

NG-6B / NG-7B / NG-5B Installation

Disclaimer:

My Liability Consultant (otherwise known as “wife”) insisted that I put a waiver of responsibility in here to let everyone know that you’re all responsible for yourselves (I’m sure your mothers all told you that at some point). As builders and pilots, you use this system and these instructions at your own risk. You should know that I explicitly designed both the parts and the instructions contained herein so that they would ensure your quick and certain demise should you make the mistake of using them, even as exactly directed. I hereby absolve myself of any responsibility for anything that happens either before or after you install these components into your aircraft.

She’s happy now. Well, with respect to this, anyway.

Included Parts:

1X	-	NG-5B Clamp Plate
1X	-	NG-6B Pivot Housing
1X	-	NG-7B Spacer

Required Hardware:

2X	-	MS24694-S75 or S76 Screws
2X	-	AN3-20A or AN3-21A Bolts
4X	-	MS21042-3 Nuts
8X	-	AN960-10 or AN960-10L Washers as needed

Required Tools:

- 3/8” socket
- 1/4” socket
- Socket wrenches
- Torque wrench
- Phillips Screwdriver
- 5/16” OD 12” - 18” long perfectly straight rod or tube - any material, as long as it’s perfectly straight
- 2 - 4 small “C” clamps
- #11 Drill
- Drill Press / Hand Drill

Introduction:

The NG-6B Pivot Housing is CNC machined from solid aluminum to ensure a safe, high quality and aesthetically pleasing unit. It also includes tapered roller bearings, an NG-7B Spacer, and the NG-5B Clamp Plate. Proper installation of this assembly will ensure a tight, play-free nose gear strut installation that will last the lifetime of the Varieze, Long-EZ or COZY III airplane.

New Installation (NOT a Retrofit):

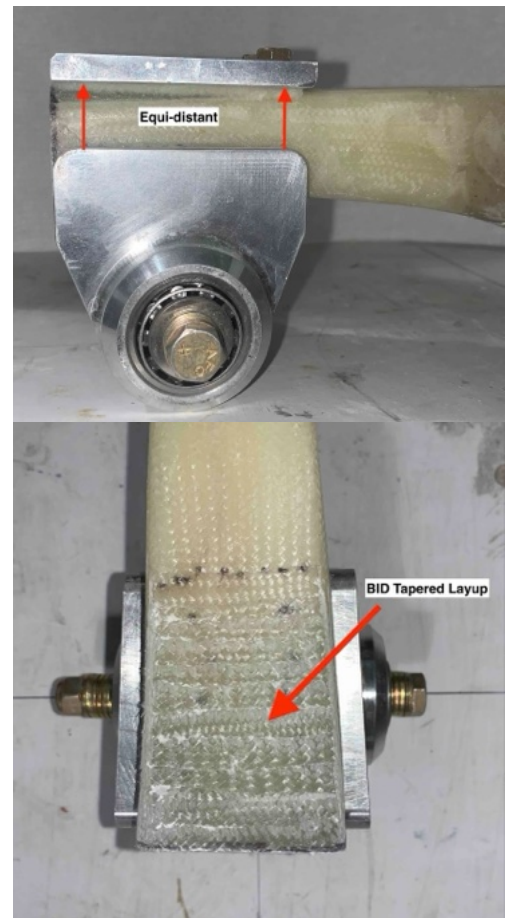
1. Remove the tapered roller bearings and the NG-7B Spacer from the NG-6B.
2. Prior to applying the 2 BID torsional wrap on the NG-1L nose gear strut, ensure that the NG1-L strut can fit inside the recess in the top of the NG-6B in the correct orientation - the narrower, tapered side of the strut should rest inside the recess in the NG-6B - with enough room on either side to allow for the 2 BID wrap.
3. Install a 2 BID wrap per plans. Once the 2 BID wrap is on the NG1-L strut, check for fit again.
4. Install a tapered 10 - 12 ply layup on the top (wider) surface of the NG-1L. This should be 1 ply thick where the NG-6B will end, and 10 - 12 ply thick at the end of the strut.

This layup ensures that the NG1-L strut thickness is constant where NG-6B attaches and that the NG-5B Clamp Plate is a constant distance from the NG-6B so that the screw and bolt heads sit flat on NG-5B. Allow to cure.

You may find that the NG1-L strut varies in thickness from side to side as well - in any case, layup BID plies as necessary to ensure that the strut thickness will be constant, as described in the previous paragraph.

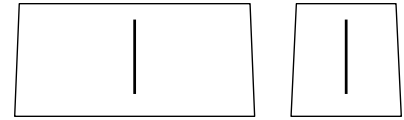
(These pictures show an MKNG-6B, but the concept is identical).

5. Sand the previous layup so that it's flat and the NG1-L strut is constant thickness where the NG-5B and NG-6B will attach.

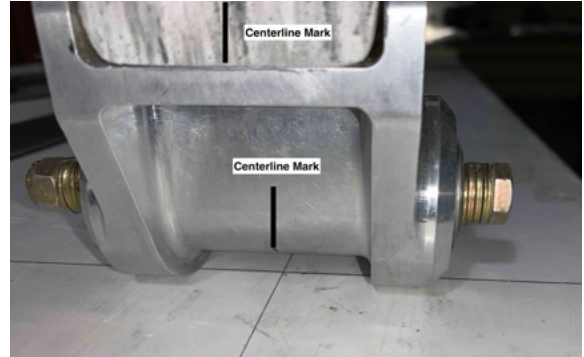


NG-6B / NG-7B Installation - Revision 5

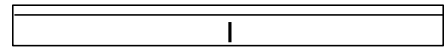
6. Mark a vertical centerline on the NG1-L strut at both ends with a thin sharpie.



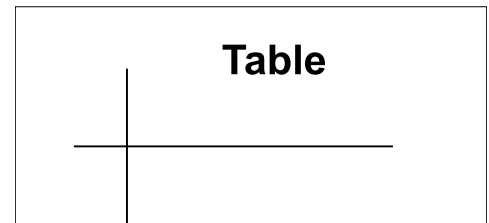
7. Mark the centerline of the NG-6B on the bottom, rounded section with a thin sharpie.



8. Mark the centerline of the forward edge of the NG-5B with a thin sharpie. This is the edge that will be at the top of the nose gear strut and the mark will line up with the centerline on the large end of the strut and the centerline on the NG-6B.



9. On your workbench, draw a 36" long centerline parallel to one edge of the bench, approximately 12" from the edge.



10. 6" from one end of the line, draw a perfectly perpendicular line 24" long, reaching one edge of the table.

11. Prepare the NG-6B by lightly sanding and cleaning the inside of the recess where the NG1-L will attach.

12. Prepare the NG-1L by lightly sanding and cleaning the strut surfaces where they will contact the NG-6B.

13. Put a bit of grease in the four bolt holes in the NG-6B to prevent epoxy/flox from filling the hole, taking care to not get grease on the recess surfaces. Clean the surfaces again, if any contaminant gets on them.

14. Install the tapered roller bearings and the NG-7B into the NG-6B, using a light clamp or clamps to hold everything in place, but leaving the center hole of the NG-7B accessible. Ensure that the bearings are properly seated in the races.

15. Insert the 5/16" OD rod or tube through the NG-7B so that it extends outward equally on both sides of the NG-6B.

16. Place the NG-6B assembly so that the rod/tube is over the perpendicular line, with the centerline mark on the NG-6B over the 36" line at the crossing point.
17. Place the NG1-L strut, narrow side down, in the NG-6B recess. Align the centerline mark on the narrow end of the NG1-L with the 36" long bench centerline and align the centerline mark on the wide end (in the NG-6 recess) with the other end of the bench centerline mark. Ensure the NG-6B centerline mark is also over the table centerline.
18. At the same time, ensure that the rod/tube is aligned with the crossing line on the bench - this will ensure perfect alignment of the NG-6B with the NG-1L strut.
19. Once you've tested the alignment of all the parts, take the NG-1L strut out of the NG-6B and paint the surfaces of the NG1-L and NG-6B with a very light coat of epoxy. Put medium floc on the mating surfaces (do not fill the NG-6B recess with floc and take care not to get grease in the bolt holes on any surfaces) and mate the parts.
20. Repeat steps (16) and (17), ensuring perfect alignment of all parts.
21. Lightly clamp NG1-L into NG-6B on both ends of NG-6B; wipe off all floc squeeze out, and once again ensure perfect alignment of the strut and NG-6B centerlines as well as the rod/tube perpendicularity. Allow to cure.
22. Clamp the NG-5B to the top of the NG1-L so it aligns with the leading edge of the NG-6B and is centered on the NG-1L strut. Ensure that the countersunk surface is facing upward and that the c'sunk holes are at the large end of the NG1-L and NG-6B.
23. Using a #11 bit in a drill press and using the pre-drilled holes in the NG-6B as a drill guide, drill ½ way through the NG1-L strut, keeping the drill as perpendicular as possible. Flip the strut and NG-6B over and drill the rest of the way through the NG1-L strut using the NG-5B holes as a guide, ensuring that the holes meet. Then drill all the way through all four holes to ensure alignment of the holes in the NG-6B with the holes in the NG-5B. Test fit two long screws and two long bolts to ensure that all four can be installed properly.
24. Remove the NG-5B from the NG1-L and lightly sand and clean the mating surfaces of the both parts.
25. Paint the mating surfaces of the NG1-L and NG-5B with a very light coat of epoxy. Put medium floc on the mating surfaces of the parts, install the NG-5B, place the two screws through the countersunk holes in NG-5B and the two bolts with AN960-10 washers under the heads through the lower, non-countersunk holes. Install four AN960-10 washers and four MS21042-3 nuts on the screws/bolts and snug them up - do **not** torque completely. If you ensure that you have exactly the same length of screw/bolt through the nut, this will ensure that the NG-5B and NG-6B are as parallel as possible. Ensure that there is floc squeeze out all around with no voids

when evening up the screw/bolt length in the nuts.

26. Remove excess flox squeeze out and let cure.
27. After cure, tighten all four screws/bolts/nuts to 40 in-lb. Ensure that at least one thread protrudes past the end of the nut, but no more than 3 - 4 threads. Multiple washers are acceptable (up to three, total) under the nuts to ensure correct thread protrusion.

Retrofit Installation Instructions:

1. Remove the nose gear strut from the aircraft.
2. Remove the NG-15 fork below the steering axis to ease handling.
3. Remove NG-7(x) from NG-6(x)
4. Remove the four mounting screws/bolts from the existing NG-6/NG-6A. You may have to apply some heat and/or a BFH to effect removal.
5. Remove existing NG-5 and NG-6/NG-6A/NG-6A using heat and the aforementioned BFH, if required.
6. Flox existing screw holes to fill, and perform step (3) in “**New Installation**” instructions above.
7. Continue with steps (4) through (26) in “**New Installation**” instructions above.

Strut Installation in NG-30's:

1. Completely clean the tapered roller bearing race in the sides of the NG-6B. Using high quality Mobil-1 wheel bearing grease or the equivalent, grease and install the tapered roller bearings and the NG-7B spacer in the NG-6B.
2. Follow the plans to install the NG-6B in between the NG-8's in the NG-30 Side Panels.
3. NG-6B Pivot Bolt Installation:
 - a. If you have the first revision of the NG-7B's which uses the standard AN5-41A long pivot bolt that requires a hole in the Varieze and Long-EZ fuselage side for installation, follow this section (3)(a):

Once the NG-6B is installed with the AN5-41A pivot bolt in place, snug the bolt, washers and nut just until there is no side-to-side play of the nose gear strut when pushing sideways at the nosewheel axle with a few lb. of force. Tighten the nut one additional flat (60 degrees rotation).

- b. If you have the newer, threaded version of NG-7B, follow this section (3)(b):

Once the NG-6B is in place between the NG-8s, insert an AN5-10A Bolt with an AN970-5 large area washer under the head and a dab of Loctite blue 242 threadlocker on the lower threads into either side of the NG-30s, into the recess in the NG-7B. Tighten the bolts with a wrench on both just until there is no side-to-side play of the nose gear strut when pushing sideways at the nose wheel axle with a few lb. of force. Tighten either bolt one additional flat (60 degrees rotation) while holding the other bolt from rotating.
4. Check strut for side-to-side play and tighten the nut on the pivot bolt (or one of the shorter bolts, if (3)(b) was used no more than one flat at a time if play develops.
5. You may find that the forwardmost part of the NG-5B clamp (the edge with the small bevel, forward of the flat-head screws) interferes with the bottom of the FS-0 bulkhead near the fuselage bottom surface. You may grind away whatever fiberglass and foam is required to provide at least 1/16" clearance for the NG-5B. If you grind away any substantial material, glass the ground away area with 2 BID at 45 degrees to protect the foam and connect FS-0 to the fuselage bottom.

Troubleshooting:

N/A

Revision List:

Date	Revision	Description
2/16/2024	1	<ul style="list-style-type: none"> ● Initial Release
2/19/2024	2	<ul style="list-style-type: none"> ● Fixed incorrect reference to COZY MKIV aircraft - reference VE/LE/COZY III ● Add “Strut Installation in NG-30’s” section
2/27/2024	3	<ul style="list-style-type: none"> ● Add comments re: NG1-L thickness variations across width as well as length
3/2/2024	4	<ul style="list-style-type: none"> ● Add section on threaded NG-7B installation
3/19/2024	5	<ul style="list-style-type: none"> ● Add FS-0 clearance note in NG-30 installation section