MAV Maintenance 101

This section will cover some simple maintenance that all ccr divers should do regularly. The Manual Addition Valve Block or MAV is an important or key element that requires at least annual service. If you dive salt water, then you may find that semi annual, or more frequent as needed. The service can be as simple as a dis-assemble, soak in solution, lubricate and re-assemble "done", or it could involve replacing worn, sticky, corroded button assemblies. In this section I will cover cleaning and replacing buttons, but I will not go into the repair of corroded injector button assemblies as they are not expensive and easy to pull and toss.

Terms - since the SCUBA & CCR industries of PADI, NAUI, IANTD, TDI, etc are bloated with acronyms or abbreviations I could choose to do this section in short hand, but lets not. Just a couple terms so I don't have to spell everything out:

- Acronym - Although the word **acronym** is often used to refer to any **abbreviation** formed from initial letters, some dictionaries and usage commentators define **acronym** to mean an **abbreviation** that is pronounced as a word, in contrast to an initialism (or alphabetism)—an **abbreviation** formed from a string of **initials**
- MAV - Manual Add Valve - is a manifold block with two or three buttons that joins gas with separate valves (button assemblies/nozzles) to inject gas into one stream into the CCR. If you have a single button MAV then it injects a single gas into a lung or single gas into a port in the loop. Multiple Single MAVs are often used by people who like clutter and hoses, or people with leaky bowl syndrome - reason not specified?
- Button Valve - aka Button Assemblies, Nozzles are common style of a valve that is spring loaded, O-ring sealed shaft, press to inject gas such as a BCD power inflator, or MAV blocks. These are common valves and many are interchangeable, inexpensive and easy to replace.
- BCD - Buoyancy Compensating Device - power inflator uses the same or very similar button valve.
- Es No Bueno - not an acronym or abbreviation - "Its No Good"

*note the tool pictured has "teeth" on both ends, not necessary, some tools only have teeth on one end.

To start you will need a simple tool that is not common, but not difficult to obtain. You can find these on several ecommerce scuba sites. The T- Spanner Tool is made to remove and install the BCD Power Inflator Button, or Button Valve. The difference in tools is that you must only choose the "Deep Socket" as the little whimpy flat combination tools are not going to work on common MAV blocks. The shallow or flat tool is only made to fit the same button assembly that is used on the BCD power inflator and will not fit into the deep recess to remove or install the button valve.

The buttons assemblies that I use on the Titan MAV are near identical to the rEvo button assemblies, and are interchangeable. Make sure you inspect the button assembly before interchanging. Warning in advance or Word of Caution when working with the Delrin plastic body as it is easier to strip plastic with metal fittings than it is to strip anodized aluminum body. The aluminum body may be more susceptible to salt corrosion, so more frequent rinse is required, but it is much more difficult to strip the threaded fittings. Go Slow!

The Right Tool!

Es No Bueno!

Next is to get a Tupperware to fit the MAV and make the cleaning solution. Use Dawn dish soap and household distilled white vinegar in 50%-50% and stir well. Find an old toothbrush with descent bristles for scrubbing.

Most Excellent Solution for cleaning scuba bits, regulators, etc... But do not leave un-attended as vinegar is a weak acid, yet will still strip plating on metal parts! Rinse well with copious amounts of hot/warm water.

The process includes but is not limited to these steps below:

- Remove MAV Block from CCR
- Remove All Fittings on top (not shown today) as well as bottom fittings. These include both 3/8- 9/16 lp hose fittings, as well as 3/8 - BCD nipple fitting, and 3/8 lp port plug. *Please be cautious with the Delrin body as metal or brass fittings will strip the plastic if you are to aggressive or too fast. Go Slow!
- Start with Top Button Valve "Diluent" , then "Off-Board" lowest, then last do the "Oxygen" or middle button valve. Reason is that the T- handle will jam and not remove on some MAV's such as the "Farfignugen" rEvo style MAV.
- Set all parts into the Solution and use toothbrush to scrub all fittings. Be gentle even with tooth brush as you are only removing light sediment. Let the solution do its job, and watch the time so you don't leave metal parts too long in the acid mixture.
- Rinse, Dry, and Inspect O-Rings on Button Assemblies. If there is question to the wear on Button Valves, just replace. If there is metal corrosion on Button Valves then replace. If the Button Valve looks good overall then save for re-assembly.
- BCD Nipple for top side, and or bottom as used for "off-board" gas addition. Try these "nipples" with a few of your Inflator Whips and test the couple / de-couple or connect/disconnect. It is better to be surprised in your workshop than struggling to get a bad fitting connected at depth! People (many who smoke crack) dismiss the simple BCD type nipple for gas addition, yet it still remains the most reliable (but not high flow) connector on the market hands down! These are inexpensive so replace if ANY difficulty coupling.

- Re-Assembly starts with debate of lube or no lube on static O-rings. In the case of the Delrin body it is not as useful, but on the aluminum body it is very useful. Lube is also a debate of Oxygen Clean or "Go ahead Ernie and dump diesel fuel on it..." No this is not that stupid internet logic debate, this is common sense. First is that there is NO oxygen lube that is superior to the properties of Silicone Grease when used to prevent galvanic corrosion, or lubricant property to prevent wear on O-rings, as well as viscosity to prevent wiping away. Second is that the MAV is Low Pressure and there is NO oxygen fire or contamination issue, NONE! I don't argue with idiots and I don't dismiss people who want to use expensive oxy lube, knock yourself out. I choose to use nice scuba Silicone Lube as it is superior in low pressure environments where oxygen is not a concern. Lubricate "Moving Parts" O-rings especially and then apply lube to surfaces of dissimilar metals. This later will prevent the fittings seizing to the MAV body. If you clean, rinse and Lube Regularly then you can use either Plastic or Metal and no worries?

Step #2 remove all fittings. Note T-handle is in last button hole and T-handle tip would be blocked by button head if they were in place. Start with outermost buttons off first, the to re-assemble reverse so the middle goes in first, then outer buttons.

Step #3 when removing the button valves, make sure the teeth of the T-Spanner fit deep into the Button Valve grooves.

Twins from a different mother? Note the bottom nut/screw slot is different. On the left is the Farfignugen Button Valve "black top" and on right is Titan Button Valve "green top" . These are both interchangeable. rEvo uses two black buttons top/ bottom and middle button has blue cap. The Titan uses orange, green, black button caps. Its a matter of preference? I like the Titan color scheme as I can see a buddy or they can clearly see me with depressing "orange" meaning diluent, or "green" meaning oxygen. You can black or any color, just respect the "green" is oxygen and do whatever suits you.

*rEvo makes two types of MAV block. One style has an "orifice" and one does NOT. The orifice style is often used on KISS or other CCR's to replace simple oxy/injector/orifice. The standard rEvo MAV used on Hybrid does not have orifice in the MAV as it is located in the exhale lung tray/solenoid.

*Not covered here is the "orifice" which is located on the bottom of the rEvo MAV underneath the 3/8 port plug. Looking at bottom of rEvo block you will see a BCD type nipple on right, and port plug on left. This is the location of the orifice. Do NOT try to remove this as it will damage the orifice. If needed you can ultrasonic the "naked" block or simply do a vinegar soak. Clean low pressure air in reverse direction to dry 'blow out" .

This is simple stuff that you should feel comfortable to do on a regular basis. If you have any questions, do not hesitate to ask your instructor to show you, or better yet watch you as you do the job for the first time. You can also email questions and I will try to answer them in timely fashion.

Ron