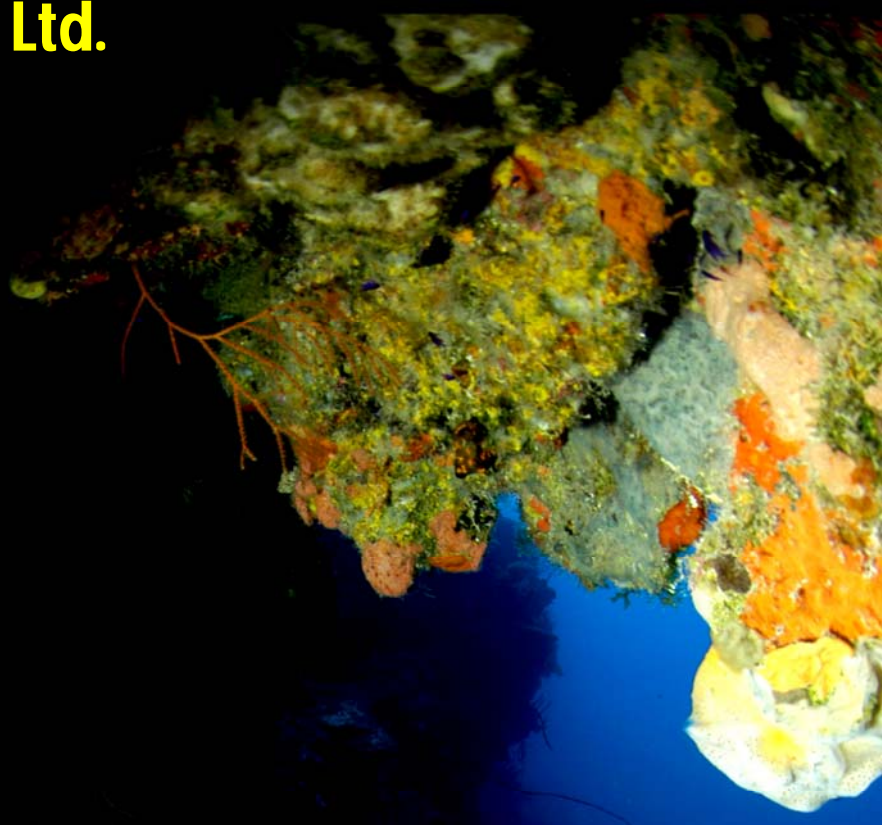
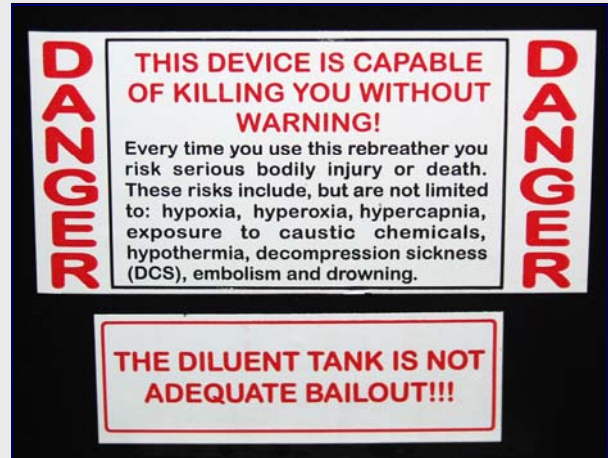


Jetsam Technologies Ltd. Classic KISS Manual



www.jetsam.ca

THIS IS NOT A JOKE!!



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

The warning on the Classic KISS rebreather is not a joke. Before beginning your dive, you must consider the risks involved. The Classic KISS 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 Classic KISS 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 problems may occur. If you do not have adequate training, equipment, physical conditioning, and a proper mindset, do not get in the water.

The diver, YOU, has the final responsibility for his or her own safety and actions while using this rebreather. All components of the Classic KISS 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 Classic KISS. 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.



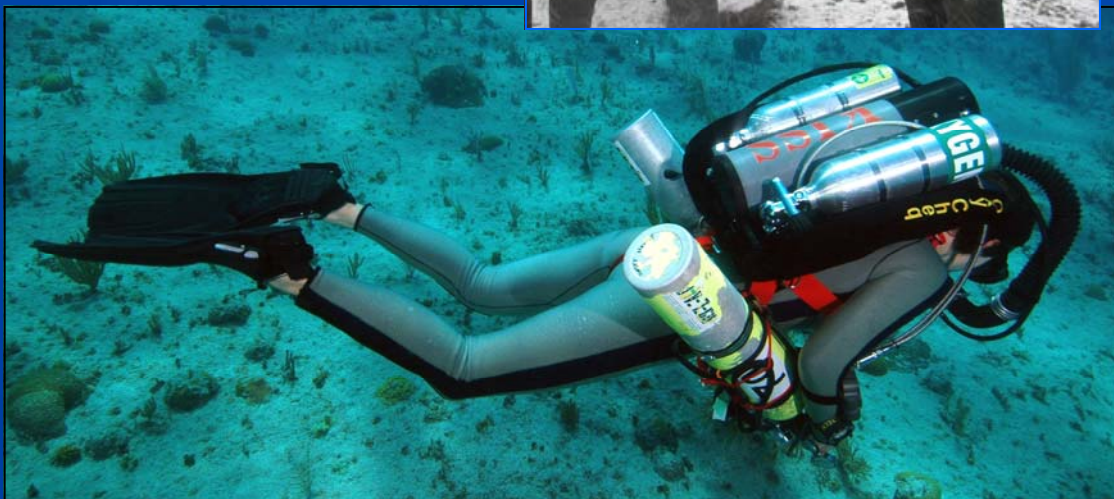


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The photographs in this manual were taken by Curt Bowen, Dave Dillabough, Anders Nasman, Peder Seippel, Ekki Schepanski, Alan Studley and Kim Smith. The schematic was drawn by Curt Bowen of Advanced Diver Magazine.

Introduction

Diving a closed circuit rebreather is an exciting way to experience the under water environment. You will be able to move through the water, interacting with the marine life in a manner not possible with open circuit scuba, moving closer than ever before to the creatures that you encounter. The Classic KISS Closed Circuit Rebreather is a durable machine which has been designed for both recreational and technical diving. If you are looking for a CCR that will take you from shallow reef dives to deeper trimix dives, this unit is for you!

SPECIFICATIONS:

- Weight with full 13 cu.ft. aluminum tanks, full scrubber, but no BCD, backplate or harness is 51 lb (22 kg).
- Bailout integrated DSV is included.
- Three independent PPO2 Displays. Each with it's own housing, battery and sensor.
- O2 is added both continuously by a feed orifice and manually as needed.
- Jetsam highly recommends the use of a normoxic Trimix to reduce narcosis, on every dive at any depth.
- The Classic KISS is a closed circuit rebreather designed for recreational and technical sport diving. It is not recommended for diving deeper than 250 feet (75 meters), cave diving or wreck penetrations.

FEATURES:

Oxygen Control

This is a manually controlled CCR. It is not electronically regulated in any way. The diver is completely responsible for maintaining the PPO2.

PPO2 displays

This is the only CCR with completely independent, redundant, backlit displays. Batteries are user changeable. Each display can be replaced independently and spares are easily affordable.

Scrubber

The scrubber canister has a basic axial flow design which is resistant to "channeling" (allowing the gas to bypass the scrubber bed) but has a higher breathing resistance than radial flow designs. Recommended scrubber brands include, but are not limited to, Carbolime, Sofnolime, Spherea Sorb, Soda Sorb, Drager Sorb and Baralyme.

Counterlungs

The Classic KISS uses two back mounted counterlungs (split counterlung) that are available in three sizes; 2, 4, and 6 liter capacity. A combination of these will normally allow a good match between the counterlung volume and the divers tidal volume. This match permits easier control of buoyancy. 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 counterlungs are also subject to changes in breathing resistance as the diver changes positions in the water. If you roll on your back you can expect a case of chipmunk cheeks. Nothing is perfect.

DSV (Mouthpiece)

This mouthpiece can go to open circuit mode with a twist of a knob. It can provide an alternate method of adding diluent gas or even an alternative diluent depending on the connection. It is an easy way to purge the rebreather for verifying the sensor readings. It can also prevent panic in the case of a malfunction in the CCR by allowing a fast, simple way of getting your next breath.

ADV (Automatic Diluent Valve)

This valve adds diluent when the loop volume is reduced by either descending or "breathing down" the volume of oxygen. Suddenly finding yourself unable to get a breath during a rapid descent could be a panic inducing situation.

The ADV has been set up "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 PO₂. You have either descended and compressed the gas in the loop or you have consumed enough oxygen to reduce the PO₂ significantly. This may also have caused you to lose buoyancy and descend.

Tanks

Using 13 cu.ft. tanks are recommended. As the limiting factor on the CCR is the 3 hour scrubber duration, this provides plenty of gas. A 13 cu.ft. oxygen tank will provide 5 hours of oxygen at a consumption rate of 1 liter per minute. A 13 cu.ft. diluent tank will provide enough gas for an experienced rebreather diver to do two, 1 hour long dives to 150 ft.

Jetsam highly recommends that you carry more gas than just the diluent. It should be in the form of emergency bailout, open circuit gas in a separate tank. A larger diluent tank is not an adequate bailout gas supply. Carefully analyze the failure paths on your gas supply and don't put all your eggs (gas) in one basket (tank).

PARTS LIST

1 Classic KISS

- 1 Counterlung case
- 1 Scrubber head with QR towers attached
- 1 Scrubber head hat
- 2 Counterlungs
- 1 Diluent first stage with LP hose
- 1 Oxygen first stage with delrin plug and OPR valve
- 1 Manual add valve with 2 SS/Teflon hoses
- 1 Sensor block (kidney) and triple display with 2 wrist straps
- 1 ADV
- 1 Exhaust valve
- 2 Hex bolts, 1 inch
- 2 Fender washers
- 1 Scrubber canister, which is packed with:
 - 4 rings with hose clamps, small
 - 1 ballast
 - 4 large hose clamps
 - 2 O-ring sets
 - 1 nut driver
 - 1 jewelers screwdriver set
 - 1 KISS tool
 - 2 hex bolts, 1 1/2 inch
 - 1 counterlung ring, spare

1 DSV with LP hose

2 Breathing hoses

4 QR hose stubs

1 Classic KISS manual

1 CD

Schematic

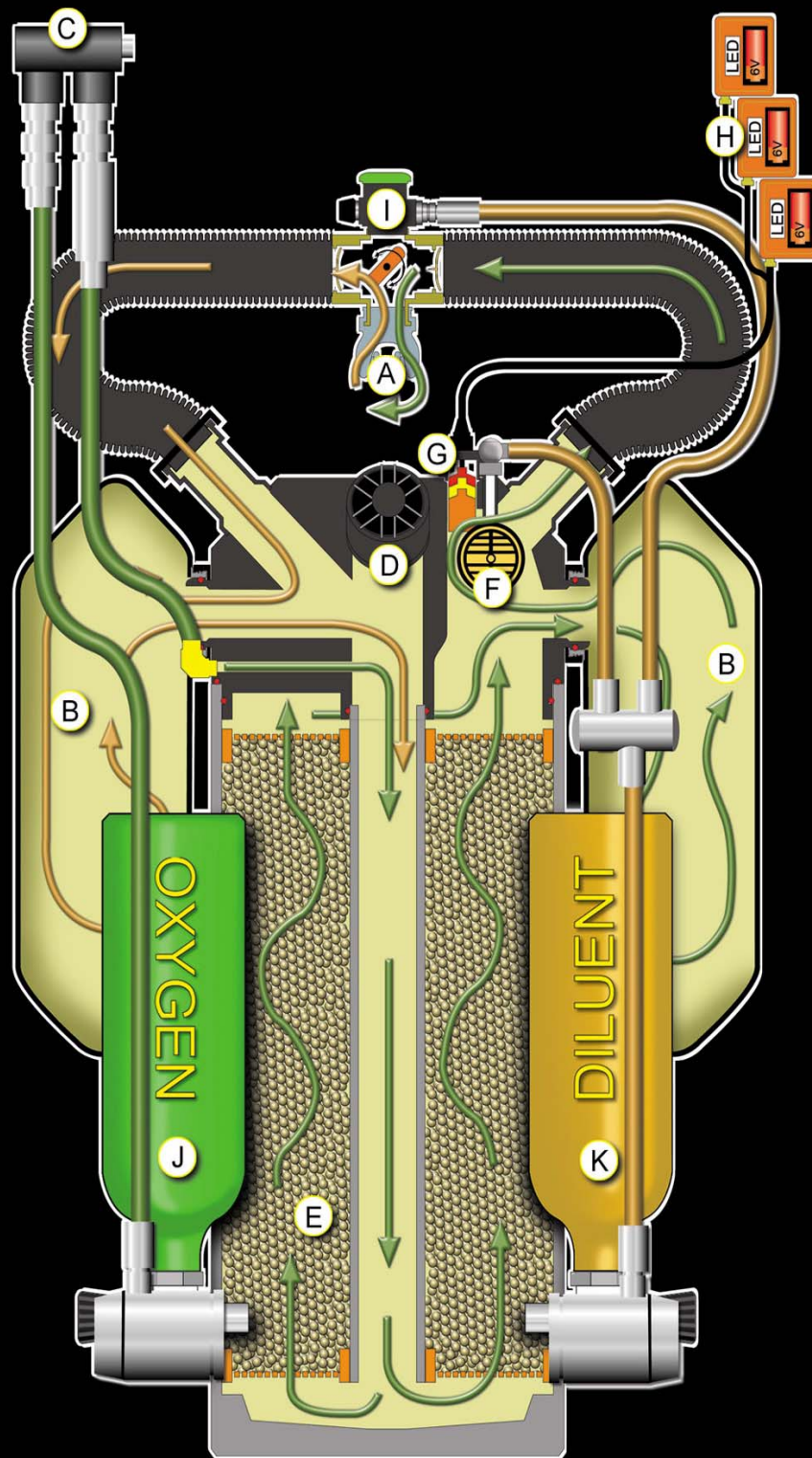


Illustration By Curt Bowen,
Advanced Diver Magazine
www.advanceddivermagazine.com



Components

- A. DSV: Dive Surface Valve
- B. Counterlungs: 2 liter, 4 liter, or 6 liter
- C. Oxygen Manual Add Valve with 15 micron filter
- D. Exhaust Valve
- E. Scrubber Canister: Approximately 6 lbs (2.7 kg)
- F. ADV: Automatic Diluent Valve
- G. Triple Sensor Well: R22D Teledyne sensors
- H. PPO2 Displays: Three independent PPO2 displays. Each with its own housing, battery and sensor.
- I. Bail-out Second Stage: The bail-out second stage is incorporated into the DSV. To switch from closed circuit to open circuit bail-out, simply close the breathing loop. The bail-out second stage is plumbed to the diluent tank. NOTE: The bail-out second stage is for getting a sanity breath only. Divers should carry a redundant bail-out system for emergencies.
- J. Oxygen Tank and First Stage: 13 cuft tanks are recommended.
- K. Diluent Tank and First Stage: The Classic KISS is compatible with either air or trimix as a diluent gas. 13 cuft tanks are recommended.

Unpacking & Disassembly

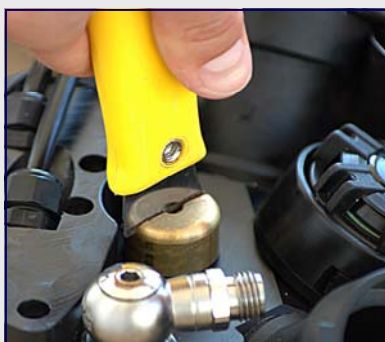


After removing your new Classic KISS from the crate, ensure that you have a DSV, 2 breathing hoses, 4 hose stubs, the manual & CD, and of course, the rebreather.

First, various components will need to be disassembled in order to install the O-Rings. Start with the counterlungs; turn the counterlung attachment counter clockwise to loosen the lung and then remove it. Next, remove the top cap on the scrubber head.



Remove the two large screws on the counterlung case shown in the photo, above right. Removing these screws will detach the scrubber head from the counterlung case. Unscrew the diluent add hose that runs from the LP manifold to the diluent add elbow. Undo the large brass draw nut that secures the scrubber canister to the scrubber head. There is a special tool for this job, but as it has been packed inside the scrubber canister you will need to find a substitute.





Once loose, remove the head from the scrubber canister.

Inside the scrubber canister you will find 2 packages of O-Rings, a nut driver, ballast for the breathing hoses, large hose clamps, plastic rings and small hose clamps, a jewelers screwdriver set and the special KISS tool.

Set aside all the parts from the inside of the canister except for 1 bag of O-Rings. From that bag, set aside the bag labeled "mouthpiece" and the tiny bag with the small O-Rings. This small bag is for the manual add valve. These O-Rings are spares. The unit comes with the O-rings installed in the DSV, manual add valve and the ADV.



O-RING INSTALLATION

Using the O-ring diagram at the back of the manual, separate the remaining O-rings by size. The O-rings that need to be installed are for the scrubber canister, exhaust valve, sensor cover, counterlungs and the draw nut.

You are now ready to start installing the O-rings. First, unscrew the counterlung attachments and the exhaust valve and remove them from the scrubber head.

***NOTE: ALL O-RINGS SHOULD BE LIGHTLY LUBRICATED!! DO NOT USE EXCESS AMOUNTS OF LUBRICANT; THE O-RINGS SHOULD ONLY BE SLIGHTLY SHINY.**

- The counterlung attachments take a 028 O-ring around the threaded section. This O-ring should be worked into the groove which is machined into the face of the attachment. On the other side of the counterlung attachment a 224 O-ring should be installed. This has a larger groove than the 028. This O-ring will need to be snapped into the groove. Once the O-rings are installed, insert the counterlung attachment into the scrubber head and hand tighten. Ensure that you do not pinch the collar under the attachments. This collar should spin freely.



- The exhaust valve takes a 220 O-ring which goes around the threaded area. This O-ring seals the valve against the top of the scrubber head. Once the O-ring is installed, reattach the valve to the scrubber head by hand tightening. When tightening, hold the exhaust valve by the body. Do not force it by holding onto the valve adjustment. If you force it, it can pop past its adjustment latch and the valve may no longer be adjustable. Once reattached, this valve should be run completely closed.



- The scrubber draw nut requires a 114 & 111 O-ring. The larger O-ring should be installed against the face of the nut and the smaller should be stretched over the body and snaps into the groove.



- The scrubber head requires a 248, 250 & 223 O-ring. The 248 O-ring goes into the radial groove around the scrubber head. It must be carefully worked down and pressed into the groove. The larger 250 axial O-ring gets pressed into the groove which forms a face seal. The final O-ring for the scrubber head is a 223 which fits inside the scrubber tube and slides into the internal groove.



- Install the last 2 large O-rings, a 248 and a 250 on the bottom of the scrubber canister. The 248 goes in the radial groove and the 250 in the axial groove.



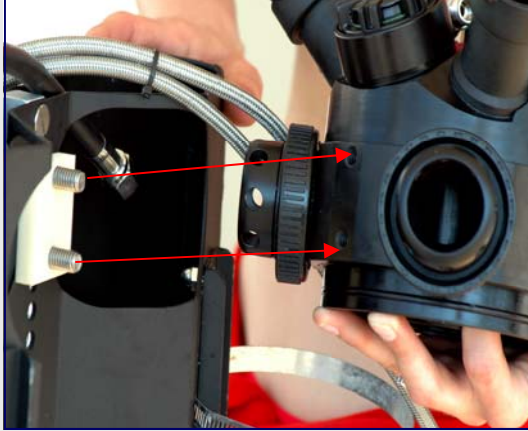
ASSEMBLY

Once the O-rings have been installed, assembly can begin. Start with the ballast. Unwind the ballast into a loose coil and slide it over the scrubber tube (remove the top basket first). Twist until snug and then squeeze the ballast together. Finally, turn the tube over and rap the ballast on a table top to form. Remove it from the scrubber tube and cut it in half. Once cut, trim the ends of the ballast to eliminate any sharp points. Ideally, the ballast should be placed on the hose approximately 1/3 of the way up from the DSV.



To assemble the scrubber canister, place the canister over the bottom cap and push down gently. While pushing, rock the canister slightly to ease the tube over the O-rings. Once assembled, check the base to ensure that the O-rings are not protruding. When secure, place the scrubber tube inside the canister.

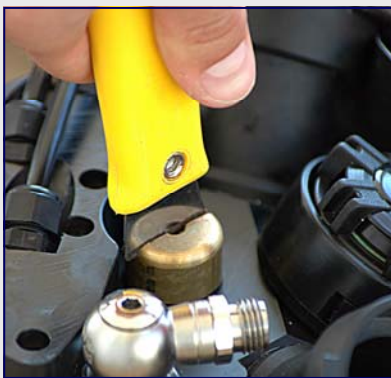




Reattach the scrubber head to the counterlung case using the two large flat head screws. It should be securely attached without over-tightening. Reattach the diluent addition hose.



To attach the scrubber canister, lay your Classic KISS, counterlung side down. See Page 22 for instructions on filling the scrubber. Slide the canister onto the scrubber head. When the canister reaches the first O-ring, gently rock the canister back and forth until the O-ring is compressed inside the tube. If too much force is used, the O-ring will dislodge and a leak will occur.



Once the scrubber canister is pushed onto the scrubber head, stand the Classic KISS up and insert and tighten the draw nut using the KISS tool. Once tight, attach the hat. For those who wish to attach a fourth sensor to read a dive computer, the port on the left hand side of the scrubber head can be used.

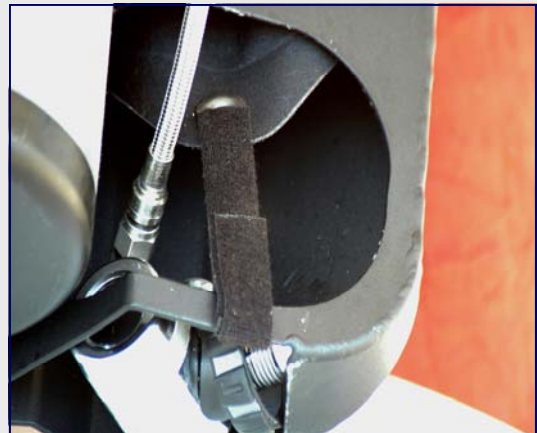
Once you have reattached the scrubber canister and scrubber head to the counterlung case, you are ready to attach the counterlungs.

***NOTE: FOR EASE OF ATTACHMENT, A VERY SMALL AMOUNT OF LUBRICANT CAN BE APPLIED TO THE INSIDE OF THE COUNTERLUNG OPENING.**

To attach the counterlungs, insert the lungs either through the top or bottom of the case.



Push the counterlung onto the counterlung attachment and turn the ring clockwise to secure. When the counterlung is tight, there should be an 1/8 inch gap between the ring and the face of the counterlung, and the gap should be even.



***WARNING: IT IS IMPORTANT THAT THE LUNGS ARE PROPERLY SECURED TO THE BOTTOM OF THE COUNTERLUNG CASE USING THE VELCRO SUPPLIED. IF THE LUNGS ARE NOT SECURED, THEY WILL FLOAT UP AND BREATHING WILL BE DIFFICULT.**

ENSURE THAT THE LUNGS ARE PUSHED ON STRAIGHT AND THAT THE RINGS ARE NOT OVER-TIGHTENED AS THEY WILL SPLIT!!

To determine if the counterlungs are a suitable size, 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 DSV 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 smaller lungs should be used. However, never use counterlungs where the volume is smaller than your own! Smaller people will find that they use 2, two liter lungs while others will use one, two liter and one, four liter lung.

***NOTE: The closer you can match the counterlung volume with your own, the better your buoyancy will be. Diving the Classic KISS with counterlungs that are too large will result in great buoyancy changes. This can cause the user to lose control of their buoyancy which can lead to injury or death!!**

Quick Disconnects

The Classic KISS is shipped with the QR hose adapters already installed on the DSV and the QR hose attachment towers already installed on the scrubber head.

***NOTE: THE QR HOSE ATTACHMENT TOWERS ARE PERMANENTLY ATTACHED TO THE SCRUBBER HEAD. DO NOT REMOVE THEM!!!!**

To prepare the QR system, the hose stubs need to be attached to the breathing hoses. To do this you will need the 4 hose stubs and the set of 4 small hose clamps and plastic rings. You will also need the nut driver.

Place a plastic ring and small hose clamp over the end of the breathing hose and push the hose into position on the hose stub. Ensure that the hose is pushed all the way onto the hose stub as in the photo below. Place the hose ring and hose clamp over the hose and hose stub, and secure. Repeat with the remaining 3 hose stubs.



Finally to attach the breathing hoses to the DSV, push the hose stubs onto the DSV hose adapters, push down and turn right. Repeat to attach the other hose ends to the hose attachments. Use the same method to attach the breathing hose to the QR hose attachment towers. Note that the attachment method is similar to opening and closing a child proof medicine bottle.



***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.**

Tank/BCD Installation



To attach the cylinders to the Classic KISS, first insert the large hose clamps through the slots on the counterlung case. Slide the tanks into position with the oxygen on the right and the diluent on the left and secure the first stages.

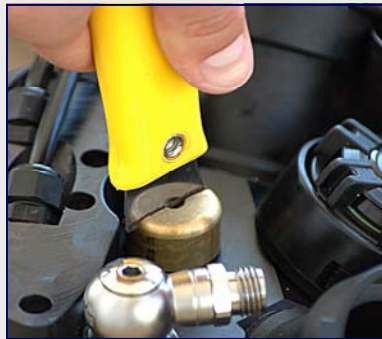


Adjust the position of the cylinders: The handles should be out at the sides, parallel with the counterlung case so the diver can easily reach them when wearing the unit. The first stages should not be resting on the counterlung case. Once positioned, tighten the hose clamps using the enclosed nut driver. Once secure, turn the unit over and attach the harness and wing. Any buoyancy compensating system can be used as long as it has bolt holes with 11 inch centres. The Classic KISS should be positioned so that it sits as high as possible on the divers back. Finally, secure the manual add valve to the right shoulder strap or D-ring.

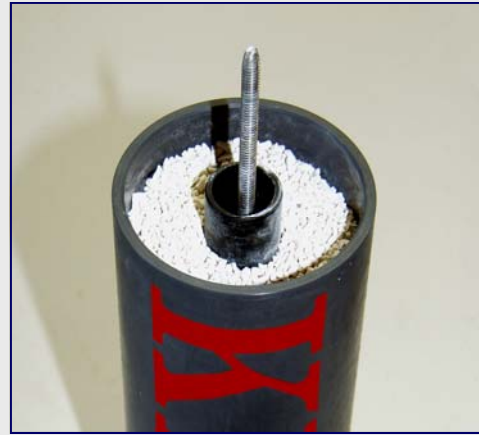
Changing The Scrubber



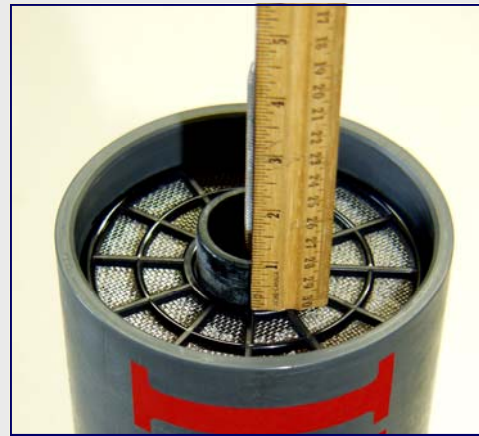
Changing the scrubber on the Classic KISS is an easy process. The scrubber canister holds approximately 5.7 lbs of scrubber. We prefer to use 4-8 Sofnolime, but others are compatible as well. The 4-8 has a slightly lower work of breathing than the 8-12, but it can still be safely used.



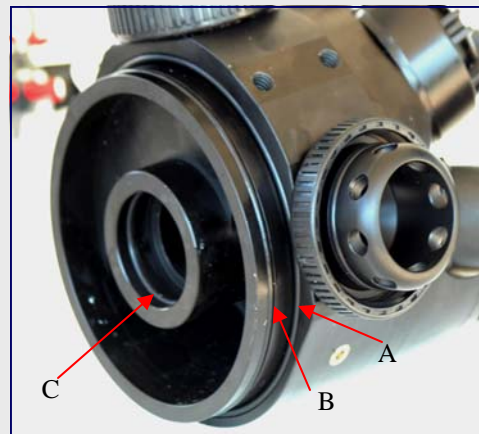
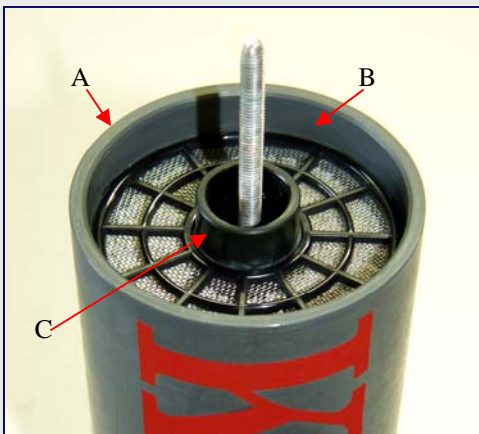
Start by removing the top hat and the large brass draw nut which secure the scrubber canister to the scrubber head and then remove the canister.



Plug the scrubber tube to prevent any scrubber material from entering it. Fill the canister with approximately 5.7 pounds of absorbent to .75 inch (19 mm) from the top and install the top screen.



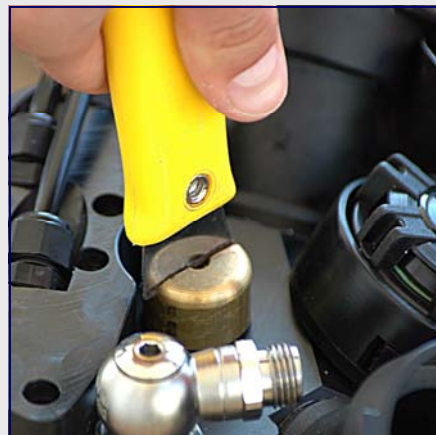
While pressing down on the top screen, tap the outside of the canister with the handle of a screwdriver or similar tool. This will compress the absorbent. When installed properly, the top of the screen will be at least .75 inch (19 mm) below the top edge of the canister but no more than 1 inch (25mm) below the tube.



Wipe away any dust from the top and inside edge of the canister and also from the outside of the inner tube. These surfaces, A, B, C, should be lightly lubricated. On the bottom of the scrubber head are three O-rings, A, B, C, these should also be lightly lubricated.



Gently, lay the canister down and push into place. Do this by keeping the canister square to the bottom of the scrubber head, and then gently push and rock it into place. This should keep the radial O-ring from becoming dislodged. If you push the canister on crooked, this O-ring may pop out of position. This is most likely to happen when the O-ring is first installed.



Lightly lubricate the draw nut O-rings prior to installing and tightening.

Once the Classic KISS has been completely assembled, 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.

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. Leave the loop closed for a few moments to see if the vacuum holds and then open the loop to let air back in.

***WARNING - It is important to not leave the vacuum in the loop for more than a few moments 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 the diver diluent.**

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 loop, 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 should be closed during these tests.



Sensor Installation & Calibration

The Classic KISS uses Teledyne R22D sensors. 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. These sensors should last for at least 1 year and possibly 2, if they are not damaged or abused. 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.



First, remove the hat from the scrubber head. Then, remove the 6 screws securing the kidney using a 5/32 allen wrench. Lift the kidney off the scrubber head.



The sensors fit into the three wells underneath the kidney. Remove the O-rings from the R22D sensors as they are not needed and then drop the sensors into the well, connector side up and screw into place. Removing the O-rings from the sensors will enable you to screw them slightly further into the well which will slightly improve the response time. The sensors should be screwed in until they are snug, but they shouldn't be excessively tight. You may wish to use needle-nose pliers to aid you in securing them.



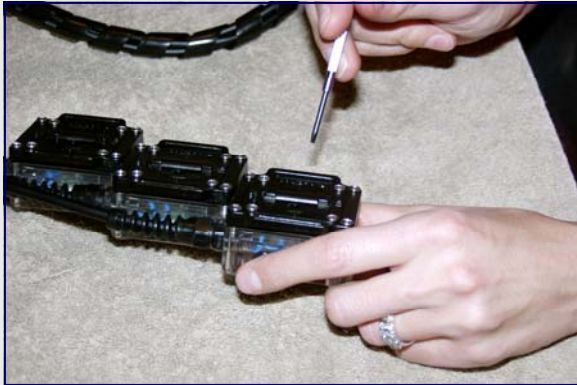
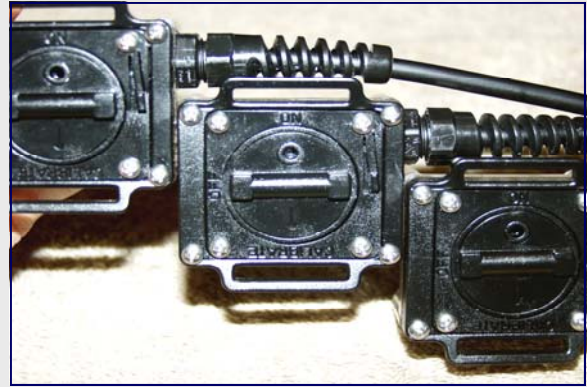
Once the sensors are in place, install the 026 O-rings around the bases on the kidney plate. Then, secure the molex connectors to the top of the sensors.

Replace the kidney plate on the scrubber head, ensuring that the wires are not pinched under the plate.

***WARNING:** If the wires are pinched under the plate the scrubber head will not be water tight. Water damage in this area will ruin the sensors and/or the electronics.

Using a 5/32 Allen wrench, secure the 6 screws which hold the kidney plate in place.

***WARNING:** Do not over tighten the screws that secure the kidney plate as the plate can be stripped. Use just 2 fingers on the Allen wrench to tighten. Remember, you just need to squeeze the O-rings to seal!!!



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 jewelers 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 SCREWDRIVER INTO THE ADJUSTMENT SCREW ON THE METER.**

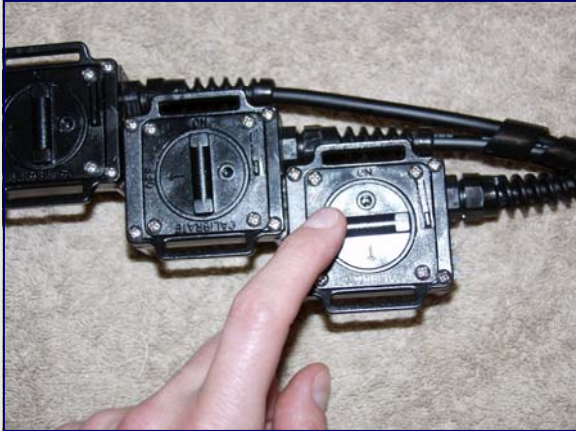
To adjust the displays, the sensors should be exposed to air. Turn the adjustment screw until the display reads either 0.209 or 0.21.



A simple method for doing the air calibration when the rebreather is assembled, is to remove the exhalation hose and with the DSV open, take several breaths. This will fill the rebreather with fresh air. After the three displays have been calibrated in air, reattach the exhalation hose, close the calibration ports and verify that the readings are correct by checking them with oxygen.

To verify the readings with Oxygen, the rebreather must be fully assembled and the mouthpiece should be in closed circuit mode. Open the Oxygen tank slowly and while watching the displays press the manual add valve button and hold it for approximately 10 seconds. As the Oxygen displaces the air in the loop, the readings should rise to around 0.98 and 1.00. If they do not rise to this level, the sensors should be tested in a pressure pot to verify their accuracy at higher levels of oxygen or they should be replaced.

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.



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.**

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 READS 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.

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 (Swagelok Part number SS-4F-T7-15) 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 9/16 wrench, 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 the 9/16th wrench and 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 Christolube. 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 manual add valve to the SS/Teflon 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.

When attaching the valve to the filter and the hoses, it is very important that you use a second 9/16 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. The valve body is not a substitute for a wrench.

Adjusting the O2 Flow Rate

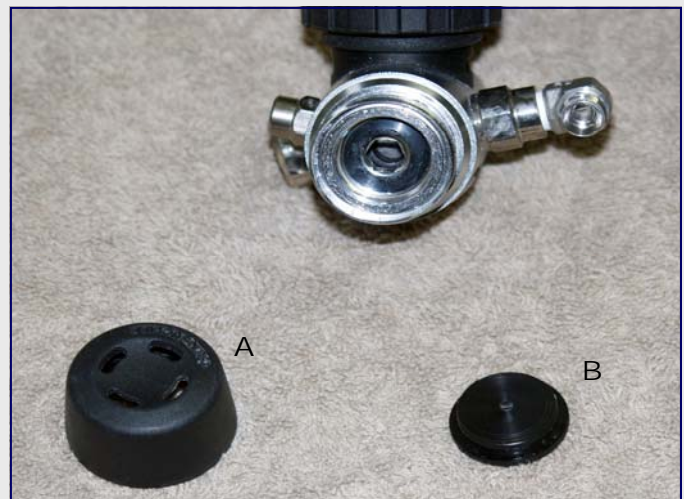
The oxygen injection rate can be adjusted to suit each individual diver. The required flow rate depends on the physical size of the diver and the degree of exertion used during the dive. If the flow rate is too high the P_{O2} will climb to dangerous levels and the breathing loop will have to be purged 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!!!

To adjust the flow rate, disconnect the oxygen delivery line where it attaches to the stainless steel elbow on the side of the scrubber head. 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 following table:



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 adjuster 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 P02 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.

KNOW YOUR PO₂ AT ALL TIMES !

MANUAL ADD VALVE TROUBLESHOOTING

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 will have a plastic plug installed 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.



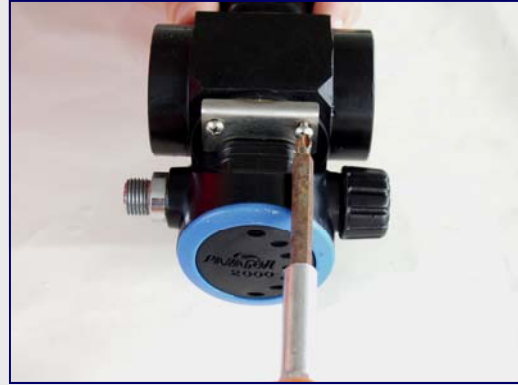
MOUTHPIECE DISASSEMBLY



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 on the open circuit regulator and remove it from the front of the mouth-piece.



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

- Ensure 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.
- 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 screws.
- Place the open circuit regulator O-ring (-020) in position and install the regulator on the front of the mouthpiece body and clamp it in place.
- Lube and install the O-ring on the knob (-214) and install the knob so that the pin 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 screws.
- Lube and install the O-rings for the hose sleeves (-030). Place the valve plates in the side ports of the body with the O-ring groove facing up (this means that the O-rings are facing outwards) and install the valve plate O-rings (-028). Make certain you have installed the valve plates in the correct side to match the flow direction of your rebreather. The KISS rebreather flows from left to right. If you are using the mouthpiece on a different unit the flow direction may not be the same.
- Install the hose sleeves and the retainers. It may be necessary to press the sleeves into the body while sliding the retainers into their grooves. Do not leave the retainer protruding from the opening. It should be fully inserted into the groove.



PREDIVE CHECKLIST

Before entering the water:

- Make sure that all three displays are turned on and properly calibrated. (You did close the calibration ports, right?)
- Check that the oxygen tank is full and analyze the gas to ensure that it is indeed, oxygen. Check the diluent tank to ensure that it is full and filled with the appropriate gas for the planned dive. You did fill the scrubber and attach the counterlungs?
- Repeat the positive / negative pressure checks if necessary.
- Open the diluent tank valve fully and inhale with the mouthpiece in the open circuit position to verify that the bailout regulator is functioning.
- Switch the mouthpiece to closed circuit position and inhale fully to check that the automatic diluent add valve is working.
- Open the oxygen tank valve (slowly) 1/4 to 1/2 turn and note the readings on the displays.
- Press the oxygen add button briefly and check that the readouts respond properly while taking several breaths. Switch the mouthpiece back to OC. If the mouthpiece is not in your mouth it should be switched to OC position.
- Verify that there are no leaks in the oxygen or diluent systems. A buddy is useful for this.
- Check your buoyancy compensator and drysuit inflators.
- Check that your open circuit (bailout) gas supply is on and adequate for the intended dive and that all regulators are functioning.

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

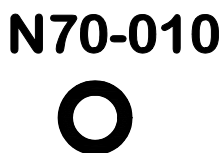
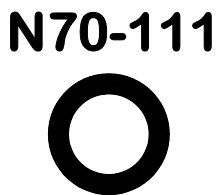
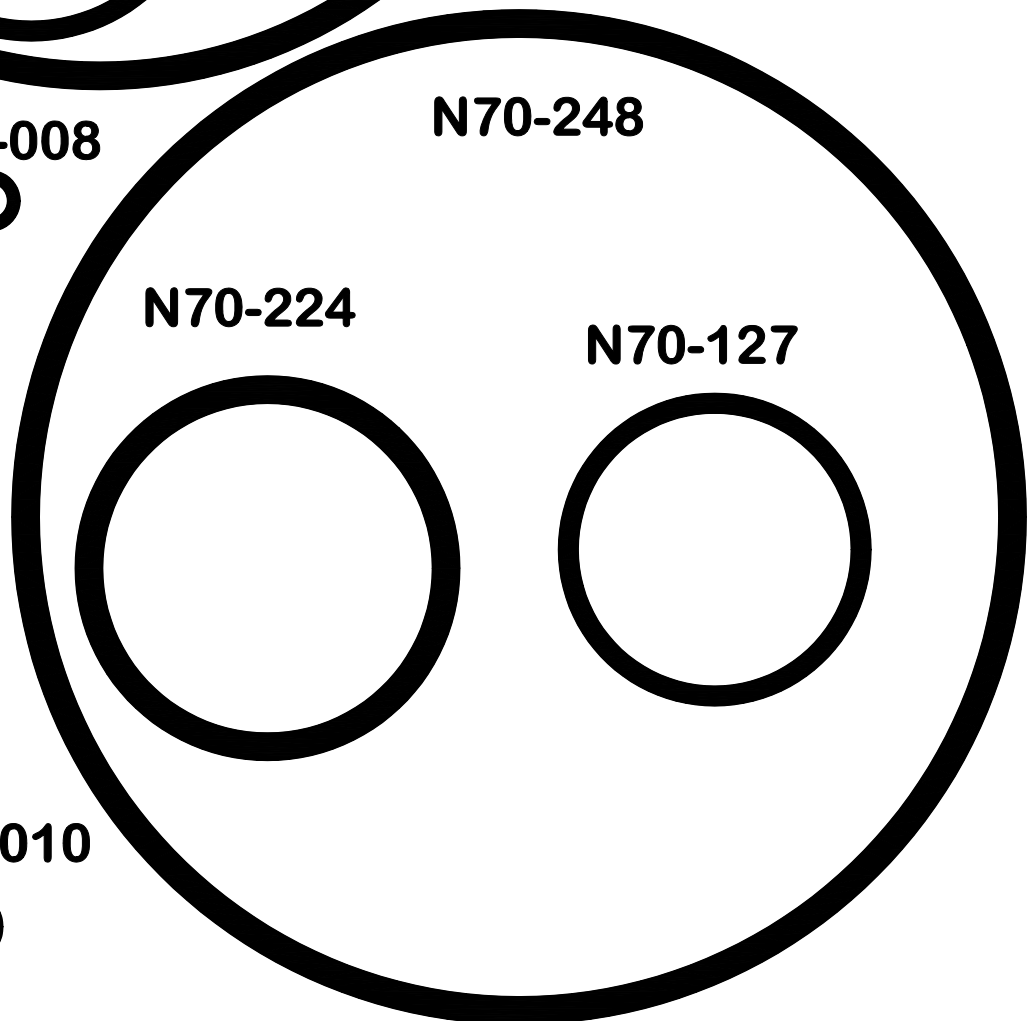
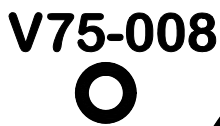
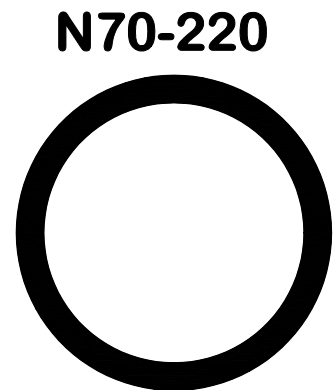
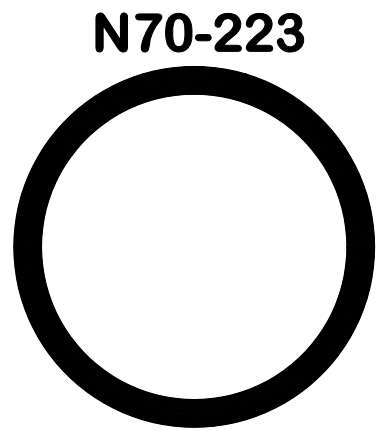
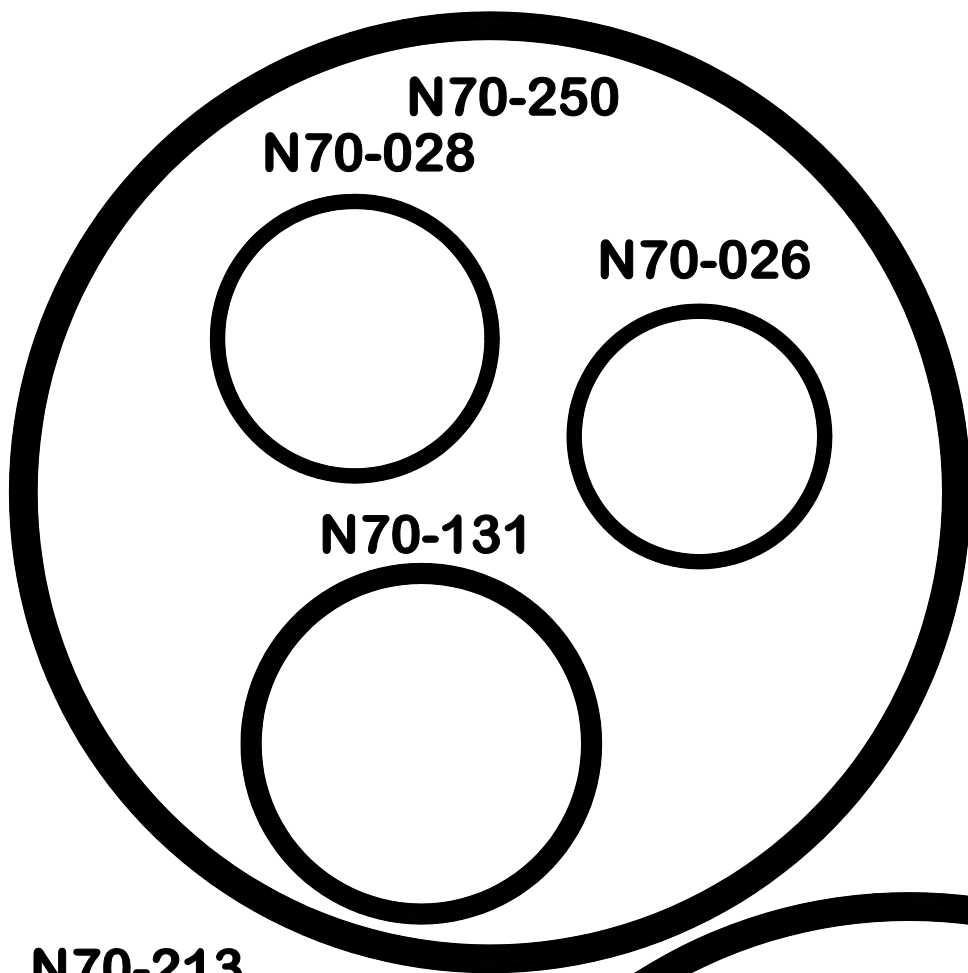
CLASSIC KISS O-RING LIST

GENERAL

Number	Where used/quantity	ID	OD	CS
N70-248	SCRUBBER X2	4-3/4	5	1/8
N70-250	SCRUBBER X2	5	5-1/4	1/8
N70-223	SCRUBBER CENTER TUBE X1	1-5/8	1-7/8	1/8
N70-220	EXHAUST VALVE X1	1-3/8	1-5/8	1/8
N70-127	QR HOSE STUBS X 4	1-7/16	1-5/8	3/32
N70-026	SENSOR COVER X3	1-1/4	1-3/8	1/16
N70-028	COUNTERLUNGS X2	1-3/8	1-1/2	1/16
N70-224	COUNTERLUNGS X2	1-3/4	2	1/8
N70-030	DISPLAY COVER X3	1-11/16	1-7/8	3/32
N70-011	DISPLAY CALIBRATION PORT X3	1/4	3/8	1/16
N70-114	DRAWBAR NUT X1	5/8	13/16	3/32
N70-111	DRAWBAR NUT X1	7/16	5/8	3/32
N70-213	OXYGEN REGULATOR PLUG X1	5/16	1-3/16	1/8
V75-008	O2 ADD VALVE X2	3/16	5/16	1/16
V75-012	O2 ADD VALVE X1	3/8	1/2	1/16

MOUTHPIECE O-RINGS

Number	Where used/quantity	ID	OD	CS
N70-016	SPOOL X1	5/8	3/4	1/16
N70-023	SPOOL X1	1-1/16	1-3/16	1/16
N70-020	OC REGULATOR X1	7/8	1	1/16
N70-026	SPOOL SEAT 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	HOSE SLEEVES X2	1-5/8	1-3/4	1/16
N70-214	KNOB X1	1	1-1/4	1/8





JETSAM TECHNOLOGIES LTD.
2817 Murray St.
Port Moody, BC V3H 1X3
Canada
Ph 1 604 469 9176
www.jetsam.ca
info@jetsam.ca

