

## DISCOVERY REBREATHER FAQ GUIDE.



This FAQ guide contains helpful information on how to resolve some of the more common situations that you might run in to with your Discovery rebreather.

With the use of this guide, you should be able to enjoy many safe, bubble free dives.



## BEFORE YOU GO DIVING

Planning and preparation might not be the most enjoyable part of diving, but the better prepared you are, the more enjoyment you'll get out of your diving.

Before you leave for the dive site, we recommend that you check the following things, on top of your normal check list:

- Is your battery charged?
- Have you done a learn cycle on your battery lately?
- Are all o-rings in the loop intact and in place?
- Are the battery connections dry?
- Is the unit properly assembled?
- Is there any visible damage to the unit?

We recommend that you perform a full learn cycle on the battery every 30 days

Make sure that all problems are resolved before you go diving.

When all of the above has been checked and found to be in good working order, start up the unit and perform a Pre Dive check to make sure it works.

It's much better to resolve any problems that might occur, in the comfort of your home rather than having to deal with them at the dive site.

## BEFORE YOU GET IN TO THE WATER

Even though the unit will check for things like battery power, air supply and what gas you are using, it is recommended that you make sure of the following:

- Do you have enough oxygen and air?
- Do you have the right gases?
- Do you have a scrubber in the unit?
- Will the scrubber last your planned dive?
- Did the loop pass a negative loop test?

If, for any reason, your Discovery won't pass a Pre-Dive check, do not dive the unit before the problem has been fixed and a Pre-Dive has been successfully completed.

## IF YOU GET AN ERROR ON TEST 49

Test 49 is the Positive Pressure Loop test (PPLT) where the unit checks for leaks in the breathing loop and if the solenoids are opening and closing they way they should.

If your unit fails on this test, check the following:

- Is the OPV valve on the exhalation lung closed?
- Are all loop hoses connected?
- Are all o-rings in the loop undamaged?
- Are all o-rings in the loop mounted correctly?
- Is there any visible damage to the unit?
- Did the loop pass a negative loop test?
- Are the lungs empty when the PPLT starts?
- Is the bottom plate of the canister housing properly assembled with all four screws?
- Is the mouthpiece leaking?

The PPLT is a very sensitive test, where the unit looks for changes in pressure in the loop. A failed PPLT can be caused by one or both lungs being pressed by the mouthpiece or any other part of the unit.

Make sure that the lungs are kept free from any external pressure, during the PPLT.

We know from experience that almost all failed PPLT are caused by improper assembly of the loop.

Proper assembly of the loop, regularly lubricating o-rings in the loop and making sure that the OPV valve on the exhalation lung is closed, rinsed with fresh water and cleaned will minimize the risk of failing on test 49.

More detailed information about all tests can be found in the Discovery usermanual.

We strongly recommend that you read through the user manual prior to diving with the Discovery, to fully understand the functionality of the rebreather.

## ERROR ON TEST 53

Test 53 is the oxygen sensor calibration test and this is quite complicated and based on a lot of factors such as:

- Temperature of the sensors
- Percentage of oxygen in the gases used
- Response time from a sensor
- Milli voltage of a sensor

The test will start by injecting pure oxygen directly on the primary oxygen sensor for 20 continuous seconds.

After the calibration constants for oxygen are established, the system then injects diluent (air) via the diluent calibration solenoid valve. In doing so, this test calibrates the primary sensor, and confirms that the correct gas mixtures are used in the respective cylinders.

This means, that the milli volt reading from a sensor alone can't be used to establish if an oxygen sensor is working properly or not.

The response time of an oxygen sensor differs based on the temperature of the oxygen sensor. This means that the temperature of an oxygen sensor can have a big effect on the success of a Pre Dive calibration.

If your unit stops at test 53, try the following to resolve the problem:

- Verify that the gas cylinders are connected to the correct pneumatics block LP connections (DIL/O2).
- Make sure the cylinders contain the correct gas mix
- If winter diving, warm the sensors up, in your pocket

If the unit keeps failing test 53, you might have to replace one or both oxygen sensors.

## DEPTH READING DIFFERENCE

When you compare the depth reading on the Discovery display and your wrist mounted dive computer, placing them side by side, you might see a difference in depth. This is due to the fact that the depth sensor in the Discovery is located at the bottom of the e-module, located behind your neck and not in the display it self.

## C1 ALARMS ON LAND

When your Discovery has passed the Pre Dive check you should always set the mouthpiece DV switch to its Open Circuit (OC) position.

If you set it in Closed Circuit (CC) position, you will most likely get a C1 alert. This is normal.

The reason for this alert is, that when the unit is turned on, and the mouthpiece is in CC mode, it will perform sensor validations, checking the PO2 value, even when it is on land. If the difference in PO2 value is too small, when the unit compares the PO2 value from the last validation with the PO2 reading from the most recent validation, the unit assumes that the primary oxygen sensor is "frozen" and giving a false reading.

If you get a C1 alert, when your unit is on land, do the following to turn the alert of:

1. Set the DV switch to CC mode.
2. Breathe on the loop, to change the PO2 value.
3. Continue breathing on the loop until the next successful sensor validation is performed. (about 2 min. maximum)
4. When the C1 alert goes away, set the DV switch in OC mode.

If the C1 alert persists, after you've done the 4 steps above, then there's something else causing the C1 alert.

### Note.

The C1 alert will NOT go away by switching the mouthpiece DV switch to OC mode only.

## VENTING THE E-MODULE

If you are doing repeated dives with your Discovery, if possible, vent your e-module between dives by removing it from the top of the canister housing.

By doing this, you reduce the risk of getting condensation on the oxygen sensors.

## HYPEROXIC LINEARITY TEST

When you descend and reach 6 m (20 swf) depth, the Discovery will do a Hyperoxic Linearity test. The reason for the test is to make sure that the oxygen sensors can read PO2 values above 1.0.

If the unit, for any reason, fails the hyperoxic Linearity test, the maximum setpoint used during the dive is 1.0.

There are a few things you can do, to increase the chance of a successful Hyperoxic Linearity test.

When descending, give the unit time to perform the test, i.e. don't descend too fast between 6 m(20 swf) to 10 m (33 swf).

Avoid repeated ascend/descend depth changes between 6 m(20 swf) to 10 m (33 swf) until the Hyperoxic Linearity test is completed.

## HOW THE PO2 ALARM WORKS

The PO2 status is processed in the following order:

If the PO2 is < 0,25 then a hypoxic alarm will occur immediately.

If the PO2 is > 1.8 then a hyperoxic alarm will occur immediately.

If the PO2 is > 1.6 and has been so for more than 1 minute, a hyperoxic alarm will occur.

If  $\text{abs}(\text{PO2} - \text{SP}) > \text{SP}/4$  and has been so for more than 2 minutes, a deviation alarm will occur.  
**(Note.** SP = setpoint)

In all other cases, no alarms will occur.

## LAST BUT NOT LEAST

All alarms generated by your Discovery MUST be treated like a real alarm, and all instructions shown on the display should be followed.

**DO NOT IGNORE ANY ALARMS AS IT MIGHT CAUSE INJURY OR DEATH.**