Section 15
Cog Belt Drive

Procedures covered in this section:
Install and tension cog belt; install cog belt tensioner; fabricate and install main shaft safety spacer.

Cards used in this section:

HARDWARE CARD	E49 CARD 1	E49 CARD 2

Prints used in this section:

E27-2000	E49-2001

Templates used in this section:

E33-1	E33-2

Tools required for this section:

Air or electric drill	Belt tension tool	Drift punch	Torque wrench
Allen wrenches	Center punch	Hacksaw	Screwdrivers
Band saw or hacksaw	Digital protractor	Ruler	Straight edge

Drill bits of the following sizes: 3/16"
Ratchet with sockets of the following sizes: 3/8", 1/2"
Wrenches of the following sizes: 3/8", 7/16", 1/2"

Notes:

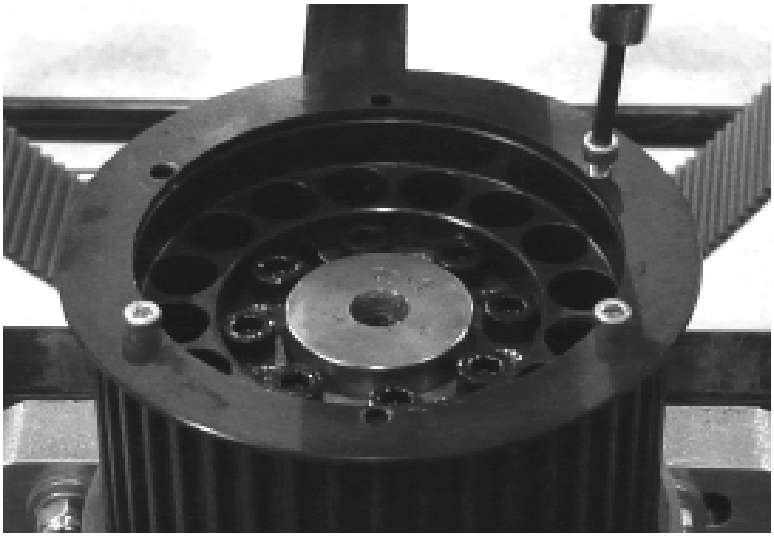

Photo #1

Remove the top excursion ring from the secondary cog belt sprocket by removing the six socket head bolts.

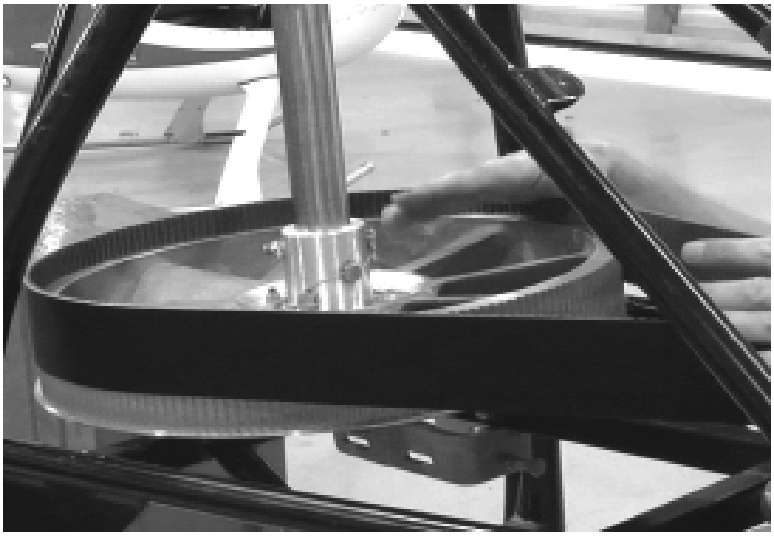

Photo #2

Slide the belt carefully down until it bottoms against the bottom excursion rings on both sprockets.

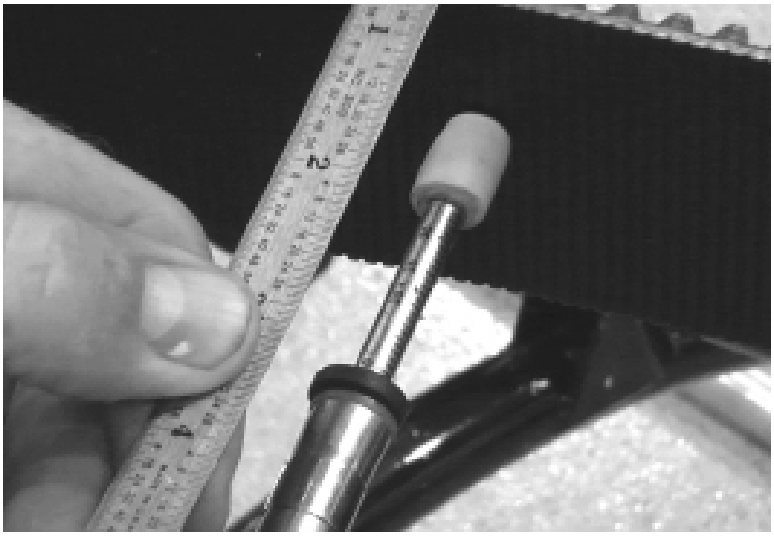

Photo #3

Push inward on belt with a force of five pounds, then push outward with a force of five pounds. The total distance should be 5/8 to 3/4 inch. This should be measured mid-span between the two sprockets. To tighten the belt, install shims equally between the square drive tubes and the top and bottom bearing mounts on the secondary drive unit.

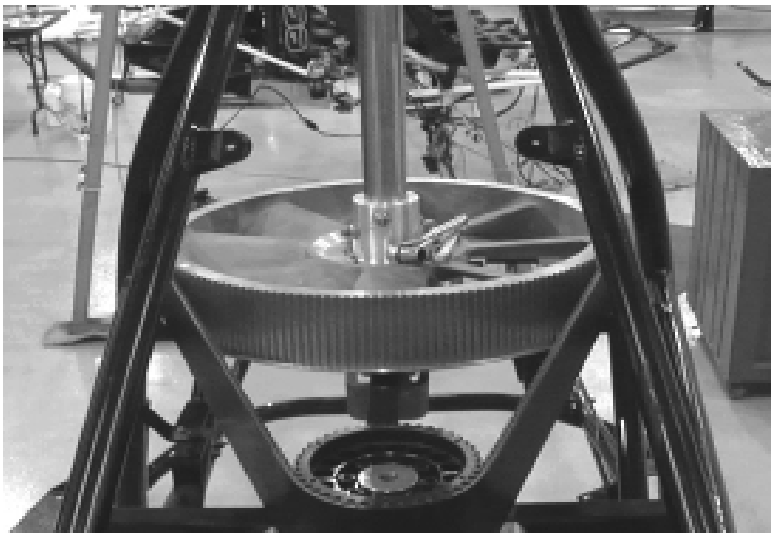

Photo #4

Note: After correct alignment and tension of belt is achieved, rotate the main sprocket a few times to check for smooth operation. The belt should track in the center of sprockets. If the belt walks up when turning by hand, check to see if secondary shaft is tilted. It should be .1 degree (one tenth of a degree) aft and .1 degree to the pilot side, compared to the main shaft.

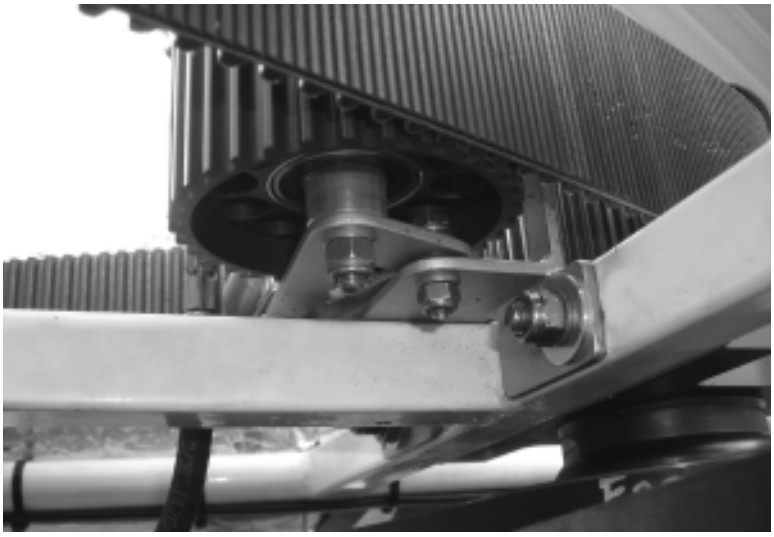

Photo #5

Mount the cog belt tensioner on the square drive tubes, in front of the secondary sprocket. The idler sprocket should be towards the inside of the belt on the pilot's side. The tensioner is held in place by the two 5/16" bolts that attach the secondary upper bearing mount to the airframe. Place two large washers between tensioner and nuts on the 5/16" bolts. Lightly snug the nuts allowing for adjustment of the tensioner.

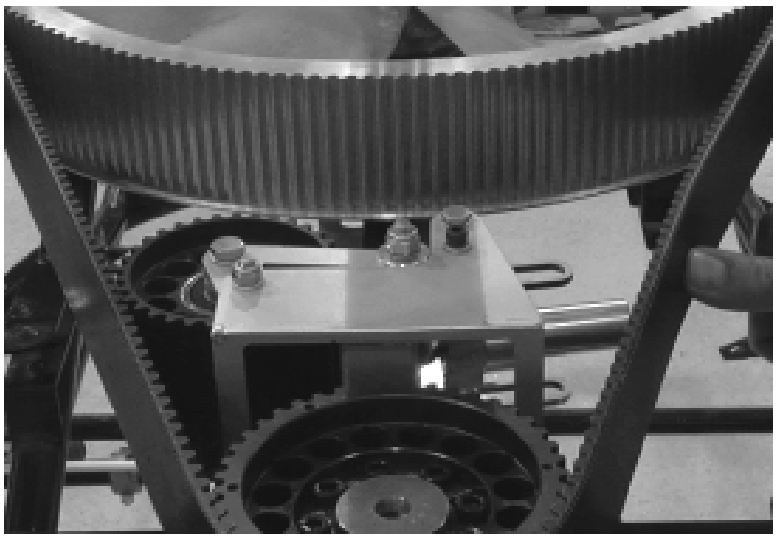

Photo #6

Apply ten pounds of pressure on the passengers side of the belt inward. This will cause the left side of the cog belt to form a straight line between the sprockets. Slide the tensioner to the pilot's side until the idler sprocket teeth just touch bottom in the teeth of the belt. Snug the two 5/16" bolts. Note: The tensioner mechanism must be in the fully closed position.

Make sure that the tensioner is parallel both fore/aft and laterally to the secondary sprocket, then torque the two 5/16" bolts to 15 ft. lbs. A straight edge pressed against all three sprockets on the left side will confirm that all sprocket teeth are fully engaged in the sprockets.

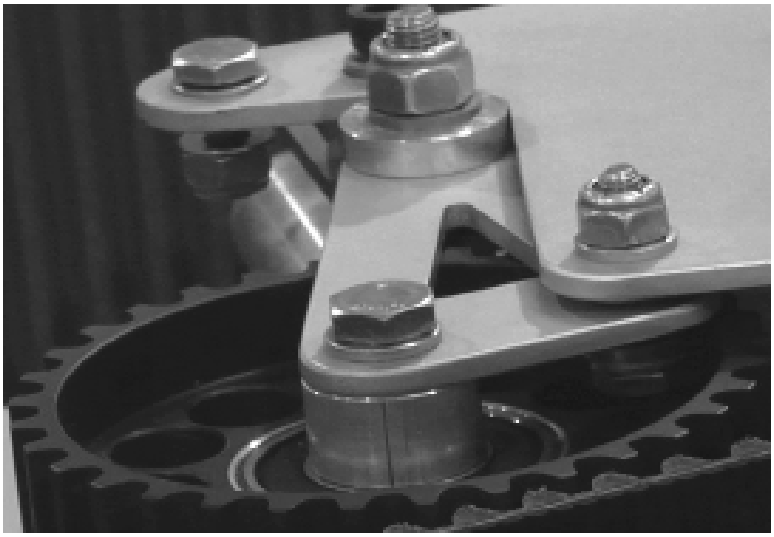

Photo #7

Check the tensioner sprocket height. It should be centered on the belt.

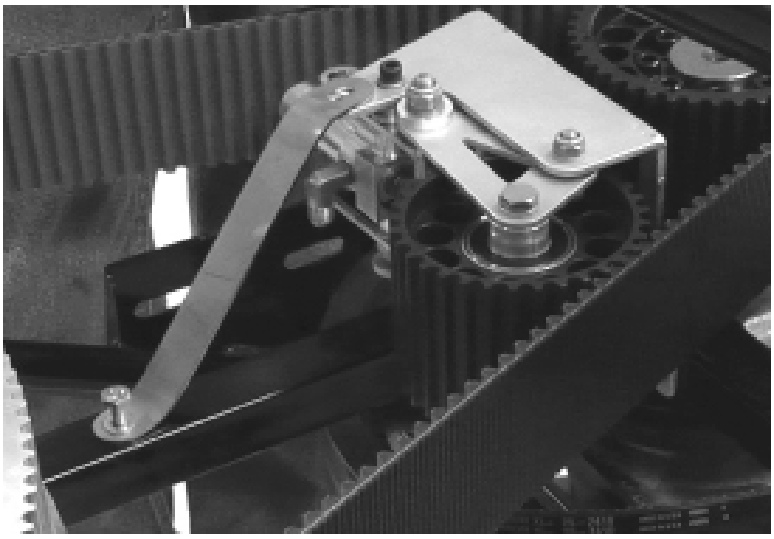

Photo #8

Make a bend about 3/4 of an inch from each end of the tensioner strap as shown. The slotted end of the strap will attach to the top of the tensioner, and the other end will bolt to the fore/aft square tube as shown. The bolt through the square tube should be located so that it will not interfere with the operation of the clutch tube below (see next photo).

Photo #9

Match drill the hole through the square drive tube, making sure that the hardware will not interfere with the operation of the clutch tube below.

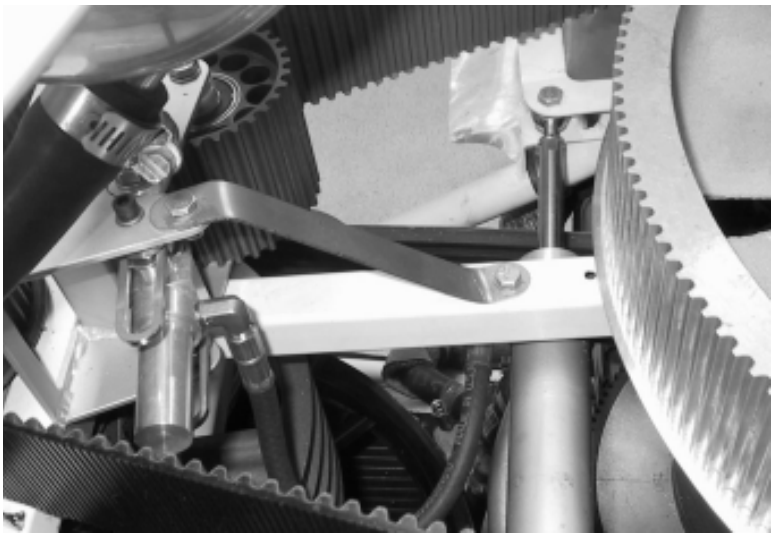

Photo #10

Install the 3/16" bolt. Do not over tighten, as it is possible to collapse the square tube. With the tensioner strap secured at the square tube, make any slight adjustments in the fore and aft plane to get the idler parallel with sprockets. Final tighten the strap bolts.
Attach the oil hose from the clutch cylinder to the tensioner, making sure that hose routing does not affect operation of either component.

Photo #11

Install the top excursion ring on the rear sprocket using Loctite 242 removable on the threads of the bolts.

MAIN SHAFT SAFETY SPACER

Photo #12

Place the safety spacer next to the main rotor shaft and mark where it will be cut for a snug fit.
Note: Make sure the concentric part of the lock ring on the main shaft bearing is seated against the bearing before the aluminum safety spacer is measured. Failure to do this will cause an excessive gap between the main shaft lock ring and the sprocket hub. This must be a snug fit. On final assembly, set the lock ring with a punch and hammer and tighten the set screw.

Photo #13

Check the fit of the safety spacer. It must fit snug between the lock ring and the sprocket hub.

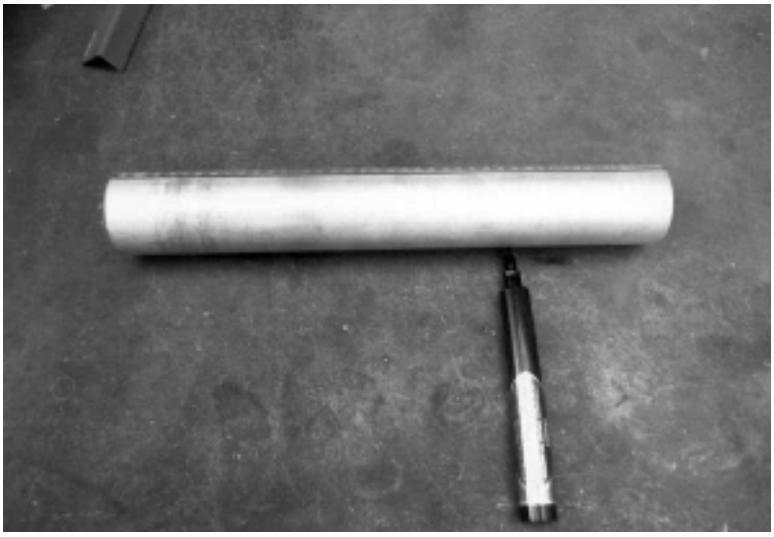

Photo #14

To make a straight line along the length of a tube, lay it on a flat surface. Lay a marker on the surface and slide it from one end of the tube to the other.

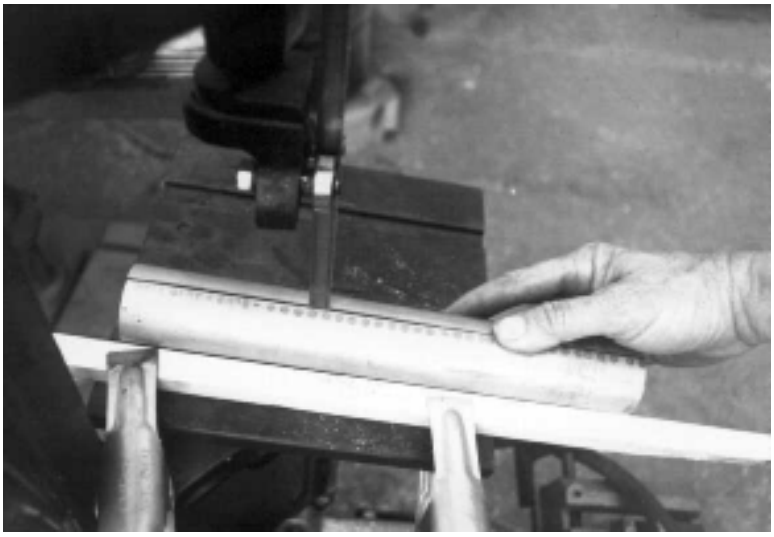

Photo #15

Clamp a board on the band saw table so that when the tube is against the board, the saw blade is centered on the tube. Turn on the saw and slide the tube along the board. The saw blade should stay on the line, cutting the tube in half.

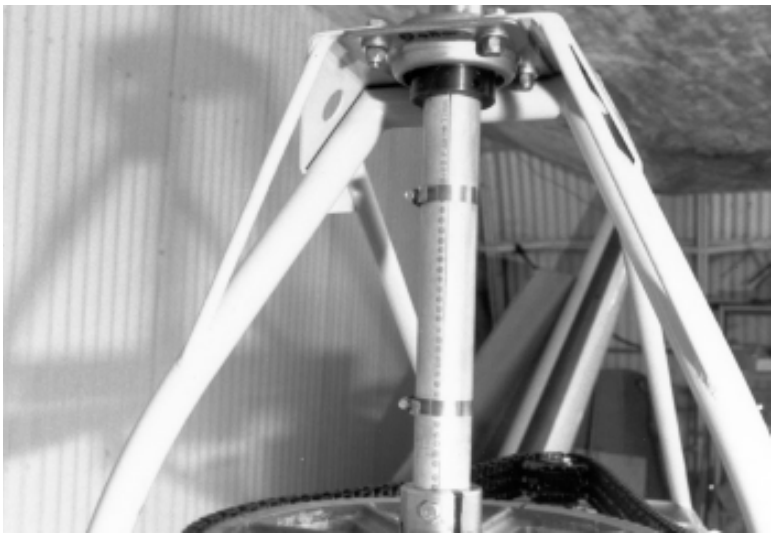

Photo #16

Deburr the edges of the safety spacer and install it on the shaft with hose clamps. Upon final assembly apply a coating of grease to the main rotor shaft to prevent surface rust.

FINAL CHECKLIST

1. Front and rear sprockets should be the same height. Measure from bottom excursion rings.
2. Secondary and idler sprockets should be parallel to each other both fore/aft and laterally.
3. Secondary sprocket should be tilted .1 degree aft and .1 degree to pilot's side compared to main rotor shaft. Ensures good belt tracking.
4. Make sure all bolts are properly tensioned, safety wired and/or Loctited. Also check that bearings are Loctited, locking rings set and set screws are tightened.
5. Cog belt should be tensioned so that 5 pounds force in each direction gives about 3/4" total belt movement at 60 to 70 degrees F.
6. Tensioner assembly should move smoothly by hand without any undue breakout pressure.
7. Tensioner pulley should be centered on cog belt.
8. Cog belt should stay centered on sprockets. Belt should not ride up on the excursion ring.