



G2 PPO2 MONITOR KIT



Assembled Left Side G2 PPO2 Monitor shown with optional HUD

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.

TABLE OF CONTENTS

Introduction pg. 3

Features pg. 3-4

Requirements pg. 4

Components pg. 5-7

Assembly pg. 8-12

Board Operations pg. 13-21

Maintenance and Servicing pg. 21-22

Trouble Shooting..... pg. 23

References..... pg. 23

Contact Information..... pg. 23

1. INTRODUCTION

This manual is a general guide for the assembly, disassembly, and servicing of components that make up a device for monitoring the partial pressure of oxygen in a gas mixture. This manual is ONLY A GUIDE and in no way should be used to understand proper PPO2 monitoring on any type of life support equipment.

WARNINGS:

- **Use of this monitor on any type of life support equipment can cause serious injury or death without warning!**
- **THIS DEVICE IS FOR OXYGEN MONITORING ONLY!** This device is sold as a kit ONLY and requires assembly of components.
- You are responsible for the proper assembly, adjustment, operation, and maintenance of the device. This is a device with mechanical and electrical components. Like all devices, parts can and will fail. Following correct assembly, calibration, function setting requirements, and servicing will help prevent failures.
- **Improper assembly, use, or maintenance will cause this unit to fail without warning.**

2. FEATURES OF DISPLAY ASSEMBLY

- 2.1 Many programmable functions.
- 2.2 PPO2 monitor uses a standard 9 volt alkaline battery.
- 2.3 One button control for all monitor settings and operations.
- 2.4 Easy sensor calibration.
- 2.5 One to three sensors capability.

- 2.6 Operator adjustable low and high PPO2 warning lights.
- 2.7 Optional externally mounted HUD.
- 2.8 Low battery warning light.
- 2.9 Backlighting.
- 2.10 Clear housing for easy leak detection.
- 2.11 External magnetic switching means no extra leak points.
- 2.12 Screw down wiring terminal requires no soldering and allows for quick board change.
- 2.13 Quick change out capability of battery.
- 2.14 Double o-ring sealed.
- 2.15 Right side and left side models available.

3. REQUIREMENTS

- 3.1 This manual must be read for correct usage of monitor features. Reading and following recommendations will reduce errors during operation, assembly, disassembly, and servicing of the unit.
- 3.2 The minimum operational requirements of this device is a 9 volt alkaline battery, sensor wiring/cable (1 ATM housing) or sensor wiring & conduit (ambient pressure housing) , housing adapter for cable or conduit, and at least one 10mv (+/- 3 mv) output oxygen sensor.
- 3.3 A small jeweler's slot screw driver is needed to tighten wires at the screw terminals.
- 3.4 Building this kit requires some mechanical aptitude and a basic understanding of gas laws.
- 3.5 Failure to assemble, disassemble, or service the components per requirements will lead to incorrect readings or failure.

Rev. 1 1-09

Rev. 2 5-10

Rev. 3 2-11

4. COMPONENTS

4.1. Outer Housing

- a. The outer housing is designed to be used as an ambient pressure housing.
- b. The outer housing can be used as an one atmosphere housing. Maximum allowable pressure on the outer housing is 175 psig (400 fsw).
- c. The housing has a ¼ diameter hole through the bottom for attaching a cord or clip device.
- d. See Figure 1 for outer housing.

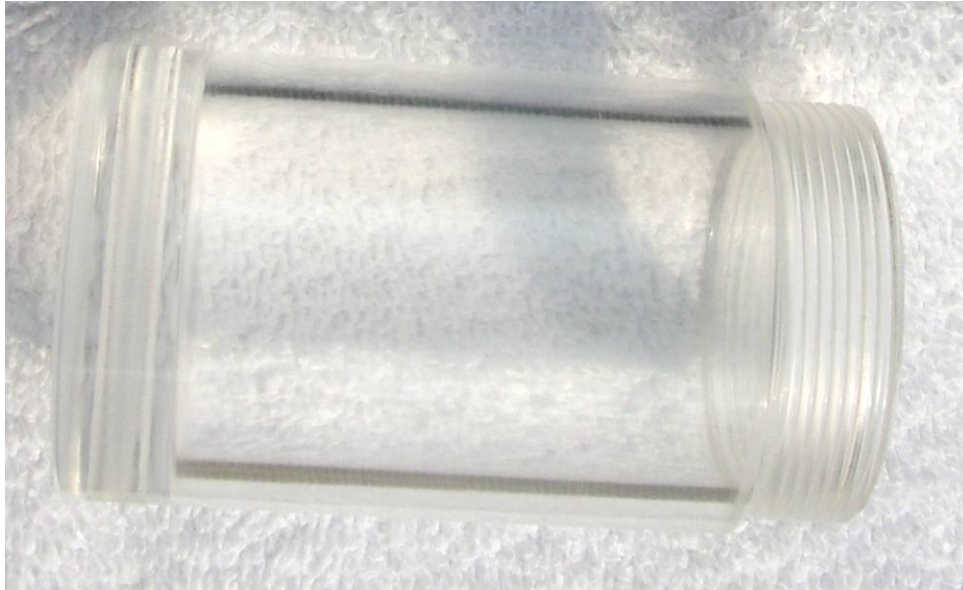


Figure 1

4.2. Internal Holder Assembly

- a. The internal holder is designed to secure the electronic board, battery, O-rings, housing cable/conduit adapter, and sensor/HUD wiring.
- b. The electronic board is held in place on the internal holder with one screw.
- c. The holder uses two V-126 o-rings to ensure proper sealing with the housing.
- d. The holder also houses the control button screw and magnet assembly.
- e. The internal holder is always shipped with the board, battery clip, and control button installed as seen in Figure 2.
- f. Figure 2 shows a right side (RS) internal housing as shipped.



Figure 2

4.3. Board

- a. This board utilizes surface mount components, is microcontroller based, and offers users flexibility not previously seen in inexpensive PPO2 monitoring systems.
- b. All user functions are accessible through the push of one button.
- c. This one button allows users to turn the system on or off, operate the backlight, calibrate the sensors, and program user definable setup options.
- d. The board allows users to select the display of one, two, or three sensors on a single Digital Panel Meter (DPM).
- e. Board is powered by a standard 9 volt alkaline battery.
- f. Board is coated with a water barrier to help prevent corrosion if subjected to moisture.
- g. Board uses screw terminals for all interfaces with wiring and power supply. No soldering required.
- h. Board has programmable high and low warning lights with direct hook up for an optional externally mounted Heads Up Display (H.U.D.).
- i. Board is mounted to the internal housing prior to shipping.
- j. NEVER connect battery or sensors prior to connecting wires to board terminals.

4.4. Retaining Cap

- a. The retaining cap is required to insure the internal board stays sealed in the outer housing. Cap and Outer Housing design allows for quick access to internal components.
- b. The retaining cap is shipped mated to the outer housing.
- c. See Figure 3 for a picture of the retaining cap.



Figure 3

4.5. Control Button

- a. The control button is used to work all functions on the board.
- b. The control button is shown in Figure 4 removed from the internal housing.
- c. The control button is threaded so the operator can turn the button counter clockwise to lock into the off position. This prevents accidental power up of the board when not in use. Button should be turned an extra 4 turns after power turns off.
- d. Turning the button clockwise will free the button so the board powers up.
- e. Caution should be used during operations not to accidentally turn the control button, as this can cause the board to power down.
- f. See section 6 (Board Operations) for activating all board functions with the control button.
- g. See section 7 (Maintenance and Servicing) for servicing of control button and magnet.



Figure 4

5. ASSEMBLE COMPONENTS

5.1. See Index for parts list.

5.2. Remove all parts from shipping container. Figure 5 shows the minimum components that would be shipped. Shown left to right: Outer Housing, Internal Housing Assembly, Retaining Cap, and two O-rings. Optional components NOT shown are sensor wiring, wiring conduit/cable, housing cable/conduit adapter, and HUD.



Figure 5

5.3. Visually inspect all components for any shipping damage.

5.4. DO NOT ASSEMBLE ANY DAMAGED COMPONENTS.

5.5. Notify Gorilla Diving Products Inc. if any components are damaged.

5.6. The monitor is shipped pre-assembled except for o-rings and battery. This is done to protect the electronic board during shipping.

5.7. O-Rings are shipped inside the housing, in the battery compartment.

5.8. Unscrew the retainer cap from outer housing and remove the internal holder and o-rings.

5.9. The board is secured to the internal holder with one 2-56 screw. Removal of the board from the internal housing is **not** required to install wiring to the screw terminals.

5.10. The monitor can be shipped with or without the HUD or housing cable/conduit adapter installed. This is determined by the customer. The housing comes with either a ¼-18 NPT or ¼-18 NPS thread. IF your monitor already has the adapter installed, then skip instruction 5.11 and 5.12.

5.11. We **DO NOT** recommend buying the PPO2 monitor without a housing cable/conduit adapter already installed. If you ordered the monitor without an adapter, now is the time to install your adapter. Use caution when installing the adapter not to damage the board or internal housing. The internal housing has two small flats that can be used to hold the internal housing while installing the adapter. We recommend that adapters only be installed by qualified technicians.

5.12. ATTN: NEVER USE TEFLON TAPE ON ANY FITTING BEING INSTALLED INTO THE INTERNAL HOUSING! See section 5.12.1 when installing a ¼ NPT adapter. Use section 5.12.2 when installing a ¼ NPS adapter.

5.12.1. IF installing a NPT fitting, then a sealant should be used. Use a flexible sealant that can seal metal to plastic. We recommend using GOOP adhesive. This adhesive can be purchased at most home improvement stores. Apply a thin layer of adhesive to the adapter threads and install. The sealant is just added as extra insurance against a leak. **DO NOT OVER TIGHTEN THE ADAPTER INTO THE INTERNAL HOUSING!**

5.12.2. IF installing a straight ¼ pipe thread adapter, then the internal housing has been machined for the o-ring required. **DO NOT OVER TIGHTEN THE ADAPTER INTO THE INTERNAL HOUSING!** Sealant is not required with an o-ring seal.

- **Allow sealant a minimum of 48 hours to cure before using.**
- **CAUTION: Never loosen or tighten any fitting in plastic components without holding the mating fitting with a wrench! Failure to do so will cause a leak or stripping of threads in the plastic component!**

5.13. We recommend using a standard low pressure (LP) second stage regulator hose as the wire conduit to the device where the sensors are located. This allows for easy and quick changing of the wiring harness. Also, since it's an LP second stage hose the fitting at the display housing rotates so you can position it for easy viewing. The following steps describe the installation of sensor wiring using a standard LP regulator hose.

5.14. Attach the LP hose to the housing conduit adapter.

5.15. Install the retainer cap over the LP hose.

- 5.16. Attach the LP hose to the device being monitored.
- 5.17. Route the sensor wires from the device being monitored to the housing through the LP hose.
- 5.18. ATTN: NEVER INSTALL THE BATTERY OR SENSORS TO WIRING HARNESS BEFORE INSTALLING WIRES TO BOARD SCREW TERMINALS.
- 5.19. There are two holes located in the board for running wiring to the terminal screws. Each terminal is labeled for the required wire. Run your wires from under the board and thru the top to the appropriate terminal. Figure 6 shows board with all wiring installed in screw terminals.
- 5.20. See Section 6 (Board Operations) for details on wiring terminal locations.



Figure 6

- 5.21. Trim back the insulation approximately 3/16 inch on each sensor wire. Insert each sensor wire into the appropriate terminal hole and lightly tighten with a small jewelers slot screwdriver. DO NOT over tighten the screws.
- 5.22. Figure 7 shows a RS internal housing assembly completed with optional HUD wires connected.
- **CAUTION: Never loosen or tighten any fitting in plastic components without holding the mating fitting with a wrench! Failure to do so will cause a leak or stripping of threads in the plastic component!**

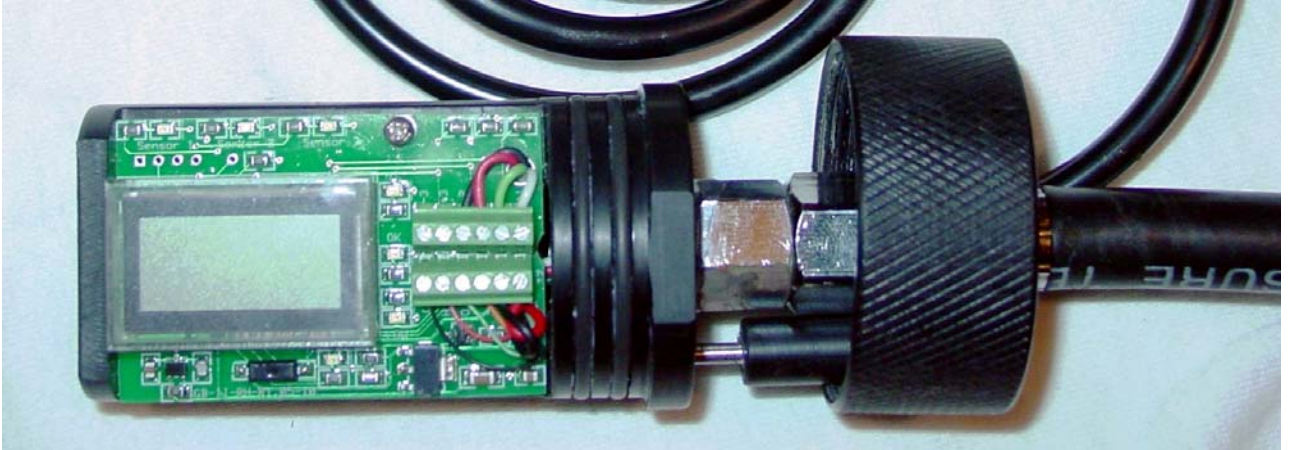


Figure 7

- 5.23. Attach sensors to the wiring connectors.
- 5.24. Install 9V battery as shown in Figure 8.



Figure 8

- 5.25. Verify that no wires will be pinched when installing internal housing assembly into outer housing.
- 5.26. Lightly lubricate the two O-rings with O2 compatible grease and install O-rings into the grooves in the internal housing.
- 5.27. Lubricate external surface of o-rings and mating bore at lip of outer housing using O2 compatible grease.
- 5.28. Install internal housing into outer housing.
- 5.29. Mate retainer cap onto outer housing.

5.30. Figure 9 shows a LS PPO2 monitor fully assembled and at initial power up. Battery voltage is shown as well as all LEDs lit.

