



# SERVICE BULLETIN

No. 494B

Piper Aircraft Corporation

FAA/DOA SO-2 Approved

Modification DOA-EA-1 Approved

Lock Haven, Pennsylvania, U.S.A.

July 17, 1979

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(Supersedes and voids Service Bulletin No. 494A dated February 25, 1977)

Subject:

Inspection of Flap Control System

Reason for Revision:

To provide closing serial numbers, thus limiting the effectivity of this Service Release to a specific group of aircraft.

Models Affected:

PA-31, PA-31-300 and  
PA-31-325 Navajo  
PA-31-350 Navajo Chieftain  
PA-31P Pressurized Navajo  
PA-31T Cheyenne/Cheyenne II  
PA-31T1 Cheyenne I

Serial Numbers Affected:

31-2 through 31-7812129  
31-5001 through 31-7852171  
31P-1 through 31P-7730012  
31T-7400002 through 31T-7820092  
31T-7804001 through 31T-7804011

Compliance Time: Flap Transmission Inspection; at the next scheduled inspection interval or Programmed Inspection Event, not to exceed 100 hours of operation, and at each 100 hours of operation thereafter--subsequent to initial compliance with Piper Service Bulletin No. 494, dated April 21, 1976 and/or FAA AD 76-10-06 (effective May 21, 1976). See Instructions No. 2, below, for recommendations concerning additional related flap system inspection/maintenance guidelines.

Purpose: Piper Service Bulletin No. 494 and FAA AD 76-10-06 were issued in response to reported flap system conditions that have occurred on the above referenced aircraft. Primarily, flap system malfunctions resulted from flap transmission failures due to excessive transmission internal component (pinion and worm gear) wear - identified as excessive "play" or "lost motion" in the transmission screws. Other flap system components (reference Instructions No. 2, below) may have been a factor.

Instructions No. 1, below, contains information to inspect the flap transmission to determine excessive drive screw wear, and to replace either the transmission or transmission internal drive gear components, if excessive wear is evident. This inspection is to be conducted at successive 100 hour operational intervals.

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Purpose: (Continued)

This Service Release also provides reference to additional current flap system inspection/maintenance information (reference Instructions No. 2, below) to be applied should operational problems exist in the flap system or if certain flap system components are replaced. Since these items are routine inspection/maintenance procedures, specific repetitive compliance is not necessary.

Instructions:

1. INSPECTION OF WING FLAP TRANSMISSION. (Refer to Figure 1, Page 3.) The flap transmissions are inspected at every 100 hour inspection cycle of the aircraft. This is accomplished without removal of the transmissions, by the following procedures:
  - a. Position the flaps in the extended position (Down).
  - b. Remove the access covers on the lower wing surface to gain access to the flap transmissions.
  - c. With the use of vise grip pliers and exerting light pressure, grasp the exposed portion of the screw close to the transmission as shown. (Refer to Figure 1, Views A and B).
  - d. With the pliers secured to the screw, a light pressure will move the pliers and screw as free play in the transmission gear set is taken up in either direction. Do not force the pliers.
  - e. Place a six inch ruler along the skin surface as shown in Figure 1, below, View B, and measure the overall distance the pliers move.
  - f. Should this dimension exceed .32 (5/16) of an inch, replace the transmission assembly or obtain Gear Transmission Overhaul Kit 755 051 for 20:1 ratio transmissions, part numbers 4268-00 and 4268-00-1, or Kit 755 050 for 40:1 ratio transmissions, part numbers 1049-00-1 and 1049-00-3. (See Parts Catalog for serial numbers affected; refer to appropriate Service Manual for transmission removal and installation.)
  - g. Reinstall the access panels and make appropriate log book entry.
  - h. Repeat inspection at 100 hour intervals.

NOTE

Refer to Appendix A (attached) for transmission run-in procedure - if transmission gears are replaced (per Step f., above).

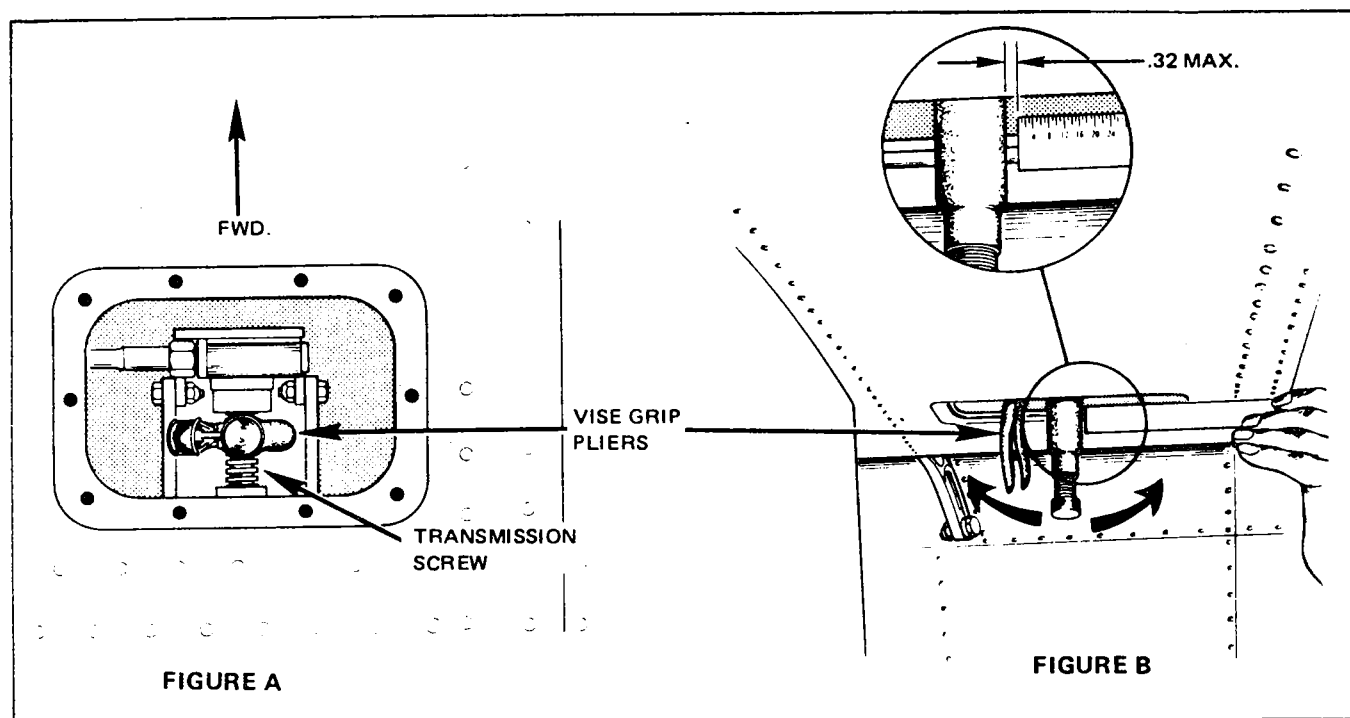


Figure 1. Wing Flap Transmission Inspection

2. Inspection/maintenance procedures relative to the following flap system components are contained in Piper Service Letter No. 764 and applicable model Service Manuals.
  - a. Inspection of Wing Flap Transmission Actuator Shaft (NOTE: Inspection required per SB 494, Section I and AD 76-10-06, Paragraph a.; recommended if transmission or shaft is replaced);
  - b. Reduction of friction in Wing Flap System;
  - c. Wing Flap Motor "No Load" RPM check;
  - d. Wing Flap Motor/Flex Shaft Engagement Check.

Material Required: Per Instructions No. 1, above; refer to appropriate model Parts Catalog data for proper aircraft model/material application. If material replacement is required, either the transmission assembly may be replaced or Gear Transmission Overhaul Kits - Piper Part Numbers 755 051 (20:1 ratio) or 755 050 (40:1 ratio) may be installed.

Availability of Parts: Your Piper Field Service Facility.

Effectivity Date: This Service Release is effective upon receipt.

Summary: Please contact your Piper Field Service Facility to make arrangements for compliance with this Service Release in accordance with the provisions of Compliance Time, above.

First it must be determined whether the transmission in question should be run-in. This applies to transmissions with Part Nos. 4268-00, 4268-00-1, 1049-00-1 and 1049-00-3 which have been rebuilt with new gear sets from Dukes or Piper Kit Nos. as follows:

| Dukes Kit No. | Piper Kit No. | Transmission Part No. |
|---------------|---------------|-----------------------|
| 1209-1000     | 755 051 20:1  | 4268-00               |
| 1209-1000     | 755 051 20:1  | 4268-00-1             |
| 1216-1000     | 755 050 40:1  | 1049-00-1             |
| 1216-1000     | 755 050 40:1  | 1049-00-3             |

This is accomplished with the transmission removed from the aircraft as follows:

1. Extend the transmission screw to the end of its travel.
2. Using a flat blade screwdriver inserted into the slot of the worm gear on the transmission (see Figure A), turn the gear 20 turns for the 4268 unit or 40 turns for the 1049 unit and note any tight or high spots as the worm gear is rotated.

#### NOTE

The transmission should have an end load applied while turning the worm gear. (See Figure A.)

3. Should a tight or high spot be felt, an additional check must be made. This requires the use of a short length of smooth (3/16) .1875 diameter rod with one end filed to form a blade shape that will fit the slot in the worm gear, or use a screwdriver with a smooth (3/16) .1875 diameter shank.

4. With the transmission positioned upright and applying the end load, again feel for the tight or high spot with the screwdriver inserted in the worm gear slot. If a high spot is found, remove the screwdriver and insert the fabricated rod or screwdriver into the slot and try to rotate the rod or screwdriver shank between your fingers.

5. If the rod or screwdriver can be rotated by finger pressure only, no further action is required and the transmission is ready for use in the aircraft. If the rod or screwdriver cannot be rotated by finger pressure only, the transmission will require a run-in prior to being used in the aircraft.

6. There are two methods for performing this run-in. The first is the preferred method which will require some equipment and the second is an alternate, should the equipment not be available.

#### METHOD I:

Equipment required:

- a. Flap motor
- b. Flap system actuator cable
- c. 28 Volt DC Power Source

1. Connect the actuator cable to the transmission and flap motor. Secure the flap motor to a solid base.

2. Extend the transmission screw to the end of its travel and hold the transmission with a shop cloth to prevent the heat buildup generated during the run-in from scorching your hand.

3. Connect the flap motor to the power source (operate the motor and transmission to extend the transmission screw) and proceed to run-in the unit for two, three (3) minute periods with a three minute rest period inbetween.

4. With the transmission positioned upright and applying the end load, again feel for the tight or high spot with the screwdriver inserted in the worm gear slot. If a high spot is found, remove the screwdriver and insert the fabricated rod or screwdriver into the slot and try to rotate the rod or screwdriver shank between your fingers.

5. If the rod or screwdriver can be rotated by finger pressure only, no further action is required and the transmission is ready for use in the aircraft. If the rod or screwdriver cannot be rotated by finger pressure only, the transmission will require an additional run-in prior to being used in the aircraft. Refer back to step 3.

## APPENDIX "A" (continued)

METHOD II: If the equipment listed in Method I is not available, the flap motor and actuator cable in the aircraft may be used. This will require disconnecting one of the actuator cables from the flap motor and the extension of the wing flaps and removal of the three lower rollers to allow the flap to drop completely out of the way, and subsequent re-rigging of the complete flap system.

1. Extend the flaps to the full down position and then run them back up 5 degrees to clear the limit switches.
2. Disconnect the transmission from the flap.
3. Remove the three lower flap rollers on the side to be used for the run-in and allow the flap to hang down from the wing.
4. Disconnect the flap actuating cable from the opposite side of the flap motor to prevent the other flap from moving during the run-in.
5. Support the flap transmission to prevent it from shaking during the run-in. (Refer to Figure A.)
6. Actuate the flap motor by selecting the flap "DOWN" position.

### NOTE

Do not select the flap "UP" position as this will run the screw up and bind the flap screw.

7. Run the transmission for two, three (3) minute periods with a three minute rest period inbetween.

8. With the transmission positioned upright and applying the end load, again feel for the tight or high spot with the screwdriver inserted in the worm gear slot. If a high spot is found, remove the screwdriver and insert the fabricated rod or screwdriver into the slot and try to rotate the rod or screwdriver shank between your fingers.

9. If the rod or screwdriver can be rotated by finger pressure only, no further action is required and the transmission is ready for use in the aircraft. If the rod or screwdriver cannot be rotated by finger pressure only, the transmission will require an additional run-in prior to being used in the aircraft. Refer back to step 7.

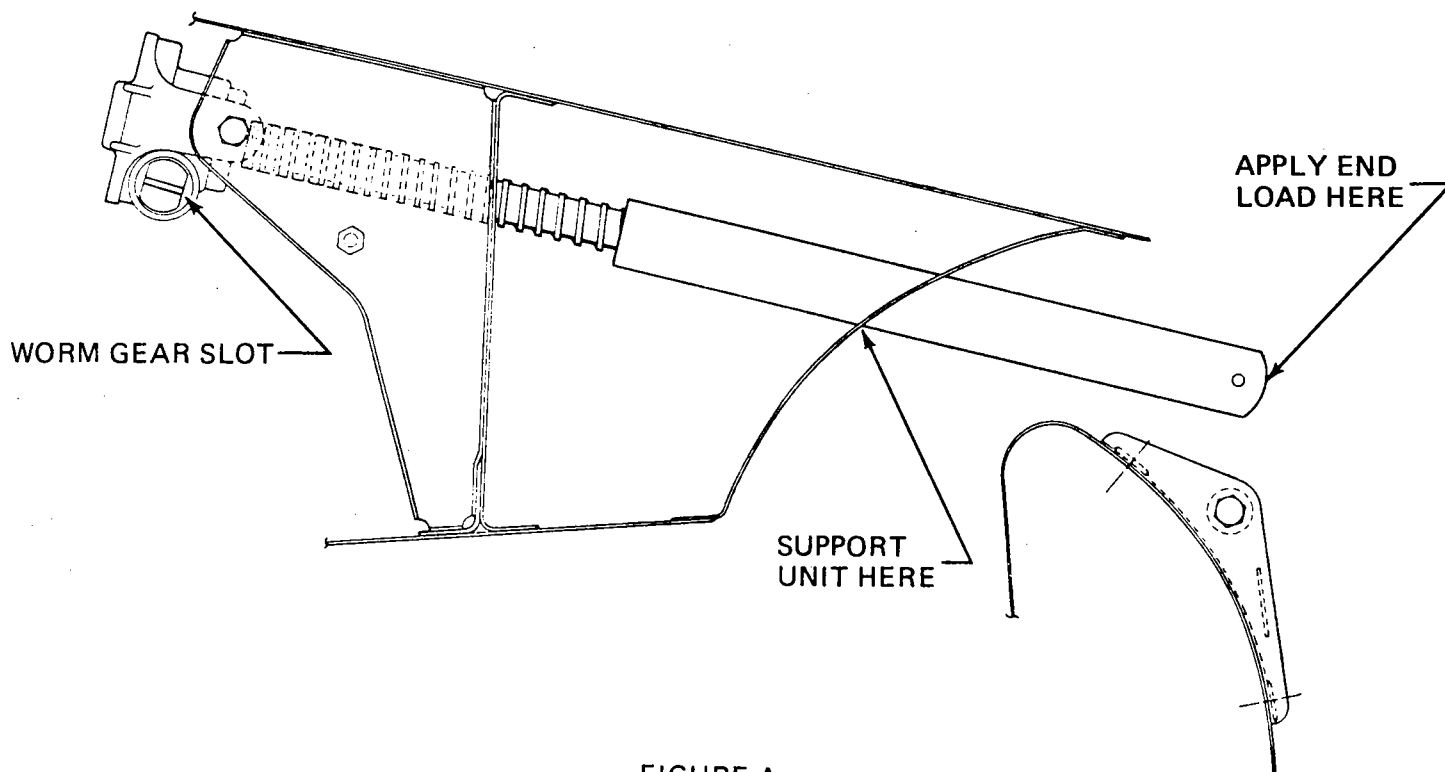


FIGURE A