

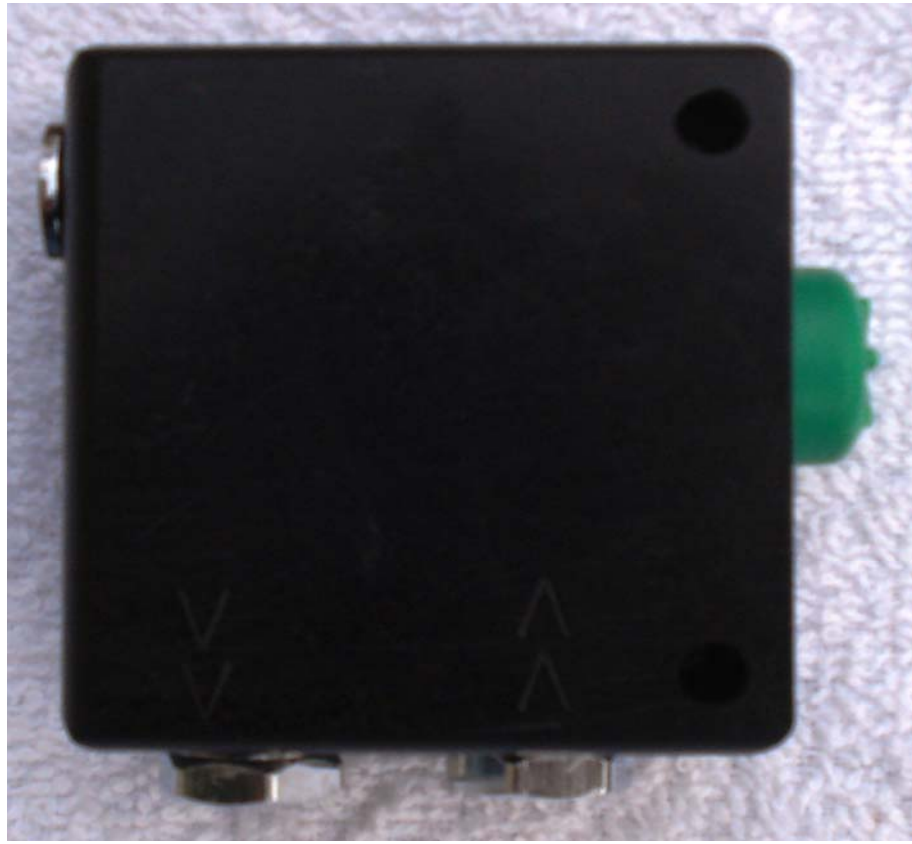
8/16/09

BY-

CJ



OV1



WARNING: USE OF THIS DEVICE ON LIFE SUPPORT EQUIPMENT IS EXTREMELY DANGEROUS.

Please read the entire manual prior to assembling components. **IF you're using this device on life support equipment then your life may depend on you reading it.** Following the recommendations in this manual will help the operator use all features correctly, help prevent failures, and increase the life of components.

Additional help can be found at www.gorilladiving.com website.

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INTRODUCTION:

The OV1 (Orifice Valve) was developed as a constant low flow oxygen supply valve with manual addition included. The OV1 has one inlet and one outlet port. We are sure you will be pleased with its performance, reliability, and ease of use.

Because this valve can be used or configured in several different ways, this manual is only a guide and is not instruction on proper diving methods or training. This manual does not cover diving physics and rebreather training needed for operating the OV1 on life support equipment. IF the OV1 will be used on life support equipment, knowledge of CCR principles, unit to be used on, dive physics, and YOUR BRAIN are required for safe usage.

There is important information throughout the manual that is critical to using and maintaining the OV1 properly, and safely. Each OV1 has been pressure and flow tested prior to shipment.

READ THE ENTIRE MANUAL BEFORE USING THE OV1! YOUR LIFE MAY DEPEND ON IT!

IF the operator plans to use this device on life support equipment, remember, this device does not control PPO2 levels or replace the operator's brain. IMPROPER USE CAN INJURE OR KILL YOU WITHOUT WARNING! WATCH YOUR PPO2!!

If any questions arise while working with this manual, STOP and contact Gorilla Diving Products Inc. technical support via email (charles@gorilladiving.com) or 704-609-8270.

Diving is a dangerous activity. Technical rebreather diving is extremely dangerous. All equipment can fail. Use of this valve on any life support equipment is no different. **THIS DEVICE CAN FAIL WITHOUT WARNING.**

This manual is to be used only by the purchaser of the OV1 who has agreed to the waiver requirements prior to purchase. The operator must understand the dangers and responsibilities of using this valve.

Use of this valve may void OEM warranties.

1 OV1 FEATURES

- 1.1. Built in 10 micron filter screen at the inlet port. The orifice also has a filter installed.
- 1.2. Standard BC inflator valve for manual injection that has been made oxygen compatible. The inflator button is colored green to signify oxygen use.
- 1.3. Quick change out orifice for easy servicing.
- 1.4. Two 13/64(.203) inch diameter holes through the body for easy mounting.
- 1.5. The OV1 is machined from solid plastic and not mold injected. This makes the valve dependable, durable, and still light weight.

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2. REQUIREMENTS

- 2.1. **The OV1 must be used with a constant inlet pressure.** Set your NON-depth compensating 1st stage pressure to 160 psig. DO NOT use a depth-compensating 1st stage. Using a depth-compensating 1st stage IS EXTREMELY DANGEROUS and will cause runaway oxygen levels in the breathing loop.
- 2.2. Be sure to use only O2 compatible hoses and fittings.
- 2.3. An over pressure valve should be installed at the supply gas valve (1st stage) to help prevent excessive inlet pressure at the OV1.
- 2.4. There must be a way to shut off the supply gas to the OV1 valve. Depending on the application, this can be done in several ways. In-line shut-offs and/or QDC fittings are often used.
- 2.5. We recommend hard plumbing this valve and using an in-line shut off valve on the inlet side.

3 ASSEMBLY and MOUNTING INSTRUCTIONS

ATTN: BE SURE TO MOUNT THE OV1 IN AN AREA WHERE ACCIDENTAL CONTACT WITH OTHER EQUIPMENT OR OBSTRUCTIONS WILL NOT CONTACT THE MANUAL ADDITION BUTTON.

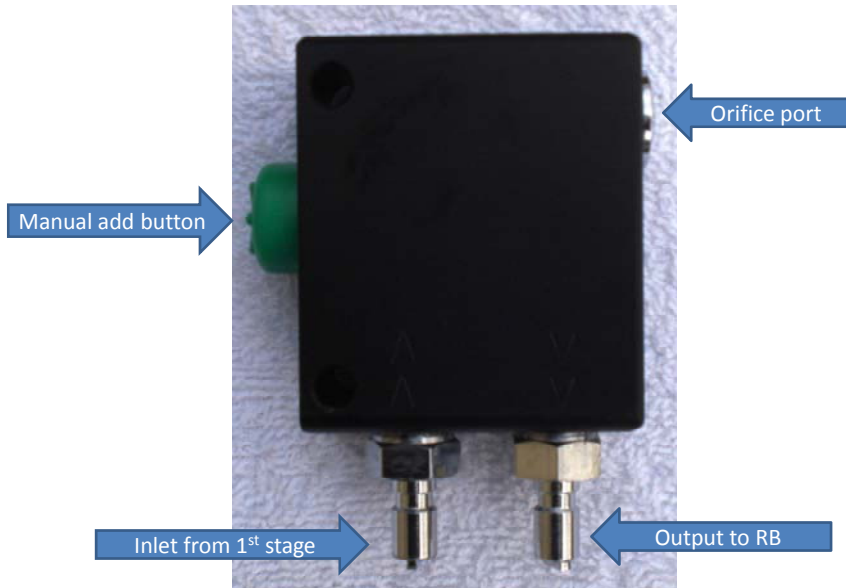
- 3.1. The OV1 is offered with several different fittings and adapters. Therefore, the following steps are only a general guide. The purchaser is fully responsible for determining correct mounting.
- 3.2. **NEVER loosen or tighten any adapters or hoses to the valve fittings without holding the stationary fitting with a wrench! Two wrenches must always be used to prevent loosening fittings or possible stripping of threads in valve body!**
- 3.3. **NEVER INSTALL THIS VALVE INTO AN OPEN CURCUIT SYSTEM!** This valve has insufficient gas flow for open circuit system requirements.
- 3.4. We recommend to hard plumb all connections and use a shut-off valve on the inlet port. This method reduces possible leaks and contaminants from entering the valve. All quick disconnects should be used for emergencies ONLY! Using QDCs can allow water infiltration and cause possible orifice clogging.
- 3.5. **WARNING: IF the OV1 will be used with QDC type adapters, the valve must be pressurized anytime it is submerged in water. Failure to do so will cause water infiltration into the valve. Water infiltration can cause orifice clogging and corrosion issues inside the valve.**
- 3.6. The following pictures are of a OV1-4 which comes with QDC-BC male fittings. These pictures are for identifying valve features only. Depending on the valve purchased, the fittings will be different.



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- 3.7. Prior to mounting the OV1, first verify the supply gas equipment meets required perimeters for correct OV1 operation. See following steps.
- 3.8. Verify main supply tank pressure is a minimum of 1000 psig.
- 3.9. Verify 1st stage is oxygen clean and plugged for constant pressure use.
- 3.10. Verify there is a 300 psig rated over pressure valve installed in 1st stage.
- 3.11. Verify 1st stage intermediate pressure (IP) is set no higher than 160 psig.
- 3.12. **CAUTION: Maximum allowable inlet pressure for the OV1 is 175 psig. Exceeding this pressure can cause valve failure and fluctuating inlet pressure from the 1st stage. Using the OV1 above 160 psig will cause shorter valve life.**

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- 3.13. Hookup the OV1 valve to the supply valve (1st stage) and a flow meter designed for oxygen use. Check the output flow of the valve to determine if it meets your flow requirement. Flow output should not exceed 1.0 liter per minute (LPM) regardless of application. If flow meets your requirements then proceed to step 3.15. **IF** the flow is too high, then follow Section 3.14 instructions. **IF** flow is too low, then change orifice to next higher diameter, reduce inlet pressure at 1st stage, and follow Section 3.14 instructions.
- With the IP at 160 psig, an OV1 valve with a .0025 orifice should have a flow of approximately .019 CFM or .53 LPM.
 - With the IP at 160 psig, an OV1 valve with a .003 orifice should have a flow of approximately .024 CFM or .67 LPM
 - With the IP at 160 psig, an OV1 valve with a .0035 orifice should have a flow of approximately .030 CFM or .85 LPM
- 3.14. Remove blocking plug from 1st stage. Adjust supply pressure down in 5 psig increments until the desired flow is met. Change blocking plug o-ring, clean, and lubricate. Re-install blocking plug and cover on 1st stage and verify flow has not changed. Check for any leaks.
- 3.15. Use of any QDC type fitting is not recommended, but many operators require it. If the operator requires in-water disconnection and reconnection of other gas supplies, it is highly recommended to install a wet connect type of fitting to reduce the amount of water infiltration. We recommend Swagelok QC4 and QC6 type for our valves. Use of any QDC will cause some infiltration if used submerged in water, thus contaminating the valve. Water infiltration can cause orifice clogging and corrosion.
- 3.16. ATTENTION: All QCD fittings will allow water infiltration if not pressurized while submerged in water. Valve must be pressurized if submerged in water.
- 3.17. If you decided to receive the OV1 without connectors, both ports are ¼-18 NPT threads. BE SURE you are using the correct male thread connectors. NEVER USE TEFLON TAPE ON THE PORT THREADS IN BODY OR OVER TIGHTEN THE CONNECTORS. Connectors should be tightened to 30 lb.-in. force. The body material is self-sealing with normal tightening. The plastic body does not require thread sealer, but can be sealed for extra protection against leaks. If a sealant is wanted on threads, use marine grade GOOP or 100% silicon adhesive. **Wait a minimum of 48 hours** to allow sealants to dry before using. Both of these are available at most home improvement stores.
- 3.18. Identify the inlet port. The inlet port is identified with arrows pointing towards the center of the valve (<<). Connect the OV1 to the constant 160 psig supply source. **WARNING: NEVER tighten or loosen any adapters or hoses to the valve fittings without holding the fitting still with a wrench! Two wrenches must always be used!**
- 3.19. Identify the outlet port. The outlet port is identified with arrows pointing away from the valve (>>). The outlet port must be plumbed into the exhale side of the breathing loop. **NEVER INJECT OXYGEN INTO THE INHALE SIDE OF A BREATHING LOOP!**
- 3.20. Connect the OV1 to the parent equipment. **WARNING: NEVER tighten or loosen any adapters or hoses to the valve fittings without holding the fitting still with a wrench! Two wrenches must always be used!** Connectors in the body should be tightened to 30 lb.-in. force.
- 3.21. Use the ¼ inch diameter holes to mount as needed.

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3.22. Turn on the gas supply from the supply tank. The OV1 is now energized.

3.23. Check connections for leaks.

3.24. Never use the OV1 with leaking connections.

3.25. ALWAYS TURN OFF THE SUPPLY TANK WHEN NOT USING THE OV1.

4 START UP INSTRUCTIONS

4.1. Turn on the preliminary gas supply from the supply tank. The OV1 is now energized.

4.2. Push the manual add button to ensure it is working properly.

4.3. Test the OV1 in a controlled environment until you are sure the flow meets your requirements.

4.4. REMEMBER, THE OV1 DOES NOT COMPENSATE FOR CHANGES IN DEPTH OR CHANGES IN YOUR BREATHING RATE!

4.5. NEVER! NEVER! NEVER! DIVE THE OV1 WITHOUT CORRECTLY ADJUSTED PPO2 METERS!

4.6. Always turn off the supply tank when not using the OV1.

5 EMERGENCY PROCEDURES

5.1. Although the OV1 is built rugged, problems can occur for many reasons. We recommend to hard plumb all connections and use shut off valves. This reduces possible leaks and contaminants from entering the valve.

5.2. If you are using the OV1 with any type of QDC connectors, and for some reason during in water use, the OV1 should have a total failure (heavy leaking of gas), disconnect both the inlet and outlet hose to the OV1. Use your manual diluent valve and your backup systems as needed. IF the valve was leaking, the valve must be serviced. NEVER USE A LEAKING VALVE. Contact Gorilla Diving Products Inc. for repair options.

5.3. If the OV1 is flooded in fresh water, disconnect the outlet connector. Press the manual button to blow out any trash or water. If the valve was only flooded with clean fresh water, this should be sufficient cleaning. Hook up a flow meter to the output port to verify flow is correct. See Section 3.13 for procedure. IF flow is below normal, then the filters and/or orifice is clogged. See Section 6 for servicing information.

5.4. If the valve is flooded with salt water, follow the same process (5.3), but afterwards disconnect the valve and place in fresh water with about 20% white vinegar for 30 minutes. Then transfer valve to fresh water to soak for 10 more minutes. Re-attach the inlet hose and follow the previous procedure (5.3) to remove any water and test output flow. IF valve flow is below your normal set flow rate, then the orifice will require removal and cleaning. See Section 6 for servicing information.

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6 MAINTENANCE and SERVICING of OV1

- 6.1. The OV1 is designed to be rugged, dependable, simple to operate, and require minimum maintenance. The best way to ensure the OV1 will work properly is to dive it frequently. Follow the instructions in this manual, and be sure to have it serviced annually or every 100 hours of use.
- 6.2. Using QDC type fittings may require the OV1 to be serviced more frequent due to small amounts of water infiltration. The OV1 is to be cleaned just like other scuba gear. IF you are using the standard QDC - BC connectors, always leave the OV1 connected if you are soaking the parent equipment. Soak in fresh water and dry.
- 6.3. The flow output of the valve should be checked frequently to ensure no leaks have developed or the orifice is clogging.
- 6.4. We highly recommend carrying a spare orifice for field emergencies.
- 6.5. IF the orifice is clogged, removal is required. See following picture of a OV1 with 1/2 port plug and orifice removed.
- 6.6. To remove the orifice, use a 3/16 Allen wrench to remove the 1/2 port plug.
- 6.7. Using a 1/4 nut driver, remove the orifice by turning the driver counter clockwise. Only two fingers on nut driver should be enough force to remove the orifice. See the following picture of an OV1 with the port plug and orifice removed.



- 6.8. Verify there are no contaminants in the valve and especially the insert face that the orifice sits on. **USE CAUTION NOT TO SCRATCH THE INSERT SEATING FACE.**
- 6.9. Once the orifice is removed, the valve can be washed in fresh water and then blown out to dry if needed. Hook up the supply gas (160 psig) to the inlet port and energize the manual addition button a few times, then allow flow through the orifice insert only for a few more seconds. Once valve is dry, turn off supply gas.

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- 6.10. ATTN: NEVER REUSE AN ORIFICE GASKET! Always use a new gasket when installing an orifice. Replacement gaskets and orifices are available on the website.
- 6.11. Install a replace orifice (with new gasket) and tighten to 8 lbs.-in. of force. ATTN: NEVER REUSE A GASKET! Always use a new gasket when installing an orifice. Replacement gaskets and orifices are available on the website. CAUTION: Light force is needed to seal the orifice. No more than two fingers are needed on the ¼ nut driver to tighten orifice.
- 6.12. Remove the old o-ring from the ½ port plug and clean. Replace o-ring on plug and lubricate with O2 compatible grease. Visually inspect o-ring seat in valve body for damage or contaminants. IF seat area is damaged, DO NOT USE VALVE and contact Gorilla Diving Products Inc. IF seat area is acceptable, install ½ port plug. DO NOT OVER TIGHTEN PLUG. No more than 12 lbs.-in. force is needed to seat the o-ring.
- 6.13. Test orifice flow with a flow meter. See Section 3.12 for procedure. IF flow is not correct use Section 3.12 to evaluate. WARNING: IF flow is much higher than original orifice and orifice is the same size, orifice gasket may be leaking. DO NOT USE VALVE and contact Gorilla Diving Products Inc.
- 6.14. If flow is correct and valve has no leak at port plug, follow all of Section 4.
- 6.15. Clogged orifices can be cleaned and reused if not damaged. Clogged orifices should be cleaned in an ultrasonic cleaner. If no ultrasonic cleaner is available, try soaking the orifice in distilled water and 20% white vinegar for 30 minutes. Then soak the orifice in distilled water for 10 minutes. Using clean scuba quality air (no shop compressors), lightly blow some air through the orifice outlet side. The inlet side is the end with the hex.

7 CONTACT INFORMATION

- 7.1. Please contact GORILLA DIVING PRODUCTS INC. for servicing, technical support, or questions. We take pride in our customer service. www.gorilladiving.com or 803-831-9020.
- 7.2. Remember, your valve is guaranteed for 1 year to be free of any manufacturing defects.
- 7.3. Last but not least, we really want your feedback on our products. Please take a few moments to contact us via email with issues, comments, or suggestions.

WATCH YOUR PPO2s!!

Thank you,
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