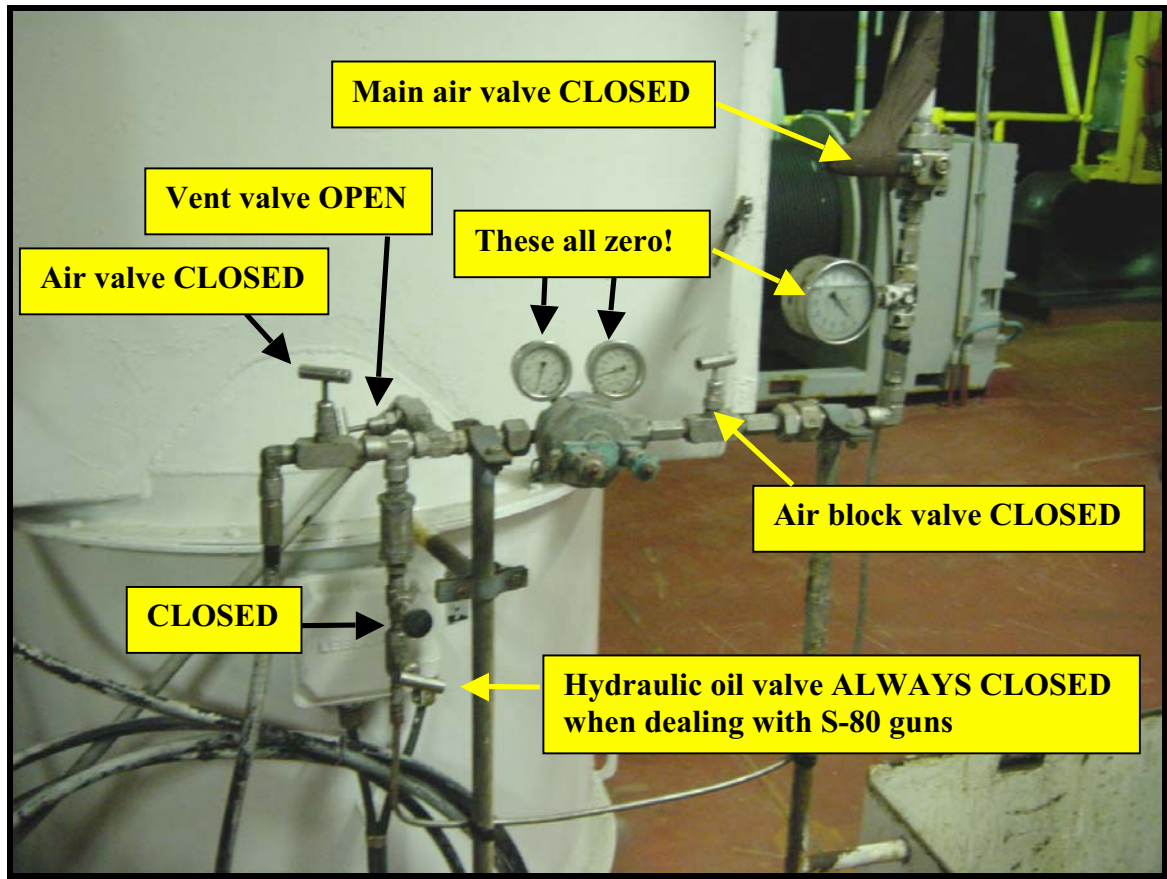
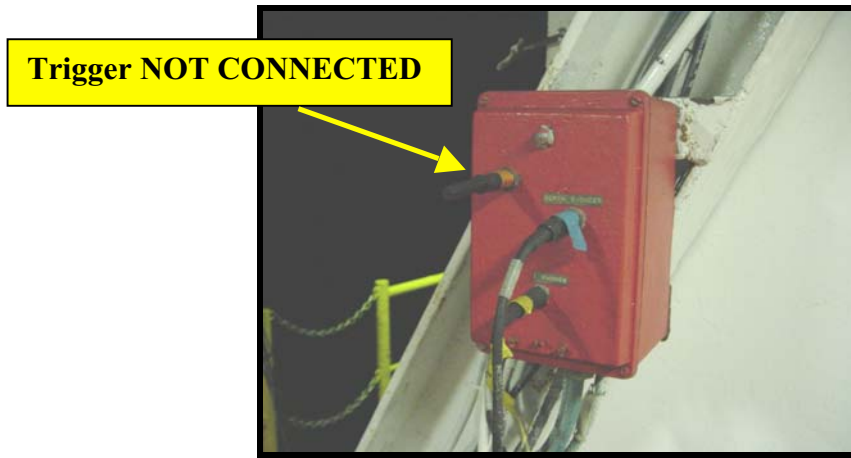


How to service an S-80 gun?

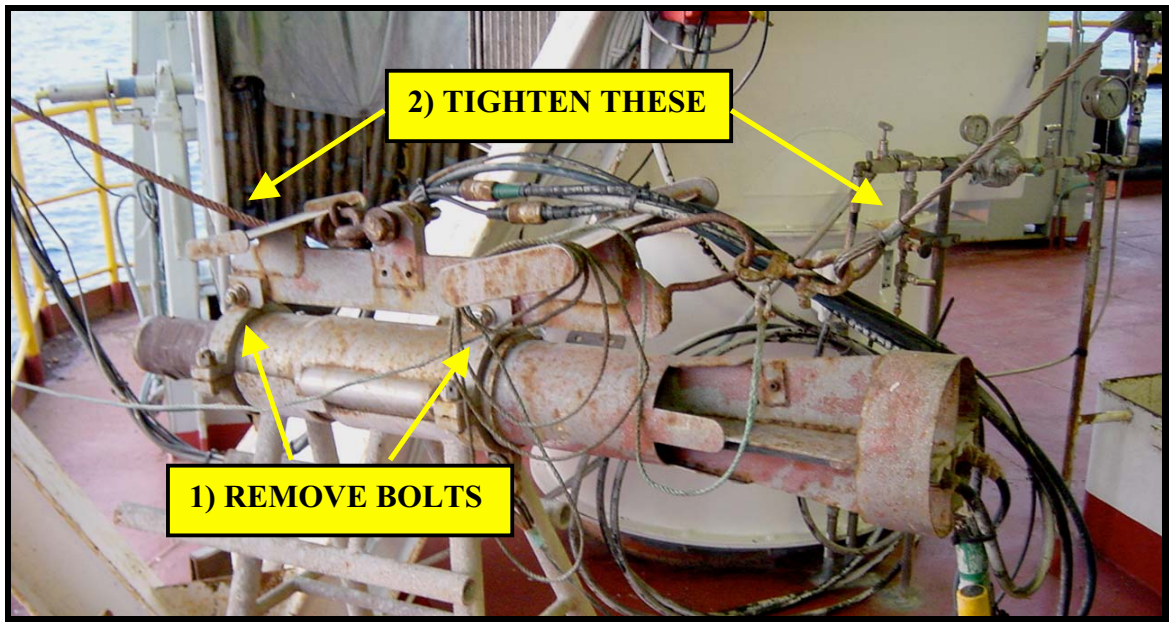
First, make sure that no air is connected to the gun.



Then, check that nothing is connected to the trigger lead.

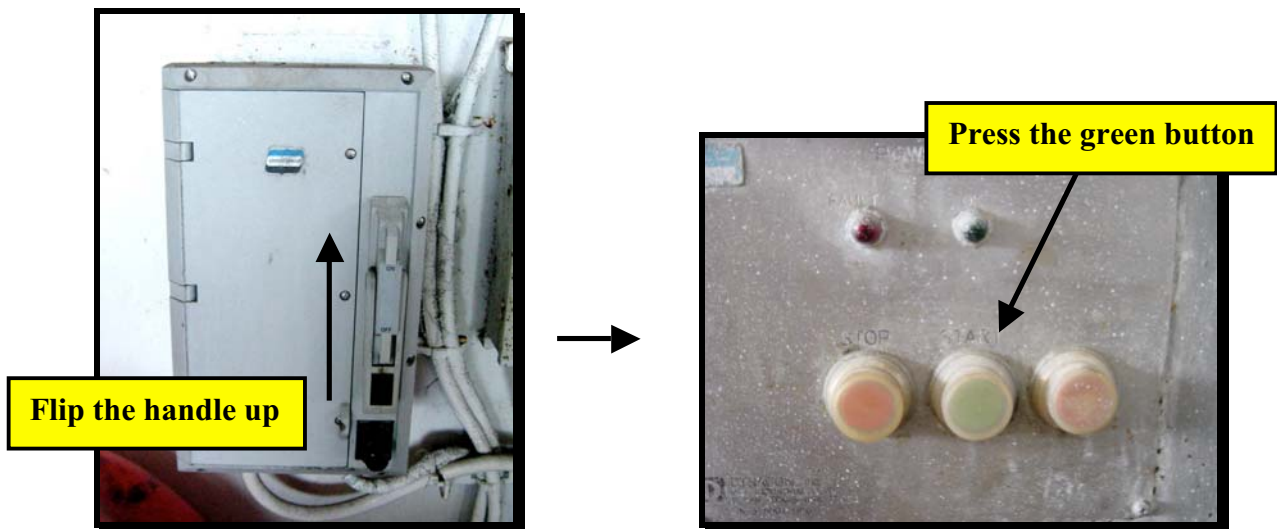


Now, remove the two bolts that hold the towing assembly in place, then tighten the back and front cables and carefully detach the towing assembly.



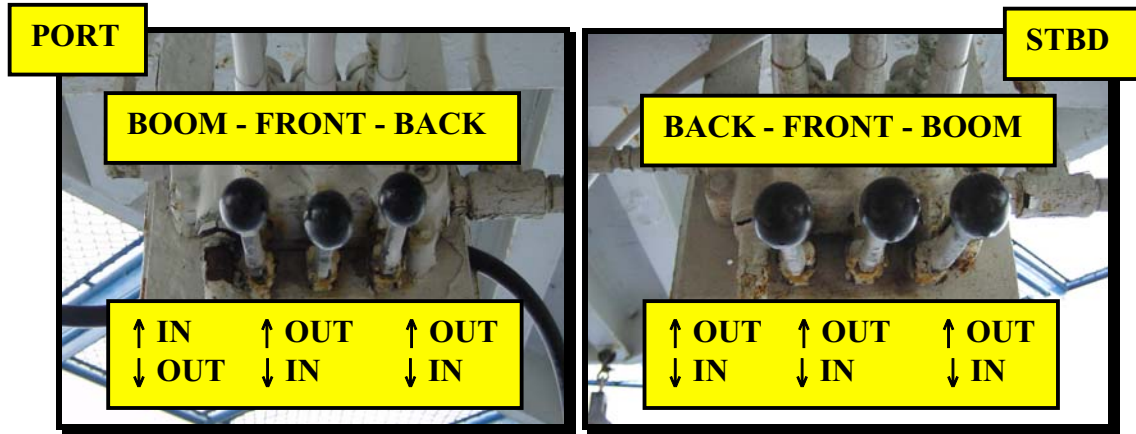
Before starting the hydraulic pump, **make sure all winch handles are centered**. If someone has been playing with them, they can be stuck up or down and once you start the pump, disaster will be awaiting you. AND remember to check both STBD and PORT. The same pump starts the winches on both sides.

Now start up the hydraulic pump.



When you flip the handle, a green light will come on on both of these boxes. At least at the moment (Leg 196) the lights are working.

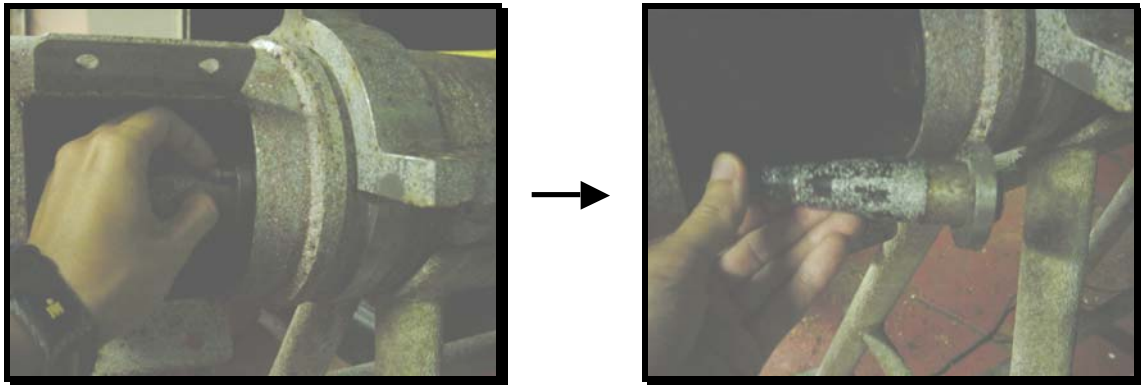
Be very careful with the winches. Use two hands when first practicing, so you do not push the handle too far –the gears are not too user friendly, especially on the single handle cable reel winch.



After you get the towing assembly loose, lift it high enough so it gives you ample room to work on the gun.



Next, remove the screws that attach the solenoid jumper plug flange 164 to the solenoid. Pull the jumper plug out.



The next step will be detaching the tail fins. Have someone hold the tail for you while you remove the clamp that holds it in place. Be very careful. **The tail is HEAVY.**

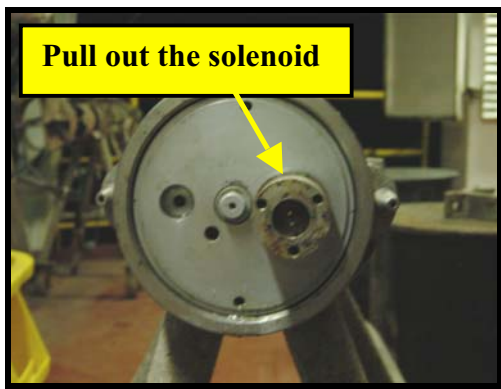




Push the cart over to the workbench. Again, have someone hold the damper while you detach it by removing the clamp. The damper is **HEAVY** too.

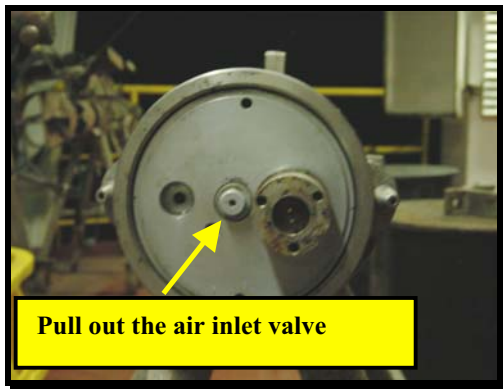


Now, pull out the solenoid valve block. The instructions for servicing the solenoid are on the PORT wall in the lab. Be gentle with it when pulling it out –do not go and scratch it with a wrench if it is stuck!



There should always be serviced solenoids in the top drawer of the underway lab work bench. The clean ones will be in zip-lock bags with the Leg number. The two O-rings that go on the outside of the solenoid will be in the bag, so all the parts that go on this solenoid will have been checked out. All you need to do is to apply some Dow Corning 111 Compound on the outside of the solenoid, grease the two O-rings in the bag and put them in place.

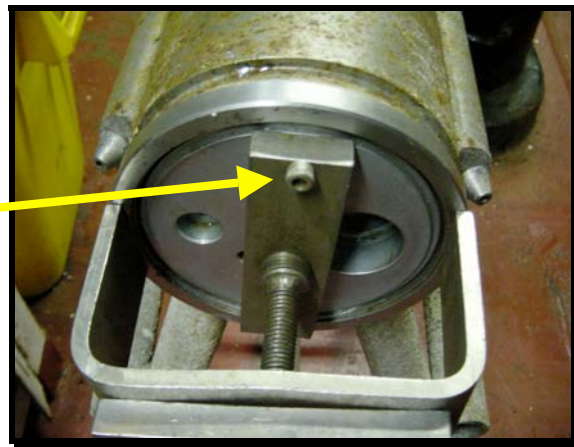
Pull out the air inlet valve. Use the valve puller that you screw into the valve and the just pull it out.



Pull the valve apart.

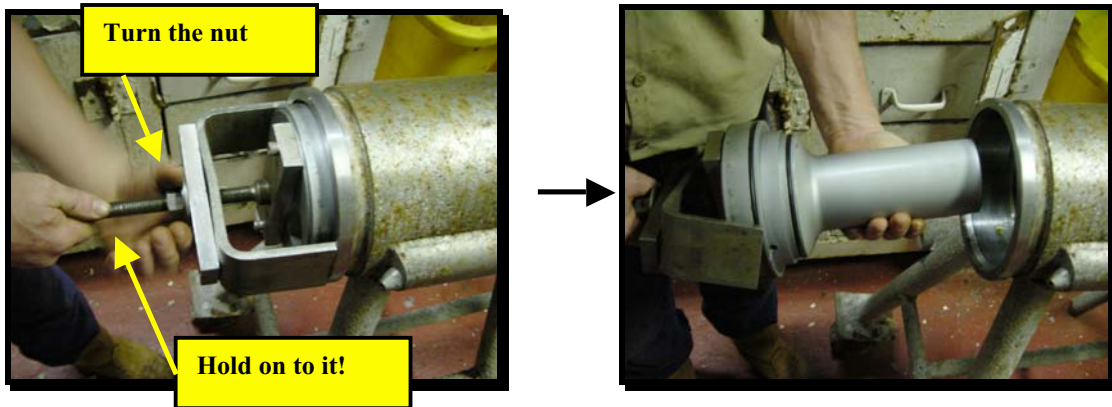


Take the extractor tool and screw it on the distributor.



Turn the nut until the extractor pulls the distributor out. Be careful when getting close to it coming out so it does not fall down on the inside of the gun and hit itself. Hold on to

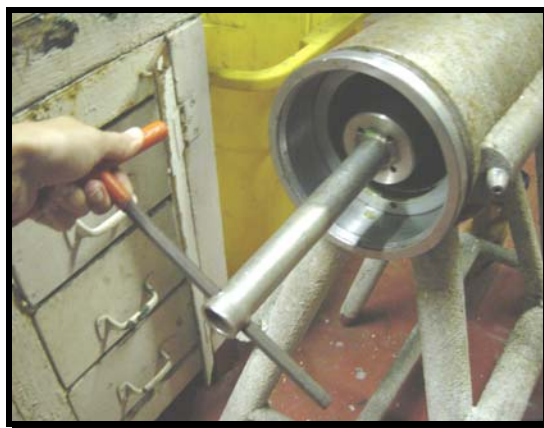
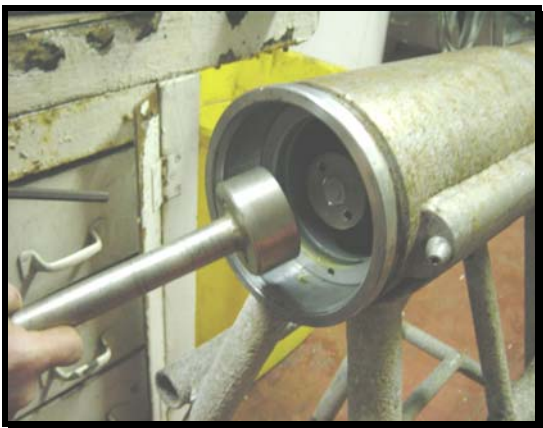
the threaded part of the tool all the time in order to keep the distributor aligned with the gun body.

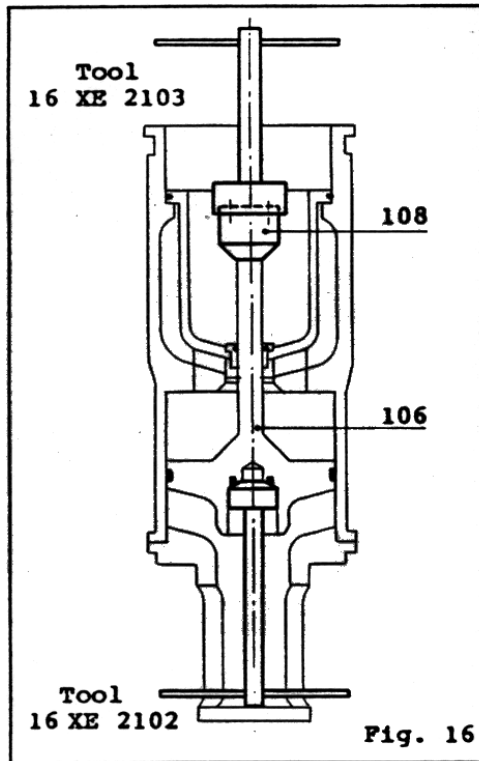


Now, take the special tools “Upper piston wrench” and the “Lower piston wrench”.



Find crank handles for the piston wrenches. The hex wrenches in the S-80 tool box work well for this. On the next page, a drawing shows which wrench is for which end.





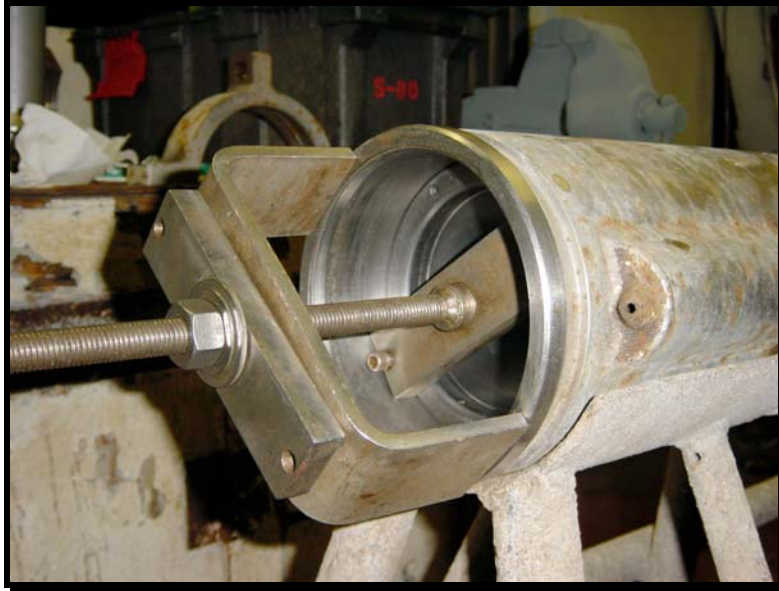
Get someone to hold the other wrench while you turn the other. If you are by yourself and can not get the pistons to come apart, you can lock the lower piston by putting the damper back in place (like in Fig. 16). Unscrew the upper piston (108).



Screw the protective bush (picture) on the lower piston. Now you can carefully tap the piston 106 with the handle of the rubber mallet, if it does not want to come out by just pushing with your hand. **DO NOT LET IT FALL OUT!** If you have someone with you, ask this person to stand at the other end of the gun in order to hold on to the piston when it starts coming out.



Next, pull out the sleeve. The same tool is used for this as was used for pulling out the distributor. Same story, be careful with it and hold on to the threaded part of the extractor so the sleeve does not fall and hit itself.



Now you have all the parts out of the gun body. It is time to start servicing them. We will take the sleeve **102** first. Place it on a piece of paper towel. Clean it well. Use oil or grease if needed, and a green scrub pad. Make sure not to scratch it.

Open the lock washers **158** (there might be a tool for this, if you can not find any, use a hammer and a chisel –just try not to do too much damage with them).



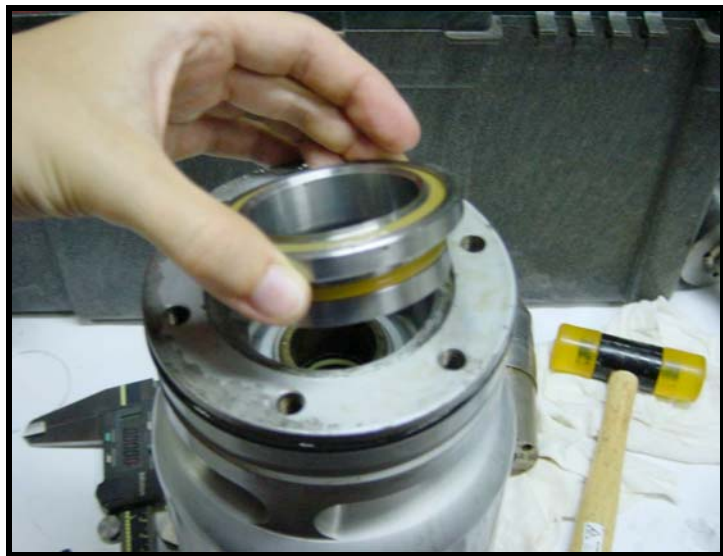
Next, take the bolts **154** out, and then detach the clamp **105**.



Clean the connecting surfaces between the clamp and the sleeve body well. Remove the yellow sealing ring **104**.

Check the condition of the sealing ring and replace it if needed.

Pull out the ring holder **103**. Service the O-rings **138** & **138** on it. Clean and grease it, and reassemble.



Take out the clip **126** that holds the bearing **125** in place, use lock ring pliers for this (if available). Next, take out the yellow O-ring **140** and the black split ring **133** inside the bearing. Be careful not to damage them or the bearing.



Clean the bearing and grease it. Q-tips are very useful for cleaning the O-ring grooves. Clean and grease both the O-ring and the black split ring on the inside of the bearing. Put them back in place. Next, service the “outside O-ring” **136** and then re-assemble it.



Clean and grease the base, and put everything back together. Remember to bend the “wings” on the lock washers back up.



“Squeeze” out (look at the picture!) the two black O-rings **139** & **143** on the outside of the sleeve.



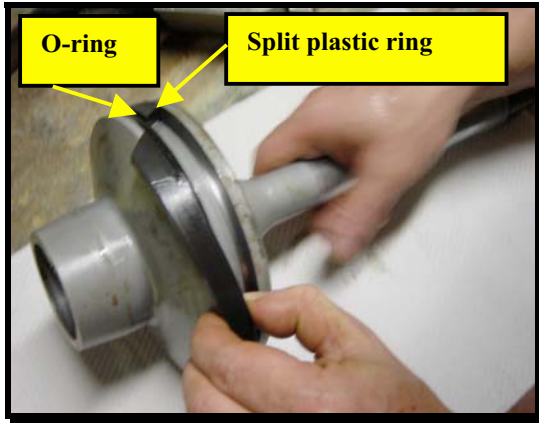
Clean the O-rings. If they are damaged, replace them with new ones. Clean grooves. Grease the grooves with Dow Corning 111 Compound and then, grease the O-rings and put them back in place.



Before you put the sleeve back in the gun body, you have to clean the inside of the body really well. Scrub off all the rust and such with a green scrubby pad, you can try to lubricate this action with some oil or grease. When the body is clean, lightly grease the inside of it with Dow Corning 111 Compound. That provides good rust protection.



Next, take off the black split ring **107** and the O-ring **137** on the lower piston **106**. Clean the piston and then grease it well. Do not forget to grease the shaft. Check for damage on the rings and replace if needed. Clean, grease properly and put back in place.



On the upper piston, there are an O-ring **142** and a split ring **132** on the outside, and an O-ring **140** on the inside. Clean all these and check their condition. Replace if needed, grease the piston and the O-rings. **Remember to clean the piston wrenches** before screwing the piston back in place, so you do not put any gunk from the dirty gun into the clean one.

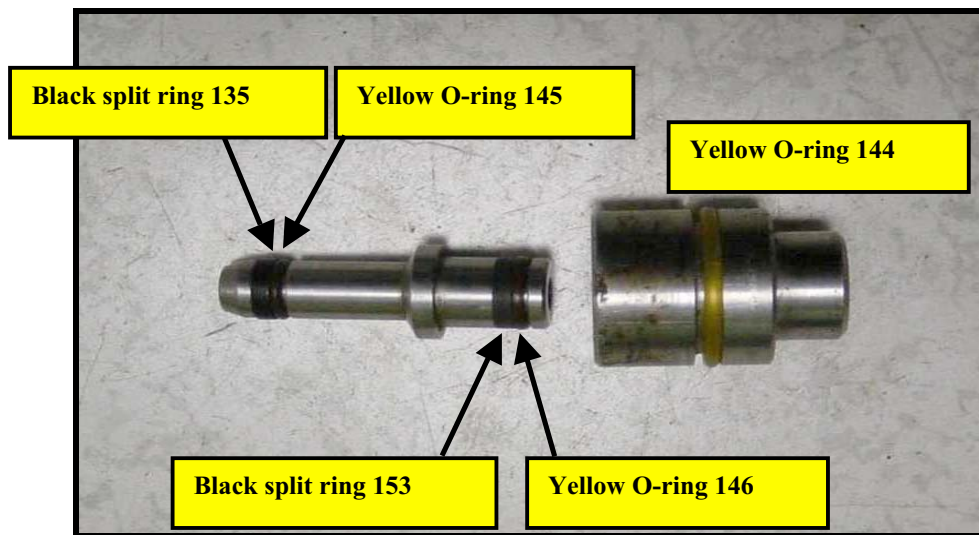
On the air distributor **109**, there are lots of small holes that need to be cleaned well. A Q-tip is a useful tool for that. It would be better to use the wooden “high-quality” cotton tip applicators since they leave less hairs than the little two-ended ones.



Clean the distributor with care, there are two O-rings **143** & **139** on the outside that you have to service, too. Remember to grease the holes on the end before you re-assemble the distributor.



When re-assembling, pay attention to the holes lining up horizontally (the solenoid hole to the right!), or you will be in trouble later.



Clean the air inlet valve **111** and the valve cap **112**. Service the O-rings on them.



Clean the connecting surfaces and the O-ring **137** on the damper **122**. Grease it, and grease the O-ring.

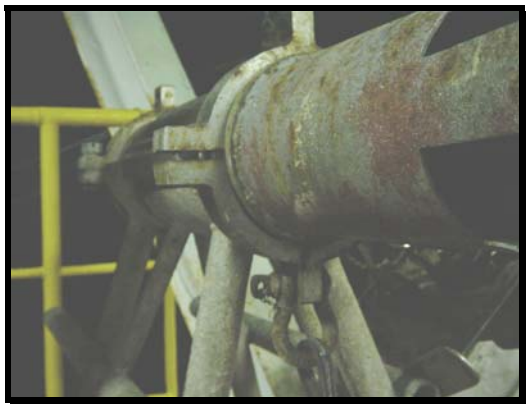
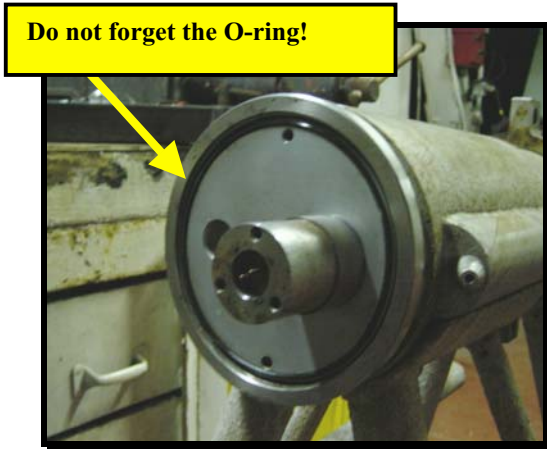
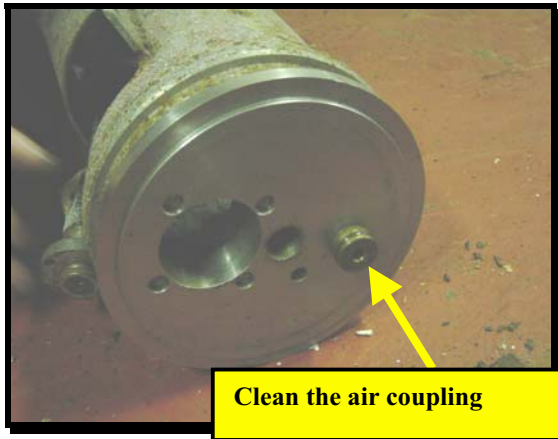


It is very useful to clean and grease the clamps **123** too -it will make your life a lot nicer in the future.



Re-assemble the damper. Put the clamps back on and secure them with the bolts.
Do not forget the cotter pins!

One more thing left to clean: the tail. Remember to clean the air coupling **110**, and the O-ring **144** on the coupling, too. Grease everything lightly. Push the gun on the cart back "home".



Remember to put the O-ring **143** between the distributor and the tail. Re-assemble the tail and put the clamps back on.



Reconnect the jumper plug to the solenoid. Apply some Kopr-Kote on the three cap screws and screw the jumper plug flange back in place.

Re-assemble the towing assembly. Do not hurt yourself.

And finally, check that every bolt on the outside of the gun has a cotter pin in it.

S-80 Water Gun Solenoid Service Guide

Disassembling a solenoid

- 1) Unscrew the base 1 from coil 2 (3/4)
- 2) Unscrew screws 13
- 3) Remove sub assy 8
- 4) Remove plunger 11
- 5) Remove spring 9
- 6) Remove retainer seat 10
- 7) Remove poppet 12
- 8) Remove O-rings 4 and 7.

Clean all parts well.
Replace worn or damaged ones. Do not grease moving parts on the solenoid.

Re-assembling a solenoid

- 1) Place poppet 12 in retainer seat 10
- 2) Place them in plunger 11
- 3) Place spring 9 in plunger 11
- 4) Place this kit in sub assembly 8
- 5) Place O-ring 7 and O-ring 4 back on
- 6) Assemble 8 and base 1
- 7) Screw 4 screws 13 (put KOPR-KOTE on the screws)
- 8) Screw this whole sub-assembly in coil 2
- 9) Grease O-rings 5 and 6 lightly, put back in place

