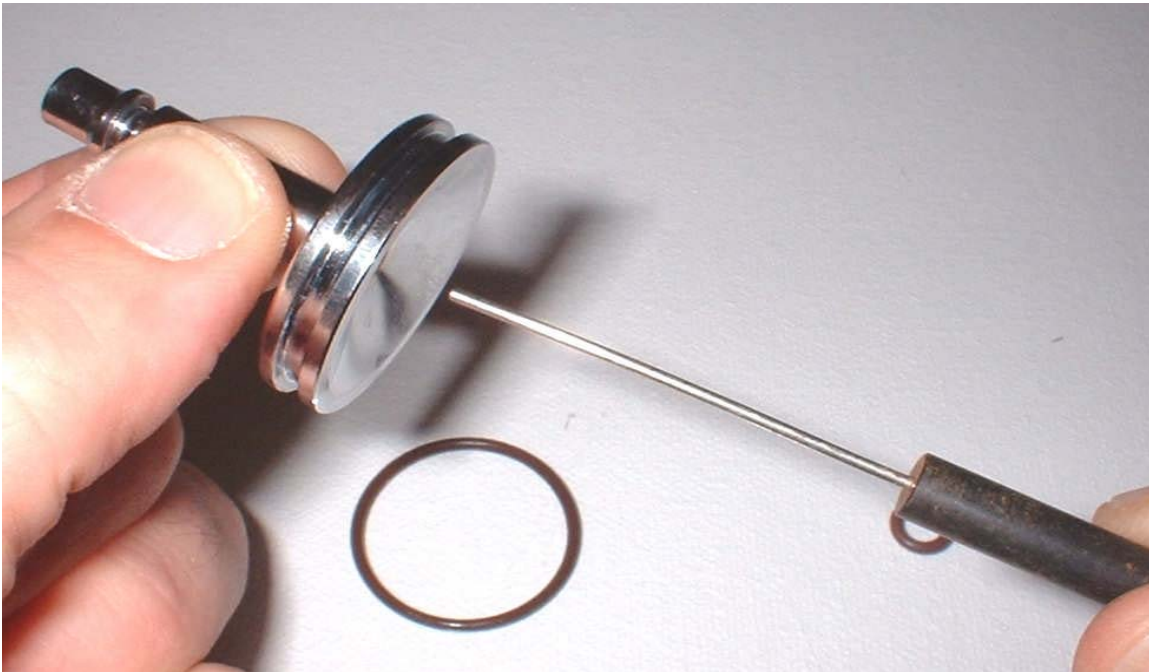


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Remove the body of the DIN connector assembly using an open end wrench.



Remove O-rings from piston head and piston stem. Be careful not to scratch metal surfaces. Use a narrow metal probe to push up through the piston head and dislodge the high pressure seat at the end.



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The high pressure seat should come out of the piston by gently pushing on the probe. If the seat does not move make sure the diameter of the probe is smaller than the passage through the shaft of the piston.



## Cleaning and Lubrication

Clean parts in CORROSTOP cleaning solution or ultrasonic cleaner. Do not expose parts to ultrasonic agitation for more than five minutes otherwise chrome plated surfaces could be damaged. A soft nylon brush can be used to loosen deposits. Thoroughly rinse all parts in clean fresh water then use clean dry compressed air to gently blow parts dry. Examine all metal surfaces for corrosion, cracking or scratches paying particular attention to threaded areas and the internal orifice that contacts the high pressure seat.

OMS ® Oxygen Compatible Grease is the recommended lubricant for OMS regulators. Use minimal amounts of lubricant where called for. Excess lubricant can trap particulates and act as a contaminant.

If the regulator is to be used for oxygen service, clean all parts using the appropriate O2 cleaning procedures.

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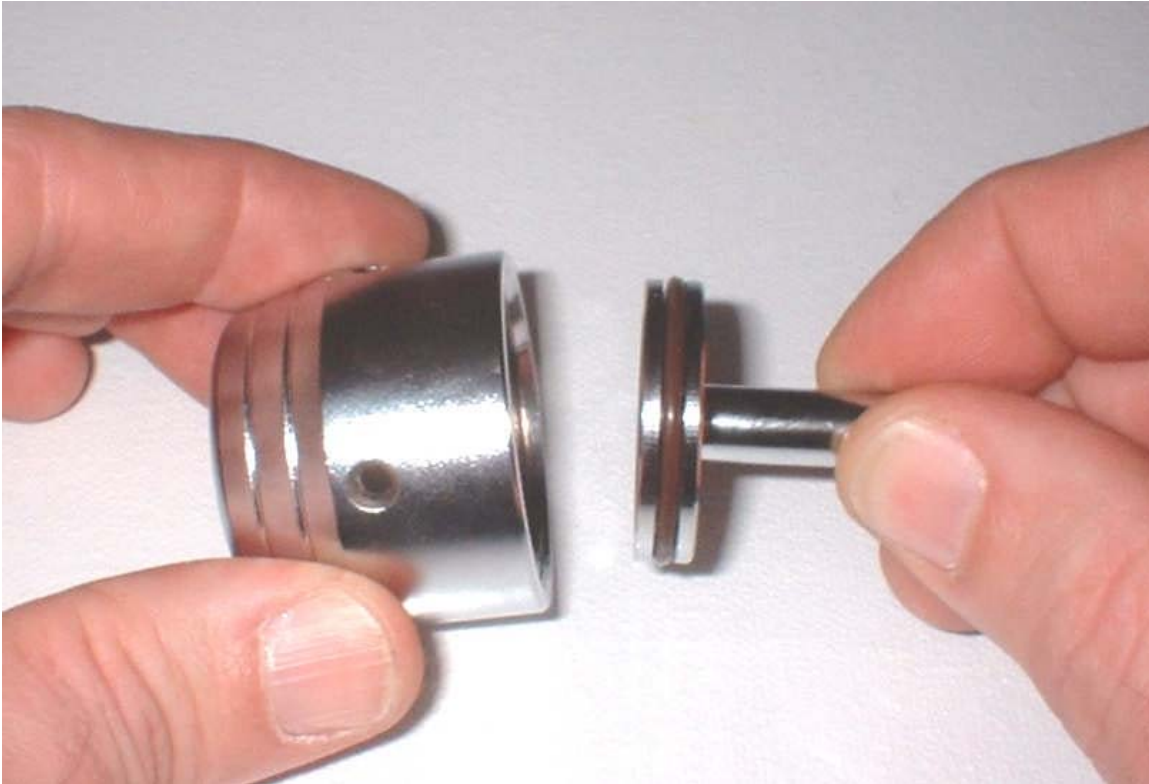
## First Stage Reassembly

Install new O-ring on piston head. Place new high pressure seat on a clean flat surface. Push the piston stem straight down on the new seat and press into place.



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Lightly lubricate the piston head O-ring with a very small amount of oxygen compatible grease. The O-ring should look shiny but no lubricate should be seen. If you can see lubricant, it's too much. Re-install piston (head first) into end cap being careful not to dislodge the O-ring from its groove.



Replace plastic shim onto piston stem followed by the main spring. Place the next plastic shim on the exposed end of the main spring.



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Mate the first stage body with the threads of the end cap. It will be necessary to apply downward pressure while rotating the body before the threads will engage. Maintain the alignment of the main spring and shim while rotating the body.



Tighten the endcap until it's secure against the first stage body. Torque to 12 ft/lbs.



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Replace O-ring on the DIN connector body. Apply a small drop of mild threadlocker solution to the internal threads of the first stage body then mate the body of the DIN connector with the first stage body.



Install O-ring on the new conical filter and insert conical filter (narrow end first) into DIN connector body.



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Slide DIN handwheel onto DIN connector body oriented with the handwheel against the 1<sup>st</sup> stage body. Replace the O-rings on the filter retainer then thread filter retainer into DIN connector body.



Use an allen wrench to tighten the filter retainer to the DIN connector body.



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## First Stage Testing

- I. Connect a tested second stage or an over-pressure relief valve to one of the low pressure ports of the first stage prior to testing. This will allow excess air pressure to vent in the event of a problem with the first stage.
- II. Connect an intermediate pressure gauge (0-300 PSI) to one of the first stage low pressure ports and plug the rest of the ports.
- III. Slowly turn on the air to the first stage. If the reading on the intermediate gauge starts to rise above 150 PSI turn off the air immediately.
- IV. The pressure should rise to 135 PSI (+/- 9 PSI) and remain steady. This is the 'lock up' pressure.
- V. Once the intermediate pressure has stabilized check the first stage for air leaks. Pay particular attention to the ambient openings on the first stage body.
- VI. Purge the second stage and watch the reading on the intermediate pressure gauge. When purging the second stage, the pressure shouldn't drop by more 15 PSI. When the purge button is released and the air flow stops the intermediate pressure gauge should return precisely to the original lock up pressure.
- VII. Cycle the regulator by pressing the purge button several times. The intermediate pressure gauge needle should respond mechanically and precisely returning to its lock up pressure each time without any rise or drop.

## Basic First Stage Troubleshooting

Symptom	Possible Causes	Correction
Intermediate pressure above 145 PSI	High pressure air seeping past seat and orifice	Check condition of high pressure seat and replace if needed. Check orifice for corrosion or flaws and replace first stage body if needed.
	Increased spring tension from main spring	Check shims under main spring, remove one shim if needed. Check for deposits or corrosion under piston head. Re-clean piston.
Intermediate pressure below 125 PSI	Low inlet pressure	Be sure regulator is connected to 3000 PSI air source.
	Decreased spring tension from main spring	Add one extra shim under spring. Replace spring if needed.
Buzzing or honking upon inhalation	Air flow causing harmonic vibration of internal components	Check piston for excess lubricant. Reverse main spring or replace spring if problem persists.

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