

So You're Diving with an Inspiration CCR wearing Buddy? Here's the low-down on what to expect



Prior to Diving

The big difference here is in the pre -dive checks that an Inspiration user **MUST** do. On your open circuit set, you'll probably get away with just turning the gas on and going diving. This is not true on a rebreather. Each user will have a set sequence of tests they **MUST** do before entering the water, even if it's only 5 minutes since they surfaced (probably more so in that case). Don't worry, they won't take long and are carried out in addition to the normal buddy checks which still need to be done. One of the myths of rebreathers is that they take ages to set up. This is not true

Positive Inflation Test

The units' buoyancy compensator and breathing loop are filled to maximum pressure, sealed and left for a time. They must not deflate. This tests for air leaks and is often done well before kit up time. The lung dump valve is tested at this time also. (Min 3 minutes)

Negative Inflation Test

The units breathing loop is sucked free of gas and sealed for a time. Often a hose is crushed. The system must not draw air back in and expand for some time. There should also be an audible gush of air into the mouthpiece when it is opened after the test. Again, this tests for air leaks and is often done well before kit up time. (Min 3 minutes)

Diluent side Checks

The diluent cylinder is turned on, the pressure gauge checked to make sure it has enough gas and the diluent injector is tested together with the ADV (Auto Diluent Valve) if fitted. If the ADV has a "flow stop" this needs to be in the open position. The bail out Demand Valve (DV) should also be tested along with the buoyancy compensator (wing) and drysuit direct feeds. (30 seconds)

Oxygen Side checks

The oxygen cylinder is turned on (**SLOWLY!**) and the pressure gauge checked to make sure there is enough gas. The Oxygen manual injector is also tested. (60 Seconds)

Electronics and initialisation

The handset is turned on. There should be audible beeps to confirm the buzzer works and then an audible click as the solenoid and batteries are tested under load. This test should always be done with the Oxygen switched on and pressurised. The user will then proceed through the electronics initialisation routines to get the handset into dive mode. This may include a "calibration" of the Oxygen sensors, which must be done at least once a day.

Pre-breathe

The last test is to breathe from the unit for at least 3 minutes prior to diving. This way if something is malfunctioning the user will either spot the problem or become unconscious while on the boat/shore and not in the water. This test is the most important and is a real lifesaver. Don't dive with them if they don't do it! If the Inspiration has the "temp stick" feature the bar display on the handset should turn black.

Checks for you to do

Do check up on your Inspiration equipped buddy:

- 1) Ask to see their contents gauges and make sure the gases are switched on and there is enough. Query them if they are not both full
- 2) Listen to hear if there are any warning buzzers sounding. If they are then something is up and the unit is NOT divisible. Do not accept any excuses
- 3) Check if they are carrying sufficient Open circuit bail out gas to abandon the dive at any point and complete the required decompression
- 4) Learn how to close the mouthpiece. If you have to rescue them **you must close this** if comes out of their mouth, otherwise the loop will flood and lose buoyancy.
- 5) Most importantly. Are they pre-breathing from the unit and have they been doing it for at least 3 minutes. Don't dive if they didn't (this most simple check would have saved many lives if carried out).

During the Dive

Descending

This is a time of high task loading for the rebreather diver. As well as clearing their ears and filling the dry suit, they will need to monitor the handset, inject diluent into the lungs and at some time swap from the low set point to high set point. They should also perform a stop at around 6m to check for bubbles and leaks (a good practice on OC). The main risk here is descending so fast that the O2 level rises too quickly. Most rebreather divers are slower on descent than OC divers (unless they have an ADV fitted)

Bottom

Once on the bottom the rebreather diver will settle down. The unit works best at constant depth and so the only differences will be that a) your buddy swims around object rather than over and b) they should be checking their handsets regularly (about once a minute). There should be no bubbles from the unit while at constant depth. Most rebreather owners will practice some drills at some time on most dives. Make sure that your buddy does check his handsets much more regularly than you check your contents gauge

Ascending

OK, now you will see some bubbles. As you ascend the rebreather diver will need to vent some of the expanding gas. They may do this several ways 1) through the lung dump valve, 2) breathing out through their nose or 3) breathing out through their mouth around the mouthpiece. They also need to keep a close eye on the handset because as the pressure drops the PPO2 will lower. This is on top of decompression and normal ascent constraints. So again this is a time of high task loading. Once on the surface they need to continue to monitor the handsets

Post dive

The unit must be kept upright or laid on its front (lungs), never on the yellow back. This keeps the internal condensation away from the Sensors. The buddy may need to turn off the handset (right hand two buttons together) and gases if there is a wait before diving again. If it's the last dive then they may remove the scrubber contents and dry the electronics. If it is being dived again on the same scrubber contents the mouthpiece is left shut to stop dirt and airflow. The exhale lung may be drained of fluid that has collected.

Some advanced points

Things an OC buddy should know?

How to open and close the CC mouthpiece, the operation of the diluent and O2 manual inject valves (normally leave the latter well alone) and how to recognise the terms and symptoms of hypoxia (Low O2), hyperoxia (High O2) and hypercapnia (high CO2).

There are numerous modes of failure of a rebreather. Most are simple to spot if the checks are done. But if not, the first warning you may get as a buddy is hearing the buzzer. If this happens you must ensure that the rebreather diver takes steps to rectify the problem. They should at least inspect the controls and analyse the situation. Give them an OK while pointing at the handset and expect one back. Unfortunately the second symptom of failure is normally unconsciousness. What can you do in that case?

- a) If unconscious and the mouthpiece is in their mouth - perform a controlled buoyant lift. If unconscious and the mouthpiece is out of their mouth - *close the mouth piece* and then perform a controlled buoyant lift. If they regain consciousness - get them onto a known gas supply by swapping to the bail out system and continue ascent immediately.
- b) You could also inspect the handset to see if the O2 is high or low. If low make sure the oxygen is turned on and not empty, if empty switch to bailout. If high inject diluent or switch to bailout. If unconscious then flush the system with diluent while pulling the lung vent and then begin to surface immediately.

Treat rebreather casualties like any other diving injury by giving oxygen first aid as soon as possible.

"If in Doubt Bail them out!" And remember **"Friends don't let friends dive solo"**