Aero Commander service letter **No. SL-AG-7**

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AILERON PUSH-PULL SYSTEM

APPLICABILITY: All S-2A Aileron Push-Pull system installations

Enclosed are instructions for installing the Push-pull system in S-2A aircraft.

This system should be a satisfactory solution to the cable wear problems experienced with the old systems. It is FAA approved.

If there are any questions regarding the installation instructions, please call the plant.

INSTALLATION INSTRUCTIONS FOR THE S-2A PUSH-PULL AILERON SYSTEM:

1 Remove forward belly skins.

2 Disconnect elevator actuating arm.

3 Remove stick and torque tube.

4 Remove all inspection plates on or near the main spar.

5 Remove all inspection plates on both wing tips.

6 Drill out rivets on out-board under side of the wings with #30 drill (see figure 1).

7 Drill out new 3 ½" diameter inspection plates at locations shown in figure 1 and insert 3 ½" diameter doublers with 8 AN470 AD304 rivets in the wing underside locations. The inspection holes in the wing and plates do not require doublers.

8 Remove pump and pump mount.

9 Cut a ½" hole directly above the aileron bellcrank bolt, loosen and remove the bolt. Also remove the bellcrank by shifting said bellcrank to the area where the skin is loose.

10 Measure 69" from the end plates on each wing top and bottom. If this 69" mark is on a rivet head, drill out the rivet with a ¼" drill. If the 69" mark is off of a rivet, make sure that the ¼" drill radius will clear the rivet head and drill directly in the line of rivets. Take care to see that the upper and lower holes are directly in line parallel to the spar web; also check to see that the bellcrank will not hit the radius of the spar.

11 Bend pitot lines to clear for the next operation.

12 Cut fuselage skins forward of the spar web in rough half circles of 9 inch radius to facilitate cutting 3 ½" holes in the dust plates of the wing root chords. These 3 ½" holes should be centered 5 ½" forward of the main spar web and 4 ¼" up from the skin (perpendicularly).

13 P.K. screw (#4 – 3/8) the inspection hole doublers onto the dust plates with the edge of the dust sock between the doubler and dust plates.

14 Take the torque tube which was removed from the airplane and cut the actuating arm gussets from the tube. Be sure to leave the actuating arm. The gussets and weld material in the area should be ground smooth since the new attach fitting will be clamped here.

15 Insert through the wing tip inspection plates the large push-pull tubes, P/N 707-6, into the wings and shove them into the cockpit area.

16 Insert the bellcranks into the wings (where the lower wing skins were loosened be drilling the rivets out). Be sure to put the bellcrank marked left into the left wing and the bellcrank marked right into the right wing.

17 After the bellcrank has been worked up to appropriate wing tip inspection hole, manipulate the bellcrank through the bay that contains the 69" holes. Ascertain that the small bearing and place the bellcrank so that the straight arms are forward through the lightening hole in the spar; the curved arms are then noted to be pointed toward the wing tip and are near the lower surface of the wing skin. Bolt the bellcrank in place with the 11 ½" stainless steel bolt making sure that the bolt is inserted from the top of the wing and that the nut is on the under side of same. The 4 thin AN364-428 elastic stop nuts provided for this purpose (see Drawing #707).

18 Insert tube number 706-8 from the rear of the wing so that the adjustment end of same is at the aileron hinge. Attach tube to the bellcrank with the AN4-11A bolt provided.

19 Attach, with AN4-11A bolts, the long leading edge tube that was previously placed in the wing to the bellcrank.

20 Make certain the bearings are on the end of the stick torque tube and reinstall as before. Put the control lock over the control stick.

21 Install the torque tube attach fitting, P/N 706-24; bolting (AN4-23A) the clamp arrangement around the torque tube such that the attach lobe is hanging down from the torque tube.

22 Install the idler assemblies, P/N 706-22 and 706-23, on each longeron such that the idler brackets are inclined toward approximately 30 degrees and are located forward of the spar web on the longerons 5 ¼" to the centerline of the idler itself. (See Snow Drawing 707). AN4-20A bolts are used on the brackets and AN4-35A bolts are used to install the iders in their brackets.

23 Bolt (AN4-11A the long tube to the idler and note that it is installed in the bottom hole of those on the idler.

24 Bolt (AN4-11A) the adjustable ends of P/N 706-27 to the idlers (use top hole).

25 Now with the stick held by the control lock, make absolutely sure that the torque tube attach assembly, P/N 706-24, is hanging directly down and is 4 ¾" from the spar web fact to the center line of the attach holes.

26 Check to see that the torque tube attach will clear all shock absorbers, cross members, etc., by moving the stick to its maximum deflection positions. Adjust for those clearances if necessary. When all clearances are ascertained, tighten the torque tube attach, drill a ¼" hole through the attach and torque tube, and bolt (AN4-23A) the assembly in place. (If possible, the bolt head should be on top of the assembly and the nut on bottom).

27 Bolt (AN4-11A) the solid end of the connecting arms, (P/N 706-27) to the torque tube assembly).

28 Remove the cables of the old bellcrank system, but do not remove the old stop cables. Re-attach the cables for the stop system to the torque tube actuating arm.

29 Rig the new system as follows: Up travel 22 degrees, down travel 18 degrees, drop 3/8", (measured from centerline of aileron trailing edge to centerline of the wing trailing edge). All other controls are unaffected.

30 Rivet the underside wing skins back in place and insert the inspection covers. Use AN470 AD4-4 rivets through single sheet thickness and AN470 AD4-5 for lapped double skin thickness.

31 Tie the dust socks securely to the leading edge tubes. Be careful to see that the socks do not restrict the system movements.

32 Install the modified pump mount and the belly skins. Replace the pump on the pump mount.

No, Required	Part No.	Item
2	706-8	Chordwise Tubes
2	706-25	Bellcranks
2	706-6	Leading Edge Tubes
2	706-22	Idlers
2	706-23	Idler Support Brackets
2	706-27	Idler Link Arms
1	706-24	Torque Tube Attach
8		AN4-20A Bolts
2		AN4-35A Bolts
10		AN4-11A Bolts
5		AN4-23A Bolts
2		¼ x 11 ½" Stainless Steel Bolts
4		AN364-428 Stop Nuts
25		AN365-428 Nuts
2		Push-Pull Aileron Socks
8		KP4A Bearings
4		RE4H-6 Bearings
6		Inspection Plate Covers
50		AN960-416 Washers
6		Inspection Plate Doublers
1		Drawing #707