**13VV4 May 2019 How to change out a nose gear actuator in a Velocity by James Kaschmitter**

*I just pulled the nose gear actuator cylinder on my XL-RG, rebuilt and re-installed it. It was a bit of a project. My nose gear actuator cylinder was leaking hydraulic fluid onto the inside floor of the fuselage underneath the cylinder. It became noticeable when it ran out underneath the lower outside of the fuselage. At this point you can either order a rebuild kit or a new actuator cylinder from Velocity, so you’ll be ready to install or rebuild once you get the old cylinder out.*

1. *The first step was to pull the nose gear actuator cylinder:*
	1. *I found it easiest to put the plane on jacks. I jogged the gear up just enough to release the over-center lock on the nose gear and then put a small block under the nose wheel to prevent it from falling back into the over-center position again. I then pulled the gear actuator breaker to prevent an inadvertent gear actuation.*
	2. *Put the emergency gear extension/pressure release valve handle on the co-pilot’s side of the keel into the “down” position to release hydraulic system pressure. The nose wheel will fall onto the small block but will not go into the over-center position again.*
	3. *Lift the nose wheel up all the way up into the gear well and place a foam block or sawhorse underneath the gear doors to prevent the nose wheel from falling out. This takes two people.*
	4. *Pull the access panel on the co-pilot’s side of the center keel.*
	5. *Loosen the cylinder top attach bolt/nut, but don’t remove it yet.*
	6. *Put rags under the cylinder inside the keel and have some available outside the keel also to catch fluid leaking from the lines as you disconnect them.*
	7. *The cylinder has two lines into each tee on the top and bottom of the cylinder – four total. Disconnect them but be prepared to drain them onto the rags.*
	8. *Undo the bottom attach bolt – you’ll need two people. I had a small access hole on the pilot’s side floor that I could just get a socket into. I had to reach into the co-pilot’s access panel with a wrench to reach the nut on the other side. Undo and pull the bolt – note the washers both outside and inside the attach point. Note to builder - it would have helped to have access through the top of the keel, but there was no access on mine.*
	9. *Remove the top attach bolt and pull the cylinder out. Make sure the hydraulic lines are leaking onto the rags instead of your floor.*
	10. *Clean out any spilled hydraulic fluid inside the keel or elsewhere.*
2. *I rebuilt the cylinder using the kit from Velocity, but I could have skipped to step 4 if had bought the rebuilt cylinder. If you decide to rebuild it, take lots of pictures as you go along – it helps when you put it back together. Also, make sure you have a good pair of snap ring pliers with small tips.*
	1. *Place the cylinder on some rags since it will leak fluid as you disassemble.*
	2. *One end with a lock nut and spacer will be adjustable – leave the spacer in place and don’t adjust.*
	3. *Remove the snap ring on one end and pull the piston out.*
	4. *Remove the snap ring on the other end*
	5. *Lube and install the O rings and seals as shown in the diagram included with the rebuild kit. You will have a spacer that is not shown in the diagram – make sure to re-install it.*
	6. *Re-install the piston and the snap rings.*
3. *I then installed the rebuilt (or new if you bought one) cylinder as follows:*
	1. *Re-connect the rear hydraulic lines*
	2. *Install the rear attach bolt, washers and nut. This is a two person job. One person will have to insert the bolt through the hole in the keel on the floor from the pilot’s side, while the other holds the nut on, reaching back from the access panel hole on the co-pilot’s side. You can use super glue to hold the washers onto the nut, etc.*
	3. *Install the front attach bolt, washer and nut.*
	4. *Re-connect the forward hydraulic lines.*
4. *Test the gear*
	1. *Put the emergency gear extension handle in the up position*
	2. *Fill the gear hydraulic fluid reservoir to about 2/3 – ¾ full*
	3. *Manually retract/extend the nose gear a few times*
	4. *Check the fluid level to make sure its about ¾ full*
	5. *Push the gear actuator breaker in. Cycle the gear a few times to make sure its working. Check to see if the nose wheel is up into the wheel well so the gear doors can close. If it’s rubbing on the doors, you can get that burned rubber smell when you retract the gear. Also check to make sure the nose gear is going over-center and locked when you put the gear down.*
	6. *Check for leaks, make sure hydraulic fluid reservoir is at least ½ full and re-install panels, etc.*