SERVICE LETTER

Service Letter No. 315 February 4, 1959

TO: All Distributors, Dealers and Owners

SUBJECT: PA-24 Comanche Landing Gear Transmission Assembly

We have been receiving warranty claims for the landing gear transmission assembly, part number 21763-03, after fifty hours of operation. These claims are based on the supposition that the unit is defective because the bearing has pulled out of the casting. Actually, this condition is caused by a misadjusted micro switch at the down-lock mechanism on one of the gears. The offending switch, not opening simultaneously with the other two switches, will cause the motor to continue to run; creating an overload on the jack screw which tends to pull the bearing out of the transmission.

In the future, warranty claims for this type of failure will not be honored and it is suggested that the rigging of the complete landing gear be very thoroughly checked at the 25 hour inspection. Our 25 hour inspection form does not treat this particular rigging problem, however, the form will be changed to cover this point. The latest inspection and adjustment procedure is attached to this letter.

Very truly yours,

PIPER AIRCRAFT CORPORATION

R Boardman

Rolland Boardman
Service Manager

RB:mm
enclosure

INSPECTION AND RIGGING INSTRUCTIONS FOR THE PA-24 LANDING GEAR SYSTEM

I. OPERATIONAL INSPECTION PROCEDURE

A. The airplane shall be on jacks and tail pedestal with the gear, drag links and landing gear transmission motor properly installed.

B. Remove landing gear transmission access cover on floor between pilot and co-pilot seat.

C. Turn master switch to "ON" position.

D. Pull throttle to closed position.

E. Move gear selector switch on instrument panel to "gear up" position.

F. The transmission motor should start to retract the landing gear.

G. The gear warning horn shall start to blow when the landing gear begins to retract.

H. The gear shall travel to a fully retracted position and the transmission motor should stop.

I. The amber "gear up" indicator light on instrument panel shall light.

J. Ascertain that the main gears are pressed against the rubber gear stops in the wheel wells and that the main gear doors are flush with the bottom wing skin. Nose gear tire shall rest against anti-rotating strap.

NOTE: If necessary, adjust up limit switch at gear retraction torque arm to obtain snug fit. The up limit switch shall break contact when gear reaches full up position.

K. Move gear selector switch on instrument panel to "gear down" position.

L. The landing gear transmission motor shall start to extend the landing gear.

M. The gear warning horn shall stop blowing when the landing gear is in a down and locked position.

N. Transmission motor shall stop.

O. The green "gear down" indicator light on the instrument panel shall light.

I. OPERATIONAL INSPECTION PROCEDURE (continued)

P. Check limit switch brackets on landing gear drag links for tightness.

Q. Adjust "gear down" limit switches, located at the main gear side brace links and on the nose gear drag link, so that when gears are down and locked the switches have just broken contact.

R. Check landing gear safety switch operation with gear in down and locked position.

1. Place 3/16 inch spacer between the limit switch actuator button and gear safety switch actuator arm.

2. Remove nut from top of clevis terminal.

3. Screw clevis terminal down actuating rod until switch is compressed and fix position with lock nut against clevis terminal.

4. Remove 3/16 inch spacer.

S. Check landing gear drag links.

1. Main gear drag link adjustment.

a. The distance between the center of the pivot bolt and the center of the rod end bearing on the lower drag link must be 6-1/8 inches.

2. Nose gear drag link adjustment.

a. Remove bolt attaching the nose gear push pull rod to the nose gear left rear drag link.

b. Remove the nose gear drag link cross brace. (Note position of brace for proper replacement.)

c. While extending and retracting the nose gear manually, ascertain that the drag links lock simultaneously and independently of each other.

d. Ascertain that the bolt attaching the front drag link to the nose gear strut assembly is a slip fit.

e. If a bind in the drag link or a misalignment of the front attachment point is observed, it shall be necessary to install shim 21820-02 (.016), 21820-03 (.020) or 21820-04 (.032) between the firewall and the two center bottom attachment points of the engine mount.

1. OPERATIONAL INSPECTION PROCEDURE (continued)

f. If a gap is evident between the attachment point of the front drag links and the nose strut assembly, washers (maximum two 1/16 inch washers) shall be installed.

g. Place a straight edge in center of rear drag link rear attachment point and center of front drag link front attachment point.

h. The center of the pivot bolt must be 3/16 inch below the straight edge.

i. If front attachment is a slip fit but the 3/16 inch dimension is exceeded, the drag link should be replaced.

j. Replace bolt attaching the nose gear push pull rod to the nose gear left rear drag link.

k. Replace nose gear drag link cross brace.

T. Inspection and adjustment of left and right main gear push-pull cables at landing gear drag links.

1. Landing gear shall be in a full down and locked position.

2. Remove bolt that attaches side brace to rear of drag link on main gear.

3. Remove spring.

4. Disconnect control cable from drag link and release spring.

5. Insert bolt and attach side brace to drag link.

6. Adjust rod end bearing on control cable so bolt is slip fit, then turn rod end bearing out until pressure is required to insert bolt.

7. Remove bolt attaching side brace to drag link.

8. Insert bolt and attach control cable to drag link.

9. Attach spring.

10. Insert bolt and attach side brace to drag link.

11. Disconnect transmission motor by pushing emergency gear release handle forward through full travel and allow slotted release tube to slide out of mating pin on torque tube.

I. OPERATIONAL INSPECTION PROCEDURE (continued)

12. Repeat operations I-T1 thru I-T10 manually.

13. Engage slotted tube on transmission screw to mating pin on torque tube.

NOTE: Be sure that threads of push-pull cables extend past "check hole" in rod end fitting.

U. Landing gear transmission assembly inspection and adjustments.

1. Slotted release tube inspection.

a. Release emergency gear release arm.

NOTE: If arm is difficult to release, a careful examination should be made of the transmission slotted release tube. If this tube is distorted or bent a replacement of the transmission assembly is necessary. It should be replaced as soon as possible.

2. Transmission motor brake adjustment.

a. Adjust the brake by adjusting the nut on the brake support rod until the brake disc clears the highest point on the transmission motor shaft rubber coupling. (Hold brake disc firmly against brake solenoid while making this adjustment.)

NOTE: It has been found that the motor shaft coupling may become worn to a point where the metal inserts in the coupling protrude from the rubber, thus causing a chatter. This chatter may be eliminated by grinding the metal inserts until they are flush with the rubber. This grinding operation may be repeated until the brake will no longer contact the rubber.

3. Transmission bearing inspection. Disregard if kit 754 219 has been installed.

a. Retract gear to an approximate 3/4 up position.

b. Pull emergency gear handle to an extended position.

c. Exert pressure on the emergency gear handle by pushing down and pulling up.

d. Attention should be focused on the landing gear transmission bearing. If there is any movement of the transmission bearing, it will be noticeable.

I. OPERATIONAL INSPECTION PROCEDURE (continued)

d. (continued)

In the event there is movement, a bearing retainer plate kit (754 219) is available through your nearest Piper distributor or dealer.

4. Inspection and adjustment of transmission stop clearance.

a. With gear in the full down and locked position, check to see if bearing retainer sleeve on transmission screw is 1/8 inch or more from the roll pin stop.

b. If distance is less than 1/8 inch the following adjustments shall be made.

aa. Adjust transmission screw until there is a distance of 1/4 inch between stop and pin.

ab. Disconnect main gear control cables at drag links.

ac. Extend rod end bearings one (1) full turn at both ends of control cables. Connect control cables at drag links and torque tube arms.

NOTE: Be sure threads of push-pull cables extend past check holes in rod end fitting.

ad. Disconnect nose gear push-pull rod from nose gear drag link.

ae. Rig main gears per paragraphs I-A thru I-Q.

I. OPERATIONAL INSPECTION PROCEDURE (continued)

af. Turn in rod end bearing on nose gear push-pull rod three (3) complete turns.

ag. Connect nose gear push-pull rod to drag link.

ah. Rig nose gear per paragraphs I-A thru I-Q.

ai. Release transmission screw slotted tube from mating pin on the torque tube and let gear drop to a full down and locked position.

aj. Disconnect nose gear pull rod from drag link.

ak. Exert forward pressure on emergency gear extension lever and align hole in rod end bearing of nose gear push-pull rod with hole in drag link.

al. Connect nose gear push-pull rod to drag link.

am. Recheck complete electrical and manual operation of main and nose gear retraction system.

an. Recheck position of transmission motor actuating screw with gear down. Maximum permissible distance between screw roll pin and stop is 1/8 inch.

ao. Engage slotted tube on transmission screw to mating pin on torque tube.

II. TROUBLESHOOTING CHART FOR PA-24 LANDING GEAR SYSTEM

TROUBLE	CAUSE	REMEDY
Landing gear retraction system fails to operate.	Circuit breaker out.	Reset circuit breaker.
	Transmission motor inoperative.	Check wiring at transmission motor.
	Motor burnt out.	Replace motor.
Warning horn fails to operate when throttle is closed and gear is retracting.	Micro switch at throttle out of adjustment.	This adjustment must be made after airplane is removed from the jacks and tail pedestal. Adjust switch with engine running at 14" MP. Loosen switch and move forward on throttle cable until switch clicks. Retighten.
	Nose gear down switch inoperative.	Check wires and possible replacement of switch on nose gear.
	Horn assembly inoperative.	Adjust horn or replace if necessary.
Motor does not shut off.	Gear up limit switch out of adjustment.	Adjust switch at transmission torque arm.
Gear up light out.	Bulb burned out.	Replace bulb.
	Gear up limit switch out of adjustment.	Adjust switch.
	Circuit breaker out.	Reset circuit breaker.
Warning horn fails to stop when throttle is closed and gear is extended.	Micro switch at throttle control out of adjustment.	This adjustment must be made after airplane is removed from the jacks and tail pedestal. Adjust switch with engine running at 14" MP. Loosen switch and move forward on throttle cable until switch clicks. Retighten.

II. TROUBLESHOOTING CHART FOR PA-24 LANDING GEAR SYSTEM (continued)

TROUBLE	CAUSE	REMEDY
Motor does not stop when gear is in fully extended position.	Gear down limit switches out of adjustment.	Adjust switches on gear drag links.
Green gear down light out.	Bulb burned out.	Replace bulb.
	"Gear down" limit switch out of adjustment.	Adjust switch.
	Circuit breaker out.	Reset circuit breaker.
Transmission screw operates but the outer sleeve remains stationary.	Bearing retainer sleeve hits pin.	Rig landing gear system so when motor stops bearing retainer sleeve is 1/8 inch or more from the roll pin stop.
	Bearing sleeve hits other restriction.	Remove restriction.
Gear will retract with oleo in a depressed condition. (Place jack under left wheel and compress oleo approximately two (2) inches.	Safety switch out of adjustment.	Adjust safety switch.