

## Diving a JJ

*Jamie Obern*

I have recently been introduced to the 'Dark Arts' and now I feel a little like Harry Potter. New magical words are buzzing around my brain: sorb, dil, bov, adv, hud – along with a few full blown incantations: diluent flush, set point, minimum loop volume, bail out, negative and positive pressure checks. I have new 'robes' to wear, discarding my trusty old twinset in favour of a sleek black cylinder sprouting a profusion of wires and tubes. I have even started a potions class, learning how to pour my ingredients, tap and slap my 'cauldron' in the correct manner, add a sprinkling more 'sorb' for good measure and then declare my 'scrubber' ready for action. But most magical of all I am now spending hours underwater in silence, an entirely new experience after 25 years of blowing bubbles. I have become a rebreather diver.



This is not a spur of the moment decision. Unless you are independently wealthy the cost alone of buying a unit will make you stop and think; but equally it is the re-training, the time commitment required to building your comfort and familiarity with the new skills and equipment. So why after so long have I made this decision? The answer is simple – there are dives I want to do which are logistically extremely difficult on open circuit. Diving with 5 tanks is manageable, but the dives I did earlier this year with 8 and 9 tanks in Blue Creek Resurgence convinced me I had reached the sensible limits of open circuit equipment and by the time I got out of the water after my final dive, I knew a different approach was inevitable.

However, before I continue, I just want to point out that whilst I have several thousand dives on open circuit, I have only 10 hours on the breather, so I reserve the right to completely contradict myself in several months' time, if I make a comment in this article which I later realise was not quite 'accurate'. But, as my aim with this article is to capture my initial thoughts on rebreathers and to be as dispassionate as possible about my feelings towards them, I hope in a years' time I will still agree with the majority of what I write now. I'm also aware of how all rebreather divers seem to fall in love with their units and struggle to hear a bad word said against them – so before that inevitability happens to me I will continue.

The concept of a rebreather can be explained very simply. Instead of exhaling into the water you exhale into a closed loop. Your exhaled breathe is passed through a chemical compound which removes the carbon dioxide; then a small amount of oxygen is added to replace the oxygen your body is metabolising; then you breath the mixture back in again. The only gas 'lost' on each cycle is the oxygen you are metabolising, unlike open circuit where every full exhale is 'lost', which means a very small oxygen cylinder should last a very long time. Easy peasy! But the devil is in the detail and there are a few technical difficulties to overcome, the most obvious being how to ensure the correct amount of oxygen is added. To describe it another way – a rebreather is simply a portable nitrox blending machine.

At this point it should already be obvious why rebreathers are more complicated and potentially more dangerous than open circuit diving. As well as all the normal problems of being underwater on open circuit you now have the additional issue of breathing a gas that is changing all the time. Unlike open circuit where your gas mix only changes when you switch bottles, a closed circuit rebreather will be supplying gas to you in a constantly changing mix, dependent on a series of oxygen cells, a solenoid, a computer and various other bits

of ‘gadgetry’. Yes in theory you have far more time on a breather to ‘fix’ problems, as your gas supply should last far longer, but the range of problems you can encounter is far greater, requiring you to use your grey matter more judiciously. Let me give a simple example: on a non-overhead, non-deco dive with open circuit equipment your best option in the event of trouble is to head for the surface; on a rebreather this may actually make things worse! (Then again it may not – but you have to think first and act second.)

But enough scaremongering – what is diving a rebreather actually like?

Well firstly as our instructor was at pains to tell us at least twice a day ‘The unit is not trying to kill you!’ Your breather does exactly what you tell it to do – although as anyone in a relationship will know, what you think you’ve said and what you actually said can often be totally different things. So, the first important step in learning to dive a rebreather is to become far more disciplined and organised. Have a check list and USE IT! It is immediately obvious with open circuit if your tank valve is switched off; it is not immediately obvious on a breather. Additionally you need to take far more care and attention when setting up your breather. As a cave instructor I thought I was pretty anal about my pre-dive preparations, but on a breather things definitely step up a notch. Leaking or bubbling gear on a simple open circuit dive is not ideal, but lots of divers do it; bubbles with a breather are very rarely acceptable. Jumping into the water and discovering you haven’t switched your computer to the correct gas mix is bad practise on open circuit, but again a manageable issue; on a breather it is imperative your computer is correctly calibrated and set up.



And once you are in the water things are also very different. I’ve already mentioned the lack of noise, but even before that the first thing I noticed was the breathing resistance. I am used to diving with very high performance, carefully maintained regulators which means breathing is almost easier underwater, as the reg literally pushes air into my lungs. I always notice the difference when I practise sharing gas with a buddy with badly maintained regs, but on the breather the additional effort required to breathe was immediately noticeable. It wasn’t a problem, just a noticeable difference. After a while it was also clear how much dryer open circuit gas is – on the breather I didn’t get my usual dry tongue – and by the end of the dive I had definitely lost less body heat on the breather compared to open circuit. (Breathing warm damp recycled air compared to fresh cold dry air in open circuit.)

But the biggest difference was buoyancy. I am used to making slight corrections using my lungs and holding my stops very accurately. On the breather it is impossible to use your lungs for small corrections, as you are simply breathing in and out of a bag and therefore making no overall change to your buoyancy. Additionally once you start moving up and down in the water column you have two extra things to consider. Firstly there is an extra air space, the counter-lung, (the bag you exhale into), which compresses and expands in just the same manner as your wing and dry-suit. And secondly the breather automatically adds gas at various points in order to maintain the set-point/gas mix you have set it to. The clearest example of this is during an ascent. Most of us are used to venting our wings and/or dry-suits on ascent, on the breather you also have to manage the volume of gas in your loop and cope with the fact that your computer will be telling the solenoid to fire more gas (oxygen) into the counter-lung during ascent in order to stop the PPO2 dropping too low. This is one of those times where initially you do feel like the unit is out to get you, until you understand what is happening. (Quick tip – if you are still struggling with ascents on open circuit you are definitely not ready for a rebreather yet!)

In terms of new skills to learn the main ones we covered during our class were the following, although this is by no means an exhaustive list: bail-out drills, diluent flushes, running the unit manually using the O2 add valve, running the unit using just the HUD (heads up display for those of us now in the know!), simulation of solenoid stuck open and stuck shut, using the Shearwater controller to change set-points. We also made sure we could still do all the standard drills – mask clearing, SMB deployment, ascents and descents.

Which brings me back to my feelings about the unit? I am not a technophobe but nor am I a technophile – I appreciate the enhanced opportunities the breather offers me, but I am not so excited by the technology that I am blinded by the additional risks and complexities of breather diving compared to an open circuit approach. After more than a thousand dives in my double tank configuration I feel completely comfortable and intimately familiar with all aspects of that kit. I know exactly how it works; where the typical failure points are; what tools I need for field repairs; what types of abuse it will and won't cope with (thinking about being inside caves and wrecks); when it is performing well and when it is telling me something needs looking at. I am also completely comfortable and very well drilled in all of the emergency actions required in the event of problems. After only 10 hours I do not have the same comfort and confidence in my breather – and it is frustrating. But I will get there. I know exactly what dives I have planned for the unit and also the skill levels I want to have, so at present I need to be patient and practice – over and over. So as several very sensible friends have already commented to me – no cave diving, no wreck penetration and no trimix with the breather. Not yet anyway.



Longer term I'm intrigued to see whether I will switch back-and-forth between open circuit for shallower dives and the breather for deeper more complex dives – assuming I can keep my skills sharp on both. (Yeah I know new converts to dry-suits all say they will still wear their old wet-suits in the summer.) At present I need to do lots of shallow breather dives to build my skills, but long term using the unit in the shallows seems to add unnecessary cost and risk to dives easily done on open circuit. And talking of cost, which is usually the biggest argument in favour of breather diving, certainly as far as deep trimix dives are concerned – well my delightful accountant wife will certainly be working out the potential profit and loss in that area.

So watch this space. I will certainly do another write up about how my breather diving develops – the question is: how fully will I become seduced by the dark arts?