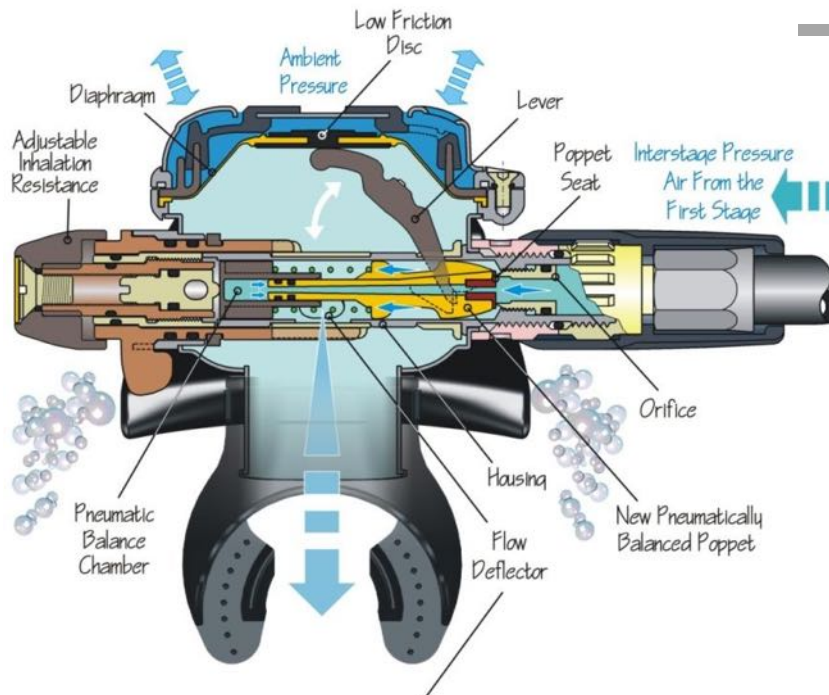




# A700 Step-by-step maintenance procedures.

Refer to schematic for part identification.

Rene' Dupre' - Technical Training Manager – 8/2009 Copyright, Modified 7/2010



**Important note:** The following information is not designed to be a complete training guide for servicing the listed SCUBAPRO regulators. All SCUBAPRO technicians are required to attend an annual service training program to insure safe handling and servicing of SCUBAPRO products. All SCUBAPRO technicians must be employed by an authorized SCUBAPRO facility.



To properly service the A700 second stage, the following or suitable alternatives are required.

- SCUBAPRO universal tool P/N 43.040.000. Purchase direct from SCUBAPRO.
- Pneumatic adjusting tool. Recommend source: [www.scubatools.com](http://www.scubatools.com)
- TORX® 10 Driver. Recommended source: Your favorite hardware store.
- TORX® 10 Plus Torque. Recommended source: [www.wihatools.com](http://www.wihatools.com)
- Brass o-ring pick set. Recommended source: [www.scubatools.com](http://www.scubatools.com)
- Flat blade screw driver.

Po.	P/N	DESCRIPTION
1	11700010	PROTECTIVE SLEEVE
2	01050132	O-RING
3	01309029	L.P. HOSE cm. 75
4	11700040	HOSE SLEEVE
5	01050347	O-RING
6	01008719	DECAL, KNOB
7	11700006	CASE
8	11700023	MOUTHPIECE SUPPORT
9	01103700	SCREW M3
10	11700009	DIAPHRAGM
11	11700117	RING
12	11700037	COVER
13	11700036	PURGE
14	01040700	CLIP
15	01040141	MOUTHPIECE
16	11250103	EXHAUST VALVE
17	11700043	EXHAUST TEE
18	11500109	ORIFICE
19	01050160	O-RING
20	11600141	LEVER
21	11250221	SEAT
22	11700220	POPPET
23	01050363	O-RING
24	11700015	POPPET ASSY
25	01020218	SPRING
26	11150102	BALANCE CHAMBER
27	11600011	SCREW ADJ.
28	01050126	O-RING
29	11650102	ADJ. SHAFT
30	01050293	O-RING
31	11650105	SLEEVE
32	01050351	O-RING
33	11700107	DIVE, SWITCH
34	11500031	CLIP
35	11700003	KNOB
36	11600002	SCREW
37	11700016	FLOW DEFLECTOR
38	11700106	NUT
39	11500024	SLEEVE

**Caution:** Items 16, 20 & 39 need not be removed during routine annual services. Dully inspect these components for damage, leaving them in place. Replace as needed.

<> Torque N·m  $\begin{smallmatrix} +2 \\ -0 \end{smallmatrix}$

[ ] Torque lb·in  $\begin{smallmatrix} +18 \\ -0 \end{smallmatrix}$

◆ Annual replacement

A700 SECOND STAGE		Prepared by <i>R. Patrone</i>
CAT. NO. 11-700-000		CHECKED
CONFIG. 3	DATE 03 / 2010	1 / 1
REV.	Modified pos 7	



1. Pull second stage hose sleeve back – to expose LP hose swivel, loosen the swivel using the SCUBAPRO universal tool.



**Do not remove the finishing-nut (jam-nut)** – to avoid permanent damage. The inlet tube is silver soldered to the case, and then pressure tested for leaks. Nothing is gained by removing the nut; it is for cosmetic purposes only and held using factory applied soft thread locking agent. Submerging the A700 case into an ultrasonic unit, using SCUBA industry-marketed ultrasonic cleaning solutions is recommended to safely clean case.



6. Hold the diaphragm to light and stretch it from 4 points to check for punctures. Reposition and repeat to be sure there are no punctures and that the diaphragm is imperfection free.



7. Inspect the smooth operating side of the disc for signs of wear. Replace as necessary.

Dive switch  
Min / Max



8. Next, remove the "dive switch" assembly. First remove the safety "C" clip by placing a flat blade screw driver in the negative detent (or the bottom side of the wave) of the "C"-clip.



9. Then slide your finger or thumb to provide support and pry, via light leverage.

C-clip



10. Pull the complete "dive switch" assembly free from the 2<sup>nd</sup>. stage case and remove the 2 o-rings, using a brass pick.



2. Using a TORX® T10 driver, remove the 4 front cover screws.

Remove the cover.



3. The screws are conveniently held in place with o-rings – to avoid losing them.

Remove the o-rings, as new ones are supplied in the annual service kit.



4. Separate the purge cover and ring. Inspect the integrity of the purge and ring. The metal, stainless steel "S" insignia is **not** removable.



5. Carefully remove the inhalation diaphragm.

Replace if it smells of diesel or gas, is tacky or distorted.



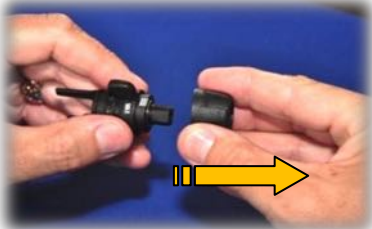
11. Lift the decal from the adjustment knob, using a suitable device. A new decal is supplied in the A700 maintenance kit.



12. Unscrew the 4 mm adjustment knob Allen-screw and remove the o-ring.



13. Pull the knob free from the adjustment shaft.



14. Push on the adjustment shaft end to separate it from the "dive switch".



15. Screw the adjustment shaft clockwise, to separate it from the metal sleeve. In some cases, you may find it helpful to use the adjustment knob.



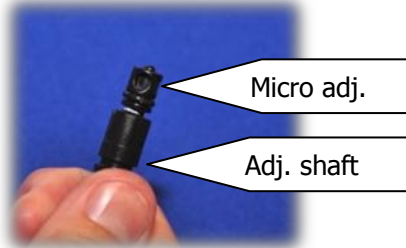
16. Remove both the shaft o-ring and sleeve o-ring, using a brass pick.



17. The *technician* micro-adjust is concealed within the knob stem and is driven out clockwise, using a small flat blade screwdriver.



**Tech tip:** Temporarily screw the "micro-adjust" (adj. screw) into the "adjustment-shaft". This will give you more area to grab and assist with the removal of the 126 o-ring.



19. Push the poppet assembly free, using a blunt small diameter tool, like a 3/32 ball-end Allen driver.

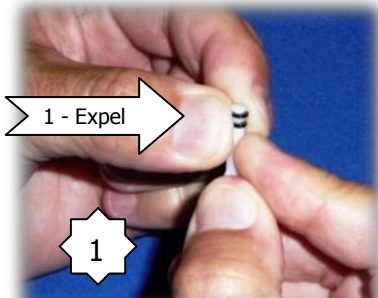


20. Driver of choice must be slim enough to pass through the center of the adjustable orifice.



21. Remove balance chamber and spring.





22. Expel o-rings out of the grooves (slightly) with one set of figures and shove off with other. Avoid use of tools, they may cause damage.



"Flow deflector" (aspirator) need not be removed!

If you must – it is a snap fit. Flow deflector is orientation specific!



23. Usage of small profile brass o-ring picks is also handy – just be careful not to score the o-ring lands.



26. Look inside the inlet tube, with proper lighting – to be sure both lever **tabs** (deep inside the inlet tube) are present and imperfection free.

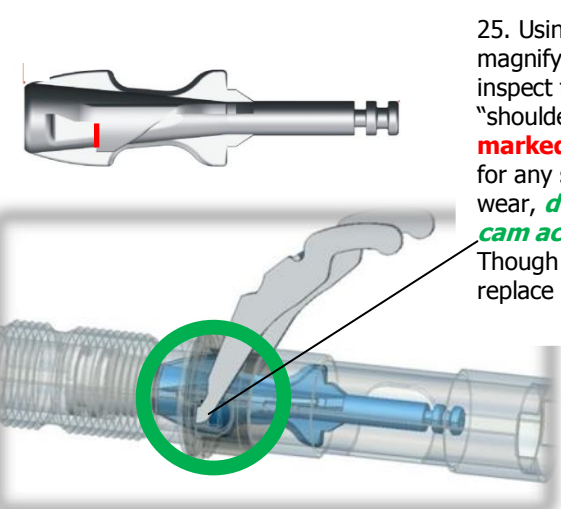


24. Pinch and separate the low pressure seat.

Note: The LP seat is a press fit. Press in / pull out.



27. Fully engage function #7 into the back slots of the adjustable orifice. Unscrew counterclockwise, until threads have disengaged, (approx. 4 rotations).



25. Using a magnifying glass – inspect the poppet "shoulders", **marked in red** - for any signs of wear, **due to cam action**. Though rare, replace as needed.



28. Expel the adjustable orifice with care, by pushing slowly from the "knob" side of the inlet tube. Your tool of choice must clear the lever tabs and orifice knife-edge.



Lever – need not be removed! Visually inspect the lever to be sure an inexperienced technician hasn't bent it previously. The lever should "parallel" the inlet tube from end-to-end.



29. Remove o-ring, with soft brass pick.



30. Now thoroughly inspect the knife-edge surface using your finger-nail to detect any nicks or imperfections, by rotating the orifice back and forth.



31. Remove inlet tube o-ring.



35. To release the clamp lock, position your tool of choice on one of the **outside "guides"** of clamp locking mechanism – rather than the "hook" itself.



32. Grasp, twist and pull the exhaust T free.

The slight twist helps removal and/or break up of unseen encrusted salt.



36. Pull the mouthpiece free and inspect.



Note the position of the index figure and thumb inside the ends of the exhaust T.



37. Grasp, twist and pull the "mouthpiece support" free.



**Exhaust valve need not be removed.**

Inspect the exhaust valve for any signs of damage or imperfections. Note: Inspect for insect/rodent damage.



Serial Number



33. Look from the side to be sure the exhaust valve is laying flat and maintaining a good seal to the case.



34. Remove the mouth piece by "releasing" the specialized clamp locking device. **See next image for more detail...**

Cleaning suggestions continued on next page...

We are now ready to clean the separate components, using an ultrasonic cleaner and suitable solutions, specifically marketed by SCUBA industry suppliers.



One source for such items is: Global Manufacturing Company. Following is an excerpt from their web site.

"Perhaps the most effective way to clean small parts including those from scuba regulators / valves is by ultrasonic's. This requires a special machine which generates high-frequency vibrations (beyond the range of human hearing) within certain liquid solvents. Forceful bubble impulsions bombard virtually every surface of any material submerged in the liquid; this cavitation literally blasts the contaminants off the parts, producing a state of microscopic cleanliness!"  
<http://www.gmcscuba.com>



Do not use solutions like: Vinegar, assorted pool acids, toilet bowl cleaners nor the like. They will cause irreversible damage to the chrome finish of the A700.

- Isolate any delicate parts (like the orifice) to protect them from damage during the cleaning cycle.



- Detail the adjustable orifice using a common pencil eraser.



An ample rinsing station with running water is ideal.

## Reassembly...



1. Push the "mouthpiece support" (trim collar) onto the case tube, and then fit the mouthpiece.

Orient SCUBAPRO® on top.



2. Spread and fasten the specialized hook and lock clasp. (Cam action). Note: Position the clasp opposite the "dive switch", avoiding interference.



### Install the exhaust T.

3. With thumbs inside the larger T outlets, position and angle the exhaust T into the section between the mouthpiece-tube and ex. valve retainer-ring. Feel for the exhaust valve retainer-ring.



4. Grasp the case from the other side with fingers.  
5. Press together and "roll" your thumbs forward "feeding" the remainder of the T onto the ring.



Note: It may be helpful to heat the exhaust T, warming a bowl of hot water in the micro wave or using a hair dryer.



6. With the adjustable orifice slots at the 12 and 6 o'clock position – install the 132 o-ring using both thumbs.



7. Apply a dot of quality lubricant to the beginning threads. This will ensure easier removal during the next service. **Simply push orifice into inlet tube. No adjustment yet!**



8. Refresh the poppet with the new o-rings and LP seat supplied in the maintenance kit.

Push lubricated o-rings into the grooves.



9. Pull the second o-ring onto the stem and use your nail to pull passed the first and into the (inside) groove.

**Apply a "bead" of quality lubricant between the o-rings.**



10. Utilizing a clean hard-flat surface – firmly **press** the poppet onto the LP seat, uniformly.



Note: Wipe the surface of the newly installed LP seat, to remove manufacturing residues.

Test for air-tight integrity by capturing air.



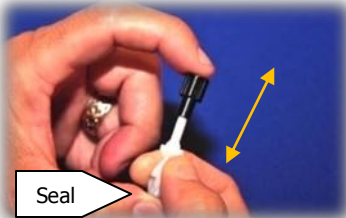
11-A. **Seal** the LP seat hole with thumb.

11-B. Place the balance chamber onto the stem just enough to cover the o-rings.

12. Now squeeze the components together – creating an air spring.

**Note:** The chamber should “spring” up and down, as you push and release.

Note: If the components go flat, submerge U/W to detect leak - revealed by bubbles.



13. Pre assemble the poppet, spring and balance chamber. Orient the pair of “poppet shoulders” (down) in relation to the lever (up) and insert into the case inlet tube.

Continued...

The objective is to engage the poppet assembly with the lever-tabs. Apply pressure with your index finger and the lever should rise.

Continued...

Maintain the “spring-load” and push the lever down. If correct the lever will return (under spring load). Cycle several times.



Refresh these components with new o-rings.

Following are some suggestions – to facilitate assembly.

**Tech tip: “micro-adj.”** Temporarily screw the “micro-adjust” (adj. screw) into the “adjustment-shaft”. This will give you more control to install the 126 o-ring.

**Tech tip continued...**

14. Push and spread the 126 o-ring onto the end with the “nipple”.



Once the 126 o-ring is in place, unscrew the “micro-adjust” and proceed.

15. Following is *dynamic* application, lubricate the o-ring groove and slide the 293 o-ring down the “adjustment shaft, into the first/true o-ring groove. Then lubricate the male threads.

16. Spread the 351 o-ring onto the metal sleeve.

Continued on next page...





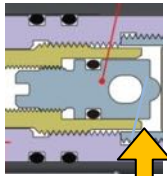
17. Push "micro adjust" into the "adjustment shaft" and hold with finger-pressure.



18. Using a flat blade screw driver, inserted through the shaft, turn the micro adjust *counterclockwise* until the micro adjust bottoms out.



19. Preset micro-adjust as pictured below. That is, bottom out counterclockwise, and then advance clockwise exactly 2 full rotations – leaving a 1 mm step



1 mm step

See cut-a-way...



20. Screw the adjustment shaft into the metal sleeve.



21. It is helpful to temporarily use the adjustment knob to finish – screw until the shaft bottoms out.



22. Prep the "dive switch" by installing both o-rings supplied in the maintenance kit.

Note the shortcut!



Continued...  
Lubricate and spread the new 160 o-ring into place.



Continued...  
Repeat and slide the second o-ring into the next groove.



23. Push the adjustment shaft sub-assembly into the "dive switch".



24. Push until it bottoms out.



Note: Orient the metal sleeve tabs "north & south" in relation to the 2 (long/short) dive switch guides. The metal sleeve tabs engage into the case inlet-tube guides.



25. Place the "dive switch" assembly into the case. Orient the long-tab (towards the mouthpiece) and engage into the "flow deflector-guides".



Note: The 2 "dive switch" tabs, engage into the 2 "flow director" guides and are location specific.



Optional step - only as needed.

If a gap is present between the "dive switch" and case, hold pressure with your index figure as seen here.



Optional step - only as needed.

While holding pressure, engage the adjustment knob and turn counterclockwise. The gap will close.



26. The C-clip retainer land is now accessible.

Orient the retainer clip "wave top" inward and snap into place.



27. Press the clip "top & bottom", to be sure the new clip is correctly engaged.



28. Lubricate and install the 347 inlet tube o-ring.



29. Engage function #7 into the orifice slots. Screw clockwise until the lever drops slightly.

This is not an adjustment!



Continued! Lowering the lever (approximately a 1/4 inch) ensures, no interference when installing the inhalation diaphragm, resulting in a watertight seal. Tap the lever.



Optional step - only as needed.

If the disc was removed from the diaphragm – return.



Optional step - only as needed.

Hold and center the disc. Feed the diaphragm into the mid section and into the disc groove.



Inspect... Be certain the diaphragm is not distorted.

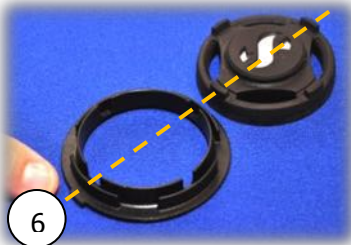


30. Check for previous folds/creases on the diaphragm "lip".

Any imperfections found merits replacement.



31. Be certain the entire circumference of the diaphragm is laying flat and into the case diaphragm groove.



32. With the outside ring tab @ the 6 o'clock position, press the cover into place, orienting the bottom of the "S" logo towards the tab.



33. Place the two piece assembly, orienting the ring tab into case notch located at the "6 o'clock position".



34. Align one cover hole with an o-ring.

A neoprene surface is best!



Neoprene

35. Press the screws, one by one, through the front cover hole and through the new 363 o-rings. The neoprene provides just enough support and give, to allow the screw to pass through the o-ring until installed.



36. Align the cover (with screws and o-rings already installed).



37. Begin to lightly snug the 4 TORX® screws down, using an X tightening pattern.



38. Using Torque driver, tighten the screw to the recommended 6.2 inch pounds / 0.7 Newton meters. See tool list on page 2 of this manual.



# On air adjustments and testing...



- Refer and review the SCUBAPRO A700 movie-tutorial.
- Let's proceed by connecting an inline adjustment tool
- Now charge the A700 with intermediate pressure air...
- Set the Diver inhalation control knob to its "lightest" setting. Note the two (II) bars.
- Place dive switch to MIN.
- Advance the spool and engage the orifice slots.
- Rotate counter clockwise until a slight leak is present, then clockwise until the leak stops, plus 30 degrees - to stabilize the adjustment.
- Press the purge valve slightly and watch the IP gauge to determine lever height. The lever must "kiss" the diaphragm disc... Avoid lever rattle!
- Now we are ready to check the inhalation effort using a Magnehelic® gauge and accurate IP gauge...
- To properly measure the inhalation effort, the practical option is to connect a Magnehelic® gauge to the 2<sup>nd</sup>. Stage mouth piece, via specialized accessories.
- Now gently draw a sustained inhalation watching for the point where the IP gauge drops indicating that the 1<sup>st</sup>. stage is now open and flowing – at that very instant...capture the reading on the Magnehelic® gauge.
- Your target inhalation effort is 1.1" to 1.3" inches of water. We do not advise setting to an effort of less than 1.1" as the second stage is sure to leak when in use underwater.
- Make any necessary adjustments via the micro adjust & flat blade screw driver by increasing or decreasing the spring counter force. Re-check the adjustable orifice position to satisfaction, (no lever rattle should be present).
- Pull back on the in line adjustment spool to disengage prior to attempting removal of same.
- It is good practice to use water to verify in water behavior. First, flood the 2<sup>nd</sup>. Stage to check for leaks via bubbles. Your hearing may not be as good as you think. Second, return to the surface, drain all water and seal the mouth piece with your thumb, as if it were in the diver's mouth and re-submerge. Slowly roll forward into a "head down position" – to verify the stability of the regulator. If bubbles commence to flow in the head down position, the unit is set to light and the spring counter force must be increased – to achieve hydrostatic equilibrium...
- Clean screw head with house hold alcohol in preparation of installing a new decal...
- Remove the adhesive back, press and hold...
- Snug the LP hose, using the Universal tool and return the hose sleeve...

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