Troubleshooting robart Air Retract Systems

Some of the most commonly asked questions we get are related to the testing and checking of air retract systems. Most problems that occur are usually due to installation errors and not component malfunctions. Care must be taken at all tubing connections. Good quality components also make the installation a reliable and long lasting one. On with the troubleshooting.
We will follow a step by step procedure for checking each component of a typical air only retract system. Please note that these procedures are based on **robart** components and may not work on other manufactures equipment.

1. The most important thing to remember is to isolate or remove each component that is to be tested. All items must be tested at 80 – 110 psi. for best results.

2. Start with the air tank. *(See Picture #1)* Disconnect the tank from the system and connect directly to an air pump. Pressurize the tank and if removed from the plane submerse the entire tank into a bucket of water and check for air bubbles. If the tank is in the plane make up soapy water solution and apply this solution at the tubing connection and around the tank cap and nipple. Again look for air bubbles. If no bubbles are seen the tank is good.

Picture #1

3. If the tank is good, the next item to check is the fill valve. Connect a line directly from the fill valve to the tank. *(See Picture #2)* Pressurize the tank through the fill valve. The pressure in the tank should go up steadily. The robart fill valve is equipped with a Schrader valve that is replaceable. First check the tubing connection as done in step (1) with soapy water or by submersing. If no leaks are found remove the air source, and check the external connection with the soapy water. *(See Picture #3)* If no bubbles are seen the fill valve is good.

Picture #2

Picture #3

4. Next you will need to test the pressure gauge, if the plane is so equipped. Tee into the air line from the air tank to the fill valve, and connect the pressure gauge. You may also connect directly to your air source. (See Picture #4) Pressurize the air tank. Submerse the pressure gauge in water or check with the soapy solution. If no bubbles are seen, the pressure gauge is good.

Picture #4

5. To test the ***Blue Retract Valve*** you will have to remove it from the airplane. First some information on how the **robart** blue retract valve works. A retract valve is really nothing more than an air switch. The **robart** blue retract valve can be easily distinguished from all others by how it is built. The valve body is made from 1/2" hexagon aluminum, and is anodized blue. The latest version of the blue valve has a 1/4" dia. one piece aluminum spool with two "O" rings and a flat tang with a hole for a standard "quick link" pushrod connector. **robart's** blue valve has five nipples; three nipples are located on one hex flat and the other two nipples on the adjacent flat.

Place the valve horizontally in front of you. Look at the flat with three nipples, pressurized air enters the center nipple, this pressurized air will then exit out of the (2) nipples at either end of the valve depending on the spool position. This pressurized air goes through the air lines, then enters the cylinder and moves the cylinder piston. As the piston moves inside the cylinder, it pushes the air (that air is now called the exhaust air) out the opposite end of the cylinder through the air lines and back to the other side of the valve. This exhaust air will exit out of the valve at either end of the spool, again depending on its position. That exhaust air is the hissing that is heard when the valve is operated. This hissing will only last a few seconds, until the cylinder piston stops moving. Please note that the servo must move the valve spool its full travel, stop to stop, (retaining ring to retaining ring) for the valve to function properly. Failure to provide full spool travel will result in a system that seems to leak and will not hold air. If however you suspect the valve is defective follow this testing procedure. With the valve removed, cut two pieces of airline each about 1 1/2" long.

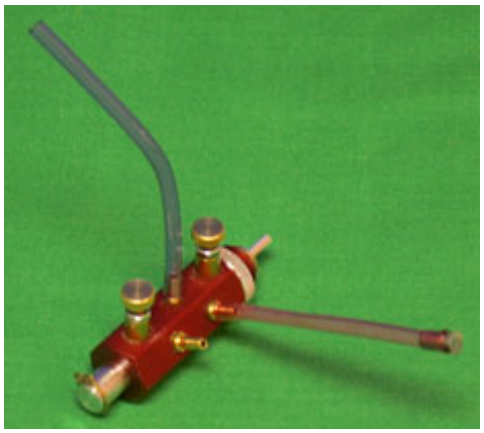
Connect your air supply to the center nipple located on the hex flat with (3) nipples. Connect one end only of each of the 1 1/2" long pieces of cut tubing to the other nipples located next to the center nipple. Connect the open ends of the 1 1/2" long tubing to the (2) nipples located directly across on the other hex flat. *(See Picture #5)* Pressurize the supply tubing and move the valve spool all the way in. Submerse the entire valve in a bowl of water and watch for bubbles. Move the spool all the way out and again submerse in the water. Watch for bubbles, one or two bubbles out of each end are normal when the spool is moved, if no other bubbles are seen then the valve is good.

Picture #5

6. To test the ***Red Retract Valve*** you will have to remove it from the airplane. Connect an air line to the center nipple between the two needle valve bodies *(See Picture #6).* Slide the valve spool in and out all the way to assure the two nipples that sit next to each other are blowing air out of them (only one at a time should be working). Next you will need a piece of air line approx. 1 ½" long and plugged on one end, slide the valve spool all the way to one end then plug the air line that is bleeding air *(See Picture #7)*, then submerse the valve into a bowl of water and watch for bubbles. Do the same for the opposite side *(See Picture #8)*, if there is no sign of bubbles after 5 – 10 seconds the valve is ok, however if you see a bubble start to form wait for 30 seconds and if it is still connected to the valve it is still ok. Now you will need a piece of air line approx. 3" long and install the airline onto both nipples (See Picture #9). Now slide the valve spool all the way to one side and loosen the needles from the needle bodies and air should come out fast from one of the needle bodies. Repeat for opposite side. Next tighten down the needles (do not over tighten needle or you will damage the valve) only tight enough so no air is escaping from the hole in the needle bodies. Now slide the valve spool all the way to one side and check for bubbles in all possible areas as before. Repeat by sliding the spool to the opposite side.

Picture #6

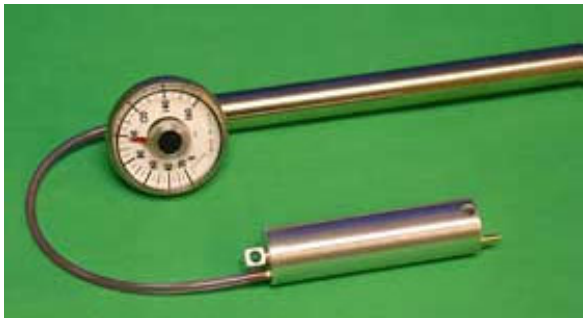
Picture #7



Picture #8

Picture #9

7. The last major components to check are the retract air cylinders. These must be removed from the retract units. With the air cylinders removed, working with one cylinder at a time, pressurize one side of the cylinder leaving the other nipple open. *(See Picture #10)* Submerse the entire cylinder in water and watch for bubbles from both the open nipple and around the cylinder cap and piston rod. A few bubbles from the open nipple are normal but they should stop. If you see a continuous stream of bubbles the cylinder is in need of repair. Remove the air supply and switch it to the other nipple. *(See Picture #11)* Submerse the cylinder again and watch for bubbles as before.



Picture #10

Picture #11

8. All that is left to check are the tubing connections, tees, restrictors, and quick disconnects. These are checked in the airplane with the entire system hooked up. Pressurize the system and apply the soapy water solution to all of the connections, if any bubbles are seen cut back the tubing about 1/4", reconnect and test again. If bubbles are still seen replace the connector. Note that the end of the tubing must fully extend over the barbs on all of the connectors. Installation of the tubing can be made easier by softening the tubing end in hot tap water prior to pushing onto the connector. Do not heat up the connector.

Remember, you have a lot of time and money invested in your airplane. Plastic valves and inferior air lines can change with time and temperature resulting in poor performance, leaks and possible disaster. **robart** manufactures most of its air control equipment out of aluminum and steel. Precise finishes and tolerances are the standard. **robart's** airlines and fittings are selected to provide the highest quality and durability. Always use "The Right Stuff", **robart**