

V-530 PROP BLADE INSTALLATION AND SETTING INSTRUCTIONS

Tools Needed:

Torque wrench
Smart Level (digital protractor) or Protractor
Flat-bladed screwdriver
Safety wire twisters
Pair of dykes
17 mm wrench
Masking tape
Safety wire
3 cotter pins

1. Remove all of the safety wire, screws and weights on the sides of the blade nuts.
2. Remove the skull cap or spinner.
3. Cut the safety wire on the screw/keeper for the dome/piston assembly. Remove the screw and keeper. Rotate the dome until you can lift the assembly out of the hub. (Almost always, the piston will remain inside of the dome. It is wise to keep a bucket underneath the hub, in case it doesn't. The dome assembly will be filled with oil.) If you have noticed oil on your gills or sprayed out on the blades, you will want to clean and inspect the dome assembly. If there is scoring on the inside of the dome, it is advisable to remove the scratches by chucking the dome up on a lathe and lightly polishing it with Scotchbrite or a fine Wet or Dry sandpaper with water, until the scratches are gone and you have a smooth surface. You will remove the anodizing in this process, but it is bathed in oil and not likely to corrode. Take a look at the surface of the seal on the piston. It may need to be replaced, if there is any metal imbedded in the seal or visible scratches in the rubber.
*** If you have evidence of an oil leak at the bottom of the junction of the hub and flange serrations, you may want to remove the snap ring and lock plate on the oil delivery tube and tighten the oil delivery tube a small amount. The torque is 102 ft-lbs. There are two gaskets and a thick metal spacer underneath the oil delivery tube. This will require a (22 mm or near equivalent US) deep socket. The lock plate will align with the delivery tube in limited positions. Reinstall the lock plate and snap ring when finished.
4. Begin with the hub in a horizontal position for mounting of the blades.
5. Make sure the counterweights are positioned so that the blades will be against their mechanical stop in the flat position. (You may wrap a couple turns of elastic material between the counterweight ends and the hub to secure them in a full forward position.)
6. The hub is assembled such that every piece is particular to side "1" or side "2" of the hub and stamped accordingly. The reason for the stampings is to account for weight

variations between individual pieces of the hub. The blades may be stamped on the metal collar with a “1” or “2”. On some blades this may not be visible any longer. It is advisable to keep these pieces matched to their particular side of the hub. Mark in some manner yourself for reassembly purposes.

7. The threads on the blades and the threads inside the intermediate bushing **MUST BE** super clean for the blades to screw in freely, so it can be accurately determined when the blade has bottomed out at initial installation.

8. Lightly grease the threads. I use Lubriplate. Also, you can lube the threads lightly inside of the hub. Please note, you will see some of this grease work its way out on your blades the first few subsequent flights. It will dissipate over time.

****IMPORTANT**** While lubing the threads of the hub nuts, make sure that the alignment pins are installed for the counterweights. These are small pins that are peened into the intermediate bushings. They line up with the slot in the center of the counterweight. Another way of checking is if the counterweights swing around freely on the blade bushing, the pin is missing. In which case, you will need to make one.

9. With the hub in the horizontal position, slowly begin to thread the blade into the hub. **It should go easily.** If not, investigate the problem. Turn the blade all the way in until it stops. Then back it out to an approximation of where it should be for fine pitch.

10. Double check that the counterweights are still against the stops in the fine pitch position. Place the Smart Level vertically across the face of the hub. Take a reading. For example, it may read something like 87.2 degrees. Your aircraft nose will be pitched higher than the tail. Your blade setting angle is 14.5 degrees. It is measured 8” in from the tip of the blade. If you have a set of factory original blades a thin, red line will be painted at this location. If you have a set of newly painted blades, use a piece of masking tape to mark the 8” line. You will place the center of the Smart level on the edge of the tape, so make note which side of the tape is the 8” line.

To obtain the reading you want to see on the Smart Level on each blade:

(Example) 2 degrees tail low from vertical on the hub face: $90 \text{ degrees} - 2 \text{ degrees} = 88 \text{ degrees}$
 $88.0 \text{ (hub reading)} - 14.5 \text{ (Blade angle setting)} = 73.5 \text{ degrees (Blade reading at the 8” mark for the port blade or the left side of aircraft from the cockpit.)}$

Or, if it is more convenient to work on the right side blade:

$90 \text{ degrees} + 2 \text{ degrees} = 92 \text{ degrees hub reading.}$
 $92.0 \text{ (Hub reading)} - 14.5 = 77.5 \text{ degrees on the right side blade.}$

11. Take the Smart Level and go to the back of the installed blade. Place the center line of the tool on the 8” line. You should also have the tool center in the chord of the blade. (You want to make sure you position it the same on the next blade.) Rotate the blade until you get the proper setting. In our case of the example: 72.7 degrees.

12. Rotate the prop 180 degrees to bring the second blade socket to the same position. Recheck the hub reading. Follow the same procedure on the second blade.
13. One final time, check the angles again. The factory manual allows only 20 minutes of angle difference between the left and right blades!
14. Once satisfied with the settings, put a final torque of 59 ft-lbs. on the counterweight nuts and install the cotter pins. **MAKE SURE THE COUNTERWEIGHT IS FLUSH AGAINST THE LIP OF THE INTERMEDIATE BLADE BUSHING ALL OF THE WAY AROUND.** If not you will be sure to have some balance problems. It is very easy to misalign this when you are snugging the nut. Run your fingernail around the perimeter. You should not have a gap that you can run your nail in between. Tighten the nut so it is snug and the blade will not move.
15. Reinstall the dome/piston and keeper. Safety the screw/keeper.
16. Install the skull cap or spinner and safety the nut with a cotter pin.
17. Test run aircraft. Many times, the match-balanced blades will allow for smooth operation and no/little vibration. However, if you have a hub that is heavy on one side, you may need to have the prop dynamically balanced after installation of the blades.

Written by:

Jill Gernetzke