

SCUBAPRO®

Technical Service Reference & Repair Guide

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Balanced Inflator

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Balanced Inflator



Important Note:




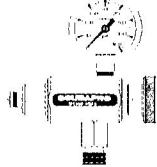



The following information is not designed to be a complete training guide for in-field servicing of SCUBAPRO Balanced Inflators. All SCUBAPRO technicians are required to attend an annual service clinic to insure safe handling and servicing of SCUBAPRO products.

TOOLS NEEDED:

Basic Tools

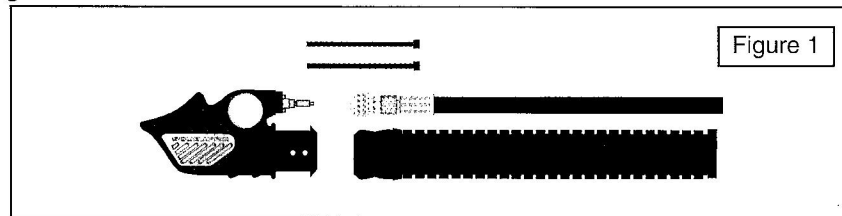
- Flat screwdriver with minimum 3/16" or 5 mm blade
- Tie wrap snips
- Flat screwdriver head for torque wrench - 3/16" or 5 mm
- 7/32" or 5.5 mm nut driver
- 15 mm box-end wrench or 6" adjustable wrench
- 7/32" or 5.5 mm nut driver head for torque wrench
- Adjustable wrench or 12 mm box-end wrench
- Cotton swabs
- Torque wrench

Special Tools and Supplies

<p>The SCUBAPRO Balanced Inflator controls are now ergonomically designed and "soft-touch" for comfort. The large geometric shapes make it easy to identify the inflation and deflation functions.</p> <p>The SCUBAPRO Balanced Inflator can be serviced annually. This feature is unique in the diving industry. The SCUBAPRO Balanced Inflator is designed to last!</p>	<p>Air 2 exhaust seat slider tool 43.300.101 (or large blade screwdriver)</p>	
	<p>SCUBAPRO Christo-Lube 41.047.000</p>	
	<p>SCUBAPRO Counter Mat 47.010.000</p>	
	<p>Pneumatic adjustment tool 43.300.112</p>	
	<p>SCUBAPRO schraeder valve tool 43.300.221</p>	
	<p>SCUBAPRO Universal Tool 43.040.000</p>	
<p>Brass Picks 43.300.017</p>		

Disassembly

Remove the inflator device from the BCD inflator hose by removing the tie-wraps. Care should be taken to avoid damaging the inflator hose as the device is being removed.



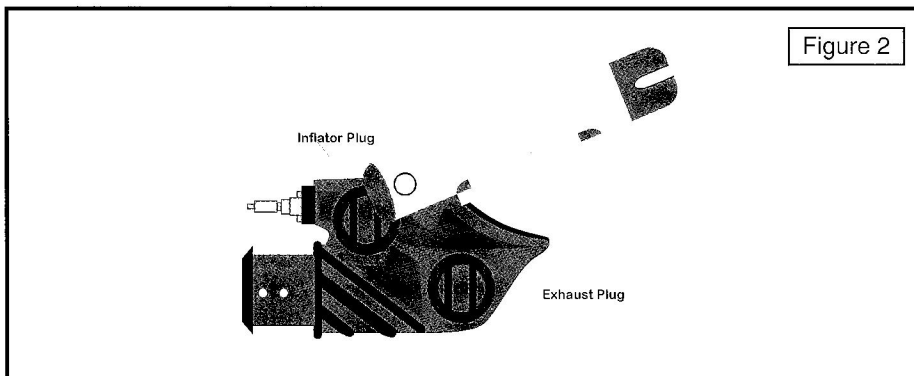


Figure 2

Loosen the inflator plug using a large screwdriver (at least 1/4" blade width) or use the back of the SCUBAPRO Air 2 Exhaust Seat Slider tool to perform this step. If there is any doubt as to the tightness of the plug, use the exhaust seat slider to help avoid damaging the plug as it is removed. The inflator plug is loosened counter-clockwise.

Once the plug is out, remove the inflator plug seal. This seal will be re-used, unless it is worn.

Remove the exhaust plug in the same manner as the inflator plug. There will be no seal under the exhaust plug.

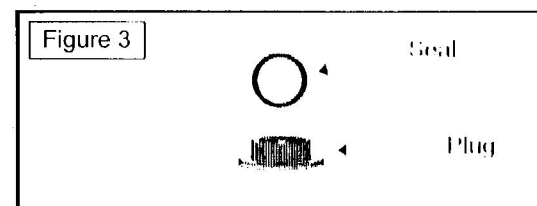


Figure 3

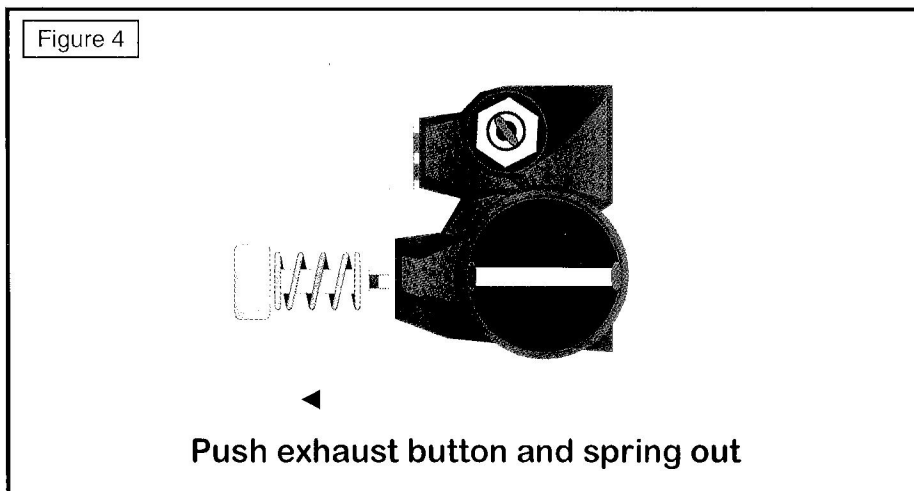


Figure 4

REMOVING THE EXHAUST MECHANISM

Apply pressure to the exhaust button and hold it down as this step is performed.

Using a 7/32" or 5.5 mm nut driver, carefully loosen the nut at the base of the exhaust button by turning it a counter clockwise direction. Continue to place pressure on the exhaust button as the nut is being loosened to prevent the spring loaded parts from coming out of the body suddenly.

Once the nut is removed, relax the pressure on the button and allow the spring tension to be slowly removed.

The exhaust seat can now be removed by grasping the sides and pulling it away from the exhaust button shaft. There will be a small washer on the opposite side of the exhaust seat and care must be taken not to lose this. Carefully push the shaft of the exhaust button through the inflator body to remove it. Use only a soft tool (such as a finger) to perform this step to avoid damaging the threads at the end of the shaft.

Carefully lift the exhaust button from the inflator body, being careful not to lose the o-ring, washer or spring, all of which can be easily removed. The o-ring will be replaced during assembly, but the exhaust seat is not normally replaced unless it is worn.

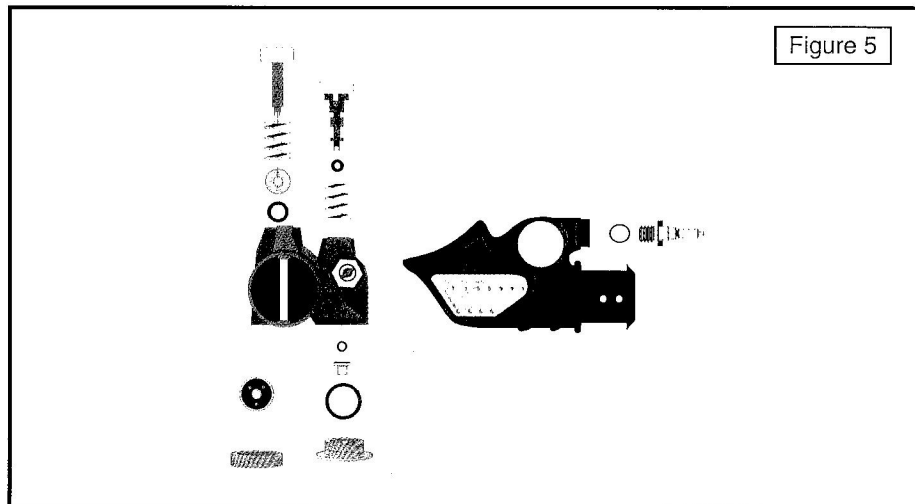
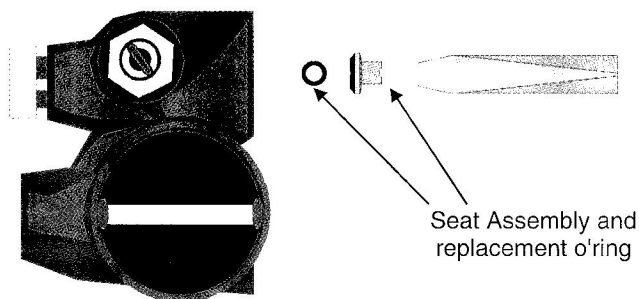


Figure 5

Figure 6



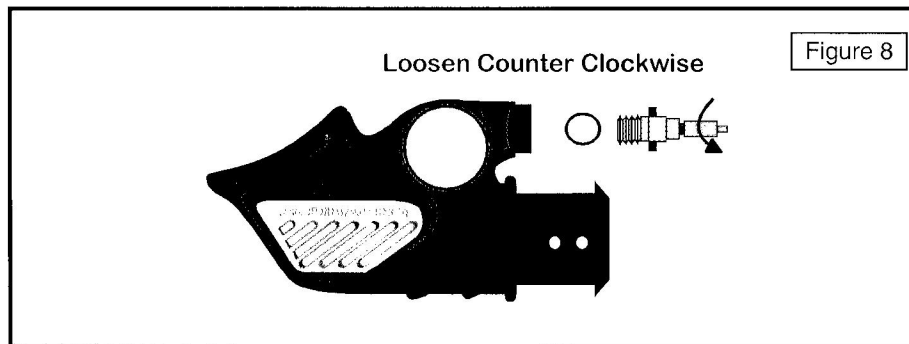
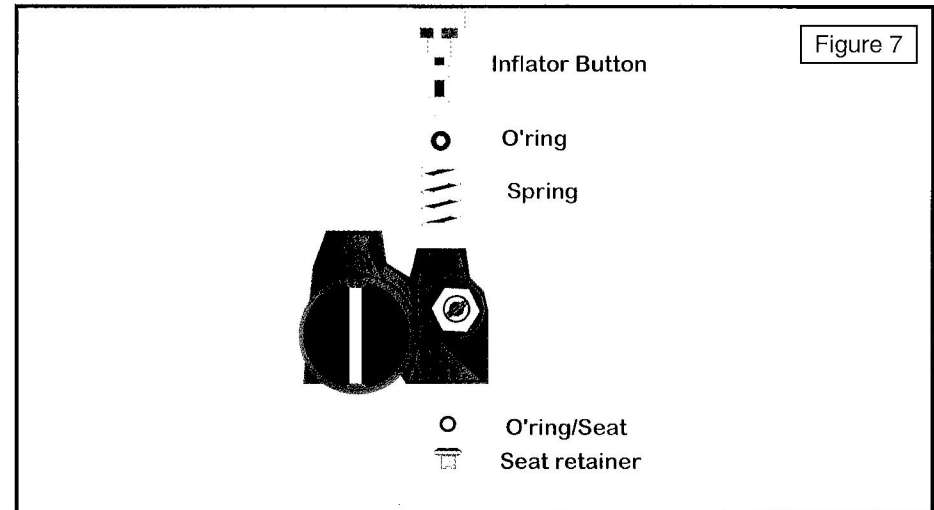
REMOVING THE INFLATOR MECHANISM

Apply pressure to the inflator button and hold it down as the following step is performed. The inflator mechanism is spring-loaded.

Using a small blade screwdriver (approx. 3/16" or 5 mm) loosen the seat assembly (counter clockwise) from the inflator mechanism. Slowly relax the pressure being applied to the inflator button, being careful not to allow the parts to come apart suddenly under the tension of the inflator mechanism spring. After loosening, turn the inflator body so that the inflator seat assembly can drop on to a hand or a SCUBAPRO counter mat. The mat will help prevent the seat retainer from bouncing if it is dropped. The seat retainer will be used again, but the o-ring will be replaced.

Relax the pressure being applied to the inflator button so the spring tension is removed. It is now possible to carefully pull the inflator button from the top of the inflator body. As the button is removed, take care not to lose the spring which is located directly under the button.

Using a brass o'ring pick, carefully remove the o'ring from the shaft of the inflator button. This o'ring will be replaced during assembly. Be sure to use only a brass pick (or softer device) to prevent damage to the o'ring seating surface on the shaft.



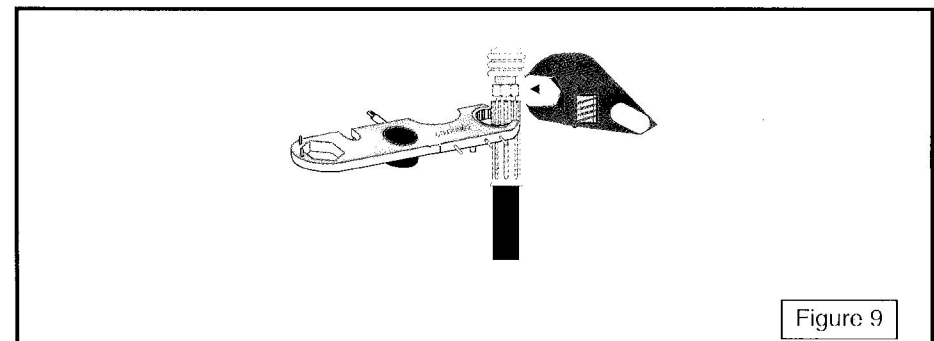
REMOVING THE QUICK DISCONNECT FITTING

The male portion of the quick-disconnect fitting can be removed using an adjustable wrench, or a 12 mm box wrench. The fitting loosens in a counter clockwise direction.

Thread the fitting all the way out and remove the o'ring. This o'ring is considered static and is not replaced, unless worn.

DISASSEMBLY OF THE SCHRAEDER VALVE AND QUICK DISCONNECT COUPLING

The female portion of the quick disconnect fitting, is first removed from the low pressure inflator hose. Use the universal tool to hold the splined fittings of the hose, and an adjustable, 15 mm box end wrench to hold the quick disconnect mechanism. Loosen the mechanism in a counter clockwise direction.



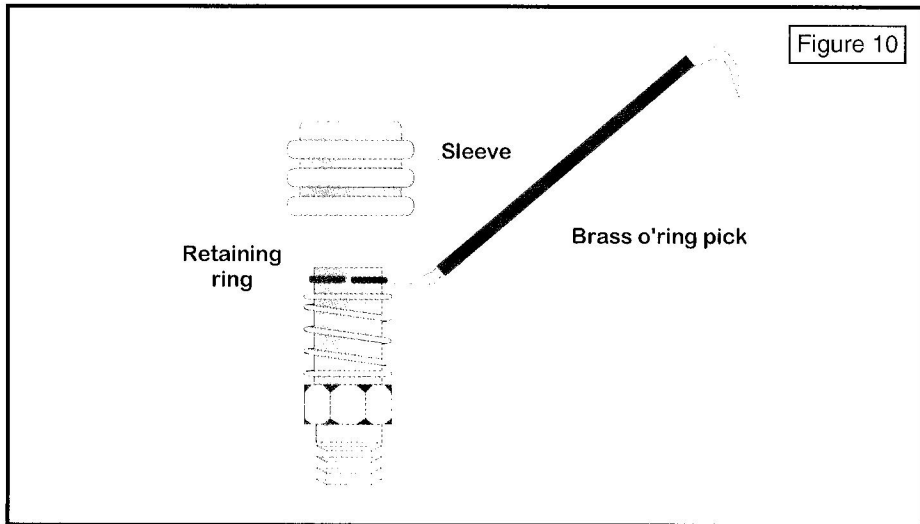


Figure 10

Pull the sliding sleeve down and use a sharp brass o-ring pick to remove the retaining ring. Slip the o-ring pick under the ring about 1/3 of the way back from the split in the ring, and gently pry it up ward. Be very careful during this step that the retaining ring does not come off suddenly, as it can be easily lost.

Remove the sleeve from the coupling body, and gently remove the spring underneath. As the spring is removed, be careful that the small bearings embedded in the quick disconnect coupling do not drop out unexpectedly.

Turn the coupling so that the small ball bearings are next to the counter mat, and use the brass o-ring pick to remove the bearings, pushing them from the inside outward. It is a good idea to place a small amount of Christo-Lube on each bearing, and then use the lubricant to "stick" all of the bearings together. In this way they can be put aside with less probability of rolling away.

Hold the coupling body with the adjustable or 15 mm wrench and remove the schraeder valve using the SCUBAPRO schraeder valve tool. This valve should be inspected and replaced if worn.

The final step in the disassembly of the quick disconnect coupling is to remove the coupling body o-ring. This o-ring provides the seal between the coupling and the male fitting on the inflator body, and is replaced during the service. Use the brass o-ring pick to reach into the coupling. Hook the o-ring and remove it.

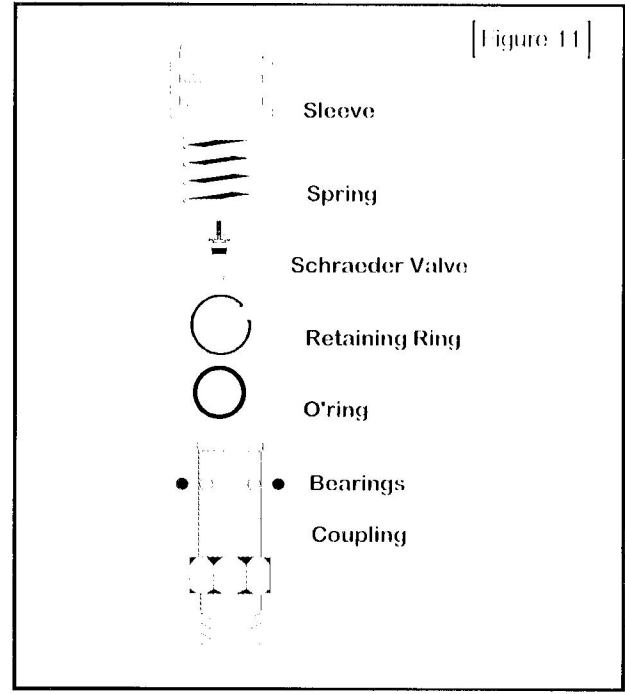
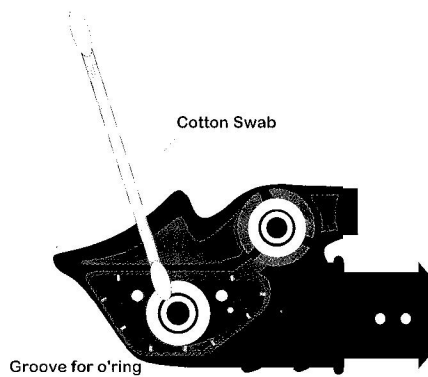


Figure 11

ASSEMBLY

Figure 12



PREPARING THE BODY FOR ASSEMBLY

Inspect the body for signs of heavy use. Although unlikely, check for cracks or other damage. In particular, be certain that o-ring seating surfaces are not damaged in any way. Damage in these critical areas may prevent the internal o-rings from sealing properly.

Clean the body o-ring seating surfaces using a clean, dry cotton swab. After removing the swab, inspect to be certain no cotton material has been left behind. Clean plug threads and the corresponding body threads with a soft-bristled brush (a toothbrush works well for this application).

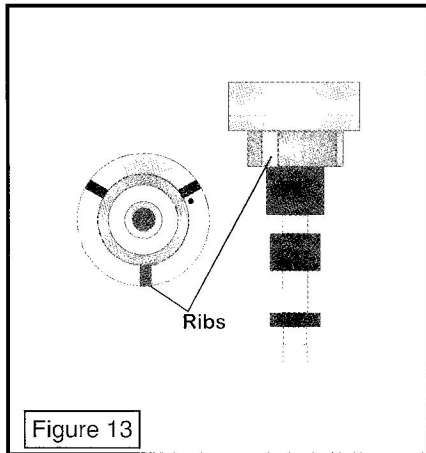
Before beginning the assembly process, make sure that all *replacement* parts are present, all parts which will be re-installed are inspected and lubricated as indicated, and that all tools are readily accessible. Because the inflator and the exhaust mechanisms are spring-loaded, it is difficult to search for parts or tools, once the assembly process has begun. If parts are kept together, and are laid out so that they are easy to find, there is less probability that the technician will have difficulty assembling the unit.

ASSEMBLY OF THE INFLATOR MECHANISM

Replace the inflator button shaft o-ring with a *new* o-ring. This o-ring is dynamic, and should be lubricated to dynamic specification. Dynamic lubrication means to lubricate well, rubbing the lubricant into the pores of the o-ring. Leave a moderate coating of lubricant on the surface of the o-ring, and run a thin bead of the lubricant into the grooves cut into the body of the inflator which will surround the o-ring

Replace the seat o-ring with a *new* o-ring. Press this o-ring into the seat assembly. Lubricate this o-ring to static specification using Christo-Lube. Static lubrication means to rub a small amount of lubricant onto the surface of the o-ring. Excess lubricant is removed.

Note: *The inflator seat assembly which combined the seat retainer and seating material into one molded piece (SCUBAPRO p/n 21-626-004) is compatible with the new balanced inflator and may be substituted.*



Note that the inflator button has three small guide "ribs" on it's underside. These ribs are used to align the button with three corresponding slots cut into the inflator body, and keep the inflator button and seat assembly from rotating during use.

Place the inflator spring on to the shaft, then push the inflator button into the inflator body, being certain that the guide ribs and slots align. Push the button all the way down and hold steady pressure on it. Turn the body over so that the end of the inflator shaft is clearly visible. Carefully thread the seat assembly on the end of the shaft. Using the torque wrench and 3/16 or 5 mm screwdriver head, apply 0.5 Newton meters or 4.42 inch pounds or torque.

Figure 13

Carefully check the inflator plug seal for nicks and tears, and replace if necessary. The seal should be lubricated to static o'ring specification, and placed over the inflator plug threads. Using the large blade screwdriver or the exhaust seat slider tool, thread in the inflator plug until it stops. The plug should be snug, but not over-tightened.

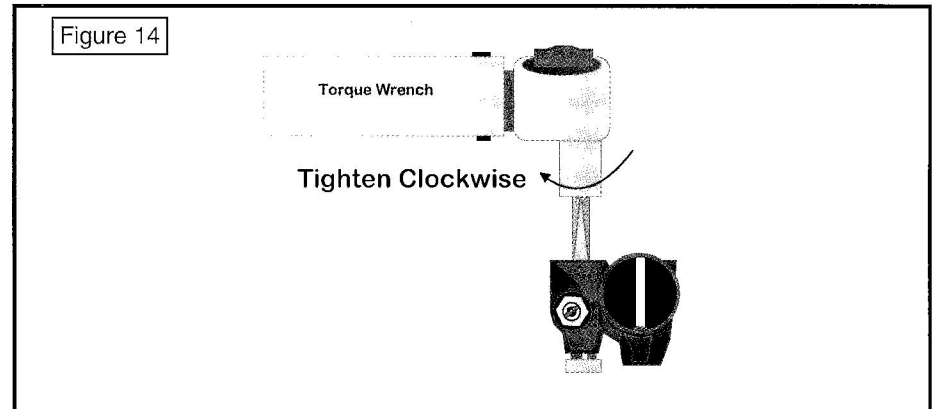


Figure 14

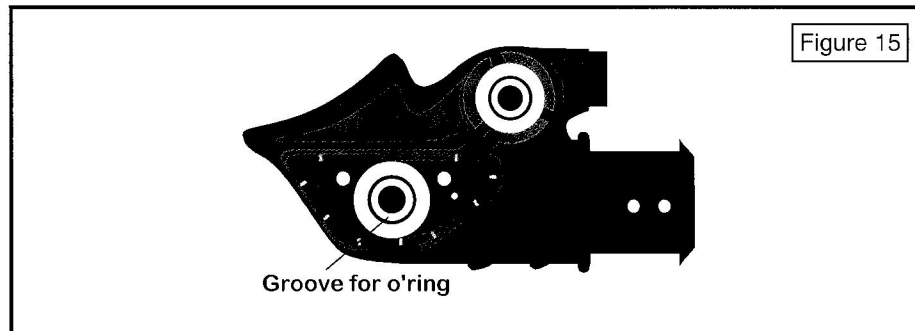


Figure 15

ASSEMBLY OF THE EXHAUST MECHANISM

Replace the dynamic exhaust shaft o'ring with a new o'ring. Lubricate to dynamic specification. The shaft o'ring provides a water tight/air tight seal for the exhaust button. It should be carefully placed into the groove cut into the inflator body, which surrounds the hole for the exhaust button shaft (Figure 15).

Next, carefully place the broad, flat washer on top of the o'ring. The washer will remain loose until pressure is applied by the exhaust button and spring. Be sure the center holes of the washer and the o'ring are aligned before proceeding.

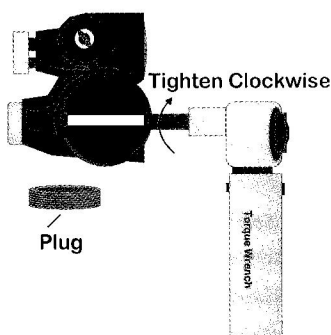
Slide the spring onto the exhaust button shaft, then carefully insert the shaft into the inflator body through the center holes of the washer and the shaft o'ring. Push the button all the way down, and continually apply pressure to the button during the next steps.

While continually holding pressure on the exhaust button, turn the inflator body over. The threaded portion of the exhaust button shaft should be clearly visible. Carefully place the small stainless steel washer onto the shaft.

Figure 16



Figure 17



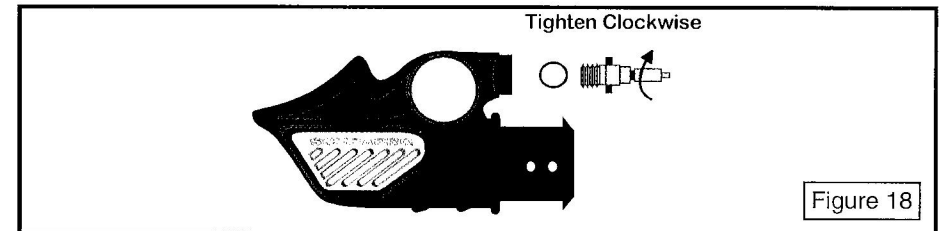
Next, after carefully inspecting the exhaust seat and replacing it if it is worn, slide the exhaust seat onto the shaft and push it to the thread shoulder. Carefully thread the small nut onto the shaft, being certain that it threads on straight.

Using a torque wrench and 3/16" or 5 mm head, tighten the nut to 0.5 Newton meters or 4.42 inch pounds.

The last step in re-assembling the exhaust mechanism is to thread in the protective plug to the inflator body using a broad screwdriver, or the Air 2 exhaust seat slider. The plug should be snug, but not over-tightened.

ASSEMBLY OF THE QUICK DISCONNECT FITTING

Inspect and replace the o'ring if worn. Lubricate the o'ring to static specification and place on the fitting. The fitting is then threaded into the inflator body and tightened using the adjustable or 12 mm wrench. Do not over-tighten.



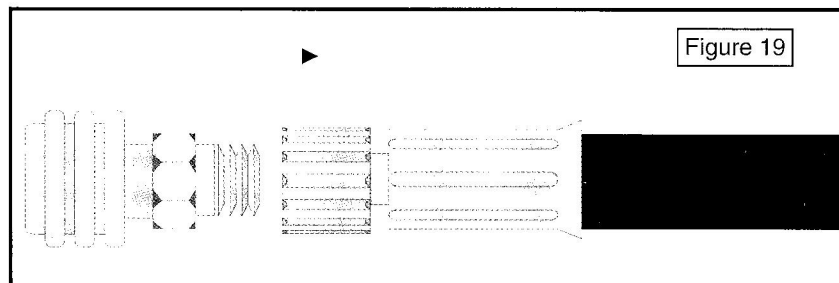
ASSEMBLY OF THE QUICK DISCONNECT COUPLING AND SCHRAEDER VALVE

Use the adjustable or 15 mm wrench to hold the coupling body and thread in the schraeder valve. Tighten the schraeder valve using the SCUBAPRO Schrader valve tool. The valve is o'ring sealed and should only be snug. Do not over-tighten.

Place a small amount of Christo-Lube in each of the bearing holes. This will help hold the bearings in place as the rest of the coupling is re-assembled. Carefully place each of the bearings into a hole, being careful not to drop any. Be sure to work over the SCUBAPRO counter mat. The counter mat will retard bouncing and help prevent loss of the bearing if it drops out during the assembly process. The excess Christo-Lube should be wiped away.

Next, place the spring over the top of the coupling and slide the sleeve on top of the spring. Be certain that the sleeve is turned so that the spring rest is facing the outside of the coupling. The spring rest should apply tension to the spring as the sleeve is pulled downward.

Hold the sleeve downward, applying tension to the spring, and pull the sleeve past the groove cut into the coupling body. This groove will hold the retainer ring. Carefully snap the retainer ring back into place, and check to be sure the ring is seated in the groove along its entire length.



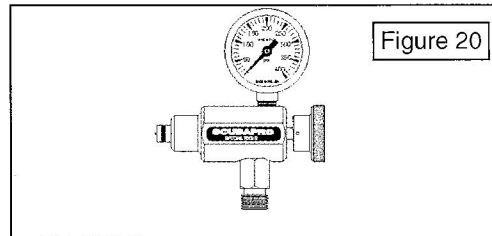
Finally, thread the coupling assembly into the swivel-end of the low pressure hose, turning the coupling with the appropriate wrench and the holding the hose connector with the universal tool. The coupling should be snug. Do not over-tighten.

Note: The swivel-end hose o'ring is dynamic. It should be replaced annually and lubricated accordingly.

TESTING THE UNIT

LOW PRESSURE AIR TEST

Use the SCUBAPRO pneumatic adjustment tool to check the intermediate pressure of the first stage to which the inflator will be attached. The inflator is designed to operate with intermediate pressures between 125 - 145 psi.



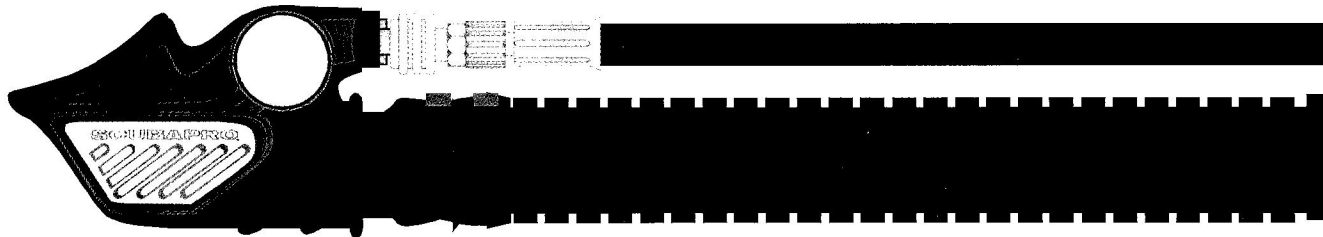
With air turned on, attach the inflator using the quick disconnect fitting. The fitting should connect easily, even with the air turned on.

Next, check for leaks by submerging it in water. There should be no leaks of any sort. If leaks are discovered, it may be necessary to disassemble the inflator and replace a part.

EXHAUST MECHANISM TEST

Following the low pressure leak tests, attach the inflator to the BC for which it will be used. Use two new tie-wraps for attaching the unit to the inflator hose.

Inflate the BC and check for leaks. The BC can be submerged in water to check immediately, or can be tightly inflated and allowed to stand for at least 30 minutes. There should be no loss of air with a resulting loss in tightness of the BC. If the BC will not hold air for this time, submerge the BC in water and determine the point of leakage.



Balanced Inflator Assembled