

KISS REBREATHERS SPORT KISS MANUAL



READ THE MANUAL!!!!

IN ORDER TO FULLY UNDERSTAND YOUR NEW REBREATHER, THE COMPONENTS, HOW THEY WORK, HOW TO HANDLE AND TREAT THEM, YOU MUST READ THE MANUAL IN FULL, FOR YOUR REBREATHER.

SPORT KISS OWNERS SHOULD READ THE SPORT KISS MANUAL. CLASSIC KISS OWNERS SHOULD READ THE CLASSIC KISS MANUAL. EXPLORER OWNERS SHOULD READ BOTH THE EXPLORER AND CLASSIC MANUALS. CLASSIC OWNERS WHO HAVE UP-GRADED TO SOME OF THE EXPLORER COMPONENTS SHOULD READ BOTH THE CLASSIC AND EXPLORER MANUALS.

THIS SHOULD BE DONE PRIOR TO DIVING OR SERVICING THIS UNIT!!! SPECIAL ATTENTION SHOULD BE PAID TO ALL NOTES &/OR WARNINGS; THEY MUST BE READ AND UNDERSTOOD!!!! FAILURE TO DO SO, MAY CAUSE SERIOUS INJURY OR DEATH!!!!

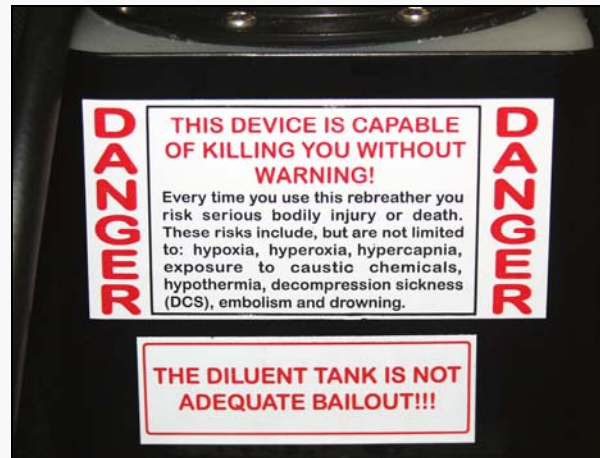
YOU MUST BE A LEGAL ADULT IN THE AREA IN WHICH YOU LIVE IN ORDER TO PURCHASE AND DIVE A KISS REBREATHER.

As with all scuba diving equipment, your KISS rebreather components should be serviced annually by a trained technician. For those diving frequently, servicing may be required more often.

ALL INFORMATION IN THIS MANUAL IS SUBJECT TO CHANGE.

**PLEASE VISIT OUR WEBSITE, www.kissrebreathers.com/manuals.html,
FOR UPDATED MANUALS**

THIS IS NOT A JOKE!!



Participation in rebreather diving can result in serious injury or death to you, the diver!

The warning on the rebreather is not a joke. Before beginning your dive you must consider the risks involved. The rebreather consists of hundreds of parts. All of these components will eventually fail. Careful maintenance, assembly, and testing will not prevent this from happening. At best it will delay the failure. The rebreather is not automatic in any way. It requires constant monitoring, a complete awareness of the potential problems likely to be encountered, and full knowledge of how to deal with whatever problem may arise. If you do not have adequate training, equipment, physical condition, and proper mindset don't get in the water.

The diver has the final responsibility for his or her safety and actions while using the rebreather. All components of the rebreather must be in good working order and be properly assembled and tested to reduce the risk of failure. Regardless of the training and experience of the diver and the reliability of the rebreather the risk of serious injury and/or death can never be reduced to zero.

This manual is not a complete text on the maintenance and operation of the rebreather. The diver must complete a proper training course covering the maintenance, testing and operation of the rebreather before diving this equipment. The rebreather can malfunction while diving even when properly assembled and having passed all pre-dive tests. Only carrying adequate bailout gas and having the training and skills necessary to utilize the bailout system can reduce, but never eliminate, the risk of equipment failure.



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INFORMATION

Welcome to the Sport KISS users manual. This manual covers a variety of information. It will assist you in preparing a new unit with instructions on O-ring insertion and general assembly. It will also provide you with information on adjusting and servicing your rebreather. It is important that this manual be read in full prior to diving the unit.

Purchasing a rebreather is a big decision for most divers. KISS Rebreathers would like to help you make the best decision possible. We want you to choose a unit which suits your diving, your budget, and where you get the features that you desire in a rebreather. You will, no doubt, be diving this rebreather for many years and we would like you to think about your decision carefully. When analyzing the data try to think beyond your upcoming training course and the next few dives. Try and think about the long term benefits or problems you may experience.

There are many questions that you should ask prior to making a decision. The answers to these questions will help you understand how the rebreather works, and help you focus on what features are important to you. If you don't get an answer from your dealer or instructor, I would suggest going directly to the manufacturer. I have listed many questions below with my answers. Any questions or concerns about my questions and comments are welcome. Please feel free to email or call.

Kim Mikusch Smith, Owner

30 QUESTIONS....

1. Does the manufacturer provide clear and detailed information on what the unit comes with, what it does not come with, and what the cost is?

The KISS brochures and price sheets outline what is included and what isn't. But recently I have redesigned them so that the information is even clearer. In talking with divers, I have found that many people have been frustrated with hidden costs on other units. We at Jetsam don't want to fall into that category and I have made an effort to be very clear!!

2. Does the manufacturer have a proven track record on excellent customer service and will they listen to your comments and concerns? Will they answer your questions honestly and will they be straight forward?

The KISS rebreathers have been selling since 1998 with the first units designed in 1996. Jetsam Technologies Ltd. has proven to have excellent customer service, and we always love to hear from KISS divers. Any comments and concerns are looked at and responded to immediately. I know that every unit has features that divers like, and some that they don't prefer. Any questions that you ask us about the features on the KISS rebreathers will be answered truthfully and we can go over the pro's and con's of all the features together. (Every rebreather on the market will have pro's & cons)

3. How many components make up the rebreather? How much is there to go wrong or break? If something does break, is it easily repairable and can it be done at a reasonable cost?

The KISS rebreathers are easily the most straight forward and simple units on the market. We work with the philosophy that anything and everything will eventually break. And when you take a piece of equipment into water, especially salt water, that could happen sooner rather than later. Due to this, we have built the KISS rebreathers to have the least amount of components possible and to make the components that we use durable and easily repairable if required. You can choose to do all repairs yourself, have your local KISS dealer do them for you, or send your components back to us.

4. Do you need to send any components back to the manufacturer for regular servicing?

All parts of the KISS units can be serviced by either the diver or by an authorized dealer. Should you choose to, parts can be returned to Jetsam for servicing.

5. Can I modify the unit, should I choose to do so?

Over the years, KISS divers have made various modifications to their units. The position of Jetsam Technologies Ltd. is that modifications to the KISS rebreathers are extremely dangerous and are strictly prohibited. Any user making their own modifications are violating the terms of the End User Acknowledgment and Waiver and does so at their own risk. It has come to our attention that some modifications are deemed unsafe and dangerous. As a result we have had to change our policy to only allow approved modifications.

6. How far from home are you comfortable taking your rebreather and still feel confident that you will be able to dive? Is your spare parts kit and tool kit small and easy to carry and transport?

The KISS rebreathers are known to be the most reliable rebreathers on the market. KISS divers rarely miss a dive. The units are so robust that it isn't often that something goes wrong. Also, spare parts are well priced, easy to install onto the units and most of them fit into a small zip lock bag!

7. What happens if you damage your display? Are backups reasonably priced and easy to carry? Is it a reasonable cost to repair the damaged display?

Unlike fully electronic units, the KISS rebreathers have affordable displays. All of our display options are reasonably priced and easy to install. You can choose to purchase any of our displays as spares. They are small and light which makes them easy to pack for a trip. The Jetsam display is user repairable, or it can be sent back to us for a quick repair at a reasonable cost.

8. Does the rebreather you are looking at purchasing offer you a variety of displays or the option of buying it with no display? Are they giving you choices?

The KISS rebreathers are available with many display options. You can decide for yourself which features are important to you. Or, you can opt to buy your KISS rebreather without a display system. With any display system that you choose, remember that there are pros and cons. Questions to ask include, what is the cost, how easy is it to change or charge the battery, how durable is the case, and probably most importantly, how easy is it to calibrate the display.

9. Is the unit capable of keeping a good positive and negative seal? Or is it always a struggle to keep the unit water tight?

With the KISS rebreathers, you know that you should have both a good positive and negative test. If you don't, there is a leak. If you aren't sure if the test is good, then you probably have a small leak. Testing is easy to do, as both the lungs and loop hoses are accessible and are the key components which need to be watched while testing. If one of the tests fails, it isn't difficult to find the leak as the units have a simple design.

10. Are the manual addition gas valves easy to access, and can you choose where to run the hoses and valve so that it suits you?

The gas addition valves on the KISS rebreathers are designed so that they sit over your shoulder. The valve can be accessed with either hand. Also, it can be secured to any part of your front area. Additionally the hoses can be swapped around so that the valve comes around your side, by your waist and secured in that area. Again, this way the valve can be accessed by either hand. KISS divers can determine what suits them best and dive accordingly.

11. How easy is it to assemble and test the unit? Is it complicated or simple?

The KISS rebreathers are well known for their simplicity and ease of assembly. Whether you are preparing for a dive, or cleaning your unit, you will find that your pre-dive checks, or changing your absorbent and washing your loop will take only minutes.

12. How many points of entry to the loop are there? Are there many fittings and tubing? Are they well sealed? If something goes wrong, is it easy to fix?

The KISS rebreathers have limited entries to the breathing loop. This means that leaks are easier to find, and leaks are less likely. Also, all O-rings are easy to clean, and easy and quick to change if required to do so. The Sport has mostly single O-rings seals, and the Classic has mostly double O-ring seals.

13. Is the unit easy to pack in a carry-on or suitcase? Does it travel well, or are parts at risk of damage? If there are delicate parts, are they easy to protect in the suitcase? Does it take a lot of time to get the unit ready to dive once you are at your destination?

The KISS rebreathers are easy to travel with. They are 2 of the lightest rebreathers on the market. For travel, you have a choice on what you would like to put in your carry-on baggage or in your checked luggage. The entire Sport unit can fit into a carry-on bag. (Cylinders excluded). The Classic head, displays and other key parts can also fit into a carry-on bag. But, due to the durability of the units, they can both easily be packed into checked luggage.

14. What kind of a rebreather diver do you want to be? Do you want to be in charge of the rebreather, or do you want a unit which takes control?

The KISS rebreathers have a mechanical system which moves the oxygen through the system. Upon the occasion when more oxygen is required, a simple push of the oxygen button will deliver it to you. As you are in control of the rebreather, you will be aware of what your PPO2 is, and should notice any problems as they arise. KISS divers are less likely to become complacent as they know they need to monitor their system.

15. How many tools are required to maintain the unit, or clean and prepare the unit? Are any of them specialized so that you must buy them from the manufacturer?

The KISS rebreathers don't require any special tools that can't be purchased from your local hardware store. We ship the unit with a nut driver, and the Classic also with a special KISS tool. (You can also buy this in your local store should you need another). A basic multi tool and adjustable wrench is all that most KISS divers carry with them. If you dive the Jetsam triple display, you will need to carry a small jewellers screwdriver for calibration. This is included with your unit also.

16. How easy is it to access the counterlungs? Are you able to remove them for cleaning and inspection and to let them dry properly? Are replacements available at a reasonable cost?

The KISS rebreathers both have easily accessible counterlungs. They are both back mounted lungs and both of the KISS units provide the diver with the option of matching their own lung volume to the rebreathers lung volume. This makes for exceptional buoyancy control at all depths, even in water as shallow as 2 or 3 feet!! The Sport lungs are conveniently located at the bottom of the scrubber canister. The Classic lungs are inside the protective counterlung case. As there are access holes in the case and the manifold is removable, these lungs are easy to access for removal and cleaning. Also, as you can see them (sport, feel them in the case) you will be able to easily determine if your positive and negative tests are working as they should. Watching/feeling the lungs is a very important part of the pre-dive testing. A great feature with the back mounted lungs is that your chest area is clear of clutter. This is one of the reasons that explorers and photographers choose to dive the KISS rebreathers.

17. Does the unit require special absorbent or a pre-packaged canister style absorbent? How easy is it to source while at home? What about when you are on holiday? Can you ship the absorbent to your destination?

The KISS units were tested with Sofnolime 797 grade. As this is the only absorbent we have tested, it is the only one we can recommend. Please see the back of the manual for more information on absorbent and run times. Absorbent can easily be obtained at most dive resorts and is easy to pack for travel, should the need arise. The Sport KISS has a bi-axial flow design.

18. Are there any special batteries or power packs required? If yes, are they easy to get and are they available at a reasonable price? Do you need to carry a charger?

The only batteries in the KISS rebreathers are in the displays. The Jetsam triple wrist display uses 3 photography batteries. They should be readily available worldwide, but some have had difficulty in obtaining them. They are available for purchase from Jetsam. The VR pendent display uses a AA size battery. Lithium is preferred, but if not available, it will run on a standard AA battery. The VRx has a built in rechargeable battery which charges in a short time period. A charger is required & is included.

19. Does the unit have first stages which are easy to repair and source for parts?

The KISS rebreathers are sold with top quality DIN first stages. These first stages and their parts are available world wide. They are known for their superior performance and also are known to be straightforward to service.

20. Does the unit you are looking at come standard with a bailout mouthpiece?

The KISS rebreathers are always shipped with a bailout mouthpiece. We feel that this is one of the most important features of a rebreather; the ability to bailout without removing the mouthpiece from your mouth. If our bailout mouthpiece is used in conjunction with our off-board accessory, bailout gas can be accessed without using the redundant bailout regulator on your stage bottle.

21. How does the ADV work? What provisions have been made to deal with failures such as free flow?

The KISS ADV system, if not working properly will either free flow or not flow at all. The system is very simple and easy to keep working. This component should not be disassembled unless there is a problem. The most difficult part is proper reassembly. If you follow the proper reassembly procedures, then it is easy. In case of the ADV not delivering gas, diluent can be added to the breathing loop via the mouthpiece. In case of the ADV delivering too much gas, the tank valve can be turned off, and opened as required. (following proper training procedures is recommended with this type of gear failure). The KISS ADV system works in a hands free mode. This means that a busy diver dropping in the water isn't required to push a button to get a breathable volume in his loop. All KISS divers need to do is inhale & the diluent gas is delivered.

22. Where will you get basic replacement parts such as O-rings? Does a spare set come with the unit? If you need to purchase them, does the manufacturer offer them at a reasonable fee and do they make the O-ring numbers available to you so you can source your own?

When you buy a KISS, 1 spare bag of O-rings is included and additional spares can be purchased at a reasonable price from us or one of our authorized dealers. Also, we list the part numbers for the O-rings in the back of the manual so that you can source your own, should you choose to.

23. What type and size of cylinders will work with the unit? Are you locked into a certain size or type of cylinder due to a cover for the unit, or because of the valve style? If yes, how will this effect your traveling? Will you need to carry the tanks with you or will you be able to rent cylinders at your travel destination?

Any type of standard aluminum or steel cylinder with a DIN valve can be used with the KISS rebreathers. The Sport KISS uses 13 to 19 cu.ft. cylinders which are available world wide. The mounting system is designed for aluminum tanks, but can be modified for use with steel. The KISS rebreathers have easily accessible cylinders and mounting areas.

24. Is the oxygen add valve reliable and a well tested design?

The KISS oxygen add valve design is tried and tested. It is the same design that has been used since we first started selling rebreathers, over 10 years ago. The body design has been updated a few times, but the working parts are the same.

25. How is off-board gas added to the rebreather, for either bailout or for multiple gas dives?

If either diluent gas or oxygen needs to be added to the system, it can be done with the use of the off-board accessory.

26. What kind of diving are you planning on doing and is the unit that you are looking at appropriate for this type of diving? Is it flexible and will it meet all your diving needs?

The Classic KISS is an exceptional unit for explorers of all kinds as it is extremely reliable and flexible. Cave, wreck, and deep divers choose it as it is easy to travel with, light enough to carry into remote areas, and for those that just want to do a basic reef dive, it's small and easy to use. The Sport KISS is very small and light weight and will also take divers past regular recreational limits. Many photographers choose the KISS units due to ease of use, size, and weight.

27. Does the manufacturer have an excellent safety record?

Jetsam Technologies Ltd. has one of the best safety records for rebreather manufacturers.

28. Is the unit supported worldwide with both divers and a dealer network?

Jetsam has a world wide dealer network, and also has divers world wide. There is no difficulty in finding dive buddies in any part of the world.

29. Is the manufacturer ISO registered?

Jetsam Technologies Ltd. is an ISO 9001:2008 registered company.

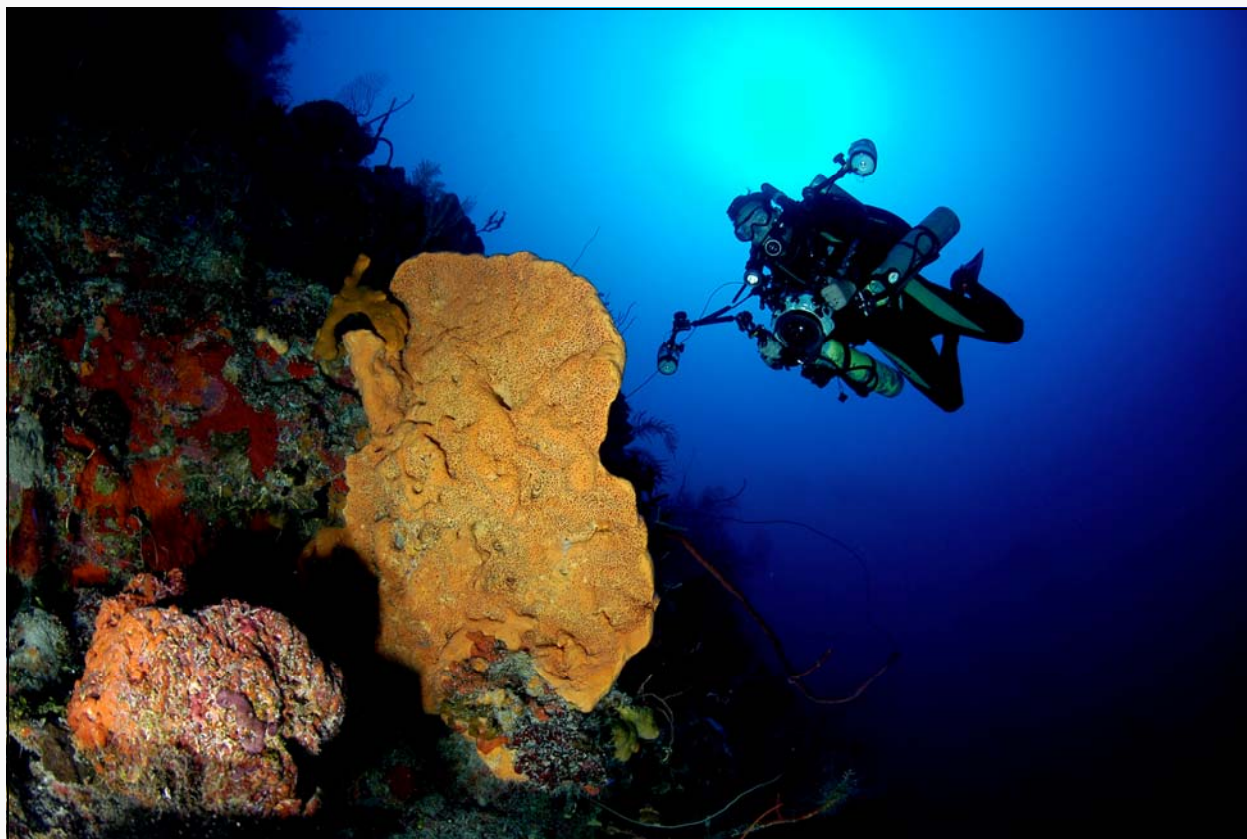
30. Are you considering purchasing a used rebreather? If you are, what risks are you taking in purchasing a rebreather, sight unseen?

As the KISS rebreathers are known to be durable and tough, there is a healthy used market for them. Things to think about if you are considering purchasing a used KISS: which display does the system have, how do you know that the display system is working properly, if it isn't working properly are you willing to pay for repairs or a new one, are you prepared to give the unit a good cleaning and inspection, could anything else be damaged? When purchasing a used unit, remember that you can't expect it to be perfect, as you don't know the units history. With a new unit, you are starting fresh.

SPECIFICATIONS: SPORT KISS

- Weight with full 13 cu.ft. aluminum tanks, full scrubber, aluminum counterlung case, but no BC back plate or harness is 39 lb (17 kg). With the stainless steel counterlung case the weight is 45 lb (20 kg).
- 22 x 20 x 5 (56cm x 51cm x 13cm)
- PLEASE SEE OUR PARTS LIST ON THE NEXT PAGE FOR A FULL LIST OF WHAT IS INCLUDED AND WHAT IS NOT
- It is a mechanical rebreather which adds O₂ continuously by a feed orifice and manually as needed.
- Compatible with Trimix.
- Scrubber holds approximately 5 lbs (2.3 kg) of absorbent.
- The Sport KISS is a closed circuit rebreather designed for recreational sport diving. It is not recommended for diving deeper than 165 feet (50 meters), cave diving or wreck penetrations. For those diving to the 50 meter limit, proper training, outside the basic KISS rebreather course is required. For some types of diving, extra gear must be carried or alternate gear configurations will be required. Ensure you have the proper training, gases and gear to conduct your planned dive.

The Sport KISS Rebreather Kit comes with the O-rings installed. However, the components do need to be assembled.



Parts List

- 1 Counterlung case in either SS or aluminum, includes adjustment plates, canister retaining hardware (2 split rings, 2 medium quick links, 2 small quick links), cylinder mounting system
- 1 Display pod with larger sensor housing and end cap (see display options below)
- 1 Exhaust pod with ADV assembly (cover, diaphragm, valve bolt, valve stem, LP "T" swivel, hose adapter) & Exhaust
- 1 Bailout mouthpiece with LP regulator hose
- 2 22 inch breathing hoses - 17 inch may be substituted at no charge
- 4 Small lined SS hose clamps - to attach quick connect system to loop hoses
- 4 Quick connect hose stubs for loop hoses
- 8 SS ballast rings
- 1 Scrubber canister with 4 plugs
- 2 Standard size counterlungs - small size may be substituted at no charge
- 1 Oxygen manual add valve with filter and 2 Miflex hoses
- 1 Oxygen first stage with delrin plug, OPV and LP swivel elbow
- 1 Diluent first stage with LP hose and OPV
- 2 Cylinder mounting plates and 4 hose clamps (to mate with cylinder mount system on counterlung case)
- 1 Set backplate attachment kit, includes 2 carriage bolts, 2 fender washers, 2 acorn nuts, 1 standard nut
- 1 Set, spare o-rings
- 1 Nut driver
- 1 CD - manuals

DISPLAY OPTIONS, IF ORDERED:

- Jetsam triple wrist display with 3-hose connector, 2 wrist straps and jewelers screw driver set
- Jetsam dual wrist display with VR3 cable, 3-hose connector, 2 wrist straps and jewelers screw driver set. Cable will read one sensor
- VR pendent display with fischer attachment plate
- VRx dive computer with fischer attachment plate
- Fischer attachment plate only
- No display

NOT INCLUDED:

- AI PSR-11-39-MD sensors (3), pressure gauges (2), wing and back plate assembly. Sensor warranty periods start from the moment they are shipping from the Teledyne warehouse. As such, it is best that they are ordered directly from the distributor or a dealer so that you get the freshest sensors possible. This way you know they have not been sitting on our shelf for some time. Most divers have pressure gauges which can be used. This is also true for the wing and back plate assembly. Additional LP and HP swivels.

EXTRAS:

We are happy to supply you with more LP swivel elbows, HP swivel elbows, off-board gas accessory.

Schematic

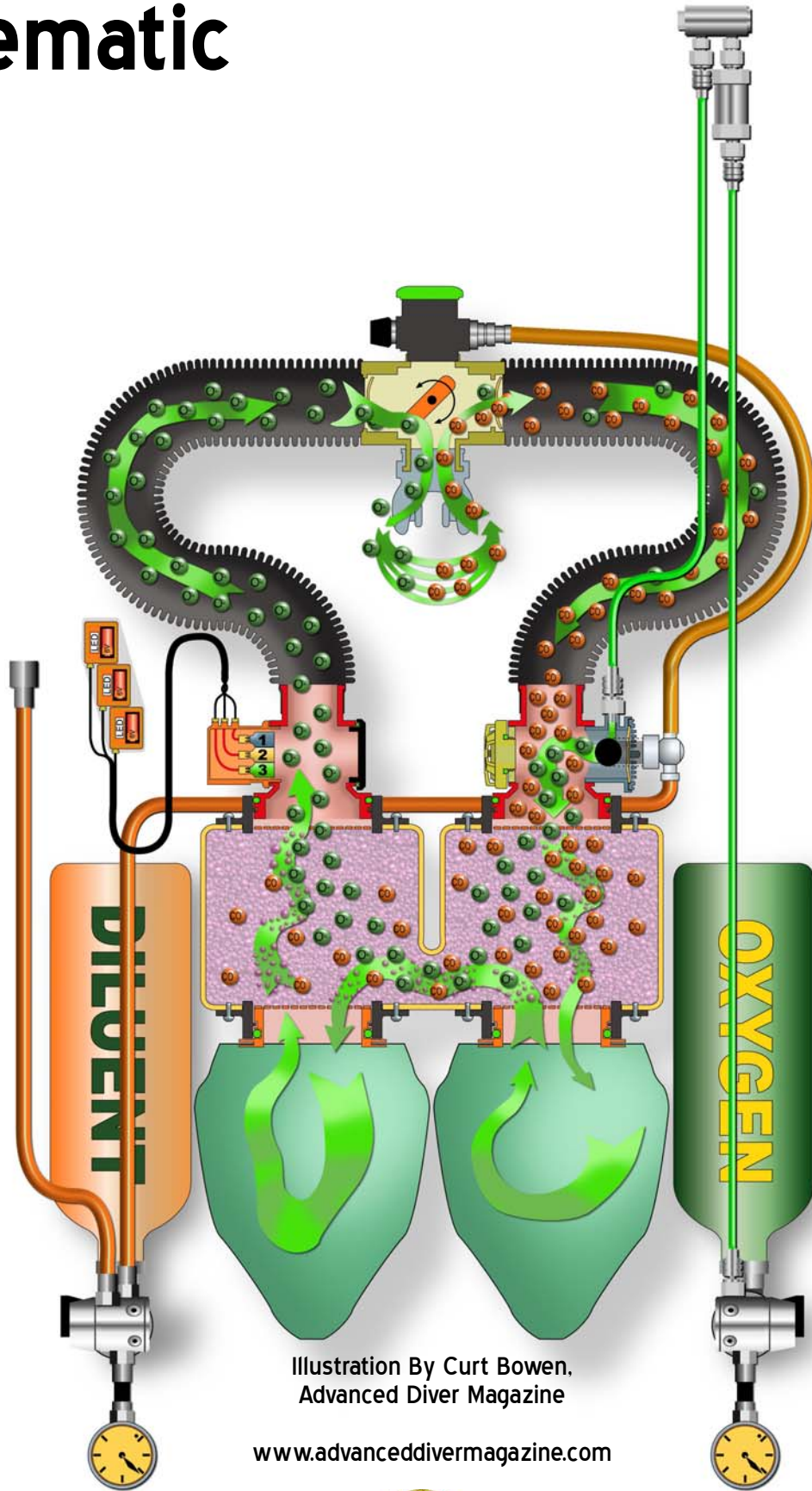
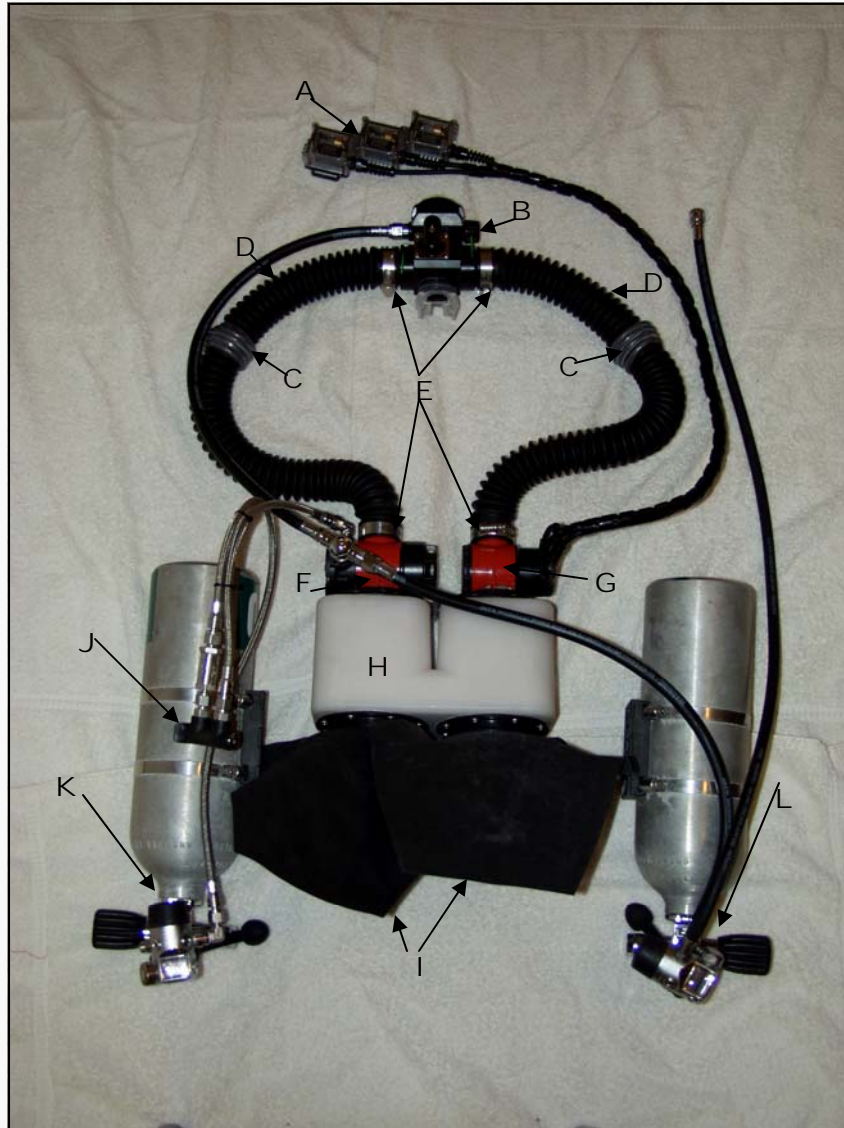


Illustration By Curt Bowen,
Advanced Diver Magazine

www.advanceddivermagazine.com



Components



- A. Triple Display
- B. Bailout mouthpiece (also called DSV)
- C. Ballast
- D. Breathing Hoses
- E. Rings and Hose Clamps
- F. Hose Attachment, ADV & Exhaust
- G. Hose Attachment, Sensor Housing
- H. Scrubber Canister
- I. Counterlungs
- J. Manual Add Valve
- K. Oxygen Tank and First Stage
- L. Diluent Tank and First Stage

MOTHER AND DAUGHTER



Assembly



After verifying that you have all the necessary parts to assemble your new Sport KISS CCR, you are ready to put the pieces together. Start with the counterlungs and scrubber canister.

First, ensure that the o-ring surface on the counterlungs and the counterlung attachments on the bottom of the scrubber canister, are clean and free of any debris. The bottom of the scrubber canister is the side with the screens.



Lightly lubricate the o-ring on each counterlung and also the inside edge of the counterlung attachment on the bottom of the scrubber canister. Then attach the counterlungs. They are attached by pushing them onto the canister and doing a 1/4 turn clockwise. When correctly attached both lungs will be facing the same direction.

When installing the canister into the counterlung case the bottom tips of the lungs should point to the divers back. In other words, the tips should point to the BCD side of the counterlung case.

***WARNING: When attaching the counterlungs, ensure that they are pushed on straight and that the lung attachment is flush with the attachment on the canister; NOT like the above photo!!**

***WARNING: IT IS IMPORTANT THAT ALL O-RINGS ARE IN GOOD CONDITON, THAT THE COMPONENTS ARE NOT DAMAGED AND THAT THE SEALING AREAS ARE CLEAN. IF THEY AREN'T, THE O-RINGS MAY LEAK CAUSING THE REBREATHER TO FLOOD!!!**



The next part to assemble are the hose attachment pods. Once complete, they should look like the above two photos. As this section is covering assembly, please see page 22 for proper scrubber filling instructions.



As before, ensure that the o-ring surfaces are clean and free of debris. Lightly lubricate the o-ring on the hose attachments and the inside surfaces of the scrubber canister where they will attach. Attach the hose attachment with the ADV/exhaust by pushing it onto the canister and rotating it a 1/4 turn clockwise. With the unit standing in front of you and the BCD attachment side away from you, this piece should be inserted on the right hand side. When attached correctly, the stainless steel T-connector swivel should be on the BCD side of the counterlung case, facing the divers back. Next, attach the other hose attachment in the same manner.

***WARNING: When attaching the hose attachments, ensure that they are inserted straight and that the base of the attachment is flush with the mating piece on the scrubber canister. The photo on the right shows the incorrect way!!**

***NOTE: Any damage to the exhaust valve, or any debris caught in this valve may cause a malfunction &/or leak. Care should be taken when servicing the valve.**

***NOTE: Care should be taken so the bottom screens of the display & exhaust pods are not damaged. If the screens come off, the absorbent will be loose and can travel up the loop hose to the mouthpiece!**





***WARNING: Ensure that the o-ring is not protruding; see photo, left.**

Once they are attached, secure the quick link tethers. Do this by securing the medium quick link which is attached to the split ring on the counterlung case, to the small quick link on the pod. There is one tether on each side of the case. (This is the most current tether system for the Sport KISS rebreather). The benefit of this current tether system is that the parts are readily available worldwide. Should you lose a component, replacement should be fairly easy.



These tethers are important as they secure the scrubber canister in the counterlung case as well as prevent the hose attachment pods from spinning off. The simple system we use, allows divers to source their own replacement parts, should the need arise.

***WARNING: IT IS VERY IMPORTANT THAT THE QUICK LINK TETHERS ARE SECURED PROPERLY. IMPROPER ATTACHMENT MAY CAUSE THE SCRUBBER CANISTER TO POP OUT OF THE COUNTERLUNG CASE OR ONE OF THE HOSE ATTACHMENT PODS TO BECOME UNSECURE WHICH MAY RESULT IN INJURY OR DEATH!**

BALLAST AND LOOP HOSES

Newer units are shipped with 8 stainless steel rings to be used as ballast. 4 rings should be placed on each breathing hose.

The weights can be moved up and down the hoses underwater for proper placement. With the loop hoses properly adjusted with no twists, and the ballast properly placed, the DSV will be weightless underwater!

The ballast rings should be placed approximately a third of the way up the loop hoses if you are diving the older mouthpiece. For those who have the new BOV, the rings should be much closer to the actual mouthpiece as it is much lighter. Attach the mouthpiece to the hoses, and then lift it so that it is level with the top of the unit. Look at the loop hoses; they should have a gentle curve. If they are twisted, adjust them by turning the end of the hose by the mouthpiece. These steps are important. If this isn't done, then the mouthpiece will be uncomfortable.

The ballast rings will need to be adjusted again, once in the water. Positioning will be different for every diver. While in the pool, your instructor will demonstrate neutral mouthpiece buoyancy. Ideally the mouthpiece will float neutrally in front of the divers face, if the rings are placed properly and the loop hoses are not twisted. If when doing this skill, the mouthpiece is not floating in the desired area, ensure that your hoses are not twisted and adjust your ballast rings. To adjust the hoses underwater, simply hold the mouthpiece with one hand, and gently turn the hose with the other. Again, once the rings are properly placed, they do not need adjusting again.

***NOTE: For the mouthpiece to be comfortable, the above instructions must be followed. If you feel the mouthpiece either pulling up or down while diving, adjust it by holding onto the mouthpiece and gently turning the hose by holding the end with your other hand.**

***NOTE: The old method of attaching the loop hoses to the quick disconnect hose stubs, required the black plastic ring and a standard hose clamp. In the past this method was required due to the lack of the quick disconnect system. As we now have the quick connect system and are not continuously attaching and removing the hose clamps, we can move to a simpler and better system. Our new system uses lined hose clamps, which have been designed to protect soft hoses. As they are lined, we will no longer be shipping new units with the black plastic rings. If for any reason, the clamps are removed and attached continuously, the hoses should be inspected each time for wear and damage. The black plastic rings will be available with the original hose clamps, as parts sales only.**

The assembly procedure below shows how to attach the original system. This new system is the same, except for the lack of the black rings. At this point, your ballast rings should already be in place.

To assemble the breathing hose quick disconnects to the loop hoses, first ensure that you have the following pieces: 4 Quick Disconnect Hose Stubs, 2 Loop Hoses, 4 sets, Rings & Hose Clamps.

The hose stubs use the same principle as a child-proof medicine bottle. Push down and turn, right to tighten and left to loosen.

To attach the hose stubs to the breathing hoses, first place a hose ring and small hose clamp over the end of the breathing hose and push the hose stub into position. Place the hose ring and hose clamp over the hose and hose stub, and secure. Repeat with the remaining 3 hose stubs. Once attached, pull on the hose stubs to ensure that they are securely fastened. A small amount of lubricant can be used to assist in pushing the hose stubs into position.



***WARNING: IT IS IMPORTANT THAT ONLY A VERY SMALL AMOUNT OF LUBRICANT IS USED TO ATTACH THE HOSE STUBS. TOO MUCH AND THE HOSES WILL NOT STAY SECURELY ATTACHED TO EITHER THE HOSE ATTACHMENT PODS OR THE DSV.**



Finally to attach the breathing hoses to the DSV, push the hose stubs onto the DSV adapters, push down and turn right. Repeat to attach the other hose ends to the hose attachment pods.



***SERVICE: THE O-RINGS ON THE HOSE STUBS AND THE CORRESPONDING SURFACES ON THE DSV ADAPTERS AND HOSE ATTACHMENTS SHOULD BE LUBRICATED ON A REGULAR BASIS. PRIOR TO DIVING, ENSURE THAT THE HOSE ATTACHMENTS ARE PROPERLY SECURED TO THE PODS AND DSV. FAILURE TO DO SO, COULD CAUSE INJURY OR DEATH!!!**

To install the sensors, see page 34. Once inserted, lightly lubricate the o-ring on the sensor housing and the cap. Then, with the sensor housing placed on the outside of the hose attachment and the displays facing forward, secure the cap. Ensure that the cap is screwed on straight.



***Warning: Ensure that the sensor housing & cap are tightly secured and that there is no gap showing, as in the photos above.**



AUTOMATIC DILUENT VALVE (ADV):

The ADV will add diluent gas to your breathing loop after the loop volume has been reduced by either descending or “breathing down” the volume of oxygen. The diver will get the feeling that there is no more air in the loop to breath. All the diver needs to do is suck hard to trigger the ADV and it will feed him more gas. This is similar to the action of a second stage regulator.

The ADV has been setup “tight” enough that it doesn’t add diluent without the diver being aware. But it adds enough gas so that a reasonable descent rate can be maintained. Anytime the ADV triggers you need to check your PPO2. you have either descended and compressed the gas in the loop or you have consumed enough oxygen to reduce the PPO2 significantly . This may also have caused you to lose buoyancy and descend

The position of the diver will effect the ADV. If the diver is horizontal or face down, the ADV will trigger easily. If the diver is vertical, then it is more difficult to trigger. (A well fitting harness is important; this will greatly reduce the difficulties of being vertical in the water). Also, rolling to your right side, while horizontal, will assist in triggering the ADV.

Diluent can also be added to the breathing loop via the mouthpiece. Simply go to open circuit mode, take a breath and then open the loop again and exhale the gas into the breathing loop.

Another way to add gas to the loop via the mouthpiece is to close the loop only a 1/4 inch, for a second. You may need to lightly push the purge button on the front of the 2nd stage. A small amount of gas will blow directly into the breathing loop.

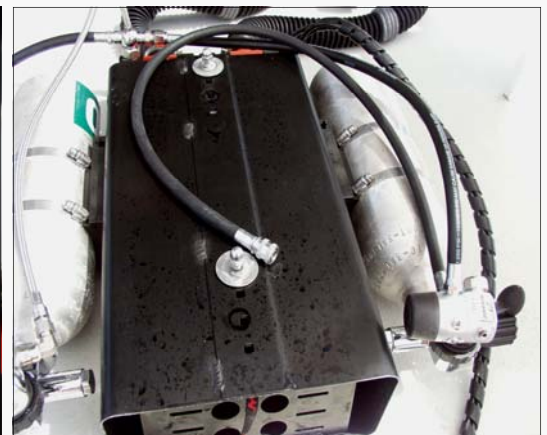


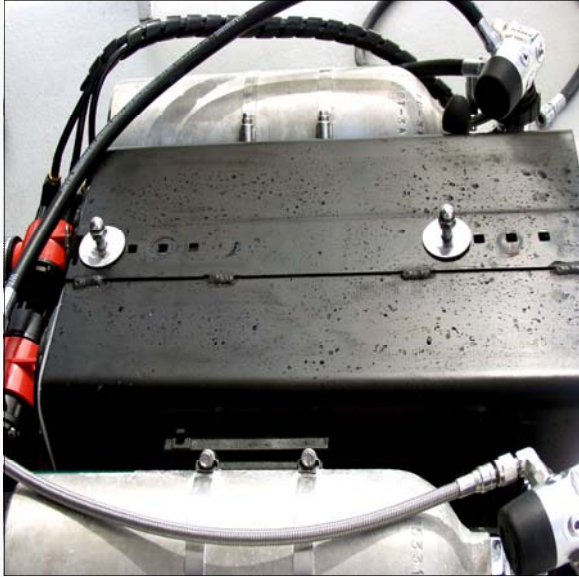
Next, attach the tanks to the counterlung case. With the unit sitting in front of you and the BCD side facing forward, the oxygen should be on the right and the diluent on the left. See page 57 for instructions on attaching the tank mount system to the pony bottles. The oxygen first stage is the one with the yellow Miflex hoses attached and the black delrin plug inserted into the first stage. Attach the oxygen first stage to the tank valve and screw the short hose onto the stainless steel elbow on the top of the ADV and tighten securely. The manual add valve should sit over the front of the divers right shoulder.



***NOTE:** The oxygen delivery system attaches to the rebreather via the elbow on the exhaust pod. Please note that the male end of the elbow which screws into the pod is NPT, or pipe thread. This is a tapered thread, NOT a straight thread. If you screw a fitting with a straight thread, such as a swivel elbow, into this port, it will damage the pod! If this happens, it is NOT repairable. Prior to modifying your rebreather, please be certain that you understand what fittings are required.

Attach the diluent first stage to the tank valve. Then connect the rubber LP hose which is attached to the first stage, to the inside of the stainless steel T-connector in front of the ADV housing. The LP hose should run under the display cables. Ensure that there are no entanglements. The DSV regulator hose should be attached to the outside of the T-connector.





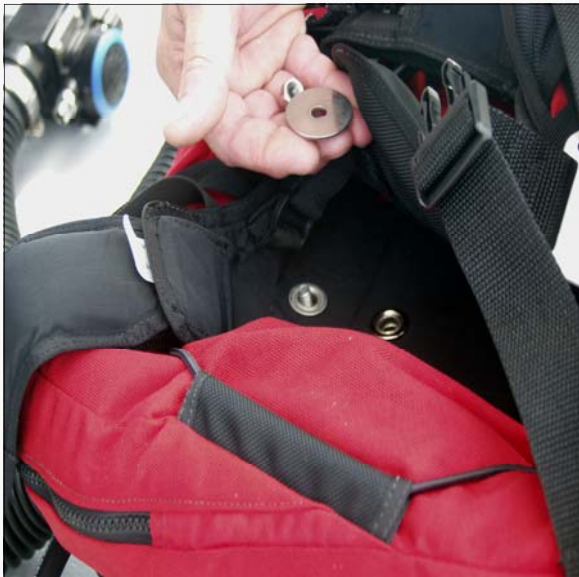
To attach the BCD lay the unit down, front side up. The BCD should be positioned so that it sits as low as possible. The higher the Sport KISS sits on the divers back, the better the work of breathing will be.

***WARNING: As the CCR positioning is very important, it is essential that the BCD that the diver is wearing is the correct size and is properly adjusted. The unit should NOT be floating of the divers back!!**

In order to attach the BCD, the carriage bolts will need to be secured to the counterlung case. They are the bolts with the domed end.

Push the first bolt through the desired hole as far as it will easily go. Then place both washers and the regular nut over the end of the bolt and tighten until it snaps into place. Remove the nut and the washers. When done correctly, the bolt will be secure in the hole and will not shift or fall out. Follow the same procedure to secure the other carriage bolt.

Once the bolts are secure, attach the BCD using one washer and acorn nut for each bolt.

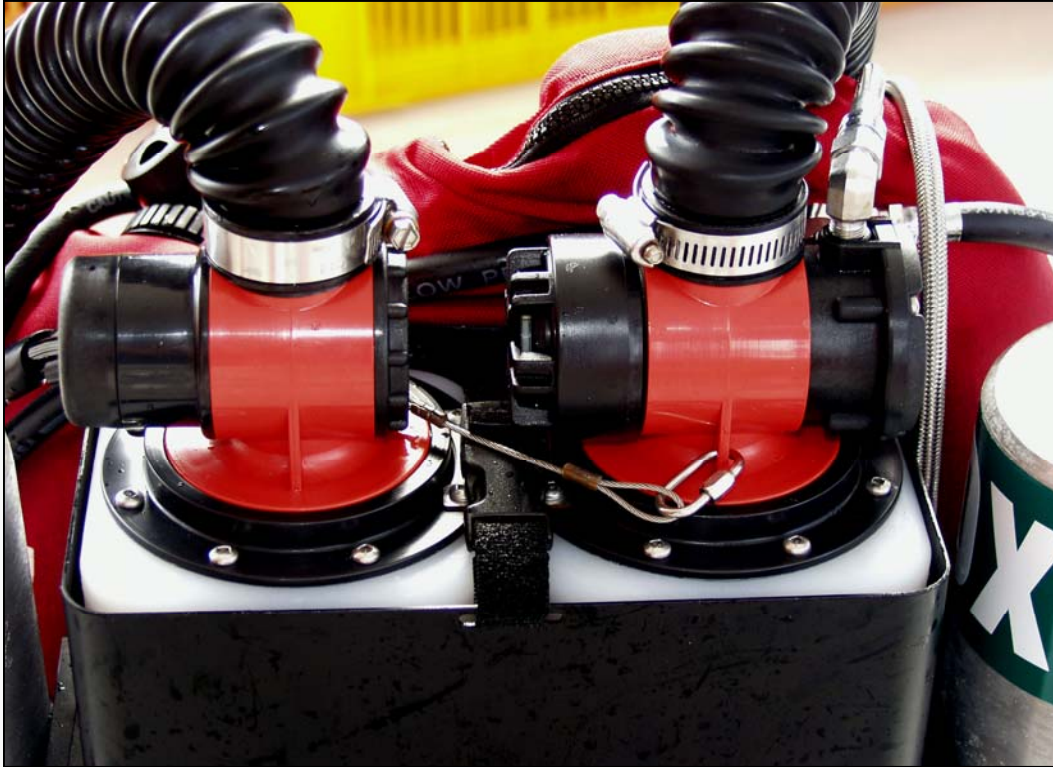


As with any piece of scuba diving equipment, the various parts and O-rings should be checked annually, and serviced as required. For those doing extensive diving, the various parts and O-rings should be checked more frequently.

The servicing of your Sport KISS can be done by your dealer.



CHANGING THE SCRUBBER



The scrubber canister holds five pounds of scrubber. It is a bi-axial design which allows the gas in the loop to pass through the scrubber two times. The KISS rebreathers were tested with Sofnolime 797 grade and this is what we recommend.



Changing the scrubber on the Sport KISS is quick and easy and takes just minutes. To start, unclip the two quick link tethers and remove the rubber LP hose which is connected to the inside of the T-connector swivel. The quick link/split ring tethers keep the pods from spinning and also hold the scrubber canister in place.



Remove the two hose attachments by rotating them 1/4 turn counter-clockwise and pulling up.



Attach the scrubber canister caps onto the top of the scrubber.



Lift the scrubber canister out of the counterlung case and remove the counterlungs. The lungs are removed by rotating them 1/4 turn counter-clockwise.



Remove the caps from the top of the canister and discard the contents. Attach the caps to the bottom of the canister.



Rinse out the canister with fresh water to remove any old scrubber material. Once clean, disinfect the canister, lungs, breathing hoses and DSV if necessary. Ensure that the o-rings on the counterlungs and attachment areas of the canister are clean and free of debris and apply a small amount of lubricant. Re-attach the lungs to the scrubber canister. Remember to push them on straight and ensure that the o-ring is not pinched.

COUNTERLUNGS:

The Sport KISS uses two back mounted counterlungs that are available in two sizes; small and medium. A combination of these will normally provide a good match between the counterlung volume and the divers tidal volume. Most divers will use two medium lungs. Smaller people, including women, will normally use two small lungs. This, in combination with the volume adjustment plates, allows for precise buoyancy control at any depth, including shallow water. Back mounted counterlungs leave the chest area clear and reduce the number of hoses and fittings compared to over the shoulder counterlungs found on other CCR designs. These lungs are inexpensive and easy to replace.

Please see page 30 to determine what size of lungs you should dive and where the adjustment plate should be.



Once both counterlungs are attached to the canister and you have ensured that they are both secure and are facing the same direction, insert the canister back into the counterlung case. Remember, the bottom tips of the bags should point towards the BCD.



Once the canister has been replaced in the counterlung case and is secure, it is ready to be filled. Start by pouring scrubber into both sides of the canister.

Fill the canister up about half way and then agitate the case to settle the scrubber material.

Fill the canister until full and agitate the case again.



The final topping up of the container may require small amounts of scrubber being added along with slapping or shaking to settle it.



When the canister has been properly filled, the scrubber material should be level with the bottom of the black retainers.

***WARNING: It is important that the canister is filled to the correct level, following the above procedures. Over filling the canister will increase the work of breathing and can actually cause CO₂ symptoms by restricting the off gassing of CO₂ within the divers lungs. Care should also be taken to ensure that the canister does not incur any damage. Damage to a sealing area could cause water to enter, rendering the absorbent useless.**





Wipe the top and inside edge of the canister once it has been filled. Also wipe the edges of the hose attachment connectors clean.



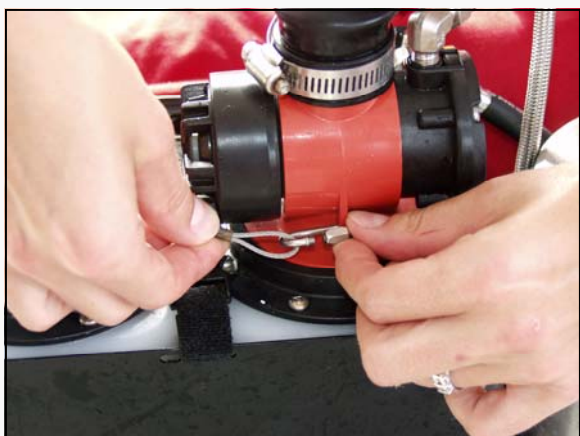
Chances are that a small amount of scrubber has collected in the edge of the hose attachments. Use a tool with a sharp end to clean out the debris. This will ensure a good seal and will make re-attachment easier.



Lightly lubricate the o-ring on the hose attachments and the inside surface of the scrubber canister.



Remember to push the hose attachments on evenly and ensure that they are flush with the canister attachments and that the o-rings is not protruding.



Once the hose attachments are back in place, re-attach the quick link safety tethers and the rubber LP hose.

***WARNING: CARE SHOULD BE TAKEN TO ENSURE THAT THE DISPLAY AND EXHAUST PODS ARE IN GOOD WORKING ORDER AND NOT DAMAGED. DAMAGED COMPONENTS MAY CAUSE THE SPORT KISS TO NOT FUNCTION PROPERLY WHICH COULD RESULT IN INJURY OR DEATH!!!**

***WARNING: IT SHOULD BE NOTED THAT ALL COMPONENTS OF THE SPORT KISS SHOULD BE HANDLED WITH CARE. ABUSE OR DAMAGE TO ANY COMPONENTS COULD CAUSE THEM TO NOT WORK PROPERLY. THIS COULD LEAD TO INJURY OR DEATH!!!**

POSITIVE / NEGATIVE TESTING:

Once the loop has been completely assembled and replaced in the counterlung case, you are ready to do the positive and negative pressure tests. While these tests will give you the best indication of any leaks in the system, it is still a good idea to do a quick bubble check when you enter the water. That's where buddies come in handy.



***WARNING: IT IS VERY IMPORTANT THAT THE POSITIVE/NEGATIVE PRESSURE TESTS ARE COMPLETED AND THAT THEY ARE DONE PROPERLY. ANY LEAKS THAT ARE PRESENT ARE MOST LIKELY TO BE CAUGHT WHILE DOING THESE TESTS!! WHEN DOING YOUR TESTS, YOU SHOULD BE VERY CERTAIN THAT THEY PASS. IF YOU HAVE ANY DOUBT AND ARE UNSURE THAT THE TEST PASSED, YOU PROBABLY HAVE A SMALL LEAK. FIND IT!! THE KISS UNITS HOLD VERY GOOD POSITIVE AND NEGATIVE TESTS.**

To do the negative test, put the DSV into your mouth, turn the knob and inhale the gas from the loop into your lungs and exhale it out of your nose until it is impossible to inhale any further. When the loop is empty, there should be no leakage into the rebreather and you shouldn't feel any extra gas sneaking into your mouth. If you don't feel any extra gas, close the loop while inhaling. The breathing hoses should be tighter as there is a vacuum in the loop. This will cause the DSV to sit higher than usual and the ridges on the hoses to be close together. If you watch the hoses while you are drawing the gas out of the loop, you will see how they constrict. Also, feel the counterlungs. They should be completely flat. Once you close the mouthpiece, watch the hoses and lungs closely. Don't look away. You need to notice if anything changes, such as a slight droop in the hoses and/or the mouthpiece dropping or the lungs shift slightly showing that gas might be going back into them. Leave the loop closed for a few moments, 60 seconds is adequate, to see if the vacuum holds and then open the loop to let air back in. (Longer is not necessary and will damage the diaphragm.)

The next most important part of doing your negative test (watching/feeling the lungs and hoses is the first) is when you release the pressure and open the mouthpiece. You should hear a "whoosh" as pressure is released. If you don't hear this sound, you have a leak! Or if the "whoosh" isn't as strong as it usually is, you have a leak. After diving the unit for a while, you will learn what sound to expect when releasing the pressure. When you hear that sound, you will feel confident that you did a good test. If you have any uncertain feeling, then you may have a small leak. The exhaust valve should be fully closed while doing these tests.

***WARNING - It is important to not leave the vacuum in the loop for more than a minute as this will cause the ADV diaphragm to stretch and get baggy. If this happens, the ADV will not work properly. It will either stop working altogether or will continuously feed you diluent.**

***NOTE: When doing your test, it is VERY important to not suck so hard that you are damaging the diaphragms. When you do the negative test, suck until you get a good seal, and then immediately close off the BOV. If you suck so hard that you feel the pressure building in the back of your throat/neck area, your ears pop, or you feel your face turning red for exertion, this is way too hard. There is no need for this and it will damage the valves and diaphragms. Suck just until you feel that pressure, then close the valve.**

Our new BOV has a larger bore and much better work of breathing, then the older DSV. In order to get that good work of breathing, the valves are more flexible. This means that with this new product, we need to ensure that we have good testing habits. Those divers who learned the testing procedures years ago, have to understand that the equipment has now changed, and that our habits must also change.

Also ensure that the area where the valve seals is clean. build up in this area will cause the diaphragm to leak.

***NOTE: if the unit is failing pressure testing due to a replaced ADV diaphragm, ensure that proper diaphragm installation procedures are followed. This is very important. See page 65.**

To do the positive test, tighten the exhaust valve by turning it fully clockwise. Put the DSV into your mouth, turn the knob and exhale into the loop until you hear the exhaust valve release. Alternatively, open the diluent tank valve and press the button in the centre of the ADV cover. The counterlungs should be expanded to their maximum size. Once inflated, close the diluent tank valve, and press the button in the centre of the ADV cover to vent the gas in the hoses from the diluent tank. Listen carefully for any air leaks and ensure that the counterlungs remain firm for at least five minutes. The oxygen tank valve and mouthpiece should be closed during these tests. After the test is complete and you open the DSV, again you will hear the sound of the pressure being released. This is important!

COUNTERLUNG PLATE ADJUSTMENT:

The final two steps to be taken prior to diving are ensuring that the counterlungs are sitting correctly and adjusting the sizing flap.

With the unit still laying down, open the bottom flaps. Reach inside and ensure that no part of the lungs are trapped in between the scrubber canister and the counterlung case and pull the lungs down into the proper position.



Set the sizing flap to the desired position and tighten the retaining strap to hold it in place. You will need to determine the correct position of the sizing flap. Most divers will be in the middle position or tighter.

To determine the proper position for the sizing flap, first put the DSV into your mouth, open the loop and inhale the gas into your lungs and then out of your nose until the loop is completely empty. When the loop is empty, close the loop without allowing any air to enter. Then take a large breath, as much as you can hold, put the DSV into your mouth, open the loop and exhale all your air completely into the loop and then close the DSV.

Ideally, the lung size should be as evenly matched to your own lungs as possible. If you find that when doing this test you can get more than one full breath into the loop before it is full, then possibly you need to tighten the plate. However, never dive where the volume is smaller than your own lungs! Smaller people will find that they have the plate tighter or even use the small lungs, while most people will use the medium lungs with the plate in the middle position or tighter.

In matching your tidal volume to the counterlung volume, you will find that your buoyancy in shallow water can be exceptional. Only KISS divers can hold their position in water that is only 3 to 4 feet deep. If you are finding buoyancy difficult in water this shallow, this is due to either being new on the rebreather or the counterlungs are too large.

While doing this test at the surface, remember that underwater your required volume won't change. If you find that your surface test went well, but it feels like the lungs are too small underwater, you probably have too much gas in the loop. To correct this, exhale some of the gas out of your nose.

***NOTE: The closer you can match the counterlung volume with your own, the better the work of breathing will be. If you have the sizing flap set to far out and the lungs are too large, the work of breathing will be very difficult. This could cause injury or death!**

Sensor Pod-Assembly & Calibration

***WARNING: THERE ARE VARIOUS DISPLAY SYSTEMS AVAILABLE FOR THE KISS REBREATHERS. THEY INCLUDE, BUT ARE NOT LIMITED TO THE JETSAM TRIPLE & DUAL DISPLAY, AND THE VR TECHNOLOGY DISPLAY SYSTEMS. As with all electronics, these components must be treated with care and respect. This includes taking care to not drop, bang, or roughly handle them. Also, do not leave these components in a hot environment, such as a car or direct sunlight. Heat &/or sun, can and will damage any electronic components.**

KISS DISPLAYS WITH ORIGINAL SMALL KID TYPE SENSORS:

In the past, the Sport KISS was shipped using the Teledyne KID sensors. For those still using these sensors or equivalent, please see below for use and installation. It is best to open the bags and let them sit for at least 24 hours prior to calibration as they need to go through a "wake up" period. If possible, open the sensors a week prior to intended use. Teledyne rates these sensors for 15 months. We recommend that they are changed at least every year. An easy way to remember your sensors anniversary date is to write the date on the bag when you open it, and keep the bag in safe place. You may need to change them more often than that. Oxygen sensors work on the same basis as a battery. The more that they are used, the more often they will need to be replaced. First, remove the end cap and pull the sensor pod off the hose attachment. Then, remove the tiny nut from the stem on the sensor pod and insert the K-ID sensors. (the tiny nut not used on the larger assembly)

The sensors should be placed so the prongs are lined up with the corners of their section.

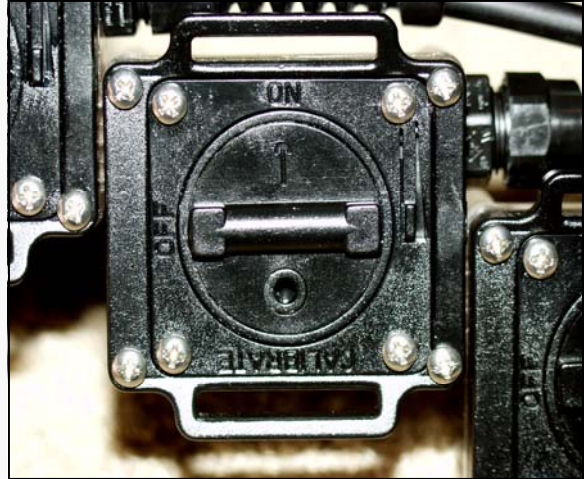
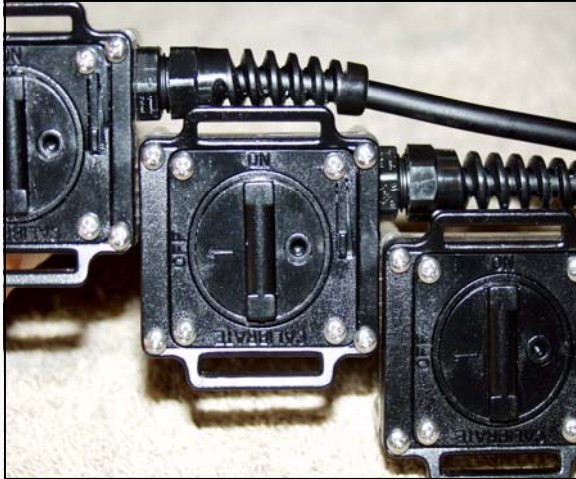


***NOTE:** The output for the K-ID sensors is 10 +/- 3 mvolts. This means that they should function accurately in a range of 7 to 13 mvolts. Also, always ensure that the sensors can be calibrated in air & pure oxygen. A volt meter can be purchased at any electronics or hardware store.

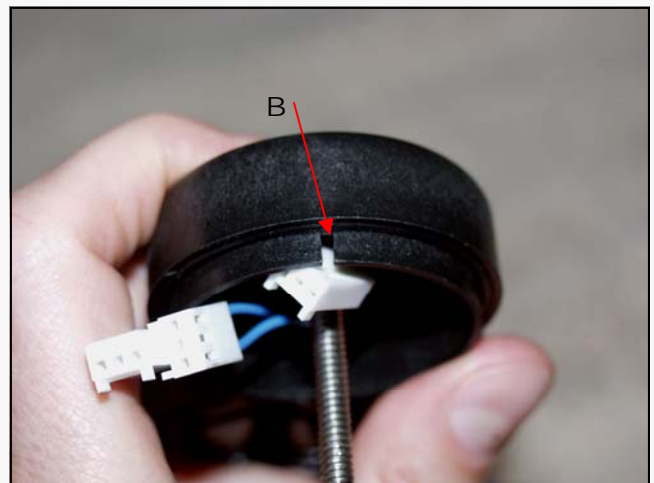
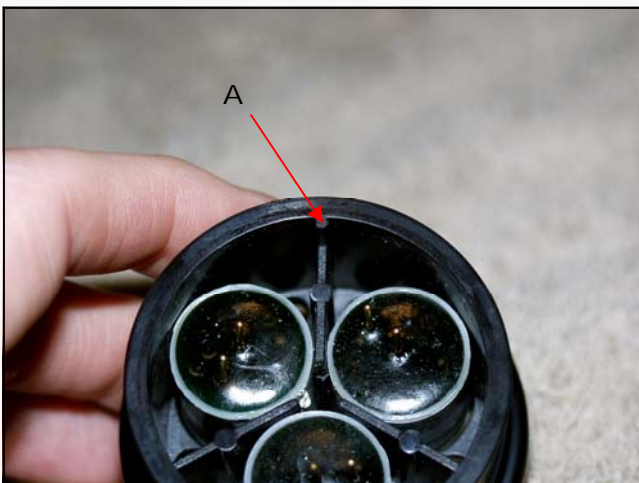
As Teledyne is no longer supplying diving sensors, customers should contact Analytical industries to find the suitable replacement for the KID sensor.



***WARNING: For the sensors to be safe to dive, you must be able to calibrate/check them in oxygen and air, plus the millivolt reading must be in the proper range. If even one of these can't be done, do not dive the sensors!!! They are not safe to use. Diving sensors that are not working properly will cause serious injury or death!!**



To turn the displays on, rotate the dial on the back, clockwise.



Push the sensor pod and the end cap with the molex plugs together. Note that the rib on the sensor pod, A, connects with the slot on the end cap, B.



Plug the sensors into the white molex connectors. Once connected, check the displays to see if you are getting "negative gas". If you have a minus sign in front of the reading, you will need to turn the corresponding molex connector around. This will eliminate the minus sign. Unfortunately, there is no way to determine which is the correct way until you actually hook the connector up. Note that this will not effect the accuracy of the reading; it will just give you a minus sign in front of it.



Once the molex connectors are attached correctly, push the sensor pod and end cap together, lining up the rib and slot so that they connect. Ensure that the wires are not pinched.

While holding the two together, screw the tiny nut back into place and hand tighten. (the tiny nut is not used on the larger sensor assembly)





Lubricate the o-ring on the sensor pod and attach it to the hose attachment by screwing the end cap onto the opposite side. When screwing on the end cap, ensure that it is straight. Hand tighten until snug.

LARGER SENSORS:

The Sport KISS now ships only with the larger sensor housing. The AI PSR-11-39-MD sensors are recommended. The unit is not shipped with sensors; you will need to order them from your local sensor supplier. Prior to installing them, it is best to open the bags and let them sit for at least 24 hours prior to calibration as they need to go through a "wake up" period. Ideally, open the bags about a week prior to use if possible. New sensors will read low when first installed and will creep up slightly over the course of a week or so. After that, they seem to be stable for months on end. Don't waste time calibrating the sensors if they are reading within a 1/2 percent. These sensors should last for at least 1 to 1 1/2 years, if they are not damaged or abused. Oxygen sensors work on the same basis as a battery. The more that they are used, the more often they will need to be replaced.

An easy way to remember your sensors anniversary date is to write the date on the bag when you open it, and keep the bag in safe place. AI PSR-11-39-MD sensors are safe to dive if the millivolt reading is between 8.5 and 13. AND they can be calibrated in both air and oxygen. The VR displays will read the millivolts of the sensors or a volt meter can be purchased at your local hardware or electronics store.

***WARNING: It is extremely important that the sensors millivolt readings are in the correct range, and that they can be calibrated in both oxygen and air. If even just one of these 3 items doesn't comply, DO NOT DIVE!!!! Failure to ensure that the sensors are working properly, can result in serious injury or death!!!**

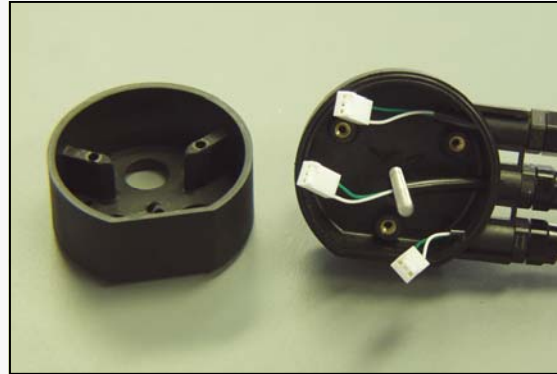
***WARNING: On the following pages are the calibration instructions for the displays systems. It is essential that the calibration procedures are followed properly. Failure to do so can cause injury or death!!**

The following procedure is for assembly and disassembly of both the Jetsam displays and the VR Technology displays to the larger sensor housing.

To disassemble the display pod, first remove the sensor knob.



Once the knob has been removed, pull the sensor housing assembly free from the display pod.



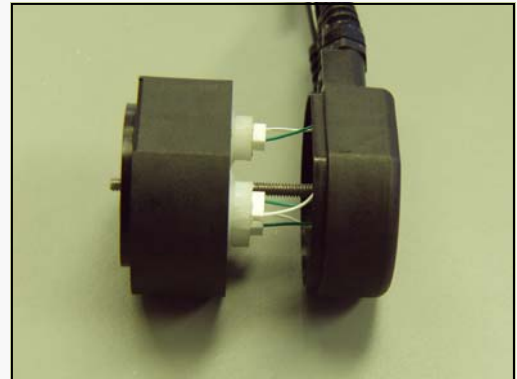
Next, remove the 3 screws. Note how secure the screws are as you remove them. There is no need to over-tighten when you reassemble!!

Before inserting the sensors into the sensor housing, remove the O-ring on each sensor, if there is one. It is not required. Push the sensors, threaded end first into the housing. Push them in until they stop moving. The threads will be showing on the outside of the housing.

***WARNING: It is important that the sensors are properly installed. If the O-ring is left on, or they are not pushed all the way into the housing, the response times may be delayed!!**

Attach the white molex connectors to the sensors, ensuring that they are pushed all the way in.

Line up the sensor housing with the three hose connector/fischer connector, ensuring that the N70-036 O-ring is lubricated and in place on the three hose connector/fischer connector. The flat bottoms should line up. Push together, with more pressure on the flat sided bottom. It should push together first, with the top of the assembly coming together last. Ensure that you do not pinch the wires. If you do, inspect them for damage and ensure that they are still working properly!



Insert the screws through the holes. While securing, alternate the tightening of each screw. Each screw should be turned in a few times, and then the next one should be started. Follow this procedure until the screws are snug.

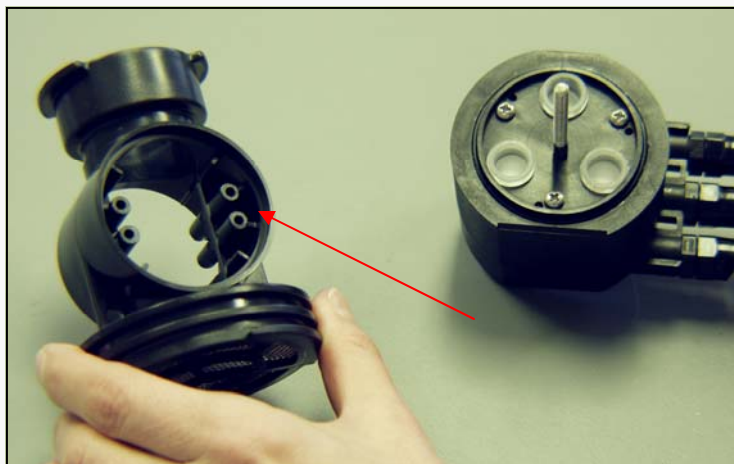
THE SCREWS SHOULD BE SECURED PROPERLY, BUT NOT OVER TIGHTENED!!!

***NOTE: Ensure that the O-rings are in good condition, that the area is clean and the components are not damaged.**

***WARNING: If the wires are pinched, the pod will not be water tight. Water damage in this area will ruin the sensors and/or the electronics. If the wires do get pinched, inspect them for damage!!**



Attach the sensor assembly to the display pod, ensuring that the N70-034 O-ring on the sensor assembly is in place and lubricated. The assembly needs to be attached to the side of the pod which has a groove machined into it. Please see the photo to the right and to the bottom for groove placement. The flat edge of the sensor assembly needs to be positioned at the bottom side of the pod.



Once pushed together, attach the sensor knob to the opposite side and secure. Ensure that the knob is tight! The O-ring should be lubricated.



SINGLE FISCHER FISCHER PLATE

VRx "C57A" CABLE, PENDENT USE

The Sport KISS rebreather has a Single Fischer plate. If the VRx is used with this plate, the C57A cable must be used. Please note that VR makes several cables. Be certain that you are using the correct one!

***WARNING: OTHER CABLES MAY GIVE YOU AN INCORRECT READING WHICH COULD CAUSE SERIOUS INJURY OR DEATH!**

The cables are labelled; do not mix them up! If you are purchasing a VRx, ensure that you ask for the proper cable!! Let your retailer know that you are using the Sport KISS Single Fischer plate so that they can order the correct cable!!

CARE FOR YOUR FISCHER CONNECTOR AND THE CABLES

The fischer connector port is watertight and any water that gets in to the port cannot harm your plate, computer, or pendent. However, should sea water get inside the port or the ends of your linking cable, flush them with fresh water as soon as possible afterwards then leave them to dry completely BEFORE refitting the cap.

If the reading for a sensor becomes erratic, a solution may be to put a SMALL amount of grease on the metal end of the cable end that slides into the computer fischer connector to lubricate the inner O ring of the bulkhead connector. This will serve to improve the seal and make the connection more reliable.

If corrosion does appear on the contacts rinse them briefly in white vinegar and use a fine toothbrush to remove the build-up. Rinse and dry before replacing the cap.

Remember, the cleanliness of the contacts is essential to the integrity of the link. Look after your cable and it will look after you.

***WARNING: On the following pages are the calibration instructions for the displays systems. It is essential that the calibration procedures are followed properly. Failure to do so can cause injury or death!!**

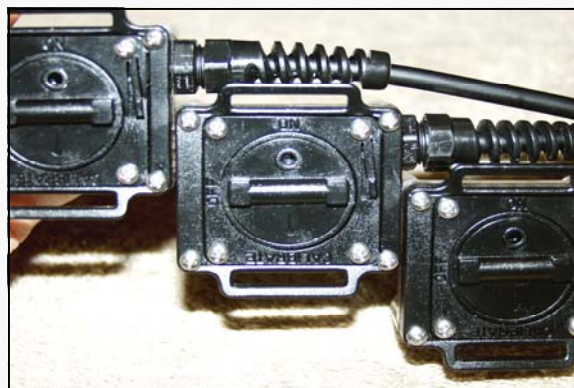
CALIBRATION JETSAM DISPLAYS

The Jetsam triple wrist display is a triple redundant system with each display having its own case, cable, battery and circuitry. Each display will read an individual oxygen sensor. This display will show the PPO2 of the oxygen. That is its only function.

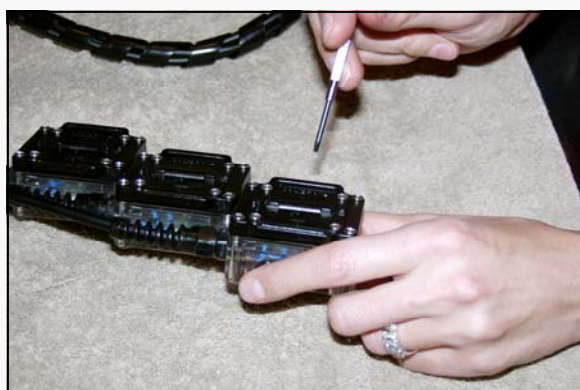
The divers that prefer this display are those who truly want to "Keep It Simple" and appreciate the triple redundancy. Things to remember with this display is that the back port must be closed prior to jumping into the water and also any water must be tapped out of the display prior to opening the port as well. A single drop of sea water on to the board will damage it. Do not use compressed air!

Those who are mechanically inclined will find that they are able to service this display themselves; Others may find it challenging. But servicing, if required can be done by the dealers or by sending in the parts to head office.

Calibration is the same for both the larger and smaller sensors. To calibrate the displays, the dial will need to be turned counter-clockwise while pushing the lever to the right. The lever must be pushed over in order for the dial to be turned in this direction. Once in this position, a small port will open to allow access to the meter. Insert the jewellers screwdriver into the port and gently turn the screw to adjust the reading.



***WARNING: When inserting the screwdriver into the port to adjust the meter, DO NOT PUSH THE SCREW DRIVER INTO THE METER WITH FORCE. GENTLY PLACE THE TIP OF THE SCREW-DRIVER INTO THE ADJUSTMENT SCREW ON THE METER.**



***WARNING: After diving, gently tap the display on your thigh to remove any water trapped in the back of the display before opening the calibration port. A single drop of salt water on the electronic board or meter will ruin them!!! Gently means, do NOT use compressed air!!**

The displays should be calibrated with oxygen. The procedure for this, is as follows:

1. Ensure that the diluent tank valve is closed.
2. Draw all of the gas out of the loop. Do this by putting the DSV into your mouth, open the loop, inhale the gas into your lungs and then exhale it out of your nose.

***Note: it is important that you do not exhale any gas back into the loop while doing this.**

3. With the loop closed, open the oxygen tank and press the manual add valve button, adding oxygen into the loop until the exhaust valve burps.
4. Repeat steps 2 & 3 until the loop has been completely flushed with oxygen. This usually takes 3 to 4 flushes.
5. Once the loop has been completely flushed close the oxygen cylinder and open and close the DSV quickly to bring the gas in the loop to ambient pressure. With the loop closed, calibrate to 1.00

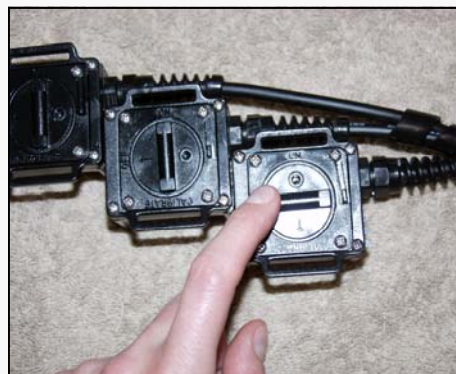
The readings should be verified with air. To verify with air, first ensure that both tank valves are turned off. Then, remove the loop hose which is attached to the exhaust side of the DSV. Put the DSV into your mouth, open the loop and breathe. This will draw fresh air through the loop and eliminate the pure oxygen which you flushed the loop with. It will take a few minutes for the oxygen percentage to drop. Alternately, you can also remove the loop hose which is attached to the sensor pod in order to flush the sensors. Once the displays have been calibrated, close the calibration ports on the back of the displays.

***WARNING: DO NOT FORGET TO CLOSE THE CALIBRATION PORTS ON THE DISPLAYS. THE DISPLAYS WILL NOT BE WATER-TIGHT WITH THE PORTS OPEN!!**

***WARNING: The PPO2 display cases have internal magnets. Divers should not wear a compass on the same wrist or near the displays as the magnets will cause the compass to read incorrectly.**

***SERVICE: Note that the display backs are disposable and are not meant to be serviced.**

The KISS rebreather should be flushed with oxygen on every dive to ensure that the displays are reading correctly, and re-calibrated every time the absorbent is changed.



ORIGINAL JETSAM DISPLAY BATTERY WARNING!!

The batteries used in the displays are Duracell PX28L 6 volt camera batteries or equivalent.

DO NOT SUBSTITUTE ALKALINE BATTERIES!

These batteries should be replaced any time the backlighting will not turn on, every three months, or more often. Do not attempt to use the batteries to the failure point.

***WARNING: WHEN THE BATTERY VOLTAGE DROPS, THE DISPLAY READING GOES HIGH. THIS IS A POTENTIALLY DEADLY SITUATION. IF THE DISPLAYS HAVE BEEN ACCIDENTALLY LEFT ON FOR AN EXTENDED PERIOD THE BATTERIES MUST BE REPLACED.**

Make a note of the installation date of the batteries. Also note the number of hours each battery is used. Your life depends on the accuracy of the sensors, batteries, and displays.

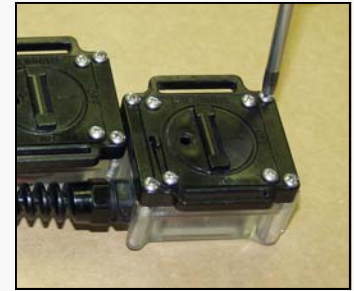
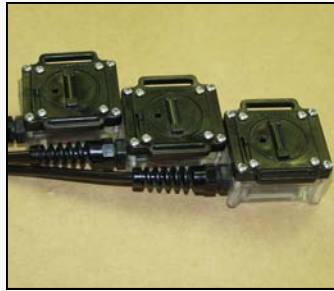
With the backlighting enabled the displays will operate for 20 hours after which the backlighting will become dim and fade out. The display will continue operating for another 20 hours before it fails. **If the backlight option is selected but the light does not come on CHANGE THE BATTERIES!**

To change the batteries, remove the four outer screws on the back of the display case and carefully remove the cover. After changing the battery and logging the date, ensure that the o-ring is LIGHTLY lubricated and clean prior to replacing the cover.

Replacing Batteries/Meters/Circuit Boards

The following instructions are for replacing the batteries, meters (LCD read-out) or circuit boards. Note that these instructions are for replacing the circuit boards with the plug-in wires.

Before you start, ensure that your work area, tools and your hands are clean and dry. This is quite important as a single drop of sea water will ruin your electronic display.

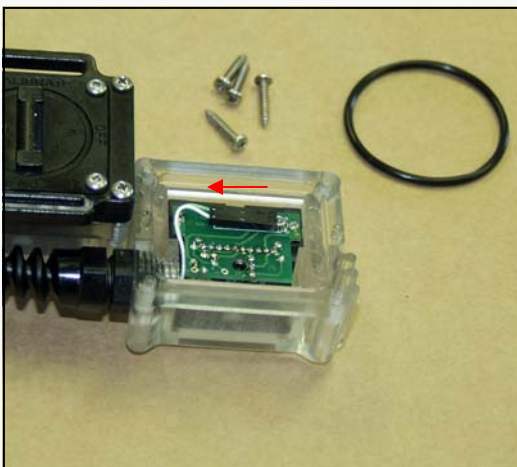


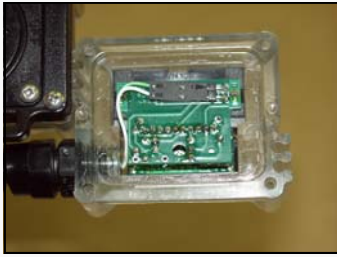
Take the display and with the calibration port side down gently tap the display on your thigh to remove any water droplets that could still be on the display back. GENTLY!! Even if you have been out of the water for some time, you should still do this.

***NOTE: Water should be tapped out when ever the case is opened or when the calibration port is opened. Do not use compressed air!!**

Place the display port side up on the table and remove the 4 outer screws on the display that you wish to service. You will need a Philips screwdriver. As you are removing the screws try and remember how tight they are. The case is sealed by an O-ring and the screws should not be over tightened. When you close up the case again, this will assist you in sealing the case properly.

The wire will need to be removed from the back of the circuit board. To unplug it, gently pull the black plug towards the wire. Once the wire has been unplugged, the circuit board can be removed. Pull it straight up and out. It will be snug. If you like, you can use a tool such as a dental pick to assist you or one of the small jewellers screw drivers from your tool kit. HOWEVER, be very careful that you do not damage the circuit board!! Replace the battery, meter or circuit board, as required.





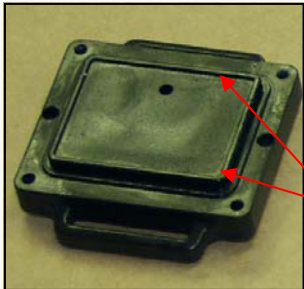
Once you have repaired or replaced the required parts, insert the circuit board back into the case. Push firmly, straight down while ensuring the wire is not pinched on the side. Once in place, plug the wire back in. Use a tiny screwdriver to push the wire into the side of the board, by where it comes in. Also, keep wire on bottom side of Souder bump located at the top left side of board. This will help keep a small amount of pressure on the connector, so it doesn't come undone.

Now you are ready to install the O-ring. Check it for nicks and indentations and if you find any, discard the O-ring and install a new one. If you dent the O-ring while re-attaching the display back, discard it and use a new one.

***NOTE: This is important as a flawed O-ring will allow water to enter the case!!**

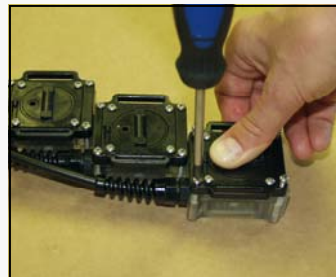
Apply lubrication generously to the O-ring. The lubricant will help the O-ring remain in place and will also assist in positioning the display back properly.

Lubricant should also be applied to the raised edge, on the inside of the display back. This will ensure that the raised plastic slides past the O-ring without catching it.



Replace the O-ring in the case. If you are reusing an O-ring, it will have kept its shape. It can go back into the case in the same orientation that it was in before. The lubricant will assist in keeping it in position.

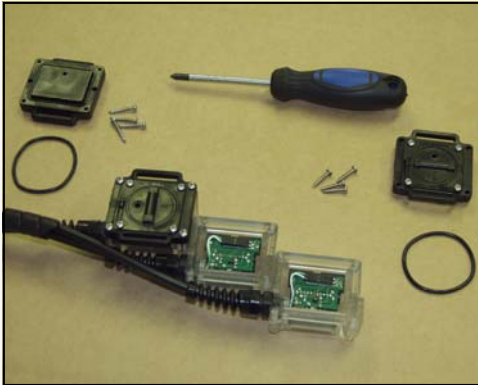
Place the back on the display case. Ensure that you have placed it correctly with the calibration port in the correct position. You will need to push it firmly down into position and must be able to hold it in place while you insert and tighten the screws. This is easiest to do by pushing down on the back, standing and using your body weight to help hold it in place.



Place the screws in the holes and turn them slightly counter clockwise until you feel them drop into the old threads. Then tighten the screws until the back is secure and seated properly. While it is important that the screws are tight enough, it is also important that they are not over tightened. Remember, the O-ring creates the seal.

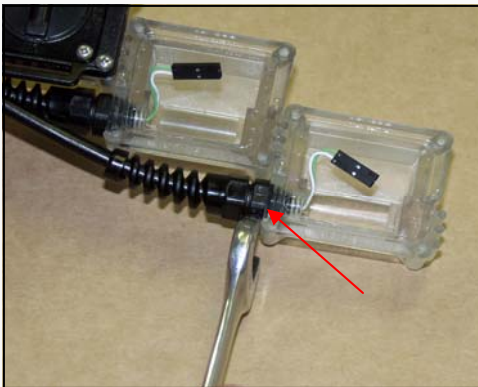
Replacing A Single Display Case

In order to remove the clear cover, you will need to remove the back from the case. As well as on the case next to the one you are working with. If you are working with the middle case, you will need to remove all 3 display backs.



To change the clear display cover, start by following the directions on page 41. As well as having the display backs off on the case that you would like to change, the O-ring, wire and circuit board assembly must be removed.

The strain relief/wire assembly will need to be removed from the clear cover. This is done by loosening the hex nut on the strain relief which is closest to the case. Once it is loose, the wire/strain relief assembly can be removed.

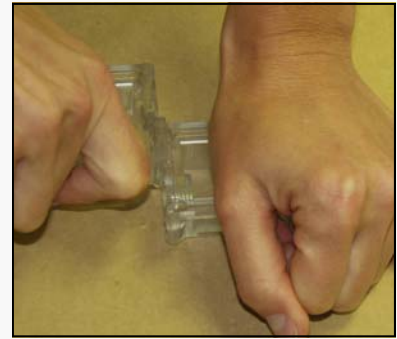
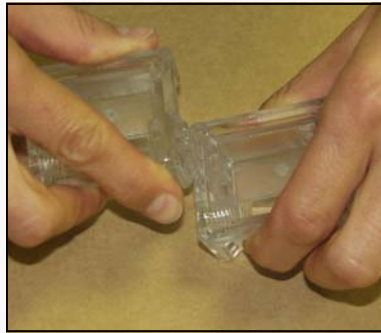


***NOTE: Do not touch the other nut on the strain relief. This is used to attach the strain relief to the wire. Generally, a strain relief can only be used once. If you loosen it or remove it, it should be replaced. Also, it is normal for the 2 nuts to have a gap between them.**



Lay the displays on the edge of your work table. The case to be removed should be sitting over the edge. With a rubber mallet, gently tap the case in the area where it is attached to the second case. See above right photo for the correct tapping location. If you tap on any other part of the case, use too much force or twist it, you can damage the case which could cause breakage at a later date.

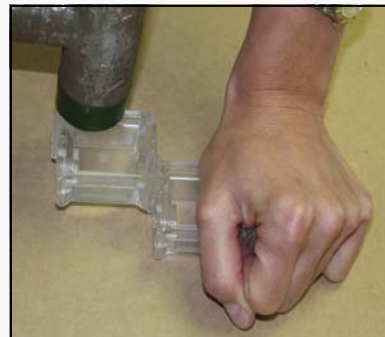
To attach a new clear display cover, reattach the strain relief and wire first. First, twist the wire counter clockwise 6 to 8 full revolutions. Then insert into the clear cover and tighten by hand. Insert the wire through the hole on the case. Secure the strain relief to the case. Tighten by hand first and then using a wrench, turn it another 1/2 to full turn more until seated. Twisting the wire prior will ensure a straight wire once you have finished reassembling the display case.



Apply lubricant to the puzzle pieces which join the displays together and then push the pieces together by hand. (ensure that you have them oriented the correct way). You should be able to push them about 1/8 to 1/4 inch together. Then, lay the cases on the table and gently tap with a rubber mallet until the edges on the back are even. Tap gently in the area where the cases join. See photo on the left.



WRONG!!



WRONG!!

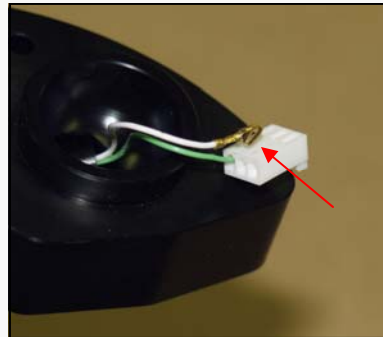
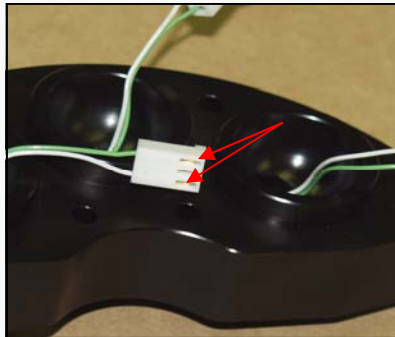
***NOTE: Only tap the cases by the puzzle pieces, as per above instructions. If you tap the cases on the outer edges, as shown in the two above photos, you will stress the plastic. This will cause breakage.**

Following the directions on page 42, insert the circuit board assembly into the case, reattach the wire to the board, insert the O-ring and seal the case.

Replacing the Wire

Remove the spiral wrap and set aside. Then, following the directions on page 41, prepare your work area, remove the display back, unplug the wire, remove the circuit board assembly and then the strain relief/wire assembly from the clear cover.

To remove the wire from either the Classic KISS sensor plate or the Sport KISS three hose connector, you will need to remove the white molex connector.

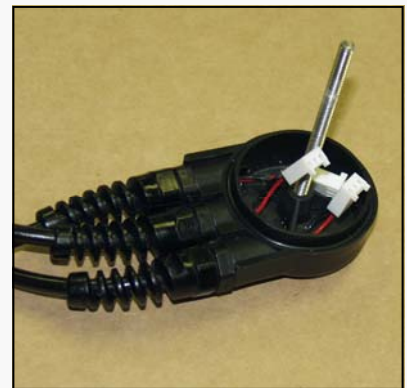


To remove the molex connector, push down on the two gold contacts as shown in the upper left photo. You will need to use a small tool such as a dental pick. Gently pull the wire out as you are pushing down. Take note on how the connector comes out of the contact. It will need to be attached in the same way. Also make a note on what position each wire is in. If you reattach the wires backwards, you will have a - sign in front of your digital PPO2 read out.

Now you are ready to remove the wire from the Sport KISS 3 hose connector.

Loosen the strain relief on the 3 hose connector. If you are changing the middle display wire, you will need to remove one of the wires on the outside first. If you do need to remove an outside wire that is not in need of replacement, ensure that you do not loosen the nut which attaches the strain relief to the wire. Loosen the hex nut which attaches the wire to the 3 hose connector. Remember, a strain relief can only be used once!

Your new wire will already have the strain relief attached to it. All you need to do is tighten the hex nut onto the 3 hose connector. Hand tighten and then using a wrench turn another 1/2 to full turn until seated. Ensure that the strain relief is threaded in straight. The bottom of the hex nut should be flat against the area where it is seated against.



Once the wires have been secured to the connector, the other end can be attached to the display case. First, twist the wire counter clockwise 6 to 8 full revolutions. Then insert into the clear cover and tighten by hand. For the last 1/2 to full turn, use a wrench and tighten until seated. Twisting the wire prior will ensure a straight wire once you have finished reassembling the display case. Follow the directions on page 42 for reassembling the case properly.

Display Troubleshooting

FLICKERING OR FLUCTUATING DISPLAYS

Your displays may flicker slightly on the surface with no sensor attached. This is normal. It is called random noise.

On the surface with a sensor attached your displays will also fluctuate. This is normal. Once diving or breathing on the unit the displays will stabilize and act normal. What is normal? Showing a gradual PPO2 drop as you metabolize the gas in the loop. The more you dive your KISS rebreather, the sooner you will learn how the oxygen sensors act.

If the displays are fluctuating during a dive this could mean the sensors are old, the battery needs to be replaced, the wire could be damaged or the magnet isn't registering (some of the older display backs had this problem).

HARD TO CALIBRATE

The potentiometer (PPO2 adjustment screw) is turned all the way in one direction. You will need to do at least one full turn, maybe two in the opposite direction and then try and calibrate again.

The sensor or battery may be old.

PPO2 READ OUT IS ZERO OR -1

If the read out is -1 then sea water has come in contact with the circuit board and/or meter. Any parts that have come in contact with sea water must be replaced.

If the read out is zero, then it could also be a dead sensor.

DETERMINING THE PROBLEM AREA

To determine where the problem lies, first take the sensor from the faulty display and swap it with a functioning one. Did the problem follow the supposedly faulty sensor? If yes, the sensor is bad. If the display still does not work, then it probably isn't the sensor.

Next, swap the meter with a functioning one. Again, did the problem follow the meter? Or is the faulty display still not working? If this is the case, the circuit board could be bad. If the meter is working on a known good display, it might be ok. When sea water comes in contact with electronics, even if it is just a small amount it is difficult to determine where and how bad the damage is. It could even be in the wire. When in doubt, change the wire, circuit board and meter.

SENSORS

When you open up your new AI PSR-11-39-MD sensors, they will have a millivolt reading between 8.5 and 13 millivolts. As per Analytical Industries, as long as they are in that range, they are safe to use.

***WARNING: You also need to ensure that they can be calibrated in Oxygen and that they read correctly in air. This is very important. Even if a sensor is reading in the proper range, as it ages you may no longer be able to calibrate it properly.**

*****IF THIS HAPPENS, THE SENSOR MUST BE DISCARDED. FAILURE TO USE A PROPER SENSOR WILL CAUSE SERIOUS INJURY OR DEATH!!!!!!!!!!**

In diving applications the larger sensor will last one to two years, depending on how often you dive and how they are stored. Sensors should be allowed to dry out after your day of diving, especially if you are diving in a humid environment. This means that you remove the hose on the display pod overnight to allow air to circulate through it. Leaving the unit sealed up will not allow the condensation to evaporate.

*****If the Sport KISS has moisture in the pod from diving or from being in a humid environment, and it is then sealed up tight, the wires from the end of the display will start to corrode!!!! If this happens, whatever display or computer you are using, will not work properly!!!! It is extremely important that the pod is allowed to dry out if the unit is to be sealed up. This means that after a dive trip, don't just drop the unit on your work bench and walk away from it!!! At the very least, pull the pod off the unit and let it dry. This will help keep your wires in good working order.**

Sea water on the sensors will probably cause them to fail.

As your sensors start to age you will notice that they are harder to calibrate, slower to react and will drift more after calibration.

Electrolyte, which is a gel like substance is inside the sensors. If you notice this substance leaking out of the sensors, do not touch it as it is caustic. Do not dive with a leaking sensor. The readings will be high!!!!

CALIBRATION & INFORMATION, VR TECHNOLOGY DISPLAYS:



The VR Technology pendent display has 3 PPO2 readouts which read 3 individual sensors, an independent battery compartment, and 3 calibration potentiometers, one for each sensor. This is a great display for those who want a simpler system for battery changes and calibration. As the case is not opened during calibration there is less risk of flood damage. Also, the battery change is quick and simple as only one part needs to be undone. This makes any last minute battery changes simple and fast!

To turn the display on push the top button; the PPO2 for each sensor will be displayed. The displays will remain on for approximately 4 to 5 minutes. To display the sensor's millivolts, push the bottom button and hold. This should be done while exposing the sensors to air. To be safe to dive, the reading must be between 8 and 13 AND you must be able to calibrate the sensors in both air and oxygen. If the sensors are unable to be calibrated in both air and oxygen, or the millivolt is off, discard them. They are no longer safe to dive.

The best way to dive the VR pendent display is to bring it around your body to the opposite top D-ring, and clip it to a SMALL loop of bungee. When you want to look at the display, simply grasp it with your hand, and while pulling it away from your body, push the button down to turn it on. It's very simple to use.

BATTERY

There is a red indicator LED light at the top of the display. When the battery needs to be changed, the red LED will stay on permanently WHEN A BUTTON IS PRESSED.

To change the battery, unscrew the battery compartment cap which is located at the bottom of the display, opposite the bottom button, on the other side of the cable. To open the compartment, use either the included tool or insert the tips of a set of pliers into the holes. While the compartment is open inspect the O-rings. Check them to ensure they are in good condition, clean and then apply fresh lubricant.

The display takes a AA size battery. For best results, a 3.6v lithium battery should be used. This battery will last around 40 hours. Insert the battery with the "+" side inwards. Secure the battery compartment cap.

Push the top button on the display to turn it on. Ensure that the red LED light is off. The display will turn off automatically after approximately 4 minutes to conserve the battery. Note that the red LED light will turn on for a moment, just as the display is about to turn off. This is normal.

WARNING: WHEN THE LOW BATTERY INDICATOR LIGHT COMES ON, THE BATTERY MUST BE CHANGED!!!! DIVING WITH A LOW BATTERY WILL AFFECT THE PPO2 READINGS! THIS CAN CAUSE INJURY OR DEATH!!



CALIBRATION

First ensure that the battery is good.

To adjust, turn the black cap on the back side of the display. Each cap will have a number beside it that corresponds with a display. Turn the black cap using a large coin or similar tool. If you can not turn the cap and have run out of range, turn the cap all the way in and start over again.

BE VERY CAREFUL TO NOT SCREW THE CAP ALL THE WAY OUT. THIS WOULD EXPOSE THE SEALING O-RING AND IF TAKEN UNDERWATER, WOULD FLOOD THE DISPLAY!!!

If you have trouble calibrating the display, expose the sensors to air and check the millivolts. They should read between 8 and 13 millivolts. If the millivolts are correct, start the calibration procedure again. Screw the black cap all the way in and then back out again.

If for some reason the black calibration cap is completely undone, clean and lubricate the O-ring on the waterproof cover and also the internal O-ring. Replace the cap.

BE EXTREMELY CAREFUL TO NOT CROSS-THREAD THE CAP!!

The displays should be calibrated with oxygen. The procedure for this, is as follows:

1. Ensure that the diluent tank valve is closed.
2. Draw all of the gas out of the loop. Do this by putting the DSV into your mouth, open the loop, inhale the gas into your lungs and then exhale it out of your nose.

***Note: it is important that you do not exhale any gas back into the loop while doing this.**

3. With the loop closed, open the oxygen tank and press the manual add valve button, adding oxygen into the loop until the exhaust valve burps.
4. Repeat steps 2 & 3 until the loop has been completely flushed with oxygen. This usually takes 3 to 4 flushes.
5. Once the loop has been completely flushed, close the oxygen cylinder and open and close the DSV quickly to bring the gas in the loop to ambient pressure. With the loop closed, calibrate to 1.00.

The readings should be verified with air. To verify with air, first ensure that both tank valves are turned off. Then, remove the loop hose which is attached to the exhaust side of the DSV. Put the DSV into your mouth, open the loop and breathe. This will draw fresh air through the loop and eliminate the pure oxygen which you flushed the loop with. It will take a few minutes for the oxygen percentage to drop.



The KISS rebreather should be flushed with oxygen on every dive to ensure that the displays are reading correctly, and re-calibrated every time the absorbent is changed.

VRx PROGRAMMING & CALIBRATION

PROGRAM THE VRx TO READ 3 EXTERNAL OXYGEN SENSORS

In order for the VRx to read the 3 KISS sensors and work as a triple display, the steps below must be followed. It is important that you program the computer properly.

1. Push one of the buttons to turn the computer on. You should be on the home screen.
2. Push the right button quickly two times. This will bring you to the "Dive Options" screen. On this screen you will see items such as GMODE, XFUNC, XDEC and other options which you can adjust.
3. It is the GMODE, XFUNC and XDEC that will need to be adjusted for triple PPO2 use.
4. Press both buttons on the computer quickly. You should now see on the bottom of the computer, an arrow in two brackets. This means that to move through the options on this screen you need to do quick pushes on both buttons.
5. Move through the fields, doing quick pushes on both buttons until you have highlighted the XFUNC area.
6. Press the right button until you see the 3xPPO2 show. This is what you want.
7. Press both buttons again quickly to move the highlight to the next field, XDEC.
8. Press the right button until you see YYY. This is what you want. The 3 Y's indicate that all 3 sensors are activated.
9. Now that you have XFUNC and XDEC programmed, you need to set the GMODE. This needs to be done AFTER the XFUNC and XDEC.
10. Move the highlight through the fields until you have it under the GMODE.
11. Push the right button until you see PO2. This is what you want.
12. Now the top row of the "Dive Options" screen should read: "PO2" under GMODE; "3xPPO2" under XFUNC; and "YYY" under XDEC. This is what is required in order for the VRx to read 3 sensors and act as your triple PPO2 display.
13. Do a long press on both buttons to take you back to the main screen. You will see at the top right hand corner "XP". This means that the computer knows that external sensors will be used.

***WARNING:** If you program the GMODE first and then move to program the XFUNC, when you change the XFUNC, it will cause the GMODE to default to another setting. This is why you must program the XFUNC and XDEC first, then lastly program the GMODE. Also, if you let the battery run completely down, you may lose your pre-programmed settings. Please check these fields in the "DIVE OPTIONS" screen to ensure they are still correct.

CABLE OPTIONS

There are now a number of cables for use with the VR3 and VRx computers. They are to be used as follows:

JETSAM DUAL DISPLAY AND VR CABLE: this cable will read one sensor only. It will work on a VR2, VR3, and the C53 version of the VRx. ONE SENSOR ONLY.

VRx, C54 COMPUTER WITH THE "SINGLE FISCHER" PLATE: With the single fischer plate, the "C57A" cable must be used. ONE OR THREE SENSOR USE.

The "A" cable is labelled with "C57A". Ensure that this is the one you are using. VR Technology offers many cables, so it is important that you are using the correct one! Also, each cable is labelled with the words "rebreather" and "VRx". Insert the end marked "rebreather" into your KISS fischer plate. Insert the end marked "VRx" into the computer. Line up the red dots on the fischer connectors and push the ends together.

CARE OF THE CABLES

The fischer connector port is watertight and any water that gets in to the port cannot harm your computer. However, should sea water get inside the port or the ends of your linking cable, flush them with fresh water as soon as possible afterwards then leave them to dry completely BEFORE refitting the cap.

If the reading for a sensor becomes erratic, a solution may be to put a SMALL amount of grease on the metal end of the cable end that slides into the computer fischer connector to lubricate the inner O ring of the bulkhead connector. This will serve to improve the seal and make the connection more reliable.

If corrosion does appear on the contacts rinse them briefly in white vinegar and use a fine toothbrush to remove the build-up. Rinse and dry before replacing the cap.

Remember, the cleanliness of the contacts is essential to the integrity of the link. Look after your cable and it will look after you.

CALIBRATION VRx

1. While on the home screen, do a long push on the left button. This will take you to the "CLOSED CCT" screen.
2. Do a quick push of both buttons. This will take you to the "SELECT" screen which is the area in which you can select various gas mixtures and turn them on and off as required.
3. Push both buttons quickly in order to move the highlight so that it is over the gas number.
4. Use the left button to scroll through the various gas mixtures until you reach the one that says "99".
5. Push both buttons until the highlight is over the "off" area.
6. Push one of the buttons to change this field to "on".
7. Move the highlight to the gas which was on first. Turn this gas off.
8. Do a long push on both buttons to save. You are now back in the "Select" screen. At the bottom of the screen it should say "CAL".
9. Do a long push on both buttons to accept 99 as the calibration gas. You are now ready to go to the calibration screen so that you can calibrate your computer in oxygen. This is what is recommended, with a verification in air.

***WARNING: ONCE THE CALIBRATION PROCESS IS COMPLETE, DO NOT FORGET TO TURN OFF THE 99 GAS SELECTION AND OPEN UP YOUR DIVING GASES!**

1. From the home screen, push the left button once and you will arrive at the PPO2 screen. This is the screen with the 3 sensor readouts showing sideways, in large numbers. You will see the three individual readouts and also the average in the top right corner.
2. Push the left button one more time and you will arrive at the O2 sensor screen. On this screen you will see the sensor and millivolt read outs.
3. From this screen, do a fast push on both buttons to start the calibration process.
4. Then do a long press on both buttons.
5. Do another long press on both buttons and you will see the screen change to "Flush"
6. Completely flush the loop with oxygen. The steps for this are as follows:

- Ensure that the diluent tank valve is closed.
- Draw all of the gas out of the loop. Do this by putting the DSV into your mouth, open the loop, inhale the gas into your lungs and then exhale it out of your nose.

***Note: it is important that you do not exhale any gas back into the loop.**

- With the loop closed, open the oxygen tank and press the manual add valve button, adding oxygen into the loop until the exhaust valve burps.
 - Repeat steps 2 & 3 until the loop has been completely flushed with oxygen. This usually takes 3 to 4 flushes.
 - Once the loop has been completely flushed, close the oxygen cylinder and open and close the DSV quickly to bring the gas in the loop to ambient pressure.
7. One quick push on the right button. The word "Equalize" will show.
 8. Another quick push on the right button.
 9. We should now see the word "Stable" on the screen. Do a quick push on both buttons.
 10. You should now see the sensor read outs changing as they calibrate. Do a quick push on the left button to take you back to the main screen.
 11. On the main screen, you will see the average reading at the top right hand corner, of the three sensors.
 12. Move through the screens and go to the O2 sensor screen. Here you can confirm the sensor and millivolt read outs.
 13. Verify the readings in air.

WHEN A SENSOR READING IS ZERO

The information below is what you will see and you can verify if you have forgotten to install sensors, if a sensor is dead, or if your cable is damaged.

1. On the home screen, there will be an average of your PPO2 in the top right hand corner. If you are having this problem, this reading will probably not be what you expect. Push the left button until you are on the PPO2 screen.
2. What you will probably see if the cable is damaged or the sensors are used up, (certainly if the sensors are missing) is that the readings will be zero.
3. Push the left button one more time and move to the O2 sensor screen.
4. Here you will see that the PPO2 readings and the millivolt readings are both zero.
5. At the point, check your rebreather to ensure that the sensors are in place. If they are, swap any good sensors with the ones that read zero. Look at the computer again. Did the good sensor reading follow the moved sensor? Then you probably have a sensor problem. If not, it could be a damaged cable.

These instructions are here to provide you with some quick notes on how the VRx computer works. This is not a complete list of the VRx instructions. Prior to diving this computer, the VRx manufacturer's instruction manual must be read in full.

THESE INSTRUCTIONS ARE SUBJECT TO CHANGE!!

VR3 PROGRAMING

The VR3 dive computers from VR Technology Ltd. are compatible with the KISS rebreathers. They can be dove either independently or with a live link. These computers offer recreational and technical KISS divers an alternative way to monitor PPO2 and decompression.

When diving a VR3 independently it will not be linked to your KISS rebreather. With this configuration, you will program the computer for a PPO2 that you would like to calculate your decompression. If you are diving this way, it is very important that you keep the PPO2 on the rebreather equal to or greater than the computer.

When diving a VR3 live it will be linked to your KISS rebreather. This means that your decompression will be based on the actual PPO2 of the gas in your KISS rebreather breathing loop.

Whether you choose to dive your computer live or independently, there are several features that you should familiarize yourself with. They are listed below. Please note that these features and instructions are listed here to provide you with the particulars of the VR3 computers. They are also here to provide you with some convenient quick notes. This is not a complete list of the computers features and these instructions do not replace the VR3 users manual. BEFORE DIVING YOUR VR3, YOU MUST READ THE USERS MANUAL!!

THESE INSTRUCTIONS ARE SUBJECT TO CHANGE!

****NOTE:** In order to easily move through the various screens on your VR3, it is recommended that you memorize the icons on the bottom of the screen and their meanings. Once you know what they represent, moving through the various screens is quick and simple!

THESE INSTRUCTIONS ARE FOR THE VR3 COMPUTER.

PROGRAM VARIOUS DILUENT GAS: AIR, NITROX, or TRIMIX

1. Push either button to turn the computer on.
2. Push the left button to take you to the home screen.
3. Enter "Dive Now" mode. This will keep the computer on for 5 minutes in between changes. One quick push on both buttons, at the same time, will enter "Dive Now" mode.
4. Ensure that the scuba tank symbol is showing on the bottom left side of the command line. (the bottom dark bar). If it is not, do quick pushes on the left button until it shows.
5. One long push on the left button. If you are in open circuit mode, you will see "SELECT" at the top of the screen. If you are in closed circuit mode, you will see "CLOSED CCT" at the top of the screen. One long push on both buttons, at the same time, will switch the computer from OC to CC, and back again. Ensure that the computer is in "CLOSED CCT" mode.
6. One quick push on both buttons. This will take you to the "SELECT" screen.
7. A quick push on both buttons, at the same time, will move you through the various fields on the screen. Set gas, MOD, PP, gas on/off as required, for as many gases as desired. With the field you wish to change highlighted, do quick pushes on either button to toggle through the features of that field.
8. Once set, do a long hold on both buttons, at the same time, to save.
9. One long push on the right button to return to the "CLOSED CCT" screen.
10. One quick push on the right button to return to the home screen.

SWITCH TO A DIFFERENT PRE-PROGRAMMED DILUENT GAS

1. From the home screen while diving or in "Dive Now" mode if not underwater, do one long push on the left button. The scuba tank symbol must be showing on the bottom left side of the command line. If it is not, do a quick push on the left button to show it.

2. One quick push on both buttons. This will take you to the "SELECT" screen.
3. One quick push on both buttons. This will take you to the "ADJUST" screen.
4. Doing quick pushes on both buttons, at the same time, toggle to the on/off field. Using the right or left button, do a quick push to turn the current gas off.
5. Doing quick pushes on both buttons, at the same time, move to the "GAS: #" field. Doing short pushes on the right or left button, toggle through this field until you reach the gas number which you desire to turn on.
6. When you reach the gas you wish to turn on, do quick pushes on both buttons, at the same time, to return to the on/off field.
7. Use the right or left button and do a quick push to turn the gas on.
8. One long push on both buttons to save. This will return you to the "SELECT" screen.
9. One quick push on the right button to return to the "CLOSED CCT" screen.
10. One quick push on the right button to return to the home screen.

PROGRAMING THE PPO2

1. Push either button to turn the computer on.
2. Push the left button to take you to the home screen.
3. Enter "Dive Now" mode. This will keep the computer on for 5 minutes in between changes. One quick push on both buttons, at the same time, will enter "Dive Now" mode.
4. Ensure that the scuba tank symbol is showing on the bottom left of the command line. If it is not, do quick pushes on the left button until it appears.
5. One long push on the left button. If you are in open circuit mode, you will see "SELECT" at the top of the screen. If you are in closed circuit mode, you will see "CLOSED CCT" at the top of the screen. One long push on both buttons, at the same time, will switch the computer from OC to CC, and back again. Ensure that the computer is in "CLOSED CCT" mode.
6. Short pushes on the left button will change the PPO2 in 0.05 increments.
7. When the computer is set at the required PPO2, do a quick push on the right button to save. This will take you back to the home screen.
8. To program an alternate PPO2, go back to the "CLOSED CCT" screen by doing one long push, left button.
9. One long push on the left button and the PO2 will switch over to the alternate PPO2. Once there, set the PPO2 as desired by doing short pushes on the left button.
10. To save this setting, do a quick push on the right button. This will return you to the home screen.
11. Once both the PPO2's are set, return to the "CLOSED CCT" screen by doing a long push on the left button.
12. You can toggle back and forth between the two PPO2 set points by doing a long press on the left button. The PPO2 you wish to start your dive with should be the one showing on the screen.
13. One quick push on the right button to accept the PPO2 and return to the home screen.

SWITCHING TO THE ALTERNATE PPO2, UNDERWATER

1. One long push on the left button. This will take you to the "CLOSED CCT" screen.
2. One long push on the left button. This will switch the current PPO2 with the alternate that you have programmed in.
3. One fast push on the right button. This will return you to the home screen.

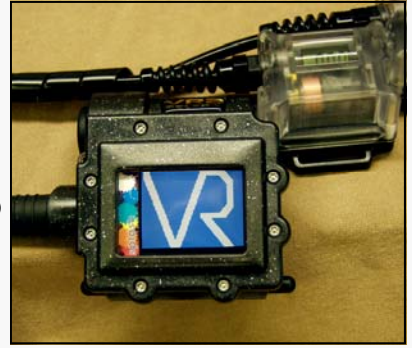
SWITCHING TO A DIFFERENT PPO2, NOT PROGRAMED, UNDERWATER

1. One long push on left button. This will take you to the "CLOSED CCT" screen.
2. Do short pushes on left button until the desired PO2 is reached.
3. A quick push on right button will save your selection and return you to the home screen.

OPENING THE VR3 CLOSED CIRCUIT REBREATHER LINK

This procedure will switch your VR3 from running independently to live. To do this, a special PIN will need to be purchased from the manufacturer in order to open this feature on your dive computer. You will also need to change your Jetsam triple display for a Jetsam dual display with a VR cable.

1. Push either button to turn the computer on.
2. Push the left button to take you to the home screen.
3. Enter "Dive Now" mode. This will keep the computer on for 5 minutes in between changes. One quick push on both buttons, at the same time, will enter "Dive Now" mode.
4. On the left side of the command line, you will see either a scuba tank symbol or "DVo". Short presses on the left button will toggle between these two options. Choose the "DVo" option.
5. With the "DVo" option showing, do a long press on the left button. You will be taken to a screen that says "Dive Modes" at the top. Various features are accessible from this screen. If the features are enabled, you will be able to highlight them. If the features are not enabled, you will not be able to access them and will need to purchase a PIN from the manufacturer in order to do so.
6. Put the highlight on the "OFF", underneath the "XFunc" feature. Move the highlight by doing short presses on both buttons.
7. A short press on the right button will change the highlighted area to "Xo2".
8. One quick press on both buttons. This will move the highlight to the "OFF" underneath the "XDec" feature.
9. One quick press on the right button will change the highlighted area to "ON".
10. One long press on both buttons will return you to the home screen.



NOTE: IF A SENSOR IS NOT CONNECTED TO THE VR3, THEN THE "XFunc" SHOULD BE SET TO "OFF". OTHERWISE CONNECTOR DAMAGE COULD OCCUR.

*NOTE: WHEN "XDec" IS ON, THE COMPUTER WILL READ FROM THE EXTERNAL SENSOR (LIVE MODE). WHEN "XDec" IS OFF, THE COMPUTER WILL READ FROM THE SELECTED GAS AND INTERNAL SETPOINT (INDEPENDENT MODE).

CLOSED CIRCUIT REBREATHER LINK - CALIBRATION VR3

Assemble your Classic KISS rebreather and attach your VR3 to your VR cable.

1. Push either button to turn the computer on.
2. Push the left button to take you to the home screen.
3. Enter "Dive Now" mode. This will keep the computer on for 5 minutes in between changes. One quick push on both buttons, at the same time, will enter "Dive Now" mode.
4. With the scuba tank symbol showing on the left side of the command line, do a long push on the left button. You should see "CLOSED CCT" at the top of the screen. If you don't, do a long push on both buttons to go to this screen.
5. One quick push on both buttons. Now you should see "SELECT" at the top of the screen. This is the screen where you can adjust and choose various gases.
6. *One quick push on both buttons. Go through your gases and select "NX 99" and turn it on.
7. One long push on both buttons. This will save "NX 99" as your diluent.
8. To save "NX 99" as your calibration gas, do a long push on both buttons. "CAL GAS" will show on the top left of the screen.
9. One quick push on the right button to save.
10. One quick push on the right button to take you back to the home screen. *WARNING: AFTER CALIBRATING, REMEMBER TO SET THE DILUENT GAS BACK TO THE ACTUAL DIVE DILUENT.
11. On the home screen, quickly push on the right button until "o2" shows on the right side of the command line.
12. One long push on the right button. This will take you to the "SENSOR" screen. Here you will see the current oxygen percentage, the PPO2 in BAR (adjusted automatically for ambient atmospheric pressure), and a PPO2 bar graph.
13. One long push on both buttons. This will take you into "CAL" or calibration mode. You will see the instruction, "FLUSH CAL GAS" on your screen.

14. Completely flush the loop with oxygen. The steps for this are as follows:
 - Ensure that the diluent tank valve is closed.
 - Draw all of the gas out of the loop. Do this by putting the DSV into your mouth, open the loop, inhale the gas into your lungs and then exhale it out of your nose.
 - *Note: it is important that you do not exhale any gas back into the loop.**
 - With the loop closed, open the oxygen tank and press the manual add valve button, adding oxygen into the loop until the exhaust valve burps.
 - Repeat steps 2 & 3 until the loop has been completely flushed with oxygen. This usually takes 3 to 4 flushes.
 - Once the loop has been completely flushed, close the oxygen cylinder and open and close the DSV quickly to bring the gas in the loop to ambient pressure.
15. One quick push on the right button. This will take you to the "EQUALISE" screen.
16. When the reading stabilizes, do a quick push on the right button to accept and move to the "SENSOR" screen. Here you will see the reading and also the sensors millivolt measurement.
17. If the reading is stable, do a short push on both buttons to save.
18. Your VR2/VR3 is now calibrated.

Operation: While diving, the "Xo2" can be turned on and off. To do this, do a quick push on the right button. This will take you to the "DVo" screen where you can select "Xo2" on or off. With the "Xo2" turned off, your decompression will be calculated using the internal set point.

Tank Mounting Brackets

When attaching the tank mounting brackets to the rebreather bottles, ensure that the bottom of the tank valves line up with the bottom of the counterlung case.

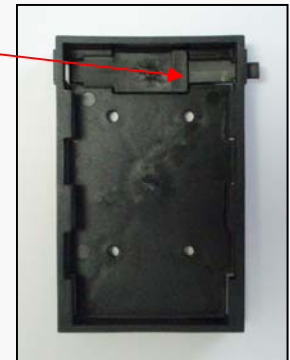
Attach using the enclosed nut driver and large hose clamps. When the bracket is fitted correctly, it will line up with the end of the tank valve, as shown. The tank mounting system should be routinely inspected for wear and damage.



We have found that after a year or two of use, the tank mounting system can start to wear. If this happens the cylinders can pop out of the holder. First flip the mount on the cylinder. By doing this, you should get more life from the mount. Also, at some point, the lever may need to be replaced also. The lever will need to be replaced after a year or two of wear, or if it breaks.

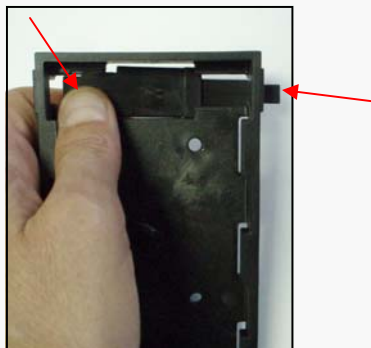
CHANGING THE LEVER:

To remove the old lever, push down on the spot indicated in the photo, while pulling the lever to the right with your other hand (pull on the tab that is on the far right side.)



To insert a new lever, first place the lever under the bracket, as shown. (Note, that the lever can be installed either way, depending on which direction you want the tab to face.)

Then, start to slide the left part of the lever into position. As you start to push the lever into the slots on the bracket, you will need to push down on the far left of the lever, while you are pushing the lever into position with your right hand. Push against the side of the push tab, where the arrow indicates. If you try and snap the lever into position any other way, the channel edges may break!



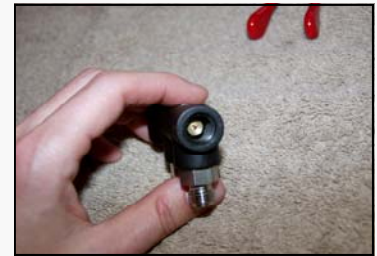
Manual Add Valve/Metering Orifice

The manual add valve is for adding oxygen to the loop. The o-rings should be changed annually or if the flow rate changes, more frequently. The inlet of the valve is protected by a 15 micron filter. This filter will NOT stop seawater from contaminating the orifice. All components in the add valve must be clean, oil free, with the o-rings lightly lubricated with oxygen compatible grease.

The tools required to disassemble the valve are a wrench or alan key, small snap ring pliers and a jewellers screwdriver. First, insert the snap ring pliers into the snap ring on the button end of the valve and remove.



Remove the nut with either the wrench or alan key, depending on which nut you have; pull out the spring. The spool and orifice are all that is left inside the valve.



DO NOT SCRAPE OR GOUGE THE BORE!!!!!!!!!!



To remove the spool and orifice push in the button using a jewellers screwdriver. This will force the spool and orifice out the other end. When you have the spool removed, cut the old o-rings away with a sharp knife and replace them with new V75-008 o-rings which have been lubricated with an oxygen compatible lubricant such as Chris-tolube. Do not scratch the O-ring grooves. The orifice does not need to be removed unless it is damaged or plugged.

The parts in the valve are: A. snap ring; B. nut; C. spring; D. spool & orifice; E. valve body

***WARNING:** When reassembling the valve, ensure that you do not over-tighten the nut. Remember, when screwing any metal screws into plastic use only two fingers on the wrench. If you over-tighten the nut, it will strip the threads and the valve will leak.



When attaching the valve to the filter and the hoses, it is very important that you use a second wrench to hold the nut next to the valve body in place. Do not allow this nut to spin as it will over-tighten and strip the plastic. This will cause the valve to leak.

Older Sport KISS units were shipped with the Swagelok SS/Teflon hoses. New units are shipped with the Miflex hose system. When attaching the manual add valve to the SS/Teflon hoses or the Miflex hoses, remember that the inlet port is the one nearest the add button. The hose which is attached to the oxygen first stage is attached to the inlet port.

Inlet port: attach filter and first stage hose to this fitting.



***NOTE:** The Miflex hoses are tested and rated for oxygen use. As they have standard regulator hose fittings, they can be replaced with other rubber LP hoses. If you do so, please ensure that the hoses you use are rated for oxygen use!!

Also, all low pressure hoses on the Classic KISS should be inspected periodically to ensure that they are not damaged and in good working order. This includes the oxygen hoses, diluent hose, DSV 2nd stage regulator hose, ADV hose.

The KISS rebreathers are mechanically controlled. The oxygen manual add valve houses a orifice which allows oxygen to flow into the loop at all times. In the event that more oxygen is required, the button on this valve will need to be pushed. The difference between diving a KISS rebreather manually and other rebreathers is that the constant flow of oxygen keeps our divers from getting too busy underwater. Diving other rebreathers manually means that the only way oxygen gets into the loop is by pushing the button.

What does this mean to the diver? It means that when you get to your maximum depth, you will adjust your PPO2 and then unless you are working hard or going up and down in the water column, you will only be pushing the button every 10 to 20 minutes. This depends also on where the constant flow has been set. If you find yourself pushing the button all the time, then you need to increase the flow. If you find that your oxygen is creeping up during normal diving activities, then you will want to decrease the flow.

Adjusting the O2 Flow Rate

The oxygen injection rate must be adjusted to suit each individual diver. The required flow rate depends on the physical size of the diver and the degree of exertion used during the dive. If the flow rate is too high the PO₂ will climb to dangerous levels and the breathing loop will have to be purged to reduce the oxygen partial pressure to a safe level. If the flow rate is set too low oxygen will have to be manually added more often during the dive.

TOO LOW IS BETTER AS IT IS QUICKER TO ADD OXYGEN TO THE LOOP, THEN TO FLUSH IT!!

To adjust the flow rate, disconnect the oxygen delivery line where it attaches to the stainless steel elbow on the top of the ADV housing. Attach a 0-1 litre per minute flow meter (Dwyer VFB-60-SSV or equivalent) to this line.

Disconnect the manual add valve supply line where it attaches to the add valve filter and connect a 0-300 psi gauge between these fittings.

Remove the clamp ring from the oxygen regulator, (A) and lift the black plastic plug, (B) out of the regulator cap. Connect the regulator to an oxygen cylinder which has at least 800 psi remaining. Slowly (oxygen, remember) open the oxygen valve. Note the gauge pressure and flow meter reading.

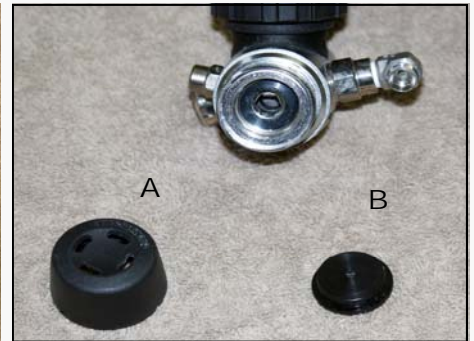
The relationship between the pressure setting and the O₂ flow rate should match the table on the following page.

For those of you using the Miflex hoses. The following photos show how the flow system can be checked and which parts you need. All parts can be purchased through one of your local fittings suppliers. This is just one method that can be used.



First, remove the miflex hose from the filter and attach an IP gauge. Determine where the IP is set, before you make any changes. After you record that information, reattach the hose. Then remove the miflex hose which is attached to the plug side of the valve. Attach your flow meter and short LP hose (see above photo). As per the instructions on the next page, adjust your flow. Once you have adjusted the flow, you can remove the flow meter and hose, and reattach the IP gauge. This will allow you to verify your flow reading with the IP of the first stage, using the chart on the next page.

NOTE: IT IS VERY IMPORTANT THAT TWO WRENCH'S ARE USED WHEN REMOVING HOSES OR FITTINGS FROM THE MANUAL ADD VALVE!!! ONE MUST BE USED TO ENSURE THAT THE FITTING ON THE VALVE DOES NOT SPIN!! SEE THE PHOTOS AT THE TOP OF PAGE 59 (THE PREVIOUS PAGE) WHICH SHOW HOW TO DO THIS PROPERLY.



0.0035 orifice

8.0 Bar (117.6 psi)	0.520 LPM
8.5 Bar (125 psi)	0.550 LPM
9.0 Bar (132.3 psi)	0.570 LPM
9.5 Bar (139.7)	0.600 LPM
10.0 Bar (147 psi)	0.630 LPM
10.5 Bar (154.4 psi)	0.660 LPM
11.0 Bar (161.7 psi)	0.70 LPM
11.5 Bar (169 psi)	0.730 LPM
12.0 Bar (176.4 psi)	0.770 LPM
12.5 Bar (183.8 psi)	0.800 LPM
13 Bar (191.1 psi)	0.830 LPM

Note that some of these pressure settings are beyond the recommended adjustment range of the regulator and may result in erratic performance. Use at your own risk!

These figures are typical but not absolute due to slight variations in the accuracy of the gauge and the tolerance of the metering orifice. If your flow rates are more than 15% different than these, see the troubleshooting guide to determine the problem.

To change the pressure use a 6mm hex key to turn the regulator adjustor under the black plastic plug. Clockwise increases the pressure, counter clockwise reduces the pressure. Turn the wrench slowly and do not insert it too far into the regulator or it will hit the diaphragm and cause the pressure to surge.

So where should the flow rate be set? 0.75 LPM is a good starting point. If you find you have to constantly add oxygen, try increasing the setting by 0.05 LPM. The PPO2 should slowly rise when you are hanging motionless in the water but you should have to add O2 at regular intervals during the dive when maintaining a constant depth. The metering orifice flow rate will decrease as the depth (ambient pressure) increases. The amount it decreases depends on the upstream pressure (regulator pressure setting) versus the downstream pressure (depth). This is not a fault, it is physics.

WARNING!

The oxygen injector is a convenience. It is not a controller in any way. The only device regulating the oxygen partial pressure is your brain. The automatic oxygen add does not reduce the need to monitor the three partial pressure displays. It only reduces the number of times you have to press the oxygen add button. The displays should be checked constantly during the dive. The oxygen regulator can fail and stop delivering O₂ or it can fail and increase the flow drastically. The orifice can become plugged and stop delivering oxygen. The add valve o-rings can fail and increase the amount of O₂ being added to the breathing loop. Any of these things can kill you but any of these problems can be overcome if you are aware of the conditions in the breathing loop.

You must check your PPO₂ reading once every minute.

KNOW YOUR PPO₂ AT ALL TIMES ... OR YOU WILL DIE!!!

Manual Add Valve Trouble Shooting

If the flow rate is lower than it should be in relation to the pressure, one of the following things has happened:

- The filter has become clogged and should be replaced.
- The orifice has become partially plugged and must be replaced.

DO NOT TRY TO CORRECT A LOW FLOW RATE BY INCREASING THE REGULATOR PRESSURE!

If the flow rate is higher than it should be in relation to the pressure one of the following things has happened:

- The orifice has become loose where it screws onto the valve.
- The valve o-ring is worn or damaged.
- The spring is broken or weakened and is not holding the valve closed.

The oxygen regulator has a plastic plug added to prevent the pressure from increasing with depth and increasing the oxygen flow rate. If the pressure is inconsistent the high pressure seat or diaphragm may be damaged. The regulator should be serviced regularly and maintained in an oxygen clean condition.

***WARNING:** It is very important that this valve is in good working order, with proper flow rates and good O-rings. Ensure that you rinse your gear after diving in salt water, and if you flood your rebreather, and you think water has gotten into the valve, service it!! If you pay attention to how often you usually add oxygen to your rebreather during a typical dive, it will be easier for you to notice a problem.

Exhaust Valve, ADV & Work of Breathing

In this section, you will find information about the exhaust valve, ADV and work of breathing. We have helpful hints and trouble shooting. The Apeks exhaust valve and the ADV work in harmony. If you are having difficulties with either one, it makes sense to check both.

[See page 65 for instructions on changing the ADV diaphragm.](#)

BUBBLING APEKS EXHAUST VALVE

There are several things that can cause this problem. Over the next few pages, 6 situations are listed and described.

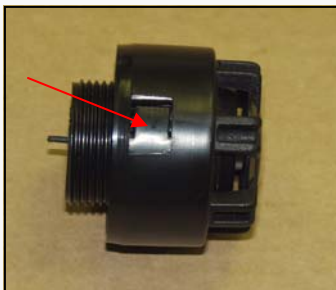
1. *The exhaust valve is not tightened down all the way or there is debris in the valve.* To tighten the valve, simply turn the dial clockwise. To remove debris, open the valve all the way and rinse well. If you need to take the valve apart, see the instructions below.

***NOTE: If debris finds its way inside your apeks exhaust valve, it could cause a leak!!**

2. *Counterlungs are the wrong size (too small).* The loop volume is at its maximum so the counterlungs are completely full. As oxygen or diluent is added, the exhaust valve will purge. This could happen if the counterlung volume is too small for the diver. On page 30 there are instructions for determining where the adjustment plate should be set. The counterlung volume should be as close to your own lung volume as possible, but never any smaller! Ensure that you have the plate set correctly!!

It should be noted that if the lungs on the unit are full, and you then open the mouthpiece and start breathing while on the surface, you will find that the air is difficult to exhaust through the exhaust valve. If this happens, it will feel like you can't properly inhale or exhale fully. This generally happens after a diver does his pre-dive testing and pre-breathe and the unit's lungs are inflated. To solve this problem, simply exhale gas out of the loop through your nose. Underwater, the exhaust valve will dump the gas for you.

3. *Stretch the valve's spring.* If the valve is clean and it was tightened all the way, you may need to stretch the valve spring. To do this, turn the valve counter clockwise as far as it will go. Do not force it. When you can not turn it anymore, stop. There is a tab which must be lifted in order to allow the valve to be opened. It is the small tab on the side of the valve. Very carefully lift the tab with a dental pick and then carefully continue to turn the valve counter clock wise. The tab will only need to be lifted while you turn the valve past it. Then it can be released and you can continue to open the valve. This is easiest to do if the bottom of the valve is pushed into the side of your knee. Then as you lift the tab, push on the top of the valve while continuing to turn it counter clock wise. Be very careful to not break the tab!! If you do, the entire valve is garbage.



Once the valve is open, you will see a small white button sitting on top of the spring. Carefully remove the button and set it aside (remember which way it came out). Remove the spring and stretch it out a slight amount and then replace it. Re-insert the button, replace the top of the valve and tighten.

As you are tightening, push in on the valve as you turn it. This will aid in turning the valve past the tab. If required, use the dental pick to lift the tab slightly. When you pass the tab, you will feel it click. Tighten all the way and ensure that the valve is working properly by pushing down on the top. Look inside the valve. You should see the spring compressed with the white button sitting evenly. Then, unscrew the valve; ensure that it stops turning when it reaches the tab. Your valve is now ready to be replaced on your Sport KISS.

4. **ADV problem.** If your counterlung volume is correct and the exhaust valve is in good working order, and you still have a leaking exhaust with the feeling of too much gas in the loop, you could have a problem with your ADV adding too much gas into the system. If this is happening you will also notice that your PPO2 is reading lower than usual and that your buoyancy is off. This could be caused by a stretched, damaged or torn ADV diaphragm, an old style ADV valve stem where the O-ring has come loose, a newer ADV valve stem which is damaged and also if the seating area of the ADV valve stem has debris in it. Inspect the diaphragm and valve stem for damage or fault.

When reinserting the ADV valve stem, clean the underside of the valve's head and apply a small amount of lubricant to it. This will keep it in good condition and help it to seal. Also thoroughly clean the seating area.

**Note: on the Sport KISS, the ADV valve stem is located under the T swivel. See the photo to the right.*

***NOTE: ensure that the seating area of the valve stem is clean and debris free!! If there is the slightest amount of dirt in this area, the valve stem will leak!**



To determine if this is the problem, shut off the diluent gas. First you will notice your PPO2 stabilize and stop dropping. Also, the lungs will stop filling up all the way and the exhaust valve should stop purging. The diaphragm is simple to check. Open the cover and pull the assembly out. It should be fairly flat, and not damaged. You may need to look quite closely for small tears or holes. Sometimes holding it up to the light and gently pulling the rubber will help.

HAVING SAID THAT THE DIAPHRAGM IS EASY TO CHECK, IT IS ALSO WORTH NOTING THAT IF YOU ARE NOT HAVING A PROBLEM WITH THE DIAPHRAGM ASSEMBLY, DO NOT DISASSEMBLE IT. WITH PROPER USE, THE DIAPHRAGM WILL LAST FOR YEARS IF NOT DISTURBED.

5. **Check the IP on the diluent first stage.** It should be between 8 (117.6 psi) and 10 bar (147 psi).
6. **First stage needs to be serviced.** If the first stage is not functioning properly, it could have a leak, which could cause excess diluent gas to flow into the rebreathers loop.

SEE BELOW FOR INSTRUCTIONS ON REINSTALLING THE ADV DIAPHRAGM.

Note that proper assembly procedures must be followed. Prior to removing the ADV diaphragm, it would be good to have a spare diaphragm handy as reinstalling an old diaphragm can be tricky.

***NOTE: A damaged ADV diaphragm assembly &/or valve stem will either deliver too much diluent gas, or none at all.**

***NOTE: It is important that the proper installation procedures are followed or the diaphragm will leak!! It is also important that proper testing procedures are followed so that the diaphragm is not stretched out!!!**

INSTALLING THE ADV DIAPHRAGM

When you are ready to attach either the original diaphragm or a new one, first inspect it. If you are reinstalling the original one, this is very important. If the diaphragm has stretch marks by the screw holes, it would be best to use a new one instead. A diaphragm in this condition is very difficult to reinstall. The stretch marks are a result of doing long negative tests on the unit. Remember, a negative test should only be about 1 minute long. Please see page 29 for the proper testing instructions. Again, if you are planning on opening up the diaphragm area, I would strongly suggest that you have a new diaphragm on hand.

Insert the screws through the ADV cover until one or two threads are showing and then push the diaphragm through the screws. Carefully place the assembly against the scrubber housing and hold it firmly in place with one hand, while turning the screws with the other. If while placing the assembly against the housing, the diaphragm shifts, start again. It must be aligned properly.

Turn each screw only a half turn or so before alternating to another screw. Watch carefully and stop turning as soon as the bottom of the screw touches the plastic cover. There will be no gap between the underside of the screw and the cover, but the screws will not have started getting more difficult to turn yet. Look at the diaphragm and ensure that it looks proper. It should not be twisted. Turn the screws another 1 to 2 mm. Then turn them another 1 mm. Remember not to over tighten the screws. If the screws are over tightened, the diaphragm will leak. If you are having a problem in this area, do a positive pressure test and then back the screws off slightly until the leak stops. The adjustment will be very slight.

We have tested this method both with and without lubricant on the diaphragm holes. We have found that it is better to NOT use lubricant in this area, as it can make it more difficult.

If you are using a new diaphragm, ensure that when you attach the plastic button and screw to it, that you do not over tighten this assembly. Again, this is a case where over tightening can cause a leak. On the other hand, if the button assembly is loose, air can leak through this area.

***NOTE: Severely over tightening the ADV diaphragm screws can damage the threads on the ADV housing!!**

ADV IS DIFFICULT TO TRIGGER

The position of the diver will effect the ADV. If the diver is horizontal or face down, the ADV will trigger easily. If the diver is vertical, then it is more difficult to trigger. (A well fitting harness is important; this will greatly reduce the difficulties of being vertical in the water). Also, rolling to your right side, while horizontal, will assist in triggering the ADV.

If preferred, diluent can be added via the mouthpiece. Turn the knob about a 1/4 inch and diluent gas should flow into the loop. Depending on where your IP is set, and which second stage you are using, you may need to lightly hit the purge button.

Lastly, check the IP on the diluent first stage. Ensure that it is in the correct range. Remember, the ADV is not meant to be easy to trigger. It was designed this way so that the diver would know when they were triggering it. If it was too easy, then diluent gas could be fed into the breathing loop without the diver being aware of what was happening.

WORK OF BREATHING

There are several things that can cause a high work of breathing.

1. ***Too much gas in the loop.*** This can happen if the loop has gas in it, the mouthpiece is closed and then the diver puts the mouthpiece in his mouth and blows more gas into the loop. The exhaust valve will probably not release any gas if the diver is on the surface. It will feel like you can not get a full breath and the breathing will be difficult. Dump part of the loop (exhale out of your nose). If this is the cause, you will notice the difference immediately. Also, if this happens, it won't be possible to trigger the ADV. This can also happen if the ADV is faulty and it leaks diluent gas into the loop.
2. ***Check the fit of your harness.*** If the unit is sitting either low on your back or the harness is not snug then this could be the problem. The unit should sit as high on your back as possible with the diver still able to reach the tank valves. Also, the unit must be tight to the divers back. It should not move up/down or side ways at all. It needs to be completely tight. This is especially true with the Sport KISS.
3. ***What is your position in the water?*** With rear mounted counterlungs, the unit will breath best in a horizontal position. Slightly head down or head up are the positions that most divers prefer. Being vertical in the water column will be more difficult and being on your back will be the hardest of all. This is why having a proper fitting harness is important. If the fit is good, the difficulties of being vertical are greatly decreased.
4. ***The lungs are too large or the adjustment plate is open to far.*** If the lungs are too large and they fill up with gas, they will float off the divers back. Again, it is very important that the lungs are the correct size and that the adjustment plate is set correctly.
5. ***The scrubber canister is too full.*** Follow the directions on page 22 for proper scrubber canister filling instructions.

Mouthpiece Disassembly (old)

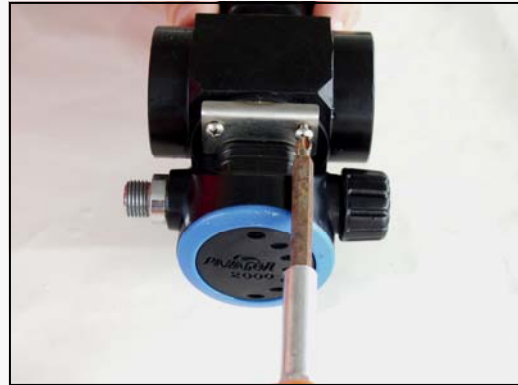
The KISS bailout mouthpiece can go from closed circuit mode to open circuit, with a simple twist of the knob. It provides divers with an alternate method of adding diluent gas or even an alternative diluent depending on the connection and if the off-board accessory is being used. It offers an easy way to purge the rebreather for verifying the sensor readings. If the need for a sanity breath or emergency bailout arises, this mouthpiece will provide the diver with a fast, simple way of getting a breath.



First, remove the monofilament by lifting it with a sharp dental pick and then pulling it out of the groove with a pair of pointed pliers or forceps. This will release the hose sleeve retainers.



Once the monofilament is removed, pull the hose retainers out of the body and shake the valve plates loose.



Remove the two screws attached to the plate, holding the second stage regulator in place. For the new Mares Prestige second stages, you will also need to remove the steel pin which holds the concave plastic plate of the exhaust port, to the second stage body. Use a dental pick to push it out. After the pin has been removed, place your thumbs on either side of the concave plastic plate, and push. It will pop out. Once this plate has been removed, detach the screw holding the second stage body to the spool guide. The second stage can now be removed.



Once the regulator has been removed, remove the two screws on the spool guide and the four screws on the selector knob.



With the screws removed, turn the selector knob slightly counter-clockwise. This will cause the spool guide to pop out of position and protrude from the front of the body. Pull the knob out of the body. Once the knob has been removed, pull the spool guide and spool out of the body as well.

Mouthpiece Parts List



- A: Monofilament
- B: Body
- C: Exhaust Valve Plate
- D: Inlet Valve Plate
- E: Hose Sleeve
- F: Regulator Attachment Plate
- G: Regulator
- H: Spool
- I: Spool Guide
- J: Selector Knob and Selector Knob Plate

Mouthpiece Reassembly

- Make certain that the spool seat o-ring, -026, located in the bottom of the main bore of the mouthpiece, is lubricated, in place, and in good condition.
- Check the condition of the spool o-rings (-016 & -023) and spool guide o-ring (-028) and make sure they are lubricated and installed properly. Also, lubricant should be applied from the tip to the base of the spool guide. (see photo page 77)
- Slide the spool onto the spool guide and slide the assembled parts into the body with the two countersunk screw holes at the bottom and install the two, 6-32 x 1/2 flat Philips screws.
- Lubricate and insert the N90P025.5 O-ring onto the selector knob.
- Install the knob so that the nub on the top face of the knob engages the groove on the spool. The knob should have 90 degrees of rotation. When you are certain that the knob is in the right orientation fasten the retaining plate on the bottom of the body with the four, 6-32 x ¼ pan Philips screws. When installed correctly the spool will move inside the body as you turn the knob.
- Attach the base of selector knob using a 10-24 x ½ SHCS.
- Lubricate and insert the -030 O-ring into the 2nd groove, on the inside of each end of the body. Don't over grease. Once in place, use a clean lint free towel to remove any excess grease that might be on the plastic beside the O-ring.
- Position the inlet valve plate and the exhaust valve plate in the body. Remember that the flow of the gas is from left to right. The inlet goes on the left and the exhaust on the right. Visualize the gas passing through the valve plates, through to the hoses. The O-ring groove should be facing out. Lubricate and insert the -028 O-ring onto each plate. If you are using the mouthpiece on a different unit, the flow direction may not be the same. Again, use a clean lint free towel to remove any grease which might be on the plastic.
- Push the quick disconnect DSV adapters onto each end of the body.
- Insert the monofilament retainer lines into the slots, to retain the DSV adapters. It may be necessary to press the adapters into the body while sliding the retainers into their grooves. Do not leave the retainers protruding from the opening. They should be fully inserted into the groove. Ensuring that there is no excess grease on the plastic or on the monofilament is important. If there is, it may be difficult to insert the monofilament into the adapter.
- Insert the -023 O-ring over the cut end of the 2nd stage. Do not grease this O-ring. Push the 2nd stage into the body and clamp it into place using two, 6-32 x 7/8 pan Philips screws. For those using the Mares Prestige second stage, insert the bottom, 6-32 x 3/8 pan Philips screw. Reattach the plastic plate onto the second stage. Place the nub end of the plate in first, and then using your thumbs, push the plate into place. It will snap in. Insert the pin which holds the plastic plate in place.

*** WARNING: Those using the Mares Prestige second stage, must use the bottom screw to assist in securing it to the DSV!!!**

MOUTHPIECE DISASSEMBLY (NEW)

The KISS bailout mouthpiece can go from closed circuit mode to open circuit, with a turn of the switch. It provides divers with an alternate method of adding diluent gas or even an alternate diluent depending on the connection and if the off-board accessory is being used. It offers an easy way to purge the rebreather for verifying the sensor readings. If the need for a sanity breath or emergency bailout arises, this mouthpiece will provide the diver with a fast, simple way of getting a breath.

The mouthpiece is in closed circuit mode when the switch is positioned with the word, "KISS" horizontal.



First the hose attachments should be removed. Do this by removing the U-clips, then pull the hose attachments away from the body.



Next, the switch will need to be removed. Remove the screw which holds the switch in place; pull the switch off.



Unscrew the front cover.



Now the inner barrel needs to be removed. It is difficult to pull out, push the switch onto the inner barrel stub, and then turn and pull. This method should easily allow the barrel to be pulled out.



If

Finally, the mushroom valve carriers can be removed. From the inside the body, using either a blunt instrument or your finger, carefully push on the EDGE of the valve carrier. DO NOT PUSH ON THE CENTER AS IT WILL DAMAGE THE CARRIER.



of

IF THE MUSHROOM VALVES ARE DISTORTED OR DAMAGED THEY MUST BE REPLACED!!! When attaching (or removing) the mushroom valves BE CAREFUL!!! PULL ON THE STEM GENTLY & ONLY HOLD THE STEM WHEN REMOVING THE VALVE.

To remove the second stage regulator, remove the metal U-clip and pull the adapter loose.



MOUTHPIECE PARTS LIST

1. Body
2. Inner barrel
3. Switch
4. Switch screw
5. Front cover
6. Hose attachments (2)
7. Plastic U-clips (2)
8. Metal U-clip (1)
9. 2nd stage regulator and adapter
10. Mushroom valve carrier (2)
11. Mushroom valves (2)

O-rings:

Mushroom valve carrier, 1 per side: 38 x 1.5 mm

Inner barrel, side port, 2 per barrel: 30 x 3 mm

Inner barrel, end, 2 per barrel: 46 x 2.5 mm

Hose end, 2 per side: 45 x 3 mm

2nd stage adapter, 1 per adapter: 28 x 2.5 mm

UNLESS OTHERWISE SPECIFIED, O-RINGS SHOULD ONLY BE LIGHTLY GREASED.

INSPECT ALL O-RINGS FOR CRACKS AND OTHER DAMAGE REGULARLY.

DISINFECT ALL BREATHING LOOP PARTS REGULARLY.

MUSHROOM VALVES SHOULD BE TESTED PRIOR TO EVERY DIVE AND AFTER REASSEMBLY. WITH THE MOUTHPIECE IN YOUR MOUTH THE GAS FLOW IS FROM LEFT TO RIGHT. SUCK IN AND THE LEFT SIDE VALVE OPENS AND EXHALE AND THE RIGHT SIDE VALVE OPENS.

DO NOT POSITION THE MUSHROOM VALVES IN ANY OTHER DIRECTION!!!!

MOUTHPIECE REASSEMBLY

- Inspect the mushroom valve carriers and the mushroom valves for damage. Ensure that they are clean; washed and disinfected, and remove any debris. IF THE MUSHROOM VALVES ARE DISTORTED OR DAMAGED THEY MUST BE REPLACED!!! When attaching (or removing) the mushroom valves BE CAREFUL!!! PULL ON THE STEM GENTLY & ONLY HOLD THE STEM WHEN REMOVING THE VALVE.
- Ensure that the mushroom valve carrier O-rings are clean, free of debris and in good condition. Lubricate the O-rings and insert them onto the carriers. These O-rings need only LIGHT lubrication.
- Clean, disinfect and inspect the mouthpiece body. Hold the body with the rubber mouth bite towards you and the port for the 2nd stage regulator facing down. Position the right side mushroom valve carrier with the valve facing out. This is the exhale side and you will notice that this valve does not have a stem. Position the left side mushroom valve carrier with the valve on the inside of the carrier. You will notice that the left side valve has the stem facing out. Ensure that the O-rings do not extrude out of their grooves when you push them into place. Push the carriers all the way in, until you feel them push against the body.
- Clean, disinfect and inspect the inner barrel and the inner barrel O-rings for damage. There are 2 side port O-rings and 2 end O-rings. Lubricate these O-rings, place them in their grooves, and then apply a touch more lubricant. If upon testing small leaks are apparent, applying silicone grease to the inner barrel O-rings could solve this problem.
- To make the inner barrel easier to insert, the switch can be pushed onto the barrel stub. Insert the barrel, twisting it slightly to ensure the port side O-rings do not move out of their grooves. Push and turn the barrel so it moves properly into position. Watch the O-rings while you do this, to ensure that they stay in position.
- Replace the front cover, ensuring that it is securing attached, but not over tightened. If it is over tightened, it will be difficult to remove.
- Replace the switch. Once the switch is attached, rotate it from open to closed circuit mode and back, several times to ensure correct action of the O-rings. Do this while looking into the second stage port to ensure that the O-rings stay in their grooves.
- Clean, inspect and re-fit the 4 hose attachment O-rings; there are 2 per side.
- Clean, disinfect and inspect the 2 hose attachments and secure them to the mouthpiece using the 2 plastic U-clips. To attach, push the hose attachments all the way against the body, and then push the clip into the slots.
- Clean, disinfect and inspect the rubber mouth bite. Attach it to the body using a zip tie and remove the sharp edges.
- Clean, disinfect and inspect the 2nd stage regulator adapter and the O-ring. Lubricate the O-ring and secure it to the adapter. Push the adapter into position and secure with the metal U-clip. Be gentle while pushing in the U-clip and push it in straight. It must be inserted fully to secure the adapter. If the clip is bent, it will be difficult to insert it properly.

MOUTHPIECE TEST

In closed circuit mode, cover the right (exhale) side and blow (gently!!) into the mouthpiece. The mushroom valve should seal and no gas should exit out of the second stage port or the front switch plate.

Problems:

- Mushroom valve on the left could leak. Remove the carrier and inspect it again.
- 2nd stage port leak. Remove the inner barrel and inspect/replace the 2 side port O-rings.
- Front switch plate leak. Remove the inner barrel and inspect/replace the 2 barrel end O-rings.

In closed circuit mode, cover the left (inhale) side and suck (gently!!) into the mouthpiece.

Problems:

- Mushroom valve on the right could leak. Remove the carrier and inspect it again.
- 2nd stage port leak. Remove the inner barrel and inspect/replace the 2 side port O-rings.
- Front switch plate leak. Remove the inner barrel and inspect/replace the 2 barrel end O-rings.

Other leaks. Cover both the inhale and exhale sides of the mouthpiece, as well as the LP hose inlet to the 2nd stage, while gently blowing into the mouthpiece. Also do this test while gently sucking from the mouthpiece. These tests will determine if the rubber mouthpiece has a leak or if the 2nd stage regulator a fault. The 2nd stage adapter O-ring could also be causing a leak.

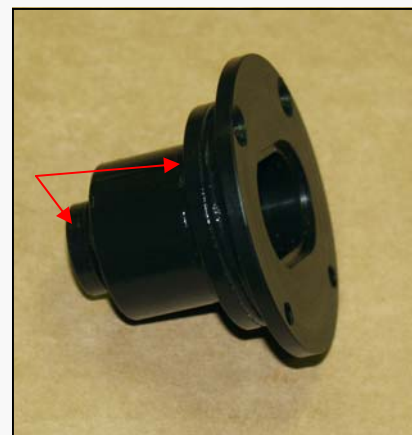
CLEAN AND INSPECT THE MOUTHPIECE AND SECOND STAGE AS REQUIRED. SERVICING OF THE SECOND STAGE SHOULD BE DONE BY A QUALIFIED SERVICE TECH.

Mouthpiece Servicing & Troubleshooting

*** WARNING: Those using the Mares Prestige second stage, must use the bottom screw to assist in securing it to the DSV!!!**

***Warning: Your KISS mouthpiece or DSV (dive surface valve) (including the 2nd stage), should be serviced yearly or more often if required. When to service depends on how often you dive, the environment you dive in and also how well it is cleaned after every dive. It is important that it is kept clean and the knob should always turn smoothly. Keeping your DSV clean is important as grit inside the moving parts can score the plastic. Your local KISS dealer can assist you with servicing the DSV if you prefer not to do it.**

Also, be aware that if you wash your DSV with a powerful hose, the valve disks may be blown off!! After cleaning, be certain to inspect your gear and follow all the pre-dive check's!!!



When you clean and service your DSV, it is important to apply lubricant to the O-rings and the Spool Guide. On the spool guide, lubricant should be added from the tip to the base. See arrows in right hand photo.

TROUBLESHOOTING

BUBBLING SECOND STAGE

First determine if the diluent first stage IP is creeping. If it is, you will probably have to replace the HP seat in the first stage. Once you know that your first stage is in good working order, check to see where the IP is set. Ideally it should be around 8 to 10 bar, with 10 bar (147 psi) being the maximum.

Once the IP has been set, you will want to ensure that the 2nd stage is adjusted properly. Turn the adjustment knob on the second stage so that it is in the middle position. (If there is an adjustment knob). Remove the LP hose opposite of the knob. The adjustment screw is on the inside on the 2nd stage where you removed the LP hose. Use a screw driver to adjust the flow. Your adjustments should be minimal; only a millimeter or so at a time. Most 2nd stages are very sensitive and require a light touch. After each adjustment check to see if your second stage is still bubbling and adjust as necessary. Once the bubbling has stopped and the flow has been adjusted to your liking, you can dive the unit with the adjustment knob on the left turned all the way in. This will also limit the chances of the regulator free flowing. When you want to breath on the 2nd stage, you will just need to dial it out to where you find it comfortable.

If after all that you still have a bubbling 2nd second stage the problem could be with the seat, inhale diaphragm, exhale diaphragm or it could be debris. Your local dive shop should be able to service the 2nd stage for you.

***NOTE: When doing your negative pressure test, it is possible to damage the exhaust diaphragm in the second stage. If your inhalation is extremely hard, for an extended period of time, this can happen. Also, on the new BOV, the 2nd stage exhaust diaphragm can be distorted if the negative is too hard causing the test to fail.**

WATER INTRUSION

First determine if the water is sea water (from diving) or fresh water (if you are not fresh water diving, this could be condensation).

If it is sea water, service your DSV and ensure that the O-rings are all in good shape. Also clean and lubricate at this time.

Inspect the inhalation and exhalation diaphragms on the second stage. Look for any tears or punctures. You may need to hold these parts up to the light and gently pull on the rubber to check for damage.

If you have an older DSV, you may need to upgrade to the new selector knob O-ring. This is a N90P025.5 metric O-ring.

Check your rubber mouth bit for damage and for a proper fit onto the mouthpiece. They generally come in a variety of attachment sizes. Ensure that the one you choose fits properly. There are some specialized rubber mouth bits which while a pleasure to dive, just do not fit properly on our mouthpiece. Seacure is one of them and after time it will always leak.

Also check for a tear underneath the zip tie which holds the rubber mouth bit in place. Damage here will also cause water to leak into the system.

Many cases of water into the loop come from torn or damaged rubber mouth pieces.

Loose lips.

IT SHOULD BE NOTED THAT A LEAK ON THE MOUTHPIECE, INCLUDING THE RUBBER MOUTH BIT, WILL NOT BE DETECTED ON THE POSITIVE AND NEGATIVE TESTS!! THIS IS WHY IT IS VERY IMPORTANT TO KEEP YOUR MOUTHPIECE PROPERLY SERVICED AND CLEANED. ALSO, ALWAYS CARRY A SPARE RUBBER MOUTHBIT. MOST MOUTHPIECE LEAKS ARE FROM THIS!!

Pre-dive Checklist's

This pre-dive checklist is a combination of the Jetsam checklist, and what some of the A.N.D.I. instructors are using. The instructors and divers who use this checklist have reported that their skill level on the rebreather increased quicker and that they understood their units better, which made them more organized and safe divers.

I have edited the check list to make it work for a KISS diver to use for every dive. The first part of our new check list, are items that must be addressed and/or confirmed prior to suiting up for the dive. Those that are using this tool, usually keep several blank copies in a small binder with their dive gear.

The second part of the check list are items that are usually checked shortly before a dive. This list can also be printed out, but other options are to copy it onto a dive slate or wet-notes in a permanent ink marker.

A point worth noting is that all pilots have a check list which they go through every time they fly. Diving a rebreather should be no different. While rebreather diving doesn't necessarily take more preparation or clean up time than open circuit diving, there are very specific things that need to be checked and confirmed prior to getting into the water.

Using this check list will only add a few seconds more time to your preparation, but could make all the difference in having a pleasurable time in the underwater environment. It certainly assists in creating competent, happy divers.

**One part of the 2nd check sheet is worth discussion. That is the 5 minute pre-breath that is required prior to diving. Note that this pre-breath is NOT to warm up the scrubber. It is to determine if the scrubber and the rebreather are working properly. It gives you a chance to monitor your display system to ensure that it is working. And most importantly, to determine how you feel during and after the pre-breath. It will help you determine if your scrubber has been properly packed, if you forgot to change the absorbent, or if the canister is completely empty!!! Also if your mouthpiece valve disks (mushroom valves) are in place and working properly. While some of these things may sound silly, very experienced divers have jumped into the water with either no absorbent, or with completely used up absorbent. The pre-breath is a minimum of 5 minutes as this much time is required for our bodies to tell us that something is wrong. The bottom line is that this 5 minute pre-breath confirms your system check has been done and that all is working.

DIVERS SHOULD FOLLOW THE PREDIVE CHECKLISTS BEFORE EVERY DIVE AND KEEP A COPY OF THE CHECKLIST WITH THE KISS REBREATHING AT ALL TIMES.

Pre-dive Checklist

NAME: _____

DATE: _____

DIVE LOCATION: _____

PLANNED DEPTH: _____

PLANNED SET POINT: _____

TODAY'S DIVE NUMBER: _____

INITIALS ↓

_____ I have checked my bailout system and it is in perfect working order.

_____ My bailout system is appropriate for the dive depth I am planning of, _____ feet/meter.

_____ My sensors are _____ months old.

_____ The millivolt readings on my sensors is: _____; _____; _____.

_____ My PPO2 display uses _____ batteries and they have _____ hours left on them.

_____ I have analyzed my O2 cylinder and it has _____% O2

_____ I am diving with _____ diluent in my on-board diluent cylinder. I have analyzed it and have confirmed what percentage of O2/Helium/Nitrogen it contains.

_____ I am diving with _____ mix in my first off-board cylinder. I have analyzed it and have confirmed what percentage of O2/Helium/Nitrogen it contains.

_____ I am diving with _____ mix in my second off-board cylinder. I have analyzed it and have confirmed what percentage of O2/Helium/Nitrogen it contains.

_____ If I am using more off-board cylinders I will also write down the mixture and ensure that I have analyzed them and have confirmed what percentage of O2/Helium/Nitrogen they contain.

_____ My absorbent has been used for _____ hours, which means that I have _____ hours left on it.

_____ My dive computer is in perfect working order.

_____ The battery voltage on my computer is _____.

_____ My buddy and I have practiced bailout procedures and understand what to do in an emergency.

_____ My surface interval before this dive is _____.

_____ My CNS before this dive is _____.

_____ I am using _____ lb/kg of weight.

This pre-dive check should be done after your unit has been assembled, your scrubber canister filled, lungs attached, all fittings/hoses checked & secure, etc. It should be done prior to entering the water.

INITIALS ↓

- I have ensured that the Valve Disks (mushroom valves) on the Valve Plates are flat and smooth. I have done a DSV positive and negative diaphragm test to ensure that they are sealing properly. I have also ensured that they have been installed correctly and the gas flow is going in the correct direction, left to right.
- I have done a breathing hose positive and negative pressure test to ensure that my loop hoses are not damaged.
- I have done a negative pressure test on the fully assembled KISS rebreather and it maintains full vacuum pressure.
- I have done a positive pressure test on the fully assembled KISS rebreather and it maintains full pressure. I have ensured that the counterlungs are hanging freely and that the adjustment plate is in the correct position.
- I have turned my displays on.
- I've opened my diluent valve and checked that the cylinder is full. It has _____ PSI/BAR in it. I've checked the pressure gauge for any sign of leakage of diluent in the system. I've ensured that the ADV and the bailout regulator are working correctly. (The diluent gas I am using is appropriate for the dive that I am planning)
- I've opened the oxygen valve and checked that the cylinder is full. It has _____ PSI/BAR in it. I've ensured that the manual add valve is working by pushing the button and watching the displays, while breathing on the unit. Also, I've ensured that the constant flow is working by listening for the flow.
- I've calibrated the sensors in oxygen. (If I am using the Jetsam displays, I will ensure that they are in the "ON" position, NOT the calibrate position before I jump in the water.) I have verified the sensor readings in air.
- I've ensured that the size of my bail-out gas cylinder is adequate for the dive that I am planning, that it is full and that the regulator is working correctly. I have also ensured that my wing and drysuit inflation are working correctly.
- I have pre-breathed my KISS rebreather for at least 5 minutes before entering the water.
- I will double check that my oxygen and diluent cylinders are open, that my displays are on, and my computer is properly programmed before I enter the water.
- Once in the water, I will do a bubble check with my buddy to double check that there are no leaks in my system.

The diluent tank is NOT an adequate gas supply for emergency situations.

Training & Basic Skills

As with most rebreathers, training is a requirement for purchasing a KISS rebreather. Training can be done prior to purchasing a unit or in conjunction with purchasing a unit.

KISS courses are set up through a number of training agencies. Information about these agencies and links to their websites are available on the Jetsam website at www.kissrebreathers.ca. The instructor you choose must be a KISS certified and insured instructor that works with one of these agencies.

During your KISS rebreather training you will be required to learn and do various skills. These are skills that all rebreather divers need to know. How these skills are performed is dependent on the particular rebreather that you are diving. Therefore, even if a diver has already trained on a closed circuit rebreather, the diver will still need to learn KISS specific skills. It is very important that during your course, these skills are learned and mastered. And after training, reviewed on a regular basis.

It is important that all the skills covered in your training course are learned and mastered. Under no circumstances should anyone dive a KISS rebreather until they have completed an approved training course.

Some of these skills are listed below. Please note that this is only a partial list of the required skills.

- HYPOXIA - Low PPO₂
- HYPEROXIA - High PPO₂
- OC BAILOUT - Required when the loop is flooded, or there is a display or CO₂ problem
- DILUENT FLUSH - Required when the diver needs to verify that the displays are reading correctly or to bring the PPO₂ to a safe level
- HYPERCAPNIA - High CO₂
- DILUENT LOSS

Sport Scrubber Duration

The duration of the Sport KISS scrubber canister is based on independent testing done at the ANSTI test facilities in the United Kingdom. Multiple tests were conducted, including testing to the CE standard of EN14143.

The first test was done in accordance with EN14143. The parameters for this standard are depth of 40 m (131 ft), water temperature of 4° C (39.2° F), 40 liter/minute breathing rate, and 1.6 liter of CO2 generation.

The other tests conducted maintained the same breathing rate and CO2 generation, but the depth and temperatures varied.

In all three analyses, two tests were conducted. The results are on the first table below.

Depth	Temperature	Breathing Rate	CO2 Generation	Duration
(EN14143 Standards)				
40 meters/131 ft	4°C/39.2°F	40 liter/minute RMV	1.6 liter/minute	65 min - 5mbar CO2
18 meters/59 ft	4°C/39.2°F	40 liter/minute RMV	1.6 liter/minute	87 min - 5mbar CO2
18 meters/59 ft	12°C (53°F)	40 liter/minute RMV	1.6 liter/minute	116 min - 5mbar CO2

In order to better explain what these results mean, below is a table outlining RMV's, CO2 generation, and how long they are sustainable.

Breathing Rate	CO2 Generation	Explanation (CO2 = 85% of VO2 and VO2 = 4% of RMV)
22.5 liter/minute RMV	0.77 lpm CO2	Most relaxed divers, doing little or no swimming, can sustain an RMV of 22.5 lpm almost indefinitely.
37.5 liter/minute RMV	1.28 lpm CO2	A physically fit diver, taking slow deep breaths while swimming hard can sustain an RMV of 37.5 lpm for a few minutes.
75 liter/minute RMV	2.55 lpm CO2	A diver with the conditioning of a Navy S.E.A.L., doing severe work, can sustain an RMV of 75 lpm for one or two minutes.

As gas density (depth), water temperature, and CO2 generation (divers work rate) vary, the canister duration will either improve or degrade.

While most divers can't maintain a breathing rate of 1.6 liters of CO2 per minute, don't dive in 4°C (39.2°F) water, and/or deep dive, these time frames are still good indicators of scrubber duration. They show that scrubber duration should not be rated as a single value; that the type of diving that is being done must be taken into consideration. Also, it shows that any test results, from testing done at the surface, will not provide realistic canister durations.

All testing was conducted using Sofnolime 797 grade and this is what we recommend that divers use.

Any divers who use an absorbent which changes colour, should not use the colour-change as an indicator for time remaining on the canister.

Warranty

The Jetsam Technologies Ltd., rebreathers, boosters, displays and mouthpieces are warranted for the period of 1 year. All warranty and service work should be returned to our warehouse.

- The warranty applies to the original owner only.
- Mistreatment or neglect of the products will void the warranty.
- Parts not covered by the warranty are batteries and sensors.
- Circuit boards and meters sold separately (without the case) are not covered under the warranty.
- Warranty cards shipped with rebreathers, boosters, displays and mouthpieces must be completed and returned to Jetsam for the warranty to be valid.
- Original, completed liability waivers must be on file for the rebreather warranty to be valid.
- We are unable to determine if the parts are covered by the warranty until they have been inspected.

PROCEDURES FOR WARRANTY & SERVICE WORK

Prior to shipping, please contact Evelyne Mikusch at kmjt@jetsam.ca to inform her of the shipment. You will need to print out the warranty/service form, fill it in and ship it with your item. This form can be obtained from the Jetsam website at www.jetsam.ca.

Your product should be returned to us with the following items:

- A copy of your original purchase receipt.
- The warranty/service form.

Carefully box up the items being returned. Jetsam Technologies is not responsible for any damage incurred during shipping. Ensure that the items are properly padded and shipped in a strong box, and also that it is well sealed. (Don't forget to insert the above mentioned paperwork!) Please write in large clear letters, WARRANTY RETURN, MADE IN CANADA on the outside of the parcel and on any paperwork. This is important as otherwise Canada Customs will charge us a brokerage fee and duties.

The parcel may be shipped via the post office or a courier. All shipments must be prepaid and insured. Any fees that Jetsam incurs must be paid for by the shipper. This includes duties and brokerage fees for the item re-entering Canada. Note that if you ship via a courier such as UPS or Federal Express, there will be a brokerage fee, even if there are no duties. While there may be no charges for the warranty work, this brokerage fee must be paid for by the shipper.

Sport KISS O-Ring List

GENERAL

Number	Where used/quantity	ID	OD	CS
N70-232	HOSE ATTACHMENT PODS X2 COUNTERLUNGS X2 & SCRUBBER PLUGS X4	2-3/4	3	1/8
N70-220	EXHAUST VALVE X1	1-1/2	1-3/4	1/8
N70-127	QR HOSE STUBS X 8	1-7/16	1-5/8	3/32
N70-033	SENSOR HOUSING SMALL & KNOB X2	2	2-1/8	1/16
N70-034	SENSOR HOUSING LARGER	2-1/8	2-1/4	1/16
N70-032	ADV HOUSING X1	1-7/8	2	1/16
N70-031	3 HOSE CONNECTOR, SMALLER X1	1-3/4	1-7/8	1/16
N70-036	3 HOSE/FISCHER CON., LARGER X1	2-3/8	2-1/2	1/16
N70-131	DISPLAY COVER X3	1-11/16	1-7/8	3/32
N70-213	OXYGEN REGULATOR PLUG (APEKS) X1	15/16	1-3/16	1/8
V75-008	O2 ADD VALVE X2	3/16	5/16	1/16

MOUTHPIECE O-RINGS (older)

Number	Where used/quantity	ID	OD	CS
N70-016	SPOOL X1	5/8	3/4	1/16
N70-023	SPOOL X1 & 2ND STAGE X 1	1-1/16	1-3/16	1/16
N70-026	SPOOL SEAT (MOUTHBIT END OF BODY) X1	1-1/4	1-3/8	1/16
N70-028	VALVE PLATES X2	1-3/8	1-1/2	1/16
N70-028	SPOOL GUIDE X1	1-3/8	1-1/2	1/16
N70-030	SIDE PORTS OF THE BODY (QD ATTACHMENT AREA) X2	1-5/8	1-3/4	1/16
N90P025.5	SELECTOR KNOB X1	25.2mm	32.2mm	3.5mm

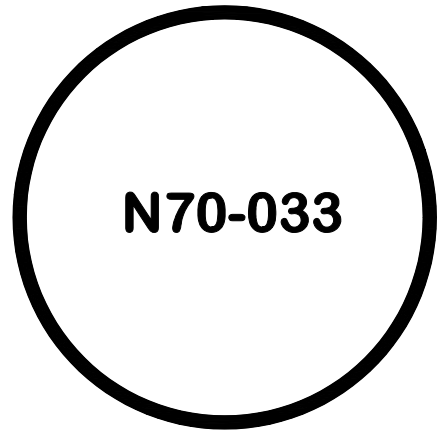
MOUTHPIECE O-RINGS (newer)

Number/size	Where used/quantity
38 x 1.5 mm	VALVE DISK CARRIER X 2
30 x 3 mm	INNER BARREL SIDE PORT X 2
46 x 2.5 mm	INNER BARREL END PORT X 2
45 x 3 mm	HOSE ATTACHMENT X 4
28 x 2.5 mm	2ND STAGE ADAPTER X 1

N70-232

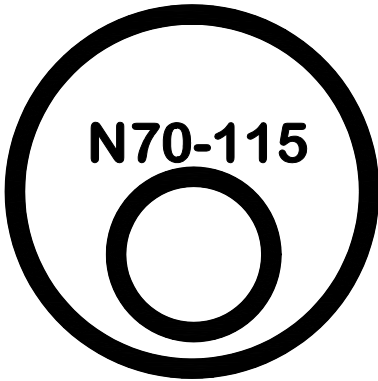


N70-222



N70-033

N70-131



N70-115



N70-032

V75-012



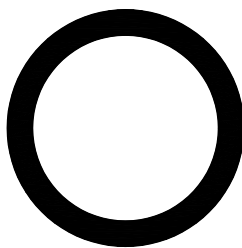
V75-010



V75-008



N70-213

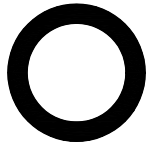


N70-031

5X7X1



N70-112





KISS REBREATHERS
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