CHAPTER

32

LANDING GEAR

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32-2	Inactive	Jun 27/75	32-41-00 Page 202	Jun 27/75	LJ	Oct 1/75 Rev. 4	LJ
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32-5	Not Issued						
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32-12	Inactive	May 29/75	32-43-01 Page 213	May 29/75	LJ	Oct 1/75 Rev. 4	LJ
32-13	Inactive	Jul 12/76	32-00-00 Page 5	Jul 12/76	LJ	Mar 23/79 Rev. 11	LJ

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32-17	Inactive	Jul 12/76	32-50-00 Page 5	Jul 12/76	LJ	Mar 28/77 TR 32-22	LJ
32-18	Inactive	Jul 12/76	32-50-00 Page 5	Jul 12/76	LJ	Mar 23/79 Rev. 11	LJ
32-19	Inactive	Aug 20/76	32-42-00 Page 201	Aug 20/76	LJ	Part of SSK 931	LJ
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32-51	Inactive	Feb 7/03	32-33-00 Page 201	Feb 7/03	LJ	Temp. Rev. 32-53	LJ
32-52	Inactive	Jun 13/03	32-43-01 Page 201	Jun 13/03	LJ	Jan 17/05 Rev. 73	LJ

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LANDING GEAR - DESCRIPTION AND OPERATION

1. Description

A. The aircraft is equipped with a retractable tricycle-type landing gear with dual main gear wheels.

B. The nose gear consists of the nose wheel and chined tire mounted on a conventional air/hydraulic shock strut which is housed in and attached to the fuselage structure by bearing plates. The nose gear is steerable through an electrical steering actuator. The nose gear wheel well is covered by two hinge mounted doors which are opened and closed mechanically through linkage connected to the nose gear strut.

C. The main landing gear consists of a conventional air/hydraulic shock strut, dual wheels, and an anti-skid brake system. Each main gear strut is attached to the wing at two points. Additional support is obtained from the main gear actuator. Each main gear is enclosed during flight by an inboard and an outboard door. The outboard door is mechanically connected to the landing gear strut by an adjustable link. The inboard door is opened and closed by a hydraulic actuator.

D. Landing gear extension and retraction is accomplished through hydraulic system pressure. The landing gear is held in the retracted position by hydraulic pressure. In the event of hydraulic system failure, mechanical uplatch hooks hold the doors and gears up until the emergency extension system is activated. An emergency system permits pneumatic blowdown of the landing gear.

E. The primary brake system includes four power brake valves, six shuttle valves, two parking brake valves, an anti-skid system and four hydraulic fuses. An integral braking system is incorporated to stop the wheels spinning before the gear is fully retracted. An emergency system permits pneumatic pressure for emergency braking.

2. Operation

A. Normal Landing Gear Operation (See Figure 1.)

(1) The landing gear is retracted or extended by operating the landing gear selector switch. Setting the switch to UP initiates a sequence of all three gear systems. The inboard main gear doors are opened, the gear is retracted, and the doors are then closed. The nose gear doors are connected by linkage to the nose gear and close when the gear retracts. Setting the switch to DN reverses the sequence.

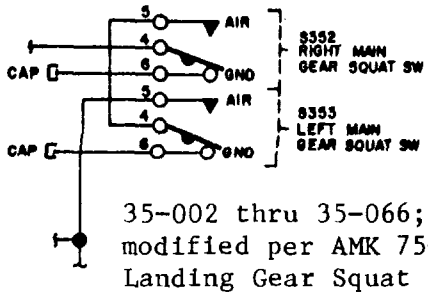
B. Emergency Landing Gear Operation

CAUTION: THE LANDING GEAR SELECTOR SWITCH IS FIRST SET TO THE GEAR DOWN POSITION TO AVOID ACCIDENTAL RETRACTION OF THE GEAR AND TO OBTAIN PROPER SAFE INDICATIONS FROM THE GEAR POSITION ANNUNCIATORS; ALSO THE RED LEFT AND RIGHT UNSAFE ANNUNCIATORS WILL BE ILLUMINATED DUE TO THE MAIN GEAR INBOARD DOORS REMAINING OPEN IN THE EMERGENCY EXTENSION MODE.

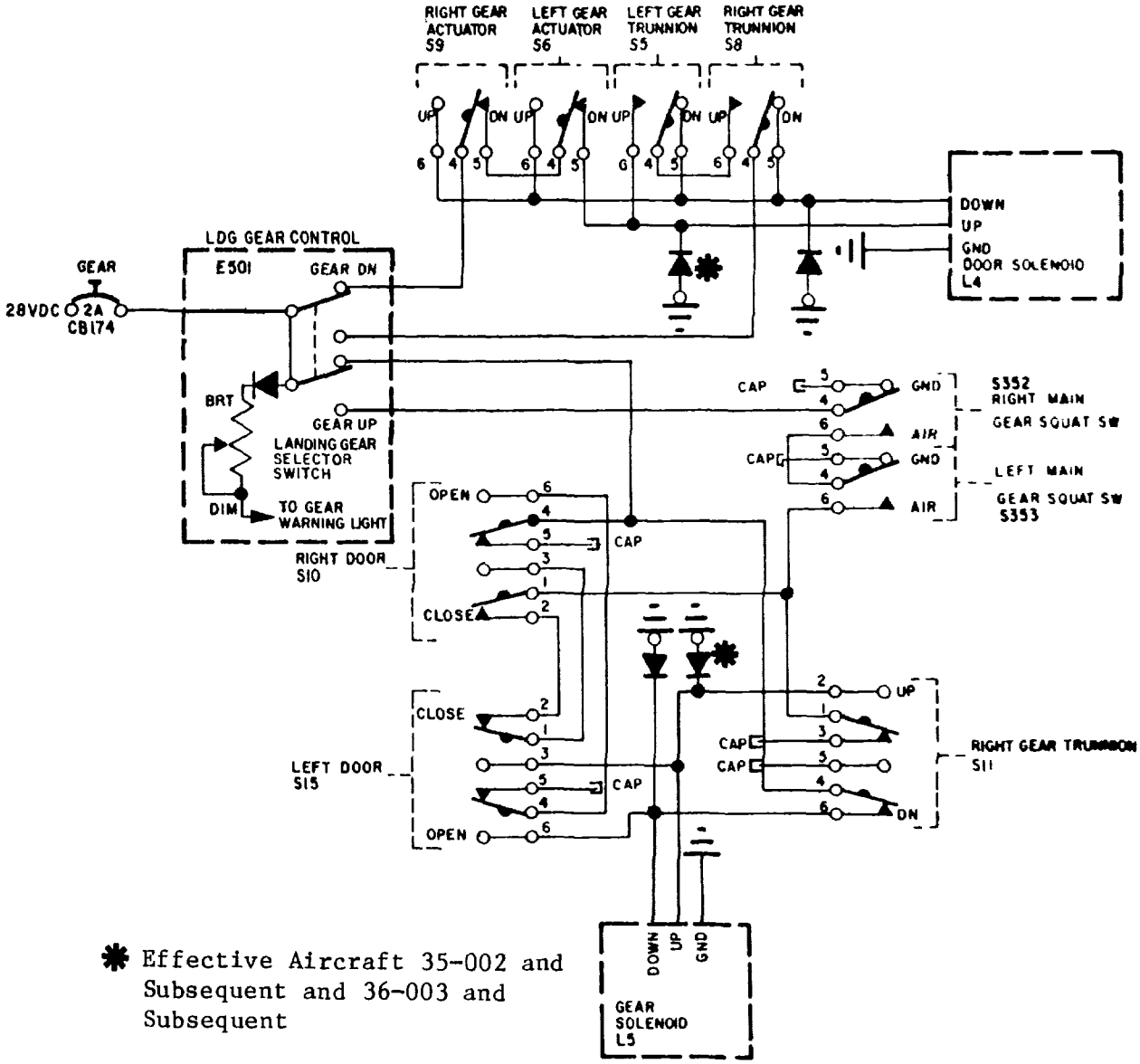
(1) In the event of main hydraulic system failure, landing gear selector system malfunction, or electrical system failure, the gear can be extended pneumatically. Emergency extension is initiated by depressing the emergency gear extension handle recessed into the right side of the pedestal. Air under pressure is then directed from the emergency air bottle through lines and shuttle valves to:

(a) The down side of the gear selector and door control valves.
(b) The nose gear uplatch actuator.
(c) The down side of the nose gear actuator.
(d) The main gear inboard door uplatch actuators.
(e) The down side of the main gear inboard door actuators.
(f) The down side of the main gear actuators. After landing, the EMERG BRAKE handle, located on the left side of the pedestal, is pushed down until adequate braking is achieved.

(2) The emergency air system to the landing gear is operated by the emergency gear extension handle, recessed into the right side of the pedestal. The handle remains in the down position when depressed. Air pressure may be bled from the gear system through an overboard vent by inserting a finger into the hole in the pedestal just forward of the handle and pushing up on the ratchet release. This allows the spring-loaded handle to return to the off position.



35-002 thru 35-066; 36-002 thru 36-017 modified per AMK 75-12, "Relocation of Landing Gear Squat Switch Striker Plates."



✱ Effective Aircraft 35-002 and Subsequent and 36-003 and Subsequent

Landing Gear Electrical Control Schematic
Figure 1

LANDING GEAR - TROUBLE SHOOTING

1. TROUBLE SHOOTING

A. The following procedure must be performed in conjunction with trouble shooting procedures in figure 101.

CAUTION: IF EMERGENCY GEAR BLOWDOWN WAS REQUIRED, ENSURE THAT THE LANDING GEAR SELECTOR SWITCH IS IN THE GEAR DOWN POSITION TO AVOID ACCIDENTAL RETRACTION OF THE GEAR.

(1) Perform the following landing gear switch adjustment:
- (a) Adjustment of gear up switches. (Refer to 32-30-01.)
- (b) Adjustment of right gear down safety switch. (Refer to 32-30-02.)
- (c) Adjustment of door down switches. (Refer to 32-30-03.)
- (d) Adjustment of main gear squat switches. (Refer to 32-30-04.)
- (e) Adjustment of main gear down and locked switches. (Refer to 32-60-01.)
- (f) Adjustment of main gear inboard door up switches. (Refer to 32-60-02.)
- (g) Adjustment of nose gear down-and-locked switch. (Refer to 32-60-03.)
- (h) Adjustment of nose gear uplatch switch. (Refer to 32-60-04.)
- (i) Adjustment of gear aural warning switches. (Refer to Chapter 76.)

(2) Place aircraft on jacks. (Refer to Chapter 7.)

(3) Pull gear circuit breaker and depressurize hydraulic system. (Refer to Chapter 29.)

NOTE: If emergency gear blowdown was required, the main gear inboard doors will be open. Pull GEAR circuit breaker and omit steps 1.A.(4) and (5).

(4) Using a screwdriver to override uplock actuator, release uplock hook from roller.

CAUTION: THE BRAKES MUST BE PUMPED DURING MANUAL LOWERING OF THE INBOARD GEAR DOOR TO PREVENT POSSIBLE DOOR ACTUATOR SEAL DAMAGE AND TO AID IN LOWERING INBOARD GEAR DOOR.

(5) To lower main gear inboard door, station a person at the door and a person in the cockpit to operate brakes. With one person pumping the brakes, the person stationed at the gear door must pull door to the down position.

(6) Disconnect main gear inboard doors by removing bolts at lower end of each actuator.

(7) Disconnect main gear outboard doors and nose gear door linkage.

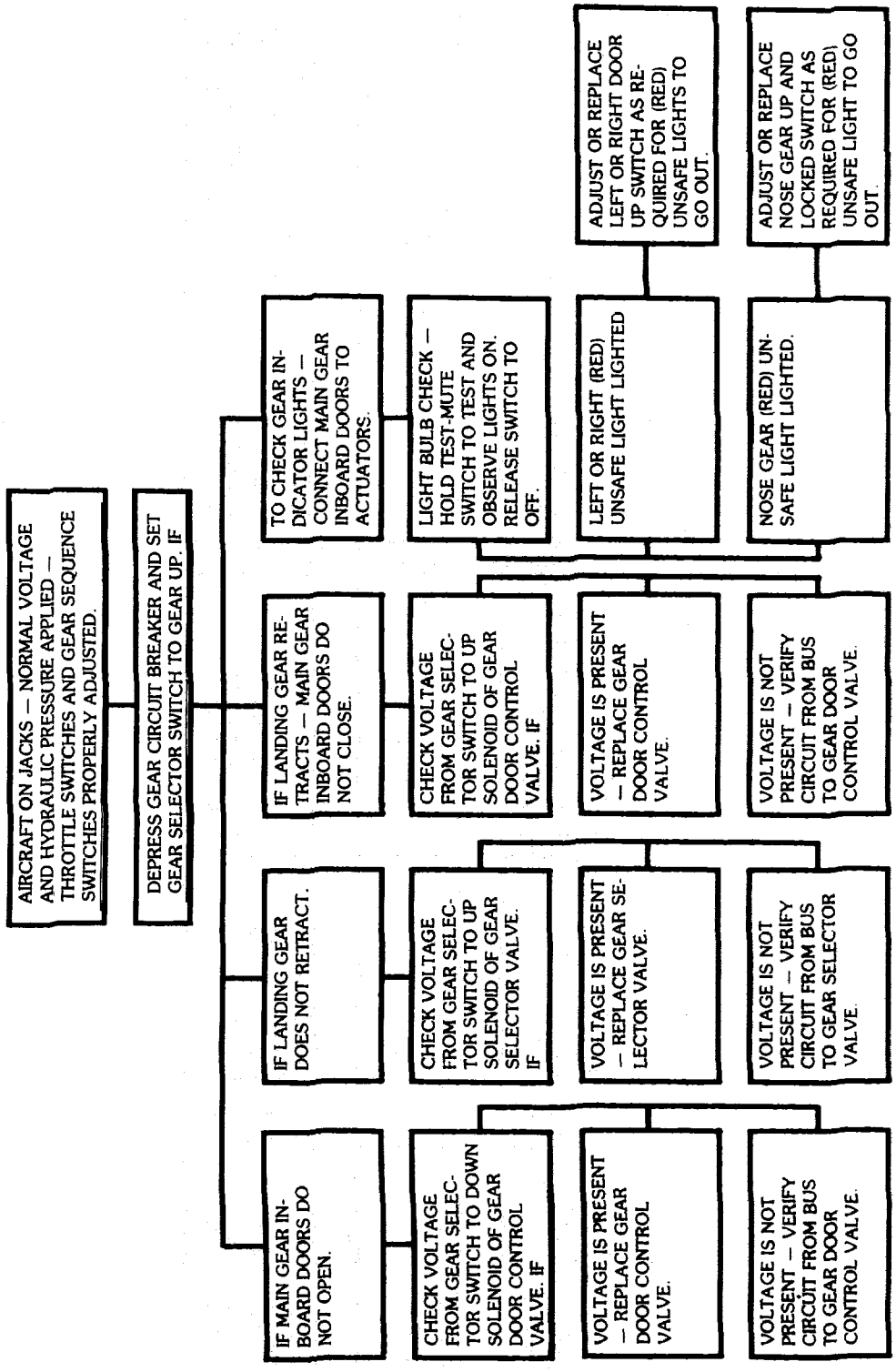
(8) When checking a particular electrical system circuit, check voltage and ground points at all valve and switch locations.

CAUTION: IF EMERGENCY GEAR BLOWDOWN HAS OCCURRED, ENSURE THAT ALL AIR IS RELEASED FROM THE LANDING GEAR SYSTEM LINES. TO PREVENT POSSIBLE RESERVOIR DAMAGE, THIS MUST BE ACCOMPLISHED BEFORE PERFORMING NORMAL HYDRAULIC SYSTEM BLEEDING PROCEDURES.

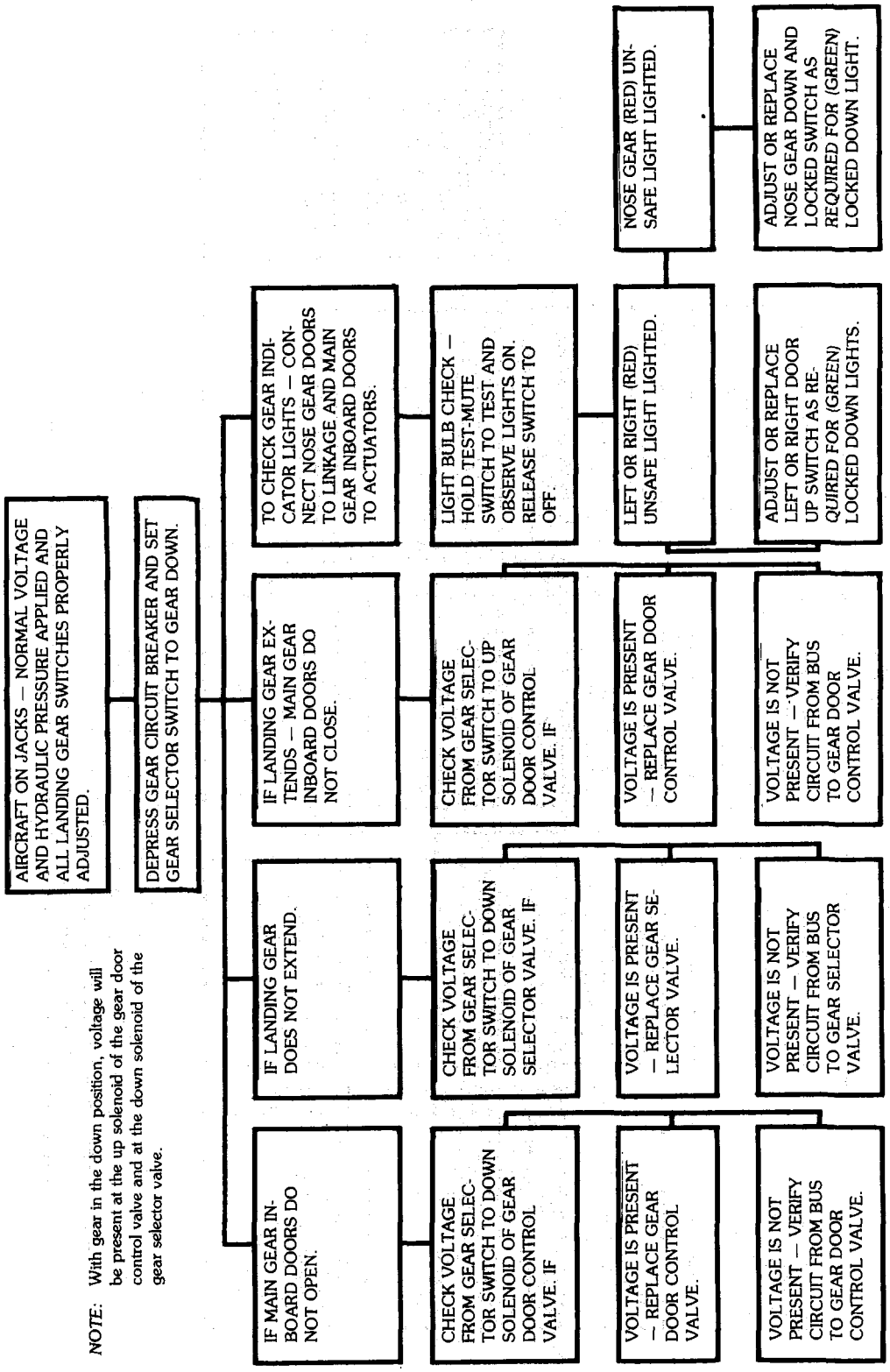
(9) Bleed air from hydraulic system if emergency gear extension has occurred. (Refer to Chapter 29.)
(10) Perform gear system trouble shooting.
(11) Connect main gear outboard doors after completion of trouble shooting.

CAUTION: DO NOT REMOVE AIRCRAFT FROM JACKS UNTIL THE LANDING GEAR IS FULLY EXTENDED TO THE DOWN-AND-LOCKED POSITION WITH ALL GREEN LOCKED DN ANNUNCIATORS ILLUMINATED.

(12) Cycle gear for proper operation. During gear cycling, observe main gear inboard door actuators for proper operation.
(13) Remove aircraft from jacks.



Landing Gear System Trouble Shooting
Figure 101 (Sheet 1 of 2)



Landing Gear System Trouble Shooting
Figure 101 (Sheet 2 of 2)

MAIN GEAR AND DOORS - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. Each main landing gear consists of dual wheels and brakes attached to a shock strut.

B. Each main gear is attached to the wing at two points. Additional support is obtained through the main gear actuator attach points.

C. Normally the gear is extended and retracted hydraulically. A pneumatic system is installed for emergency gear blowdown and emergency braking.

D. Multiple disc brakes are installed on each main landing gear and are operated by power brake valves connected to the rudder pedals.

E. Each shock strut is a conventional air/hydraulic unit designed to absorb the shock of landing, takeoff, and taxiing. It is essentially a steel piston riding in a cylinder and utilizing O-rings to prevent leakage between the piston and the cylinder. An air/hydraulic filler valve is installed on the strut for servicing purposes.

F. Each main gear is enclosed by an inboard door and an outboard door. The inboard door is hydraulically operated. The outboard door is mechanically connected to the landing gear strut by an adjustable link. The doors are hinged from the structure by continuous-type hinges. Refer to Chapter 52 for main landing gear door maintenance.

MAIN GEAR SHOCK STRUT - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: Removal and installation of right and left main gear shock struts are identical.

During disassembly, tag and keep all parts together for assembly into the same unit. Discard all O-rings, backup rings, seal rings, felt wiper, and rod scraper.

It is not necessary to remove the anti-skid transducer during disassembly of main landing gear shock strut.

A. Removal of Main Gear Shock Strut (See Figure 201 and Figure 202.)
(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Extend flaps and spoilers.
(3) Set Battery Switches off and disconnect aircraft batteries.
(4) Depressurize hydraulic system. (Refer to Chapter 29.)
(5) Remove main gear actuator. (Refer to 32-31-01, Removal/Installation.)
(6) Remove clamps securing electrical wiring and hydraulic hoses to gear strut.
(7) Remove squat switch and landing light from strut and tie them to aircraft structure out of the immediate work area. This will eliminate the cutting and splicing of electrical wiring.
(8) Remove nut and bolt attaching outboard door link to strut.

CAUTION: DO NOT REMOVE THE LARGE AND SMALL ELBOW FITTINGS FROM BRAKE ASSEMBLY HOUSINGS.

(9) Disconnect hydraulic brake hoses from brake assemblies. Plug lines and cap ports in brakes.
(10) Loosen clamps securing brake hose support assembly and remove hydraulic lines and support assembly from main gear strut. Tie hydraulic lines and support assembly to structure out of the immediate work area.

NOTE: If desired, wheels may be removed at this point (Refer to 32-42-00, Removal/Installation), and brakes may be removed at this point (Refer to 32-43-01, Removal/Installation). If wheel and brake removal is performed, provide protection for axle and identify brake assemblies as to position on aircraft.

(11) Identify and disconnect (unsolder) anti-skid transducer electrical wiring from applicable transducer electrical connector.
(a) Store anti-skid transducer electrical connector with anti-skid transducer.
(b) Remove seal from anti-skid transducer electrical wiring at hub entry hole and remove wiring from axle. Tie electrical wiring to aircraft structure, clear of immediately work area.
(12) Remove access door, inboard of gear hinge point, on spar 7 to gain access to aft trunnion pin.
(13) Remove bolt from aft side of trunnion, releasing switch striker.

WARNING: REMOVAL OF AFT TRUNNION PIN RELEASES THE MAIN GEAR FROM THE AIRCRAFT. ADEQUATE SUPPORT MUST BE GIVEN THE GEAR TO PREVENT IT FROM FALLING AND CAUSING BODILY INJURY TO PERSONNEL OR STRUCTURAL DAMAGE TO THE AIRCRAFT.

(14) Provide protection for plumbing in vicinity of aft trunnion pin. Remove round access cover located on aft side of spar 8. This access cover is located on wing spar 8 just below inboard end of spoiler and is secured by six (6) screws.

(15) Screw an AN8-20 bolt into aft trunnion pin.

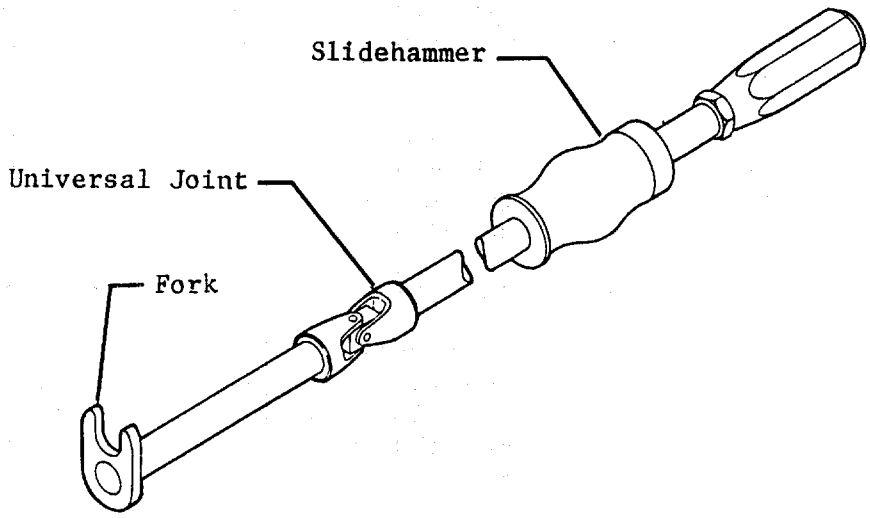
NOTE: Proper alignment (strut support) of aft trunnion pin to strut fitting will allow easier pin removal.

(16) The aft trunnion pin may be removed by pulling on bolt while wiggling strut.
(17) If aft trunnion pin cannot be removed by hand, position slide hammer fork through access hole in wing spar 8 and hook the fork over the head of the bolt which is screwed into the trunnion pin.
(18) Extract trunnion pin by alternately using slidehammer and prying on trunnion pin lip.

NOTE: As aft trunnion pin is removed, shims will be released. Be sure to retain shims for reinstallation.

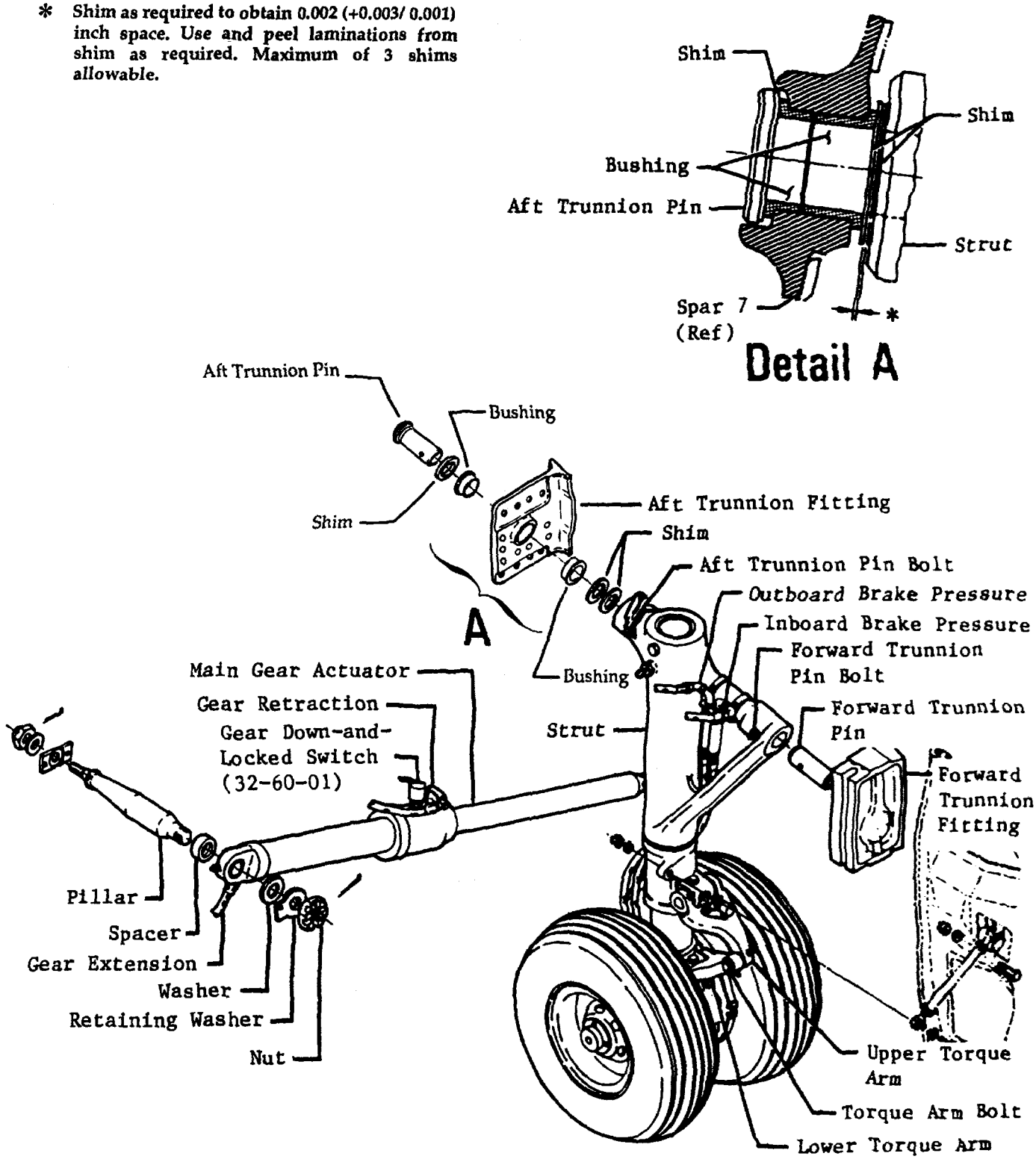
(19) Inspect friction surfaces of trunnion pins and support bushings and bearings for out of round or abnormal wear. Replace if necessary.

NOTE: Ensure assembly slot in outer race of forward trunnion bearing is positioned horizontal within ±15°. Refer to 20/30 Series Structural Repair Manual for replacement of bearings and bushings.



Aft Trunnion Pin Removal Tool
Figure 201

* Shim as required to obtain 0.002 (+0.003/ 0.001) inch space. Use and peel laminations from shim as required. Maximum of 3 shims allowable.



Main Gear Shock Strut Installation
Figure 202

B. Installation of Main Gear Shock Strut (See Figure 202.)
(1) If forward trunnion pin was removed from shock strut, install and secure with nut and bolt.
(2) Screw an AN8-20 bolt temporarily into aft trunnion pin to assist in aft trunnion pin installation.
(3) Raise shock strut and insert forward trunnion pin into forward trunnion bearing.
(4) Align shock strut with aft trunnion fitting, place shims on aft trunnion pin, and insert aft trunnion pin from aft side of spar 7, through the aft trunnion fitting. Place same number of shims as previously removed on aft trunnion pin (between aft trunnion fitting and strut).
(5) Insert aft trunnion pin through aft trunnion fitting into shock strut, ensuring that shims are still in place and not damaged.
(6) Align bolt hole in aft trunnion pin with hole in shock strut and temporarily install attaching trunnion pin bolt. Check tolerances as shown in Figure 202, Detail A.
(7) Remove trunnion pin bolt and align hole in switch striker with hole aligned in step 1.B.(6). Insert trunnion pin bolt through switch striker, shock strut, and trunnion pin and secure with nut.
(8) Remove AN8-20 bolt from aft trunnion pin.
(9) Install access door on spars 7 and 8.

CAUTION: IF REMOVED, INSTALL WHEELS AND BRAKES AT THIS POINT. (REFER TO 32-42-00 FOR WHEELS, AND 32-43-01 FOR BRAKES.) ENSURE THAT BRAKE ASSEMBLIES ARE INSTALLED IN THEIR PROPER LOCATION.

(10) Install brake hydraulic hoses and clamps on main gear strut and connect hoses to brake ports. Bleed brake system. (Refer to 32-43-00, Servicing.)
(11) Identify and connect anti-skid electrical wiring by soldering wires to plug.
(12) Attach outboard door link to main gear strut and secure with bolt and nut.
(13) Install main gear squat switch and landing light.
(14) Connect electrical connectors to aircraft batteries.
(15) Adjust squat switch. (Refer to 32-30-04, Adjustment/Test.)
(16) Install clamps securing electrical wiring to gear strut.
(17) Install main gear actuator.
(18) Service main gear shock strut. (Refer to Chapter 12.)
(19) Pressurize hydraulic system. Cycle gear while checking for proper gear indication and operation.
(20) Check for proper clearance of landing light, hydraulic hoses, wiring and clamps.
(21) Check main gear rigging. (Refer to Adjustment/Test, this section.)
(22) Perform Anti-Skid Operational Check. (Refer to 32-44-00, Inspection/Check.)

2. Repairs
A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Metering Pin Removal Tool	3170034-1	Learjet Inc. Wichita, KS	Removal of metering pin.
Metering Pin Capture Tool	2370122-001	Learjet Inc. Wichita, KS	Contains metering pin upon its release.
Rope or Strap		Commercially Available	Tie strut in compressed position.

NAME	PART NUMBER	MANUFACTURER	USE
External Hydraulic Pressure Source		Commercially Available	Remove and install metering pin.
Spanner Wrench		Fabricate Locally	Remove nut from cylinder.
Cleaning Solvent (Stoddard)		Commercially Available	Clean metal parts.
Finger Print Neutralizer		Commercially Available	Removing fingerprints.
Compressed Air (Clean & Dry)			Dry metal parts and inflate strut.
Hydraulic Fluid (MIL-H-5606)		Commercially Available	Coating part and filling strut.
Cloth (Lint-Free)		Commercially Available	Protecting parts.
or Wax Paper		Commercially Available	Protecting parts.
Preservative (MIL-C-11796)			Coating unplated machined parts when stored more than a few hours.
Fluorescent Penetrant Dye		Commercially Available	Inspecting aluminum parts.
or Acetic Acid		Commercially Available	Inspecting aluminum parts (etching).
Internal Micrometer and Plug Gages		Commercially Available	Inspecting parts for out-of-round and taper.
Oilstone		Commercially Available	Remove scratches.
Crocus Cloth		Commercially Available	Polishing.
Dry Nitrogen		Commercially Available	Inflate strut.

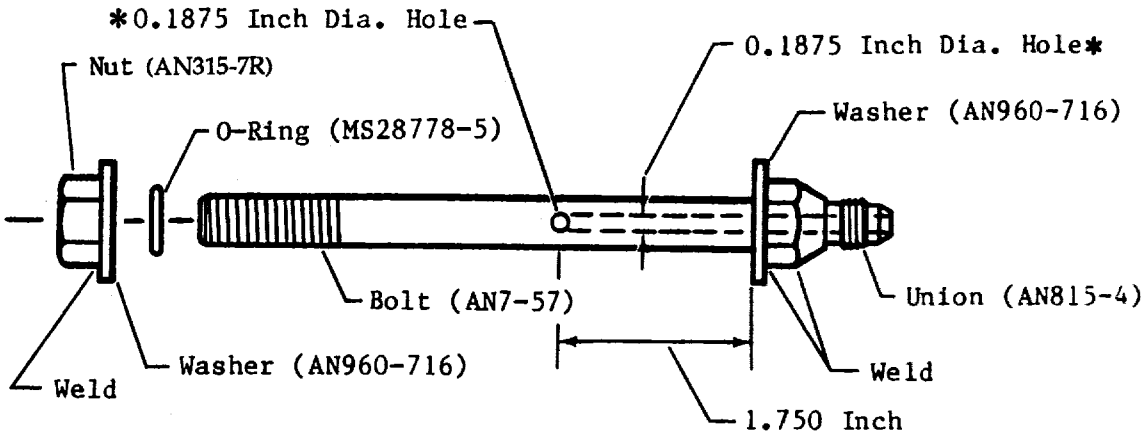
NAME	PART NUMBER	MANUFACTURER	USE
Epoxy Primer		Refer to Chapter 20.	Refinish externally painted surfaces. Sealing bushings.
Aluminum Topcoat	Color No. 17178	Pratt and Lambert	Refinish externally painted surfaces.
Holding Fixture	ST00378	Learjet Inc. Wichita, KS	Hold main gear assembly. Remove main gear axle from hub.
Punch	ST00378-201	Learjet Inc. Wichita, KS	
Arbor	ST00378-205	Learjet Inc. Wichita, KS	Hold main gear axle.
Sealant (Class B)	Pro-Seal 890	Coast Pro-Seal & Mfg. Co., Los Angeles, CA	Apply sealant to axle/hub juncture.

B. Disassemble Main Gear Shock Strut (See Figure 204 and Figure 205.)

NOTE: Remove main gear shock strut as required by the extent of the disassembly of strut. (Refer to Removal/Installation, this section.)

WARNING: DO NOT RELEASE AIR BY LOOSENING OR REMOVING AIR VALVE. FAILURE TO COMPLY MAY RESULT IN BODILY INJURY.

(1) Remove cap from air valve and loosen end nut 3/4 turn to release all air from strut.
(2) Remove wheels, if not already accomplished. (Refer to Removal/Installation, 32-42-00.)
(3) Remove brakes, if not already accomplished. (Refer to Removal/Installation, 32-43-01.)
(4) Remove air valve and drain hydraulic fluid through air valve port. Move piston through stroke to aid draining. Retain fluid for contaminant inspection.
(5) Remove safety wire from retainer ring lockscrew and cylinder lockscrew. Remove retainer ring lockscrew and retainer ring lock from strut.
(6) Remove orifice tube bolt and remove orifice assembly from cylinder.
(7) Remove and discard the O-ring, backup ring and seal ring from barrel.
(8) Compress landing gear strut by using a rope or strap and tie strut in compressed position at torque link bosses.
(9) Slide metering pin capture tool into cylinder piston and attach it to cylinder with orifice assembly bolt.
(10) Using metering pin removal tool (see Figure 203), remove metering pin as follows:
  (a) Remove bolt through brake reaction pads.
  (b) Install metering pin removal tool in bolt hole.
  (c) Attach a hydraulic pressure source to metering pin removal tool end fitting.



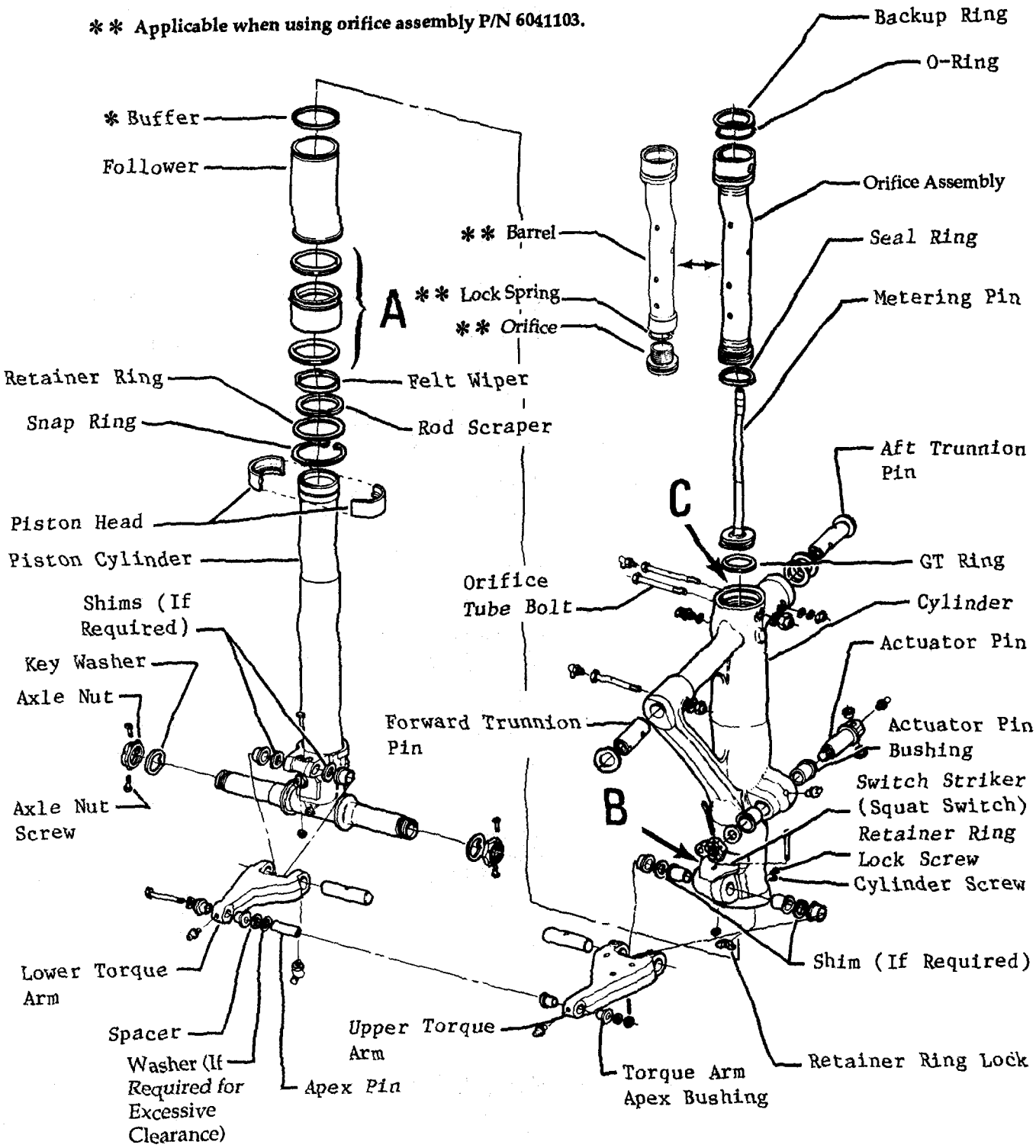
*Drill to meet hole through center of bolt. Do not drill completely through bolt.

NOTE: In lieu of fabricating a metering pin, Metering Pin Removal Tool (P/N 3170034-1) may be ordered from Learjet Inc. Spares.

Metering Pin Removal Tool Fabrication
Figure 203

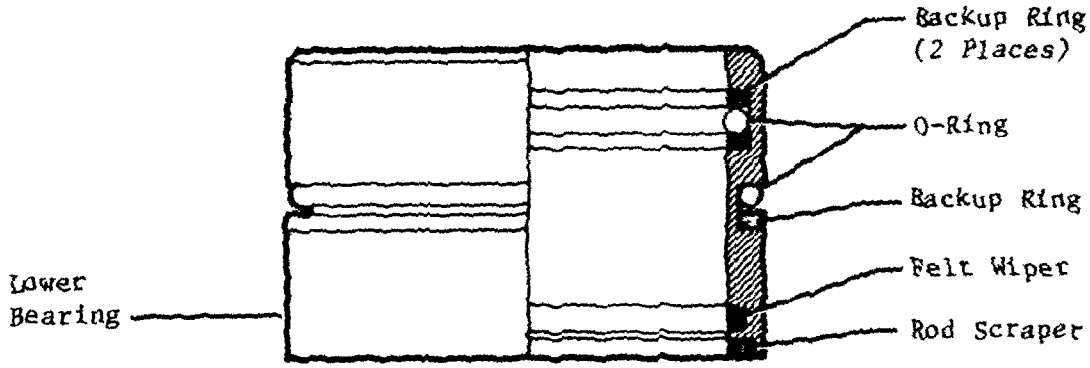
* Aircraft Modified per AAK 78-3, "Replacement of Main Landing Gear Strut Piston Assembly for Improved Snubbing.")

** Applicable when using orifice assembly P/N 6041103.

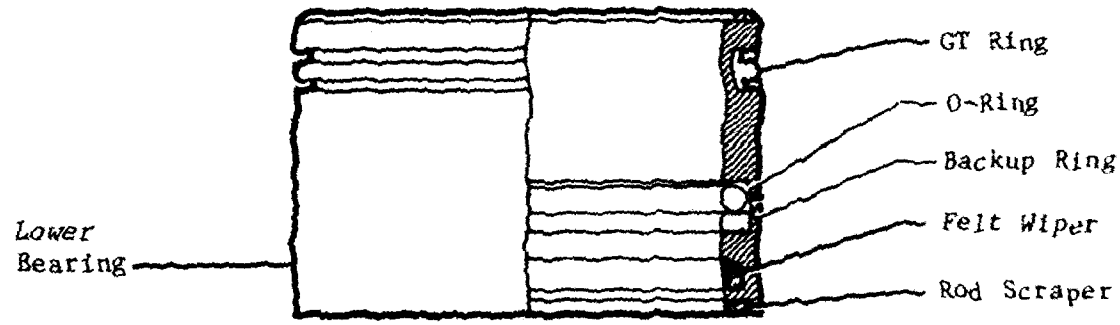


Main Gear Shock Strut Assembly
Figure 204 (Sheet 1 of 5)

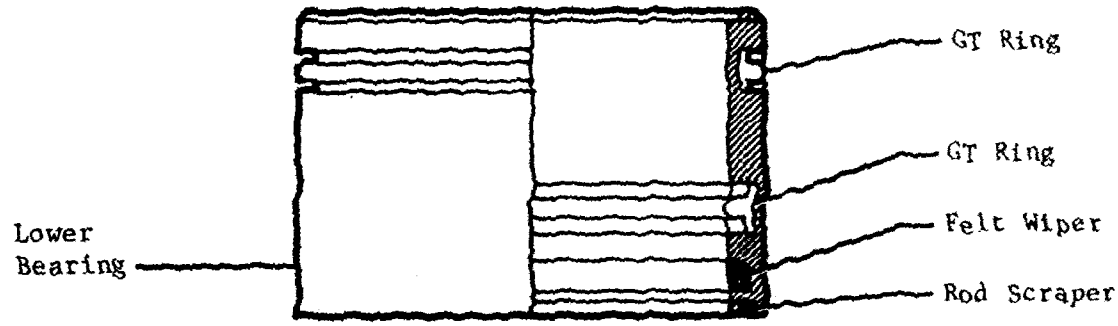
EFFECTIVITY: AIRCRAFT NOT MODIFIED PER SB 35/36-32-16



(35-002 thru 35-250, 36-002 thru 36-044 not Modified per AAK 78-3, "Replacement of Main Landing Gear Strut Piston Assembly for Improved Snubbing.")



(35-251 thru 35-587, 36-045 thru 36-047)

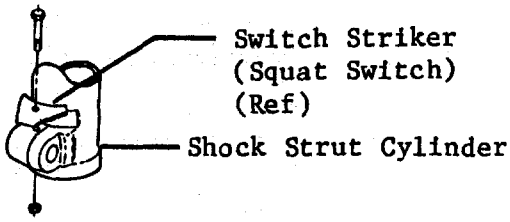


(35-288 and Subsequent, 36-048 and Subsequent and Prior Aircraft Modified per AAK 78-3, "Replacement of Main Landing Gear Strut Piston Assembly for Improved Snubbing.")

Detail A

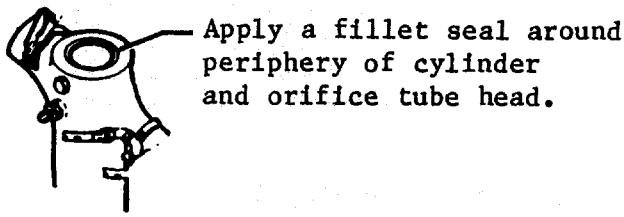
Main Gear Shock Strut Assembly
Figure 204 (Sheet 2 of 5)

EFFECTIVITY: AIRCRAFT NOT MODIFIED PER SB 35/36-32-16



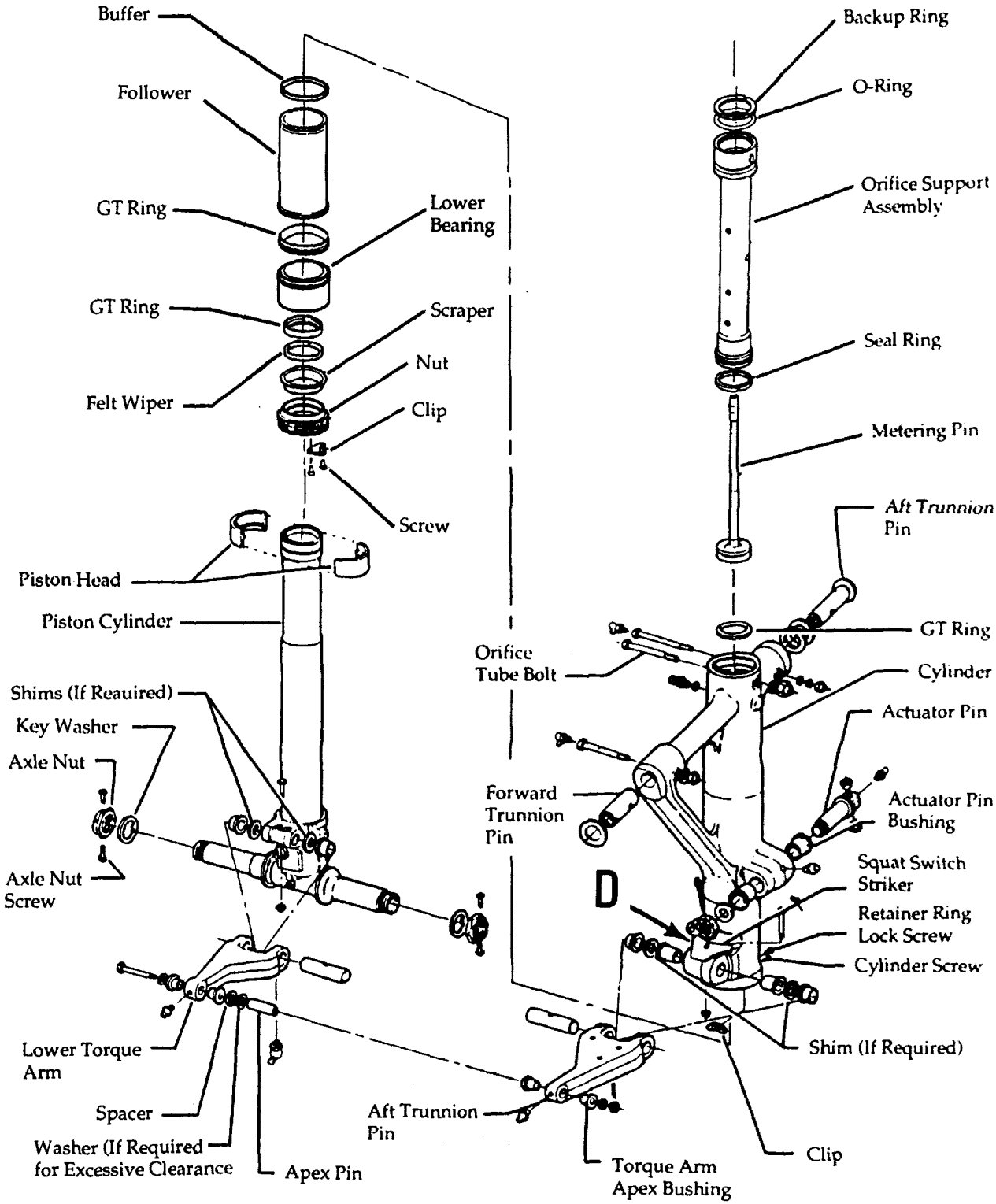
(Aircraft 35-067 and Subsequent and 36-012 and Subsequent and Prior Aircraft Modified per AMK 75-12, "Relocation of Landing Gear Squat Switch Striker Plates.")

Detail B

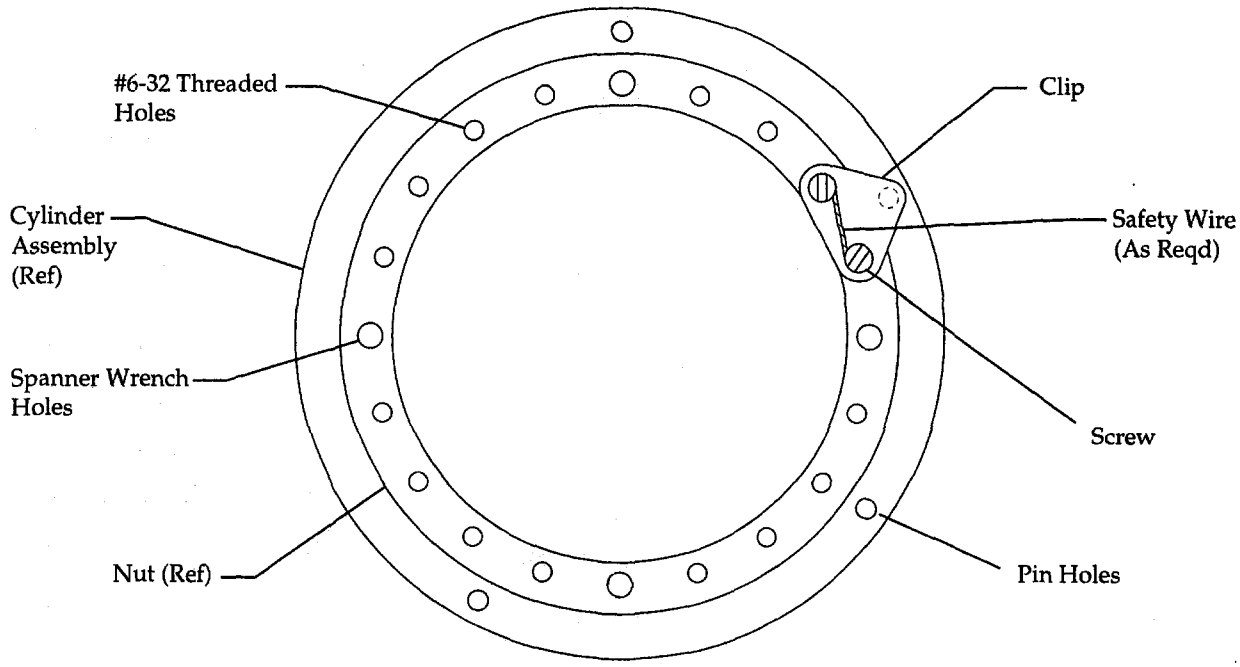


Detail C

Main Gear Shock Strut Assembly
Figure 204 (Sheet 3 of 5)



Main Gear Shock Strut Assembly
Figure 204 (Sheet 4 of 5)



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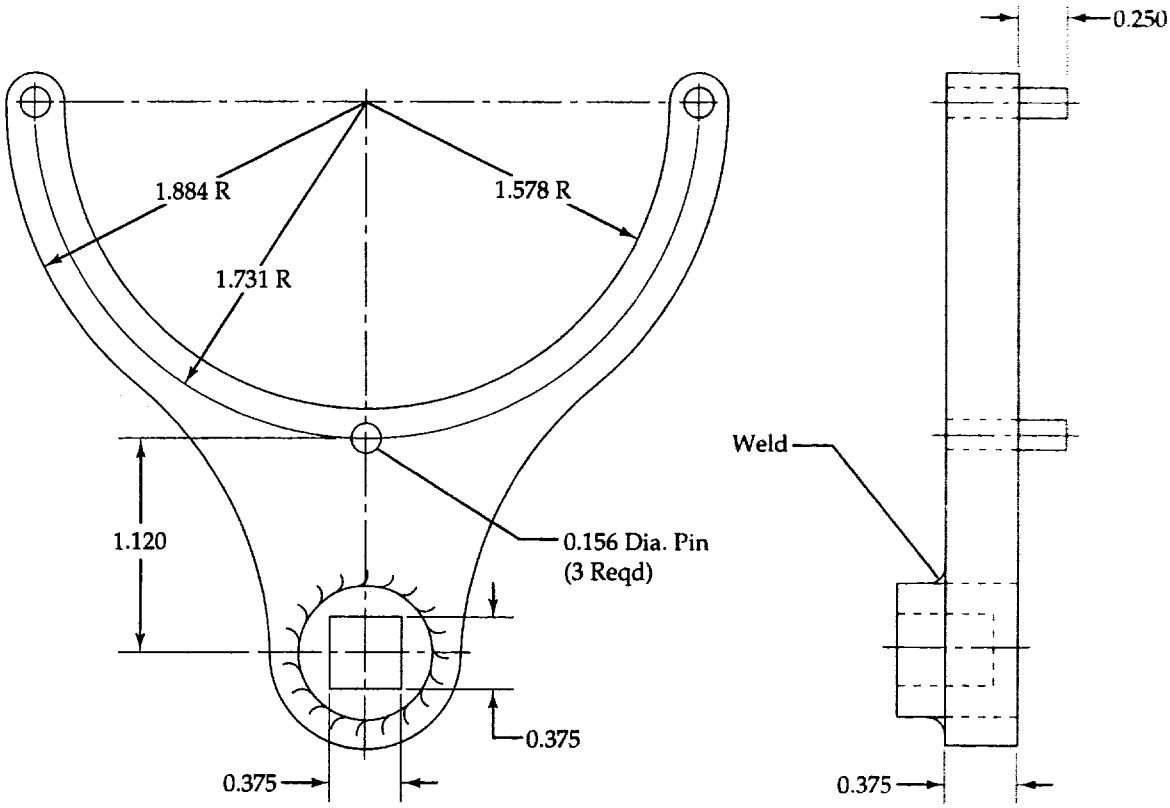
Detail D

Main Gear Shock Strut Assembly
Figure 204 (Sheet 5 of 5)



Spanner Wrench
Figure 205

WARNING: ALL AIR MUST BE BLED FROM CAVITY BEFORE HYDRAULIC PRESSURE IS APPLIED TO REMOVE METERING PIN. HYDRAULIC PRESSURE APPLIED TO THE METERING PIN REMOVAL TOOL MUST NOT EXCEED 3,750 PSI [25.855 MPa].

IF METERING PIN CAPTURE TOOL IS NOT AVAILABLE, USE EXTREME CAUTION AND TAKE NECESSARY PRECAUTION TO CONTAIN THE METERING PIN WHEN IT RELEASES FROM STRUT OR BODILY INJURY CAN RESULT. THE METERING PIN CAN EJECT AT A HIGH VELOCITY.

(d) Slowly apply hydraulic pressure until metering pin is released from cylinder piston into capture tool.
(e) Release hydraulic pressure and disconnect pressure source.
(f) Replace metering pin removal tool with brake reaction pad bolt.
(g) Remove metering pin capture tool.
(h) Remove metering pin.
(i) Remove and discard GT-ring from metering pin.

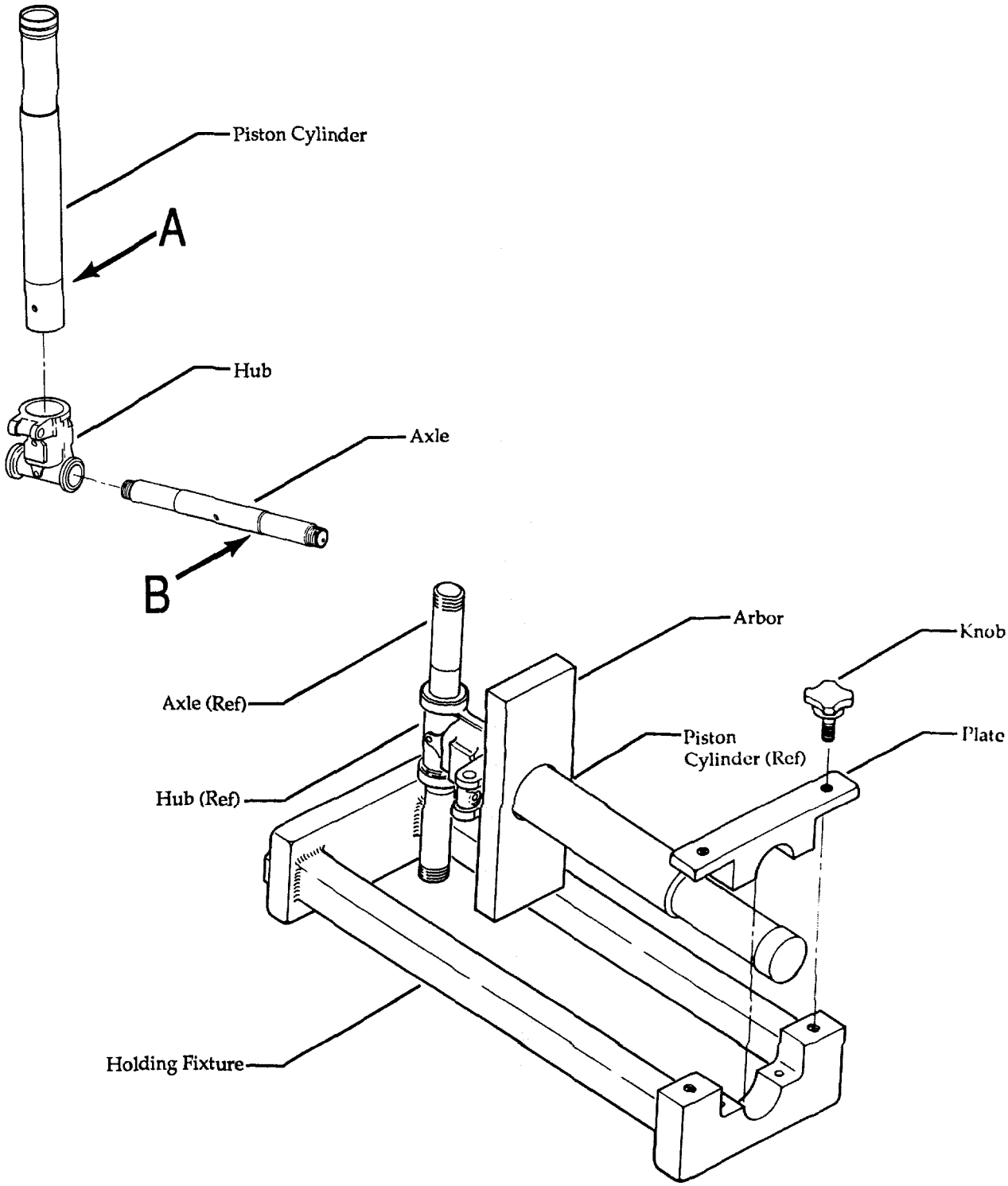
(11) Release compression of landing gear strut by removing rope or strap from torque link bosses.
(12) Remove bolt, washers and nut that secure torque arms together.
(13) Remove apex pin, washer and spacer.
(14) Inspect torque arms for fit on torque arm pins. Maximum allowable side movement is 0.0010 inch [0.0025 cm]. Maximum allowable bushing/pin clearance is 0.009 inch [0.0023 cm]. Torque arm removal may be necessary. (Refer to 32-11-01.)
(15) *On Aircraft not modified per SB 35/36-32-16*, remove snap ring and disengage retainer ring from its groove in cylinder.
(a) Slide piston straight out releasing piston head.
(b) Remove follower, lower bearing, retainer, and retainer ring from piston.
(c) Remove GT ring(s), O-ring, backup ring(s), felt wiper and rod scraper from lower bearing.
(16) *On Aircraft modified per SB 35/36-32-16*, remove attaching parts securing clip to cylinder.
(a) Using a spanner wrench, remove nut from cylinder. (See Figure 205.)
(b) Slide piston straight out releasing piston head.
(c) Remove follower and lower bearing from piston.
(d) Remove GT ring(s), felt wiper and rod scraper from lower bearing.
(17) Clean all metal parts with Stoddard solvent or equivalent.
(18) Remove all fingerprints from machined surfaces not painted, using a suitable fingerprint neutralizer.
(19) Dry metal parts with clean, dry, compressed air.
(20) Coat internal parts with MIL-H-5606 hydraulic fluid.
(21) Wrap cleaned parts in lint-free cloth or clean waxed paper while awaiting repair or reassembly.

NOTE: When storing unplated machine surface parts more than a few hours, coat with MIL-C-11796 preservative. Remove preservative prior to assembly.

C. Remove Piston and Axle from Hub (See Figure 206.)

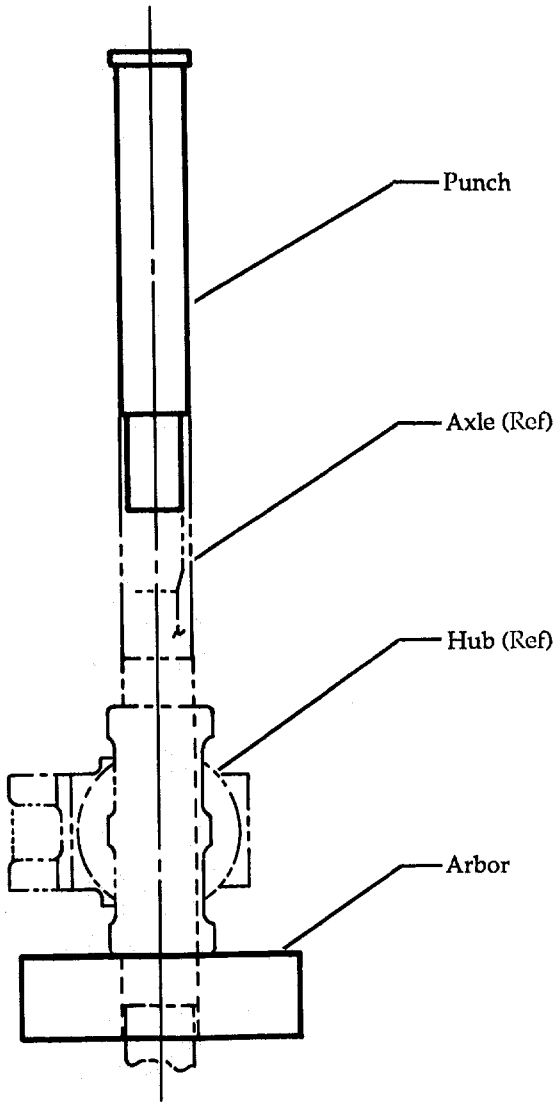
CAUTION: THE FOLLOWING PROCEDURE IS CRITICAL. FAILURE TO EXERCISE PRECISE CONTROL OVER DISASSEMBLY COULD CAUSE FAILURE OF THE LANDING GEAR STRUT.

(1) Remove retaining bolts and nuts from piston and axle.
(2) Install holding fixture (P/N ST00378) onto piston/hub assembly and place in hydraulic press. (See Figure 206, Detail A.)



Detail A

Main Gear Shock Strut Disassembly
Figure 206 (Sheet 1 of 2)



Detail B

Main Gear Shock Strut Disassembly
Figure 206 (Sheet 2 of 2)

WARNING: ENSURE THAT ALL PERSONNEL REMAIN CLEAR OF AREA BETWEEN HYDRAULIC PRESS AND HOLDING FIXTURE WHILE PRESSURE IS BEING APPLIED. HIGH PRESSURE COULD CAUSE BODILY INJURY.

CAUTION: IF PRESSURE NEEDED TO SEPARATE PISTON FROM HUB EXCEEDS 20 TONS, THE ENTIRE ASSEMBLY MUST BE SCRAPPED AND REPLACED.

(3) Place a piece of wood between holding fixture and hub to prevent holding fixture striking and damaging hub when piston and hub separates.
(4) Actuate hydraulic press to pull piston from hub.
(5) Remove tool from hub.
(6) Place arbor (P/N ST00378-205) on hydraulic press and insert axle/hub assembly. (See Figure 206, Detail B.)
(7) Insert punch (P/N ST00378-201) into upper end of axle and align with ram of press. (See Figure 206, Detail B.)

CAUTION: IF PRESSURE NEEDED TO SEPARATE AXLE FROM HUB EXCEEDS 20 TONS, THE ENTIRE ASSEMBLY MUST BE SCRAPPED AND REPLACED.

(8) Actuate hydraulic pressure to remove axle from hub.

D. Inspect Main Gear Shock Strut for Wear

NOTE: If an Overhaul, Hard Landing or any Chapter 5 inspection is accomplished on the main gear shock strut, perform entire procedure. If only repairs have been accomplished, delete steps (3) and (4).

(1) Inspect drained hydraulic fluid for metal particles which may be used as an aid in determining trouble source.
(2) Inspect all metal parts including welds and machined and forged parts for evidence of structural fatigue, nicks, burrs, cracks, corrosion, worn threads and excessive wear.
(3) Perform a magnetic particle inspection on all ferrous parts in accordance with Part 6, Chapter 32 of the NDI Manual. Perform fluorescent penetrant check on all aluminum parts in accordance with Part 5, Chapter 32 of the NDI Manual. After ferrous parts inspection, demagnetize to remove all metal particles.
(4) Check all friction surfaces of bushings and strut holes for out of round and taper using an internal micrometer, plug gages, or similar equipment.
(5) Inspect O.D. and I.D. surfaces of piston and I.D. surfaces of cylinder for galls, scratches, scoring, corrosion and worn plating.
(6) Buff out minor scratches in piston, cylinder, piston head, lower bearing, and trunnion pins. Do not create low spots by excessive buffing or polishing. Use oil stone to remove the scratches and polish with crocus cloth. Check tolerances after polishing. (Refer to Learjet 20/30 Series Structural Repair Manual.)
(7) Replace any part which does not meet inspection requirements or tolerances.
(8) On *Aircraft 35-250 and Subsequent and 36-044 and Subsequent and Prior Aircraft Modified per AAK 78-3, "Replacement of Main Landing Gear Strut Piston Assembly for Improved Snubbing"*, inspect buffer for excessive wear and replace if necessary.
(9) Inspect orifice tube ends for looseness. Bottom end of orifice tube may rotate (maximum allowable end play of 0.005 inch [0.127 mm]). Top end of orifice tube shall not rotate.

E. Assemble Piston and Axle to Hub (See Figure 205.)

CAUTION: THE FOLLOWING PROCEDURE IS CRITICAL. FAILURE TO EXERCISE PRECISE CONTROL OVER ASSEMBLY COULD CAUSE FAILURE OF LANDING GEAR STRUT.

(1) Prior to assembly, heat hub to +200°F [93.3°C].
(2) Clean and freeze axle and piston a minimum of 45 minutes in dry ice or to a temperature of -75°F [-59.4°C].
(3) Insert piston and axle into hub, aligning holes in axle and piston with holes in hub.

NOTE The piston and axle must be simultaneously inserted into hub. If both parts are not inserted and properly aligned within 15 seconds, repeat disassembly procedures.

Ensure that keyway is to top when installing axle to facilitate anti-skid transducer wire routing.

(4) Allow assembly to cool to ambient temperature and remove all condensate.
(5) Apply a 1/16 inch fillet bead to each axle/hub juncture.
(6) Coat exposed external surfaces of axle with MIL-C-11796 Class 3 (or equivalent) corrosion preventive compound.

NOTE: Prior to installation of wheels and brakes, remove corrosion preventive compound from axle, trim fillet bead of sealant (if required) from surface of axle/hub juncture and lubricate axle with MIL-G-81322 grease.

F. Assemble Main Gear Shock Strut *(Aircraft not modified per SB 35/36-32-16)* (See Figure 204.)
(1) Immerse all GT rings, O-rings, backup rings, seal rings, felt strip and rod scraper in MIL-H-5606 hydraulic fluid immediately prior to installation.
(2) Slide retaining ring and retainer on piston.
(3) See Figure 204, Detail A, for lower bearing configuration, and install required parts.
(4) Install lower bearing (chamfered end up) and follower (buffered end up) on piston.
(5) Install GT ring on metering pin.
(6) Install metering pin inside piston. Ensure that metering pin is bottomed out in piston.

CAUTION: USE CAUTION TO PREVENT DAMAGE TO PISTON ASSEMBLY'S SNUBBER ORIFICE NOZZLE OR TO BUFFER (IF INSTALLED) ON THE FOLLOWER DURING INSERTION OF PISTON ASSEMBLY INTO CYLINDER. STRIKING SNUBBER ORIFICE NOZZLE (SWAGGED INTO PISTON) MAY LOOSEN IT.

(7) The piston head consists of two matched halves and is to be replaced only as a complete unit. With piston head assembled on piston, slide piston assembly into lower end of cylinder until bottom end of cylinder contacts bottom of piston.

NOTE: During piston assembly insertion, use shim stock around follower buffer (if installed) to protect buffer from scraping against internal cylinder edges.

(8) Secure piston in cylinder with retainer ring. Check to ensure that the centerline of retainer ring gap is aligned with screw hole for retainer ring lockscrew and that retainer ring is set at least halfway into retainer ring groove. If necessary, tap retainer ring lightly to set it into groove. Retainer ring lockscrew cannot be installed if retainer ring is not properly installed.

(9) Install retainer ring lock with retainer ring lockscrew and secure with safety wire adjacent to cylinder screw provided for that purpose.
(10) When replacing existing orifice assembly with orifice assembly (P/N 6041103), accomplish the following (refer to Figure 204):
  (a) Place clip on barrel.
  (b) Screw orifice into barrel, torque to 600 inch-pounds [67.74 Nm].
  (c) Locate lock spring hole in barrel and drill 0.101 diameter hole in orifice.
  (d) Remove orifice and deburr hole.
  (e) Reinstall orifice and torque to 600 inch-pounds [67.74 Nm].
  (f) Install lock spring.
(11) Assemble seal ring on orifice assembly head and O-ring and backup ring on orifice tube end.
(12) Insert orifice assembly inside cylinder ensuring that metering pin is aligned with metering pin hole in orifice tube head. Secure orifice end in cylinder with bolt, washer, and nut.

NOTE: *On Aircraft 35-168 and Subsequent and 36-039 and Subsequent*, apply a fillet seal around periphery of cylinder and orifice tube head.

(13) Replace lubricators removed during disassembly.
(14) Replace worn or damaged bushings in pairs only. If bushings are to be replaced, proceed as follows:
  (a) Coat outside diameter and adjacent flanges of new bushings with primer and press into place while primer is wet.
  (b) After installation, coat bushing faces with primer. Remove excess primer from lubricator holes.
(15) Install spacer and apex pin in torque arms and secure arms together with bolt and nut. Add AN960-916L washer, if necessary, to eliminate excessive clearance between torque arms.
(16) With strut vertical, fill with MIL-H-5606 hydraulic fluid in accordance with nameplate attached to trunnion.
(17) Install air valve and tighten securely.
(18) Refinish all externally painted surfaces with one coat of epoxy primer (refer to Chapter 20) and one coat of Pratt and Lambert aluminum topcoat, color 17178.
(19) Perform leak test of shock strut as follows:
  (a) Place completely assembled strut in vertical or horizontal position.
  (b) Inflate strut with dry compressed air or nitrogen to pressure specified in Chapter 12 alternate strut inflation procedure.
  (c) No leakage is allowed during a one hour period.
  (d) After completion of test, release all air from strut through air valve.
  (e) After air pressure is released, install dust cap on air valve.
(20) Install brakes. (Refer to 32-43-01, Removal/Installation.)
(21) Install wheels. (Refer to 32-42-00, Removal/Installation.)

G. Assemble Main Gear Shock Strut *(Aircraft modified per SB 35/36-32-16)* (See Figure 204.)
(1) Immerse all GT rings, O-rings, backup rings, seal rings, and scraper in MIL-H-5606 hydraulic fluid immediately prior to installation.

NOTE: Do not immerse felt strip in hydraulic fluid.

(2) Install nut and slide to bottom of piston.
(3) Install scraper on piston with narrow end down against nut.
(4) Install GT ring in inside groove of lower bearing.
(5) Install GT ring in outside groove of lower bearing.
(6) Install felt wiper in lower inside groove of lower bearing.
(7) Install lower bearing on piston with outer GT ring up.

(8) Install buffer on follower.
(9) Install follower on piston with buffer up.
(10) Install GT ring on metering pin.
(11) Install metering pin inside piston. Ensure metering pin is bottomed out in piston.

CAUTION: USE CAUTION TO PREVENT DAMAGE TO SNUBBER ORIFICE NOZZLE OR TO BUFFER DURING INSERTION OF PISTON ASSEMBLY INTO CYLINDER. STRIKING SNUBBER ORIFICE NOZZLE (SWAGGED INTO PISTON) MAY LOOSEN IT.

(12) Install piston head halves on piston.
(13) Slide piston assembly into lower end of cylinder until bottom end of cylinder contacts bottom of piston.

NOTE: During piston assembly insertion, use shim stock around follower buffer to protect buffer from scraping against internal cylinder edges.

(14) Secure piston in cylinder by screwing nut into cylinder.
(15) Torque retaining nut to 250 inch-pounds with spanner wrench. Install retaining clip into one of the pin holes that aligns with two screw holes. If no screw holes align with one of the pin holes, continue to torque nut until clip can be installed. Do not exceed 600 inch-pounds torque.

NOTE: Torques are applicable to center of retaining nut. Actual torque applied to spanner wrench must be calculated depending on length of spanner wrench.

(16) Install retaining clip and secure with screws. Safety wire screws.
(17) Install seal ring on orifice support assembly.
(18) Install O-ring and backup ring on upper end of orifice support assembly.
(19) Insert orifice support assembly inside cylinder ensuring that metering pin is aligned with metering pin hole in orifice support assembly.
(20) Replace lubricators removed during disassembly.
(21) Replace worn or damaged bushings in pairs only. If bushings are to be replaced, proceed as follows:
  (a) Coat outside diameter and adjacent flanges of new bushings with primer and press into place while primer is wet.
  (b) After installation, coat bushing faces with primer. Remove excess primer from lubricator holes.
(22) Install spacer and apex pin in torque arms and secure arms together with bolt and nut. Add AN960-916L washer, if necessary, to eliminate excessive clearance between torque arms.
(23) With strut vertical, fill with MIL-H-5606 hydraulic fluid in accordance with nameplate attached to trunnion.
(24) Install air valve and tighten securely.
(25) Refinish all externally painted surfaces with one coat of epoxy primer (refer to Chapter 20) and one coat of Pratt and Lambert aluminum topcoat, color 17178.
(26) Perform leak test of shock strut as follows:
  (a) Place completely assembled strut in vertical or horizontal position.
  (b) Inflate strut with dry compressed air or nitrogen to pressure specified in Chapter 12 alternate strut inflation procedure.
  (c) No leakage is allowed during a one hour period.
  (d) After completion of test, release all air from strut through air valve.
  (e) After air pressure is released, install dust cap on air valve.
(27) Install brakes. (Refer to 32-43-01, Removal/Installation.)
(28) Install wheels. (Refer to 32-42-00, Removal/Installation.)

3. Adjustment/Test

A. Main Landing Gear Rigging

(1) Place aircraft on jacks and level in accordance with Chapter 8.

(2) With strut fully extended, place clinometer on inboard or outboard side of strut piston. (See Figure 207.)

(3) Strut shall be perpendicular to horizontal line (90° [+0°10'; -0°15']).

(4) Adjust main gear actuator rod end as necessary to position strut within tolerance.

B. Main Landing Gear Axle Alignment Check

(1) Remove main landing gear wheels and tires from main landing gear. (Refer to 32-42-00, Removal/Installation.)

(2) Remove apex pin bolt, washers, nut, and cotter pin.

(3) Remove apex pin releasing spacer and, if installed, washer.

(4) Measure distance between inboard end of left main landing gear axle and inboard end of right main landing gear axle.

(5) Cut a pipe four (4) inches [10 cm] longer than distance between axles. Pipe should be able to fit snuggly over axle diameter.

NOTE: Axle diameter is 1.4998 (+0.0000; -0.0010) inches [3.809 (+0.0000; -0.0025) cm].

CAUTION: USE CARE NOT TO DAMAGE AXLES WHEN INSTALLING AND REMOVING PIPE.

(6) Rotate one strut enough to slip pipe over inboard end of axle.

(7) Rotate axle and pipe until pipe can be slid over inboard end of opposite axle.

(8) Position pipe so that equal amounts of pipe are on each axle.

(9) Bring torque arms together and temporarily insert apex pins into torque arms.

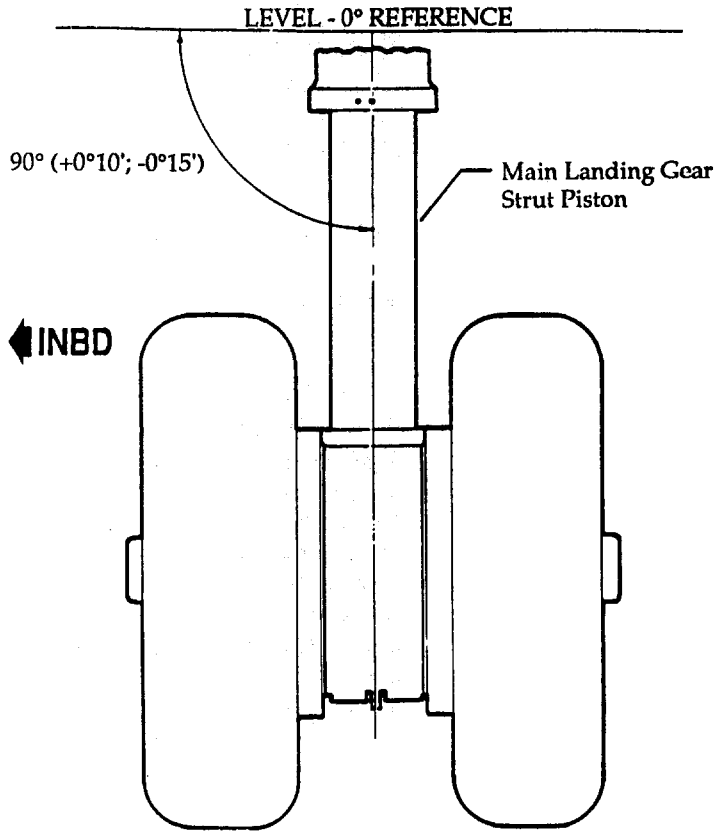
(10) Measure distance between faces of bushings at apex pins. Distance shall be 0.120 to 0.167 inch [0.305 to 0.424 cm]. If distance is out of tolerance, examine torque arms, torque arm bushings, strut end bushings, or strut to wing connection for cause.

(11) Remove apex pins and remove pipe from axles.

(12) Position spacers and washers, when applicable, between torque arms and install apex pins.

(13) Install apex pin bolt, washers, nut, and cotter pin.

(14) Install main landing gear wheels and tires on main landing gear. (Refer to 32-42-00, Removal/Installation.)



Main Landing Gear Adjustment
Figure 207

MAIN GEAR SHOCK STRUT TORQUE ARM - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of Torque Arms (See Figure 201.)

NOTE: Torque arms may be replaced individually. The torque arm bushings and upper and lower apex bushings must be replaced in pairs and line reamed to fit.

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Remove wheels. (Refer to 32-42-00, Rmoval/Installation.)
(3) Remove brakes. (Refer to 32-43-01, Removal/Installation.)
(4) Remove torque arm pin bolts, washers, nuts, and cotter pins, and if not already accomplished, remove apex pin bolt, washers, nut, and cotter pin.
(5) Remove apex pin, releasing spacer and washer.
(6) Press out torque arm pins, releasing shims if installed, and remove torque arms from strut.

B. Installation of Torque Arms (See Figure 201.)

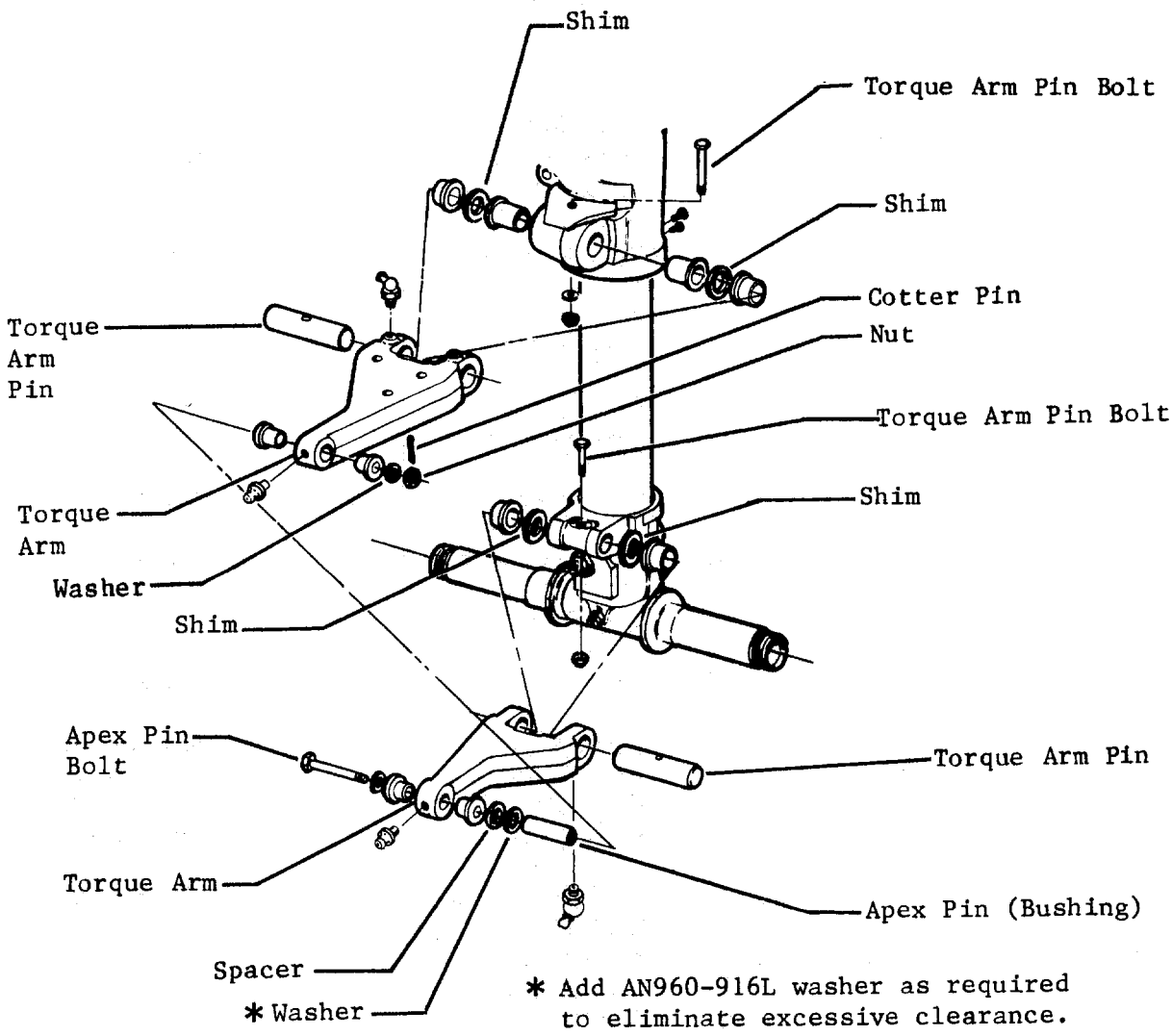
(1) Perform Inspection Check per 3.A.(1) thru (3).
(2) Position upper torque arm on strut and add shims to bring clearances to 0.001 inch [.0025 cm] or less.

NOTE: Torque arm must retain freedom of movement.

(3) Install pin ensuring that bolt hole in pin aligns with bolt hole in boss. Secure with bolt, washer, nut, and cotter pin.
(4) Position lower torque arm on strut and add shims to bring clearances to 0.001 inch or less.

NOTE: Torque arm must retain freedom of movement.

(5) Install pin ensuring that bolt hole in pin aligns with bolt hole in boss. Secure with bolt, washer, nut, and cotter pin.
(6) If this torque arm installation procedure is part of a main landing gear assembly procedure, proceed with remainder of gear assembly instructions. If this torque arm installation procedure is independent of other procedures, proceed with step 1.B.(10).
(7) Align upper torque arm, spacer, washer, and lower torque arm. Insert apex pin and secure with bolt, washers, and nut.
(8) Deflate main landing gear strut and check for binding through full stroke of lower cylinder.
(9) Inflate main landing gear strut. (Refer to Chapter 12.)
(10) Install brakes. (Refer to 32-43-01, Removal/Installation.)
(11) Install wheels. (Refer to 32-42-00, Removal/Installation.)
(12) Remove aircraft from jacks. (Refer to Chapter 7.)



Main Gear Shock Strut Torque Arm Installation
Figure 201

2. **Repairs**
   A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

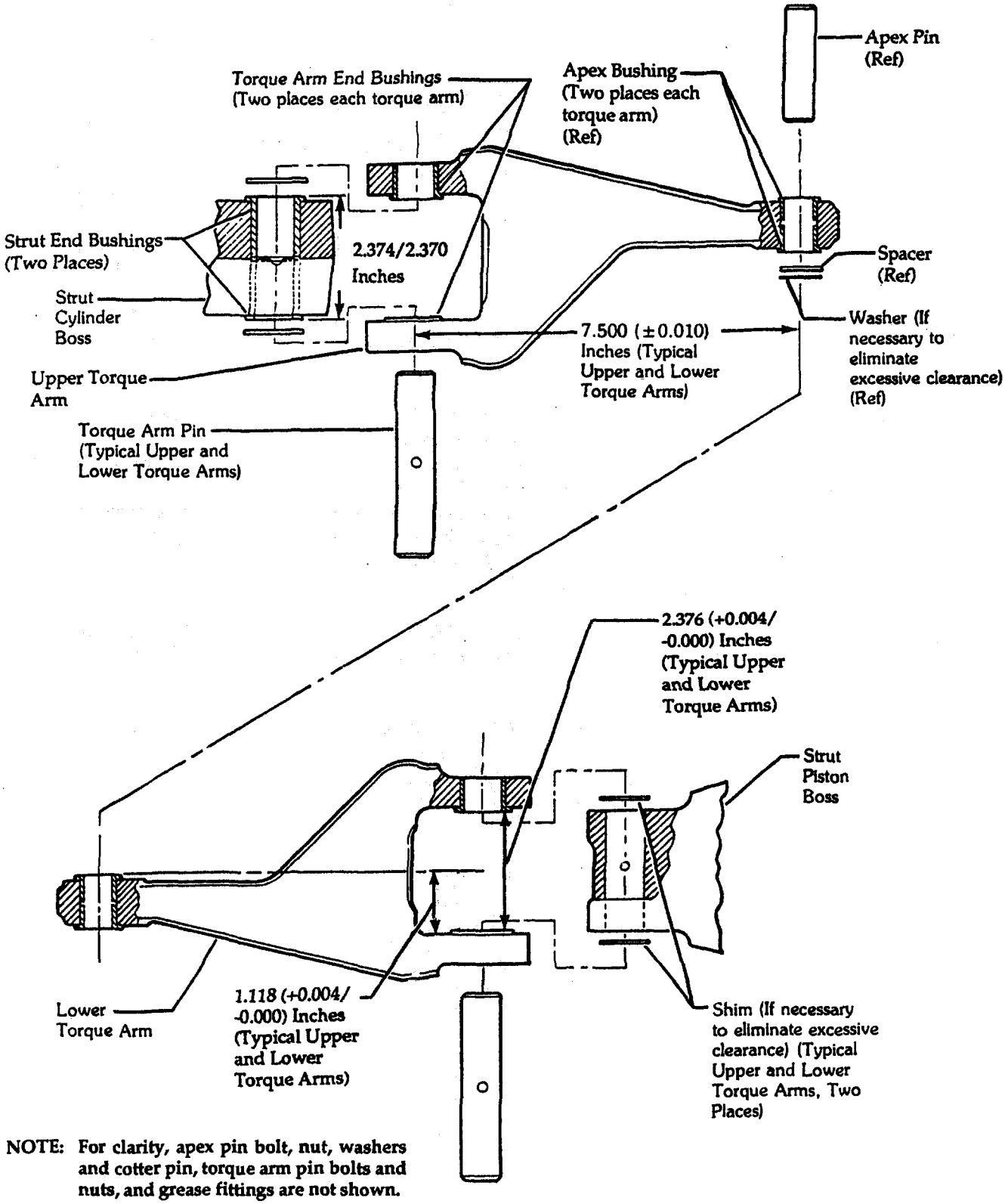
NAME	PART NUMBER	MANUFACTURER	USE
Epoxy Primer		Refer to Chapter 20	Sealing.
Anti-corrosion chemical film treatment		Refer to Chapter 20	Treat grease fitting hole.
Grease Fitting	1630B1	Alemite Corp. Charlotte, NC	Lubrication access.

B. Replacement of Torque Arm End Bushings and Strut End Bushings (See Figure 202.)
   (1) Press out bushings to be replaced. Bushings must be replaced in pairs only.
   (2) Apply a coat of primer to bushing and hole and press bushing into hole. Care shall be taken not to plug grease hole in bushing. Seal edges of bushings with epoxy primer.
   (3) Line ream bushings to dimensions shown in Learjet 20/30 Series Structural Repair Manual.
   (4) Machine flat surface of replaced bushings to obtain dimensions shown in Figure 202.

C. Replacement of Torque Link Grease Fittings (See Figure 203.)
   (1) Remove old grease fittings from torque link.

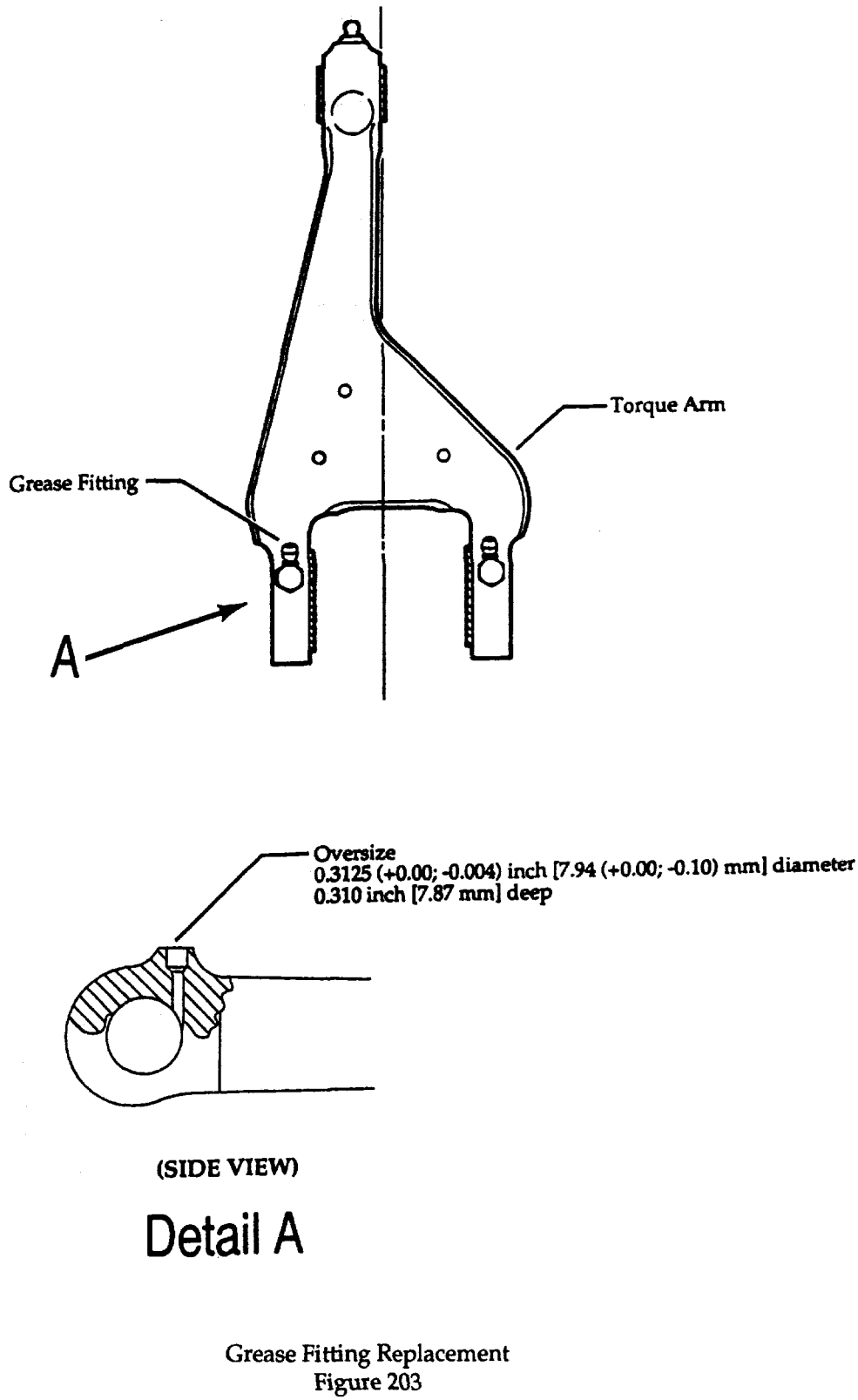
CAUTION: WHEN DRILLING GREASE FITTING HOLE, ENSURE THAT HOLE IS PERPENDICULAR TO BOSS AREA AND THAT HOLE DEPTH IS NOT INCREASED.

   (2) Drill out grease fitting hole to 0.3125 (+0.00; -0.004) inch [7.94 (+0.0; -0.10) mm] diameter.
   (3) Fluorescent penetrant inspect for cracks in rework area.
   (4) Treat hole with anti-corrosion chemical film. (Refer to Chapter 20.)
   (5) Treat hole with epoxy primer. (Refer to Chapter 20.)
   (6) Insert new grease fitting into hole.



NOTE: For clarity, apex pin bolt, nut, washers and cotter pin, torque arm pin bolts and nuts, and grease fittings are not shown.

Torque Arm Pin and Bushing Replacement
Figure 202



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Grease Fitting Replacement
Figure 203

EFFECTIVITY: ALL

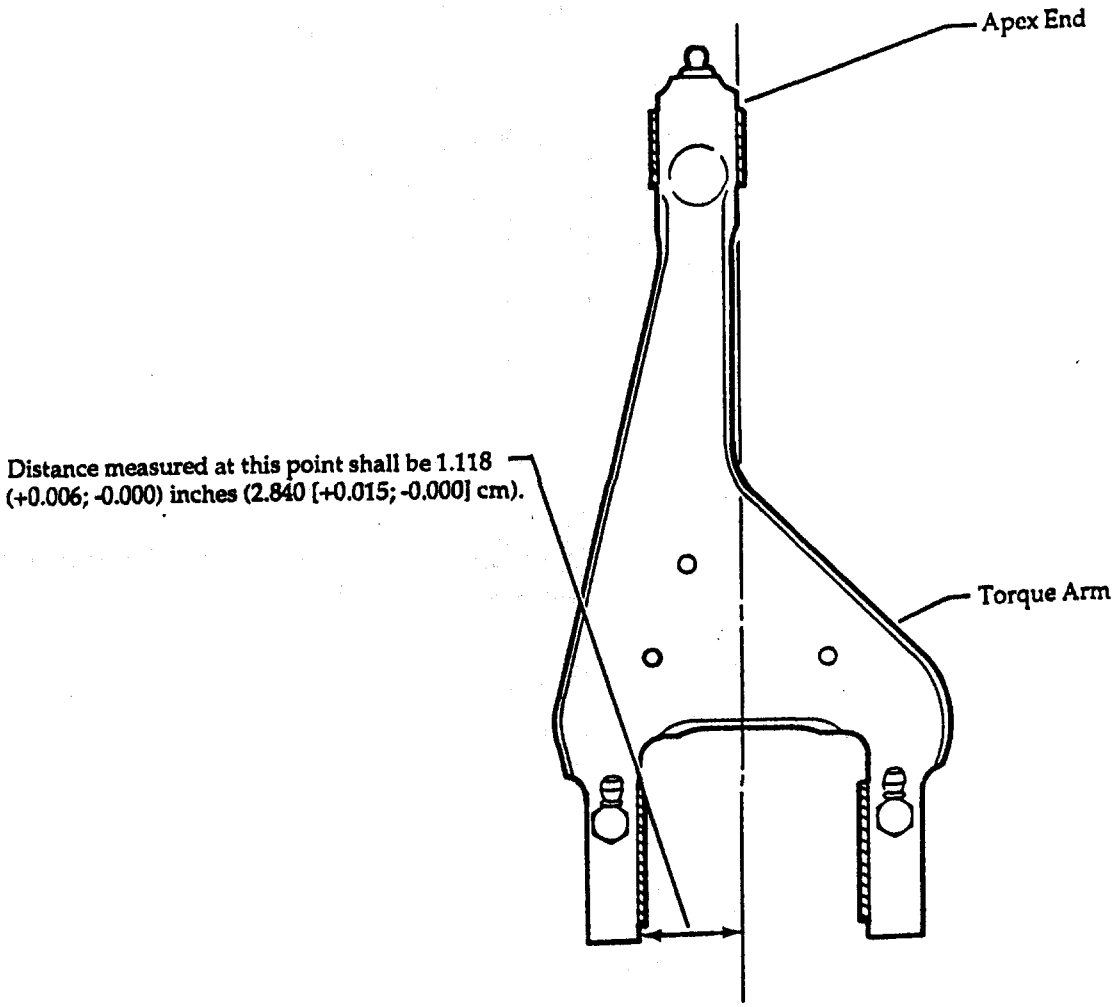
3. **Inspection/Check**

A. Inspect Torque Arm and Attaching Parts

NOTE: *Inspect torque arm and attaching parts in accordance with the current inspection interval* specified in Chapter 5.

(1) Inspect all metal parts for evidence of structural fatigue, nicks, burrs, cracks, corrosion, worn threads, and excessive wear.
(2) Check all friction surfaces of bushings for out of round and taper using an internal micrometer, plug gages, or similar equipment.
(3) Replace any part which does not meet inspection requirements or tolerances.

B. Torque Arm Alignment and Symmetry Check (See Figure 204.)
(1) Position straightedge on machined surface of apex end nearest centerline.
(2) Measure distance between inner machined surface of torque arm and straightedge as far from apex end as possible. Distance shall be 1.118 (+0.006; -0.000) inches [2.840 (+0.015; -0.000) cm].



NOTE: Do not use bushing surface during measurement.

Torque Arm Symmetry Check
Figure 204

NOSE GEAR AND DOORS - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The nose landing gear consists of the nose wheel and tire attached to a shock strut.

B. The nose landing gear is attached to the fuselage structure by two trunnion pins protruding into bearing plates. Additional support is obtained from the nose gear actuator which is attached at the midpoint of the shock strut and to the fuselage structure.

C. Normally the nose gear is extended and retracted hydraulically. A pneumatic system is installed for emergency gear blowdown.

D. The shock strut is a conventional air/hydraulic unit designed to absorb the shock of landing, takeoff, and taxiing. It is essentially a steel piston riding in a cylinder and utilizing O-rings to prevent leakage between the piston and cylinder. An air/hydraulic filler valve is installed on the strut for servicing purposes.

E. The nose gear is enclosed by two hinge-mounted doors. The doors are opened and closed mechanically through linkage connected to the nose gear. Adjustable pushrods are provided to bring the doors into contour with the fuselage when the gear is retracted. Refer to Chapter 52 for nose gear door maintenance.

NOSE GEAR SHOCK STRUT - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Removal of Nose Gear Shock Strut (See Figure 201.)
      (1) Place aircraft on jacks. (Refer to Chapter 7.)
      (2) Depressurize hydraulic system. (Refer to Chapter 29.)
      (3) Set Battery Switches off and disconnect aircraft batteries.
      (4) Disconnect door pushrod from nose gear strut.
      (5) Disconnect nose gear actuator from nose gear strut.
      (6) An electrical connector, installed on the nose wheel box, connects nose gear steering wiring to aircraft wiring. Disconnect electrical connector and remove wiring clamps as necessary to allow removal of nose gear strut.
      (7) Remove right and left bolts from nose gear trunnion.

      WARNING: REMOVAL OF TRUNNION PIN FROM TRUNNION BEARING RELEASES THE NOSE GEAR FROM THE AIRCRAFT. ADEQUATE SUPPORT MUST BE GIVEN THE GEAR TO PREVENT IT FROM FALLING AND CAUSING BODILY INJURY TO PERSONNEL OR STRUCTURAL DAMAGE TO THE AIRCRAFT.

      (8) Insert a small punch into slot (lower side of trunnion axle) and slide trunnion pins inboard (toward strut) until pins are free from bearing plates and remove strut from aircraft.

      NOTE: When trunnion pins are slid out of bearing plates, the shims (if any) will be released. Retain these shims (if serviceable) for installation of nose gear shock strut. To ensure proper strut and actuator alignment, install shims back in their original position.

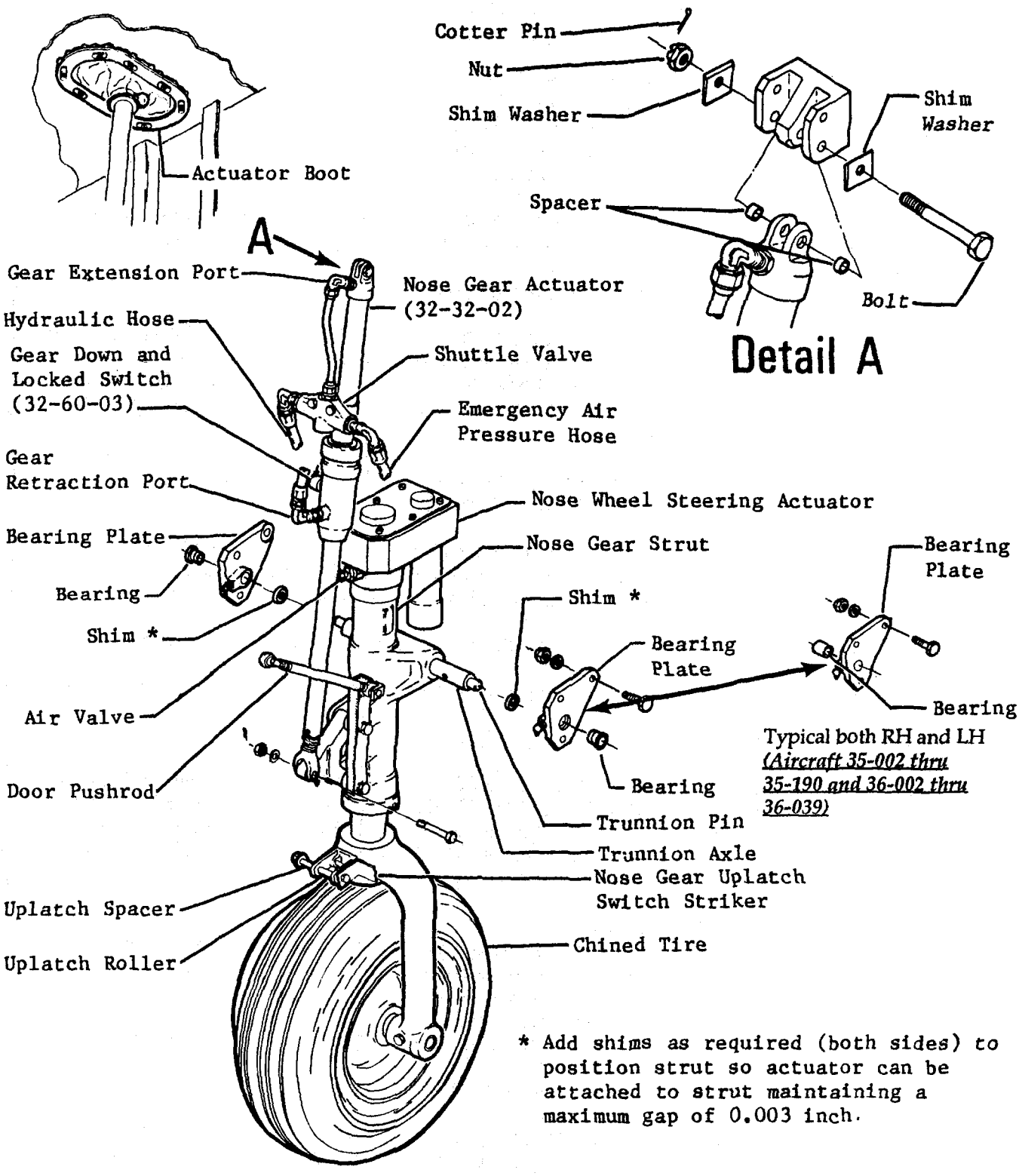
      (9) Inspect trunnion pins and bearings for wear in accordance with Learjet 20/30 Series Structural Repair Manual.
      (10) Replace trunnion pins that are less than the minimum wear and replace trunnion bearings greater than the maximum wear.
   B. Installation of Nose Gear Shock Strut (See Figure 201.)

      CAUTION: PRIOR TO INSTALLATION OF NOSE GEAR SHOCK STRUT, INSPECT TRUNNION PINS AND BEARINGS FOR GENERAL CONDITION. ENSURE TRUNNION BEARINGS AND PINS, THAT ARE OUT OF SPECIFICATION, ARE REPLACED. REFER TO LEARJET 20/30 SERIES STRUCTURAL REPAIR MANUAL FOR TOLERANCES.

      (1) Install bearing assemblies on aircraft.
         (a) If replacement bearing assemblies are being installed, trunnion bearings have been factory installed in bearing plates and reamed to tolerance.
         (b) If replacing only the trunnion bearings:
            1) Install bearings in bearing plates.
            2) Ream replacement bearings to original tolerance. (Refer to Learjet 20/30 Series Structural Repair Manual.)
            3) Install bearing assemblies in aircraft.

      CAUTION: REPLACE TRUNNION PINS THAT ARE OUT OF SPECIFICATION. REFER TO THE LEARJET 20/30 SERIES STRUCTURAL REPAIR MANUAL FOR WEAR TOLERANCES.

      (2) Install trunnion pins into strut trunnion axle. Replace trunnion pins that are out of specification.



Nose Gear Shock Strut Installation
Figure 201

(3) Position strut in aircraft.
   (a) Install previously removed shims (in their original position) between nose gear strut and bearing plates. This will properly align strut to allow attachment of actuator.
   (b) If new shock strut is being installed with new shims, center strut in wheel well.
      1) Using feeler gage, measure space on both sides between trunnion axle and bearing plate.
      2) Install shims as required, both sides, to ensure shock strut is centered in wheel well to achieve proper actuator to strut attachment while maintaining a maximum gap of 0.003 inch [.0762 mm] between trunnion axle and shim.
   (c) Using a punch inserted into trunnion slot, position trunnion pins through shims and into bearing plates.
(4) Install trunnion pin bolt through trunnion and trunnion pin and secure with nut.
(5) Connect electrical connector and replace wiring clamps.
(6) Attach actuator to nose gear strut.

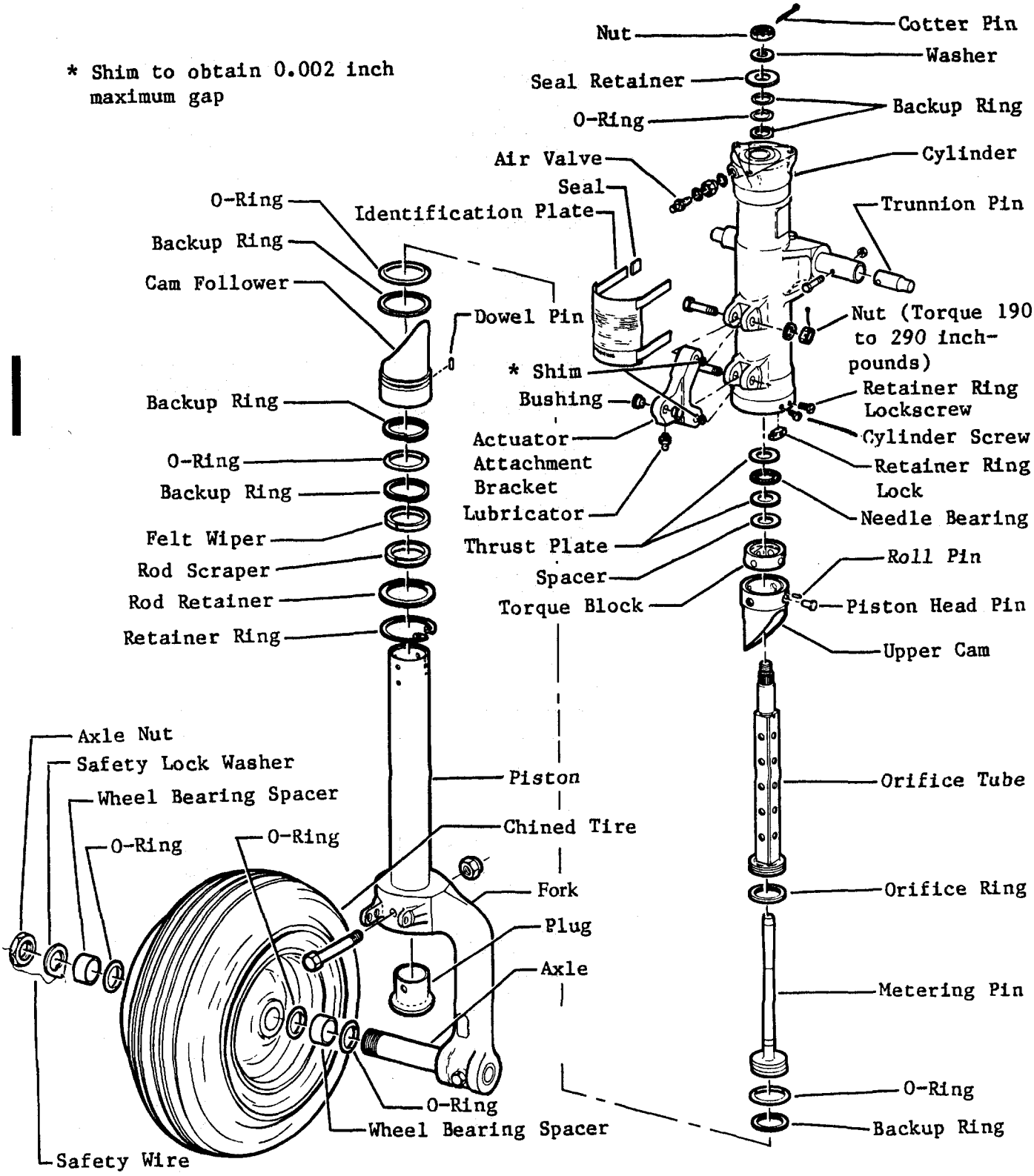
CAUTION: ENSURE BOLT ATTACHING DOOR PUSH ROD TO STRUT IS INSTALLED WITH HEAD OUTBOARD. THIS WILL ENSURE BOLT DOES NOT GOUGE INTO AIRCRAFT STRUCTURE WHEN GEAR IS CYCLED.

(7) Position door pushrod to strut and secure with attaching parts.
(8) Connect aircraft batteries.
(9) Service nose shock strut. (Refer to Chapter 12.)
(10) Pressurize hydraulic system. (Refer to Chapter 29.)
(11) Bleed extension and retraction system. (Refer to 32-30-00, Adjustment/Test.)
(12) Cycle gear, checking for proper gear indication and operation.

2. Repairs

A. Tools and Equipment

NAME	PART NUMBER	MANUFACTURER	USE
Punch	ST00378-202	Learjet Inc. Wichita, KS	Remove nose gear axle from fork.
Punch	ST00378-203	Learjet Inc. Wichita, KS	Remove nose gear piston from fork.
Punch	ST00378-204	Learjet Inc. Wichita, KS	Remove trunnion axle from nose gear cylinder.
Arbor	ST00378-206	Learjet Inc. Wichita, KS	Hold nose gear piston.
Arbor	ST00378-207	Learjet Inc. Wichita, KS	Hold trunnion axle.
Sealant (Class B)	Pro-Seal 890	Coast Pro-Seal & Mfg. Co., Los Angeles, CA	Apply sealant to piston cover/fork juncture.



Nose Gear Shock Strut Assembly
Figure 202

B. Disassemble Nose Gear Shock Strut (See Figure 202.)

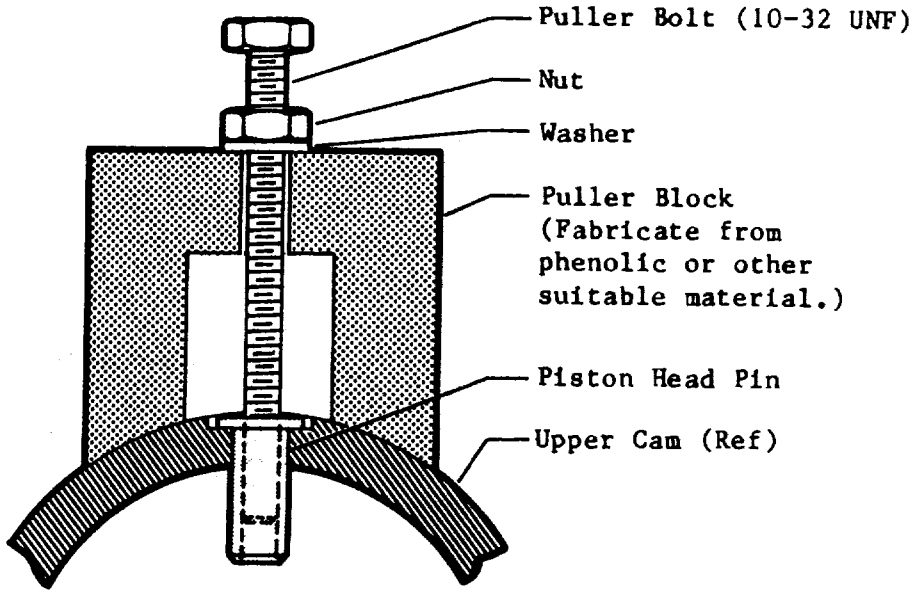
WARNING: BEFORE PERFORMING ANY DISASSEMBLY OF PARTS ON THE STRUT, ENSURE THAT ALL AIR PRESSURE HAS BEEN RELEASED THROUGH THE AIR VALVE. FAILURE TO DO SO CAN CAUSE BODILY INJURY. DO NOT RELEASE AIR BY LOOSENING OR REMOVING AIR VALVE.

NOTE: During disassembly, tag and keep all parts together for assembly into the same unit. Discard all O-rings, backup rings, rod scraper, and felt wiper.

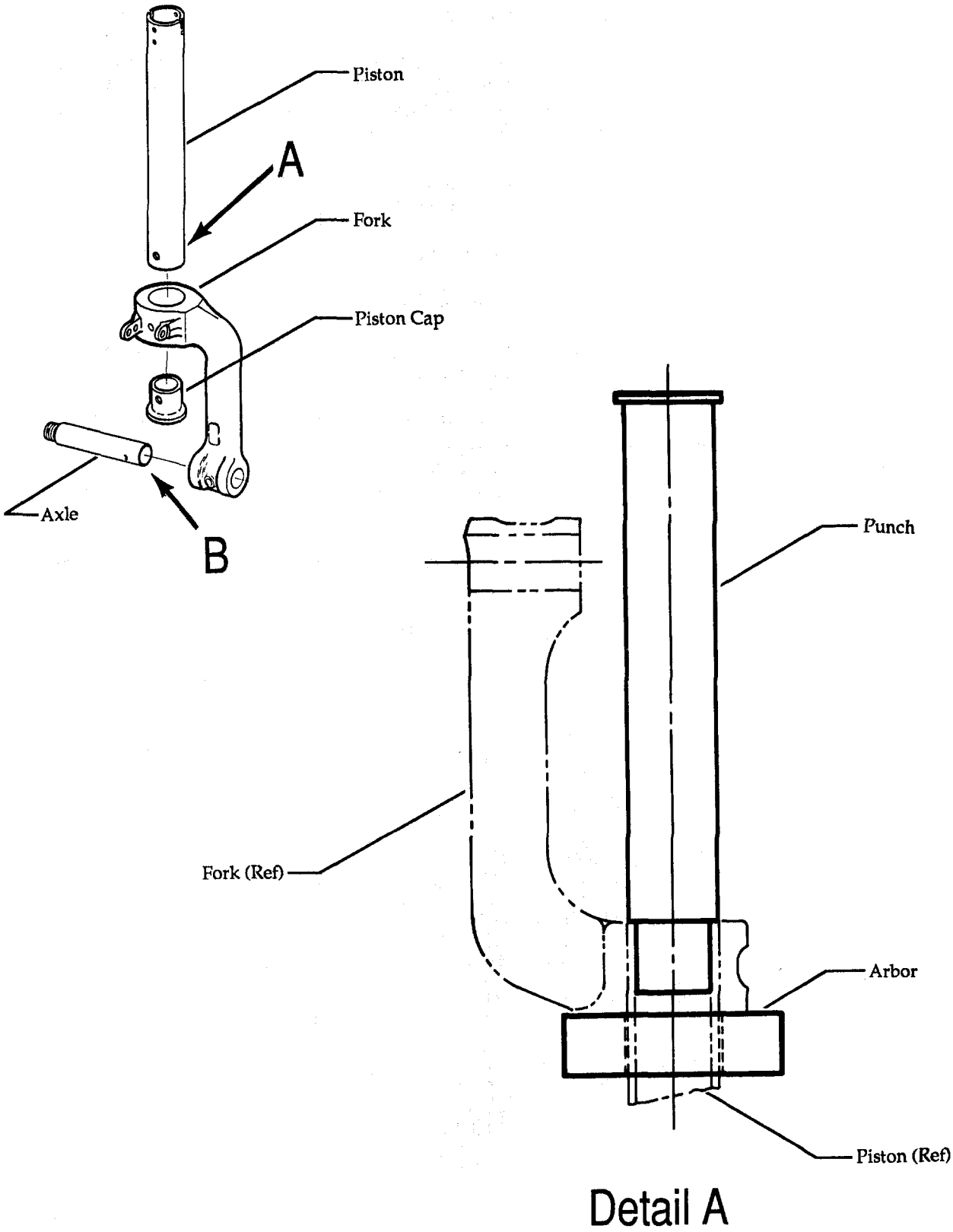
(1) Remove dust cap from air valve, loosen end nut 3/4 turn, and release all air from strut.
(2) Remove nose wheel. (Refer to 32-41-00.)
(3) Remove nose wheel steering actuator. (Refer to 32-50-02.)
(4) Cut safety wire and remove air valve.
(5) Drain hydraulic fluid through air valve port. Move piston through stroke to aid draining.
(6) Remove safety wire from retainer ring lockscrew and cylinder screw. Remove retainer ring lockscrew and retainer ring lock from strut.
(7) Disengage retainer ring from groove in cylinder and slide piston straight out of cylinder. Do not twist or turn piston until dowel pin disengages from cylinder.
(8) Remove thrust plates, needle bearing, and spacer from orifice tube.
(9) Remove piston head pins which secure upper cam and torque block to piston as follows. (See Figure 203.)

NOTE: The piston head pins incorporate internal threads (10-32 UNF-3B) to aid in removal of the pins.

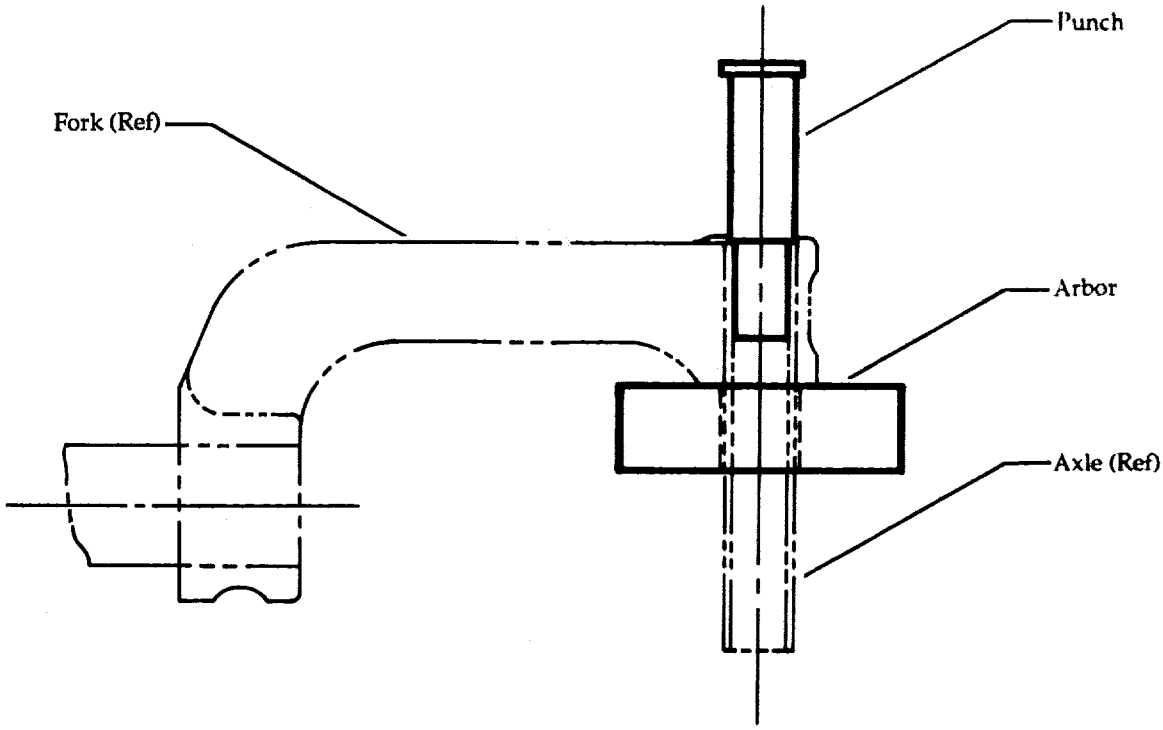
(a) Fabricate piston head pin puller per Figure 203 or order piston head pin puller (P/N 3170011-1) from Learjet Inc. Spares.



Piston Head Puller
Figure 203



Nose Gear Shock Strut Disassembly
Figure 204 (Sheet 1 of 2)



Detail B

Nose Gear Shock Strut Disassembly
Figure 204 (Sheet 2 of 2)

(b) Screw bolt into piston head pin not more than 0.5 inch [12.7 cm].
(c) Run puller nut down against washer.
(d) Holding puller bolt head steady, turn puller nut clockwise until piston head pin is backed out of upper cam (on end of puller bolt).

NOTE: If piston head pin is easily removed or loose, it should be replaced. If pin is loose, it could back out and damage the cylinder wall.

(10) Remove roll pin from upper cam and slide upper cam off piston.
(11) Push up against metering pin to slide metering pin, orifice tube, and torque block from piston.
(12) Remove torque block from orifice tube and orifice tube from metering pin.
(13) Do not remove actuator attach bracket from cylinder unless replacement is required.
(14) Clean metal parts with Stoddard solvent or equivalent.
(15) With a suitable fingerprint neutralizer, remove all fingerprints from machined surfaces not plated or painted. Ensure that no solvent remains in internal cavities or surfaces.
(16) Dry metal parts after cleaning with clean, dry, compressed air.
(17) Coat internal parts with MIL-H-5606 hydraulic fluid.
(18) Wrap cleaned parts in lint-free cloth or clean, waxed paper while awaiting repair or assembly.

NOTE: When storing unplated machined parts more than a few hours, coat with MIL-C-11796 preservative. Remove preservative prior to assembly of parts.

C. Removal of Piston and Axle from Fork (See Figure 204.)

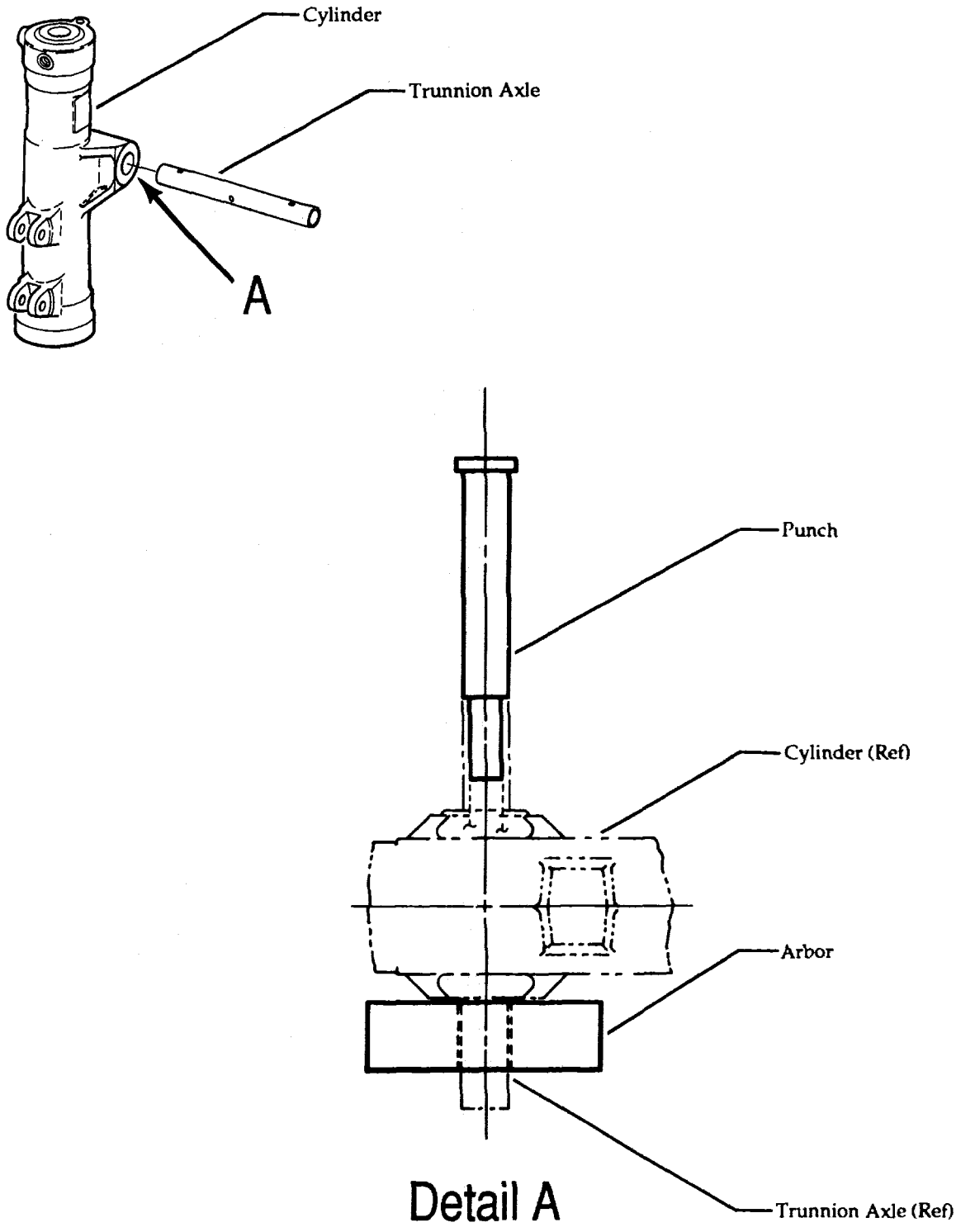
CAUTION: THE FOLLOWING PROCEDURE IS CRITICAL. FAILURE TO EXERCISE PRECISE CONTROL OVER DISASSEMBLY COULD CAUSE FAILURE OF THE LANDING GEAR STRUT.

(1) Remove retaining bolts and nuts from piston and axle.
(2) Remove piston cover from fork.
(3) Place arbor (P/N ST00378-206) on hydraulic press I-beams. (See Figure 204, Detail A.)
(4) Install punch (P/N ST00378-203) on piston/fork assembly and place in press. (See Figure 204, Detail A.)

WARNING: USE EXTREME CAUTION WHEN USING HYDRAULIC PRESS. HIGH PRESSURE COULD CAUSE BODILY INJURY.

CAUTION: IF PRESSURE NEEDED TO SEPARATE PISTON FROM FORK EXCEEDS 25 TONS, THE ENTIRE ASSEMBLY MUST BE SCRAPPED AND REPLACED.

(5) Press piston from fork with hydraulic press.
(6) Remove punch from fork.
(7) Remove arbor (P/N ST00378-206) from hydraulic press and place arbor (P/N ST00378-205) on hydraulic press I-beams. (See Figure 204, Detail B.)
(8) Insert axle/fork assembly into tool on press and install punch (P/N ST00378-202) into end of axle and align with ram of press. (See Figure 204, Detail B.)



Trunnion Axle and Cylinder Disassembly
Figure 205

CAUTION: IF PRESSURE NEEDED TO SEPARATE AXLE FROM FORK EXCEEDS 25 TONS, THE ENTIRE ASSEMBLY MUST BE SCRAPPED AND REPLACED.

(9) Press axle out of fork.
(10) Remove punch from fork and arbor from hydraulic press.

D. Removal of Trunnion Axle from Cylinder (See Figure 205.)

WARNING: USE EXTREME CAUTION WHEN USING HYDRAULIC PRESS. HIGH PRESSURE COULD CAUSE BODILY INJURY.

CAUTION: THE FOLLOWING PROCEDURE IS CRITICAL. FAILURE TO EXERCISE PRECISE CONTROL OVER DISASSEMBLY COULD CAUSE FAILURE OF THE LANDING GEAR STRUT.

NOTE: Nose landing gear trunnion axle may be left installed in cylinder and inspection per step H. as an alternate to removal from cylinder and magnetic particle inspection.

(1) Remove nuts and bolts from each end of trunnion axle and remove trunnion pins.
(2) Remove nut and bolt securing trunnion axle from cylinder.
(3) Place arbor (P/N ST00378-207) in I-beams of hydraulic press. (See Figure 205, Detail A.)
(4) Insert cylinder/trunnion axle assembly into arbor on press.
(5) Install punch (P/N ST00378-204) into end of axle. (See Figure 205, Detail A.)

CAUTION: IF PRESSURE NEEDED TO SEPARATE AXLE FROM CYLINDER EXCEEDS 20 TONS, THE ENTIRE ASSEMBLY MUST BE SCRAPPED AND REPLACED.

(6) Press trunnion axle from cylinder.
(7) Remove punch from cylinder and arbor from hydraulic press.

E. Inspect Nose Gear Shock Strut for Wear

NOTE: If an Overhaul of Hard Landing Inspection is accomplished on the nose gear shock strut, perform all of the following steps. If repairs only have been accomplished, delete steps (3), (4), and (5).

(1) Screen drained hydraulic fluid for metal particles which may be used as an aid in determining trouble source.
(2) Inspect interior and exterior of all metal parts for structural failure and corrosion. Inspect machined parts for excessive wear, nicks, burrs, cracks, and worn threads.
(3) Perform a magnetic inspection on all ferrous parts (refer to Part 6, Chapter 32 of the NDI Manual.) After magnetic inspection, demagnetize to remove all metal particles. Perform a fluorescent penetrant check on all aluminum parts (refer to Part 5, Chapter 32 of the NDI Manual).

NOTE: Nose landing gear trunnion axle may be left installed in cylinder and inspection per step H. as an alternate to removal from cylinder and magnetic particle inspection.

(4) Refer to Learjet 20/30 Series Structural Repair Manual for OD and ID tolerance inspection on piston and cylinder.
(5) Check all friction surfaces of bushings and strut holes for out-of-round and taper using internal micrometer, plug gages, or similar equipment.
(6) Buff out minor scratches in upper cam, trunnion pins, cam follower, piston, and cylinder. Do not create low spots by excessive buffing or polishing. Use oilstone to remove the scratches and polish with crocus cloth. Check tolerance after polishing.

(7) Replace any part that does not meet inspection requirements or tolerances. (Refer to Learjet 20/30 Series Structural Repair Manual.)

F. Assemble Axle and Piston to Fork (See Figure 204.)

CAUTION: DO NOT HEAT FORK BEYOND 350°F [121°C]. HEATING FORK ABOVE THIS TEMPERATURE MAY CAUSE FORK STRUCTURAL DEGRADATION.

(1) Prior to assembly, heat fork to +200°F [93°C].
(2) Clean and freeze axle and piston a minimum of 45 minutes in dry ice or to a temperature of -75°F [-59°C].

CAUTION: ENSURE THAT NOTCH IN PISTON IS ALIGNED WITH FORK OR NOSE WHEEL CENTERING WILL NOT BE CORRECT.

(3) Insert piston and axle into fork, aligning holes in axle and piston with holes in fork.

NOTE: The piston and axle must be simultaneously inserted into the fork. If both parts are not inserted and properly aligned within 15 seconds, repeat the disassembly procedure.

Ensure that keyway for lockwasher is to bottom when axle is installed.

(4) Install piston cover into fork and secure with nut and bolt.
(5) Install bolt and nut into axle and tighten.
(6) Allow assembly to cool to ambient temperature and remove all condensate.
(7) Apply a 1/16" fillet bead of Pro-Seal 890 to piston cover/fork juncture.
(8) Coat exposed external surfaces of axle with MIL-C-11796 Class 3 (or equivalent) corrosion preventive compound.

NOTE: Prior to installation on aircraft, remove corrosion preventive compound from axle, trim fillet seal (if required), and lubricate axle with MIL-G-81322 grease.

G. Assemble Cylinder and Trunnion Axle (See Figure 205.)

CAUTION: DO NOT HEAT FORK BEYOND 350°F [121°C]. HEATING FORK ABOVE THIS TEMPERATURE MAY CAUSE FORK STRUCTURAL DEGRADATION.

(1) Prior to assembly, heat cylinder to approximately +200°F [93°C].
(2) Clean and freeze trunnion axle a minimum of two (2) hours in dry ice or to a temperature of -75°F [-59°C].

CAUTION: SLOTS IN TRUNNION AXLE MUST FACE DOWN TO ENABLE TRUNNION PIN INSTALLATION AND REMOVAL.

(3) Insert trunnion axle into cylinder, aligning holes in axle and cylinder.

NOTE: The axle must be inserted and aligned within 30 seconds. If axle is not inserted and properly aligned in the cylinder, repeat the disassembly procedure.

(4) Install retaining bolt and nut and tighten.
(5) Allow assembly to cool to ambient temperature and remove all condensate.
(6) Coat exposed external surfaces of trunnion axle with MIL-C-11796 Class 3 (or equivalent) corrosion preventive compound.

NOTE: Prior to installation in aircraft, remove corrosion preventive compound from axle and lubricate axle with MIL-G-81322 grease.

H. Inspection of Nose Gear Trunnion Axle
(1) Remove nose gear trunnion axle retention bolt and inspect for corrosion.
(2) Visually inspect axle and installation area of trunnion bearing for cracks, corrosion, damage and deformation.
(3) Perform fluorescent penetration inspection of the axle portion that is exposed from the cylinder.
(4) Confirm any suspect condition by removing trunnion axle and performing magnetic particle inspection per Part 6 of the NDI Manual, 32-23-01.

I. Assemble Nose Gear Shock Strut (See Figure 202.)
(1) Immerse all O-rings, backup rings, rod scraper, and felt wiper in MIL-H-5606 hydraulic fluid immediately prior to installation.

CAUTION: TO AVOID POSSIBLE DAMAGE TO THE NOSE GEAR PISTON, ENSURE THAT THE ACTUATOR ATTACHMENT BRACKET IS PROPERLY SHIMMED AND ATTACHING BOLTS ARE PROPERLY TORQUED.

(2) Install nose gear actuator attachment bracket and shims if removed during disassembly. Torque nuts 190 to 290 inch-pounds [21.5 to 32.8 Nm].

NOTE: *Effective 35-574, 35-578 thru 35-588, 35-604 and Subsequent, 36-054, 36-056 and Subsequent,* actuator attachment brackets are equipped with threaded lubricators. Install new threaded lubricators with Loctite (Screw Lock No. 222).

(3) Install O-ring and backup ring on metering pin and install metering pin in piston. Push metering pin down until it bottoms in piston.
(4) Install orifice ring on orifice tube and install orifice tube in piston over metering pin.
(5) Insert retainer ring, rod retainer, and rod scraper over piston.
(6) Install O-rings, backup rings, and felt wiper in cam follower and slide cam follower over piston.
(7) Insert torque block onto orifice tube and into piston. Slide upper cam over piston. Align holes in piston, torque block, and upper cam and install piston head pin and roll pin.
(8) Assemble spacer, needle bearing, and thrust plates on orifice tube.
(9) Install piston into cylinder. Keep piston straight as it is being installed in cylinder to prevent jamming of needle bearing and thrust plate. Jamming will cause shimmy problems.
(10) Extend piston approximately five (5) inches [12.7 cm] and align holes in cam follower and cylinder for dowel pin.
(11) Press dowel pin into place, ensuring that pin is flush with lower end of cam follower.
(12) Secure piston in cylinder by installing rod scraper, rod retainer, and retainer ring. Check to ensure that centerline of retainer ring opening is aligned with screw hole for retainer ring lock and that snap retainer is set at least halfway into retainer ring groove. If necessary, tap retainer ring lightly to set it into groove. Retainer ring lock cannot be installed if retainer ring is not properly installed.
(13) Install retainer ring lock and secure with retainer ring lockscrew. Install cylinder screw.
(14) Safety wire cylinder screw to retainer ring lockscrew.
(15) After complete assembly of strut, except for air valve, fully compress piston.
(16) Place strut in vertical position and fill with clean MIL-H-5606 hydraulic fluid through air valve port until overflow exists. Pour fluid slowly to avoid foaming and accumulation of air pockets.
(17) After servicing, install packing, reducer, seal, and air valve.
(18) Refinish all damaged externally painted surfaces with one coat of epoxy primer (refer to Chapter 20) and one (1) coat of Pratt and Lambert aluminum topcoat, color number 17178.

(19) Perform leak test of shock strut as follows:
  (a) Place completely assembled strut in either vertical or horizontal position.
  (b) With piston fully extended, inflate strut with dry compressed air or nitrogen to pressure specified in Chapter 12.
  (c) During a 1-hour period there shall be no leakage.
  (d) After completion of test, remove dust cap from air valve and loosen end nut 3/4 turn to release all air from strut.
  (e) Install dust cap on air valve.
(20) Install nose steering actuator. (Refer to 32-50-02.)
(21) Install nose wheel. (Refer to 32-41-00.)

EXTENSION AND RETRACTION SYSTEM - DESCRIPTION AND OPERATION

1. **Description**
   A. The landing gear extension and retraction system consists of the components necessary to extend and retract the landing gear, retain the gear in the up and locked position and open and close the gear doors.
   B. The landing gear is extended by hydraulic actuators which contain internal locking devices to lock the gear in the down position. Hydraulic pressure is required to unlock and retract the landing gear.
   C. The main gear doors and the nose gear shock strut are held in the up position by hydraulic pressure. In the event of hydraulic system failure, mechanical uplatch hooks hold the doors and gears up until the emergency extension system is activated. The uplatch hooks are normally released by uplatch actuators.
   D. The nose gear doors and the outboard main gear doors are opened and closed mechanically through linkage connected to the shock strut. The main gear inboard doors are opened and closed by a hydraulic actuator.
   E. In addition to normal gear extension, an emergency gear extension system is provided. The emergency gear extension system is controlled by an emergency gear control valve through shuttle valves.
   F. Component Description
      (1) The gear up switches are actuated by strikers mounted on top of the left and right landing gear trunnions. These switches energize the gear door control valve to the up position to close the main gear inboard doors. If these switches are not correctly adjusted, the main gear will retract but the inboard door will not close.
      (2) The right gear down safety switch is actuated by a striker mounted on top of the right gear trunnion. This switch supplies continuous voltage to the landing gear selector valve which maintains the gear in its selected position.
      (3) The left and right door down switches, one located on each main gear inboard door actuator, energize the gear selector valve to the up or down position after the main gear inboard doors are open. This allows the landing gear to extend or retract.
      (4) The left and right main gear squat switches are located on each strut torque arm. When the aircraft is on the ground, the squat switches will:
         (a) Complete a circuit to prevent the landing gear selector valve from energizing to the up position.
         (b) Break a circuit that prevented aircraft landing with the brakes applied.
         (c) Complete a circuit that energizes the squat switch relay panel.
         (d) Enable the Stall Warning System Test Circuit.
      (5) On *Aircraft 35-002 thru 35-066 and 36-002 thru 36-017*, the landing gear squat switch relay panel is located on the lower side of the RH floorboard between frames 13A and 14. On *Aircraft 35-067 and Subsequent and 36-018 and Subsequent*, the landing gear squat switch relay panel is located below the RH floorboard between frames 13B and 13C. Depending upon aircraft serial number, the following systems may be affected:
         (a) Cabin pressurization and temperature control. (Refer to Chapter 21.)
         (b) Autopilot system. (Refer to Chapter 22.)
         (c) DC electrical power distribution. (Refer to Chapter 24.)
         (d) Flight control systems. (Refer to Chapter 27.)
         (e) Windshield anti-ice heat. (Refer to Chapter 30.)
         (f) Gear extension and retraction system, and nose wheel steering system. (Refer to Chapter 32.)
         (g) Aural warning system. (Refer to Applicable Chapters.)

         NOTE: Simulating an air mode in the squat switch relay panel will be required during some maintenance practices. This is accomplished by pulling the SQUAT SW circuit breaker.

2. Operation

A. Landing Gear Down Cycle Operation (See Figure 1.)

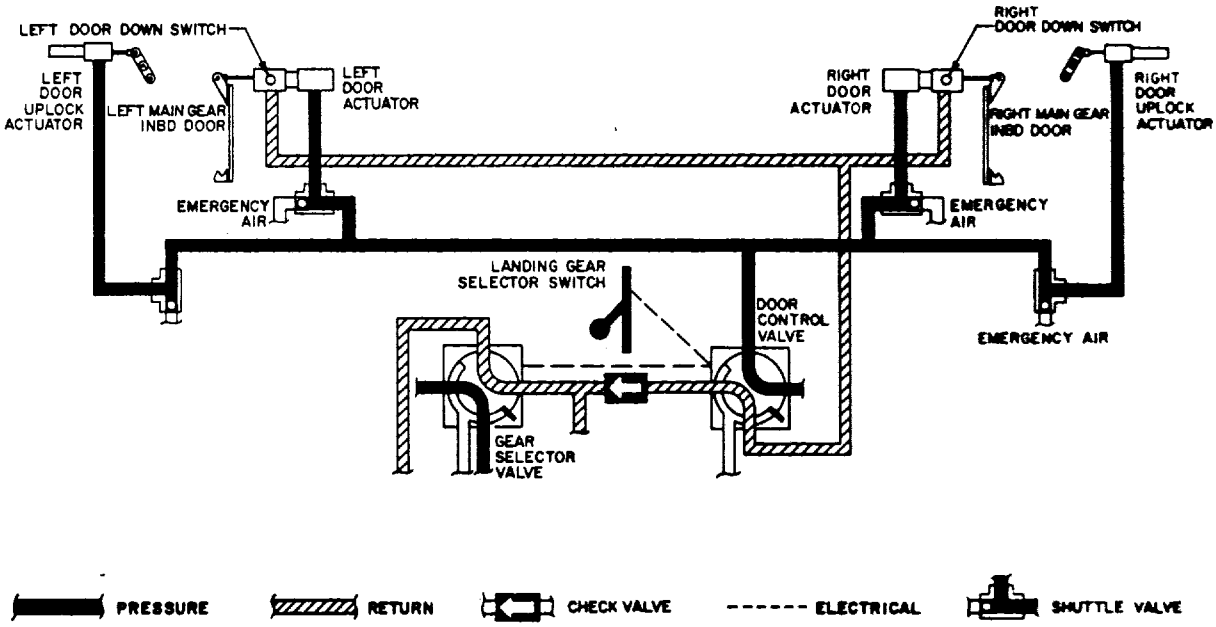
(1) Setting the Landing Gear Selector Switch to DN energizes the gear door control valve to the down position. System pressure enters the valve and is directed to the door uplatch actuators and door actuators. Pressure unlatches the main gear door uplatches and opens the main gear inboard doors. When the uplatches open, the door up switches cause the gear indication red UNSAFE annunciators to illuminate. When the main gear doors are open, the door down switches are actuated and energize the landing gear selector valve to the down position. Pressure flows through the valve to release the nose gear uplatch actuator and extend the nose gear. The nose gear doors and main gear outboard doors are opened by mechanical linkage between the struts and the doors. Restrictors, installed in the main and nose gear actuator return lines, dampen gear extension. The restrictors have a free flow bypass feature in the opposite direction for rapid gear retraction. The nose gear down and locked switch illuminates the green LOCKED DN annunciator when the nose gear is fully extended and causes the UNSAFE annunciator to extinguish. When the main gear is extended, the main gear down and locked switches energize the gear door control valve to the up position and illuminate the green LOCKED DN annunciators. Pressure is routed to the door actuators and the main gear inboard doors close. The main gear inboard door uplocks are engaged by actuator spring tension. When the uplock mechanism is engaged, the door up switches are actuated and the left and right red UNSAFE annunciators extinguish. This completes the landing gear down cycle.

B. Landing Gear Up Cycle Operation (See Figure 2.)

(1) When the landing gear clears the ground on takeoff or when the aircraft is on jacks, the squat switches are actuated to allow the landing gear selector valve to be energized to the up position. Setting the landing gear selector switch to GEAR UP energizes the gear door control valve to the down position. System pressure enters the valve and is directed to the door uplock actuators and door actuators. Pressure unlatches the gear door uplocks and opens the main gear inboard doors. When the main gear inboard doors are opened, the door down switches are actuated and the landing gear selector valve is energized to the up position. Pressure flows through the valve to the nose gear and main gear actuators, causing the landing gear to retract. The nose gear doors and main gear outboard doors are closed by mechanical linkage. When the gear is retracted, the gear up switches are actuated, energizing the gear door control valve to the up position. Pressure is routed to the door actuators and the main gear inboard doors close. The nose gear and main gear inboard door uplatches are engaged by actuator spring tension. When the gear is fully retracted (all doors closed), the door up switches and nose gear up and locked switch are actuated, causing the red UNSAFE annunciators to extinguish. This completes the landing gear up cycle.

C. Landing Gear Down Cycle, Emergency Extension (See Figure 3.)

(1) The emergency air system to the landing gear and inboard main gear doors is operated by the emergency gear extension handle, located on the right side of the cockpit center pedestal. The emergency gear extension handle is recessed into the pedestal to prevent inadvertent actuation. When the handle is depressed, air from the emergency air bottle located in the nose cone is directed to the nose gear uplatch actuator, the main gear inboard door uplatch actuators, the nose gear actuators, the main gear inboard door actuators, and both main gear actuators. Shuttle valves, installed in the system, isolate the pneumatic system from the hydraulic system. After pneumatic extension of the landing gear, air pressure may be bled from the gear system through an overboard vent by inserting a finger into the hole in the pedestal just forward of the handle and pushing up on the ratchet release. This allows the spring-loaded handle to return to the off position.

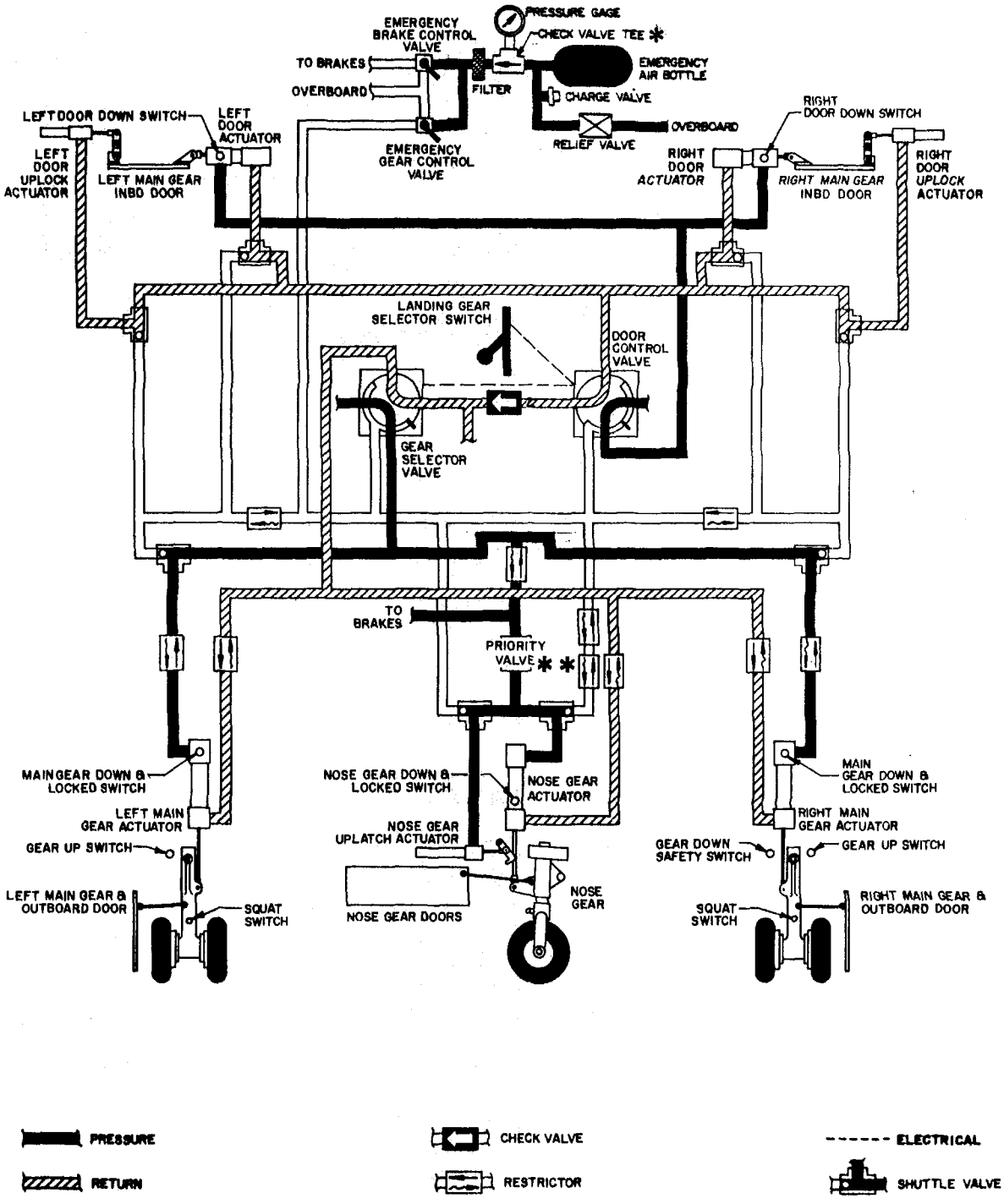


GEAR DOWN OPERATION SEQUENCE - HYDRAULIC SYSTEM

NOTE: Door Control Valve shown in down position to open main gear inboard doors prior to gear extension. See Sheet 2 for complete gear down cycle.

1. Landing Gear Selector Switch to GEAR DOWN.
2. Door Control Valve energized to down position.
3. Hydraulic pressure releases door uplock actuators and main gear inboard doors open.
4. Door down switches energize Gear Selector Valve to down position (See Sheet 2).
5. Hydraulic pressure releases nose gear uplatch actuator and extends landing gear.
6. Gear down and locked switches energize Door Control Valve to up position and main gear inboard doors close.
7. Main gear inboard doors lock in position by spring tension of door uplock actuators.

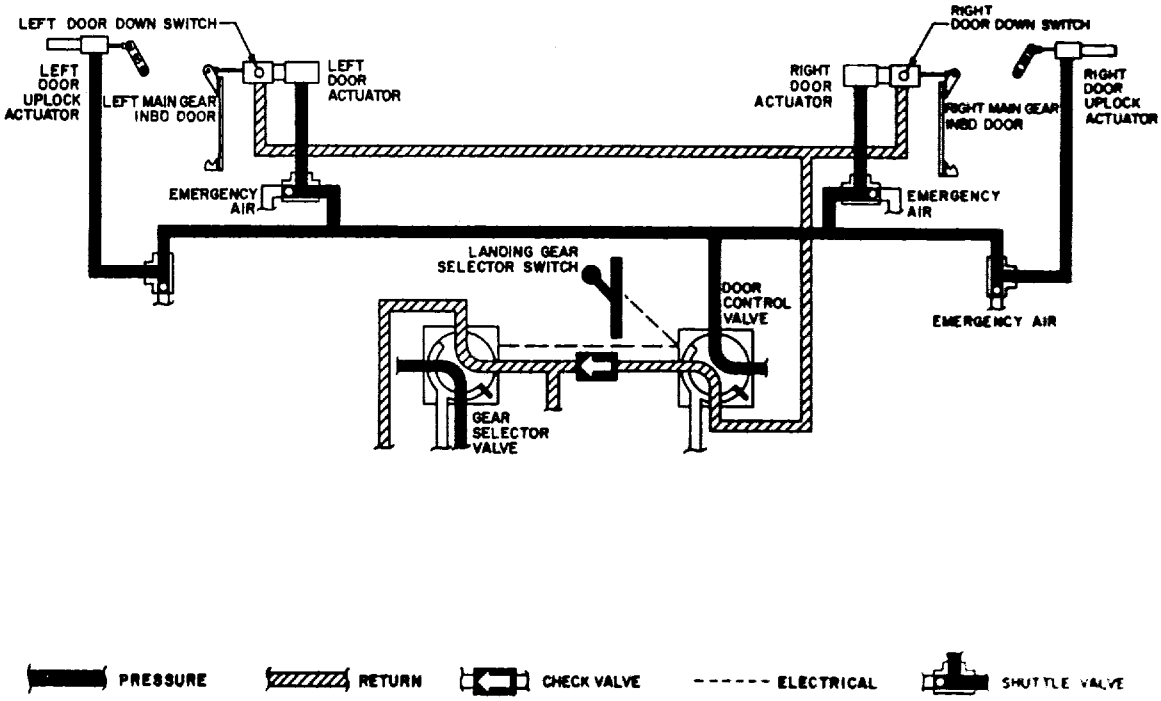
Landing Gear Hydraulic System Schematic - Gear Down Cycle
Figure 1 (Sheet 1 of 2)



* *Effective Aircraft 35-231 and Subsequent and 36-045 and Subsequent*

* * *Effective Aircraft 35-002 thru 35-673 and 36-002 thru 36-063*

Landing Gear Hydraulic System Schematic - Gear Down Cycle
Figure 1 (Sheet 2 of 2)

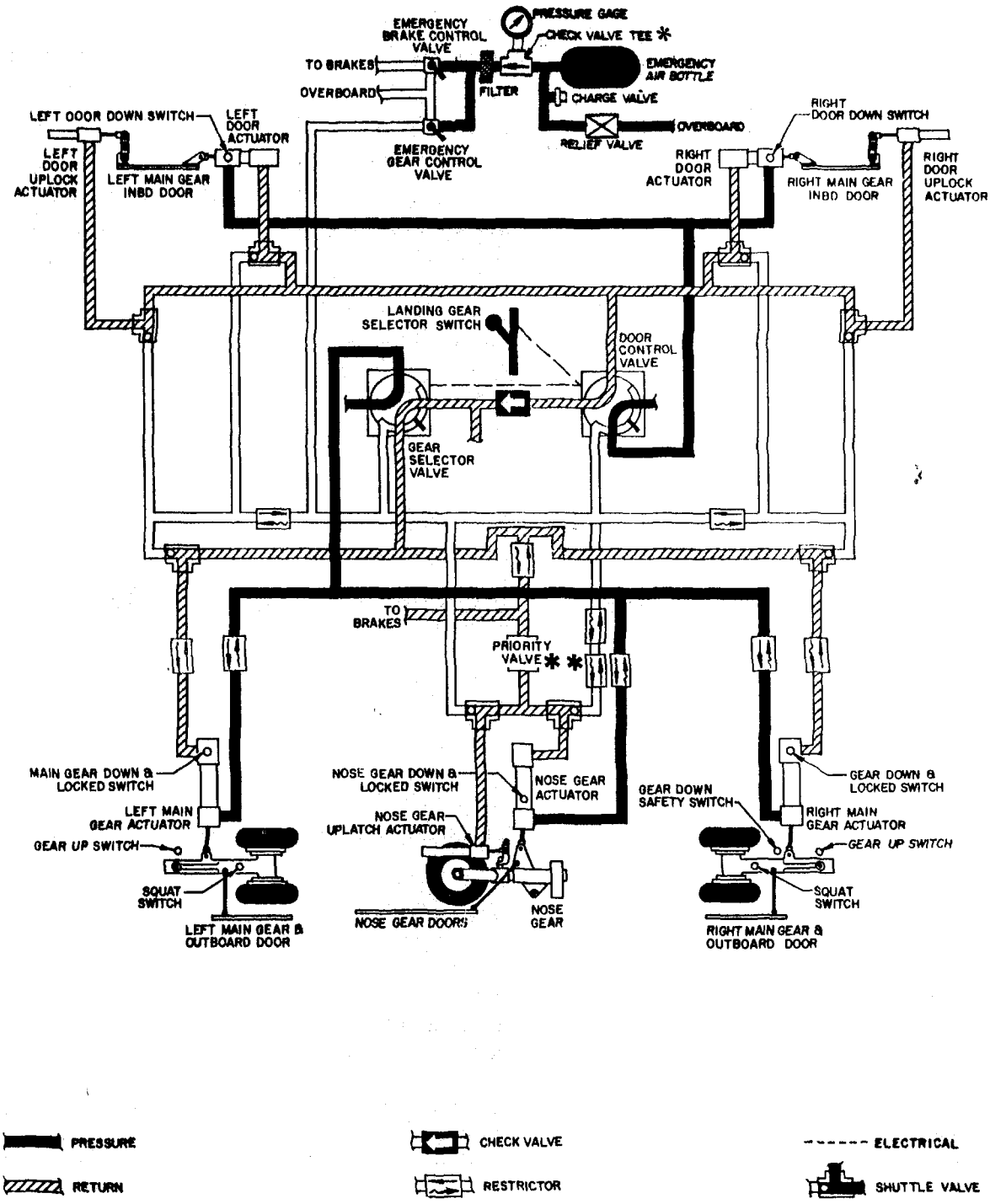


GEAR UP OPERATION SEQUENCE - HYDRAULIC SYSTEM

NOTE: Door Control Valve shown in down position to open main gear inboard doors prior to gear extension. See Sheet 2 for complete gear down cycle.

1. Landing Gear Selector Switch to GEAR UP.
2. Door Control Valve energized to down position.
3. Hydraulic pressure releases door uplock actuators and main gear inboard doors open.
4. Door down switches energize Gear Selector Valve to up position (See Sheet 2).
5. Hydraulic pressure retracts landing gear.
6. Gear up switches energize Door Control Valve to up position and main gear inboard doors close.
7. Main gear inboard doors lock in position by spring tension of door uplock actuators.

Landing Gear Hydraulic System Schematic - Gear Up Cycle
Figure 2 (Sheet 1 of 2)

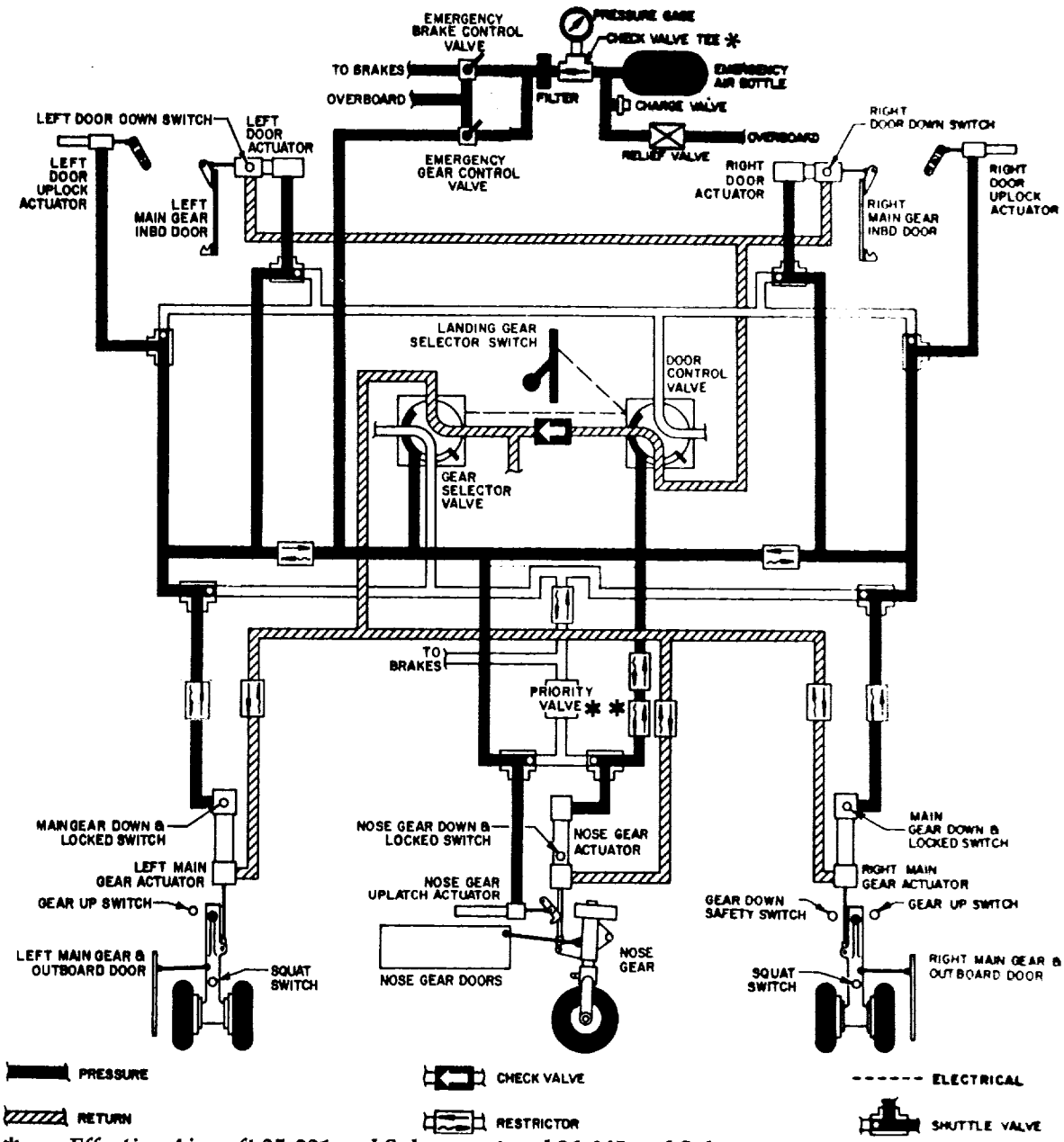


* *Effective Aircraft 35-231 and Subsequent and 36-045 and Subsequent*

* * *Effective Aircraft 35-002 thru 35-673 and 36-002 thru 36-063*

Landing Gear Hydraulic System Schematic - Gear Up Cycle
Figure 2 (Sheet 2 of 2)

EFFECTIVITY: ALL



* *Effective Aircraft 35-231 and Subsequent and 36-045 and Subsequent*

* * *Effective Aircraft 35-002 thru 35-673 and 36-002 thru 36-063*

GEAR DOWN OPERATION SEQUENCE - EMERGENCY AIR

1. Emergency Gear Control Valve to down position.

   NOTE: Air pressure moves all system shuttle valves to positions shown.

2. Air pressure moves door control valve and gear selector valve to down position.
3. Door uplock actuators release and main gear inboard doors open.
4. Nose gear uplatch actuator releases and gear extends. Inboard doors remain open.

Landing Gear Emergency Air System Schematic
Figure 3

EXTENSION AND RETRACTION - MAINTENANCE PRACTICES

1. **Adjustment/Test**
   A. Bleed Extension and Retraction System
      (1) Lower tailcone access door. Loosen one hydraulic line nut between hydraulic reservoir and 20 psi [137.9 kPa] vent valve to bleed off reservoir pressure. Tighten nut.

      CAUTION: THERE IS A POSSIBILITY OF A LARGE VOLUME OF HIGH PRESSURE AIR BEING TRAPPED ON THE HYDRAULIC SIDE OF THE SHUTTLE VALVES. IF SO, THE HYDRAULIC RESERVOIR COULD RUPTURE WHEN THE GEAR IS RETRACTED. THEREFORE, THE RESERVOIR FILLER CAP MUST BE DRAINED OF HYDRAULIC FLUID PRIOR TO RETRACTING THE GEAR TO PREVENT A LARGE VOLUME OF FLUID, UNDER HIGH PRESSURE, FROM PASSING THROUGH THE RELIEF VALVE.

      (2) Make provisions to vent hydraulic reservoir overboard. This can be accomplished using one of the following:
         (a) Remove filler cap and install an old filler cap with fitting and hose to vent overboard.
         (b) Disconnect a vent line and attach an overboard vent hose.
         (c) Other suitable means of protecting the tailcone and equipment from hydraulic fluid contamination.
      (3) Retract gear in approximately six (6) stages by setting gear selector switch to UP and then to DN, allowing gear to retract slightly further each time until gear is completely retracted. This will purge trapped air and help prevent fluid from spurting out of reservoir.
      (4) Cycle gear approximately 20 times to ensure that all air is expelled from system. Check for proper system operation during cycles.
      (5) Service hydraulic reservoir. (Refer to Chapter 12.)
      (6) Close tailcone access door.

2. **Inspection/Check**
   A. Operational Check of Landing Gear Retraction/Extension

      CAUTION: AN EXTERNAL HYDRAULIC POWER SOURCE MUST BE USED TO CYCLE GEAR IN THE FOLLOWING PROCEDURE TO PREVENT POSSIBLE DAMAGE TO AUXILIARY HYDRAULIC PUMP.

      NOTE: Perform Operational Check of Landing Gear Retraction/Extension in accordance with the current inspection interval specified in Chapter 5.

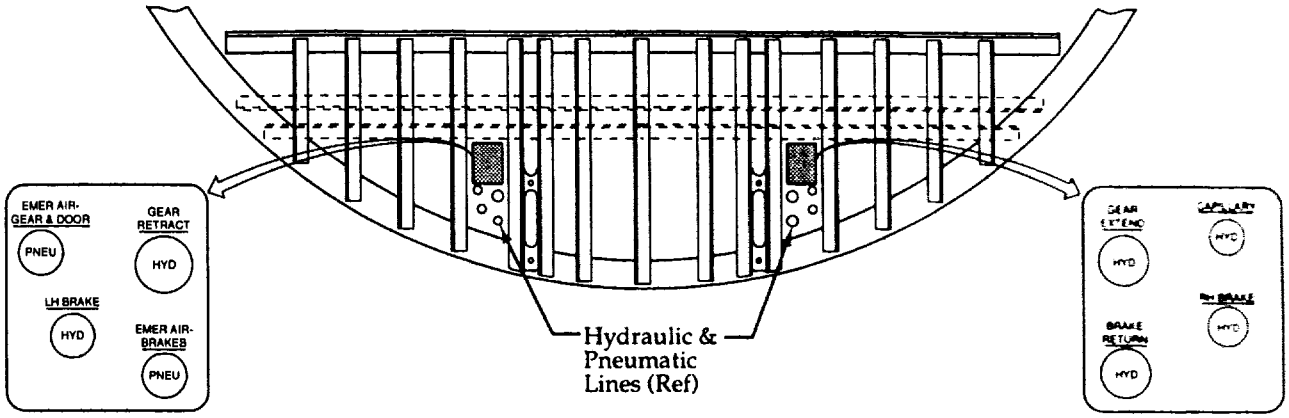
      (1) Place aircraft on jacks. (Refer to Chapter 7.)
      (2) Disconnect actuators from inboard main gear doors.
      (3) Disconnect pushrods from nose gear and outboard main gear doors to facilitate inspection.
      (4) Connect external hydraulic power source to aircraft.
      (5) Set Battery Switches on. LOCKED DOWN indicators on Landing Gear Control Panel shall illuminate.
      (6) Set left and right Landing Light Switches to TAXI. Landing lights, located on main landing gear, shall illuminate.

WARNING: PRIOR TO SPINNING WHEELS AND LANDING GEAR RETRACTION, CLEAR ALL PERSONNEL AND EQUIPMENT FROM LANDING GEAR AREAS. MAINTENANCE PERSONNEL SPINNING WHEELS SHALL BE PREPARED FOR LANDING GEAR AND LANDING GEAR DOOR MOVEMENT.

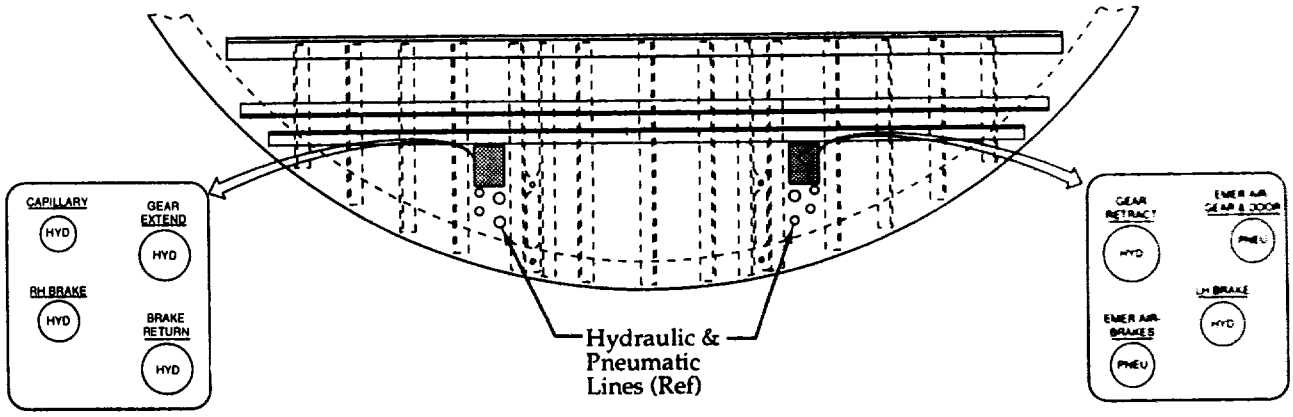
(7) Spin main gear wheels.
(8) Set Gear Selector Switch to UP. The following shall occur:
  (a) LOCKED DOWN indicators extinguish.
  (b) Landing lights extinguish.
  (c) UNSAFE indicators illuminate until landing gear are completely retracted.
  (d) Landing gear retract.
  (e) Main gear wheels are braked (snubbed) during landing gear retraction.

WARNING: PRIOR TO LANDING GEAR EXTENSION, CLEAR ALL PERSONNEL AND EQUIPMENT FROM LANDING GEAR AREAS.

(9) Set Landing Gear Selector Switch to DOWN. The following shall occur:
  (a) UNSAFE indicators illuminate until landing gear are completely extended.
  (b) Landing gear extend.
  (c) LOCKED DOWN indicators illuminate.
  (d) Landing lights illuminate.
(10) Connect door actuators and pushrods to main gear and nose gear doors.
(11) Set left and right Landing Light Switches to OFF. Landing lights shall extinguish.
(12) If these checks fail, the hydraulic and possibly pneumatic lines at frame 15 (see Figure 201) may have been swapped. Ensure hydraulic and pneumatic lines are connected in their correct locations.
(13) Set Battery Switches off.
(14) Disconnect hydraulic power cart from aircraft.
(15) Remove aircraft from jacks. (Refer to Chapter 7.)



(VIEW LOOKING FORWARD AT AFT SIDE OF FRAME 15)



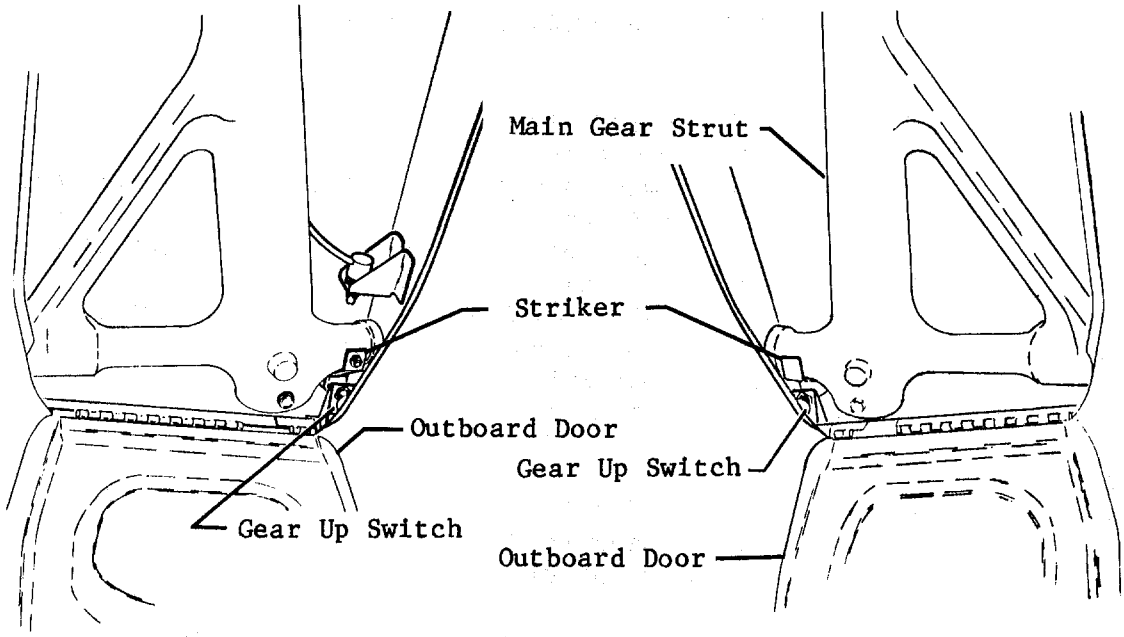
(VIEW LOOKING AFT AT FORWARD SIDE OF FRAME 15)

Hydraulic and Pneumatic Plumbing Connections
Figure 201

GEAR UP SWITCH - MAINTENANCE PRACTICES

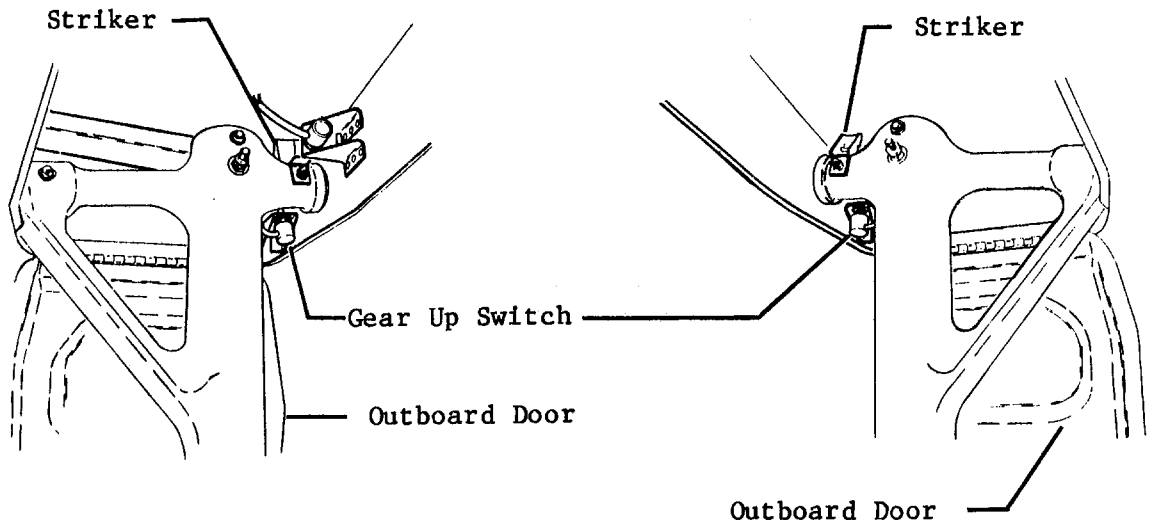
1. **REMOVAL/INSTALLATION**
   - **A. Remove Gear Up Switch** (See figure 201.)
     - (1) Remove electrical power from aircraft.
     - (2) Cut safetywire and remove jamnut securing switch to support bracket.
     - (3) Remove switch from support bracket.
     - (4) Disconnect and identify switch electrical wires from aircraft wiring.
   - **B. Install Gear Up Switch** (See figure 201.)
     - (1) Identify and connect switch electrical wires to aircraft wiring.
     - (2) Position switch on support bracket and secure with jamnuts.
     - (3) Safetywire jamnuts using double twist method.
     - (4) Restore electrical power to aircraft.

2. **ADJUSTMENT/TEST**
   - **A. Adjust Gear Up Switch** (See figure 201.)
     - (1) Place aircraft on jacks. (Refer to Chapter 7.)
     - (2) Disconnect main gear outboard door(s).
     - (3) Retract landing gear.
     - (4) Depressurize hydraulic system, allowing gear to drop on door(s).
     - (5) Attach an ohmmeter to switch wires No. 1 and 3.
     - (6) Loosen and adjust jamnuts until continuity is just established. Then adjust jamnuts one revolution beyond point at which continuity was established.
     - (7) Tighten jamnuts and safety wire.
     - (8) Connect main gear outboard door(s).
     - (9) Pressurize the hydraulic system and cycle gear while checking proper operation and gear indication.
     - (10) Remove aircraft from jacks.



RIGHT GEAR UP

LEFT GEAR UP



RIGHT GEAR DOWN

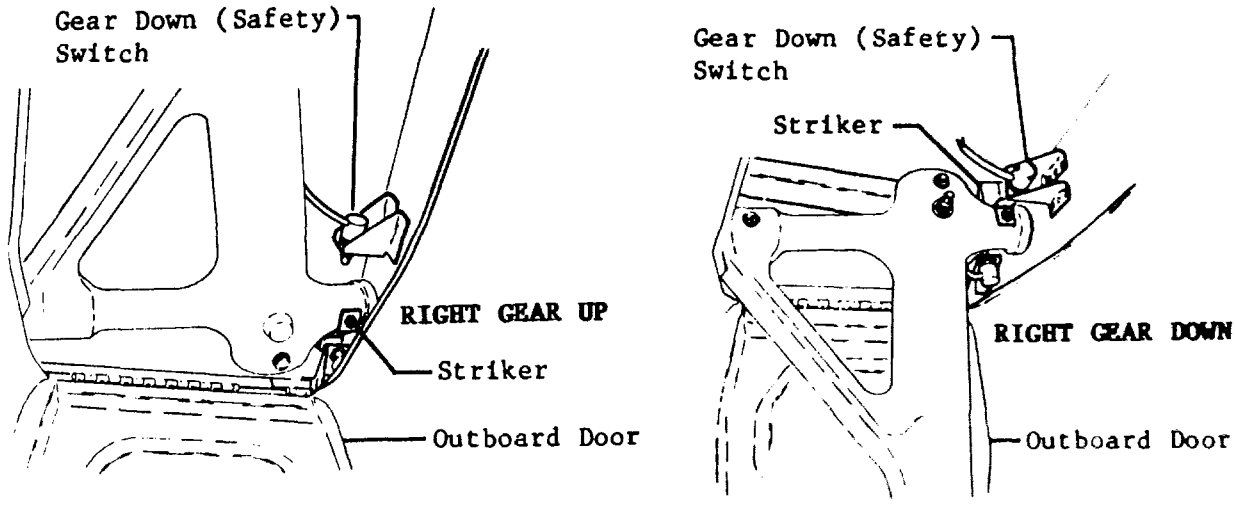
LEFT GEAR DOWN

Gear Up Switch Installation
Figure 201

GEAR DOWN SAFETY SWITCH - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Gear Down Safety Switch (See Figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Cut safety wire and remove jamnut securing switch to support bracket.
      (3) Disconnect and identify switch electrical wires from aircraft wiring.
      (4) Remove switch from support bracket.
   B. Install Gear Down Safety Switch (See Figure 201.)
      (1) Position switch on support bracket and secure with jamnuts.
      (2) Identify and connect switch electrical wires to aircraft wiring.
      (3) Safety wire jamnuts using double twist method.
      (4) Restore electrical power to aircraft.

2. **Adjustment/Test**
   A. Adjust Gear Down Safety Switch (See Figure 201.)
      (1) Place aircraft on jacks. (Refer to Chapter 7.)
      (2) With landing gear extended, attach an ohmmeter to switch wires No. 1 and 3.
      (3) Loosen jamnuts and adjust switch until ohmmeter actuation occurs. Then adjust switch one revolution beyond point of actuation.
      (4) Secure jamnuts and safety wire.
      (5) Cycle gear while checking for proper operation and gear indication.
      (6) Remove aircraft from jacks. (Refer to Chapter 7.)



Gear Down Safety Switch Installation
Figure 201

DOOR DOWN SWITCH - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Door Down Switch (See figure 201.)

(1) Remove electrical power from aircraft.

CAUTION: THE BRAKES MUST BE PUMPED DURING MANUAL LOWERING OF THE MAIN GEAR INBOARD DOOR TO PREVENT POSSIBLE ACTUATOR DAMAGE AND TO AID IN LOWERING INBOARD GEAR DOOR.

(2) Depressurize hydraulic system and lower inboard gear door:
   (a) Station a person at the inboard gear door and a person in the cockpit to operate flaps and brakes.
   (b) Raise and lower flaps until hydraulic pressure is reduced to near zero.
   (c) The person at gear door must pry uplock roller away from uplock hook, then pull door to full down position with the other person pumping brakes to relieve pressure being built up from pulling the inboard door down.

(3) Disconnect and identify electrical wiring from door down switch.

(4) Loosen jamnut securing down switch to inboard door actuator.

(5) Unscrew down switch from actuator and remove from aircraft.

B. Install Door Down Switch (See figure 201.)

(1) Install jamnut on door down switch.

(2) Screw down switch into inboard door actuator.

(3) Identify and connect aircraft electrical wiring to down switch.

(4) Tighten jamnut.

(5) Adjust Door Down Switch

(6) Restore aircraft to normal.

2. ADJUSTMENT/TEST

A. Adjust Door Down Switch (See figure 201.)

(1) Place aircraft on jacks. (Refer to Chapter 7.)

(2) Remove electrical power from aircraft.

CAUTION: THE BRAKES MUST BE PUMPED DURING MANUAL LOWERING OF THE MAIN GEAR INBOARD DOOR TO PREVENT POSSIBLE ACTUATOR DAMAGE AND TO AID IN LOWERING INBOARD GEAR DOOR.

(3) Depressurize hydraulic system and lower inboard gear door as follows:
   (a) Station a person at the inboard gear door and a person in the cockpit to operate flaps and brakes.
   (b) Raise and lower flaps until hydraulic pressure is reduced to near zero.
   (c) The person at gear door must pry uplock roller away from uplock hook, then pull door to full down position with the other person pumping brakes to relieve pressure being built up from pulling the inboard door down.

(4) Attach an ohmmeter to switch wires No. 4 and No. 6.

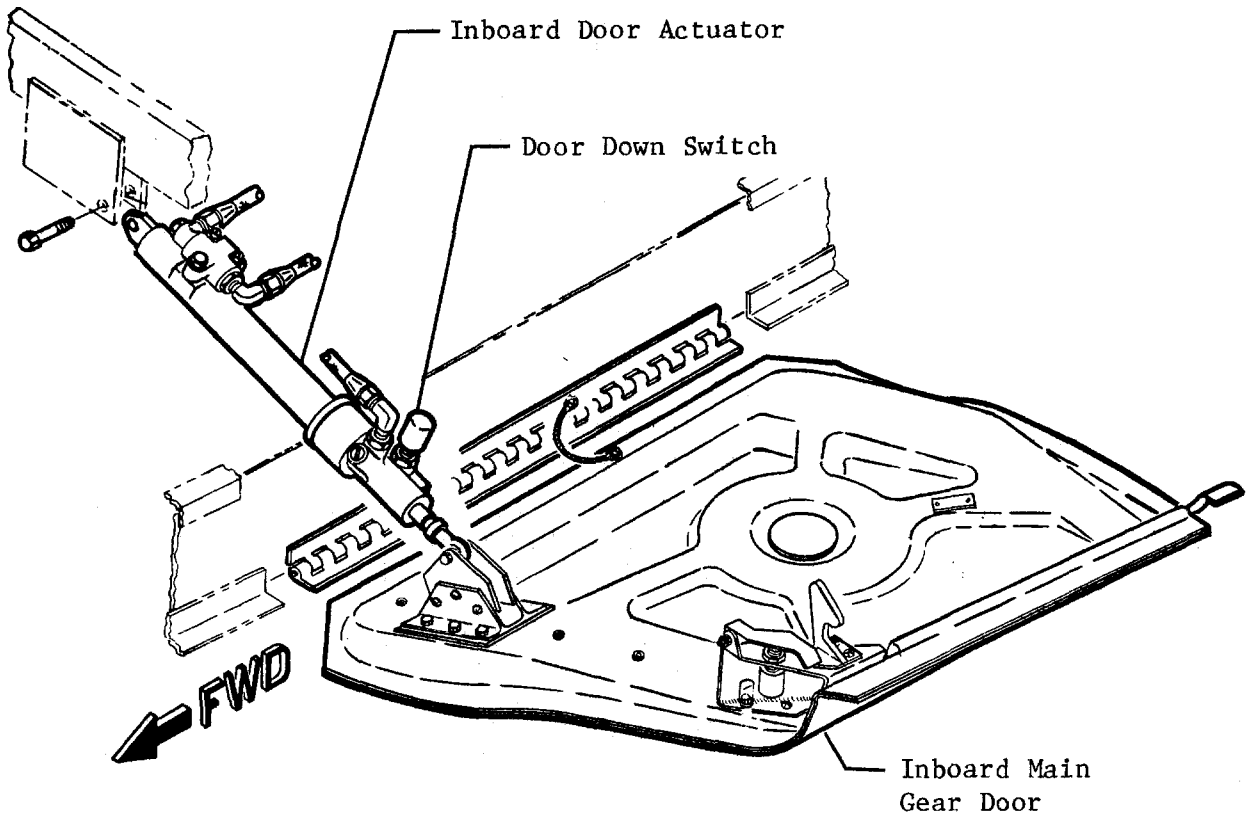
(5) Loosen jamnut and screw switch into actuator (clockwise) until ohmmeter actuation occurs.

(6) Rotate switch clockwise an additional one-half to one and one-half turns until wiring is routed in line with actuator. Secure jamnut.

(7) Raise door slightly to retract door actuator and watch ohmmeter to verify that the switch circuit opens.

(8) Safety wire jamnut.

(9) Restore electrical power to aircraft.
(10) Pressurize hydraulic system and cycle gear to check for proper operation.
(11) Remove aircraft from jacks.
(12) Restore aircraft to normal.



Door Down Switch Installation
Figure 201

MAIN GEAR SQUAT SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of Main Gear Squat Switch (See Figure 201.)
   (1) Remove attaching parts and switch bracket and switch from strut torque arm.
   (2) Remove keeper from switch roller retainer.
   (3) Remove switch roller retainer. Count the number of complete turns required to remove the switch roller retainer from the switch.
   (4) Remove safety wire from switch jamnuts.
   (5) Remove jamnuts and squat switch from switch bracket and aircraft.

B. Installation of Main Gear Squat Switch (See Figure 201.)
   (1) Install jamnut and keyway washer on switch.
   (2) Position switch through hole in switch bracket with tong of keyway washer engaged in hole in switch bracket. Install remaining washer and jamnut.

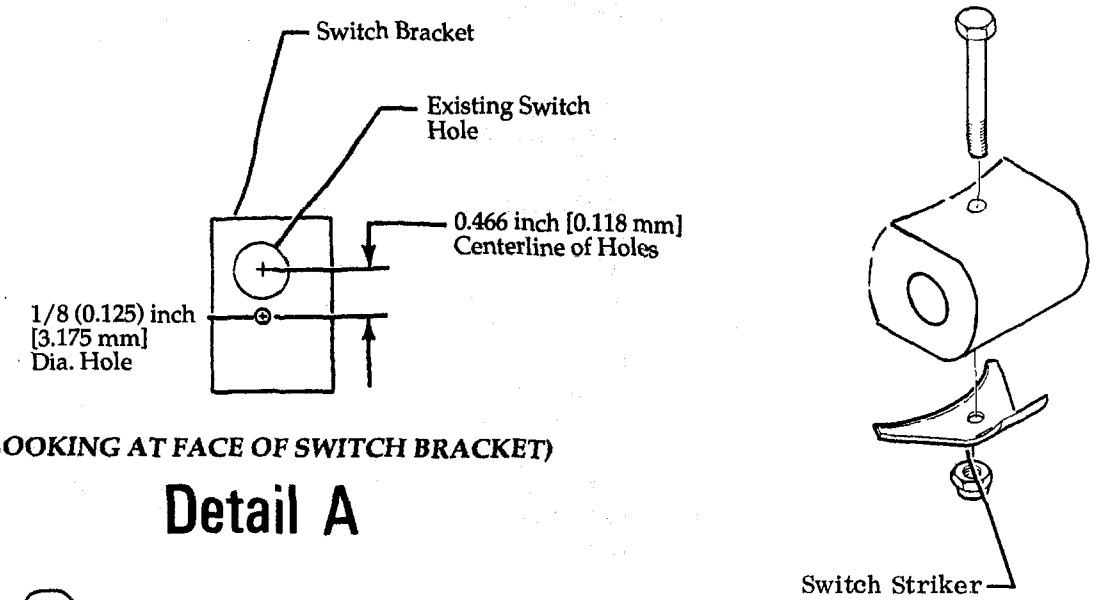
   NOTE: On some aircraft the switch bracket does not incorporate a hole for the keyway washer tong. On these switch brackets it is permissible to drill a 1/8 (0.125) inch [3.175 mm] hole in switch bracket as shown in Detail A.

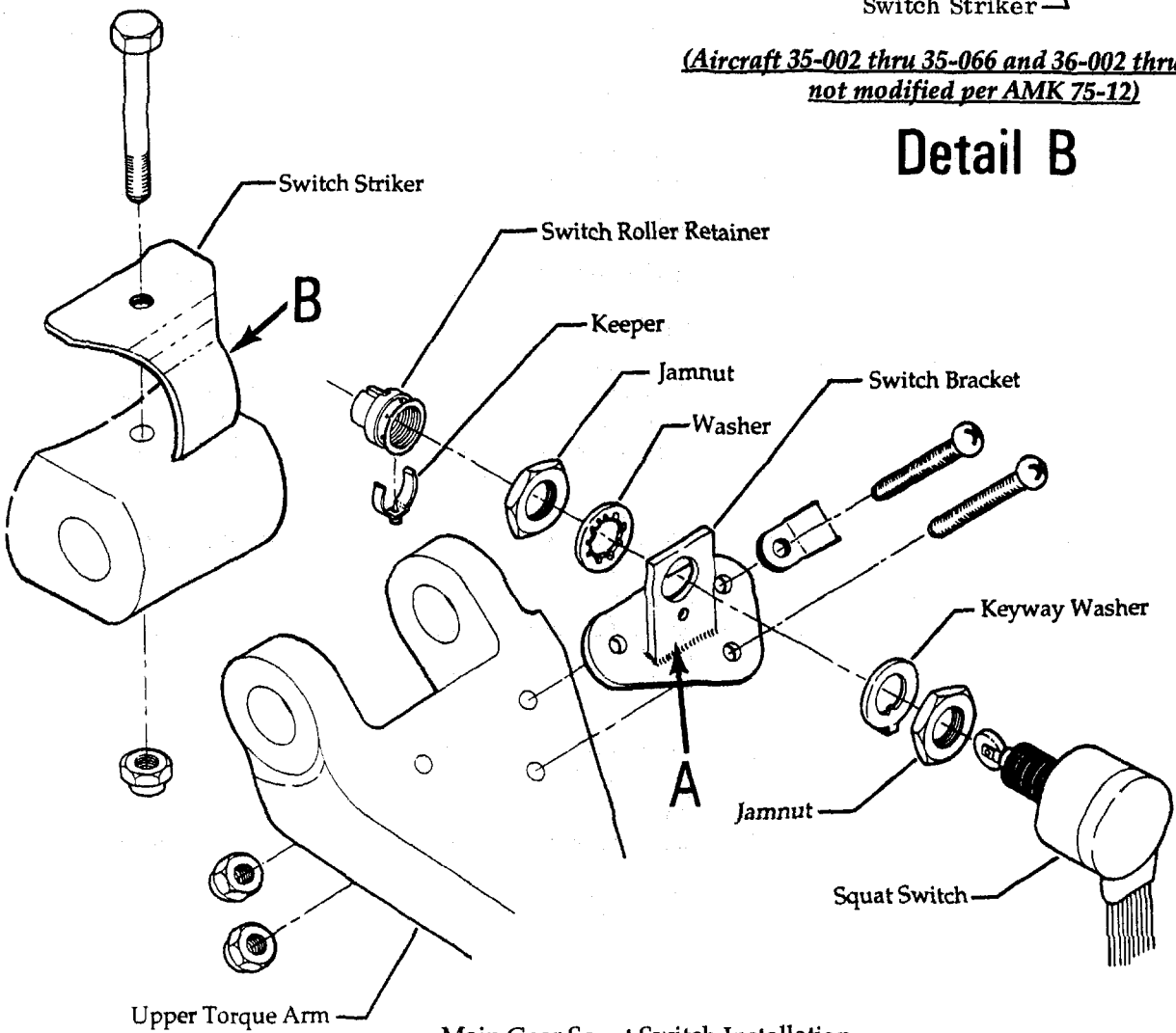
   (3) Install switch roller retainer on switch the same number of complete turns as required for its removal. Refer to step 1.A.(3).
   (4) Install keeper and ensure that keeper is properly sealed through hole in roller retainer and switch keyway.
   (5) Install switch bracket on strut torque arm and secure with attaching parts.
   (6) Adjust squat switch. (Refer to Adjustment/Test, this section.)

2. Adjustment/Test

A. Adjust Main Gear Squat Switches *(Aircraft 35-002 thru 35-066 and 36-002 thru 36-017 not modified per AMK 75-12)* (See Figure 201.)
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Attach an ohmmeter to switch wires No. 1 and 3.
   (3) Loosen jamnuts and adjust until ohmmeter actuation occurs, with the strut within 0.50 (±0.01) inch [12.7 (±.254) mm] from fully extended position. After extension, the gear may be manually positioned to make the necessary switch adjustments. Do not rotate the switches after final adjustment is made.
   (4) Secure jamnuts and safety wire.
   (5) Perform Operational Check of Landing Gear Squat Switch. (Refer to Inspection/Check, this section.)
   (6) Remove aircraft from jacks. (Refer to Chapter 7.)

B. Adjust Main Gear Squat Switches *(Aircraft 35-067 and Subsequent and 36-018 and Subsequent and prior Aircraft modified per AMK 75-12)* (See Figure 201.)
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Attach an ohmmeter to switch wires No. 1 and 3.
   (3) Loosen jamnuts and adjust until ohmmeter actuation occurs.
   (4) Secure jamnuts and safety wire.
   (5) Place aircraft on jacks. (Refer to Chapter 7.)
   (6) Perform Operational Check of Landing Gear Squat Switch. (Refer to Inspection/Check, this section.)
   (7) Remove aircraft from jacks. (Refer to Chapter 7.)





Main Gear Squat Switch Installation
Figure 201

3. **Inspection/Check**
   A. Operational Check of Landing Gear Squat Switch.
      (1) Raise aircraft until all landing gear is clear of ground. (Refer to Chapter 7.)
      (2) Ensure proper squat switch condition, operation and indication by checking the following systems:
         (a) Pressurization (10 second delay in squat switch relay panel). (Refer to 21-30-00.)
         (b) Nose Gear Steering. (Refer to 32-50-00.)
         (c) Thrust Reversers. (Refer to 78-30-00.)
         (d) Anti-Skid. (Refer to 32-42-00.)
         (e) Auto Spoilers. (Refer to 27-60-00.)
         (f) Gear Swing (i.e., block squat switch to ground mode and ensure gear does not retract.) (Refer to 32-30-00.)
         (g) Stall Rate (i.e., stick shaker inactive). (Refer to 27-31-00.)
      (3) Remove aircraft from jacks. (Refer to Chapter 7.)

SQUAT SWITCH RELAY PANEL - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

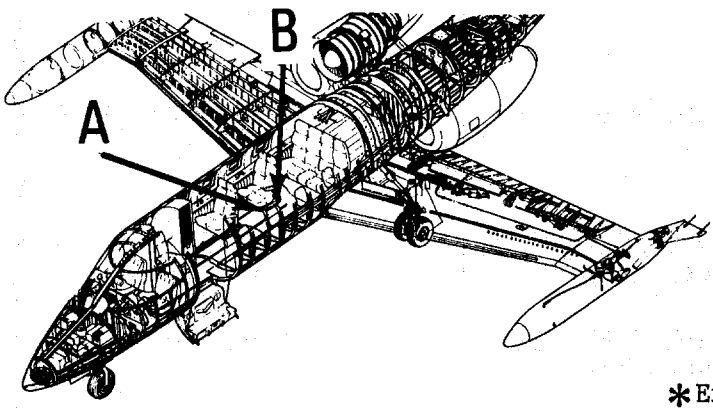
NOTE: ° Aircraft 35-002 thru 35-066 and 36-002 thru 36-017, the relay panel is installed to underside of floorboard between frames 13A and 14, at RBL 12.

° Aircraft 35-067 thru 35-505, 36-018 thru 36-053, relay is installed on bracket below floorboard between frames 13B and 13C, at RBL 12.

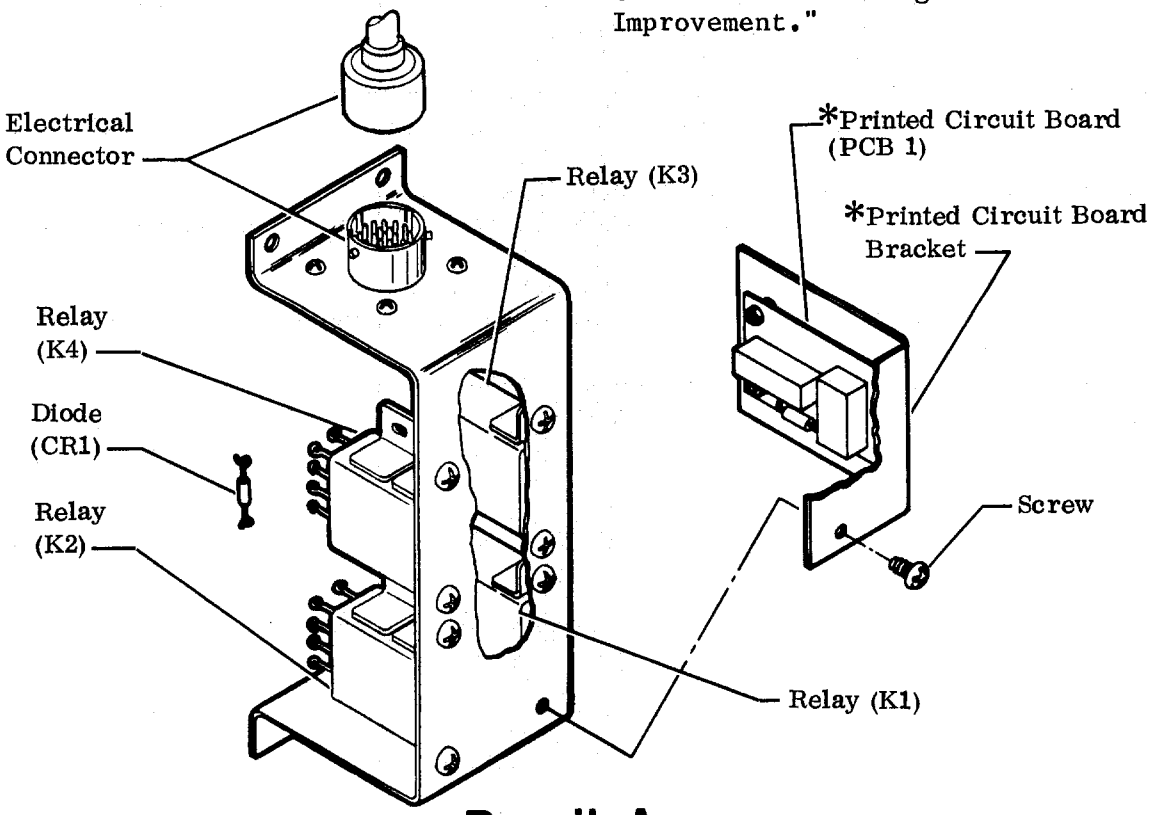
° Aircraft 35-506 and Subsequent and 36-054 and Subsequent, refer to Chapter 39 for maintenance practices.

A. **Remove Squat Switch Relay Panel** (See figure 201.)
   (1) Remove equipment, upholstery, and floorboard as required to gain access to squat switch relay panel.
   (2) Remove electrical power from aircraft.
   (3) Disconnect electrical connectors from relay panel.
   (4) Remove and retain attaching parts securing relay panel and remove relay panel.

B. **Install Squat Switch Relay Panel** (See figure 201.)
   (1) Install and secure squat switch relay panel with existing attaching parts.
   (2) Connect electrical connectors to relay panel.
   (3) Install floorboard and any other structure removed to gain access to relay panel.
   (4) Install upholstery and equipment previously removed.
   (5) Restore electrical power to aircraft.



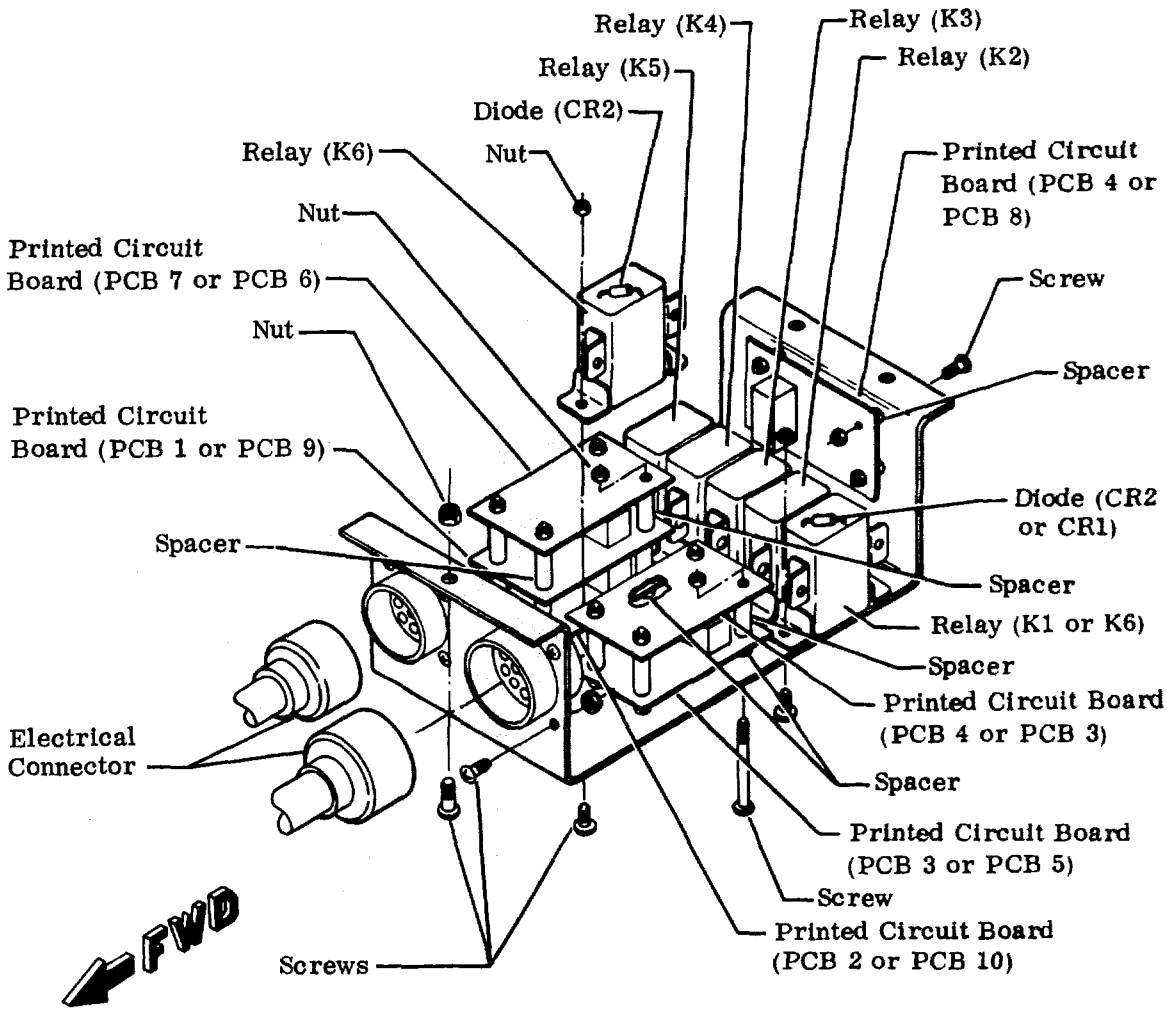
*Effective on aircraft modified per AAK 76-7, "Bleed Air Precooler and Windshield Defog and Anti-Ice Improvement."



Detail A

NOTE: Refer to Wiring Manual for applications of specific relays, diodes, and printed circuit boards.

Typical Squat Switch Relay Panel Installation
Figure 201 (Sheet 1 of 3)

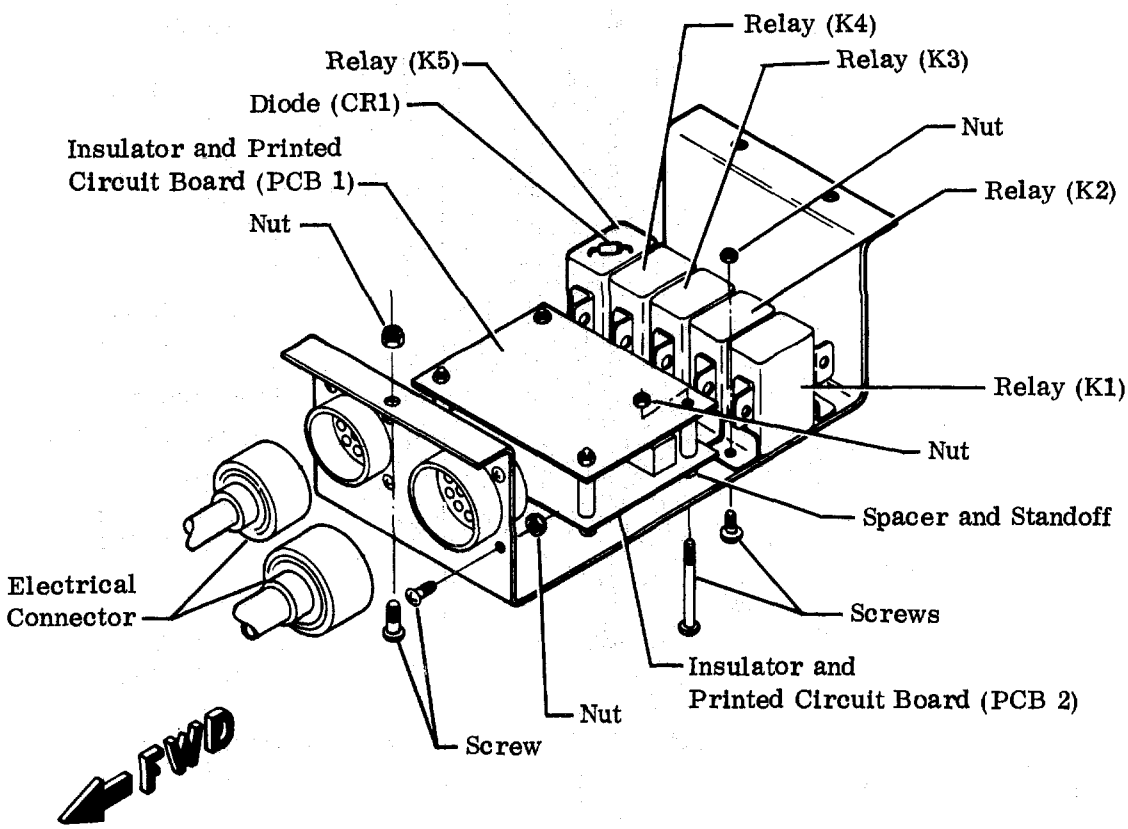


Refer to Wiring Manual for applications of specific relays, diodes, and printed circuit boards. Some aircraft may not have all shown components installed.

Detail B

Typical Squat Switch Relay Panel Installation
Figure 201 (Sheet 2 of 3)

9-109A-1



Refer to Wiring Manual for applications of specific relays, diodes, and printed circuit boards.

Detail B

Typical Squat Switch Relay Panel Installation
Figure 201 (Sheet 3 of 3)

9-109A-3

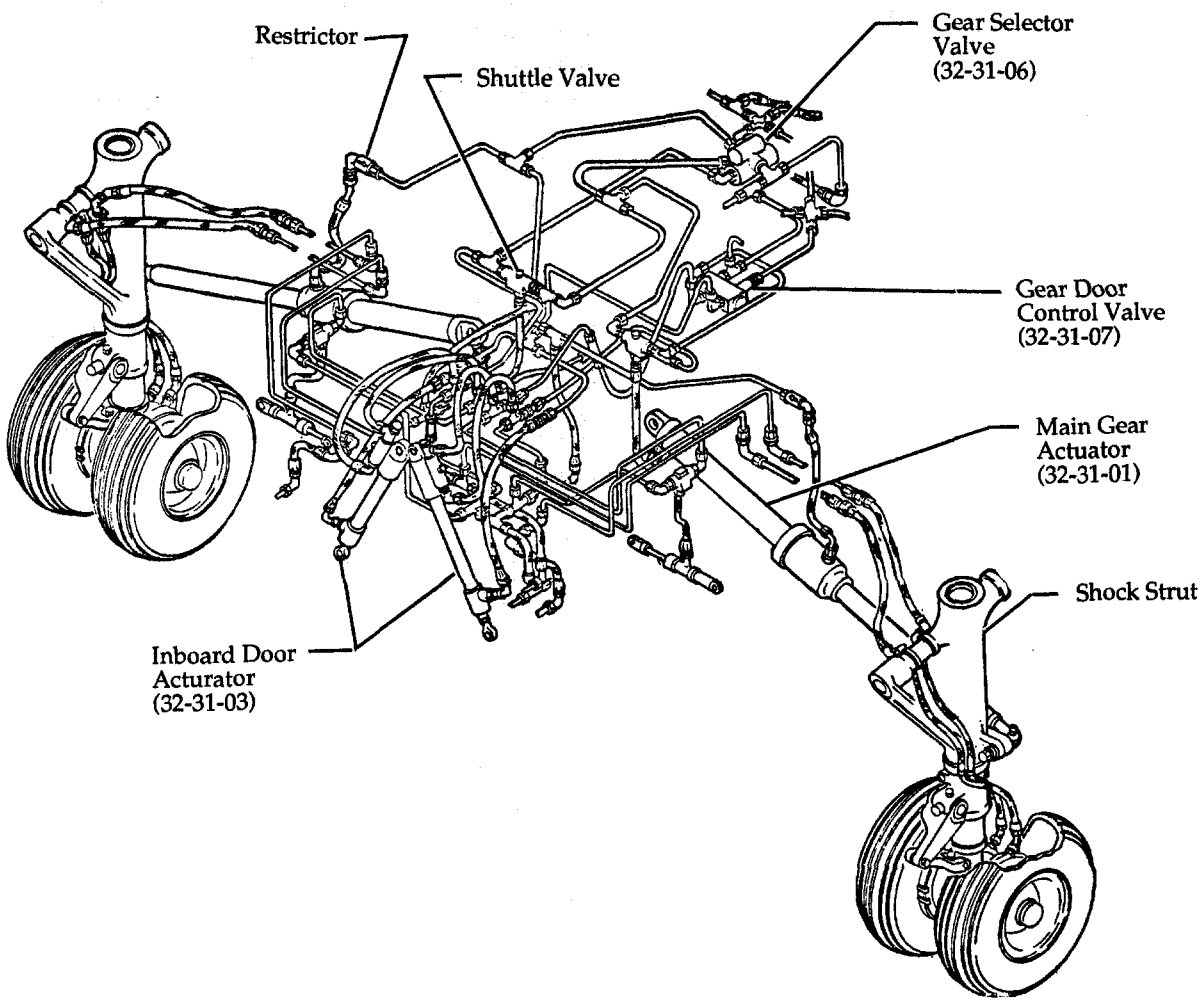
MAIN GEAR EXTENSION AND RETRACTION - DESCRIPTION AND OPERATION

1. Description

A. The main gear extension and retraction system consists of two (2) main gear inboard door actuators and two (2) main gear inboard door uplatches.

2. Operation

A. Each main gear is retracted and extended by an actuator which is attached to the shock strut and to a pillar in the wing structure. A spring load, built into the actuator, drives a downlock ball housing which entraps 14 steel balls in a notch in the piston rod, causing a positive mechanical lock when the main gear is in the down position. An integral switch in the actuator transmits a gear down-and-locked indication to the position indicator annunciators when the downlock ball housing has extended over the mechanical lock. Hydraulic pressure in excess of 250 psi [1722.5 kPa] is required to retract the housing against the spring to release the downlock mechanism and permit gear retraction. During an emergency, the actuator is extended by emergency air pressure to the down position. (Refer to 32-33-00 for Emergency Extension System.)



Main Landing Gear Hydraulic Components Locator
Figure 1

MAIN GEAR ACTUATOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of Main Gear Actuator (See Figure 201.)

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Depressurize hydraulic system. (Refer to Chapter 29.)
(3) Set Battery Switches off and disconnect aircraft batteries.

CAUTION: NOTE ROUTING OF HYDRAULIC HOSES AT RETRACT PORT AND MARK CLOCKING OF FITTING ON ACTUATOR.

(4) Disconnect hydraulic hoses. Cap hoses and plug actuator ports.
(5) Disconnect inboard main gear door actuator from door.
(6) Disconnect down-and-lock switch electrical connector (LH, P1125; RH, P1126).

NOTE: Connector is located above the lower wing skin. Remove grommet and pull connector through hole in wing skin.

(7) Cut safety wire (noting manner in which safety wire is installed) and remove cotter pin, nut, and washers from end of actuator attached to pillar in wing.
(8) Remove cotter pin, nut, washer, and bolt securing actuator to shock strut.
(9) Remove actuator from aircraft. As actuator is being removed from aircraft, rotate actuator to dislocate and remove main gear down and locked switch ball.
(10) If required, remove down and locked switch and electrical wiring clamps. (Refer to 32-60-01, Removal/Installation.)

B. Installation of Main Gear Actuator (See Figure 201.)

(1) Position actuator on pillar and strut and secure with attaching parts. Torque nut to 300 inch-pounds [33.87 Nm]. Safety wire.

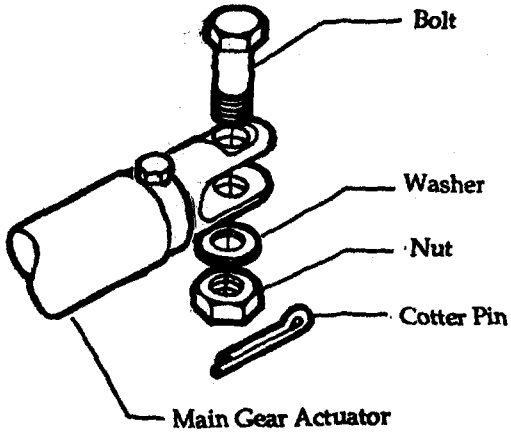
NOTE: If nut is not in locking position, advance nut to nearest locking position and install cotter pin.

(2) Check actuator pin in strut boss for freedom of movement and linear free play of 0.001 to 0.036 inch [0.025 to 0.91 mm].
(3) Position rod end clevis on strut actuator pin and secure with attaching parts.
(4) Install switch actuator ball, down and locked switch, and electrical wiring clamps. (Refer to 32-60-01, Removal/Installation.)

NOTE: The switch actuator ball shall be thoroughly cleaned, inspected, and lubricated before installation. (Refer to Chapter 12.)

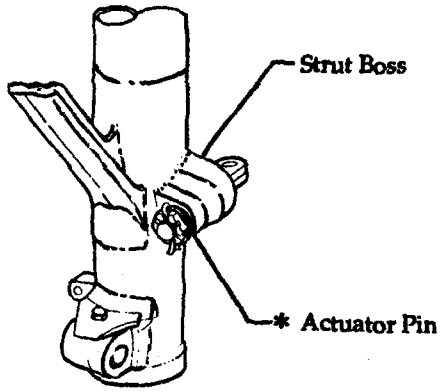
CAUTION: ROUTE AND CONNECT ACTUATOR RETRACT HOSE AS IT WAS PRIOR TO REMOVAL. THIS WILL PREVENT HOSE FROM BEING TWISTED. IMPROPERLY INSTALLED HOSE WILL RESULT IN HOSE RUPTURE AND HYDRAULIC SYSTEM FAILURE.

(5) Remove plugs and caps and connect hydraulic hoses to actuators.
(6) Check hydraulic reservoir fluid level. (Refer to Chapter 12.)
(7) Insert down-and-lock switch electrical connector (LH, P1125; RH, P1126) through hole in wing skin and connect to aircraft wiring.
(8) Connect main gear inboard door actuator to door and secure with attaching parts.
(9) Connect aircraft batteries and pressurize hydraulic system. (Refer to Chapter 29.)
(10) Bleed hydraulic system. (Refer to 32-43-00, Adjustment/Test.)

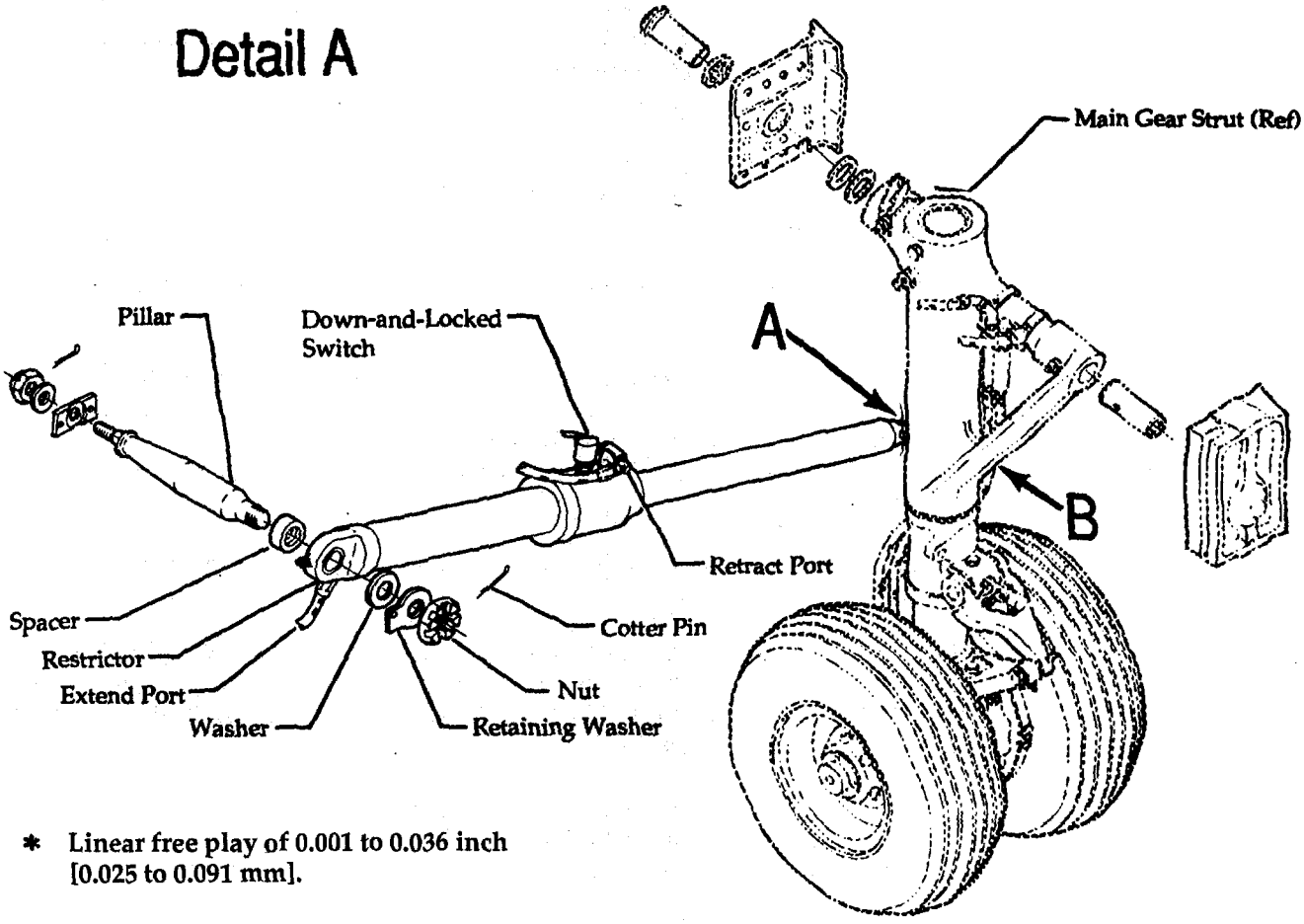


(TYPICAL ATTACHMENT)

Detail A



Detail B



* Linear free play of 0.001 to 0.036 inch [0.025 to 0.091 mm].

Main Gear Actuator Installation
Figure 201

(11) Adjust down-and-locked switch, if required. (Refer to 32-60-01, Adjustment/Test.)
(12) Cycle landing gear system, and check for proper gear indication and operation.
(13) Check main landing gear rigging. (Refer to 32-11-00, Adjustment/Test.)
(14) Remove aircraft from jacks. (Refer to Chapter 7.)

2. **Repairs**
A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Hydraulic Fluid (MIL-H-5606		Commercially Available	Cleaning and lubrication.
Stoddard Solvent		Commercially Available	Cleaning.
Methyl-Propyl-Ketone (MPK)		Commercially Available	Cleaning.
Loctite Retaining Compound	No. RC 680	Commercially Available	Apply to mating surfaces.

B. Disassemble Main Gear Actuator. (See Figure 202.)
(1) During disassembly, tag and keep all parts together for assembly into the same unit. Do not remove nameplate unless it is damaged.

WARNING: THE ACTUATOR IS SPRING LOADED TO 290 (± 20) POUNDS. USE SPECIAL PRECAUTION WHEN UNSCREWING CYLINDER ASSEMBLY FROM HOUSING TO PREVENT EITHER PART FROM SPRINGING OUT OF CONTROL AND CAUSING INJURY.

(2) Remove lockscrew and, while taking care to control the actuator spring load, slowly unscrew cylinder assembly from housing.
(3) Remove nut and rod end attachment bolt or loosen jamnut that secures rod end to piston and remove rod end from piston.
(4) Slide piston, laminated shim, drive spring, plunger, and downlock ball housing from actuator housing. Retrieve the downlock balls which will fall free as piston is removed.
(5) Remove retaining ring and rod scraper from actuator housing. Remove and discard all O-rings, D-ring, backup rings, and felt strip.
(6) Remove inner piston from cylinder assembly.
(7) Bearing and lubricators are pressed into place. Bearings are staked when installed. Remove only if replacement is required.
(8) Clean metal parts with Stoddard solvent or equivalent. Ensure that no solvent is allowed to remain in internal cavities or surfaces.
(9) Remove all fingerprints from machined surfaces not plated or painted using methyl-propyl-ketone (MPK). Do not allow MPK to air dry on surfaces.
(10) Dry metal parts after cleaning with clean, dry, compressed air.
(11) Coat internal surfaces with MIL-H-5606 hydraulic fluid.
(12) Wrap cleaned parts in lint-free cloth or clean, waxed paper while awaiting repair and assembly.
(13) When storing unplated machine surface parts more than a few hours, coat with MIL-C-11796 preservative. Remove preservative prior to assembly of parts.

C. Inspect Main Gear Actuator. (See Figure 203.)
(1) Inspect drained hydraulic fluid for metal particles which may be used as an aid in determining trouble source.

NOTE: If an Overhaul or Hard Landing Inspection is being accomplished on the main gear actuator, perform all of the following steps. If only repairs are being accomplished on actuator, omit steps 2.C.(3) and 2.C.(4).

(2) Inspect all metal parts including welds and machined and forged parts for structural failure, nicks, burrs, corrosion, worn threads, and excessive wear.
(3) Perform a magnetic particle inspection on all ferrous parts. Perform a fluorescent penetrant check on all aluminum parts. After ferrous parts inspection, demagnetize to remove all metal particles.
(4) Inspect OD and ID surfaces of piston, cylinder assembly, and ID surfaces of housing assembly for galls, scratches, scoring, corrosion, or worn plating.
(5) Check to ensure that spring height is 2.44 inches at 290 (±20) pound load.

NOTE: *Aircraft 35-250 and Subsequent, 36-045 and Subsequent, and prior aircraft modified per AAK 79-3, "Installation of Main and Nose Landing Gear Actuator Clevis and Jamnut,"* are equipped with a jamnut and lock type rod end which eliminates possibility of looseness. Aircraft with jamnut type installation should omit steps (6) and (8).

(6) With rod end threaded into piston, check rod end for looseness. If looseness exists between actuator piston and rod end, remove rod end.
(7) Inspect threads of piston and rod end. Replace if damaged.
(8) If threads are not damaged and end play does not exceed 0.004 inch [0.010 cm], apply Loctite Retaining Compound evenly to threads and install rod end. If looseness exceeds 0.004 inch, replace defective part.
(9) Buff out minor scratches in piston, cylinder assembly, inner piston, downlock ball housing, plunger, or housing assembly. Do not create low spots by excessive buffing or polishing. Use oil stone to remove scratches and polish with crocus cloth. Check tolerances after polishing.
(10) Replace any parts which are damaged, cracked, excessively worn, scored, corroded or do not meet inspection requirements or tolerances.

D. Assemble Main Gear Actuator. (See Figure 202.)
(1) Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Hydraulic Fluid (MIL-H-5606		Commercially Available	Clean and lubricate O-rings, D-rings, backup rings, and felt wipers.
Isopropyl Alcohol	TT-I-735	Commercially Available	Cleaning bearings and bearing housings. Remove excessive Loctite.
Loctite Primer (Grade T)	Refer to Chapter 20.	Commercially Available	Applied to mating surfaces.

NAME	PART NUMBER	MANUFACTURER	USE
Loctite	RC 680	Commercially Available	Applied to mating surfaces.
Wash Primer	Refer to Chapter 20.	Commercially Available	Refinish exterior painted surfaces.
Epoxy Primer	Refer to Chapter 20.	Commercially Available	Refinish exterior painted surfaces.
Aluminized Lacquer (MIL-L-7178)		Commercially Available	Refinish exterior painted surfaces.
Plunger Installation Tool	2370130-001	Learjet Inc. Wichita, KS	Contains -002 and -003 seals. Insert Plunger.
Seal Compression Tool Plunger Insertion Tool	-002 -003		Compress seals. Insert plunger.

(2) Ensure that all items are thoroughly clean and immerse new O-rings, D-rings, backup rings, and felt strip in MIL-H-5606 hydraulic fluid immediately prior to installation.
(3) Install new lubricator and/or bearing if removed during disassembly. If new bearing is to be installed, install as follows:

NOTE: Maximum tolerance between new bearing and cylinder assembly is 0.004 inch [0.010 cm]. If dimension is greater, replace cylinder assembly.

(a) Clean bearing and cylinder assembly using isopropyl alcohol. Bearing and bearing housing must be clean of all traces of oil, dust, condensation, or other contaminants.
(b) Apply Loctite primer (Grade T) to mating surfaces of bearing outer race, actuator bearing housing outer race, and actuator bearing housing; wipe off while still wet. Reapply primer to bearing and bearing housing and allow to dry until the primer odor is no longer present.
(c) Apply an even coat of Loctite RC 680 evenly to mating surfaces of bearing and cylinder assembly. Excessive compound may be removed using a rag moistened in isopropyl alcohol.
(d) Press bearing into cylinder assembly and keep aligned until Loctite cures. Do not stake bearing.

NOTE: Cure time is 20 to 30 minutes.

(4) Install D-ring and felt strip inside actuator housing assembly.
(5) Assemble O-ring and seals on plunger.
(a) *On Aircraft not installing Main Gear Actuator Seal Kit, P/N 2392700-5.*
1) Install O-ring on inside upper section of plunger.
2) Install O-ring on outside lower section of plunger.
(b) *On Aircraft equipped withS32850-3002 and -3006 seals and M83461/1-143 and -146 O-rings.* (See Figure 202, Detail B.)
1) Install O-ring into groove on inside of plunger.
2) Slide seal inside plunger and ensure it straddles O-ring in groove.

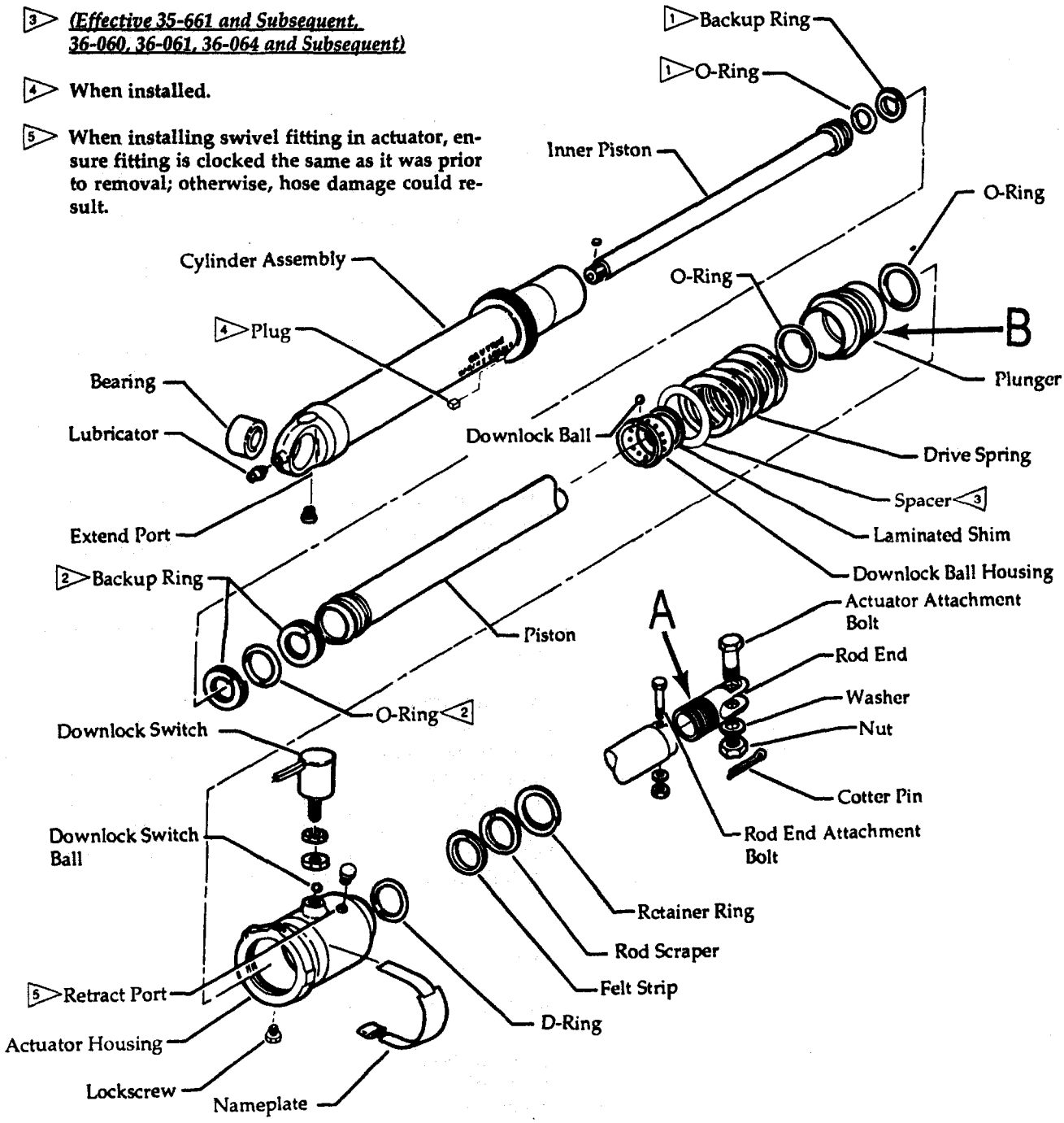
1 Replaced with a seal if 2392700-2 Repair Kit is installed.

2 Replaced with a seal if 2392700-2 or -3 Repair Kit is installed.

3 *(Effective 35-661 and Subsequent, 36-060, 36-061, 36-064 and Subsequent)*

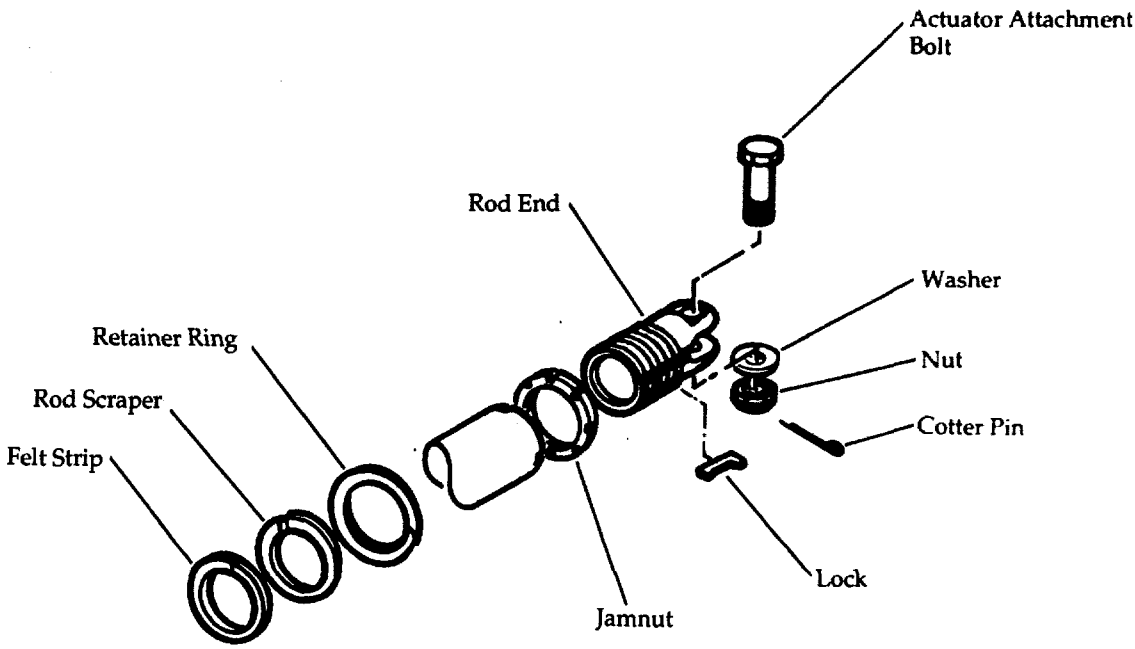
4 When installed.

5 When installing swivel fitting in actuator, ensure fitting is clocked the same as it was prior to removal; otherwise, hose damage could result.



11-36B

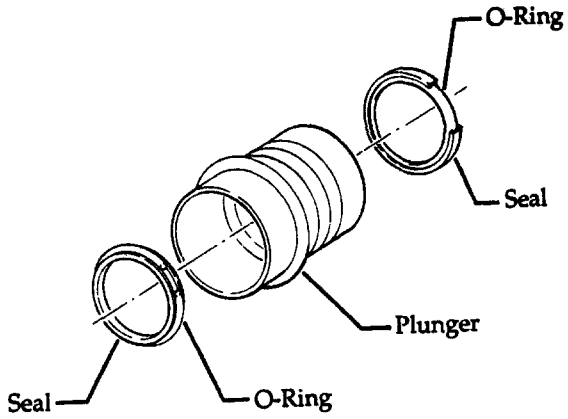
Main Gear Actuator Assembly
Figure 202 (Sheet 1 of 3)



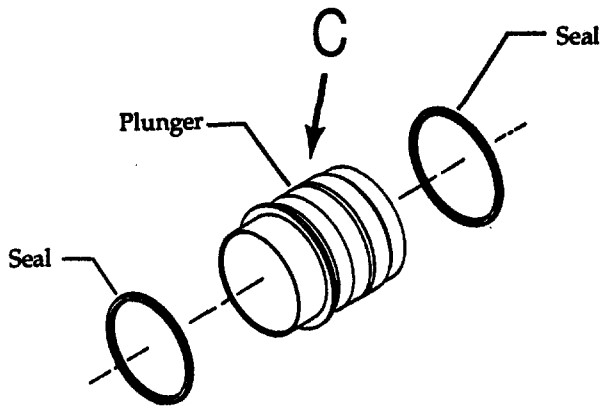
(Aircraft 35-250 and Subsequent, 36-045 and Subsquent, and prior Aircraft Modified per AAK 79-3)

Detail A

Main Gear Actuator Assembly
Figure 202 (Sheet 2 of 3)

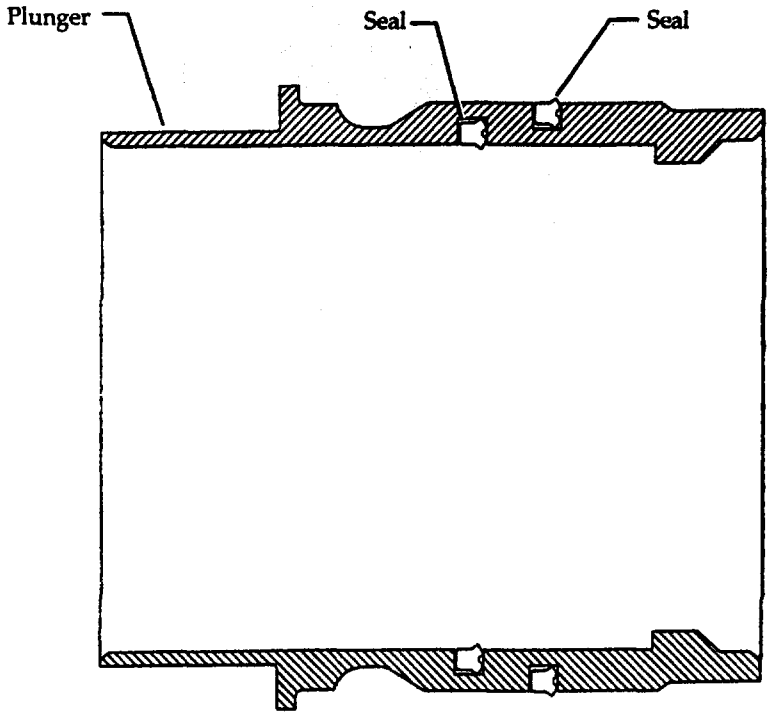


(Aircraft equipped with S32850-3002 and -3006 seals and M83461/1-143 and -146 O-rings)



(Aircraft equipped with a Main Actuator Seal Kit [P/N 2392700-5] and 7600840-001 and -002 Seals)

Detail B

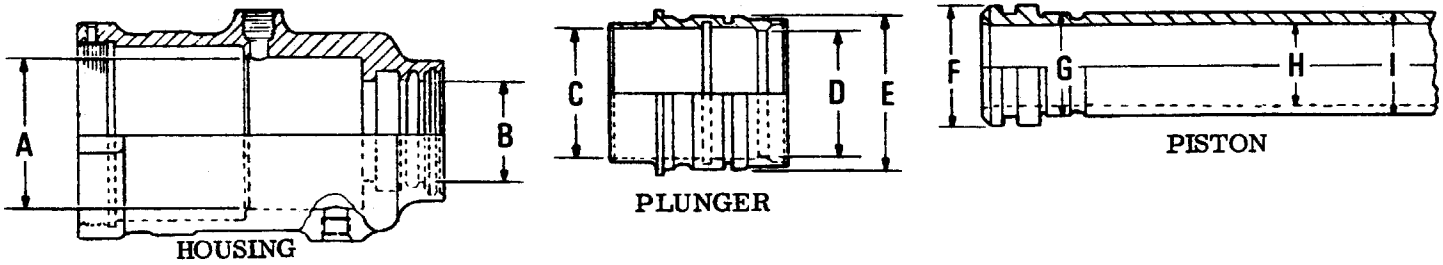


(PLUNGER CROSS SECTION)

Detail C

11-36B

Main Gear Actuator Assembly
Figure 202 (Sheet 3 of 3)



Main Gear Actuator Wear Tolerances
Figure 203

NOMENCLATURE	OUTSIDE DIAMETER (INCHES)		INSIDE DIAMETER (INCHES)		TOTAL CLEARANCE DIAMETER (INCHES)		SURFACE FINISH
	ORIGINAL	MINIMUM	ORIGINAL	MAXIMUM	ORIGINAL	MAXIMUM	
Cylinder	2.436 2.439	2.433	2.247 2.245	2.252	0.006 0.002	0.022	16 RMS
Inner Piston (Head)	1.489 1.487	1.484					63 RMS
Piston Head (F)	2.243 2.241	2.236					63 RMS
Piston Rod (G)	1.873 1.871	1.870					16 RMS
Piston (I)	1.873 1.871	1.870					32 RMS
Piston (H)			1.493 1.491	1.496	0.006 0.002	0.018	32 RMS
Ball Housing	2.217 2.215	2.213	1.877 1.875	1.880	0.006 0.002	0.016	125 RMS
Plunger (E)	2.811 2.809	2.807					32 RMS
Plunger (C)			2.440 2.438	2.442	0.006 0.002	0.015	32 RMS
Plunger (D)			2.230 2.228	2.235			125 RMS
Housing (B)			1.878 1.876	1.885	0.007 0.003	0.012	32 RMS
Housing (A)			2.815 2.813	2.819	0.006 0.002	0.018	32 RMS

CAUTION: SEAL WILL BE DAMAGED AND WILL LEAK IF SEAL AND O-RING ARE NOT SEATED IN GROOVE IN PLUNGER BEFORE INSTALLATION.

3) Slide plunger onto cylinder assembly to seat O-ring and seal in groove. Remove plunger from cylinder assembly.
4) Install O-ring into groove on outside of plunger.
5) Slide seal onto outside of plunger and ensure it straddles O-ring in groove.

CAUTION: SEAL WILL BE DAMAGED AND WILL LEAK IF SEAL AND O-RING ARE NOT SEATED IN GROOVE ON PLUNGER BEFORE INSTALLATION IN ACTUATOR HOUSING.

6) Push seal compression tool, -002, over O-ring and seal on outside of plunger to ensure O-ring and seal are seated in groove. Remove seal compression tool.

(c) On *Aircraft equipped with Main Gear Actuator Seal Kit, P/N 2392700-5 with 7600840-001 and -002 seals*. (See Detail B of Figure 202.)

CAUTION: SEAL WILL BE DAMAGED AND LEAK IF NOT SEATED PROPERLY IN PLUNGER GROOVE BEFORE INSTALLATION.

1) Install seal into groove on inside of plunger, ensuring that orientation of seal is correct. (See Figure 202.)
2) Install seal into groove on outside of plunger, ensuring that orientation of seal is correct. (See Figure 202.)

(6) Slide plunger insertion tool, -003 over end of plunger and insert plunger into actuator housing. Ensure that plunger is bottomed. Remove plunger insertion tool.
(7) Install O-ring and backup ring on inner piston.
(8) Install nylon lock plug on inner piston.
(9) Screw inner piston into cylinder assembly.
(10) Install O-ring and backup ring on piston.
(11) Assemble downlock ball housing, shoulder first, on piston.
(12) Assemble laminated shim on piston.
(13) Install 14 balls in downlock ball housing.
(14) With actuator housing assembly held vertically, slide piston with laminated shim, balls, and downlock ball housing into actuator housing assembly and plunger.
(15) With actuator housing assembly held securely, pull piston to extended position.

NOTE: Pulling piston to extended position will seat ball housing into groove just below piston head and will hold piston in extended position.

(16) Place spring inside housing assembly and bottom against shoulder on actuator plunger.
(17) Screw inner piston into cylinder assembly.
(18) Align and insert inner piston through housing assembly into piston and compress spring enough to screw cylinder into housing assembly and bottom together. With cylinder bottomed in housing assembly, extend and retract ports must be aligned on same plane, within 5°, and lockscrew slot in cylinder lined up with lockscrew hole in housing assembly.
(19) Add to or remove laminations on laminated shim as required to obtain firm seating of spacer shim and downlock ball housing inside of housing.
(20) Install lockscrew in housing assembly, securing housing assembly and cylinder as a unit. On actuator assemblies equipped with neoprene plug, assure that plug is installed in housing.

(21) *On Aircraft with plug installed,* install rubber plug into lockscrew slot on cylinder assembly.
(22) Install rod scraper on piston and secure in housing with retainer ring.
(23) *On Aircraft 35-250 and Subsequent, 36-045 and Subsequent, and prior Aircraft modified per AAK 79-3, "Installation of Main and Nose Landing Gear Actuator Clevis and Jamnut"*, place lock key against threads of jamnut. Align lock key with groove in rod end and screw jamnut with lock key onto rod end.
(24) Install rod end in piston and adjust so that dimension from center of rod end bolt hole to center of cylinder assembly bolt hole is 45.79 (±0.03) inches [116.3 (±.0762) cm] extended and locked (26.76 (±0.03) inches [67.97 (±.0762) cm] compressed). Secure rod end with attaching parts.

NOTE: On actuator with jamnut, tighten jamnut by hand until jamnut is snug against cylinder. Tighten 1/16 to 3/32 of a turn more. This will provide a torque of 1000 to 1200 inch-pounds.

(25) Secure rod end.
(a) *On Aircraft 35-003 thru 35-249, 36-002 thru 36-044, not modified per AAK 79-3, "Installation of Main and Nose Landing Gear Actuator Clevis and Jamnut"*, secure rod end with attaching parts.
(b) *On Aircraft 35-250 and Subsequent, 36-045 and Subsequent, and prior Aircraft modified per AAK 79-3, "Installation of Main and Nose Landing Gear Actuator Clevis and Jamnut"*, rotate rod end to align lock key with nearest slot in piston, install key in slot, and hand tighten jamnut against piston. Tighten jamnut 1/16 to 3/32 of a turn to secure, and safety wire between jamnut and lock key.

NOTE: This will provide a torque of 1000 to 1200 inch pounds [112.9 to 135.5 Nm].

(26) Refinish all exterior painted surfaces, as required, with one coat of wash primer, one coat of epoxy primer, and one coat of MIL-L-7178 aluminized lacquer.
(27) Lubricate the main gear actuator piston rod end felt wiper. Lubrication is accomplished through the lubrication hole on the rod end of the actuator housing. Lubricate only with MIL-H-5606 hydraulic fluid.
(28) Perform Functional test of main gear actuator. (Refer to Adjustment/Test, this section.)

3. Adjustment/Test

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Pressure Gauge, 3000 psig		Commercially Available	Measure hydraulic pressure.
Hand Pump, 2250 psig min.		Commercially Available	Test actuator.
Hydraulic power source, 1500 psig, 4.0 (±0.5) GPM		Commercially Available	Cycle actuator.
Hydraulic Selector Valve, Solenoid Operated		Commercially Available	Test circuit.
Restrictors	1R3665-035 1R3665-059	Gar-Kenyon Brewster, NY	Control flow.

NAME	PART NUMBER	MANUFACTURER	USE
Fittings and Hoses		Commercially Available	Assemble test circuit.
Plugs	AN814-6D	Commercially Available	Plug ports.
Hydraulic Fluid	MIL-H-5606	Commercially Available	Service actuator.

B. Functional Test of Main Gear Actuator (260F)

CAUTION: MINIMIZE MANUAL EXTENSION OR RETRACTION OF ACTUATOR PISTON ROD DURING FUNCTIONAL TEST. THE LOCK BALLS MAY DAMAGE THE PISTON ROD.

NOTE: Record Functional Test results on Table 201.

(1) After assembly, place actuator in a horizontal position with extend port up.
(2) Fill through extend port with clean MIL-H-5606 hydraulic fluid, bleeding unit of all air.
(3) Place actuator in a horizontal, approximately mid-stroke position and connect hand pump and pressure gage to extend port.
(4) With switch port and retract port plugged, apply 5 psig [34.5 kPa] for two (2) minutes. There shall be no evidence of external leakage.
(5) Disconnect hand pump and pressure gage from extend port. Attach hand pump and pressure gage to retract port and connect extend port to hydraulic power source return. Use hand pump to position actuator in fully retracted position.
(6) Attach hand pump and pressure gage to extend port and connect retract port to hydraulic power source return.
(7) Slowly apply pressure until piston begins to move. Pressure shall not exceed 100 psig [689 kPa].
(8) Repeat step (7) with actuator in the mid-stroke position and in an extended, but not locked, position.
(9) With the actuator assembly in the extended and locked position, attach hand pump and pressure gage to retract port and connect extend port to test stand return.
(10) Slowly apply pressure until lock releases and piston begins to move. The unlock pressure shall be between 170 psig [1.2 MPa] and 300 psig [2.1 MPa].
(11) Attach actuator to test stand. (See Figure 204.)
(12) Fully extend and retract actuator twenty-five times at 1500 psig [10,342 kPa]. External leakage from rod seal shall not exceed one (1) drop in 25 full stroke cycles.
  (a) Visually observe lock plunger through switch port to verify proper unlocking (approximately 0.5 inch [12.7 mm] plunger travel) occurs.
  (b) Note the action of the piston rod when the actuator lock engages. Any axial misalignment in excess of 0.05 inch [1.3 mm] at the rod end bolt attach point shall be repaired.
  (c) During cycle test, measure actuator stroke. Stroke shall be 19.03 (±0.03) inches [48.34 (±0.07) cm] for actuator P/N 2327100. Stroke shall be 18.9 inches [48 cm] for actuator P/N 6027100.

MAIN LANDING GEAR ACTUATOR ASSEMBLY

Visual Inspection: Satisfactory _____

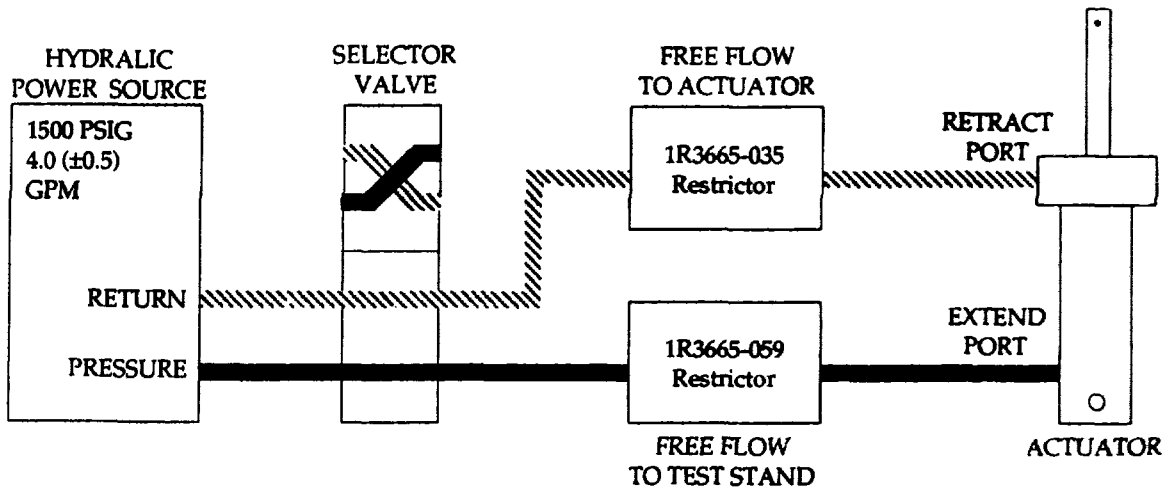
Discrepancies Noted _____

REF. PARA.	NOMINAL VALUE & TOLERANCE	ACTUAL VALUE
3.B (4)	5 psig [34.5 kPa] for 2 minutes with no leakage	_____
3.B (7), (8)	Pressure to move actuator - 100 psig [689 kPa] maximum	_____psig
3.B (10)	Pressure to unlock - 170 psig [1.2 Mpa] to 300 psig [2.1 MPa]	_____psig
3.B (12)	Leakage after 25 cycles - 1 drop maximum	_____Drop
3.B (12) (b)	Axial misalignment less than 0.05 inch [1.3 mm] maximum	_____Inch
3.B (12) (c)	Actuator stroke - P/N 2327100 - 19.03 (±0.03) inches [48.34 (±0.07) cm]	_____Inches
	P/N 6027100 - 18.9 inches [48 cm]	_____Inches

S/N _____ Date _____

Tested by _____ Inspected by _____

MLG Actuator Test Data Sheet
Table 201



Main Gear Actuator Test Schematic
Figure 204

MAIN GEAR INBOARD DOOR UPLATCH MECHANISM - MAINTENANCE PRACTICES

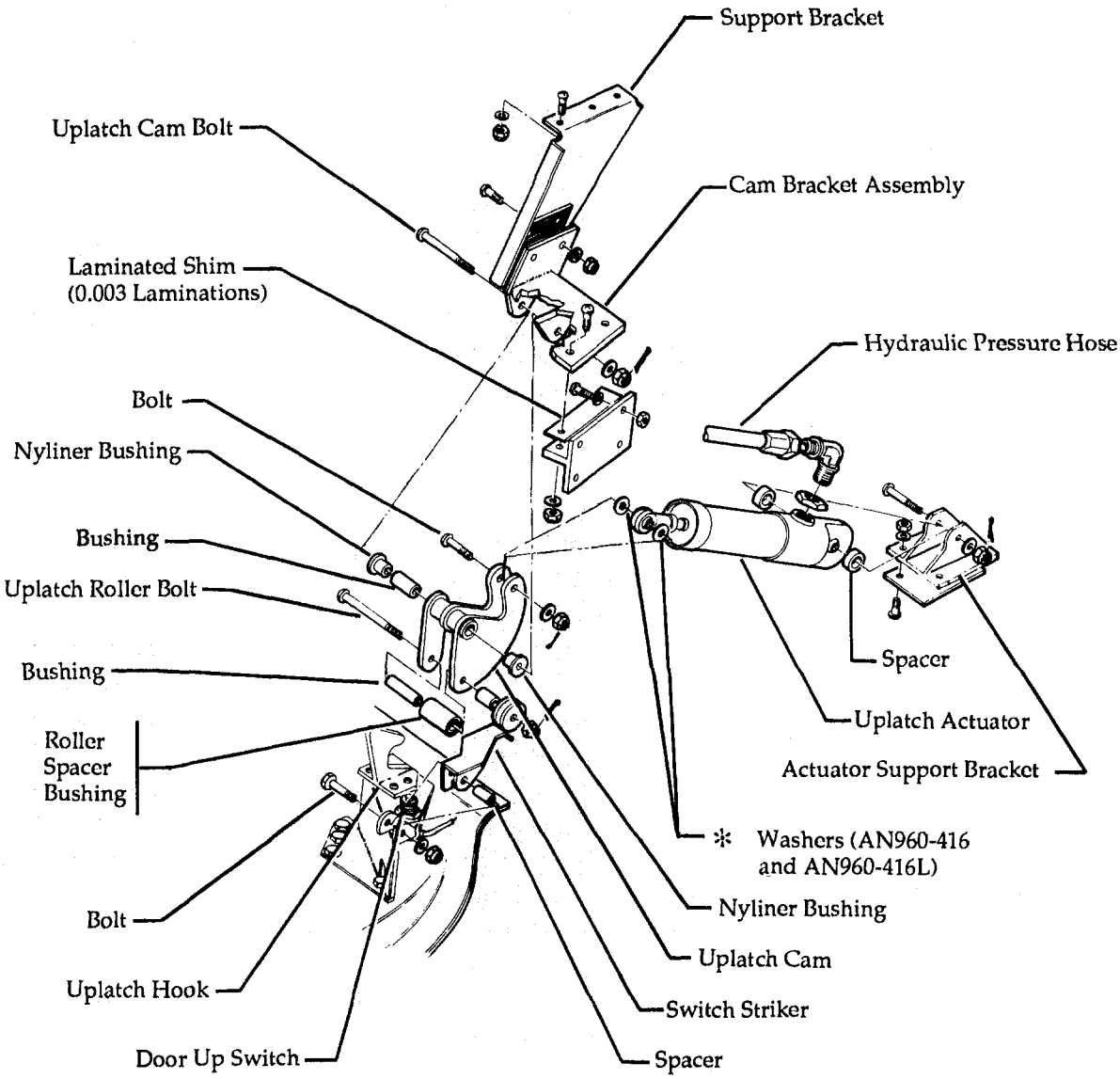
1. Removal/Installation

A. Remove Uplatch Mechanism (See Figure 201.)
(1) *Place aircraft on jacks. (Refer to Chapter 7.)*
(2) Remove electrical power from aircraft.
(3) Depressurize hydraulic system. (Refer to Chapter 29.)
(4) Remove attaching parts securing uplatch actuator to uplatch cam.
(5) Remove uplatch cam bolt securing uplatch cam to cam bracket assembly. Remove uplatch cam from aircraft.
(6) Check condition of spacers, roller, bushings, bolts, and bolt holes of mechanism. (Refer to Structural Repair Manual [SRM-4]).

B. Install Uplatch Mechanism (See Figure 201.)
(1) Replace any badly worn spacers, rollers, bushings, bolts or mechanism assembly (if bolt holes are worn).
(2) Position uplatch mechanism on cam bracket assembly and install uplatch cam bolt and secure.
(3) Adjust uplatch mechanism. (Refer to Adjustment/Test, this section.)
(4) Remove aircraft from jacks. (Refer to Chapter 7.)

2. Adjustment/Test

A. Adjust Uplatch Mechanism (See Figure 202.)
(1) Place aircraft on jacks and disconnect electrical power from aircraft. (Refer to Chapter 7.)
(2) Connect auxiliary hydraulic power cart to aircraft and pressurize hydraulic system.
(3) Disconnect outboard door linkage and fully retract gear.
(4) *On Aircraft equipped with short uplatch hook*, loosen attaching parts of cam bracket assembly and adjust uplatch cam bracket to obtain 0.10 (±0.03) inch between uplatch roller and top of uplatch hook. Adjust laminated shim, if necessary, to keep mechanism assembly in proper alignment.
(5) *On Aircraft equipped with long uplatch hook*, loosen attaching parts of cam bracket assembly and adjust uplatch cam bracket to obtain 0.25 (±0.03) inch between uplatch roller and top of uplatch hook. *Adjust laminated shim, if necessary, to keep mechanism assembly in proper alignment.*
(6) Adjust uplatch actuator rod end until roller contacts back of hook, then back off 1/2 turn to next terminal index and safety wire rod end using MS20995C32 lock wire.
(7) Release hydraulic pressure so that door hook hangs on uplatch roller.
(8) Attach an ohmmeter to No. 1 and 3 wires of door up switch.
(9) Adjust door up switch jamnuts until ohmmeter actuation occurs; then one more revolution beyond point where actuation occurs. This will provide positive actuation of switch.
(10) Secure jamnuts and safety wire.
(11) Extend landing gear and connect outboard door linkage. Slowly cycle landing gear and check for proper engagement of uplatch mechanism.
(12) Remove aircraft from jacks.
(13) Restore aircraft to normal.

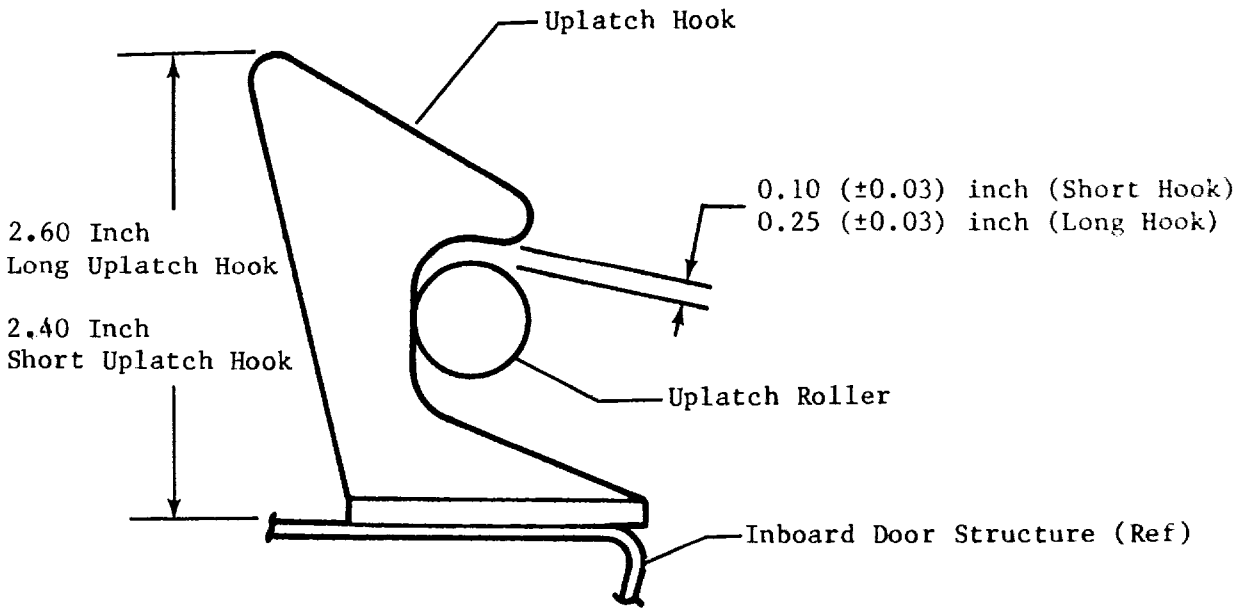


(RH SHOWN, LH TYPICAL)

* ***(Effective 35-659 and Subsequent, 36-064 and Subsequent)***

6-5C-2

Main Gear Inboard Door Uplatch Installation
Figure 201



NOTE: Measure from base of uplatch hook to top of uplatch hook to determine which hook (long or short) is installed. Adjust uplatch cam bracket accordingly.

Main Gear Inboard Door Uplatch Adjustmemt
Figure 202

MAIN GEAR INBOARD DOOR ACTUATOR - MAINTENANCE PRACTICES

1. Removal/Installation

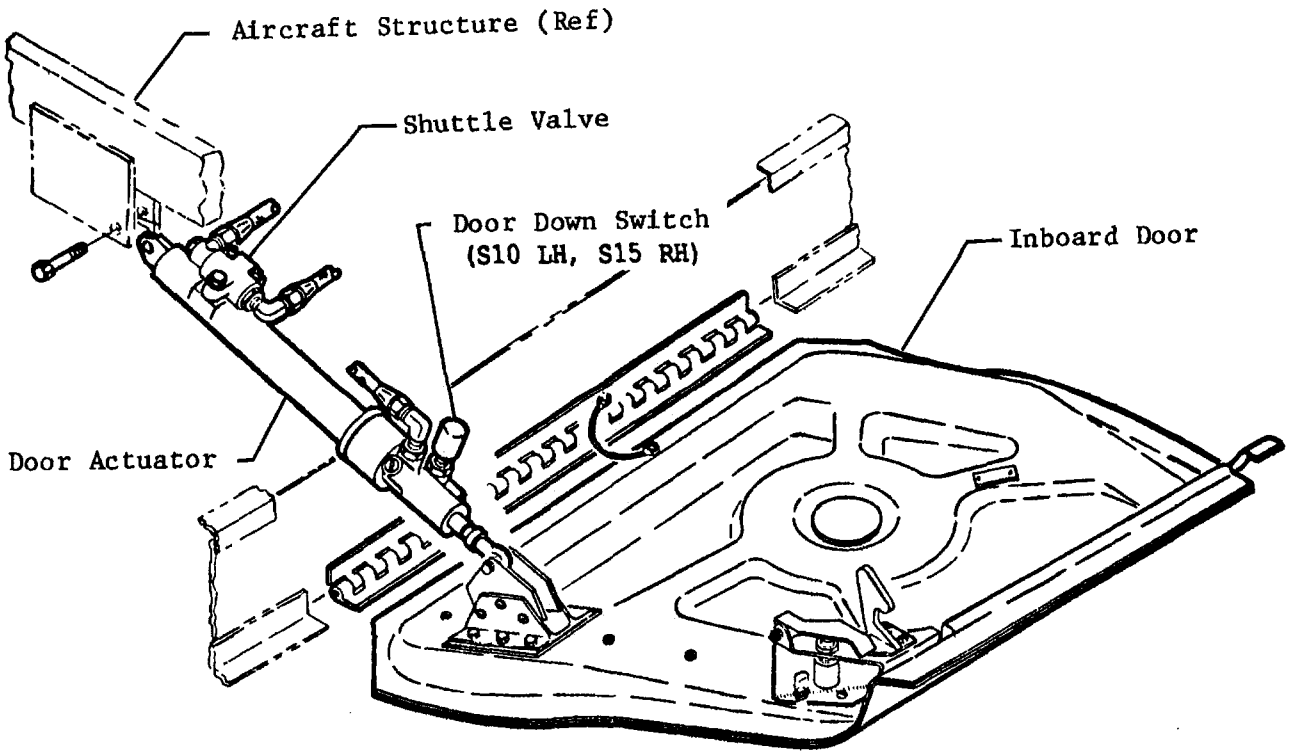
A. Remove Main Gear Inboard Door Actuator (See Figure 201.)
(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Open tailcone access door and disconnect both battery quick-disconnects.
(3) Depressurize the hydraulic system. (Refer to Chapter 29.)
(4) Lower inboard gear door as follows:
(a) With one (1) person pumping brakes, a person at the gear door must release uplatch hook and pull door to the down position.
(5) *On Aircraft not modified per SB 35/36-32-19*, remove screws and universal bolt securing shuttle valve to actuator and cap exposed fittings.
(6) *On Aircraft modified per SB 35/36-32-19*, disconnect hydraulic and air hoses from shuttle valve. Cap exposed fittings
(7) Remove attaching parts securing actuator to door. Push actuator rod in (retracted position).
(8) Disconnect hydraulic hoses from actuator. Cap and plug exposed fittings.
(9) Remove safety wire from switch and loosen jamnut.
(10) Remove attaching parts securing actuator to aircraft structure.
(11) Holding switch steady, unscrew actuator from switch. This will prevent twisting of electrical wiring. Count the number of revolutions it takes to disengage switch from actuator.
(12) Ensure Door Down Switch actuating ball will not be lost.
(13) Secure hoses and Door Down Switch to aircraft frame.

B. Install Main Gear Inboard Door Actuator (See Figure 201.)

NOTE: *On Aircraft not modified per SB 35/36-32-19*, if actuator is to be replaced, remove shuttle valve from old actuator and install on new actuator. Refer steps B.(1) and B.(2). If old actuator is to be installed, refer to step B.(3).

(1) Check condition of gaskets and replace if necessary.
(2) Assemble gasket, washer, and shuttle valve on actuator. Position secure shuttle valve to actuator and secure using attaching parts.
(3) Ensure Door Down Switch actuating ball is in actuator.
(4) Holding switch steady, screw actuator on to switch the same number of revolutions as counted in step A.(11). Ensure switch wiring is aligned with actuator.
(5) Snug up jamnut, but do not tighten or safetywire at this time.
(6) Position actuator on aircraft structure and secure with attaching parts.
(7) *On Aircraft modified per SB 35/36-32-19*, connect hydraulic and air hose to shuttle valve.
(8) Remove caps and plugs and connect hydraulic hoses to actuator. Ensure proper hose connection.
(9) Pull actuator rod to extend position and connect to inboard door. Secure with attaching parts.
(10) Adjust Door Down Switch. (Refer to 32-30-03, Adjustment/Test.)
(11) Connect battery quick-disconnect.
(12) Pressurize hydraulic system using an auxiliary hydraulic power source. (Refer to Chapter 29.)
(13) Bleed extension and retraction system. (Refer to 32-30-00, Adjustment/Test.)
(14) Cycle gear and check for proper operation.

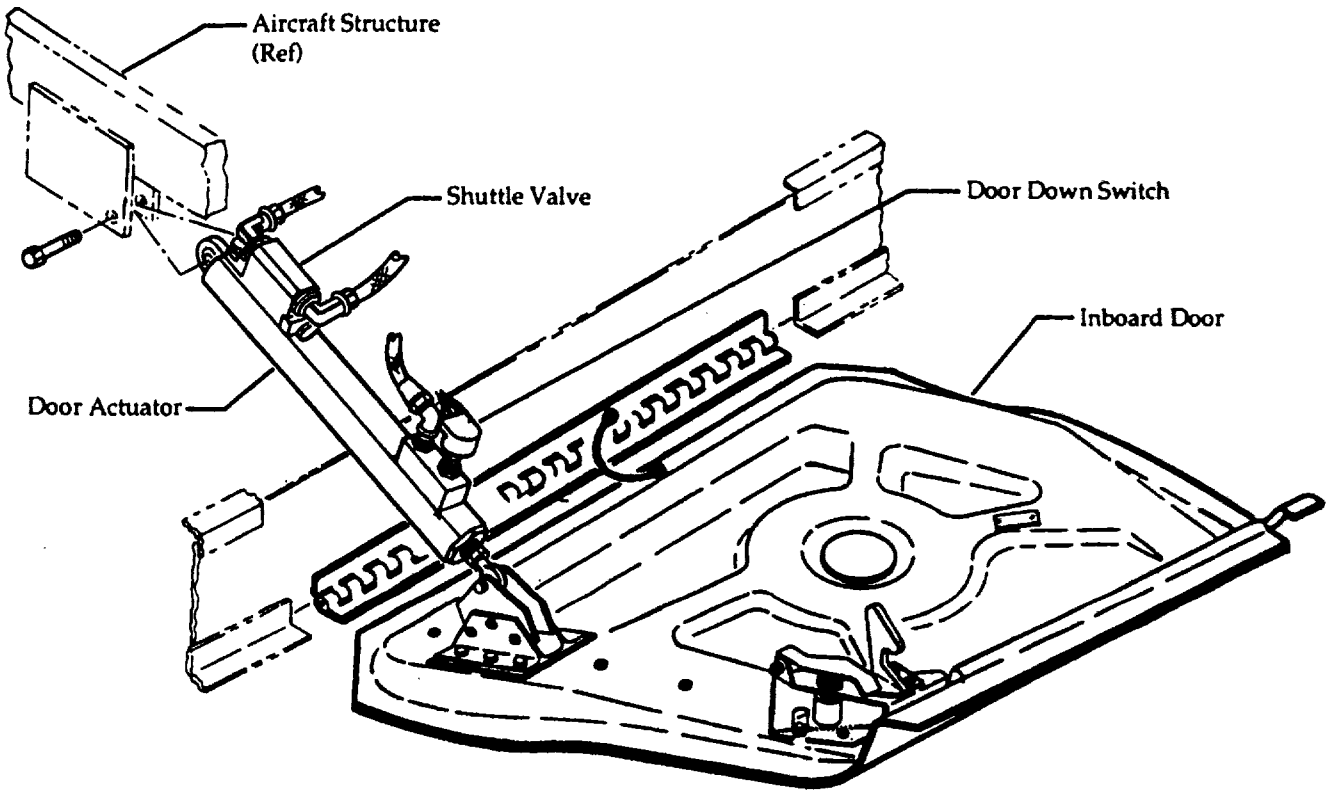
(15) Perform Functional Test of Landing Gear Emergency Extension System. (Refer to 32-33-00, Adjustment/Test.)
(16) Ensure that gear selector switch is DN, and remove aircraft from jacks. (Refer to Chapter 7.)



Aircraft not Modified per SB 35/36-32-19.

11-86A
6-6C

Main Gear Inboard Door Actuator Installation
Figure 201 (Sheet 1 of 2)



6-59B

Main Gear Inboard Door Actuator Installation
Figure 201 (Sheet 2 of 2)

2. Repairs

A. Main gear inboard gear actuator *(Aircraft Equipped with Actuator P/N 2397102-803)* are no longer considered field repairable. Return actuators to vendor (Gar-Kenyon Controls Division, New Haven, CT) for repairs.

B. Disassemble Main Gear Inboard Door Actuator *(Aircraft Equipped with Actuator P/N 48C48608-102)* (See Figure 202.)

(1) Acquire necessary tools and equipment.

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Stoddard Solvent		Commercially Available	Clean parts.
Compressed Air Source		Commercially Available	Dry parts.

(2) Cut safety wire and remove rod end lock, locknut, and rod end from piston rod.
(3) Loosen spanner nut and unscrew cap from body. Remove piston rod from body.
(4) Remove retainer ring, washer, scraper ring, felt wiper, spacer, and all O-rings and backup rings from cylinder body, piston head, and cap.
(5) Unscrew piston head from piston rod. Remove O-rings and backup rings from piston rod. Retain spacer for reinstallation.
(6) Remove plug from cap to gain access to actuating pin. Insert a small screwdriver through hole in cap and remove actuating pin from piston.
(7) Insert screwdriver through hole into slot in sleeve. Remove sleeve, stem, and actuating ball from cap.
(8) Slowly remove plug from cap, releasing tension on spring. Remove spring and piston from cap. Remove O-rings and backup rings from piston.

WARNING: DRY-CLEANING SOLVENTS ARE TOXIC AND VOLATILE. USE IN WELL VENTILATED ROOM. AVOID CONTACT WITH SKIN OR CLOTHING. DO NOT INHALE VAPORS.

(9) Clean all parts in Stoddard solvent or equivalent and dry with clean, dry, compressed air.
(10) Inspect all parts for nicks, scratches, or excessive wear. Replace defective parts.

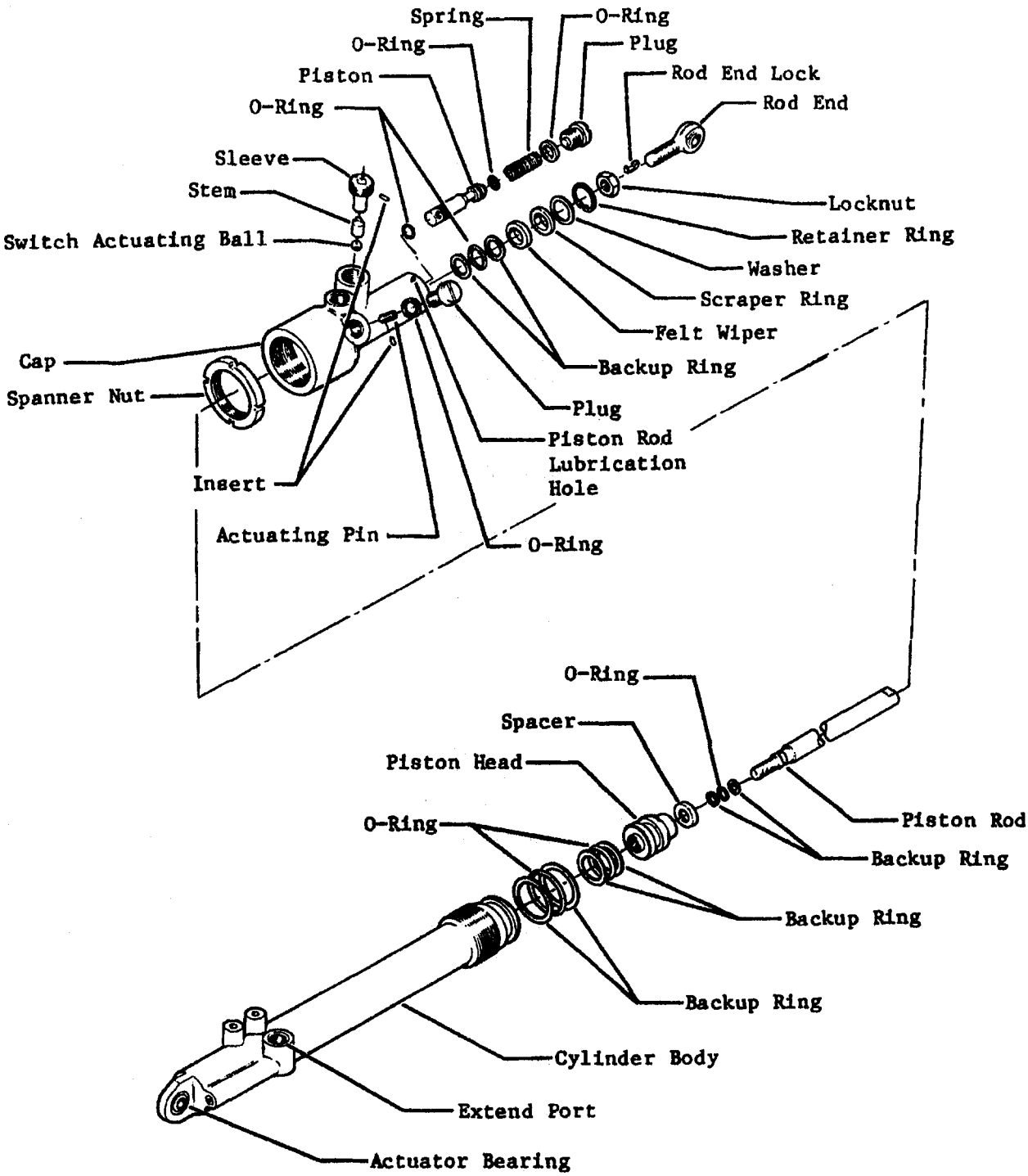
C. Assemble Main Gear Inboard Door Actuator *(Aircraft Equipped with Actuator P/N 48C48608-102)* (See Figure 202.)

(1) Acquire necessary tools and equipment.

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Stoddard Solvent		Commercially Available	Clean parts.
Hydraulic Fluid	MIL-H-5606	Commercially Available	Lubricate seals, O-rings, backup rings, wipers, and AGT rings.
Safety Wire	MS20995C32	Commercially Available	Safety components.
Hydraulic Power Source		Commercially Available	Testing actuator.

(2) Immerse all O-rings and backup rings in MIL-H-5606 hydraulic fluid prior to installation.
(3) Install O-rings and backup rings on piston and insert piston in cap as far as possible. Install actuating pin in piston. Install O-ring on plug and install plug in cap.
(4) Install O-ring on plug and install spring and plug in cap.
(5) Insert actuating ball, stem, and sleeve in cap. Insert screwdriver into slot in sleeve and tighten.
(6) Assemble O-ring, spacer, and backup rings on piston rod and screw piston head on piston rod.
(7) Assemble O-ring and backup rings in body. Assemble O-ring and backup rings on piston head. Insert piston rod (with piston head attached) in body.
(8) Assemble O-ring, backup rings, and felt wiper in cap. Slip cap over piston rod and screw cap on body as far as possible. Tighten spanner nut against cap and safety wire.
(9) Assemble scraper ring, washer, and retainer ring in end of cap. Install rod end, locknuts, and rod end lock on piston rod.
(10) With piston rod fully bottomed, adjust rod end for 17.55 inches [44.58 cm] between centerlines of actuator bearing and rod end bearing and safety wire.
(11) Rotate rod end to align lock key with nearest slot in piston, install key in slot, and hand tighten locknut against piston. Tighten locknut 1/16 to 3/32 of a turn to secure, and install safety wire.
(12) Lubricate the main inboard gear door actuator piston rod end felt wiper. Lubrication is accomplished through the lubrication hole on the rod end of the actuator. Lubricate only with MIL-H-5606 hydraulic fluid.
(13) Connect a hydraulic power source to the extend and retract ports of the actuator. Pressure check at 2250 psi [15.5 MPa] for three (3) minutes in both the extend and retract positions. Leakage rate should not exceed one drop in the 3-minute period.
(14) Remove hydraulic pressure source from the extend and retract ports of actuator.
(15) Secure Door Down Switch actuating ball in housing to ensure ball is not lost.



Main Gear Inboard Door Actuator Assembly
Figure 202

MAIN GEAR INBOARD DOOR UPLATCH ACTUATOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - A. **Remove Uplatch Actuator** (See figure 201.)
     - (1) Place aircraft on jacks. (Refer to Chapter 7.)
     - (2) Remove electrical power from aircraft.
     - (3) Depressurize hydraulic system. (Refer to Chapter 29.)
     - (4) Disconnect hydraulic hose from uplatch actuator. Cap and plug exposed hydraulic fittings.
     - (5) Remove attaching parts and actuator from aircraft.
   - B. **Install Uplatch Actuator** (See figure 201.)
     - (1) Install actuator and secure with attaching parts.
     - (2) Connect hydraulic hose to uplatch actuator.
     - (3) Adjust uplatch mechanism. (Refer to Adjustment/Test, 32-31-02.)
     - (4) Restore electrical power to aircraft.
     - (5) Remove aircraft from jacks.

2. **APPROVED REPAIRS**
   - A. **Disassemble Uplatch Actuator** (See figure 202.)
     - (1) Cut safety wire and loosen locknut sufficiently to release rod end lock from piston rod. Remove rod end, rod end lock, and locknut from piston rod.

       WARNING: USE EXTREME CARE WHEN REMOVING LOCK RING AND PLUG FROM BARREL. THE ACTUATOR IS SPRING LOADED TO 40 POUNDS IN THE RETRACTED POSITION AND COULD SPRING OUT OF CONTROL, CAUSING BODILY INJURY.

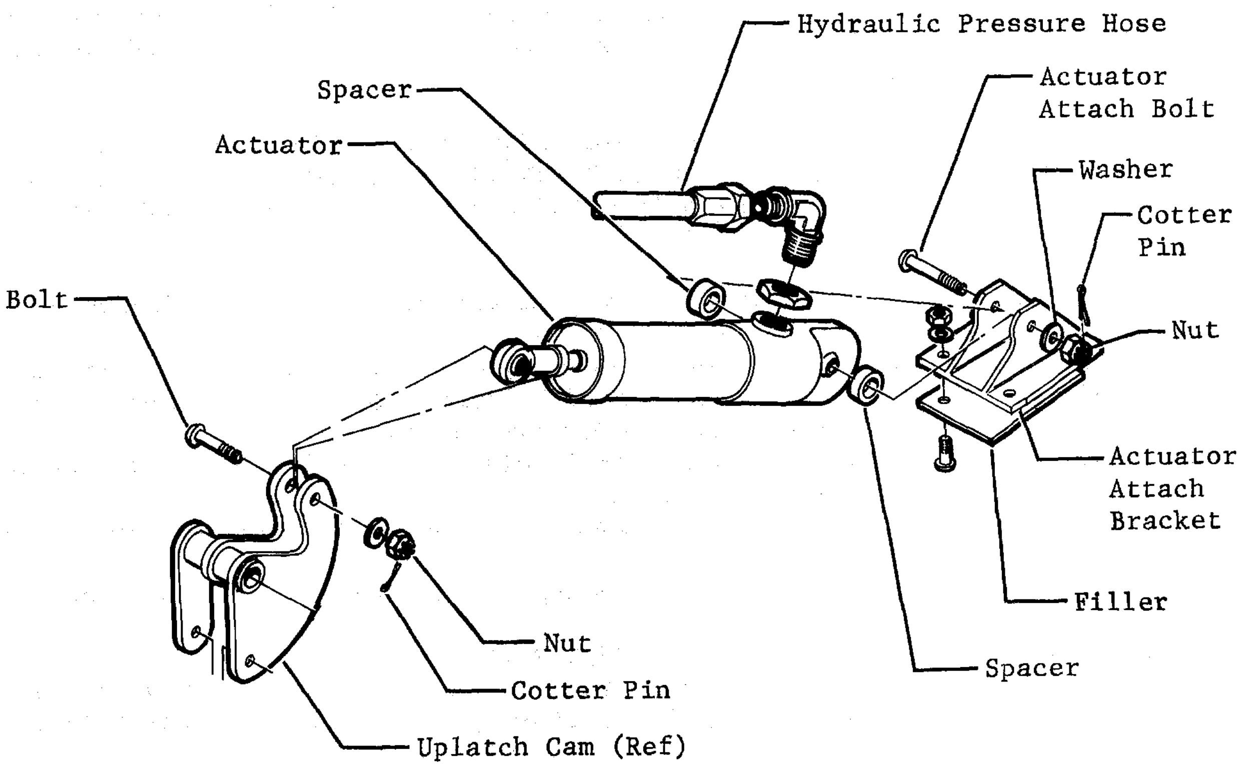
     - (2) Press plug inboard to allow removal of lock ring. Remove lock ring and slowly release plug.
     - (3) When spring tension is released, remove plug and spring from barrel.
     - (4) Remove piston rod from barrel. Remove O-ring and backup rings from piston rod. Remove felt wiper from plug.
     - (5) Clean all parts with Stoddard solvent or equivalent. Dry parts with clean, dry, compressed air.
     - (6) Inspect all parts for nicks, scratches, or excessive wear. Replace defective parts.
     - (7) Buff out minor scratches using an oil stone and polish with crocus cloth.
   - B. **Assemble Uplatch Actuator** (See figure 202.)
     - (1) Use new O-rings, backup rings, and felt wiper at each assembly. Immerse these items in MIL-H-5606 hydraulic fluid immediately prior to installation.
     - (2) Assemble O-ring and backup rings on piston rod and insert felt wiper in plug.
     - (3) Position piston rod and spring in barrel. Install plug on piston rod and push in, compressing spring sufficiently to allow installation of lock ring.

(4) Install lock ring and slowly release plug until firmly seated against lock ring.
(5) Install rod end lock, lock nut, and rod end on piston rod.
(6) Perform functional test of uplatch actuator. (Refer to Adjustment/Test.)

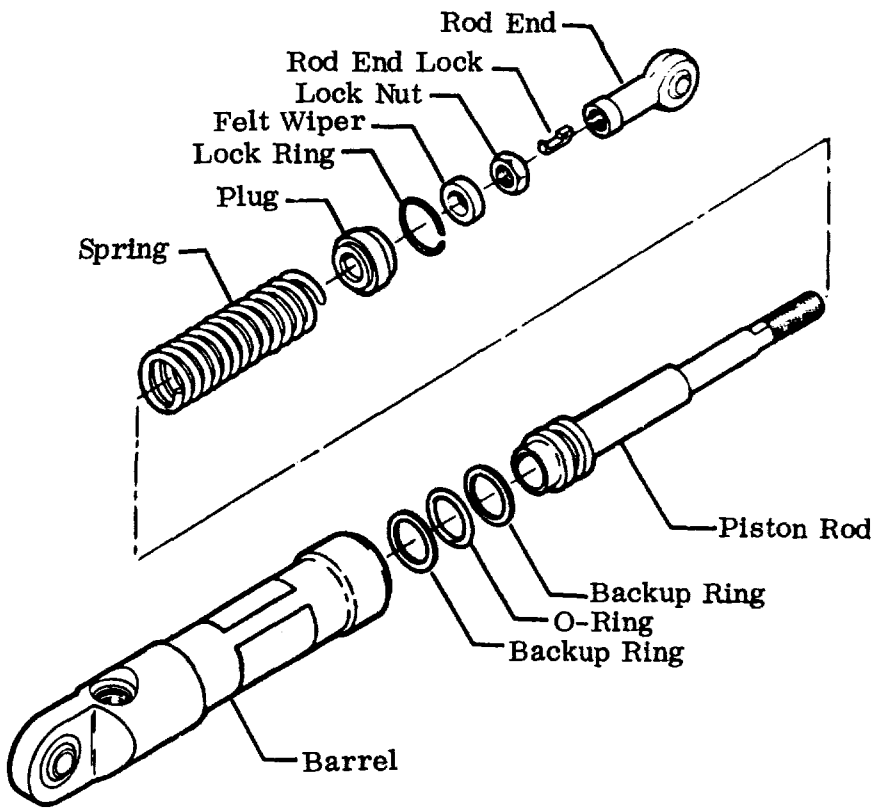
3. **ADJUSTMENT/TEST**

A. **Functional Test of Uplatch Actuator**

(1) Connect actuator to a hydraulic source and pressure check at 2250 psi for 3 minutes. Leakage rate shall not exceed one drop in the 3 minute period.
(2) While actuator is in the extended position, adjust for 9.34 (±0.015) inches distance between centerlines of rod end and actuator bearing.
(3) Remove hydraulic pressure and check retracted length of 8.44 (±0.045) inches. Safety wire rod end lock in place using MS20995C32 lock wire.



Main Gear Inboard Door Uplatch Actuator Installation
Figure 201



Main Gear Inboard Door Uplatch Actuator Assembly
Figure 202

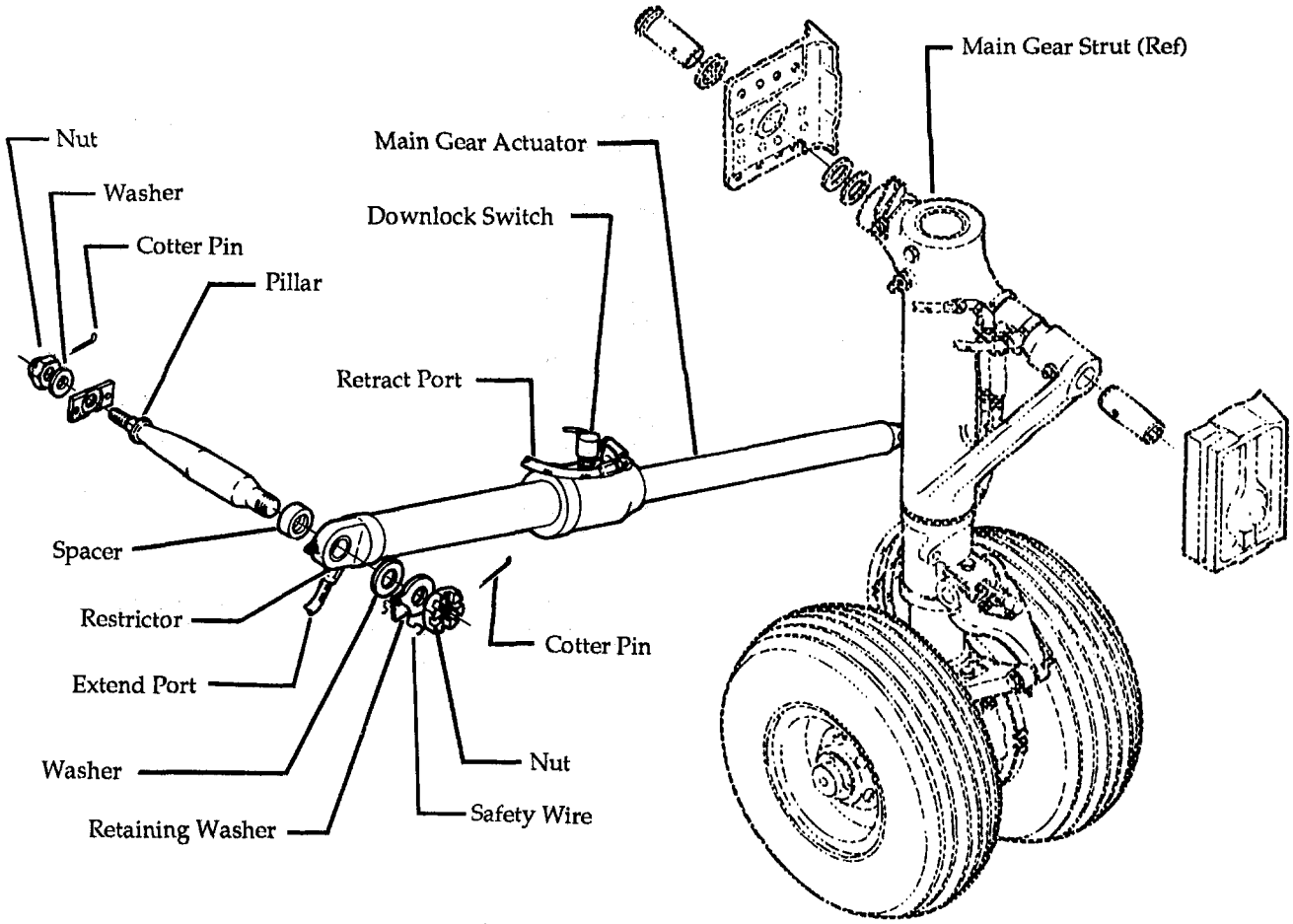
MAIN GEAR ACTUATOR PILLAR - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: Removal and installation procedures for both Actuator Pillars are identical.

A. Remove Main Gear Actuator Pillar (See figure 201.)
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Lower tailcone access door and disconnect batteries.
   (3) Depressurize hydraulic system. (Refer to Chapter 29.)
   (4) Remove electrical power from aircraft. Pull and tag Gear circuit breaker on copilot's circuit breaker panel.
   (5) Remove wing fairing from aft side of wheel well and fuselage panel inboard of fairing allowing access to pillar nut aft of spar 8.
   (6) Cut safety wire (noting manner in which safety wire is installed) and remove cotter pin, nut, retaining washer, and washer securing actuator to forward end of pillar.
   (7) Remove actuator and spacer from pillar and secure actuator with safety wire or rope in a position that allows removal of pillar through wheel well, yet keeps hydraulic hoses and electrical wires from being strained.
   (8) Remove cotter pin, nut, and washer from aft end of pillar.
   (9) Remove pillar through wheel well.

B. Install Main Gear Actuator Pillar (See figure 201.)
   (1) Insert pillar through bearing in spar 7 and through square hole in spar 8.
   (2) Secure aft end of pillar with attaching parts.
   (3) Position spacer and actuator on pillar and secure with attaching parts. Safety wire.
   (4) Restore electrical power to aircraft.
   (5) Remove tag and depress gear circuit breaker.
   (6) Pressurize hydraulic system, cycle landing gear system, and check for proper gear indication and operation.
   (7) Install panel and fairing removed for access to aft end of pillar.
   (8) Close tailcone access door.
   (9) Remove aircraft from jacks.
   (10) With the aircraft fully fueled and resting on landing gear, check main gear struts perpendicular position to ground. (Refer to 32-11-00, Adjustment/Test, Main Landing Gear Rigging.)
   (11) Restore aircraft to normal.



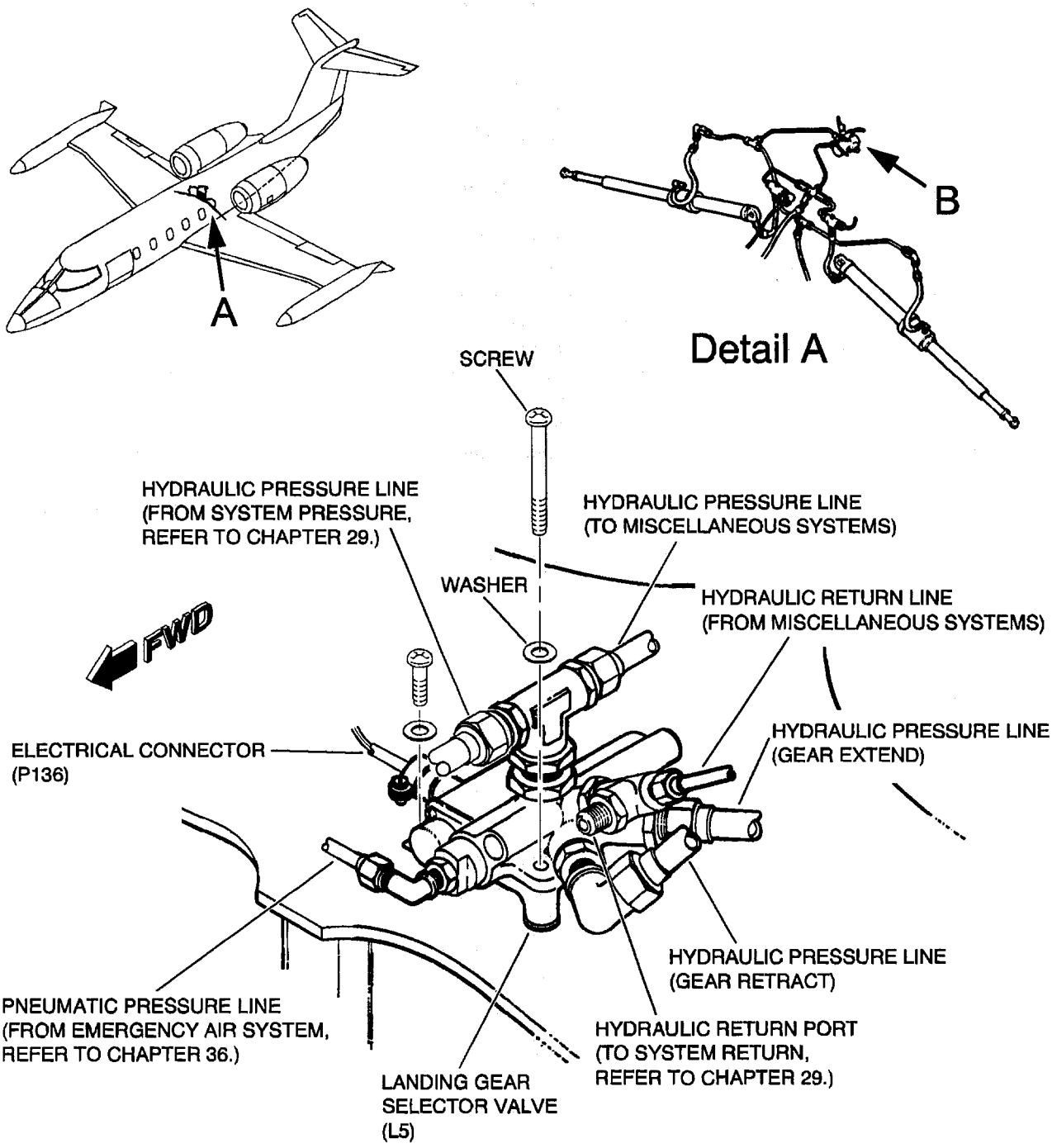
Main Gear Actuator Pillar Installation
Figure 201

LANDING GEAR SELECTOR VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of Landing Gear Selector Valve (L5) (See Figure 201.)
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Set Battery Switches off and disconnect aircraft batteries.
   (3) Drain hydraulic reservoir. (Refer to Chapter 29.)
   (4) Disconnect and identify all hydraulic and pneumatic lines from landing gear selector valve. Cap or plug all openings.
   (5) Disconnect and bag electrical connector (P136) from landing gear selector valve.
   (6) Remove attaching parts and landing gear selector valve from aircraft.

B. Installation of Landing Gear Selector Valve (L5) (See Figure 201.)
   (1) Position landing gear selector valve and secure with attaching parts.
   (2) Identify and connect all hydraulic and pneumatic lines.
   (3) Remove bag and connect electrical connector (P136) to landing gear selector valve.
   (4) Connect electrical connectors to aircraft batteries.
   (5) Service hydraulic system as required. (Refer to Chapter 12.)
   (6) Perform Functional Test of Landing Gear Emergency Freefall/Blowdown Extension Systems. (Refer to 32-33-00, Adjustment/Test.)
   (7) Perform Operational Check of Landing Gear Retraction/Extension. (Refer to 32-30-00, Inspection/Check.)
   (8) Remove aircraft from jacks. (Refer to Chapter 7.)



11-13C-5

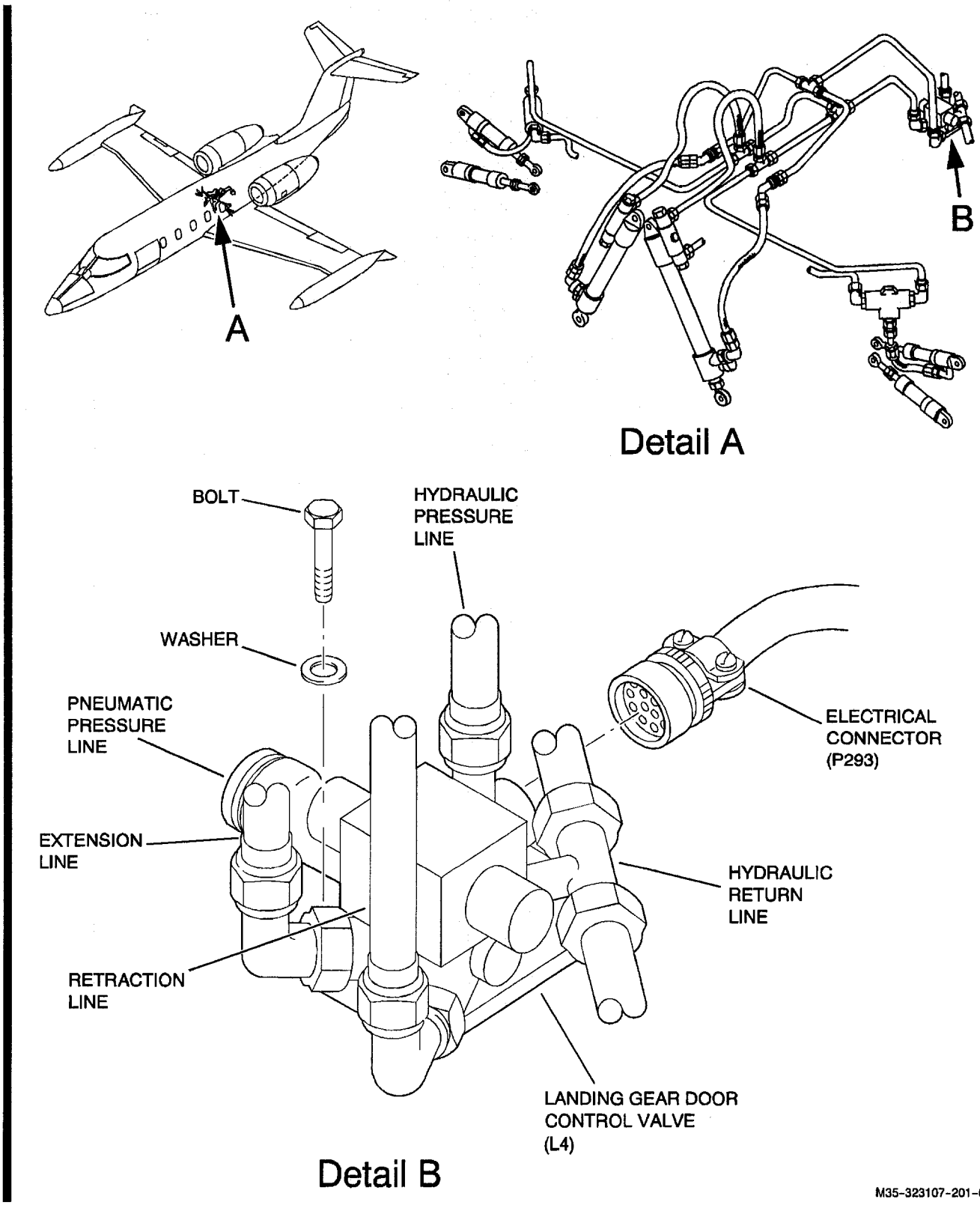
Landing Gear Selector Valve Installation
Figure 201

LANDING GEAR DOOR CONTROL VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of Landing Gear Door Control Valve (L4) (See Figure 201.)
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Set Battery Switches off and disconnect aircraft batteries.
   (3) Depressurize hydraulic system. (Refer to Chapter 29.)
   (4) Disconnect and identify all hydraulic and pneumatic lines. Cap or plug all openings.
   (5) Disconnect and bag electrical connector (P293) from landing gear selector valve.
   (6) Remove attaching parts and landing gear door control valve from aircraft.

B. Installation of Landing Gear Door Control Valve (L4) (See Figure 201.)
   (1) Position landing gear door control valve and secure with attaching parts.
   (2) Identify and connect all hydraulic and pneumatic lines.
   (3) Remove bag and connect electrical connector (P293) to landing gear selector valve.
   (4) Connect electrical connectors to aircraft batteries.
   (5) Service hydraulic system as required. (Refer to Chapter 12.)
   (6) Perform Functional Test of Landing Gear Emergency Extension Systems. (Refer to 32-33-00, Adjustment/Test.)
   (7) Perform Operational Check of Landing Gear Retraction/Extension. (Refer to 32-30-00, Inspection/Check.)
   (8) Remove aircraft from jacks. (Refer to Chapter 7.)



11-13C-6

Landing Gear Door Control Valve Installation
Figure 201

NOSE GEAR EXTENSION AND RETRACTION - DESCRIPTION AND OPERATION

1. **Operation**
   A. The nose gear is retracted and extended by an actuator which is attached to the shock strut and to the fuselage structure. A spring load built into the actuator drives a sleeve arrangement which entraps 10 steel balls engaging a notch in the piston rod to cause a positive mechanical locking action when the nose gear is in the down position. An integral switch in the actuator transmits a gear down and locked indication (green LOCKED DN annunciator) when the sleeve has extended over the locking arrangement. To retract the gear, hydraulic pressure in excess of 250 pounds is required to retract the sleeve assembly against the drive spring and release the downlock mechanism to permit gear retraction. During an emergency, the actuator is extended pneumatically to the down position.
   B. *On Aircraft 35-002 thru 35-673 and 36-002 thru 36-063*, the priority valve is a 500 to 550 psi valve located in the nose gear extend line. During gear retraction the priority valve offers no restriction to fluid flow. During gear extension the priority valve initially stops fluid flow for nose gear extension allowing full hydraulic pump flow to the main gear. When system pressure exceeds 500 to 550 psi, fluid flow is admitted through the priority valve allowing nose gear extension.

PRIORITY VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Priority Valve. (See Figure 201.)

(1) Depressurize hydraulic system. (Refer to Chapter 29.)
(2) Remove electrical power from aircraft.
(3) Disconnect and cap hydraulic lines at priority valve.

NOTE: The priority valve is located at the right rear of the nose wheel well on Frame 5.

(4) Remove clamp and priority valve from aircraft.

B. Install Priority Valve. (See Figure 201.)

(1) Install priority valve and secure with clamp.

NOTE: Install priority valve with pressure end to hydraulic system plumbing and return end to actuator plumbing. Free flow arrow will point down.

(2) Connect hydraulic lines to priority valve.
(3) Pressurize and bleed hydraulic system.
(4) Restore electrical power to aircraft.
(5) Cycle gear and check for proper operation.
(6) Restore aircraft to normal.

2. Approved Repairs

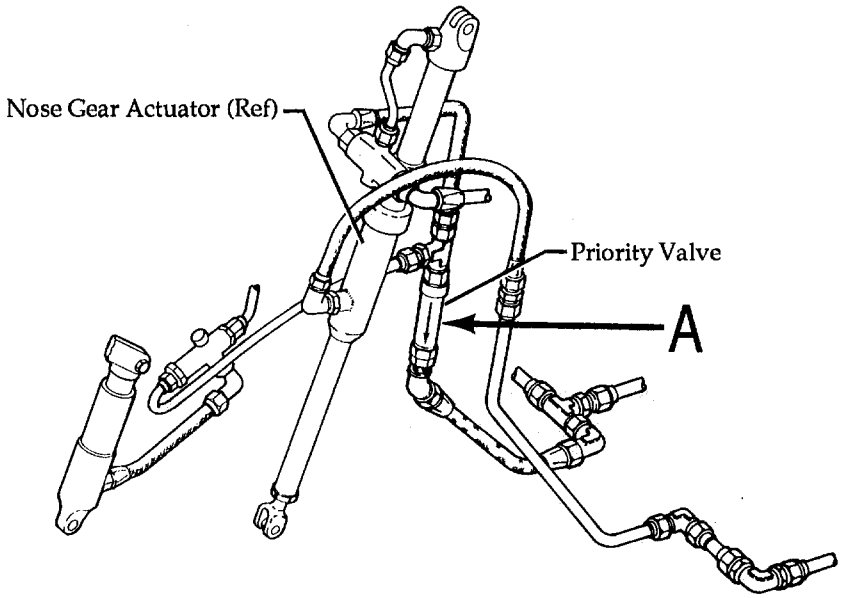
A. Disassemble Priority Valve. (See Figure 201, Detail A.)

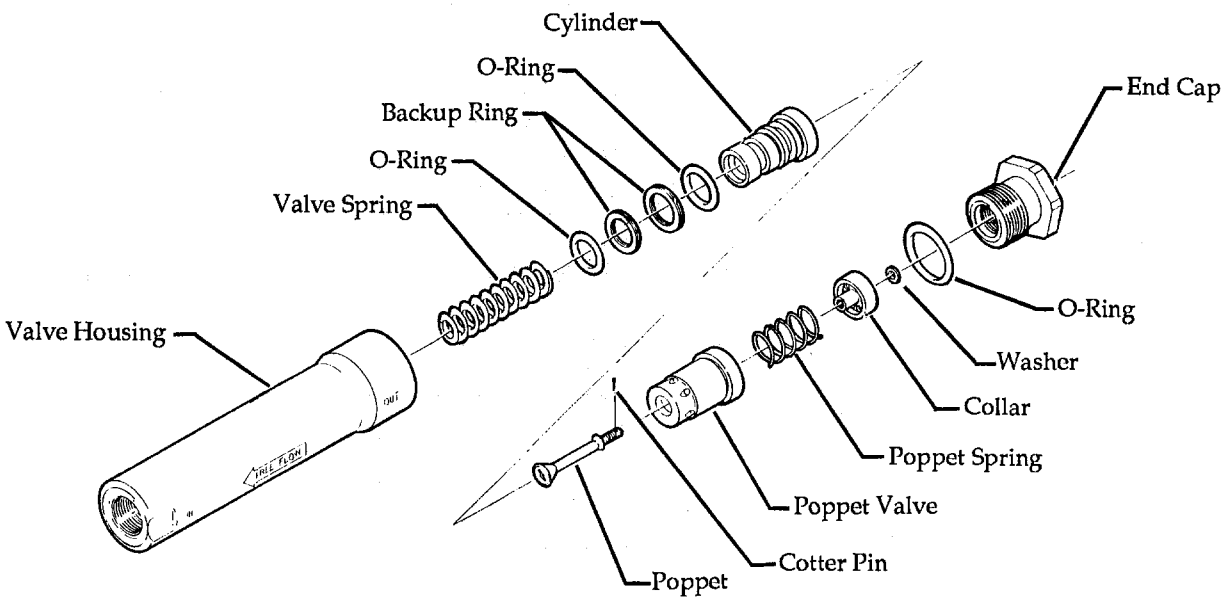
WARNING: PRIORITY VALVE IS SPRING LOADED. CAREFULLY REMOVE END CAP TO RELEASE SPRING TENSION OR BODILY INJURY MAY OCCUR.

(1) Remove end cap from valve housing.
(2) Remove poppet valve, cylinder, and valve spring from valve housing. The adjustment screw, located in the valve housing, is factory set; no adjustment is allowed.
(3) Remove cotter pin and washer from poppet and unscrew collar from poppet.
(4) Remove poppet and poppet spring from poppet valve.
(5) Remove and discard O-rings and backup rings from cylinder and end cap.
(6) Clean all parts in Stoddard solvent and air dry.
(7) Inspect all parts for nicks, scratches, or badly worn areas, paying particular attention to poppet valve and cylinder areas.
(8) If parts are badly worn or nicked, replace valve.

B. Assembly Priority Valve. (See Figure 201, Detail A.)

(1) Install all O-rings and backup rings on cylinder. Install O-ring on end cap.
(2) Install poppet and spring in poppet valve. Screw collar on poppet and install washer and cotter pin.
(3) Insert valve spring, cylinder, and poppet valve in valve housing.
(4) Install end cap.
(5) Connect a pressure source to valve port marked PRESS. With pressure set at 5 psi, leakage rate shall not exceed 6 cc's in 3 minutes.
(6) Connect pressure source to valve port marked RET. With opposite end of valve plugged, apply pressure of 2250 psi. There shall be no leakage.





Detail A

11-55C
A6-22B

Priority Valve Installation and Assembly
Figure 201

NOSE GEAR ACTUATOR - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Removal of Nose Gear Actuator (See Figure 201.)
      (1) Place aircraft on jacks. (Refer to Chapter 7.)
      (2) Set Battery Switches off and disconnect electrical connectors from aircraft batteries.
      (3) Depressurize hydraulic system. (Refer to Chapter 29.)
      (4) Remove nose compartment doors and electronic equipment from racks.
      (5) Remove clamp securing shuttle valve to actuator. Disconnect and remove hydraulic line, hose, and elbows from actuator. Cap or plug all exposed hydraulic fittings.
      (6) Remove safety wire and gear down-and-locked switch from actuator.
      (7) Remove clamp securing actuator boot to actuator.
      (8) Remove attaching parts from upper and lower end of actuator and remove actuator through nose compartment. The switch ball will be released by removal of the switch. As actuator is being removed from aircraft, turn actuator to remove switch ball.
   B. Installation of Nose Gear Actuator (See Figure 201.)
      (1) Install actuator in aircraft and secure with attaching parts.
      (2) Secure actuator boot to actuator with clamp.
      (3) Secure shuttle valve to actuator and connect elbow and tube to extend port. Connect elbow and hose to retract port.
      (4) Lubricate nose gear piston rod and felt wiper. (Refer to Chapter 12.)

      CAUTION: THE SWITCH BALL IS TO BE CLEANED, HELD WITH TWEEZERS (NOT WITH FINGERS), AND LIGHTLY SPRAYED WITH LUBRICANT. DO NOT SPRAY LUBRICANT INTO HOLE OF ACTUATOR.

      (5) Install switch ball in actuator and install down-and-locked switch in actuator and adjust switch. (Refer to 32-60-03.)
      (6) Connect electrical connectors to aircraft batteries.
      (7) Pressurize and bleed the hydraulic system.

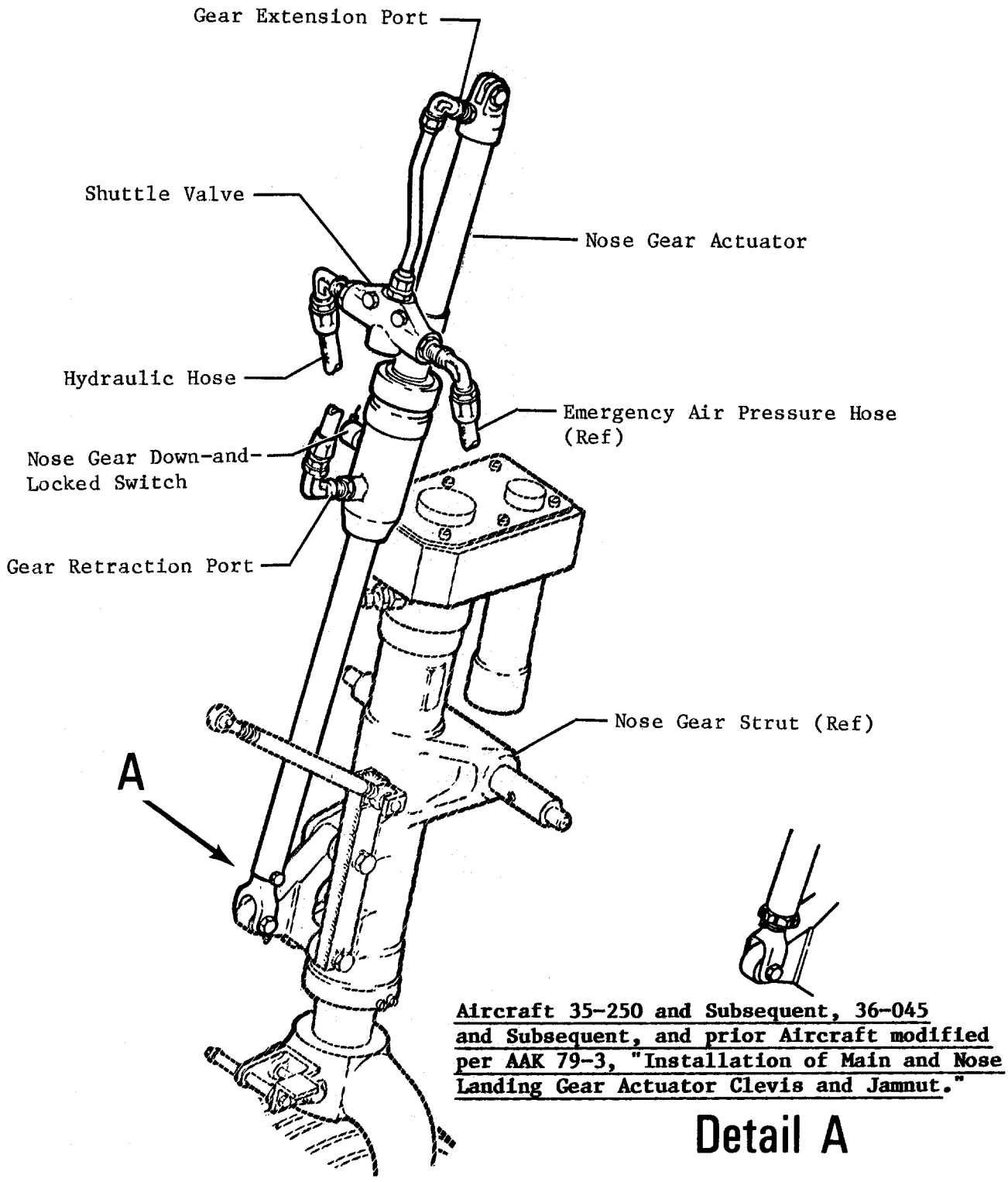
      CAUTION: ENSURE THAT NOSE GEAR SHUTTLE VALVE HYDRAULIC AND EMERGENCY AIR HOSES DO NOT INTERFERE WITH FRAME 5 CONNECTORS OR CHAFE ELECTRICAL WIRING DURING EXTENSION AND RETRACTION.

      (8) While bleeding system, check for proper operation of actuator.
      (9) Install electronic equipment and nose compartment doors.
      (10) Remove aircraft from jacks.

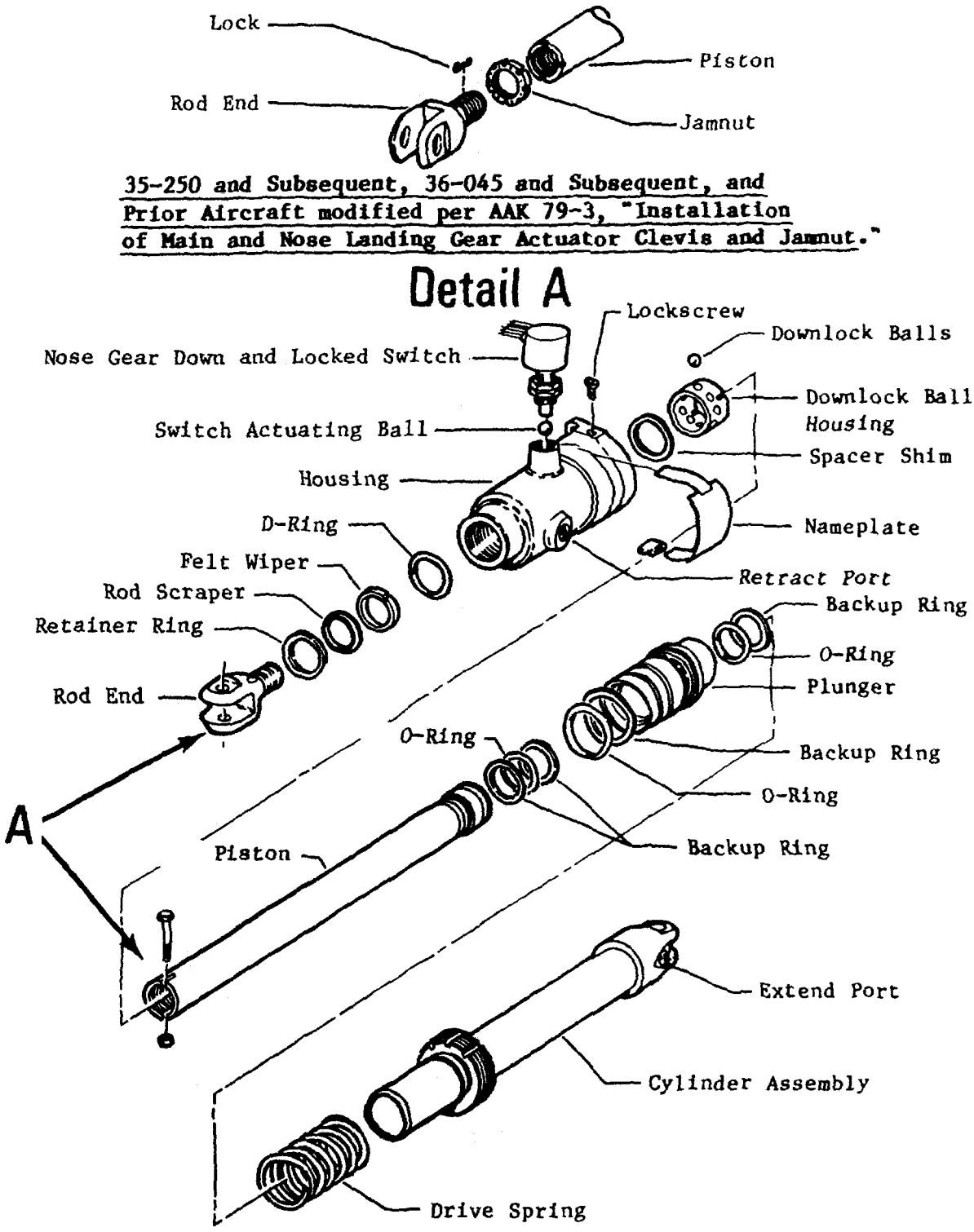
2. **Repairs**
   A. Tools and Equipment

      NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Hydraulic Fluid	MIL-H-5606	Commercially Available	Coat internal surface of parts.
Stoddard Solvent		Commercially Available	Clean parts.

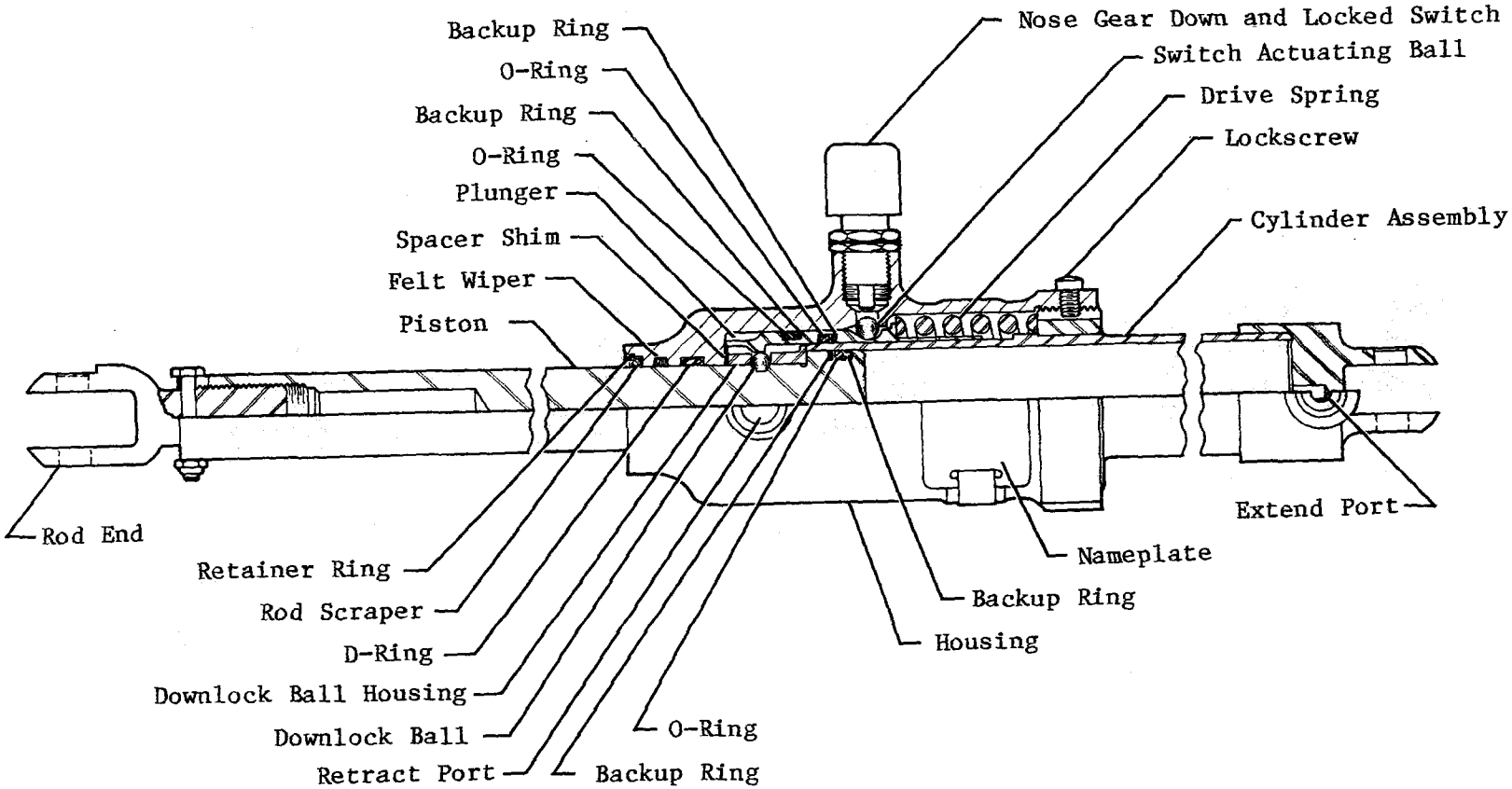


Nose Gear Actuator Installation
Figure 201



11-32B

Nose Gear Actuator Assembly
Figure 202 (Sheet 1 of 2)



Nose Gear Actuator Assembly
Figure 202 (Sheet 2 of 2)

NAME	PART NUMBER	MANUFACTURER	USE
Cloth (lint-free) or Waxed Paper		Commercially Available	Wrap clean parts.
Retaining Compound	Loctite No. RC 680	Commercially Available	Apply to threads.
Preservative	MIL-C-11796	Commercially Available	Coat unplated machined surfaced parts for storage.
Petroleum Jelly	AN-P-51 Vaseline	Commercially Available	Coat plunger.

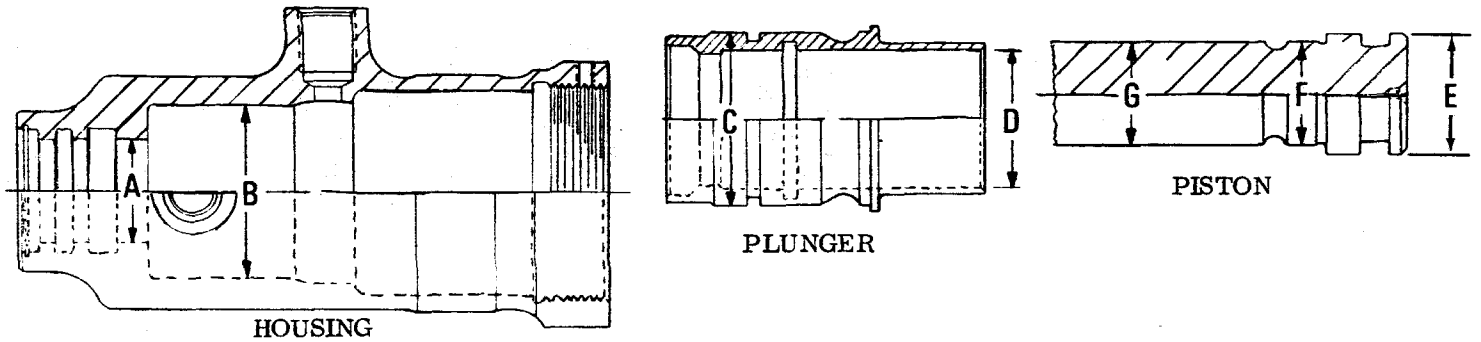
B. Disassemble Nose Gear Actuator. (See Figure 202.)
(1) During disassembly, tag and keep all parts together for assembly into the same unit. Do not remove actuator nameplate unless it is damaged.

WARNING: THE ACTUATOR IS SPRING LOADED TO 161 POUNDS. USE SPECIAL PRECAUTION WHEN UNSCREWING CYLINDER ASSEMBLY FROM HOUSING TO PREVENT EITHER PART FROM SPRINGING OUT OF CONTROL. OTHERWISE BODILY INJURY MAY RESULT.

(2) Remove lockscrew and, while taking care to control actuator spring load, slowly unscrew cylinder assembly and remove from housing.
(3) *On Aircraft 35-002 thru 35-249, 36-002 thru 36-044 not modified per AAK 79-3*, remove nut and bolt attaching rod end to piston and remove rod end from piston. *On Aircraft 35-250 and Subsequent, 36-045 and Subsequent and prior aircraft modified per AAK 79-3*, loosen rod end locknut so that lock key can be extracted from piston. Remove rod end, with lock key and locknut installed, from piston.
(4) Slide piston, spacer shim, drive spring, plunger, and downlock ball housing from housing. Retrieve the downlock balls which will fall free as piston is removed.
(5) Remove retainer ring and rod scraper from housing. Remove and discard D-ring and felt wiper.

WARNING: USE CLEANING SOLVENTS ONLY ON WELL-VENTILATED AREAS. AVOID INHALING SOLVENT VAPORS. KEEP SOLVENT AND SOLVENT CONTAINERS AWAY FROM SPARK OR OPEN FLAME.

(6) Clean metal parts with Stoddard solvent or equivalent. Ensure that no solvent is allowed to remain in internal cavities or surfaces.
(7) Remove all fingerprints from machined surfaces not plated or painted using a suitable fingerprint neutralizer.
(8) Dry metal parts after cleaning with clean, dry, compressed air.
(9) Coat internal surfaces with hydraulic fluid.
(10) Wrap cleaned parts in lint-free cloth or clean, waxed paper while awaiting repair and assembly.
(11) When storing unplated machined surface parts more than a few hours, coat with preservative. Remove preservative prior to assembly of parts.



Nose Gear Actuator Wear Tolerances
Figure 203

NOMENCLATURE	OUTSIDE DIAMETER (INCHES)		INSIDE DIAMETER (INCHES)		TOTAL CLEARANCE DIAMETER (INCHES)		SURFACE FINISH
	ORIGINAL	MINIMUM	ORIGINAL	MAXIMUM	ORIGINAL	MAXIMUM	
Upper and Lower Attach Bolts	0.4367 to 0.4358	0.433					32 RMS
Cylinder Assembly	1.627 to 1.625	1.624	1.438 to 1.436	1.440	0.006 to 0.002	0.016	16 RMS
Plunger (C)	1.990 to 1.988	1.986					32 RMS
Plunger (D)			1.631 to 1.629	1.633	0.006 to 0.002	0.015	32 RMS
Piston (E)	1.434 to 1.432	1.430					32 RMS
Piston (F)	1.124 to 1.122	1.120					32 RMS
Piston (G)	1.124 to 1.122	1.121					16 RMS
Downlock Ball Housing			1.128 to 1.126	1.130	0.006 to 0.002	0.016	32 RMS
Housing (B)			1.994 to 1.992	1.997	0.006 to 0.002	0.017	32 RMS
Housing (A)			1.127 to 1.125	1.131	0.005 to 0.001	0.015	32 RMS

C. Inspect Nose Gear Actuator (See Figure 203.)

NOTE: If an Overhaul, Hard Landing or a Major Landing Gear Inspection is being accomplished on the nose actuator, perform all of the following steps. If only repairs are being accomplished on actuator, omit steps (3) and (4).

(1) Screen drained hydraulic fluid for metal particles which may be used as an aid in determining trouble source.
(2) Inspect all metal parts including welds and machined and forged parts for structural failure, nicks, burrs, cracks, corrosion, worn threads, and excessive wear.
(3) Perform a magnetic-type inspection on all ferrous parts. Perform an etching or fluorescent penetrant check on all aluminum parts. After ferrous parts inspection, demagnetize to remove all metal particles.
(4) Inspect OD and ID surfaces of cylinder assembly, OD surfaces of piston, and ID surfaces of housing for galls, scratches, scoring, corrosion, and worn plating.

NOTE: *Aircraft 35-250 and Subsequent, 36-045 and Subsequent, and prior Aircraft modified per AAK 79-3,* are equipped with a jamnut and lock-type rod end. Aircraft with jamnut type installation should skip steps (5) and (7).

(5) With rod end threaded into piston, check rod end for looseness. If looseness exists between actuator piston and rod end, remove rod end.
(6) Inspect threads of piston and rod end. Replace if damaged.
(7) If threads are not damaged and end play does not exceed 0.004 inch [0.1016 mm], apply Loctite Retaining Compound evenly to threads and install rod end. If looseness exceeds 0.004 inch [.1016 mm], replace defective part.
(8) Check to ensure that spring height is at least 2 inches [5.8 cm] when supporting a 161-pound load.
(9) Buff out minor scratches in cylinder assembly, plunger, ball housing, piston, and housing. Do not create low spots by excessive buffing or polishing. Use oil stone to remove scratches and polish with crocus cloth. Check tolerances after polishing. (See Figure 203.)
(10) Replace any parts which are damaged, cracked, excessively worn, scored, corroded, or do not meet inspection requirements or tolerances.

D. Assemble Nose Gear Actuator (See Figure 202.)
(1) Immerse O-rings, backup rings, and felt wiper in hydraulic fluid prior to installation.
(2) Install D-ring, felt wiper, rod scraper, and retaining ring in housing.
(3) Place downlock ball housing and spacer shim on piston and slide piston through housing. If a new shim is to be installed, ensure that it is the same thickness as shim which was removed.
(4) With spacer shim and downlock ball housing firmly seated in housing, check to ensure that retract and extend port are in same plane and facing same way to within 5°. The above check must be obtained with center groove in threaded portions of cylinder assembly aligned with hole in housing for lockscrew.
(5) Add to or remove laminations on spacer shim or remove spacer shim completely as required to obtain firm seating of spacer shim and downlock ball housing inside of housing.
(6) Install O-rings and backup rings on piston and plunger.
(7) Coat outside and inside diameters of plunger with a light coat of Vaseline and assemble the 10 locking balls in downlock ball housing. Slide plunger over them to hold their relative positions.
(8) Place drive spring over cylinder.

WARNING: TAKE CARE TO CONTROL THE SPRING LOAD INSIDE HOUSING WHEN SCREWING CYLINDER ASSEMBLY INTO PLACE.

(9) Coat lower outside diameter of cylinder assembly with a light coat of AN-P-51 (Vaseline) and screw cylinder assembly into place until its inner face firmly clamps downlock ball housing and spacer shim against housing.
(10) Install lockscrew and safety wire at place provided on housing.
(11) Install rod end and adjust so that dimension from center of rod end bolt hole to center of cylinder assembly bolt hole is 33.79 (±0.03) inches [85.82 (±0.076) cm] with cylinder extended and locked and 20.19 (±0.03) inches [51.28 (±0.076) cm] with cylinder compressed. Secure rod end with attaching parts.

NOTE: On actuators with jamnut, tighten jamnut by hand until jamnut is snug against cylinder. Tighten 1/16 to 3/32 of a turn more. This will provide a torque of 700 to 800 inch-pounds [79.03 to 90.32 Nm].

(12) When installing nameplate, steel stamp new part to duplicate data on actual part being replaced.
(13) Refinish all externally painted surfaces with one coat of wash primer, one coat of zinc chromate primer, and one coat of aluminized lacquer.
(14) Lubricate nose gear actuator piston rod end felt wiper. (Refer to Chapter 12.)

3. **Adjustment/Test**
A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Pressure Gauge, 3000 psig		Commercially Available	Measure hydraulic pressure.
Hand Pump, 2250 psig min.		Commercially Available	Test actuator.
Hydraulic power source, 1500 psig, 4.0 (±0.5) GPM		Commercially Available	Cycle actuator.
Hydraulic Selector Valve, Solenoid Operated		Commercially Available	Test circuit.
Restrictors	1R3665-035 1R3665-059	Gar-Kenyon Brewster, NY	Control flow.
Fittings and Hoses		Commercially Available	Assemble test circuit.
Plugs	AN814-6D	Commercially Available	Plug ports.
Hydraulic Fluid	MIL-H-5606	Commercially Available	Service actuator.

B. Functional Test of Nose Gear Actuator (261G)

CAUTION: MINIMIZE MANUAL EXTENSION OR RETRACTION OF ACTUATOR PISTON ROD DURING FUNCTIONAL TEST. THE LOCK BALLS MAY DAMAGE THE PISTON ROD.

NOTE: Record Functional Test results on Table 201.

(1) After assembly, place actuator in a horizontal position with extend port up.
(2) Fill through extend port with clean MIL-H-5606 hydraulic fluid, bleeding unit of all air.
(3) Place actuator in a horizontal, approximately mid-stroke position and connect hand pump and pressure gage to extend port.
(4) With switch port and retract port plugged, apply 5 psig [34.5 kPa] for two (2) minutes. There shall be no evidence of external leakage.
(5) Disconnect hand pump and pressure gage from extend port. Attach hand pump and pressure gage to retract port and connect extend port to hydraulic power source return. Use hand pump to position actuator in fully retracted position.
(6) Attach hand pump and pressure gage to extend port and connect retract port to hydraulic power source return.
(7) Slowly apply pressure until piston begins to move. Pressure shall not exceed 70 psig [482.6 kPa].
(8) Repeat step (7) with actuator in the mid-stroke position and in an extended, but not locked, position.
(9) With the actuator assembly in the extended and locked position, attach hand pump and pressure gage to retract port and connect extend port to test stand return.
(10) Slowly apply pressure until lock releases and piston begins to move. The unlock pressure shall be between 120 psig [827.4 kPa] and 300 psig [2.1 MPa].
(11) Attach actuator to test stand. (See Figure 204.)
(12) Fully extend and retract actuator twenty-five times at 1500 psig [10,342 kPa]. External leakage from rod seal shall not exceed one (1) drop in 25 full stroke cycles.
   (a) Visually observe lock plunger through switch port to verify proper unlocking (approximately 0.4 inch [10.2 mm] plunger travel) occurs.
   (b) Note the action of the piston rod when the actuator lock engages. Any axial misalignment in excess of 0.05 inch [1.3 mm] at the rod end bolt attach point shall be repaired.
   (c) During cycle test, measure actuator stroke. Stroke shall be 13.69 (±0.040) inches [34.77 (±0.10) cm].

NOSE LANDING GEAR ACTUATOR ASSEMBLY

Visual Inspection: Satisfactory _____

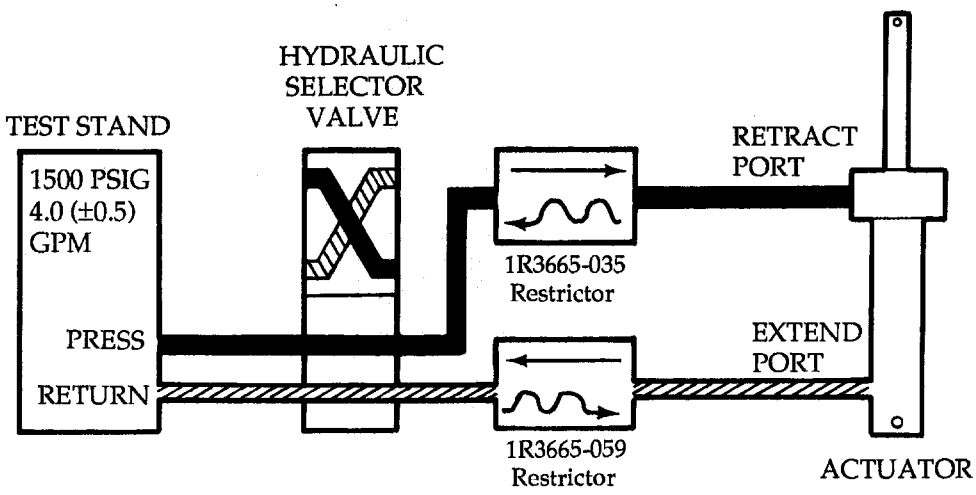
Discrepancies Noted _____

REF. PARA.	NOMINAL VALUE & TOLERANCE	ACTUAL VALUE
3.B (4)	5 psig [34.5 kPa] for 2 minutes with no leakage	_____
3.B (7), (8)	Pressure to move actuator - 70 psig [482.6 kPa] maximum	_____psig
3.B (10)	Pressure to unlock - 120 psig [827.4 kPa] to 300 psig [2.1 MPa]	_____psig
3.B (12)	Leakage after 25 cycles - 1 drop maximum	_____Drop
3.B (12) (b)	Axial misalignment less than 0.05 inch [1.3 mm] minimum	_____Inch
3.B (12) (c)	Actuator stroke - 13.69 (±0.04) inches [34.77 (±0.10) cm]	_____Inches

S/N _____ Date _____

Tested by _____ Inspected by _____

NLG Actuator Test Data Sheet
Table 201



20-35A

Nose Gear Actuator Test Stand
Figure 204

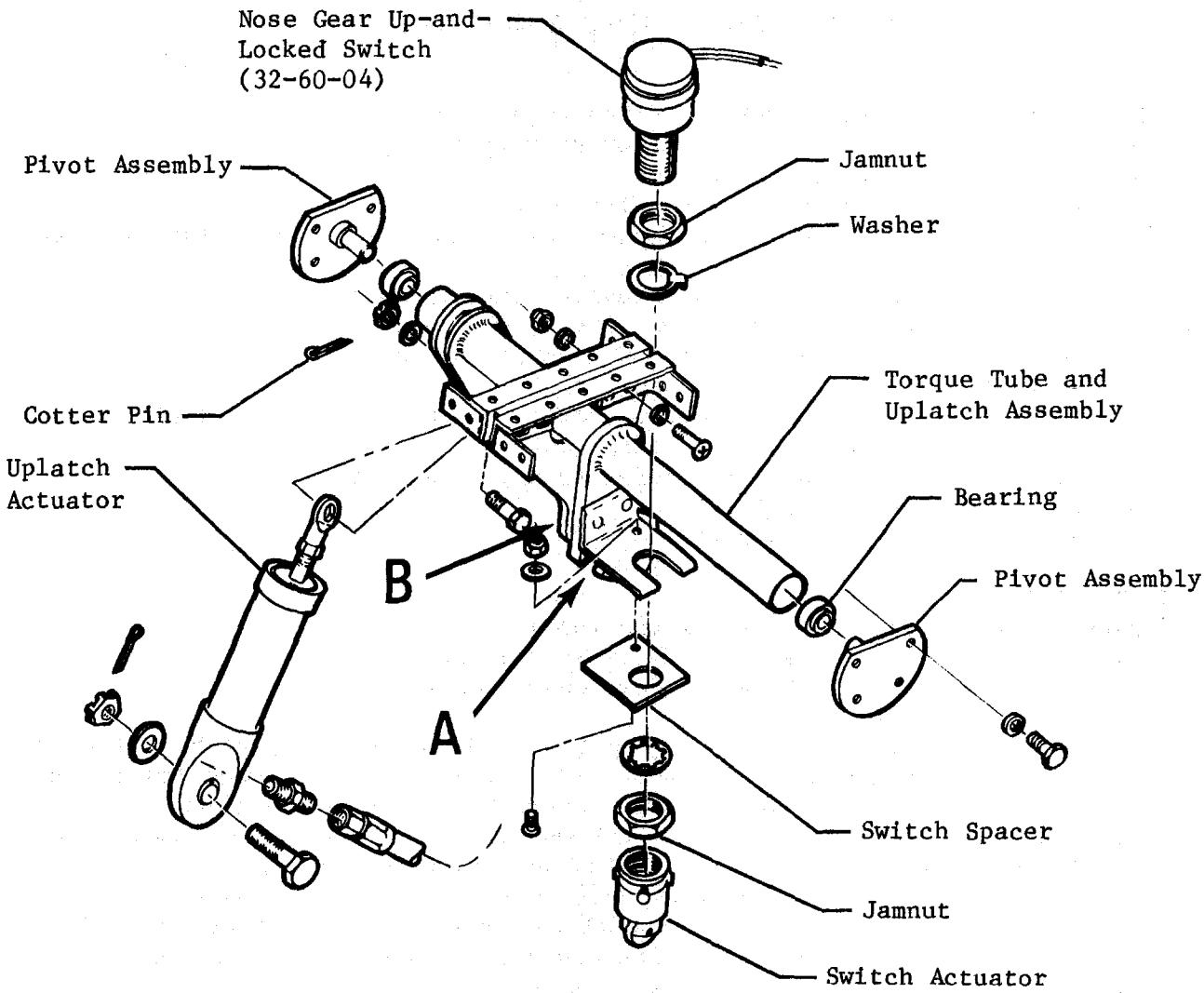
NOSE GEAR UPLATCH - MAINTENANCE PRACTICES

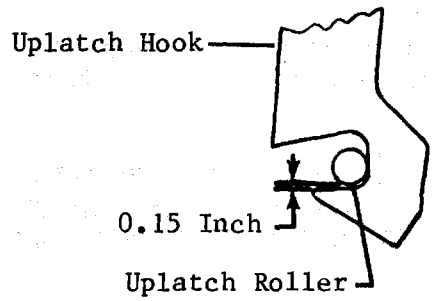
1. **REMOVAL/INSTALLATION**
   - A. **Remove Nose Gear Uplatch Actuator** (See figure 201.)
     - (1) Place aircraft on jacks. (Refer to Chapter 7.)
     - (2) Depressurize hydraulic system.
     - (3) Remove electrical power from aircraft.
     - (4) Disconnect hydraulic line from actuator. Cap and plug exposed hydraulic fittings.
     - (5) Remove attaching parts and actuator from aircraft.
   - B. **Install Nose Gear Uplatch Actuator** (See figure 201.)
     - (1) Position actuator and secure with attaching parts.
     - (2) Connect hydraulic hose to actuator.
     - (3) Pressurize and bleed hydraulic system. (Refer to Chapter 29.)
     - (4) Restore electrical power to aircraft.
     - (5) Adjust uplatch mechanism. Refer to Adjustment/Test.
     - (6) Remove aircraft from jacks.
     - (7) Restore aircraft to normal.

2. **ADJUSTMENT/TEST**
   - A. **Adjust Uplatch Mechanism** (See figure 201.)
     - (1) Place aircraft on jacks. (Refer to Chapter 7.)
     - (2) Disconnect linkage from the nose gear doors.
     - (3) Retract nose gear.
     - (4) Loosen uplatch roller attach bolt and adjust until uplatch roller is securely engaged in hook with 0.15 inch clearance between roller and edge of hook. (See detail A.) Secure bolt with cotter pin.
     - (5) Attach an ohmmeter across up-and-locked switch leads and adjust inner jamnut until switch actuates, plus one additional turn.
     - (6) Secure outer jamnut and safety wire per double twist method.
     - (7) Adjust safety cam forward or aft as required to maintain 0.03 inch clearance between cam and uplatch spacer with nose gear retracted.
     - (8) Extend nose gear and attach linkage to doors.
     - (9) Remove aircraft from jacks.

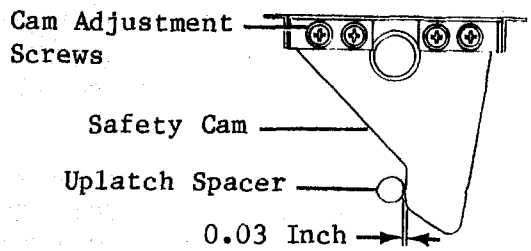
3. **APPROVED REPAIRS**
   - A. **Disassemble Uplatch Actuator** (See figure 202.)
     - (1) Cut safety wire and loosen locknut sufficiently to release rod end lock from piston rod. Remove rod end, rod end lock, and locknut from piston rod.

CAUTION: USE EXTREME CARE WHEN REMOVING LOCK RING AND PLUG FROM BARREL. ACTUATOR IS SPRING LOADED TO 40 POUNDS IN RETRACTED POSITION AND COULD SPRING OUT OF CONTROL, CAUSING BODILY INJURY.





Detail A



Detail B

Nose Gear Uplatch Assembly
Figure 201

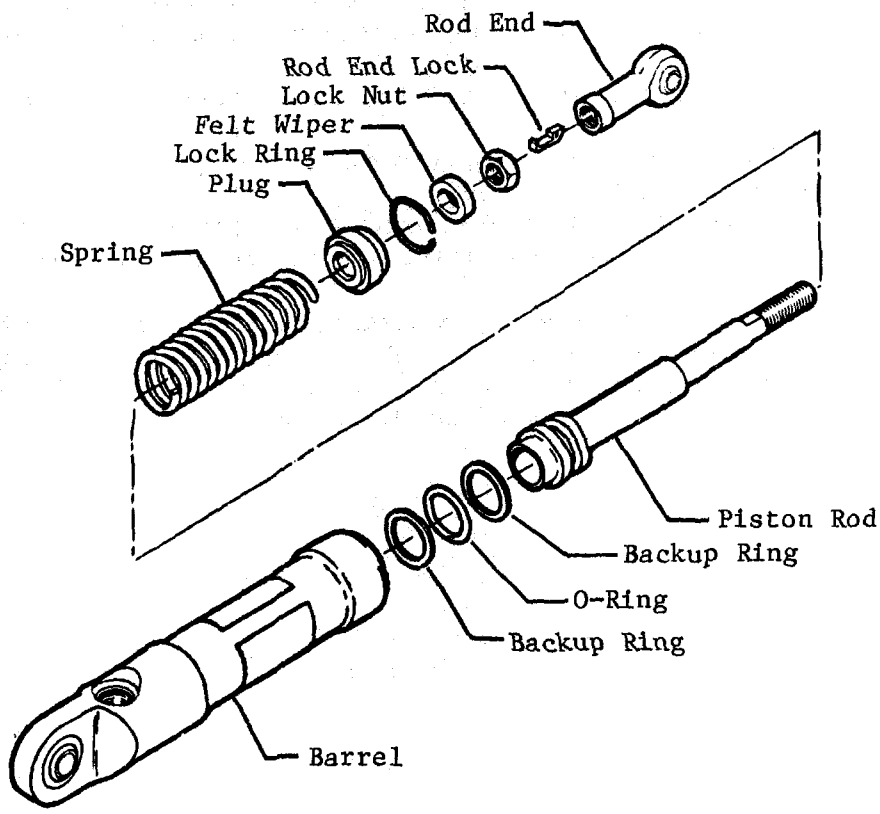
(2) Press plug inboard to allow removal of lock ring. Remove lock ring and slowly release plug.
(3) When spring tension is released, remove plug and spring from barrel.
(4) Remove piston rod from barrel. Remove O-ring and backup rings from piston rod. Remove felt wiper from plug.
(5) Clean all parts with Stoddard solvent or equivalent. Dry parts with clean, dry, compressed air.
(6) Inspect all parts for nicks, scratches, or excessive wear. Replace defective parts.
(7) Buff out minor scratches using an oil stone and polish with crocus cloth.

B. Assembly Uplatch Actuator (See figure 202.)

(1) Use new O-rings, backup rings, and felt wiper at each assembly. Immerse these items in MIL-H-5606 hydraulic fluid prior to installation.
(2) Assemble O-ring and backup rings on piston rod and insert felt wiper in plug.
(3) Position piston rod and spring in barrel. Install plug on piston rod and push in, compressing spring sufficiently to allow installation of lock ring.
(4) Install lock ring and slowly release plug until firmly seated against lock ring.
(5) Install rod end lock, locknut, and rod end on piston rod.

C. Functional Test of Uplatch Actuator

(1) Connect actuator to a hydraulic source and pressure check at 2250 psi for 3 minutes. Leakage rate shall not exceed one drop in the 3 minute period.
(2) While actuator is in extended position, adjust for 9.34 (±0.015) inch distance between centerlines of rod end and actuator bearing.
(3) Remove hydraulic pressure and check retracted length of 8.44 (±0.045) inches. Safety wire rod end lock in place.



Uplatch Actuator Assembly
Figure 202

EMERGENCY EXTENSION - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The emergency extension system consists of the emergency gear control valve installed on the RH side of the pedestal, and the shuttle valves installed at each actuator.

2. OPERATION

A. Set the Landing Gear Selector Switch to DN. The emergency gear control valve is manually operated. When the valve handle is pulled down, high pressure air is applied through the shuttle valves to the actuators. The main gear inboard doors will open and the main and nose gear will extend to their down and locked positions. When the uplatches unlatch, the red gear UNSAFE annunciators will illuminate; and when the gear is down and locked, the green gear LOCKED DN annunciators will illuminate. Because air pressure remains applied to the actuators, the uplatch mechanisms will not close and the red gear UNSAFE annunciators will remain illuminated while the green gear LOCKED DN annunciators are illuminated.

B. Shuttle valves isolate the hydraulic system from the emergency air system, then reposition from hydraulic flow to emergency air flow when air pressure exceeds hydraulic pressure. Shuttle valves will reposition when hydraulic pressure exceeds air pressure.

EMERGENCY EXTENSION - MAINTENANCE PRACTICES

1. Adjustment/Test

A. Functional Test of the Emergency Gear Extension System and Emergency Brake System (See Figure 202.)

NOTE: Whenever maintenance or inspections are performed, which requires removal or disconnection of the emergency air plumbing, the landing gear blowdown and emergency brakes shall be functionally tested.

(1) Place the aircraft on jacks. (Refer to 7-00-01.)

WARNING: MAKE SURE THAT THE INBOARD DOOR ACTUATORS ARE POSITIONED SUCH THAT THE PISTON WILL NOT STRIKE MAINTENANCE PERSONNEL OR AIRCRAFT STRUCTURE WHEN EMERGENCY AIR IS APPLIED.

(2) Disconnect the inboard door actuators and secure the actuators so the pistons will not strike maintenance personnel or the aircraft structure when emergency air is applied.
(3) Depress and hold the emergency gear control handle.
(4) Make sure that the inboard door actuator piston has extended and the inboard door uplatch actuator has retracted.
(5) Make sure that the main landing gear wheels (both sides) are free to turn.
(6) Continue to hold the emergency gear control handle. Monitor the emergency air pressure gage (approximately 3 minutes) for loss of air pressure. Release the emergency gear control handle.
(7) Depress and hold the emergency brake control handle.
(8) Make sure that the main landing gear wheels are locked in position and will not rotate.
(9) Continue to hold the emergency brake control handle. Monitor the emergency air pressure gage (approximately 3 minutes) for loss of air pressure. Release the emergency brake control handle.
(10) If these checks fail, the emergency pneumatic lines at frame 15 (see Figure 202) may be swapped.
(11) Service the emergency air bottle if necessary. (Refer to 12-10-07.)
(12) Connect the inboard doors.
(13) Remove the aircraft from the jacks. (Refer to 7-00-01.)
(14) Bleed the hydraulic brake system. (Refer to 32-43-00.)
(15) Service the hydraulic reservoir as required. (Refer to 12-10-02.)

B. Return the Extension System to Normal Operation
(1) Place the aircraft on jacks. (Refer to 7-00-01.)
(2) Bleed the air lines by inserting a finger into the pedestal through the hole just forward of the handle and pushing up on the ratchet release. This allows the handle to return to the off position.

NOTE: *On aircraft equipped with a Kidde emergency gear control valve*, the handle will return to the off and latched position when the ratchet spring release is pulled. *On aircraft equipped with a Sterer emergency gear control valve*, the handle will return to off position when the ratchet spring release is pulled but will not latch. The Sterer valve handle must be manually lifted up into the latched position.

(3) Do the necessary maintenance to correct the system malfunction.
(4) With the electrical power applied, set the gear selector switch to DN.
(5) Return the system shuttle valves to the normal position by pressurizing the hydraulic system using an external hydraulic power source.

CAUTION: DUE TO THE POSSIBILITY OF A LARGE VOLUME OF HIGH-PRESSURE AIR BEING TRAPPED ON THE HYDRAULIC SIDE OF THE SHUTTLE VALVES, THE HYDRAULIC RESERVOIR COULD BE RUPTURED WHEN THE GEAR IS RETRACTED. THEREFORE, REMOVE THE RESERVOIR FILLER CAP PRIOR TO RETRACTING THE GEAR. THE GEAR SHOULD BE RETRACTED IN A SERIES OF AT LEAST SIX STAGES BY SETTING THE GEAR SELECTOR SWITCH TO UP THEN TO DN. EACH TIME THE GEAR SELECTOR SWITCH IS SET TO UP, THE GEAR SHOULD BE ALLOWED TO RETRACT FURTHER THAN THE PREVIOUS PARTIAL RETRACTION UNTIL GEAR IS COMPLETELY RETRACTED.

(6) Lower the tailcone access door. Loosen one hydraulic line nut between the hydraulic reservoir and 20 psi vent valve to bleed off the reservoir pressure. Tighten the nut and remove the reservoir filler cap. Make sure that the reservoir fluid level is above the sight glass. Make provisions in the tailcone area for possible spurting of fluid from the reservoir filler.
(7) Retract the gear in approximately six stages by setting the gear selector switch to UP and then to DN, allowing the gear to retract slightly further each time until the gear is completely retracted. This will purge the trapped air and help prevent fluid from spurting out of the reservoir.
(8) Cycle the gear approximately 20 times to make sure that all the air is expelled from the system.
(9) Service the hydraulic reservoir and emergency air bottle. (Refer to 12-10-02 and 12-10-07.)

C. Emergency Extension System Leakage Check
(1) Remove the emergency air bottle filler cap, loosen the valve end nut, and bleed the pressure down to approximately 800 psi [5515 kPa]. This prevents repositioning of the main gear actuator shuttle valves, nose gear uplatch actuator, and nose gear actuator shuttle valves, introducing air into the hydraulic system, and disturbing the O-ring seal when the emergency control valves are opened.
(2) Pressurize the hydraulic system to 1500 psi [10,341 kPa] using an external hydraulic power source.
(3) While the system pressure is at 1500 psi [10,341 kPa], fully depress either the pilot's or copilot's brake pedal and set the parking brake. This lets adequate hydraulic pressure maintain to prevent repositioning of the brake system shuttle valves by the emergency air.
(4) Depress the emergency gear control handle.

NOTE: When the emergency gear control handle is depressed, the system hydraulic pressure will drop momentarily until the external hydraulic power source returns the pressure to 1500 psi [10,341 kPa]. This is due to the door actuator and door uplock actuator shuttle valves repositioning.

(5) After the system has stabilized, monitor the emergency air pressure gage for approximately 3 minutes for loss of air pressure.

(6) If loss of air pressure is not evident, bleed the air pressure from the system by pulling the ratchet spring release to allow the handle to return to the usual position.

NOTE: *On the aircraft equipped with a Kidde emergency gear control valve*, the handle will return to off and latched position when the ratchet spring release is pulled. *On the aircraft equipped with a Sterer emergency gear control valve*, the handle will return to off position when the ratchet spring release is pulled but will not latch. The Sterer valve handle must be manually lifted up into the latched position.

(7) Service the emergency air bottle. (Refer to 12-10-07.)

D. Functional Test of the Landing Gear Emergency Blowdown Extension System (1095AC)

NOTE: Refer to Chapter 5 for the current inspection interval for the Functional Test of Landing Gear Emergency Blowdown Extension System.

(1) Put the aircraft on jacks. (Refer to 7-00-01.)
(2) Connect an external electrical power source to the aircraft.
(3) Connect an external hydraulic power source to the aircraft.
(4) Using the Gear Selector Switch, retract the landing gear.
(5) Depressurize the hydraulic system.
(6) Make sure that the emergency air bottle is correctly charged. (Refer to 12-10-07.)
(7) Pull the GEAR circuit breaker.

WARNING: BEFORE EXTENDING THE LANDING GEAR, MAKE SURE THAT THE LANDING GEAR AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.

(8) Push the emergency gear control handle down to the latched position.
(9) Make sure that the landing gear extends and locks within 11 seconds or less.
(10) With the landing gear extended and locked, monitor the emergency air pressure gauge (approximately 1 hour) for loss of air pressure. Pressure drop must not exceed 100 psi.
(11) Release the emergency gear control handle.
(12) Push in the GEAR circuit breaker.
(13) Remove and inspect the emergency air filters (Refer to 32-45-00.)
(14) Return the extension system to the usual position. (Refer to 32-33-00.)
(15) Service the emergency air bottle if necessary. (Refer to 12-10-07.)
(16) Remove the aircraft from the jacks. (Refer to 7-00-01.)

2. Cleaning/Painting

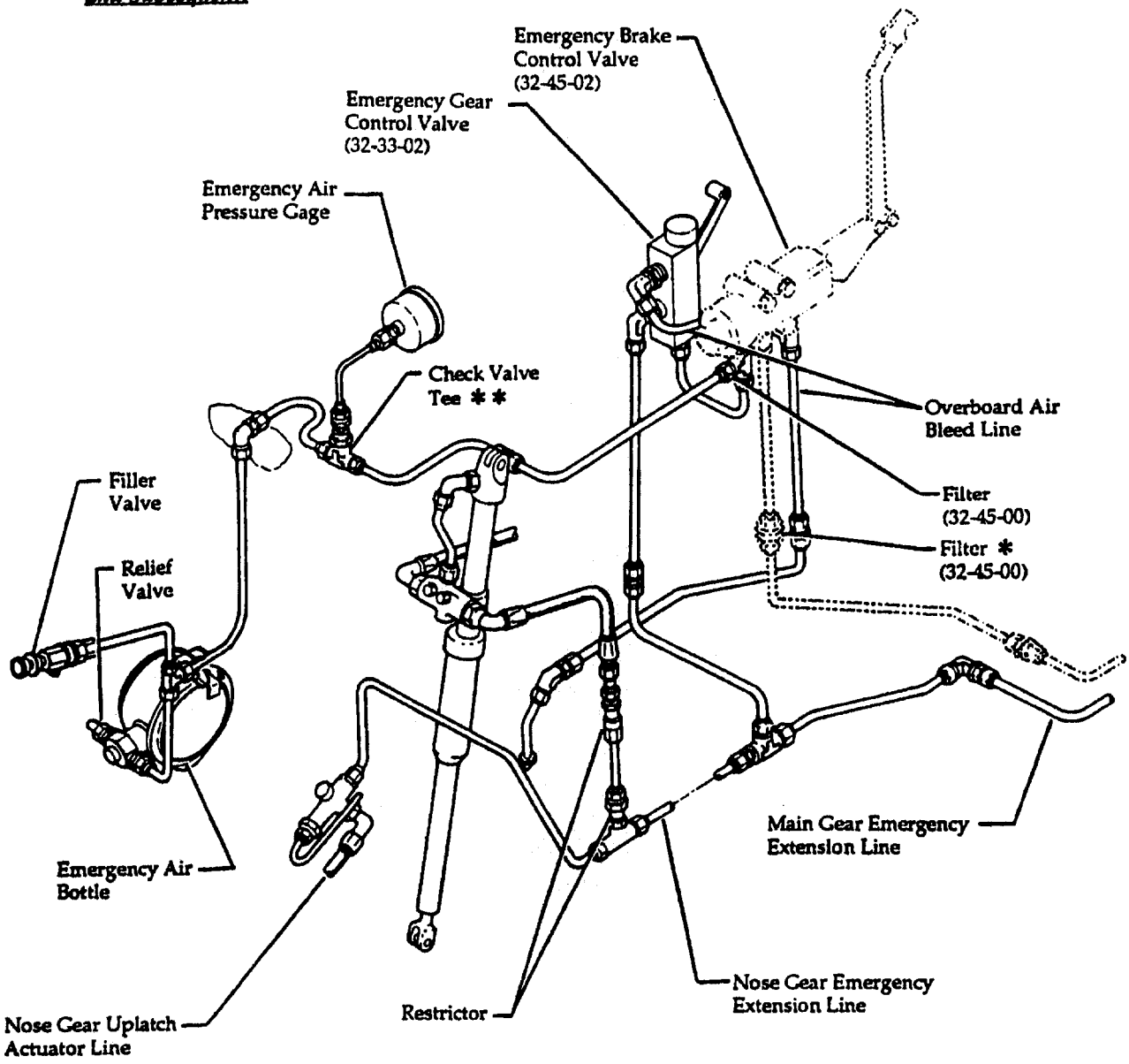
A. Clean the Air Filter(s)

NOTE: Refer to Chapter 5 for the current inspection interval for cleaning the emergency air filter.

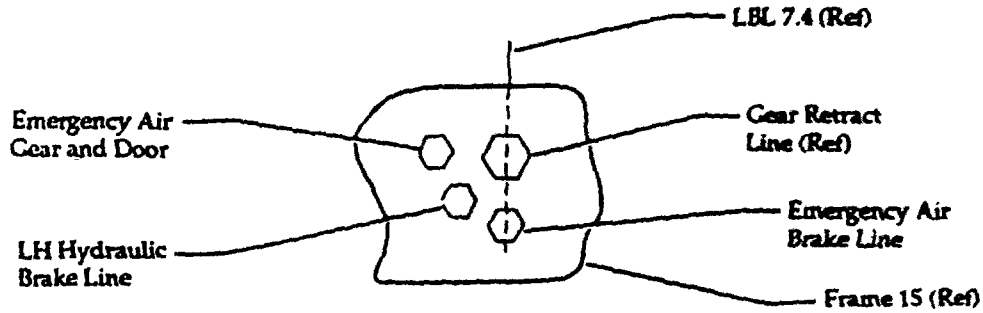
(1) Clean the air filter(s). (Refer to 32-45-00.)

* ***Effective Aircraft 35-028, 35-034 and Subsequent; 36-018and Subsequent.***

** ***Effective Aircraft 35-231 and Subsequent; 36-045 and Subsequent.***



Emergency Air Extension Components Installation
Figure 201



Emergency Air Plumbing Connections
Figure 202

SHUTTLE VALVE - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Shuttle Valve

(1) Depressurize hydraulic system. (Refer to Chapter 29.)

(2) Disconnect hydraulic and pneumatic lines at shuttle valve. Discard pneumatic B-nut fitting seal.

(3) Remove attaching parts and shuttle valve from aircraft.

B. Install Shuttle Valve

(1) Position and install shuttle valve in its original position with attaching parts.

(2) Connect hydraulic and pneumatic lines to their original fittings. Use a new fitting seal at pneumatic B-nut connection.

(3) Pressurize and bleed hydraulic system.

2. APPROVED REPAIRS

A. Due to many configurations of shuttle valves, only general repair instructions can be given.

(1) Disassemble shuttle valve beginning with cap bolt and/or outlet port. Note sequence of parts removal.

(2) Discard O-rings, packing, and backup rings (if installed).

(3) Inspect for scoring, scratches, or corrosion. Buff out minor damage with crocus cloth using caution not to create any low spots.

(4) Clean thoroughly with Stoddard solvent and blow dry to remove foreign particles.

(5) Reassemble in reverse order of disassembly using new O-rings, packing, and backup rings (if required). Immerse O-rings in MIL-H-5606 hydraulic fluid prior to assembly.

3. ADJUSTMENT/TEST

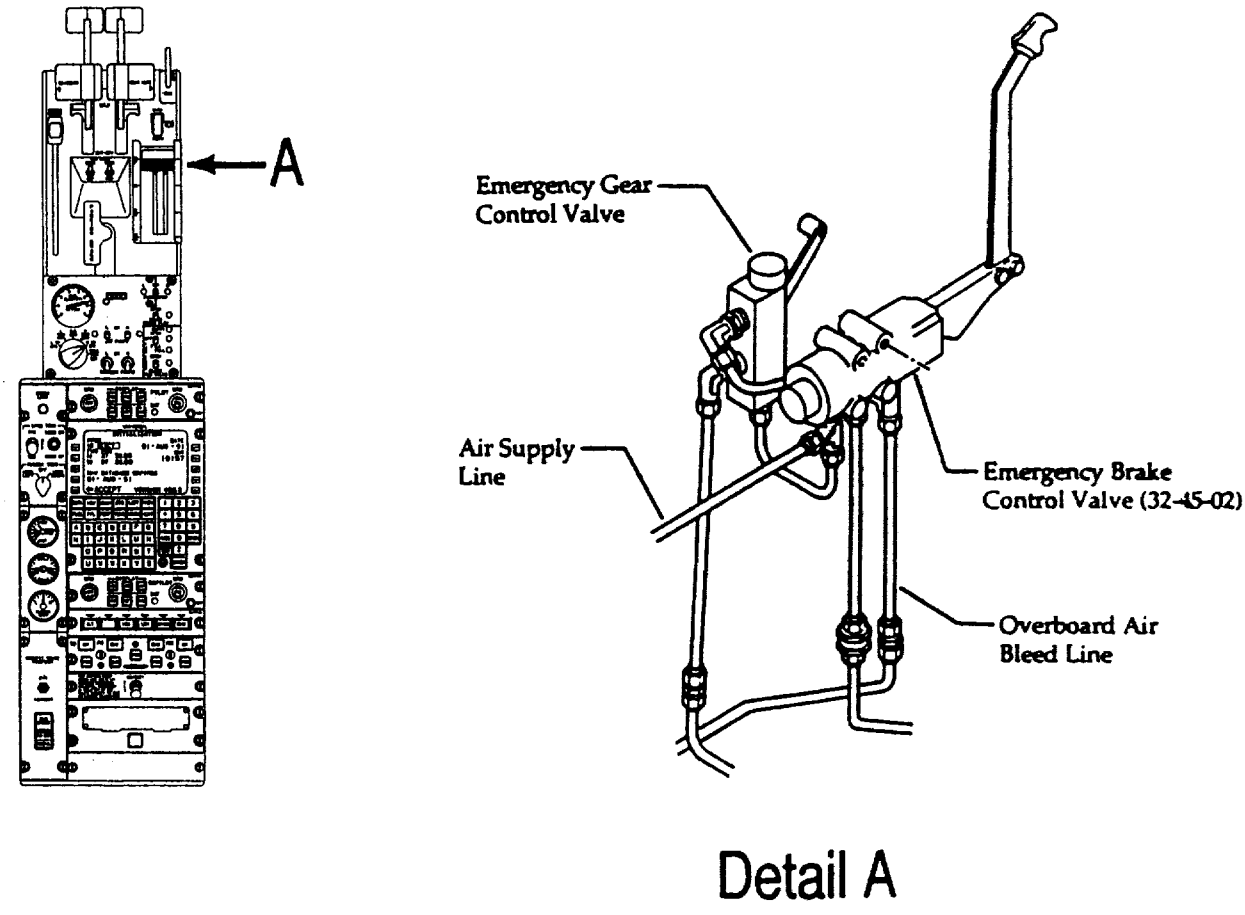
A. With outlet port capped and valve connected to a hydraulic test bench, apply a proof pressure of 2250 psi for 3 minutes to each inlet port. There shall be no sign of leakage.

EMERGENCY GEAR CONTROL VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of Emergency Gear Control Valve (See Figure 201.)
   (1) Discharge air pressure from emergency air bottle. (Refer to Chapter 12.)
   (2) Remove copilot seat. (Refer to Chapter 25.)
   (3) Remove RH side panel from pedestal.
   (4) Disconnect and plug plumbing connections attached to blowdown valve.
   (5) Remove attaching parts securing control valve to pedestal.
   (6) Turn valve to pull handle through cover slot and remove control valve from aircraft.

B. Installation of Emergency Gear Control Valve (See Figure 201.)
   (1) Rotate control valve to insert handle through cover slot and position valve for installation.
   (2) Connect plumbing to blowdown valve.
   (3) Charge emergency air bottle. (Refer to Chapter 12.)
   (4) Perform Emergency Extension System Leakage Check. (Refer to 32-33-00, Adjustment/Test.)
   (5) Install RH side panel on pedestal and secure with attaching parts.
   (6) Install copilot seat. (Refer to Chapter 25.)



14-236A
11-113A

Emergency Gear Control Valve Installation
Figure 201

NOSE WHEEL SPIN-UP SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The optional nose wheel spin-up system is installed to enable the crew to spin up the nose wheel prior to landing on an unpaved runway.

B. On Aircraft 35-244 and Subsequent and 36-045 and Subsequent not modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway," the nose wheel spin-up system consists of a vane rotor assembly attached to the nose wheel, two nozzle assemblies, a diverter valve and control cable, an RPM sensor, an electrical control box, and an annunciator.

(1) The vane rotor assembly is attached to the LH side of the nose wheel by eight bolts. A sensor plate is attached to one of the rotor blades.

(2) Two nozzle assemblies are attached to a support plate on the nose gear strut. The nozzles are used to direct bleed air pressure into the rotor assembly blades, causing the nose wheel to rotate.

(3) A diverter valve, associated bleed air ducts, and control cable are installed just aft of frame 5, at RBL 21. The diverter valve is controlled by a cable attached to a control knob (IN-NORMAL/OUT-SPIN-UP) located adjacent to the landing gear control panel. The control knob IN-NORMAL position controls the diverter valve to route bleed air to the external anti-ice outlets; the control knob OUT-SPIN-UP positions controls the diverter valve to remove bleed air from the external anti-ice outlets and routes it to the spin-up system.

(4) An RPM sensor is installed on the support assembly on the nose gear strut. The RPM sensor is a ferrous metal detector which applies a sinewave output to the electrical control box. The sinewave amplitude is proportional to the speed at which the sensor plate passes the detector and the proximity of the sensor plate to the detector.

(5) The electrical control box is installed beneath the floorboards just aft of frame 13A at LBL 8. The electrical control box contains the circuits necessary to operate the NOSE WHEEL SPIN-UP annunciator.

(6) The annunciator (green) is installed on the copilot's instrument panel adjacent to the landing gear control panel and annunciator is labeled NOSE WHEEL SPIN-UP. The annunciator is connected to 28 vdc power through the landing gear control panel dimming circuit. The annunciator is also connected to the landing gear control panel lamp test circuit. When the TEST-MUTE switch is set to TEST, the annunciator will illuminate with the rest of the gear annunciators.

C. On Aircraft 35-002 and Subsequent and 36-002 and Subsequent modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway," the nose wheel spin-up system consists of a vane rotor assembly attached to the nose wheel, two nozzle assemblies, a windshield defog valve, a nose wheel spin-up valve, an electrical control switch, an RPM sensor, an electrical control box, and an annunciator.

(1) The vane rotor assembly is attached to the LH side of the nose wheel by eight bolts. A sensor plate is attached to one of the rotor blades.

(2) Two nozzle assemblies are attached to a support plate on the nose gear strut. The nozzles are used to direct bleed air pressure into the rotor assembly causing the nose wheel to rotate.

(3) On Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031, windshield defog and nose wheel spin-up valves and associated electrical wiring are installed just aft of frame 5. The valves are controlled with an electrical (NOSE WHEEL SPIN-UP, ON-OFF) switch on the copilot's instrument panel. When the windshield defog system is on and the Nose Wheel Spin-Up Switch is set to OFF, bleed air is routed to the external anti-ice outlets; setting the Nose Wheel Spin-Up Switch to ON opens the nose wheel spin-up valve which allows the bleed air to be routed to the spin-up system. On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent, a diverter valve, associated bleed air ducts, and control cable are installed just aft of frame 5, at RBL 21. The diverter valve is controlled by a cable attached to a control knob (IN-NORMAL/OUT-SPIN-UP) located adjacent to the landing gear control panel. The control knob IN-NORMAL position controls the diverter valve to route bleed air to the external anti-ice outlets; the control knob OUT-SPIN-UP position controls the diverter valve to remove bleed air from the external anti-ice outlets and routes it to the spin-up system.

(4) An RPM sensor is installed on the support assembly on the nose gear strut. The RPM sensor is a ferrous metal detector which applies a sinewave output to the electrical control box. The sinewave amplitude is proportional to the speed at which the sensor plate passes the detector and the proximity of the sensor plate to the detector.

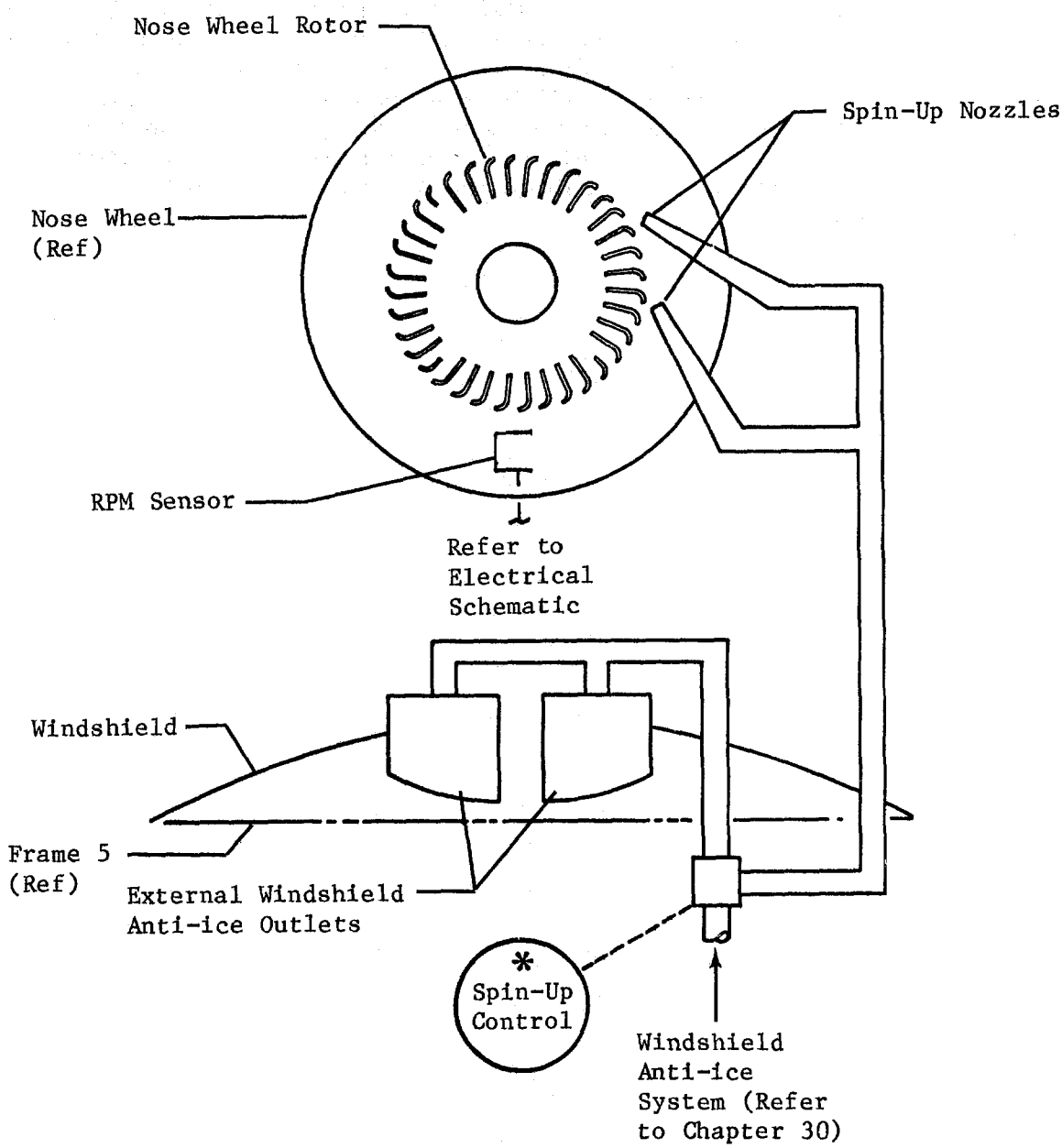
(5) An electrical control box is installed at the top of the Frame 2 web at BL 0. The electrical control box contains the circuits necessary to operate the NOSE WHEEL SPIN-UP annunciator.

(6) The annunciator (green) is installed on the copilot's instrument panel adjacent to the landing gear control panel and is labeled NOSE WHEEL SPIN-UP. The annunciator is connected to 28 vdc power through the landing gear control panel dimming circuit. The annunciator is also connected to the landing gear control panel lamp test circuit. When the TEST-MUTE switch is set to TEST, the annunciator will illuminate with the rest of the gear annunciators.

2. **OPERATION** (See figures 1 and 2.)

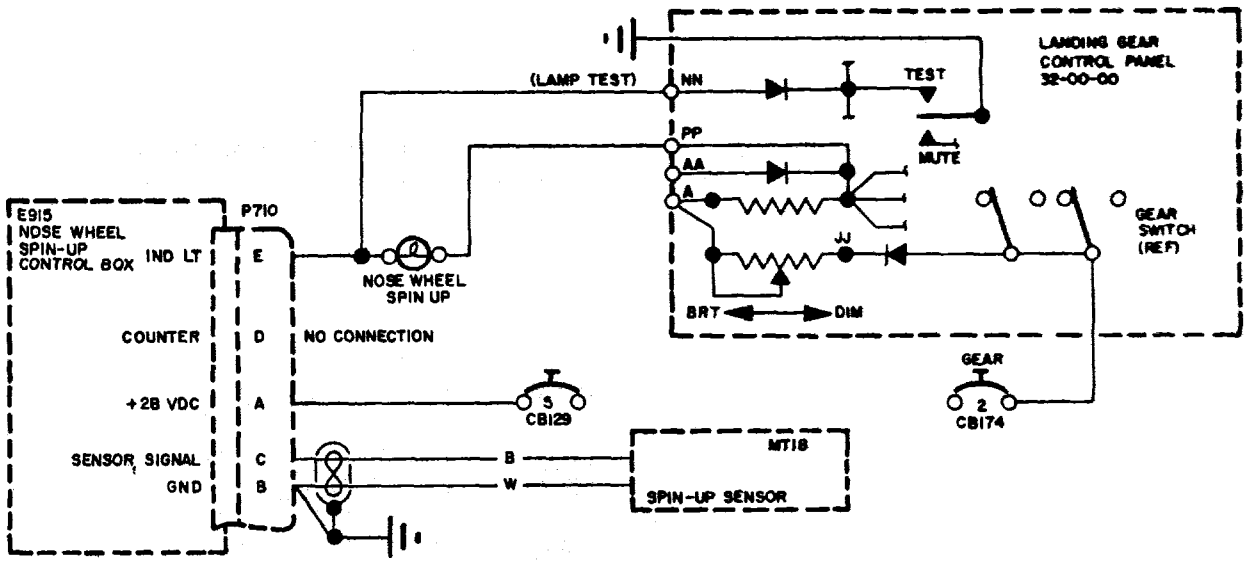
A. When the nose wheel spin-up system is utilized, the spin-up control switch is set to on or the control knob is pulled out and the WSHLD HT Switch is set to ON. This directs all bleed air normally used for external defog to the nose wheel vane rotor. At wheel speed of 700 (±50) rpm the annunciator will start to blink on and will illuminate steadily at 1820 (±20) rpm, indicating that the nose wheel is up to minimum speed for landing. The time required for the nose wheel spin up is approximately 1.5 minutes.

B. When the nose wheel spin-up system is being utilized, windshield anti-icing will not be available.



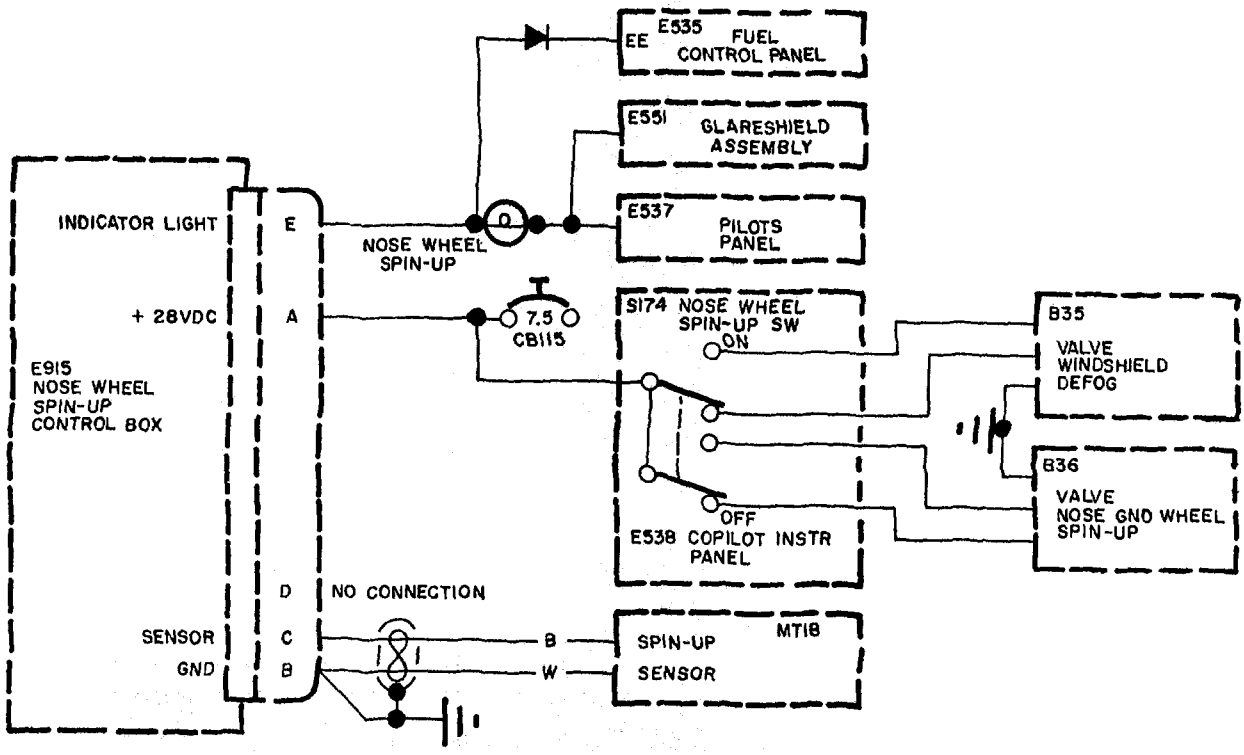
* On 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031 modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation," an electrical control switch is used. See Electrical Control Schematic.

Nose Wheel Spin-Up System Schematic
Figure 1

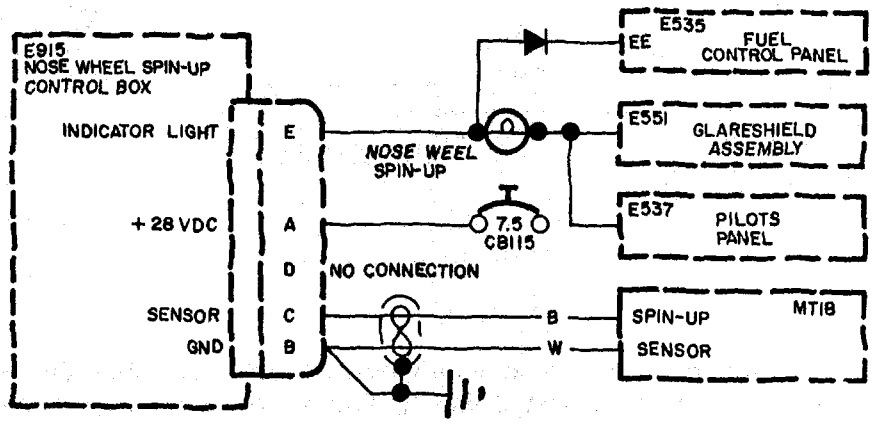


35-244 and Subsequent, 36-045 and Subsequent not modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation"

Nose Wheel Spin-Up Electrical Control Schematic
Figure 2 (Sheet 1 of 2)



35-002 thru 35-106, 35-108 thru 35-112, 36-002 thru 36-031 modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation"



35-107, 35-113 and Subsequent, 36-032 and Subsequent modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation"

Nose Wheel Spin-Up Electrical Control Schematic
Figure 2 (Sheet 2 of 2)

NOSE WHEEL SPIN-UP SYSTEM - TROUBLE SHOOTING

1. TROUBLE SHOOTING

NOTE: ° The nose wheel spin-up annunciator will alert the crew to possible system trouble.

° Perform Adjustment/Test, under Maintenance Practices, to verify proper system operation after Trouble Shooting is complete.

TROUBLE	PROBABLE CAUSE	CORRECTION
A. Annunciator does not illuminate.	a. Pulled down or blown circuit breaker.	a. Reset or replace circuit breaker as necessary. If circuit breaker has incurred electrical damage, check all electrical components for evidence of shorts; repair as necessary.
	b. Defective or missing lamp.	b. Replace lamp.
	c. No power to bulb.	c. Check for open circuit from gear control panel to annunciator.
	d. Misaligned or damaged spin-up sensor.	d. Inspect sensor for damage; replace if necessary. Check for maximum of 0.06 inch between end of sensor and sensor plate. Align or adjust gap as necessary.
	e. Insufficient bleed air pressure to rotate nose wheel for speeds to initiate annunciator operation.	e. Check ducting, nozzles and diverter valve for restrictions or broken lines. Check diverter valve, spin-up controls, and bleed air system for proper operation.
	f. Damaged or defective nose wheel spin-up control box.	f. Inspect control box for evidence of damage; replace if necessary.

TROUBLE	PROBABLE CAUSE	CORRECTION
B. Steady annunciator illumination when system is turned on.	a. Misaligned or damaged spin-up sensor.	a. Inspect sensor for damage; replace if necessary. Check for maximum of 0.06 inch between end of sensor and sensor plate. Align or adjust gap as necessary.
	b. Damaged or defective nose wheel spin-up control box.	b. Inspect control box for evidence of damage, replace if necessary.
	c. Defective press-to-test switch on landing gear control panel.	c. Replace switch.
C. Annunciator blinks continuously when system is operating.	a. Misaligned or damaged spin-up sensor.	a. Inspect sensor for damage, replace if necessay. Check for maximum of 0.06 inch between end of sensor and sensor plate. Align or adjust gap as necessary.
	b. Insufficient bleed air pressure to rotate nose wheel for speeds to initiate annunciator operation.	b. Check ducting, nozzles, and diverter valve for restrictions or broken lines. Check diverter valve, spin-up controls, and bleed air system for proper operation.

NOSE WHEEL SPIN-UP SYSTEM - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

NOTE: Refer to 32-41-00, for nose wheel spin-up rotor replacement.

A. Remove Wheel Speed Sensor (See figure 201.)
(1) Place jack under nose of aircraft and raise aircraft until nose wheel is free to rotate.
(2) Remove safety wire from nuts securing wheel speed sensor.
(3) Remove nut, washer, and sensor from support assembly.
(4) Disconnect and identify sensor wiring at splices (approximately 18 inches from sensor).

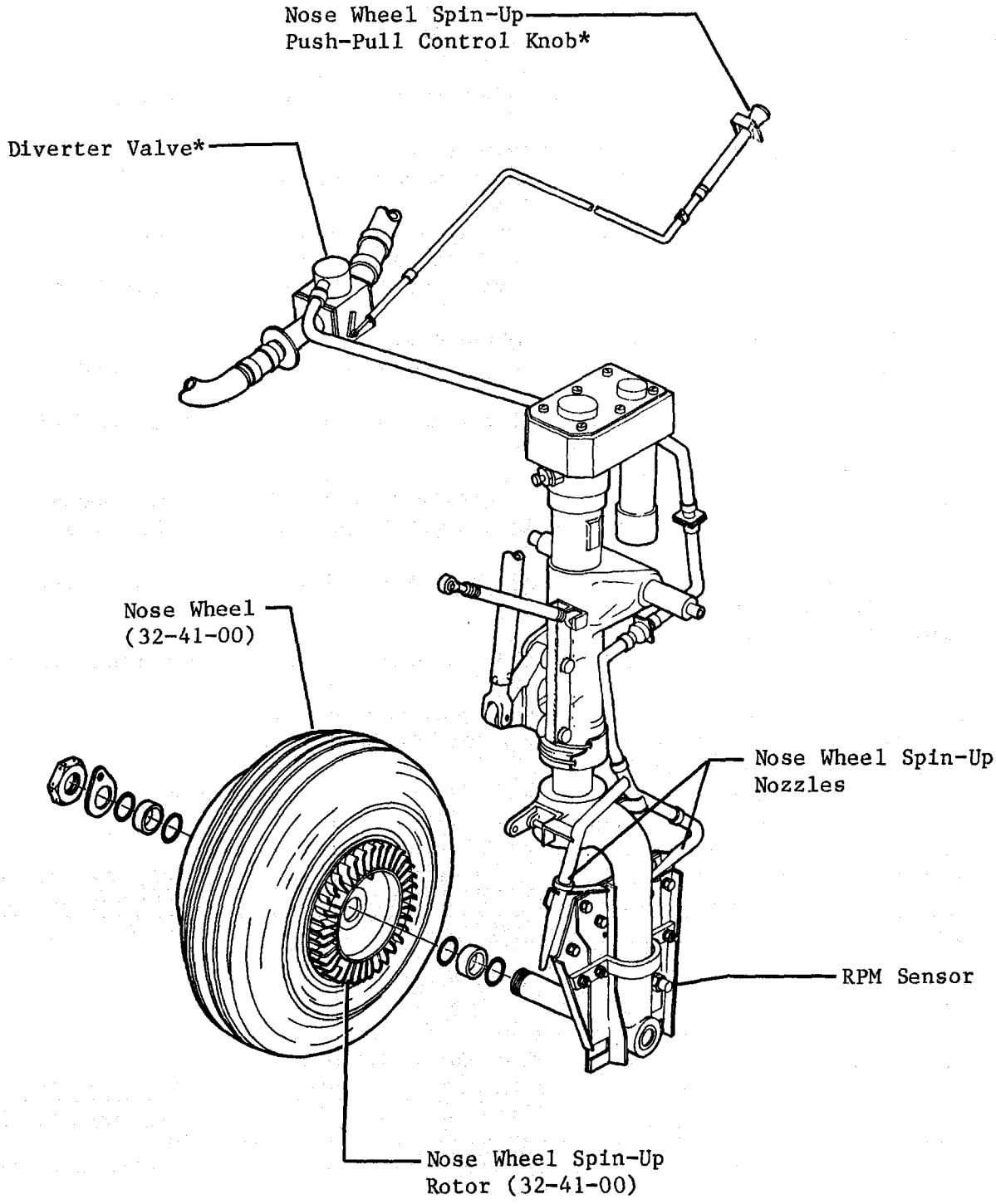
B. Install Wheel Speed Sensor (See figure 201.)
(1) Position wheel speed sensor in support bracket and secure using attaching parts.
(2) Adjust sensor so that the end of the sensor is a maximum of 0.06 inch from the edge of the sensor plate.
(3) Tighten nuts and safety wire.
(4) Identify and connect sensor pigtails to aircraft wiring. Sensor pigtails are color coded (B & W) to aid in proper connection to aircraft wiring.
(5) Perform Operational Check of Nose Wheel Spin-Up System. (Refer to Adjustment/Test.)

C. Remove Electrical Control Box
(1) Remove floorboard as required to gain access to electrical control box.
(2) Disconnect electrical connector from control box.
(3) Remove attaching parts and control box from aircraft.

D. Install Electrical Control Box
(1) Install electrical control box and secure with attaching parts.
(2) Connect electrical connector to control box.
(3) Install floorboards and secure with attaching parts.

E. Remove Nose Wheel Spin-up Valve (Aircraft 35-002 thru 35-106, 35-108 thru 35-112, 36-002 thru 36-031 modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation.") (See figure 201.)
(1) Set Battery Switches OFF.
(2) Gain access to aft side of frame 5 (RBL 6).
(3) Remove ducts which attach to valve.
(4) Disconnect electrical connector (P56) from valve.
(5) Remove attaching parts and Nose Wheel Spin-up Valve.

F. Install Nose Wheel Spin-up Valve (Aircraft 35-002 thru 35-106, 35-108 thru 35-112, 36-002 thru 36-031 modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation.") (See figure 201.)
(1) Position Nose Wheel Spin-up Valve in place and secure with attaching parts.
(2) Connect electrical connector (P56) to valve.
(3) Install and secure ducts to valve.
(4) Restore aircraft to normal.



* Effective on 35-107, 35-113 and Subsequent
and 36-032 and Subsequent

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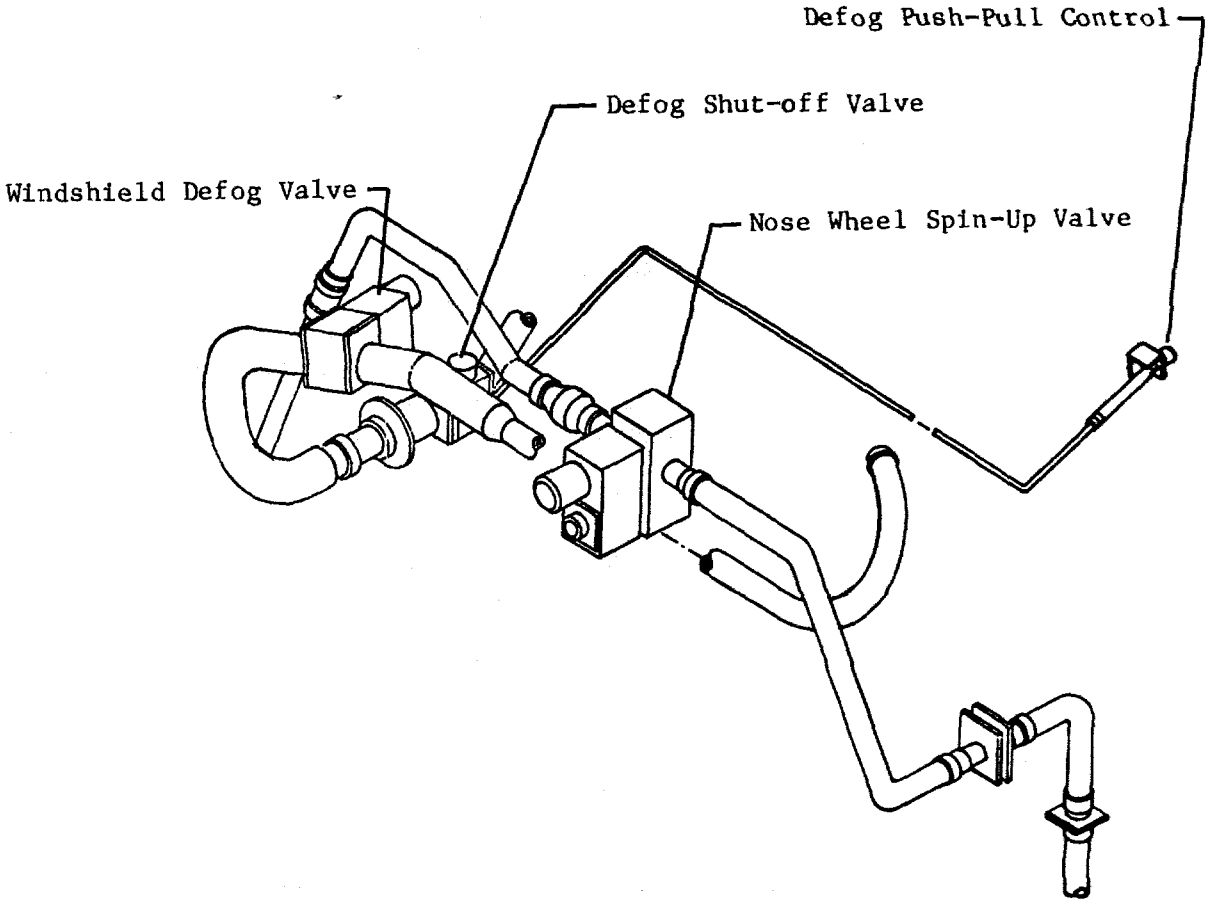
Nose Wheel Spin-up System Installation
Figure 201 (Sheet 1 of 2)



35-002 thru 35-106, 35-108 thru 35-112, 36-002 thru 36-031 modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation"

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Nose Wheel Spin-up System Installation
Figure 201 (Sheet 2 of 2)

G. **Remove Windshield Defog Valve** (35-002 thru 35-106, 35-108 thru 35-112, 36-002 thru 36-031 modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation.") (See figure 201.)
(1) Set Battery Switches off.
(2) Gain access to the aft side of frame 5 (RBL 15).
(3) Remove ducts which attach to valve.
(4) Disconnect electrical connector (P55) from valve.
(5) Remove attaching parts and remove windshield defog valve.

H. **Install Windshield Defog Valve** (35-002 thru 35-106, 35-108 thru 35-112, 36-002 thru 36-031 Modified per AAK 78-5, "Installation of Nose Wheel Spin Up for Unpaved Runway Operation.") (See figure 201.)
(1) Position windshield defog valve in place and secure with attaching parts.
(2) Connect electrical connector (P55) to valve.
(3) Install and secure ducts to valve.
(4) Restore aircraft to normal.

2. **ADJUSTMENT/TEST**

A. **Perform Operational Check of Nose Wheel Spin Up**
(1) Place jack under nose of aircraft and raise aircraft's nose wheel until it is free to rotate. (Refer to Chapter 7.)
(2) Disconnect windshield external defog tube upstream of diverter valve.
(3) Connect an air pressure source equipped with a pressure gage and pressure regulator to tube disconnected in step 2.A.(2), upstream of diverter valve.
(4) Place a chalk mark on LH side wall of nose tire.

WARNING: ENSURE THAT ALL OTHER MAINTENANCE ON THE AIRCRAFT IS SUSPENDED UNTIL COMPLETION OF THIS TEST.

(5) Connect an external electrical power source to aircraft.
(6) Set Battery Switches on.
(7) Position a Strobotac (Model 1531A, manufactured by General Radio Co. or equivalent) unit 3 or 4 feet to the left of the nose wheel. Set Strobotac unit controls at 700 rpm. (Refer to manufacturer's instructions.)

WARNING: ° PERSONNEL MUST REMAIN CLEAR OF THE NOSE WHEEL AREA (ESPECIALLY DIRECTLY FORWARD AND AFT OF THE SPINNING NOSE WHEEL) DURING THIS TEST.

° AIR PRESSURE SHALL NOT EXCEED 25 PSI DURING THIS TEST.

° NOSE WHEEL SHALL NOT EXCEED 3000 RPM.

(8) With spin-up system set off, turn on external test air pressure; regulated to 10 psi. Set spin-up control on. Turn Strobotac unit on.

NOTE: To check rpm, adjust external test air pressure with pressure regulator.

(9) Increase external test air pressure until NOSE WHEEL SPIN-UP annunciator on instrument panel starts to flash. Stabilize external test air pressure (with pressure regulator) and check that rotation of nose wheel is synchronized with Strobotac unit.

NOTE: If the chalk mark appears to be in the same position each time the Strobotac unit flashes, the nose wheel is perfectly synchronized with the Strobotac unit.

(10) If chalk mark appears to walk (move) in either direction, adjust Strobotac unit rpm until it is synchronized with rotation of nose wheel. The rpm setting on the Strobotac unit shall be 700 (±50) rpm. Record rpm.
(11) Increase Strobotac unit setting to 1820 rpm.

CAUTION: DO NOT INCREASE THE TEST PRESSURE TO MORE THAN 25 PSI, OTHERWISE DAMAGE TO AIRCRAFT COULD OCCUR.

(12) Increase external test air pressure until NOSE WHEEL SPIN-UP annunciator glows steadily. Stabilize external test air pressure (with pressure regulator) and check that rotation of nose wheel is synchronized with Strobotac unit.

NOTE: If the chalk mark appears to be in the same position each time the light flashes, the nose wheel is perfectly synchronized with the Strobotac unit.

(13) If chalk mark appears to walk (move) in either direction, adjust Strobotac unit rpm until it is synchronized with rotation of nose wheel. The rpm setting on the Strobotac unit shall be 1820 (±20) rpm. Record rpm.
(14) Reduce external test pressure to zero.
(15) Set Strobotac unit at rpm recorded in step 2.A.(10). Increase external test air pressure slowly and verify that NOSE WHEEL SPIN-UP annunciator starts illuminating intermittently at that nose wheel rpm.
(16) Set Strobotac unit at rpm recorded in step 2.A.(13) and verify that NOSE WHEEL SPIN-UP annunciator starts illuminating steadily at that nose wheel rpm. Reduce external test air pressure to zero.
(17) If system is out of tolerance, trouble shoot system in accordance with Trouble Shooting. Make adjustments and/or replace components as necessary, and perform Operational Check.
(18) Remove external electrical power source from aircraft.
(19) Set Battery Switches off.
(20) Remove external test air pressure lines from aircraft and install windshield external defog tube to diverter valve.
(21) Remove aircraft from jacks. (Refer to Chapter 6.)
(22) Restore aircraft to normal.

WHEELS AND BRAKES - DESCRIPTION AND OPERATION

1. Description

A. Nose Wheel and Tire

(1) The nose landing gear wheel consists of inboard and outboard wheel halves. The LH wheel half has a machined groove to accommodate an O-ring seal to retain tire air pressure. The RH wheel half contains an air valve assembly for servicing the tubeless tire. Each wheel half is fitted with a tapered bearing. The bearing is rubber sealed to prevent contamination entry and lubricant loss.

(2) The nose wheel is equipped with an 18 x 4.4, 10-ply-rated, type VII, tubeless tire. The tire incorporates chines on each side which deflect water and slush away from engine inlets.

B. Main Wheel and Tire

(1) Each main landing gear wheel consists of two bolted together wheel halves. The strut side half of the wheel has a machined groove to accommodate an O-ring seal to retain tire pressure. Two fusible plugs release excessive air pressure caused by overheat. The strut side wheel half contains seven slots which are fitted with disc drive keys. The keys drive the rotating brake discs when the wheels are in motion. The opposite side wheel half contains a valve assembly for servicing tires. Both wheel halves are fitted with tapered bearings which are rubber sealed to prevent contamination entry and lubrication loss.

(2) Each main gear wheel is equipped with a 17.5 x 5.75-8, 12-ply rated, type VII, tubeless tire. On *Aircraft equipped with SSK-931, "Substitution of 10-ply rated Main Gear Tires for 12-ply rated tires,"* the tire will be 18 x 5.5, 10-ply rated type VII.

C. Brake System

(1) The hydraulic brake system includes four power brake valves located directly below the rudder pedals, six shuttle valves (two under the floorboards and two in each main gear wheel well), two parking brake valves located under the right floorboards between frames 10 and 11, four multi-disc self-adjusting brake assemblies, and four hydraulic fuses (one in each brake line).

(2) The parking brake is connected to, and used in conjunction with the hydraulic brake system. The parking brake valves are located beneath the right floorboards between frames 10 and 13. The parking brake control handle is located on the center pedestal. An anti-skid disconnect switch (S173) is installed on the LH (forward) parking brake valve assembly.

D. Anti-Skid System

(1) The brake anti-skid system consists of an anti-skid valve in each brake pressure line, two wheel speed transducers in each main gear axle, and an anti-skid control box located in the tailcone.

E. Emergency Brake System

(1) The emergency brake system consists of the emergency air bottle, located in the nose compartment, and the emergency air valve, located on the pedestal, which is operated by a handle to the left of the throttle levers on the pedestal.

2. Operation

A. Brake System

(1) Depressing the brake pedals opens the power brake valves and directs hydraulic fluid from the nose gear down line through the shuttle valves, anti-skid solenoid valves, and brake fuses to the corresponding brakes. An integral braking system is incorporated in the aircraft to prevent the wheels from spinning as the gear is retracted. On retraction, the return landing gear hydraulic fluid passes through a restrictor in the return line to the reservoir. This return line is also common to the brakes, thus creating approximately 100 to 180 psi back pressure in the brake system which snubs the wheels during the gear retraction cycle. After the gear is retracted, the back pressure returns to normal and the brakes are released. In case of hydraulic system failure, pressure for brake application is provided by the emergency air system.

(2) The multiple disc brake assembly is actuated by hydraulic pressure. When brakes are applied, pressure enters the housing and acts equally on each piston. Piston movement presses the pressure plate and the rotating and stationary discs against the back plate to produce the braking action. When hydraulic pressure is released, the brake return springs return the pressure plate and piston to their original position. Automatic adjustment of brakes to compensate for brake wear is accomplished as follows. As the brakes wear, the return pins and tubes are pulled through grips by the pressure-plate movement. This small movement between pin and grip is equal to the combined wear of all braking surfaces. Thus, when the brake return springs return the pressure plate to the released position, the built-in clearance between the pressure plate and discs remains at a preset constant.

(3) Depressing the brake pedals and pulling the Parking Brake Handle sets the parking brake. When the brake pedals are depressed, fluid pressure is built up in the system and the parking brake valves check the pressure return and hold pressure against the brakes. As the Parking Brake Handle is pulled, the control level on the forward parking brake valve contacts the anti-skid disconnect switch and electrically disconnects the anti-skid system. This prevents system pressure from bleeding off. To release the parking brakes, return the Parking Brake Handle to the off detent position.

B. Anti-Skid System

(1) During brake application, the output signal from each wheel speed transducer is coupled to the anti-skid control box. This signal is amplified, integrated, and filtered to provide an output signal in DC voltage which is proportional to actual aircraft wheel speed. Whenever any braked wheel decelerates faster than the remaining wheels (an impending skid condition), a rate-of-change in DC voltage occurs. Whenever that rate-of-change exceeds a predetermined rate, an output signal from the control box is applied to the anti-skid valve, momentarily releasing the brake pressure on the affected wheel.

C. Emergency Brake System

(1) The emergency brake system is operated by pulling the emergency brake control handle, located on the LH side of the center pedestal, from its detent and then downward. The amount of handle deflection (handle movement downward) determines the amount of air pressure applied to the brakes. Air pressure from the emergency air bottle is routed through the control valve to shuttle valves located in the main wheel wells. The shuttle valves reposition to allow air to actuate the brakes. A pressure regulator within the control valve limits pressure to a maximum of 600 psi.

(2) When the emergency brake control handle is raised, the brakes are released, the emergency brake air pressure is relieved overboard, and the emergency air pressure is shut off at the control valve. To return the brake system to normal, the brakes must be bled. (Refer to 32-43-00.) The emergency air bottle must be recharged with dry air or nitrogen when the indicated pressure falls below the green line on the gage. (Refer to Chapter 12.)

NOTE: The brake anti-skid system is bypassed during emergency braking.

1. Inspection/Check

WARNING: THE USE OF RECAPPED TIRES IS NOT APPROVED.

DO NOT PROBE CUTS OR EMBEDDED FOREIGN OBJECTS WITH TIRE INFLATED.

NOTE: In a case where one main gear tire must be replaced due to wear limits or damage, consideration regarding the replacement of the adjacent tire is left to the discretion of the customer. When making a decision, Learjet recommends that a thorough inspection of the tire be accomplished. In addition, the tread life expectancy and scheduled maintenance activities should be considered.

The following procedures are provided to establish the serviceability of aircraft tires.

A. Tire Wear Limits

NOTE: Nose and main gear tires must be replaced if any of the following discrepancies are found:

(1) Skid - An oval-shaped flat spot or skid burn in the tread which may extend to or into fabric plies.
(2) Tread Rubber Reversion - An oval-shaped area in the tread similar to a skid, but where rubber shows burning due to hydroplaning during landing. Replace tire if imbalance results.
(3) Cuts - Cuts into fabric at any location. Cuts extending across more than 50% of rib with:

Tread Remaining	Maximum Cut Depth
1/2 to 13/32 Inch	1/4 Inch
3/8 to 9/32 Inch	3/16 Inch
1/4 to 5/32 Inch	1/8 Inch
1/8 to 0 Inch	1/16 Inch

(4) Open Tread Splice - An opening of the biased tread splice across one or more tread ribs.
(5) Tread Chunking - A pock mark condition in the wearing portion of tread. Replace if fabric is visible.
(6) Tread Separation - An area of separation or void between components in the tread area due to loss of adhesion. Bulges in any part of tire tread, sidewall, or bead areas indicate separation or damage.
(7) Blister - A void within the tread or sidewall rubber. Replace if caused by delamination.
(8) Chevron Cutting - Tread damage. Replace if chunking to fabric occurs.
(9) Peeled Rib - A circumferential delamination of a tread rib to tread fabric ply. Replace tire if fabric is visible.
(10) Thrown Tread - Partial or complete loss of tread down to or past the tread fabric ply.
(11) Groove Cracking - A circumferential cracking at the base of a tread groove.
(12) Rib Undercutting - An extension of groove cracking progressing under a tread rib.
(13) Cut or Snag - Penetration by a foreign object. Replace tire if sidewall injury extends into fabric.
(14) Ozone or Weather Checking/Cracking - Random pattern of shallow sidewall cracks. Replace if fabric is visible.
(15) Radial or Circumferential Cracks - Cracking condition in the sidewall/shoulder area. Replace tire if down to fabric.
(16) Sidewall Separation - Bulges in any part of sidewall or bead area indicates separation or damage.
(17) Brake Heat Damage - A deterioration of the bead from toe to wheel flange area; minor to severe blistering of rubber in this area; melted or solidified nylon fabric if temperatures were excessive.

(18) Kinked Bead - Deformation of the bead wire in the bead toe, face, or heel area.
(19) Inner Tire Breakdown - Deterioration with the shoulder area, identified by distorted, wrinkled rubber of tire inner liner.
(20) Impact Break - Rupture of tire carcass in tread or sidewall area.
(21) Wear - If cords are exposed at any location, replace tire. The tire must be closely monitored for exposed cords when tire wear reaches base of any groove.

B. Eddy Current Inspection of Wheel Bead Seat Radius (See Figure 201.)

NOTE: Procurement of a Wheel Test Kit P/N EZ9105950 (Mfg. by Detek, Inc., Temple Hills, Maryland 20748-6996), or equivalent tester/probe is required to perform this inspection. When an alternate type tester/probe is used, refer to the applicable manufacturers instructions for performing Eddy current inspection. Equivalent equipment must be able to detect a 0.005 inch deep surface crack.

When using the tester, use of an Eddy Current Probe Guide P/N 2471017-1, available from Learjet, is recommended to facilitate inspection.

Wheel halves shall be replaced if any evidence of cracking is noted. Corrosion shall be repaired prior to inspecting. Scratches, nicks, and other types of damage may be repaired, provided damage is within the allowable limits as specified in the appropriate overhaul manual: AP-494, Aircraft Braking Systems Nose Wheel Assembly Component Maintenance Manual for the nose gear wheel; on *Aircraft with P/N 9543991 series main gear wheels installed,* refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; on *Aircraft with P/N 5004913 series main gear wheels installed,* refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.) Wheel halves shall be reinspected, per the following procedures, after any type repair.

The following recommended inspection procedure is applicable when using the Eddy Current Test Instrument, Model MIZ-10A, or Hocking Locator UH with the Eddy Current Probe Guide P/N 2471017-1 only.

This inspection may be performed by a licensed airframe mechanic when the recommended equipment Wheel Test Kit P/N EZ9105950 (Mfg. by Detek, Inc., Temple Hills, Maryland 20748-6996) and procedures are used. Appropriate training and qualification is required for other equipment.

(1) Remove applicable wheel(s) from aircraft and disassemble in accordance with procedures outlined in the appropriate section, this Chapter.

WARNING: DRY-CLEANING SOLVENTS ARE TOXIC AND VOLATILE. USE IN WELL VENTILATED ROOM. AVOID CONTACT WITH SKIN OR CLOTHING. DO NOT INHALE VAPORS.

(2) Clean wheel halves with dry-cleaning solution, Specification P-D-680 (Stoddard solvent), or equivalent.

NOTE: To perform Eddy current inspection, paint on bead seat shall be smooth and uniform prior to performing Eddy current inspection. If stripping of paint from wheel halves is required, refer to the appropriate overhaul manual for paint removal procedures: AP-494, Aircraft Braking Systems Nose Wheel Assembly Component Maintenance Manual

for nose gear wheels; on *Aircraft with P/N 9543991 series main gear wheels installed*, refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; on *Aircraft with P/N 5004913 series main gear wheels installed*, refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)

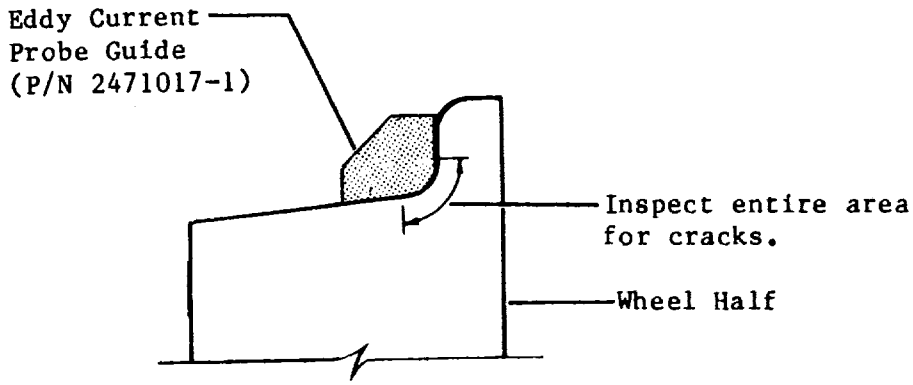
When inspecting painted wheel half, if an area is suspected of having a crack, strip paint from wheel half and reinspect.

(3) Utilizing recommended test equipment as identified previously, preselect Eddy current tester to 500 kHz frequency, and adjust gain to 500.

NOTE: When using equipment other than that recommended, refer to the applicable manufacturers instructions for frequency and sensitivity adjustments.

(4) Position Eddy current probe guide (P/N 2471017-1) on bead seat radius, and using pencil probe, inspect entire periphery of wheel bead seat. Use each of the four locations on probe guide. Replace wheel half if any evidence of cracking is noted.

C. Inspection of Wheel Valve Assembly, Fusible Plugs, Bearing Cup, Bearing Seal and Keyway Liners. Refer to AP-494, Aircraft Braking Systems Nose Wheel Assembly Component Maintenance Manual for nose gear wheels; on *Aircraft with P/N 9543991 series main gear wheels installed*, refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; on *Aircraft with P/N 5004913 series main gear wheels installed*, refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)



Eddy Current Inspection of Wheel Bead Seat Radius
Figure 201

NOSE WHEEL AND TIRE - MAINTENANCE PRACTICES

1. Removal/Installation

A. Tools and Equipment

NOTE: Equivalent substitues may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Tire gage (capable of 125 psi [862 kPa])		Commercially Available	Check tire pressure.
Schader Tire Deflator	4277	Commercially Available	Deflate tire.
Stoddard Solvent	P-D-680	Commercially Available	Clean parts.
Grease (MIL-G-81322	Refer to Chapter 12.	Commercially Available	Pack bearings and lubricate seals, bearing cups, and axle.
Nitrogen		Commercially Available	Inflate tire.
Safety wire.		Commercially Available	Secure axle nut.

B. Removal of Nose Wheel (See Figure 201 and Figure 202.)
(1) Place aircraft on jacks. (Refer to Chapter 7.)

WARNING: TIRE SHALL BE DEFLATED BEFORE REMOVING AXLE NUT FROM AXLE. IF WHEEL BOLT(S) HAVE FAILED, THE WHEEL ASSEMBLY MAY SEPARATE WITH EXPLOSIVE FORCE WHEN AXLE NUT IS LOOSENED.

DO NOT ATTEMPT TO REMOVE VALVE CORE UNTIL TIRE IS COMPLETELY DEFLATED. THE VALVE CORE CAN BE EJECTED AT HIGH VELOCITY IF UNSCREWED BEFORE AIR PRESSURE IS RELEASED.

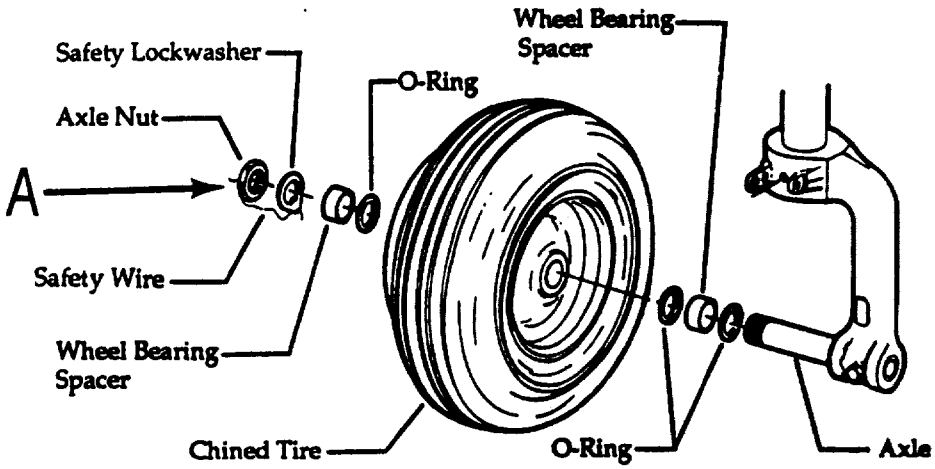
DO NOT REDUCE TIRE PRESSURE WHEN TIRE IS HOT.

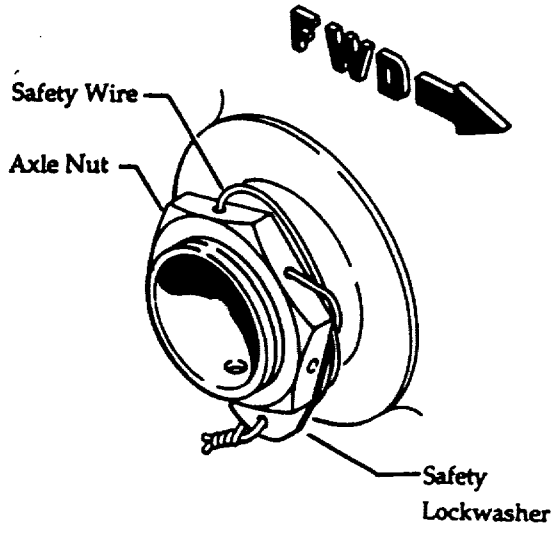
(2) Deflate tire by removing valve cap and install tire deflator. Remove tire deflator when all pressure is deflated.

CAUTION: **BEARING CONES WILL BE RELEASED WHEN WHEEL ASSEMBLY IS REMOVED. CARE SHALL BE TAKEN TO PREVENT DROPPING OR DAMAGING THESE PARTS.**

ENSURE THAT BEARINGS AND SEALS ARE TAGGED UPON REMOVAL FOR INSTALLATION IN THE SAME WHEEL HALF.

(3) Remove safety wire, axle nut, and safety lockwasher from nose gear axle.
(4) Remove O-ring and wheel bearing spacer, then slide wheel from axle.
(5) If wheel assembly is to be remounted on aircraft, visually check tire for wear and cuts. Check tire bead for damage before installation. (Refer to 32-40-00, Inspection/Check.)
(6) If tire must be replaced, refer to Repairs, this section.
(7) Visually inspect axle. (Refer to 5-10-00.)





Detail A

Nose Wheel Installation
Figure 201

C. Install Nose Wheel (See Figure 201 and Figure 202.)

(1) Assemble O-rings and wheel bearing spacer on axle.

NOTE: It is recommended that wheel assembly be installed with valve stem on RH side.

(2) Install seal, LH bearing cone, wheel, RH bearing cone, and seal on axle.

NOTE: Separate seals are installed on *Aircraft 35-665 and Subsequent, 36-064 and Subsequent, and prior Aircraft incorporating SSK 993, "Replacement of Landing Gear Wheel Bearings."*

Marked side of seal is placed toward bearing.

Ensure wheel bearing hub area (grooves) have grease applied to them before the bearing seal is installed. (See Figure 203.)

(3) Assemble O-ring, wheel bearing spacer, safety lockwasher, and axle nut on axle.
(4) Tighten axle nut to 80 inch-pounds [9.0 Nm], then back off to zero inch-pounds (without separating parts), and retorque to 80 inch-pounds [9.0 Nm]. Check that no wheel side motion exists. Safety wire axle nut and safety lockwasher. (See Figure 201, Detail A.)
(5) Inflate tire with nitrogen. (Refer to Chapter 12.) Ensure that valve core is not leaking and install valve cap.
(6) Remove aircraft from jacks. (Refer to Chapter 7.)
(7) Check tire pressure 24 hours after installing on aircraft; maximum allowable pressure loss is 5%.

2. Repairs

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Component Maintenance Manual with Illustrated Parts List	AP-494	Aircraft Braking Systems Corp. 1204 Massillon Road Akron, OH 44306-4186	Nose wheel maintenance.
Tire Gage (Capable of 125 psi [862 kPa])		Commercially Available	Check tire pressure.
Schrader Tire Delfator	4277	Commercially Available	Deflate tire.
Stoddard Solvent	P-D-680	Commercially Available	Clean parts.
Grease (MIL-G-81322)	Refer to Chapter 12.	Commercially Available	Pack bearings and lubricate seals, bearing cups, and axle.

NAME	PART NUMBER	MANUFACTURER	USE
Tire Inflation Cage	3170030	Learjet, Inc. Wichita, KS	Tire inflation protection.
Nitrogen		Commercially Available	Inflate tire.
Isopropyl Alcohol (TT-I-735)		Commercially Available	Cleaning.
Clean, Soft, Lint-free Cloth		Commercially Available	Drying and Cleaning.
Anti-Seize Compound (MIL-T-83434)		Commercially Available	Lubricate threads and bearing surfaces.
Safety Wire	MS2099NC51	Commercially Available	Secure axle nut.
Soap		Commercially Available	Check tire for leakage.

B. Disassemble Nose Wheel For Tire Change (See Figure 202.)

NOTE: For replacement specifications and allowable damage (e.g., wheels subjected to rolling on a flat or disintegrated tire), as well as overhaul and repair procedures, other than routine tire changes, refer to Publication No. AP-494, Nose Wheel Assembly Overhaul Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)

For Tire Wear Limits, refer to 32-40-00, Inspection/Check.

CAUTION: WHEELS THAT HAVE A MISSING, BROKEN OR CRACKED BOLT(S) MUST BE OVERHAULED PER THE APPLICABLE WHEEL COMPONENT MAINTENANCE MANUAL.

(1) Visually inspect wheel assembly for missing bolts, nuts and washers.

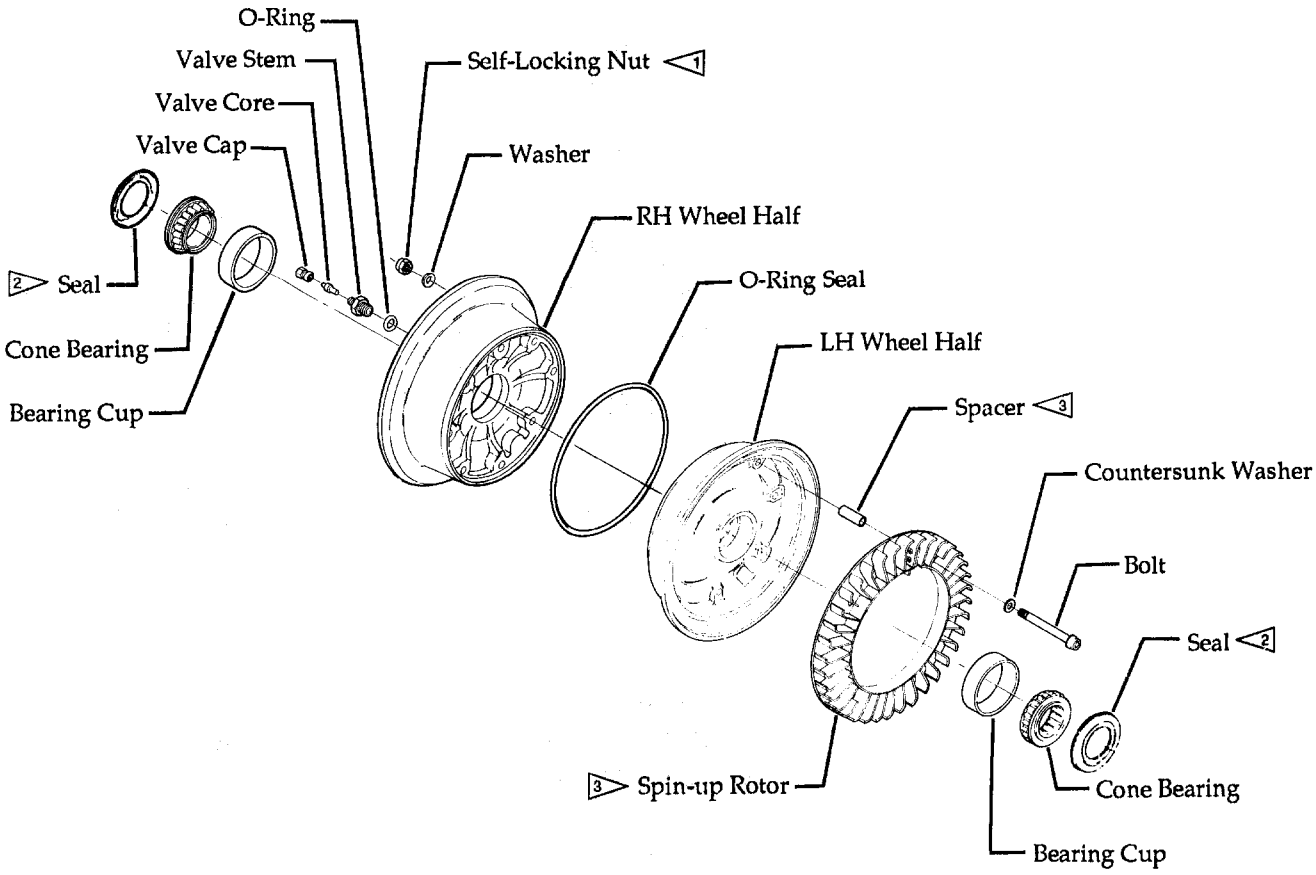
WARNING: DO NOT ATTEMPT TO REMOVE VALVE CORE UNTIL TIRE IS COMPLETELY DEFLATED. THE VALVE CORE CAN BE EJECTED AT HIGH VELOCITY IF UNSCREWED BEFORE AIR PRESSURE IS RELEASED.

(2) Ensure tire is completely deflated by removing valve cap and installing tire deflator. After all air pressure has been released, remove valve core.

1> Marked side of seal goes toward bearing. (*Aircraft 35-665 and Subsequent, 36-064 and Subsequent, and prior Aircraft modified per SSK 993, "Replacement of Landing Gear Wheel Bearings".*)

2> *Aircraft Equipped with Nose Wheel Spin-up Rotor.*

CAUTION: BEARINGS ARE NOT INTERCHANGEABLE BETWEEN WHEELS MODIFIED PER SSK 993 AND NON-MODIFIED WHEELS. ENSURE THAT BEARINGS AND SEALS ARE TAGGED AND REINSTALLED IN THEIR PROPER WHEEL.



Nose Wheel Assembly
Figure 202

CAUTION: **DO NOT PRY BETWEEN THE FLANGE AND BEAD WITH SHARP TOOLS OR WHEEL AND TIRE MAY BE DAMAGED, DESTROYING THEIR SEALING AND STRUCTURAL PROPERTIES.**

(3) Break tire beads away from both wheel flanges by applying pressure in even increments around entire sidewall as close to tire beads as possible.

WARNING: **DO NOT LOOSEN OR REMOVE WHEEL BOLTS UNTIL TIRE IS COMPLETELY DEFLATED. FAILURE TO COMPLY CAN CAUSE BODILY INJURY.**

CAUTION: **ALL WHEEL NUTS AND BOLTS THAT ARE ACCIDENTALLY TIGHTENED (INSTEAD OF LOOSENED) TO 120% OF RECOMMENDED TORQUE SHALL BE DISCARDED.**

DO NOT USE AN IMPACT OR POWER WRENCH TO REMOVE WHEEL NUTS OR BOLTS.

DISASSEMBLE WHEEL ON TIRE CHANGER OR CLEAN, FLAT SURFACE. DO NOT NICK, SCRATCH, OR OTHERWISE DAMAGE THE WHEEL HALVES.

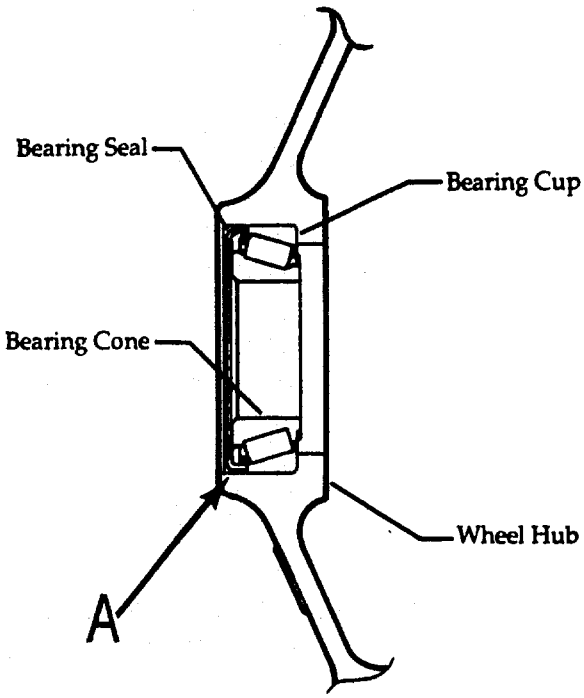
(4) Remove self-locking nuts, washers, countersunk washers, and bolts.

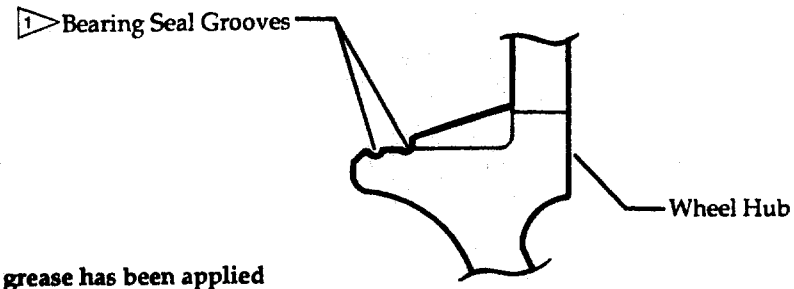
CAUTION: **TAKE CARE NOT TO DAMAGE VALVE STEM WHEN SEPARATING WHEEL HALVES.**

(5) Separate wheel halves; remove tire and O-ring seal being careful not to damage O-ring seal.

NOTE: Do not reuse old O-ring unless necessary. If old O-ring must be reused, mark position of O-ring in wheel half. Do not damage O-ring. Store O-ring on a clean flat surface; do not hang or stretch it.

(6) Visually inspect valve stem for condition and security. If required, remove valve stem and pre-formed packing from outboard wheel half.





1 Ensure grease has been applied to grooves before installing bearing cone and seal.

Detail A

(INBOARD WHEEL BEARING HUB SHOWN: OUTBOARD WHEEL BEARING HUB TYPICAL.)

Nose Wheel Bearing Hub Bearing Seal Grooves
Figure 203

WARNING: **DRY-CLEANING SOLVENTS ARE TOXIC AND VOLATILE. USE IN WELL VENTILATED ROOM. AVOID CONTACT WITH SKIN AND CLOTHING. DO NOT INHALE VAPORS.**

CAUTION: **CAREFULLY CLEAN BEARING CONES IN A SEPARATE CONTAINER WITH CLEANING SOLVENT TO PREVENT CONTAMINATION.**

ON AIRCRAFT 35-002 THRU 35-664 AND 36-002 THRU 36-063 NOT MODIFIED PER SSK 993, "REPLACEMENT OF LANDING GEAR WHEEL BEARINGS," **DO NOT REMOVE INTEGRAL SEAL FROM BEARING.**

(7) Clean all metal parts with solvent. Clean bearing cones in a separate clean container.

NOTE: A soft-bristle brush may be used to remove hardened grease, dust, or dirt.

WARNING: **DO NOT SPIN BEARINGS WHILE DRYING WITH COMPRESSED AIR. UNMOUNTED SPINNING BEARINGS MAY SHATTER CAUSING PERSONAL INJURY.**

(8) Dry metal parts thoroughly, using low pressure (15 psi) filtered air.

CAUTION: **ENSURE THAT BEARINGS AND SEALS, WHICH WERE TAGGED UPON WHEEL REMOVAL, ARE INSTALLED IN THE SAME WHEEL HALF.**

IF A BEARING OR BEARING CUP IS REJECTED, THEY MUST BE REPLACED AS A SET.

(9) Visually inspect wheel bearings and bearing seals. Replace bearings showing surface damage, corrosion, spalling, scratches, flat positions, pitting, roller end scoring or heat discoloration. Refer to Publication No. AP-494, Nose Wheel Assembly Overhaul Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)

(10) Inspect bearing cups for scratches, nicks, pitting, brinelling, spalling, heat discoloration, corrosion, wear, and other damage. Refer to Publication No. AP-494, Nose Wheel Assembly Overhaul Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)

WARNING: **DO NOT LET GREASE CONTACT EYES OR SKIN. GREASE IS SOMEWHAT TOXIC TO SKIN. FOLLOW MANUFACTURER'S INSTRUCTIONS.**

(11) Pack bearing cones and bearing cups with clean MIL-G-81322 grease immediately after drying. Store bearings and seals in clean sealed containers.

(12) Visually inspect inboard and outboard wheel subassemblies for cracks and structural damage. Inspect all wheel subassembly areas for corrosion, nicks, scratches, marks from tools, and surface damage.

NOTE: Wheel subassemblies with grooves worn in the bearing hubs as shown in Figure 203 do not need to be scrapped. These grooves, caused by the bearing seal, are normal and acceptable.

(13) Deleted.

CAUTION: ALL WHEELS THAT HAVE A MISSING, BROKEN, OR CRACKED BOLT(S) MUST BE OVERHAULED PER THE APPLICABLE WHEEL COMPONENT MAINTENANCE MANUAL.

(14) Visually inspect wheel bolts. (Refer to 5-10-00.) Carefully examine under bolt head and in threads adjacent to shank for cracks. Replace all bolts that have damaged or worn threads corrosion, or cracks. Magnetic particle check or replace any bolt with any other suspect condition.

NOTE: Replace or perform magnetic particle check on all bolts with unknown history.

(15) Visually inspect wheel washers for cracks, distortion or damage. Examine washer surfaces for grooves, fretting or other damage. Replace all damaged washers.

(16) Visually inspect for security and condition, instruction data plates, identification data plates, and warning data plates. Replace all unreadable, loose, or missing data plates.

C. Assemble Nose Wheel For Tire Change (See Figure 202.)

(1) Install valve stems, if removed. Refer to Publication No. AP-494, Nose Wheel Assembly Overhaul Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)

(2) Ensure wheel flange is clean and dry. Clean flange with a clean cloth dampened with isopropyl alcohol.

WARNING: USE OF RECAPPED TIRES IS NOT APPROVED.

(3) Visually inspect tire to be installed for particles inside, wear, cuts, abrasions, flat spots. Inspect bead area for cleanliness and damage. (Refer to 32-40-00, Inspection/Check.)

WARNING: DO NOT LET GREASE CONTACT EYES OR SKIN. GREASE IS SOMEWHAT TOXIC TO SKIN. FOLLOW MANUFACTURER'S INSTRUCTIONS.

CAUTION: REUSED WHEEL O-RING SEALS SHOULD BE INSTALLED IN THEIR ORIGINAL POSITION. ENSURE THAT SEAL IS NOT TWISTED OR DISTURBED DURING INSTALLATION.

(4) Lubricate wheel O-ring seal with light coat of grease.

(5) Install wheel O-ring seal in groove on inboard (LH) wheel half. Ensure that seal is not twisted on installation. Reused seals shall be installed as near as possible to their original position.

(6) Place tire on a clean, flat surface.
(7) Place outboard (RH) wheel half in tire so that red balance dot on tire is aligned with valve stem.
(8) Flip tire and wheel half over on work surface.
(9) Place inboard (LH) wheel half in tire so that raised flats on inside of both wheel halves are aligned. **Do not** disturb wheel O-ring seal.
(10) Using anti-seize compound, lubricate bolt and nut threads and bearing surfaces of nut, bolt head, and washers.

CAUTION: INSTALL BOLT HEADS ON INBOARD SIDE. THERE MUST BE A COUNTERSUNK WASHER UNDER EACH BOLT HEAD AND A FLAT WASHER UNDER EACH NUT. MAKE CERTAIN THAT COUNTERSUNK SIDE OF WASHER IS INSTALLED AGAINST THE BOLT HEAD.

(11) Install countersunk washers with the countersunk areas facing bolt heads.
(12) Install bolts through wheel halves and secure with washers and new self-locking nuts.

CAUTION: DO NOT USE IMPACT OR POWER WRENCH TO TIGHTEN OR TORQUE WHEEL BOLTS OR NUTS.

ANY NUTS AND BOLTS TIGHTENED TO MORE THAN 120 PERCENT OF THE RECOMMENDED FINAL TORQUE VALUE SHALL BE REMOVED FROM SERVICE.

(13) First tighten all self-locking nuts to 60 inch-pounds [7.0 Nm]. Then tighten self-locking nuts to 120 inch-pounds [13.5 Nm] in equal increments in a crisscross sequence around wheel. Do not use a power wrench.
(14) Install valve core in valve stem.

WARNING: PLACE WHEEL IN AN INFLATION CAGE FOR INITIAL INFLATION WHEN SEATING BEADS. TIRE AND/OR WHEEL FAILURE MAY OCCUR CAUSING INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT IF THE TIRE IS OVERINFLATED.

MAINTENANCE OF TIRE AND WHEEL ASSEMBLIES MUST BE DONE WITH PROPER INFLATION EQUIPMENT THAT IS MADE FOR THIS FUNCTION.

(15) With tire/wheel assembly contained in safety cage, inflate tire to operating pressure. Ensure valve core and bead seat area is not leaking. Install valve cap.

D. Nose Wheel Balancing
(1) For balancing procedures, refer to Publication No. AP-494, Nose Wheel Assembly, Aircraft Braking Systems Part No. 9544207, Overhaul Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)

CAUTION: DO NOT EXCEED 2.5 TOTAL OUNCES [71 GRAMS] OF BALANCE WEIGHTS.

(2) Use method II and balance wheel within 0.5 ounce [14 gm].

3. Cleaning/Paining

A. For cleaning/painting procedures, refer to Publication No. AP-494, Nose Wheel Assembly Overhaul Manual with Illustrated Parts List. (Refer to Introduction, List of Supplementary Publications.)

MAIN WHEEL AND TIRE - MAINTENANCE PRACTICES

1. Removal/Installation

A. Tools and Equipment

NOTE: Equivalent substitues may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Tire gage (capable of 125 psi [862 kPa])		Commercially Available	Check tire pressure.
Schader Tire Deflator	4277	Commercially Available	Deflate tire.
Grease (MIL-G-81322)	Refer to Chapter 12.	Commercially Available	Pack bearings and lubricate seals, bearing cups, and axle.
Nitrogen		Commercially Available	Inflate tire.
Anti-Seize Compound (MIL-T-83483)		Commercially Available	Lubricate threads and bearing surfaces.
Safety wire	MS20995NC51	Commercially Available	Secure axle nut.

B. Removal of Main Gear Wheel (See Figure 201.)
(1) Place aircraft on jacks. (Refer to Chapter 7.)

WARNING: TIRE SHALL BE DEFLATED BEFORE REMOVING AXLE NUT FROM AXLE. IF WHEEL BOLT(S) HAVE FAILED, THE WHEEL ASSEMBLY MAY SEPARATE WITH EXPLOSIVE FORCE WHEN AXLE NUT IS LOOSENED.

DO NOT ATTEMPT TO REMOVE VALVE CORE UNTIL TIRE IS COMPLETELY DEFLATED. THE VALVE CORE CAN BE EJECTED AT HIGH VELOCITY IF UNSCREWED BEFORE AIR PRESSURE IS RELEASED.

DO NOT REDUCE TIRE PRESSURE WHEN TIRE IS HOT.

(2) Deflate tire by removing valve cap and install tire deflator. Remove tire deflator when all pressure is deflated.
(3) Cut safety wire and remove screws from anti-skid generator drive cap.
(4) Remove anti-skid generator drive cap.

CAUTION: BEARING CONE WILL BE RELEASED WHEN WHEEL ASSEMBLY IS REMOVED. CARE SHALL BE TAKEN TO PREVENT DROPPING OR DAMAGING THESE PARTS.

ENSURE THAT BEARINGS AND SEALS ARE TAGGED UPON REMOVAL FOR INSTALLATION IN THE SAME WHEEL HALF.

(5) Remove axle nut screws, axle nut, key washer, and wheel from aircraft.
(6) If wheel assembly is to be remounted on aircraft, visually check tire for wear and cuts. Check tire bead for damage before installation. (Refer to 32-40-00, Inspection/Check.)
(7) If tire must be replaced, refer to Repairs, this section.
(8) Visually inspect axle. (Refer to 5-10-00.)

C. Installation of Main Gear Wheel (See Figure 201.)
(1) Install seal, inboard bearing cone, wheel assembly, outboard bearing cone, and seal on axle.

NOTE: Separate seals (see Figure 201) are installed on *Aircraft incorporating SSK 993, "Replacement of Landing Gear Wheel Bearings."*

Marked side of seal is placed toward bearing.

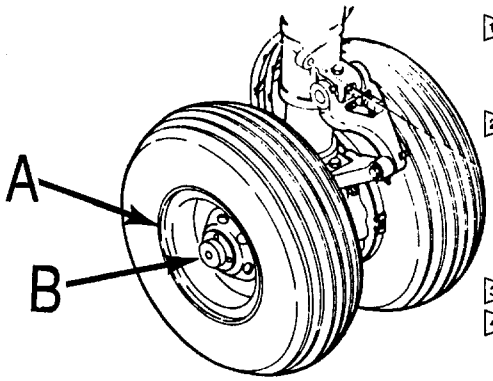
Ensure wheel bearing hub area (grooves) have grease applied to them before the bearing seal is installed. (See Figure 202.)

CAUTION: CHECK FOR FULL ENGAGEMENT OF BRAKE ROTATING DISC TANGS INTO WHEEL SLOTS.

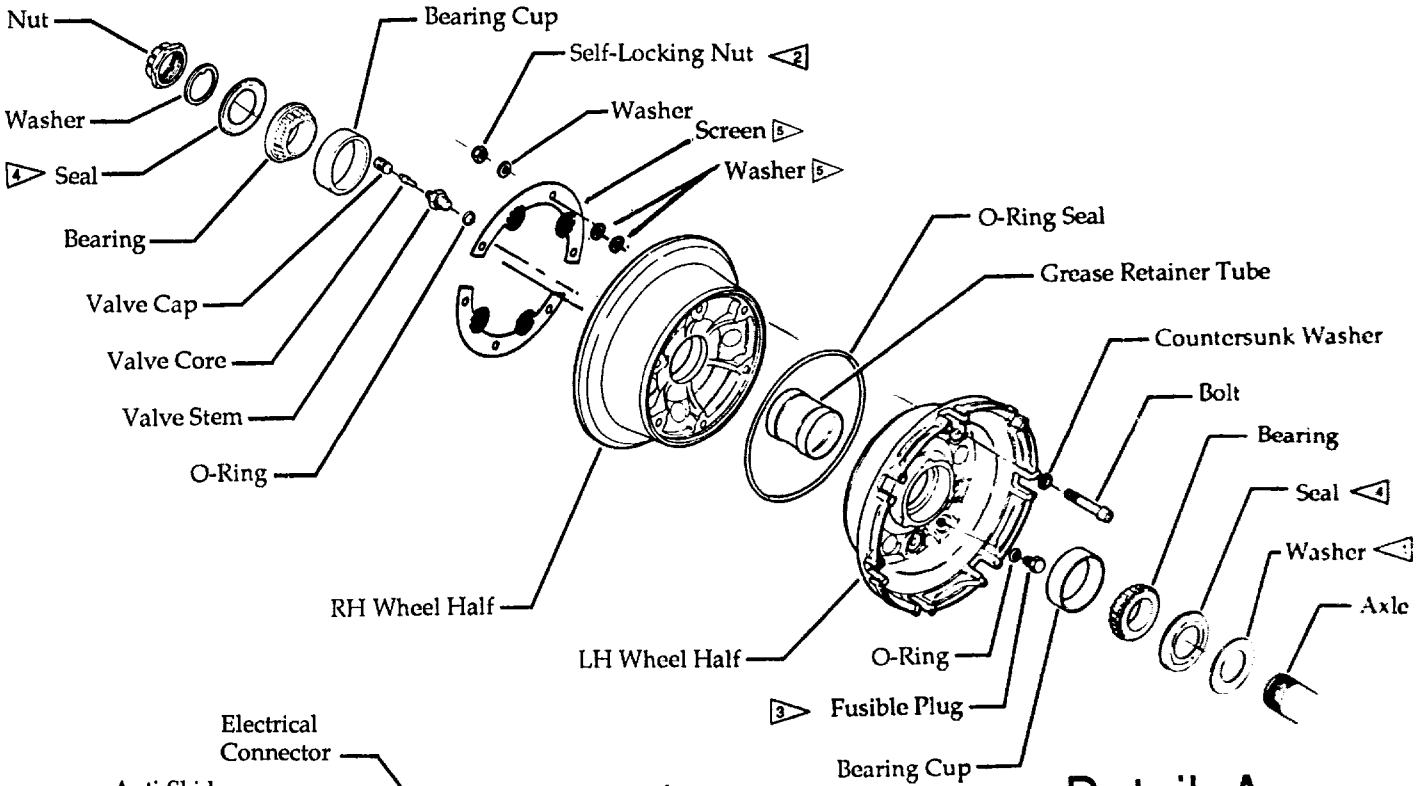
(2) Install key washer and axle nut.
(3) Torque axle nut to 80 inch-pounds [9.0 Nm], then back off to zero pounds, without separating parts. Retorque axle nut to 20 inch-pounds [2.3 Nm]. After final torque, nut may be advanced a maximum of 60° to obtain the position required to install wheel speed transducer retaining screws.

CAUTION: WHEN COMPLETING THE SAFETY ON WHEEL SPEED TRANSDUCER RETAINING SCREWS, USE NEEDLE NOSE PLIERS TO TUCK THE SAFETY WIRE PIGTAIL END INTO A GROOVE SECTION OF THE MAIN WHEEL NUT, AWAY FROM THE HUB CAP. THIS WILL PREVENT THE SAFETY WIRE PIGTAIL ENDS FROM DAMAGING THE ALUMINUM HUB CAP.

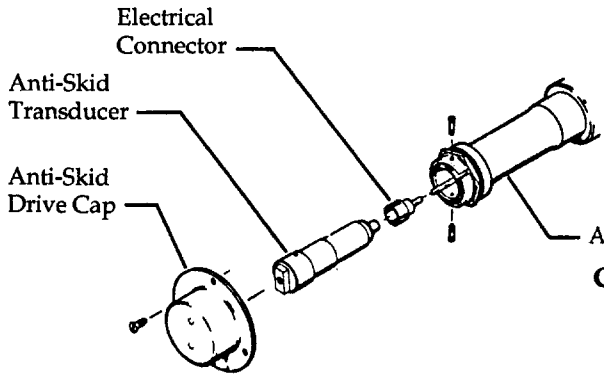
(4) Install wheel speed transducer retaining screws into slots and safety wire.
(5) Install wheel speed transducer drive cap and safety wire screws as required.
(6) Inflate tire with dry nitrogen. (Refer to Chapter 12.) Ensure that valve core is not leaking and install valve cap.
(7) Remove aircraft from jacks. (Refer to Chapter 7.)
(8) Adjust tire pressure 24 hours after wheel is installed on aircraft to compensate for normal tire stretch. Maximum allowable pressure loss is 5%.



1. *Aircraft 35-002 thru 35-87 and 36-002 thru 36-047 Equipped with 5442200 Series Struts or incorporating AAK 85-2, and Aircraft 35-88 and Subsequent, 36-048 and Subsequent.*
2. Torque all self-locking nuts in a crisscross pattern: On *Aircraft with Goodyear P/N 9543991 series wheels installed;* in equal increments of 40 inch-pounds to final Lubtork value of 120 inch-pounds. On *Aircraft with Goodyear P/N 5004913 series wheels installed;* to a Lubtork value of 20 foot-pounds.
3. Torque fusible plug 80 to 90 inch-pounds.
4. Marked side of seal goes toward bearings. *(Aircraft 35-002 thru 35-664 and 36-002 thru 36-063 modified by SSK 993, and 35-665 and Subsequent, and 36-064 and Subsequent.)*
5. *Aircraft 35-002 and Subsequent modified per SB 35/36-32-18. Aircraft 36-002 and Subsequent modified per SB 35/36-32-18.*



Detail A



Detail B

CAUTION: BEARINGS ARE NOT INTERCHANGABLE BETWEEN WHEELS MODIFIED PER SSK 993 AND NON-MODIFIED WHEELS. ENSURE THAT BEARINGS AND SEALS ARE TAGGED AND REINSTALLED IN THEIR PROPER WHEEL.

6-3C-1
A6-17C
B6-19B-1

Main Gear Wheel Assembly
Figure 201

2. Repairs

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Component Maintenance Manual with Illustrated Parts List	AP-480	Aircraft Braking Systems Corp. 1204 Massillon Road Akron, OH 44306-4186	Main wheel maintenance.
Schrader Tire Delfator	4277	Commercially Available	Deflate tire.
Stoddard Solvent	P-D-680	Commercially Available	Clean parts.
Brush (Soft Bristled)		Commercially Available	Cleaning parts.
Grease	MIL-G-81322	Commercially Available	Pack bearings and bearing cups. Lubricate seals, bearing cups, axle, and fusable plug threads.
Isopropyl Alcohol	TT-I-735	Commercially Available	Clean reusable O-ring seals. Clean areas of wheel and tire.
Cloth (Clean, Soft, and Lint-free)		Commercially Available	Dry reusable O-ring seals. Clean valve stem hole and areas of wheel and tire.
Anti-Seize Compound	MIL-T-83434	Commercially Available	Lubricate bolt threads, nut threads, and bearing surfaces.
Tire Inflation Cage	3170030	Learjet, Inc. Wichita, KS	Tire inflation protection.
Nitrogen		Commercially Available	Inflate tire.
Soap		Commercially Available	Check tire for leakage.

B. Disassemble Main Gear Wheel (See Figure 201.)

NOTE: For replacement specifications and allowable damage (e.g., wheels subjected to rolling on a flat or disintegrated tire), as well as overhaul and repair procedures, other than routine tire changes, refer to the following publications. *On Aircraft with P/N 9543991 series main gear wheels installed,* refer to Aircraft Braking Systems Publication AP-480, Component

Maintenance Manual with Illustrated Parts List; *on Aircraft with P/N 5004913 series main gear wheels installed,* refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List.

For Tire Wear Limits, refer to 32-40-00, Inspection/Check.

CAUTION: ALL WHEELS THAT HAVE A MISSING, BROKEN OR CRACKED BOLT(S) MUST BE OVERHAULED PER THE APPLICABLE WHEEL COMPONENT MAINTENANCE MANUAL.

(1) Visually inspect wheel assembly for missing bolts, nuts, and washers

WARNING: DO NOT ATTEMPT TO REMOVE VALVE CORE UNTIL TIRE IS COMPLETELY DEFLATED. THE VALVE CORE CAN BE EJECTED AT HIGH VELOCITY IF UNSCREWED BEFORE AIR PRESSURE IS RELEASED.

(2) Deflate tire by removing valve cap and installing tire deflator. After all air pressure has been released, remove valve core.

CAUTION: DO NOT PRY BETWEEN THE FLANGE AND BEAD WITH SHARP TOOLS OR WHEEL AND TIRE MAY BE DAMAGED, DESTROYING THEIR SEALING AND STRUCTURAL PROPERTIES.

(3) Break tire beads away from both wheel flanges by applying pressure in even increments around entire sidewall as close to tire beads as possible.

WARNING: DO NOT LOOSEN OR REMOVE WHEEL BOLTS UNTIL TIRE IS COMPLETELY DEFLATED. FAILURE TO COMPLY CAN CAUSE BODILY INJURY.

CAUTION: ALL WHEEL NUTS AND BOLTS THAT ARE ACCIDENTALLY TIGHTENED (INSTEAD OF LOOSENED) TO 120% OF RECOMMENDED TORQUE SHALL BE DISCARDED.

DO NOT USE AN IMPACT OR POWER WRENCH TO REMOVE WHEEL NUTS OR BOLTS.

DISASSEMBLE WHEEL ON TIRE CHANGER OR CLEAN, FLAT SURFACE. DO NOT NICK, SCRATCH, OR OTHERWISE DAMAGE THE WHEEL HALVES.

(4) Remove self-locking nuts, washers, countersunk washers, and bolts.
(5) If equipped with screens, separate and remove screens and washers.

CAUTION: TAKE CARE NOT TO DAMAGE VALVE STEM WHEN SEPARATING WHEEL HALVES.

(6) Separate wheel halves; remove tire, grease retainer tube, and O-ring seal being careful not to damage O-ring seal.

NOTE: Do not reuse old O-ring unless necessary. If old O-ring must be reused, mark position of O-ring in wheel half. Do not damage O-ring. Store O-ring on a clean flat surface; do not hang or stretch it.

(7) Visually inspect valve stem for condition and security. If required, remove valve stem and preformed packing from outboard wheel half.

(8) Visually inspect fusible plugs for signs of melting. This is indicated by a loss of fusible alloy or by irregular openings in alloy at either end of the fusible plug.

NOTE: If a fusible plug shows discoloration or other signs of heat damage, overhaul wheel assembly. (*On Aircraft with P/N 9543991 series main gear wheels installed,* refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; *on Aircraft with P/N 5004913 series main gear wheels installed,* refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List.)

(9) Visually inspect keyway liners for condition and security. If distance across any set of keyslot liners exceeds 0.690 inch [17.5 mm] replace all liners in wheel assembly. (Refer to applicable Component Maintenance Manual.)

WARNING: DRY-CLEANING SOLVENTS ARE TOXIC AND VOLATILE. USE IN WELL VENTILATED ROOM. AVOID CONTACT WITH SKIN AND CLOTHING. DO NOT INHALE VAPORS.

CAUTION: CAREFULLY CLEAN BEARING CONES IN A SEPARATE CONTAINER OF CLEANING SOLVENT TO PREVENT CONTAMINATION.

DO NOT PERMIT BEARING CONES TO SOAK IN CLEANING FLUID OR RUBBER BEARING SEALS MAY BE DAMAGED.

***ON AIRCRAFT NOT MODIFIED PER SSK 993, "REPLACEMENT OF LANDING GEAR WHEEL BEARINGS,"* DO NOT REMOVE INTEGRAL SEAL FROM BEARING.**

(10) Clean all metal parts with solvent. Clean bearing cones in a separate clean container.

NOTE: A soft-bristle brush may be used to remove hardened grease, dust, or dirt.

WARNING: DO NOT SPIN BEARINGS WHEN DRYING WITH COMPRESSED AIR. UNMOUNTED SPINNING BEARINGS MAY SHATTER CAUSING PERSONAL INJURY.

(11) Dry metal parts thoroughly using low pressure (15 psi) filtered air.

CAUTION: ENSURE THAT BEARINGS AND SEALS, WHICH WERE TAGGED UPON WHEEL REMOVAL, ARE INSTALLED IN THE SAME WHEEL HALF.

IF A BEARING OR BEARING CUP IS REJECTED, THEY MUST BE REPLACED AS A SET.

(12) Visually inspect wheel bearings and bearing seals. Replace all bearings showing surface damage, corrosion, spalling, scratches, flat positions, pitting, roller end scoring or heat discoloration. (*On Aircraft with P/N 9543991 series main gear wheels installed,* refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; *on Aircraft with P/N 5004913 series main gear wheels installed,* refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List.)

(13) Inspect bearing cups for scratches, nicks, pitting, brinelling, spalling, heat discoloration, corrosion, wear, and other damage. (*On Aircraft with P/N 9543991 series main gear wheels installed,* refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; *on Aircraft with P/N 5004913 series main gear wheels installed,* refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List.)

WARNING: DO NOT LET GREASE CONTACT EYES OR SKIN. GREASE IS SOMEWHAT TOXIC TO SKIN. FOLLOW MANUFACTURER'S INSTRUCTIONS.

(14) Pack bearing cones and bearing cups with clean grease immediately after drying. Store bearings and seals in clean sealed containers.

(15) Visually inspect inboard and outboard wheel subassemblies for cracks and structural damage. Inspect all wheel subassembly areas for corrosion, nicks, scratches, marks from tools and surface damage.

NOTE: Wheel subassemblies with grooves worn in the bearing hubs as shown in Figure 202 do not need to be scrapped. These grooves, caused by the bearing seal, are normal and acceptable.

(16) Perform eddy current inspection of wheel in bead seat radius. (Refer to 32-40-00, Inspection Check.)

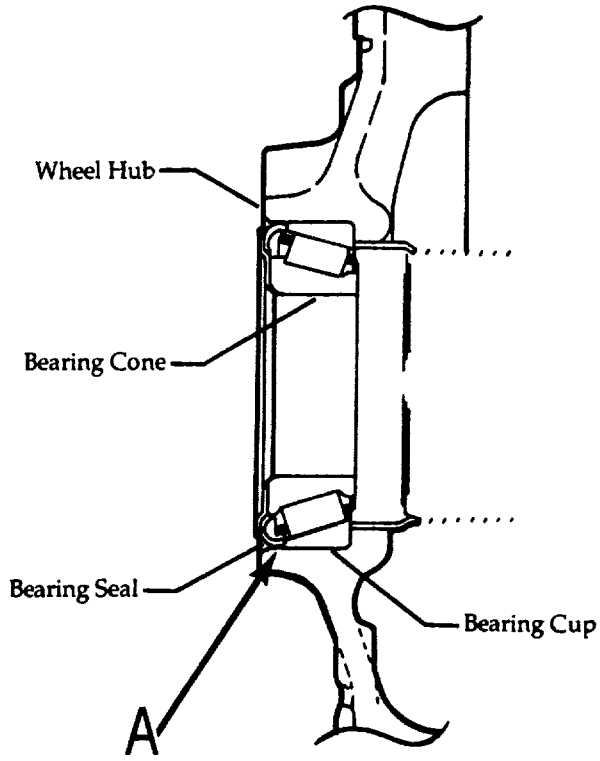
CAUTION: ALL WHEELS THAT HAVE A MISSING, BROKEN, OR CRACKED BOLT(S) MUST BE OVERHAULED PER THE APPLICABLE WHEEL COMPONENT MAINTENANCE MANUAL.

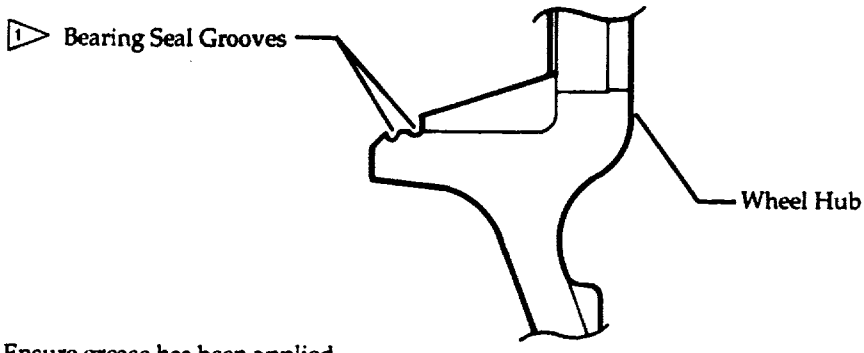
(17) Visually inspect wheel bolts. (Refer to 5-10-00.) Carefully examine under bolt head and in threads adjacent to shank for cracks. Replace all bolts that have damaged or worn threads corrosion, or cracks. Magnetic particle check or replace any bolt with any other suspect condition.

NOTE: Replace or perform magnetic particle check on all tie bolts with unknown history.

(18) Visually inspect wheel washers for cracks, distortion, or damage. Examine washer surfaces for grooves, fretting, or other damage. Replace all damaged washers.

(19) Visually inspect for security and condition, instruction data plates, identification data plates, and warning data plates. Replace all unreadable, loose, or missing data plates.





1 Ensure grease has been applied to grooves before installing bearing cone and seal.

Detail A

INBOARD WHEEL BEARING HUB SHOWN. OUTBOARD WHEEL BEARING HUB TYPICAL.

Main Wheel Bearing Hub Bearing Seal Grooves

Figure 202

C. Assemble Main Gear Wheel (See Figure 201.)

(1) Install valve stems, if removed. (*On Aircraft with P/N 9543991 series main gear wheels installed*, refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; *on Aircraft with P/N 5004913 series main gear wheels installed*, refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List.)

(2) Install fusible plugs, if removed. (*On Aircraft with P/N 9543991 series main gear wheels installed*, refer to Aircraft Braking Systems Publication AP-480, Component Maintenance Manual with Illustrated Parts List; *on Aircraft with P/N 5004913 series main gear wheels installed*, refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List.)

WARNING: DO NOT MIX FUSE PLUGS. ALL FOUR (4) MAIN GEAR WHEELS MUST BE EQUIPPED WITH THE SAME TEMPERATURE FUSE PLUGS.

(3) Ensure wheel flange is clean and dry. Clean flange with a clean cloth dampened with isopropyl alcohol.

WARNING: USE OF RECAPPED TIRES IS NOT APPROVED.

(4) Visually inspect tire to be installed for particles inside, wear, cuts, abrasions, and flat spots. Inspect bead area for cleanliness and damage. (Refer to 32-40-00, Inspection/Check.)

WARNING: DO NOT LET GREASE CONTACT EYES OR SKIN. GREASE IS SOMEWHAT TOXIC TO SKIN. FOLLOW MANUFACTURER'S INSTRUCTIONS.

CAUTION: REUSED WHEEL O-RING SEALS SHOULD BE INSTALLED IN THEIR ORIGINAL POSITION. ENSURE THAT SEAL IS NOT TWISTED OR DISTURBED DURING INSTALLATION.

(5) Lubricate wheel O-ring seal with light coat of grease.

(6) Install wheel O-ring seal in groove on inboard (LH) wheel half. Ensure that seal is not twisted on installation. Reused seals shall be installed as near as possible to their original position.

(7) Place tire on a clean, flat surface.

(8) Place outboard (RH) wheel half in tire so that red balance dot on tire is aligned with valve stem.

NOTE: If no balance dot appears on tire, align tire serial number with valve stem.

(9) Flip tire and wheel half over on work surface.

(10) Install grease retainer tube into hub of wheel half so it touches base of bearing cup.

(11) Place inboard (LH) wheel half in tire so that forge numbers and lot numbers on inside of both wheel halves are aligned. Do not disturb wheel O-ring seal.

(12) If equipped with screens, position washers and screens to outer wheel half.

(13) Using anti-seize compound, lubricate bolt and nut threads and bearing surfaces of nut, bolt head, and washers.

CAUTION: INSTALL BOLT HEADS ON INBOARD SIDE. THERE MUST BE A COUNTERSUNK WASHER UNDER EACH BOLT HEAD AND A FLAT WASHER UNDER EACH NUT. MAKE CERTAIN THAT COUNTERSUNK SIDE OF WASHER IS INSTALLED AGAINST THE BOLT HEAD.

(14) Install countersunk washers with the countersunk areas facing bolt heads.
(15) Install bolts through wheel halves and secure with washers and new self-locking nuts.

NOTE: Install new self-locking nuts at every tire change.

CAUTION: DO NOT USE IMPACT OR POWER WRENCH TO TIGHTEN OR TORQUE WHEEL BOLTS OR NUTS.

ANY NUTS AND BOLTS TIGHTENED TO MORE THAN 120 PERCENT OF THE RECOMMENDED FINAL TORQUE VALUE SHALL BE REMOVED FROM SERVICE.

(16) Tighten self-locking nuts in a crisscross pattern.
  (a) *On Aircraft with P/N 9543991 series wheels installed,* in equal increments of 40 inch-pounds [4.5 Nm] to final Lubtork value of 120 inch-pounds [13.5 Nm].
  (b) *On Aircraft with P/N 5004913 series wheels installed*, to a Lubtork value of 20 foot-pounds [27.1 Nm].
(17) Install valve core in valve stem.

WARNING: PLACE WHEEL IN AN INFLATION CAGE FOR INITIAL INFLATION WHEN SEATING BEADS. TIRE AND/OR WHEEL FAILURE MAY OCCUR CAUSING INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT IF THE TIRE IS OVER INFLATED.

MAINTENANCE OF TIRE AND WHEEL ASSEMBLIES MUST BE DONE WITH PROPER INFLATION EQUIPMENT THAT IS MADE FOR THIS FUNCTION.

(18) With tire/wheel assembly contained in safety cage, inflate tire to operating pressure. Ensure valve core and bead seat area is not leaking. Install valve cap.
(19) Allow 12 hours for initial stretch period, then inflate tire to normal operating pressure. (Refer to 12-10-05, Tire Servicing.)

NOTE: If conditions demand, tire/wheel assembly may be placed on axle with axle nut torqued and safetied before inflating.

3. Cleaning/Paining

A. For cleaning and painting procedures:
  (1) *On Aircraft with P/N 9543991 series wheels installed,* refer to Aircraft Braking Systems Publication No. AP-480, Component Maintenance Manual with Illustrated Parts List.
  (2) *On Aircraft with P/N 5004913 series wheels installed,* refer to Aircraft Braking Systems Publication No. AP-517, Component Maintenance Manual with Illustrated Parts List.

HYDRAULIC BRAKE SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The hydraulic brake system includes four power brake valves located directly below the rudder pedals, six shuttle valves (two under the floorboards and two in each main gear wheel well), two parking brake valves located under the right floorboards between frames 10 and 11, multiple disc brake assemblies, and four hydraulic fuses (one in each brake line).

B. The hydraulic brake system incorporates an anti-skid braking system which ensures the proper amount of brake pressure to each brake. The anti-skid system is explained in 32-44-00.

C. The parking brake system consists of one Parking Brake Handle (mounted on the LH side of the pedestal) that operates two parking brake valves installed in the main hydraulic brake lines.

D. Component Description

(1) Each multiple disc brake assembly consists of two rotating discs which are driven by radial tangs engaging keyway slots in the wheel. They rotate on either side of a stationary disc keyed to the torque tube. The stationary disc, pressure plate, and back plate provide rubbing surfaces for the rotating disc. The back plate, pressure plate, and torque tube are bolted to the brake housing. The housing contains five brake pistons, four return springs and automatic adjustment units, and an inlet and bleeder port. The piston cavities are interconnected by drilled passages to provide simultaneous piston actuation with equalized pressure on each piston. There is one brake assembly for each main landing gear wheel.

(2) Power brake valves are installed forward of each rudder pedal and control hydraulic pressure to the brake assemblies. There are three ports on each valve assembly: system pressure, return, and brake pressure. The valves are manually operated by linkages connected to the rudder pedals.

(3) Hydraulic fuses are located in each wheel well adjacent to the anti-skid valves and prevent the loss of system pressure and fluid due to brake line failure. The fuses close when 5.5 (±1.1) fluid ounces of hydraulic fluid pass through the fuse.

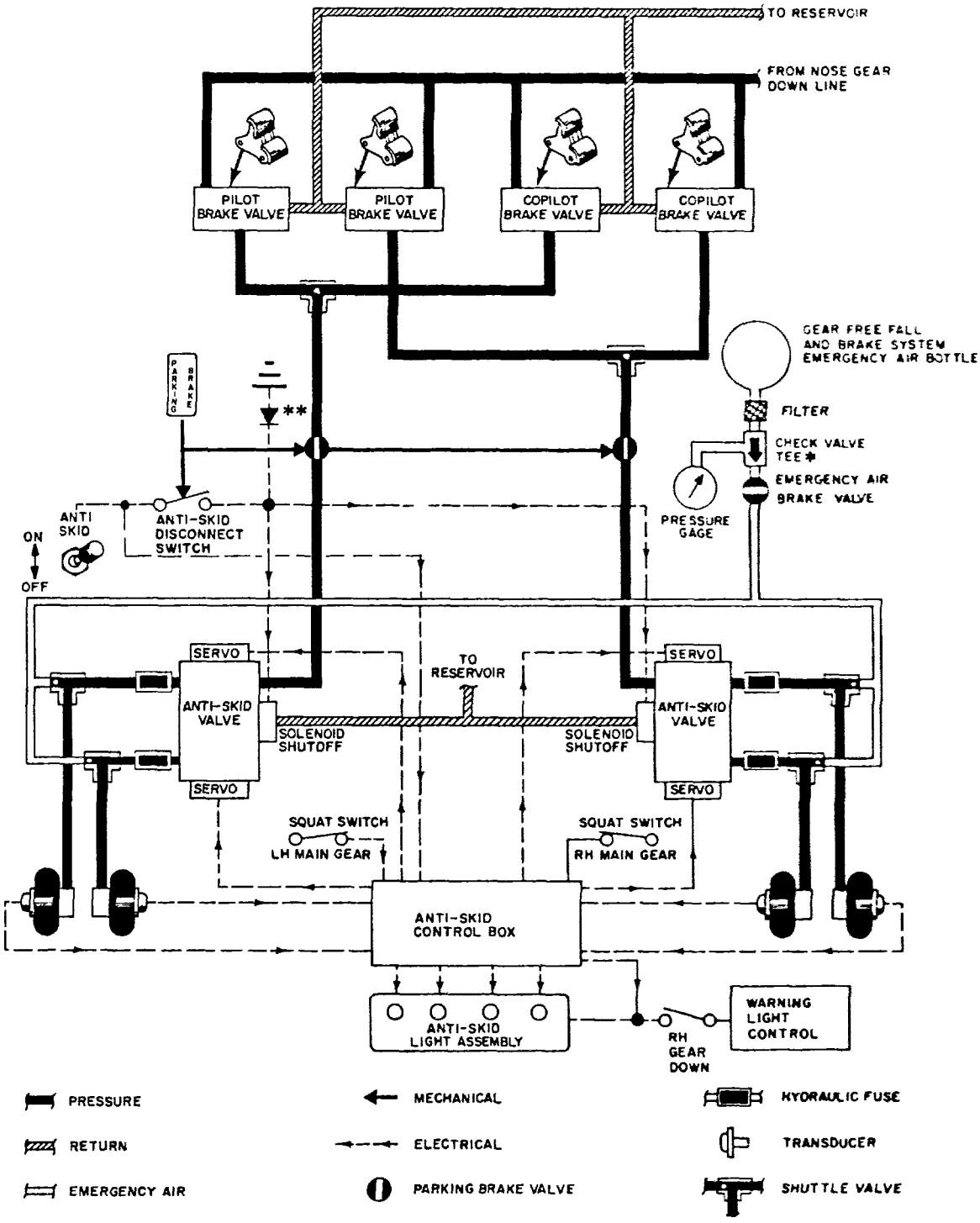
(4) The two parking brake valves are interconnected and are manually operated. The parking brake valves are installed in the brake lines and are normally open. When pressure is applied to the brake assemblies and the parking brake valves are actuated, the valves will block off the brake lines, retaining brake pressure on the brake assemblies.

2. OPERATION (See figure 1.)

A. Depressing the brake pedals opens the power brake valves and directs hydraulic pressure from the nose gear down line through the anti-skid control valves, brake fuses, and shuttle valves to the brake assemblies. Built into the gear retraction system is an integral braking system to stop wheel rotation before full retraction. During retraction, the return land-

ing gear hydraulic fluid passes through a restrictor in a return line which is common to the brakes. A restrictor in the line creates 100 to 180 psi back pressure in the brake system to lightly apply the brakes and stop wheel rotation. When the landing gear reaches the up-and-locked position, the pressure is removed from the brake system, and the brakes are released. In case of hydraulic system failure, pressure for brake application is provided by emergency air pressure. (Refer to 32-45-00.)

B. The parking brake is applied by depressing the brake pedals and moving the Parking Brake Handle to lock the hydraulic pressure in the brake lines.



* Effective Aircraft 35-231 and subsequent, and 36-045 and subsequent.
** Effective Aircraft 35-034 and subsequent, and 36-017 and subsequent.

Brake System Schematic
Figure 1

1. SERVICING

NOTE:
- *Brake system bleeding is required whenever the system is opened at any point between the power brake valves and the wheel brake assemblies, whenever the brakes become spongy in service, whenever the parking brake will no longer hold, or after emergency air pressure braking.* In case of parking brake malfunction or emergency air pressure braking, check the system for leakage.

- Normally the 20 psi head pressure in the hydraulic reservoir will be sufficient to bleed the brakes; however, if the head pressure is not sufficient, the hydraulic system should be pressurized using an external hydraulic power source. System pressure should be maintained at approximately 600 psi during bleeding.

- Cleanliness during maintenance procedures cannot be overemphasized due to the extremely close tolerances used during the manufacture of hydraulic components. The slightest amount of contamination can cause a malfunction.

- Entrapped air in the system is the most common cause of malfunction and is usually the result of allowing the fluid level to drop below the sight gage on the hydraulic reservoir.

- Erratic braking can occur during brake application if the refrigeration system compressor motor comes on. The electrical system voltage drop caused by the initial high current draw of the compressor motor creates a false signal causing the anti-skid to dump the brake pressure for approximately 2 to 3 seconds.

A. Bleed the Brake System
   (1) Install a length of transparent hose on bleeder screw and loosen screw.
   (2) Slowly depress applicable brake pedal and allow hydraulic fluid to flow until there are no air bubbles evident.

NOTE:
- When bleeding the brakes, use care to depress brake pedal slowly as excessive *fluid flow through the bleed port could cause the hydraulic fuses to close.*

- Hydraulic fuses which are accidentally closed should automatically open after approximately one minute. Fuses which do not open must be removed, placed on a hydraulic test bench, and subjected to reverse flow.

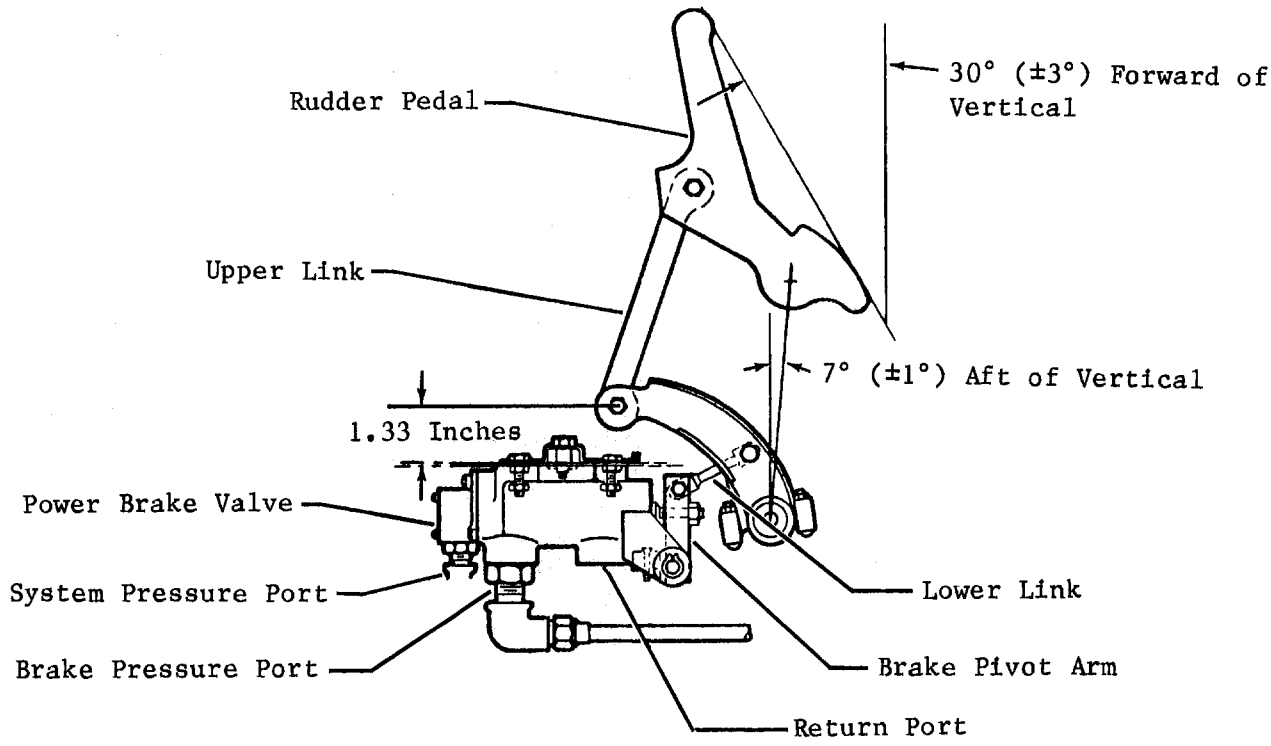
   (3) Tighten bleeder screw and remove hose prior to releasing brake pedal.
   (4) Repeat steps 1.A.(1) through (3) for remaining brake assemblies.
   (5) Service hydraulic reservoir. (Refer to Chapter 12.)

2. ADJUSTMENT/TEST

A. Rig the Brakes (See figure 201.)
   (1) Rig rudder pedals. (Refer to Chapter 27.)
   (2) Adjust lower link to obtain brake pedal angle of 30° (±3°) forward of vertical (1.33 inches above floorboard as shown).
   (3) Install a pressure gage (0 to 2000 psi) in brake pressure line.
   (4) With pedals in neutral, apply an 80-pound load with a spring scale to pedal toe position. Pressure gage shall indicate 625 to 825 psi.

(5) With either pedal fully forward and brakes applied, pressure gage shall indicate approximately 1500 psi.
(6) With maximum braking force applied to both pedals, pressure gage shall indicate approximately 1500 psi normal system pressure.
(7) Remove pressure gage and restore aircraft to normal.

B. Check Brake Emergency Air
(1) Push emergency brake handle completely down and hold. Monitor emergency air pressure gage (approximately 3 minutes) for loss of air pressure.
(2) If loss of pressure is not evident, release emergency brake handle, allowing air pressure to bleed from system.
(3) Charge emergency air bottle to normal pressure. (Refer to Chapter 12.)
(4) Bleed the hydraulic system. (Refer to Brake System Servicing.)
(5) Restore aircraft to normal.



Brake Rigging
Figure 201

MULTIPLE DISC BRAKES - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of the Multiple Disc Brake (See Figure 201.)
(1) Place the aircraft on jacks. (Refer to 7-00-01.)
(2) Depressurize the hydraulic system. (Refer to 29-00-00.)
(3) Remove the main landing gear wheels. (Refer to 32-42-00.)

CAUTION: THE BRAKE HOSE REDUCER IS REMOVED FROM THE OUTBOARD BRAKE HOUSING DURING OVERHAUL. MAKE SURE THAT IT IS RETAINED FOR INSTALLATION ONLY IN THE OUTBOARD BRAKE HOUSING UPON REASSEMBLY OF THE BRAKE HOUSING.

(4) Disconnect the hydraulic hoses at the brake housings. Cap or plug all the exposed hydraulic fittings.
(5) Remove the two self-locking nuts, washers, and bolts that fasten the brake housings together.
(6) Remove the brake assembly from the aircraft.

B. Install the Multiple Disc Brake (See Figure 201.)
(1) Get the necessary tools and equipment.

NOTE: You can use equivalent alternatives for these items:

NAME	PART NUMBER	MANUFACTURER	USE
Nutlock	Loctite 242	Refer to 20-21-00	Optional to secure brake lines.

CAUTION: PRIOR TO THE INSTALLATION OF PARTS TAKEN FROM STORAGE, REMOVE THE PROTECTIVE COATING IN ACCORDANCE WITH THE APPLICABLE AIRCRAFT BRAKING SYSTEMS REPAIR MANUAL. FAILURE TO REMOVE THE COATING COULD RESULT IN A LOSS OF/OR REDUCED BRAKING.

(2) Install the brake assembly on the main gear axle. The brake assembly with the reducer must be on the outboard side of the main gear axle.
(3) Attach the brake assemblies together using the two housing attachment bolts, washers, and self-locking nuts. Lubtork the bolts to 120 inch-pounds [13.54 Nm], after installation on the aircraft.
(4) Install the main landing gear wheels. (Refer to 32-42-00.)

CAUTION: REVERSING THE CONNECTION OF THE BRAKE HOSES WILL RENDER THE ANTI-SKID INOPERATIVE. CONNECT THE LARGE BRAKE HOSE TO THE

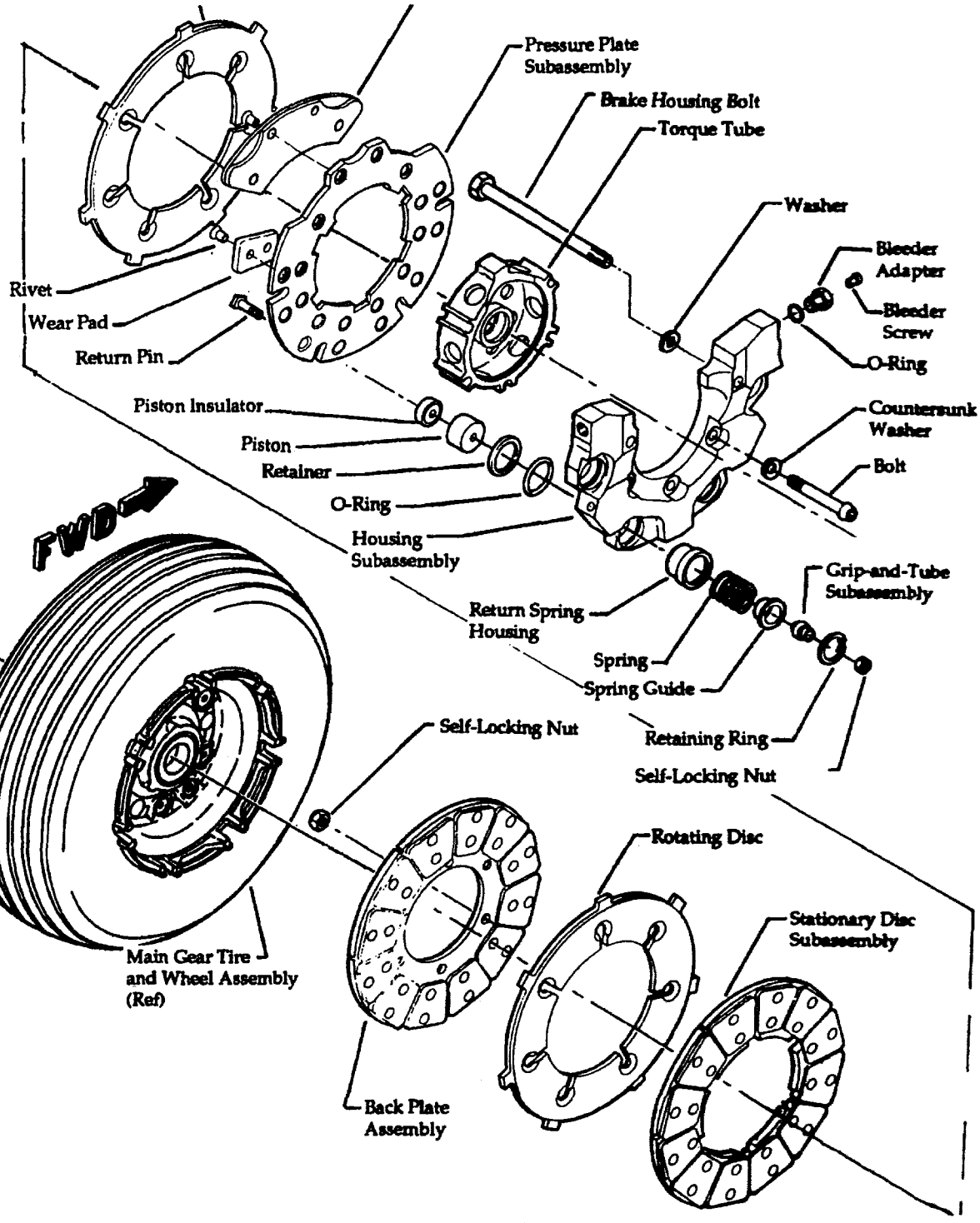
REDUCER ON THE OUTBOARD BRAKE HOUSING AND THE SMALL HOSE TO THE INBOARD BRAKE HOUSING.

MAKE SURE THAT THE ANTI-SKID WIRING IS ROUTED PROPERLY WHEN INSTALLING THE BRAKE HOSES. (SEE FIGURE 202.) FAILURE TO PROPERLY ROUTE THE ANTI-SKID WIRING CAN RESULT IN WIRE CHAFING, CAUSING LOSS OF ANTI-SKID AND/OR BRAKING.

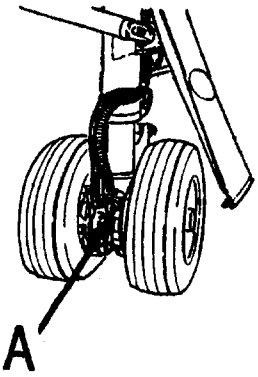
(5) Connect the large hydraulic brake hose to the reducer on the outboard brake housing. Connect the small brake hose to the inboard brake housing.

NOTE: It is permissible to use Loctite 242 Nutlock on the jam nut threads.

(6) Pressurize the hydraulic system and bleed brakes. (Refer to 32-43-00.)
(7) Perform the Anti-Skid Operational Check. (Refer to 32-44-00.)



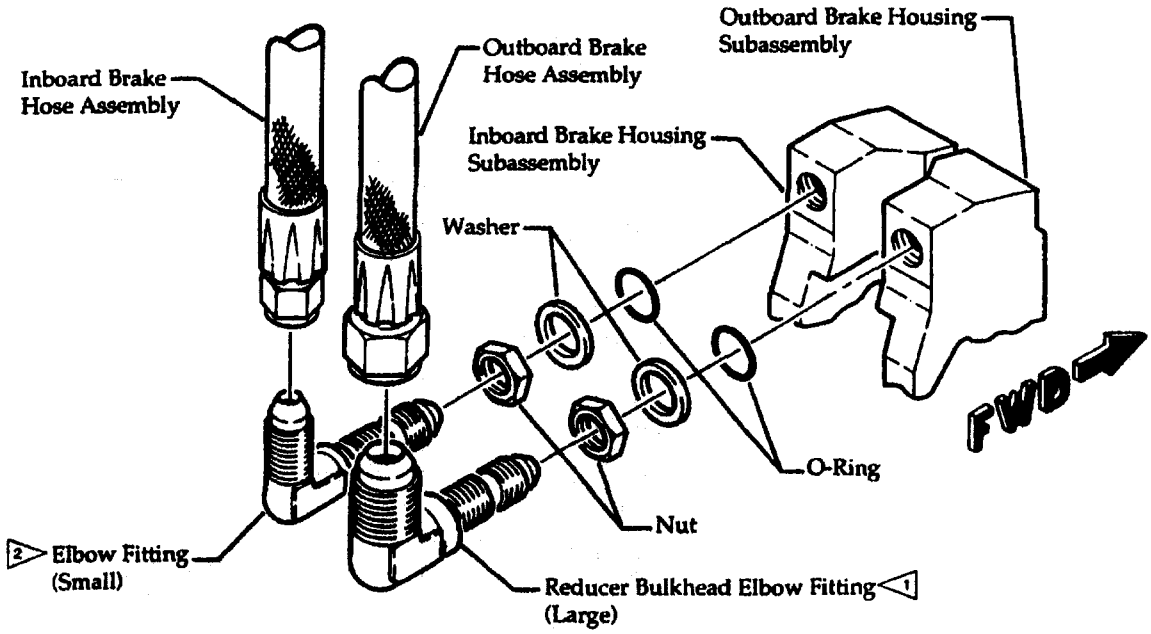
Multiple Disc Brake Installation
Figure 201 (Sheet 1 of 2)



(RH MAIN GEAR SHOWN,
AS VIEWED FROM AFT SIDE)

1 **Reducer bulkhead elbow fitting (large) *must be installed in outboard brake* housing subassembly only.**

2 **Elbow fitting (small) must be installed in inboard brake housing subassembly only.**

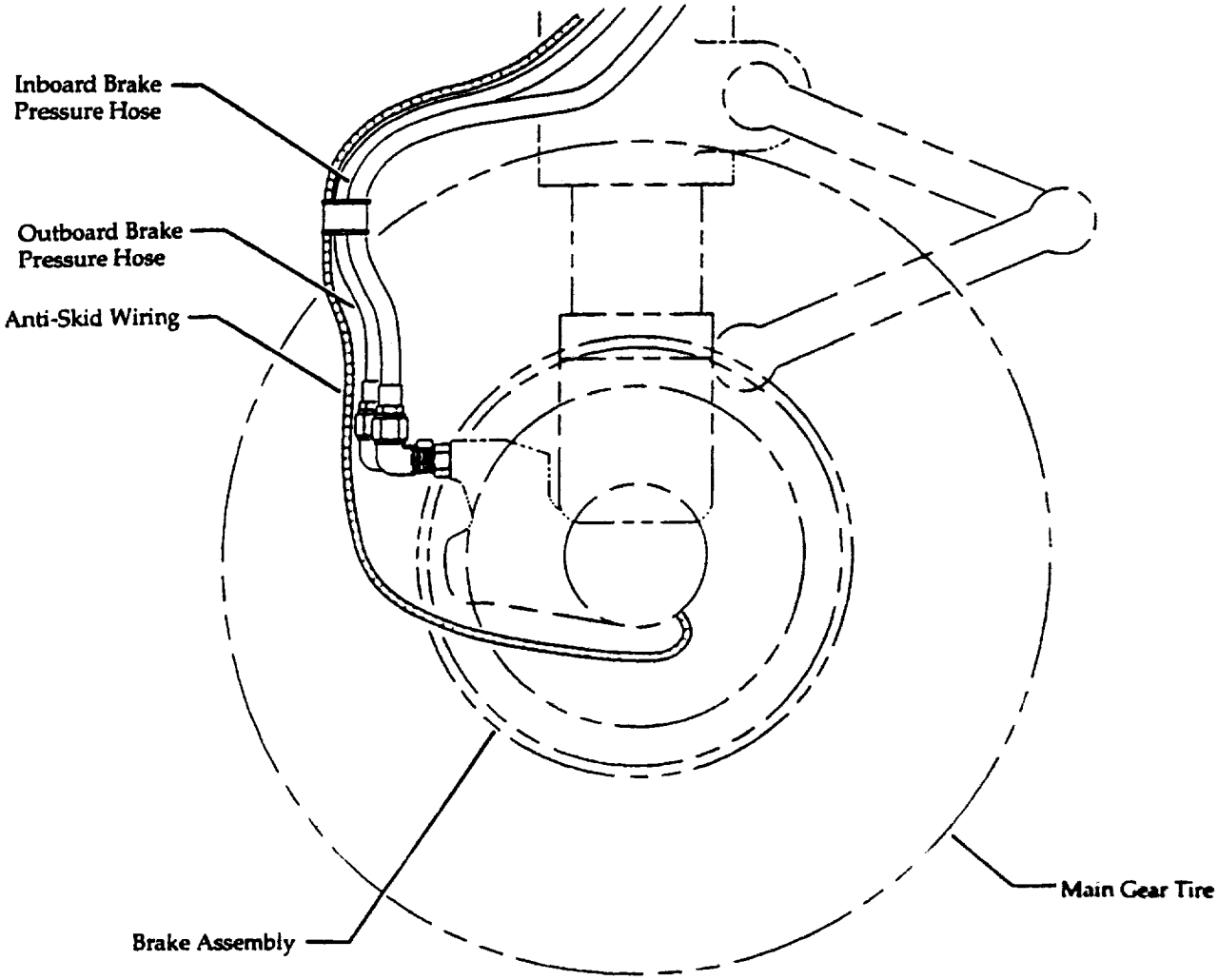


(RH MAIN GEAR BRAKE HOSE INSTALLATION SHOWN. LH INSTALLATION OPPOSITE)

CAUTION: ENSURE OUTBOARD HYDRAULIC BRAKE HOSE ASSEMBLY IS CONNECTED TO THE REDUCER BULKHEAD ELBOW FITTING (LARGE) LOCATED ON THE OUTBOARD BRAKE SUBASSEMBLY. FAILURE TO PROPERLY INSTALL OUTBOARD BRAKE HOSE ASSEMBLY TO OUTBOARD BRAKE HOUSING AND INBOARD BRAKE HOSE ASSEMBLY TO INBOARD BRAKE HOUSING (SMALLER ELBOW FITTING) WILL RESULT IN AN ANTI-SKID SYSTEM MALFUNCTION.

Detail A

Multiple Disc Brake Installation
Figure 201 (Sheet 2 of 2)



(VIEW LOOKING OUTBOARD - LH SIDE)

CAUTION ENSURE THAT ANTI-SKID WIRING DOES NOT PROTRUDE BELOW BRAKE ASSEMBLY.

Anti-Skid Wiring Routing
Figure 202

2. Inspection/Check

A. Inspect the Brakes for Excessive Wear (See Figure 203.)
(1) Get necessary tools and equipment.

NOTE: You can use equivalent alternatives for these items:

NAME	PART NUMBER	MANUFACTURER	USE
Brake Wear Gaging Tool	3170031-1	Learjet, Inc. Wichita, KS	Measure brake wear.

(2) Pressurize the hydraulic system. (Refer to 29-00-00.)
(3) Depress the brake pedals and set the parking brake.
(4) Measure the distance between the brake housing and pressure plate as shown.
(5) If the distance between the brake housing and pressure plate is 0.330 inch [8.38 mm] or greater, remove the brake assemblies for inspection and overhaul.

NOTE: The brake housing bolt (See Figure 201) is considered part of the brake assembly and must be included when the brake assembly is sent in for inspection and overhaul.

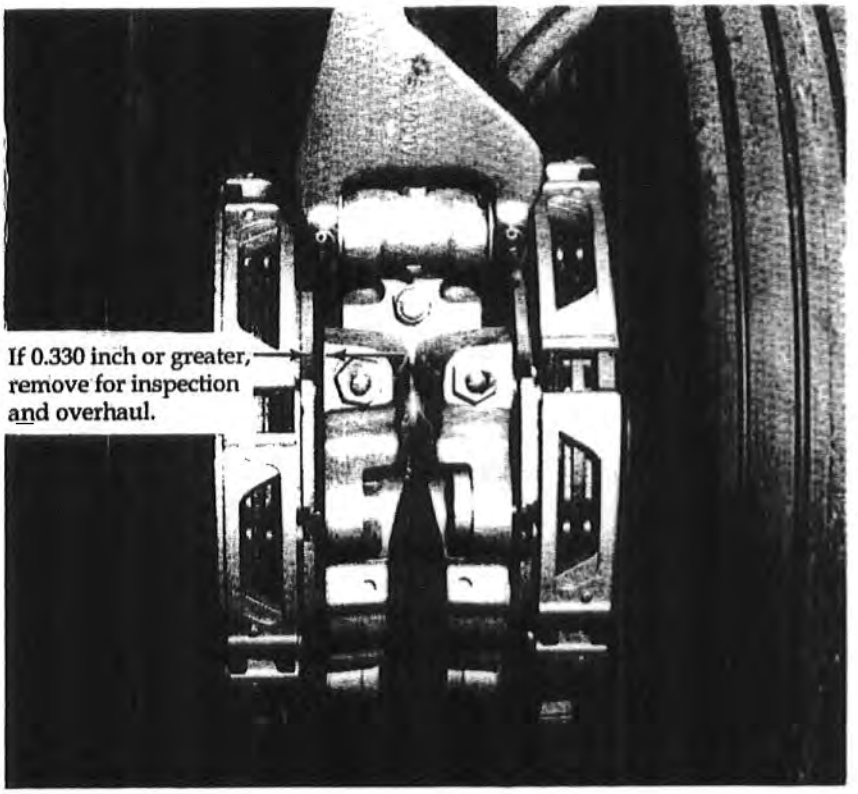
It is acceptable to inspect the bolt (per the vendors manual) or to replace it.

3. Repairs

WARNING: PRIOR TO THE INSTALLATION OF PARTS TAKEN FROM STORAGE, REFER TO THE APPLICABLE AIRCRAFT OVERHAUL BRAKING SYSTEM MANUAL FOR REMOVAL OF THE PROTECTIVE COATING. FAILURE TO REMOVE THE COATING COULD RESULT IN A LOSS OF/OR REDUCED BRAKING.

A. *On Aircraft equipped with brake assemblies P/N 9550608*, refer to the Aircraft Braking Systems Overhaul Manual with Illustrated Parts List (publication no. AP-319) for disassembly, inspection, repair, and assembly procedures.

B. *On Aircraft equipped with brake assemblies P/N 5003096 (6600330),* refer to the Aircraft Braking Systems Component Maintenance Manual with Illustrated Parts List (publication no. AP-455) for disassembly, inspection, repair, and assembly procedures.



Multiple Disc Brake Check
Figure 203

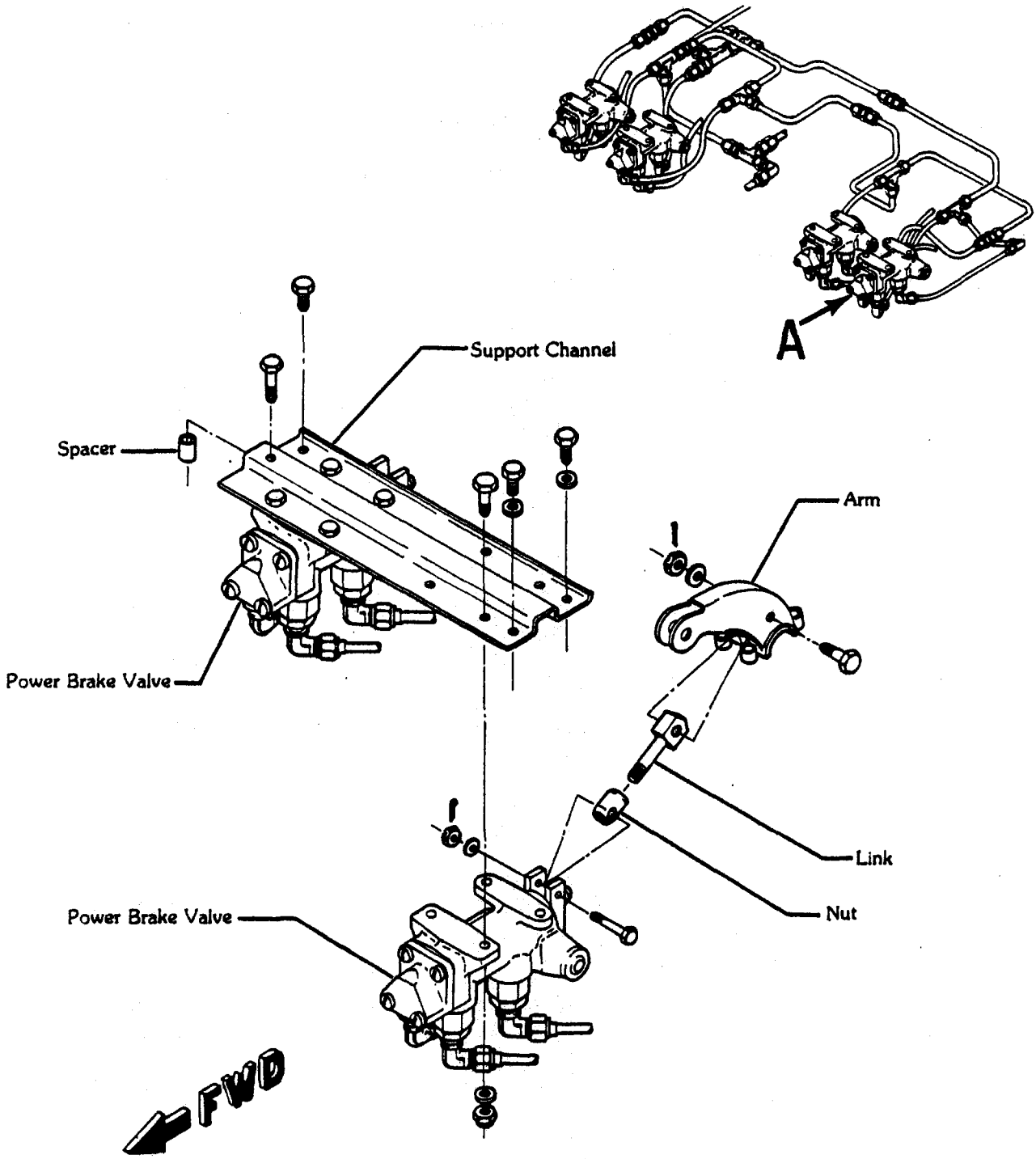
POWER BRAKE VALVE - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Removal of Power Brake Valve (See Figure 201.)
      (1) Depressurize hydraulic system. (Refer to Chapter 29.)
      (2) Remove pilot's and copilot's rudder pedals. (Refer to Chapter 27.)
      (3) Disconnect power brake valve hydraulic lines at frame 6. Cap and plug all exposed hydraulic fittings.
      (4) Remove power brake valve support channel attaching parts and remove power brake valves, lines, and support channel from the aircraft.
      (5) Remove attaching parts securing power brake valve to power brake valve support channel.
   B. Installation of Power Brake Valve (See Figure 201.)
      (1) Secure power brake valve on power brake valve support channel and secure using attaching parts.
      (2) Position power brake valve support channel in the aircraft and connect power brake valve hydraulic lines to hydraulic fittings at frame 6.
      (3) Secure power brake valve support channel to aircraft structure using attaching parts.
      (4) Pressurize hydraulic system. (Refer to Chapter 29.)
      (5) Check power brake valve hydraulic lines for leaks.
      (6) Install rudder pedals. (Refer to Chapter 27.)

2. **Repairs**
   A. Disassemble Power Brake Valve (See Figure 202.)
      (1) Drain hydraulic fluid from valve.
      (2) Remove snap rings and lever pin that retain power brake lever. Remove lever and piston actuator pin from valve. **Do not** disassemble power brake valve lever.
      (3) Remove screws from system pressure port and end cap assembly.
      (4) Remove spacer, O-ring, seat with poppet assembly attached, and valve spring from valve body.
      (5) Remove piston from valve body and remove O-ring and backup rings (if installed) from piston.
      (6) Clean all metal parts with Stoddard solvent or equivalent. Visually inspect valve bore, piston, seat, and poppet assembly for scoring, scratches, and corrosion.
      (7) Seat and poppet assembly may be disassembled for thorough cleaning as follows:
         (a) Push retainer back and remove roll pin from valve.
         (b) Remove valve, retainer, and poppet spring from poppet and remove poppet from seat.

      CAUTION: DO NOT CREATE LOW SPOTS BY EXCESSIVE BUFFING OR POLISHING. USE OIL STONE TO REMOVE SCRATCHES AND POLISH WITH CROCUS CLOTH.

      (8) Buff out minor scratches and corrosion.
      (9) Coat internal parts with MIL-H-5606 hydraulic fluid.
      (10) Wrap cleaned parts in lint-free cloth or clean, waxed paper while awaiting repair or assembly.
   B. Assemble Power Brake Valve (See Figure 202.)
      (1) Immerse all internal parts, O-rings, and backup rings in MIL-H-5606 hydraulic fluid prior to installation.
      (2) Assemble seat, valve, retainer, poppet, and poppet spring as follows:
         (a) Install poppet in seat and assemble poppet spring and retainer on poppet.
         (b) Install valve on poppet and secure with roll pin. Retainer will slip over valve due to spring pressure and hold roll pin in place.



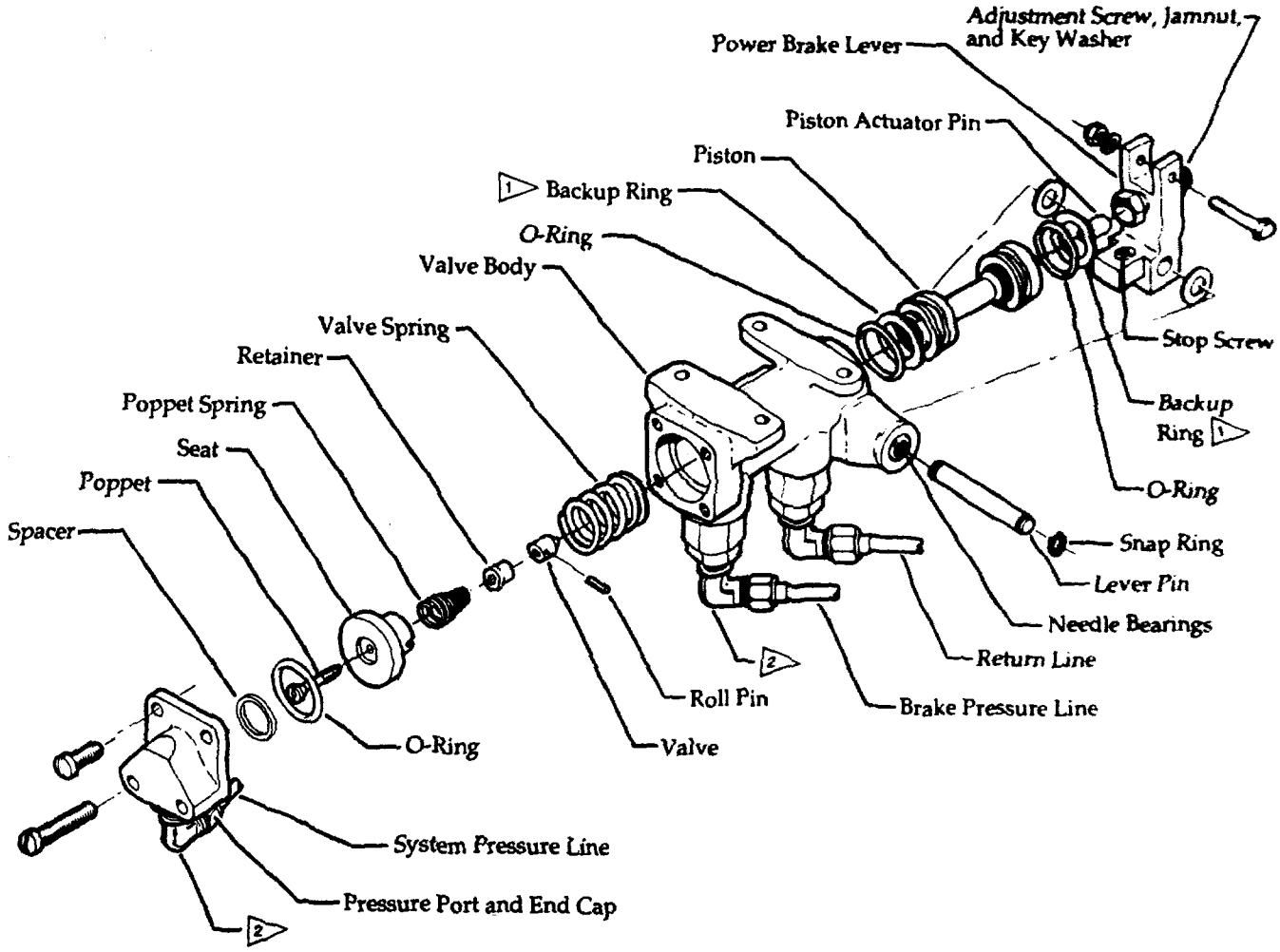
PILOT'S SIDE SHOWN

Detail A

11-62C

Power Brake Valve Installation
Figure 201

1 *Backup rings are used only when piston grooves are 0.207 inch wide.*



Power Brake Valve Assembly
Figure 202

(3) Install seat and poppet assembly in valve body.
(4) Install spacer and O-ring in pressure port and end cap assembly and secure to valve body with screws.
(5) Install O-rings and backup rings (if required) on piston and install valve spring and piston in valve body.
(6) Lubricate needle bearings with MIL-G-3278 grease, install power brake control lever, and secure with lever pin and snap rings.

NOTE: Ensure that piston actuator pin is installed between piston and adjustment screw as power brake lever is being installed.

(7) Adjust power brake valve as instructed in Adjustment/Test.
(8) Disconnect hydraulic line from valve pressure port and cap line.
(9) Connect hydraulic source containing MIL-H-5606 hydraulic fluid to valve pressure port.
(10) With valve control lever in static position, apply 2250 psi [15.51 MPa] pressure to valve; hold for five (5) minutes. There shall be no leakage.
(11) Disconnect hydraulic source and connect system line to pressure port.
(12) Disconnect hydraulic line from valve **return** port and cap line.
(13) Connect hydraulic source containing MIL-H-5606 hydraulic fluid to valve **return** port.
(14) With valve control lever in static position, apply 50 psi [.3445 MPa] pressure to valve; hold for two (2) minutes. There shall be no leakage.
(15) Disconnect hydraulic source and connect system line to return port.

3. Adjustment/Test

A. Adjust Power Brake Valve

(1) Loosen locknut and turn stop screw until valve lever is 90° to centerline of valve assembly.
(2) Connect valve to a hydraulic test bench capable of 1500 psi [11.342 MPa].
(3) With 1500 psi [11.342 MPa] applied at system pressure port, loosen jamnut and turn lever adjustment screw until valve poppet cracks, then back off adjustment screw until poppet seats plus 3/4 additional turn. Tighten jamnut and bend tabs of key washer securing jamnut.

HYDRAULIC BRAKE FUSE - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: Hydraulic fuses which have closed should automatically open after approximately one minute. Fuses which do not open automatically must be removed, placed on a hydraulic test bench, and subjected to reverse flow.

A. Remove Hydraulic Brake Fuse (See figure 201.)
   (1) Depressurize hydraulic system. (Refer to Chapter 29.)
   (2) Disconnect and cap brake pressure line from brake fuse.
   (3) Disconnect and remove brake fuse from line at shuttle valve. Cap exposed fittings.

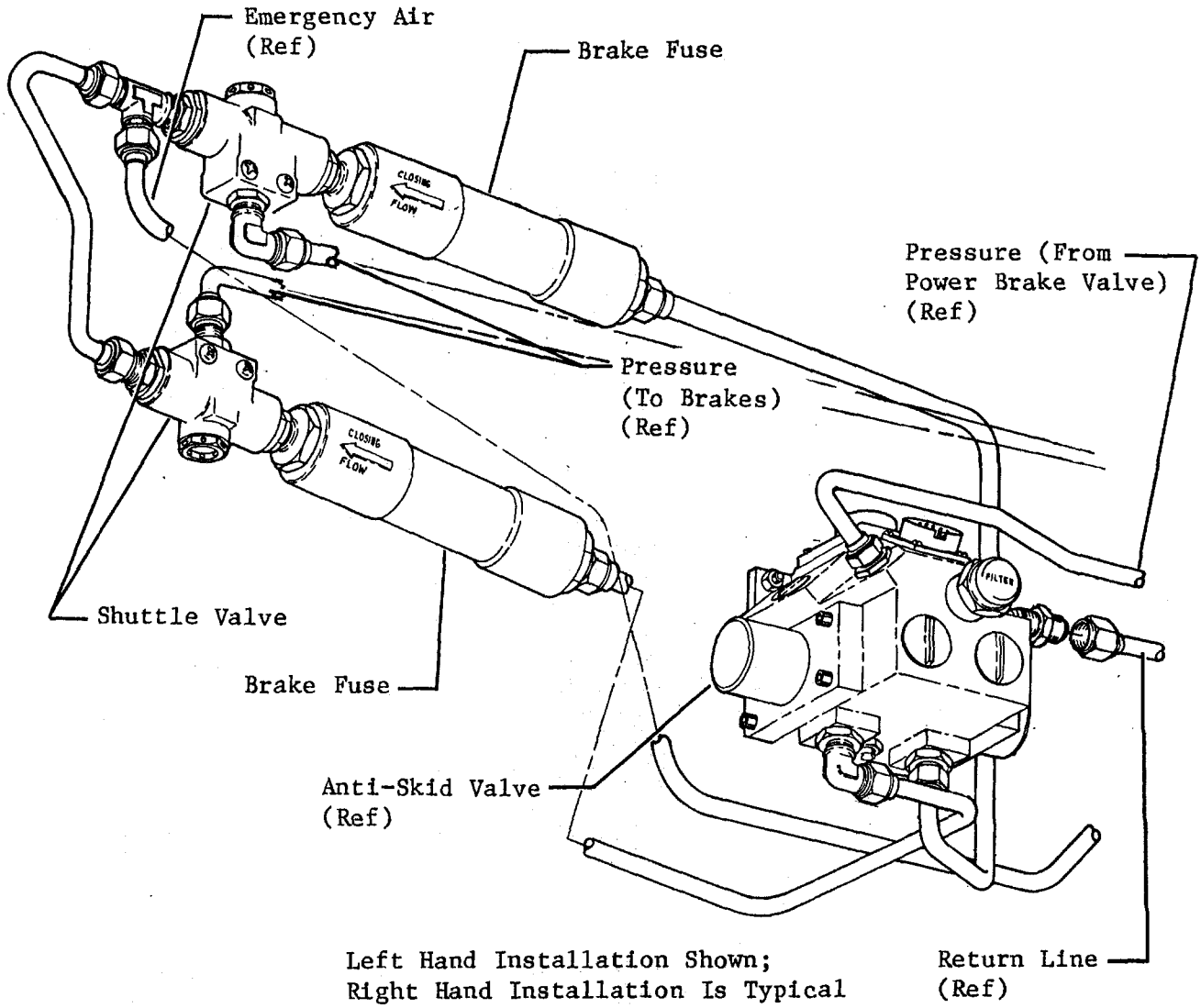
B. Install Hydraulic Brake Fuse (See figure 201.)
   (1) Install brake fuse with closing flow arrow pointing towards shuttle valve.
   (2) Pressurize hydraulic system. (Refer to Chapter 29.)
   (3) Bleed brake system. (Refer to 32-43-00.)

2. Approved Repairs

A. Disassemble Hydraulic Brake Fuse (See figure 202.)
   (1) Remove safety wire and end cap from valve housing.
   (2) Remove flow detector, measuring float, diffuser, diffuser spring, flow barrel collector ring, and spring washer from valve housing.
   (3) Remove snap ring from flow detector. Remove orifice support, O-ring, orifice disc, orifice housing and filler ring from flow detector.
   (4) Remove float plug from measuring float.
   (5) Remove snap ring from diffuser. Remove spring seat, piston spring, and piston from diffuser. Remove snap ring and washer from opposite end of diffuser.
   (6) Remove and discard all old O-rings.
   (7) Clean all metal parts with Stoddard solvent or equivalent and dry with compressed air.
   (8) Clean orifice disc hole.

B. Assemble Hydraulic Brake Fuse (See figure 202.)
   (1) Install new O-rings on end cap, flow detector, orifice support, and flow barrel.
   (2) Assemble filler ring, orifice housing, orifice disc, and orifice support into flow deflector and secure with snap ring.
   (3) Install float plug in measuring float.
   (4) Assemble piston, piston spring, and spring seat into diffuser and secure with snap ring. Install washer and snap ring in opposite end of diffuser.
   (5) Install spring washer and collector ring in valve housing. Insert flow barrel in valve housing until it is firmly seated against collector ring and spring washer.
   (6) Insert diffuser spring and diffuser assembly in flow barrel.
   (7) Insert measuring float into flow barrel.
   (8) Install flow deflector assembly on end of flow barrel and install end cap. Safety wire end cap to valve housing.
   (9) Perform Functional Test of brake fuse.

C. Functional Test of Hydraulic Brake Fuse.
   (1) Attach a supply line to inlet port.
   (2) Apply fluid at a minimum pressure of 5 psi to brake fuse and measure amount of fluid passed through fuse before it closes. Amount of fluid passed should be 5.5 (±1.1) fluid ounces. Check amount of fluid three times.
   (3) Apply a proof pressure of 2250 psi for a period of 3 minutes. There should be no leakage.
   (4) Remove proof pressure and recheck fluid volume as described in step 2.C.(2).
   (5) Remove brake fuse from supply line.



Hydraulic Brake Fuse Installation
Figure 201

3. Adjustment/Test
   A. Tools and Equipment.

NOTE: Equivalent substitute may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Clear Vinyl Tubing		Commercially Available	Direct hydraulic fluid flow.
Plastic Container, Graduated in ounces		Commercially Available	Retain and measure hydraulic fluid being bled from system.

B. Functional Test of Hydraulic Brake Fuse.

CAUTION: SAFETY GLASSES SHALL BE WORN WHILE PERFORMING THIS PROCEDURE.

NOTE: Hydraulic brake fuses must be functionally tested, using the following procedure, in accordance with the current inspection interval specified in Chapter 5.

(1) Connect one end of clear plastic tubing snugly over RH inboard brake housing bleeder adapter.
(2) Place other end of tube in plastic container.
(3) Connect external electrical power source to aircraft.
(4) Set Battery Switch(es) on.
(5) Set Aux Hydraulic Pump Switch on.
(6) Allow hydraulic pressure to build up until pump shuts off.
(7) Depress and hold RH inboard brake pedal.
(8) Rapidly rotate RH inboard brake housing bleeder adapter 1/4 to 1/2 turn counterclockwise to open adapter. Verify that RH inboard brake fuse closes, stopping flow of hydraulic fluid.
(9) Rotate RH inboard brake housing bleeder adapter clockwise to close adapter.
(10) Release RH inboard brake pedal.
(11) Measure Hydraulic fluid collected in step (8). Fluid shall measure 6.6 fluid ounces or less.
(12) To verify that brake fuse is open, depress RH inboard brake pedal. RH inboard brake shall activate, and there shall be no hydraulic fluid leakage.

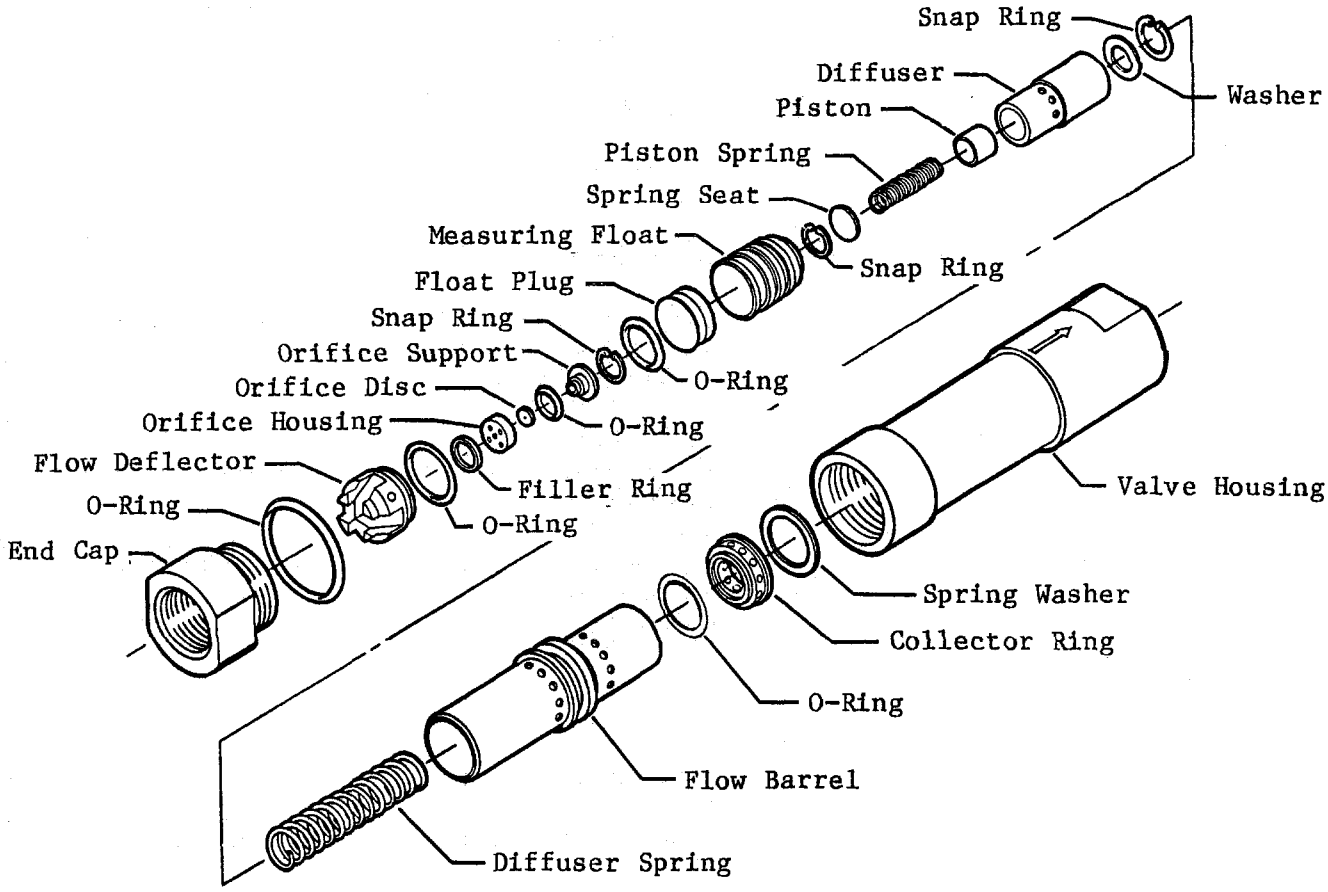
NOTE: Hydraulic fuses which have closed should automatically open after approximately one minute. Fuses which do not open automatically must be removed, placed on a hydraulic test bench, and subjected to reverse flow.

(13) Release RH inboard brake pedal.
(14) Repeat steps (6) thru (13) two times.
(15) Check for internal leakage as follows:
   (a) Allow hydraulic pressure to build up until pump shuts off.
   (b) Depress and hold RH inboard brake pedal.
   (c) Rapidly rotate RH inboard brake housing bleeder adapter 1/4 to 1/2 turn counterclockwise to open adapter.
   (d) Once brake fuse is closed, observe vinyl tubing for one minute. There shall be no fluid leakage present.

NOTE: Disregard residue remaining in tubes from previous checks.

(e) Rotate RH inboard brake housing bleeder adapter clockwise to close adapter.
(f) Release RH inboard brake pedal.

(16) Remove vinyl tubing from RH inboard brake housing bleeder adapter.
(17) Repeat steps (1) thru (16) for three remaining hydraulic brake fuses.
(18) Set Aux Hydraulic Pump Switch off.
(19) Set Battery Switches off.
(20) Disconnect external power source from aircraft.
(21) Check reservoir oil level. Service, if necessary. (Refer to Chapter 12.)
(22) Return aircraft to normal.



Hydraulic Brake Fuse Assembly
Figure 202

PARKING BRAKE VALVE - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Parking Brake Valve (See Figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Depressurize hydraulic system. (Refer to Chapter 29.)
      (3) Remove RH floorboards between frames 10 and 13 to gain access to parking brake valves.
      (4) Disconnect hydraulic lines from valve and cap or plug hydraulic lines and valve ports.
      (5) Disconnect link assembly from valve control levers.
      (6) Disconnect and identify electrical wiring from anti-skid disconnect switch and park brake annunciator switch when installed.
      (7) Remove attaching parts and valves from aircraft.
   B. Install Parking Brake Valve (See Figure 201.)
      (1) Install valve assembly on valve support assembly using attaching parts.
      (2) Connect link assembly to control lever.
      (3) Identify and connect electrical wiring to anti-skid disconnect switch and park brake annunciator switch when installed.
      (4) Connect hydraulic lines to valve ports.
      (5) Pressurize hydraulic system and bleed brake system. (Refer to 32-43-00.)
      (6) Rig parking brake valve. (Refer to Adjustment/Test, 32-44-03.)

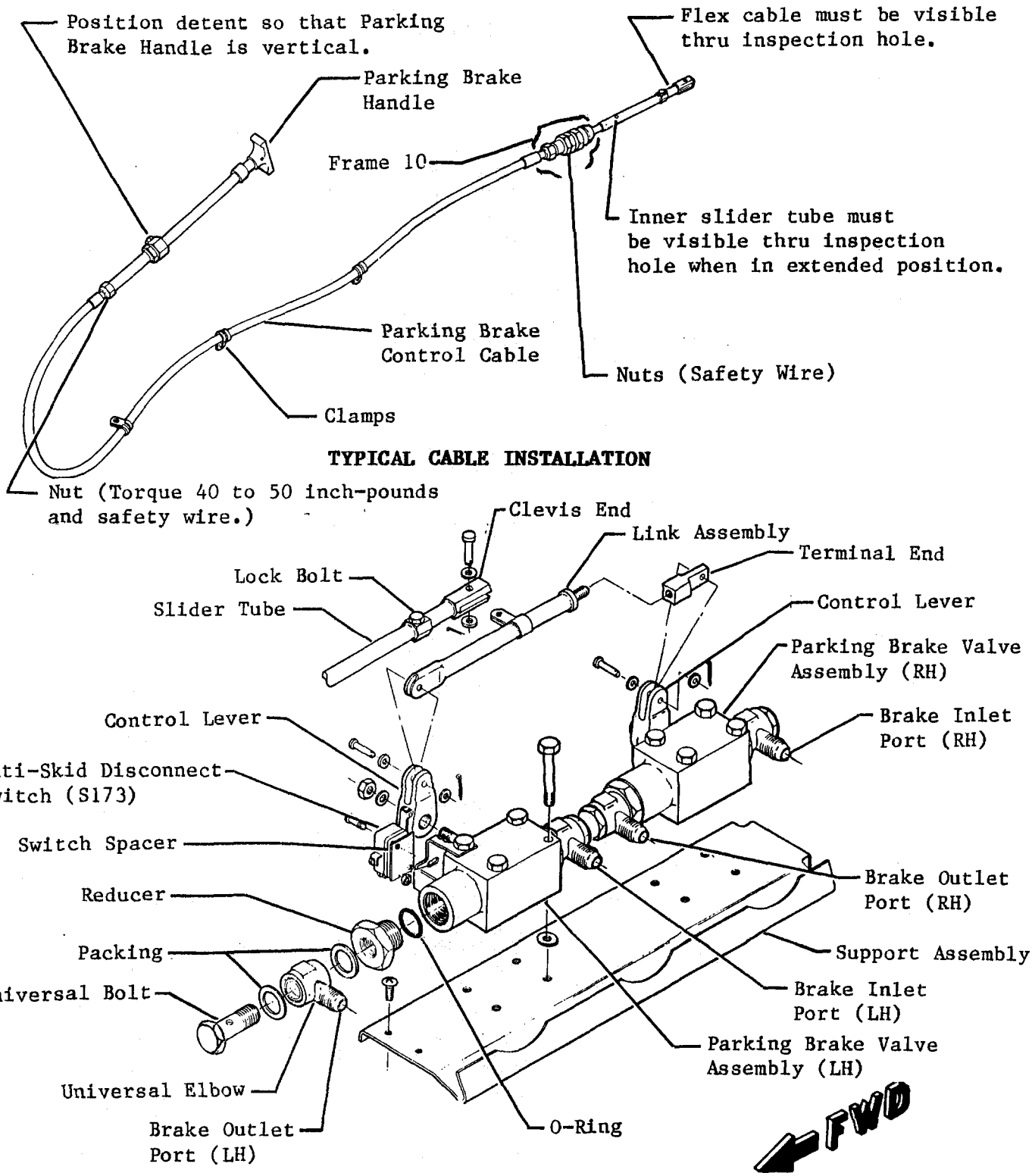
      NOTE: Parking brake valve rigging is a part of the rigging anti-skid disconnect switch procedures.

      (7) Restore electrical power to aircraft.

2. **Approved Repairs**
   A. Disassemble Parking Brake Valve (See Figures 201 and 202.)
      (1) Remove universal bolt, universal elbow, packings, reducer, and O-ring from inlet and outlet ports of valve body. Discard packings and O-rings.
      (2) If applicable, remove anti-skid disconnect switch bracket with switch attached from valve body.
      (3) Unscrew spring retainer from valve body and remove spring, spring seat, and poppet.

      CAUTION: THE CONTROL LEVER AND SHAFT ARE CLOCKED AND BONDED TOGETHER FOR PROPER VALVE CONTROL. REMOVING CONTROL LEVER FROM SHAFT MAY CAUSE DAMAGE TO SHAFT.

      (4) Remove screws that secure shaft retainer to valve body and remove shaft retainer.
      (5) Pull shaft from valve body. Remove and discard O-rings.
      (6) Clean metal parts in Stoddard solvent or equivalent.
      (7) Visually inspect interior of valve body and all removed parts. Replace all parts which show signs of excessive wear, nicks, or scoring.
   B. Assemble Parking Brake Valve (See Figures 201 and 202.)
      (1) Immerse O-rings in MIL-H-5606 hydraulic fluid and install on shaft. Insert shaft into valve body.
      (2) Position shaft retainer on valve body so that screw holes align. Apply Loctite screw lock to screw threads and install screws.
      (3) Insert poppet, spring seat, and spring in valve body. Screw in spring retainer until it bottoms out, then back out 1-1/2 turns to ensure that valve is working properly.
      (4) If applicable, install anti-skid disconnect switch bracket with switch attached. Apply Loctite screw lock to screw threads and secure bracket.
      (5) Immerse O-rings in MIL-H-5606 hydraulic fluid and install on reducers. Screw reducers into valve body.
      (6) Install universal elbows using new packings and secure with universal bolts.
      (7) Perform Functional Test of parking brake valve. (Refer to Adjustment/Test.)

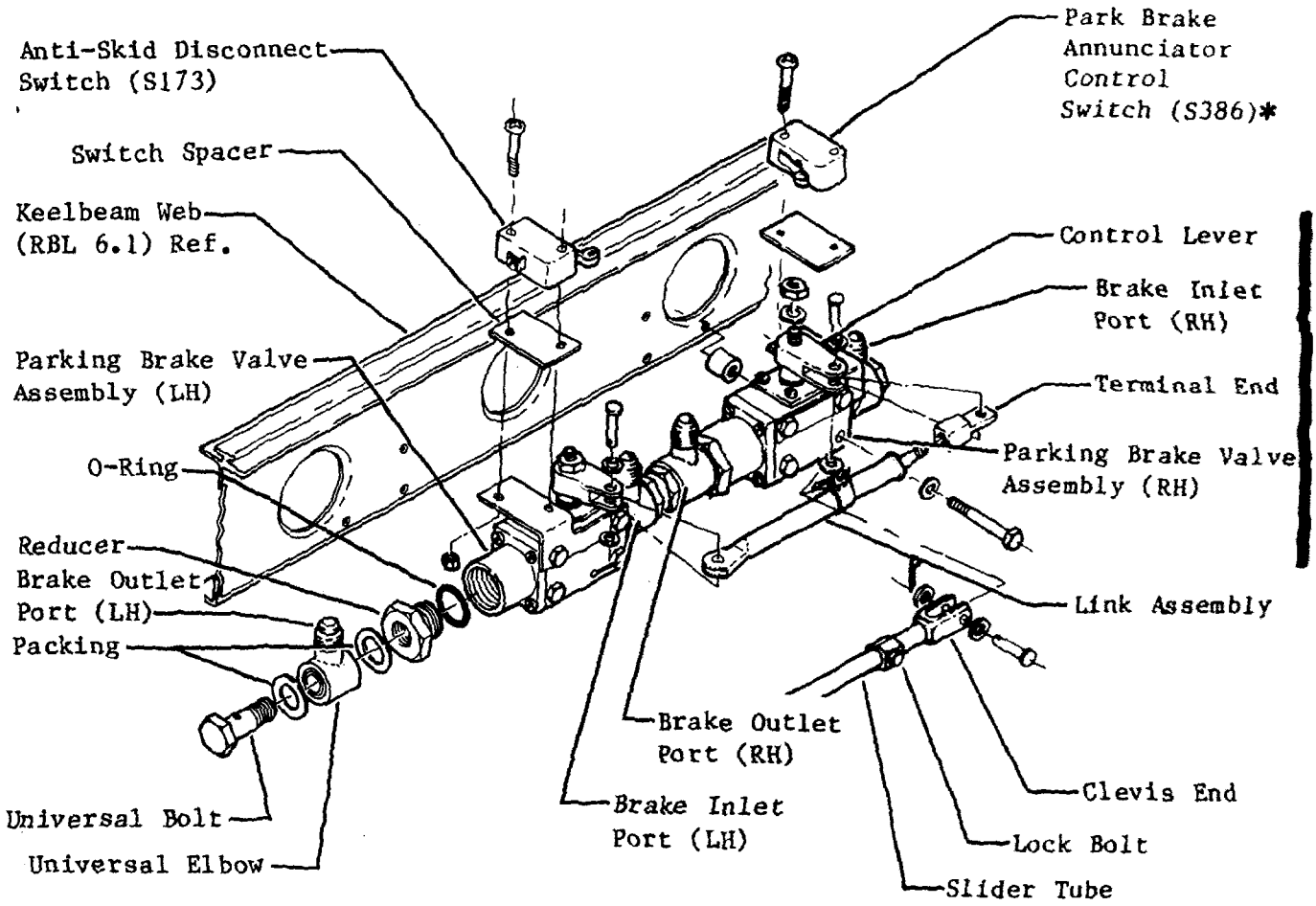


TYPICAL CABLE INSTALLATION

11-10C-1

Parking Brake Valve Installation
Figure 201 (Sheet 1 of 2)

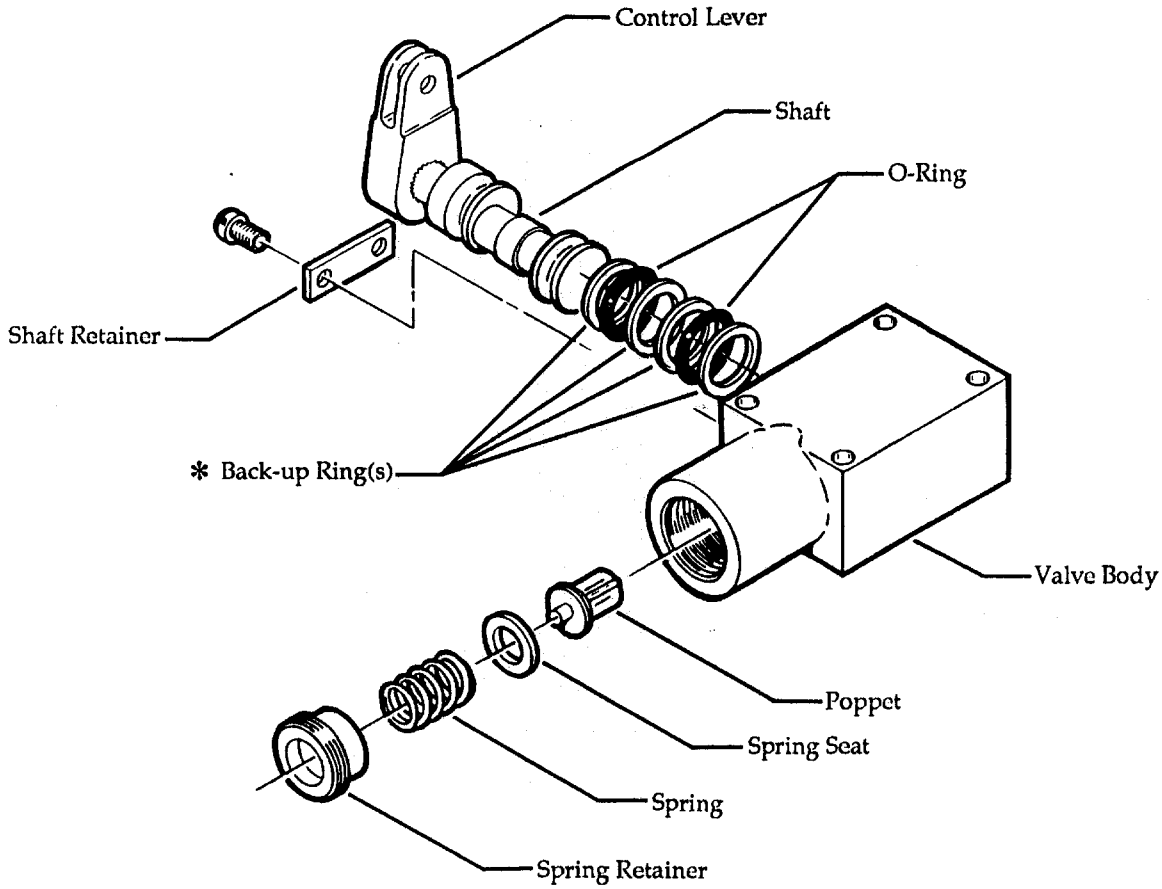
* *Effective Aircraft 35-623, 35-626, 35-627, 35-630 and Subsequent; 36-056, 36-059 and Subsequent.*



Parking Brake Valve Installation
Figure 201 (Sheet 2 of 2)

3. Adjustment/Test
   A. Functional Test of Parking Brake Valve
      (1) Install pressure cap on outlet port.
      (2) Connect valve to hydraulic source containing MIL-H-5606 hydraulic fluid.
      (3) Apply 2250 psi pressure for 3 minutes; there shall be no external leakage or rupture.
      (4) Disconnect hydraulic source and remove outlet cap from valve.
      (5) Connect valve to hydraulic source using outlet port.
      (6) With valve in closed position, apply 1550 psi pressure to outlet port. After 3 minutes there shall be no external leakage, and internal leakage shall not exceed 1 drop per minute from inlet port.
      (7) Reduce pressure to 5 psi; open and close valve. After 3 minutes there shall be no external leakage, and internal leakage shall not exceed 1 drop per minute from inlet port.
      (8) Disconnect hydraulic source, cap ports, and clean external surface.

* **When part of Forward Parking Brake Valve Assembly, effective on *Aircraft 35-571 thru 35-588, 35-611 and Subsequent; 36-054, 36-056 and Subsequent.* When part of Aft Parking Brake Valve Assembly, effective on *Aircraft 35-623, 35-626, 35-627, 35-630 and Subsequent; 36-056, 35-059 and Subsequent.***



11-27A-1

Parking Brake Valve Assembly
Figure 202

PARKING BRAKE ANNUNCIATOR CONTROL SWITCH - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Parking Brake Annunciator Control Switch (S386) (See figure 201.)

(1) Remove electrical power from aircraft.

(2) Remove applicable cabin isle carpeting and floorboards as required to gain access to parking brake annunciator control switch, located on the RH parking brake valve assembly, between frames 10 and 11.

(3) Disconnect and identify electrical wiring at switch.

(4) Remove attaching parts securing switch and spacer to parking brake valve assembly. Remove switch and spacer.

B. Install Parking Brake Annunciator Control Switch (S386) (See figure 201.)

(1) Position parking brake annunciator control switch and spacer at their appropriate location on RH parking brake valve assembly and loose secure attaching parts.

(2) Identify and connect electrical wiring to switch.

(3) Adjust parking brake annunciator control switch in accordance with procedures outlined in step 2. Adjustment/Test.

(4) Install all previously removed cabin isle floorboards and carpet.

(5) Restore aircraft to normal.

2. ADJUSTMENT/TEST

A. Adjust Parking Brake Annunciator Control Switch (S386)

(1) Gain access to parking brake annunciator control switch in accordance with procedures outlined in step 1. Removal/Installation.

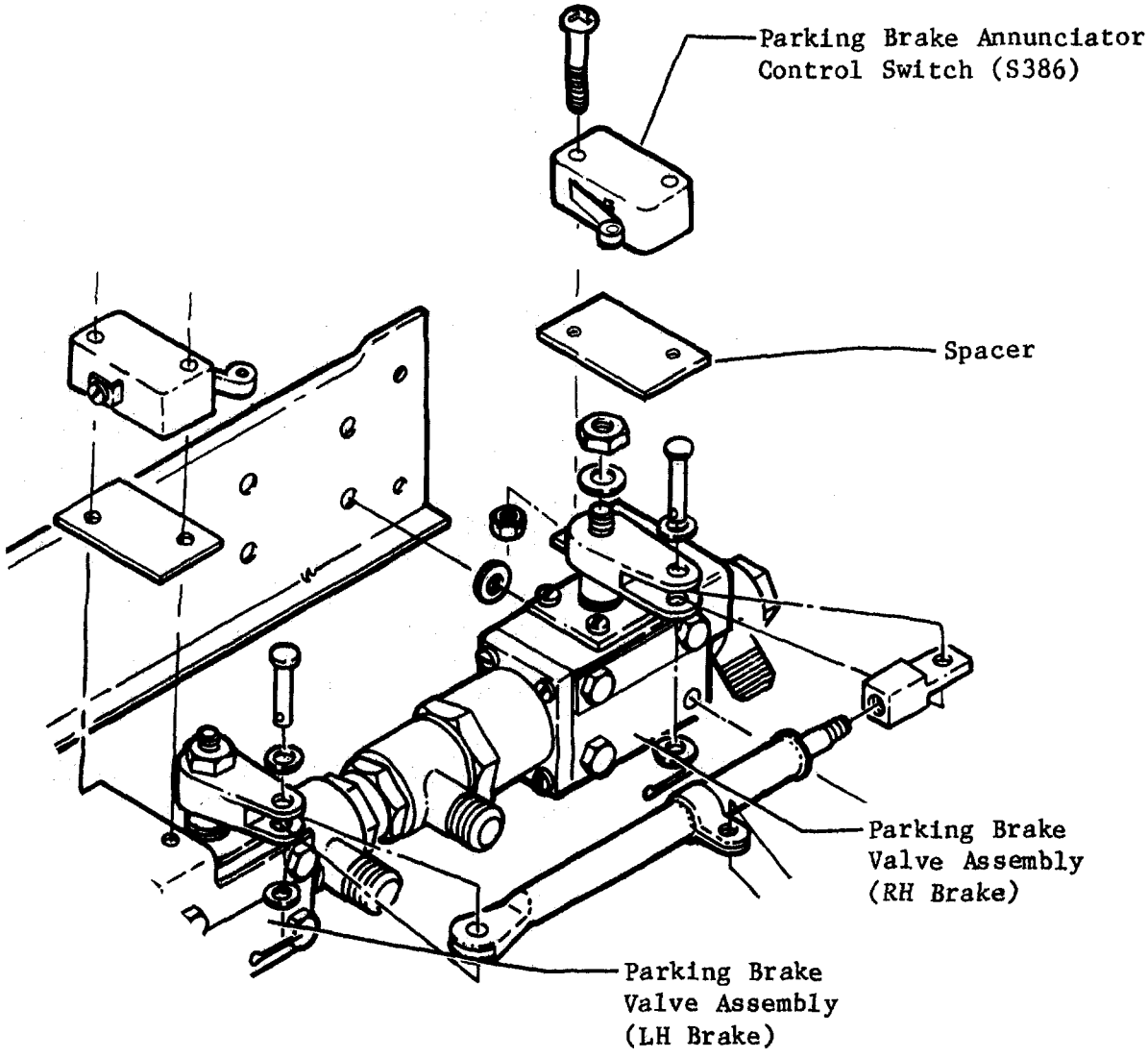
(2) If suspect, verify parking brake cable assembly rigging in accordance with procedures outlined in the appropriate section, this chapter.

(3) Pull parking brake handle aft into detent position (parking brake annunciator illuminates), then push handle forward to 0.12 (±0.03) inch from quadrant (brakes off position).

(4) Adjust parking brake annunciator control switch toward parking brake valve lever until switch actuates (parking brake light shall extinguish). Secure switch in this position.

(5) Cycle parking brake several times. Parking brake annunciator shall be extinguished when parking brake handle is not less than 0.12 (±0.03) inch from the quadrant.

NOTE: Due to cable stretch, the annunciator may not illuminate until parking brake handle is more than 0.12 (±0.03) inch from quadrant.



Park Brake Annunciator Control Switch Installation
Figure 201

ANTI-SKID SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The anti-skid system is an integrated electro-mechanical and hydraulic system incorporated in the main hydraulic brake system to allow even braking on all types and conditions of runways without skidding the landing gear tires.

B. On Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 not equipped with Reduced Approach Speed System, the brake anti-skid system consists of two anti-skid pressure control valves, four wheel speed transducers, an anti-skid control box, an anti-skid light panel, an anti-skid shutoff switch, and a system control switch. The Anti-Skid Switch supplies system electrical power and the anti-skid test switch checks the system, illuminating the four individual anti-skid annunciators. During normal operation, illumination of an anti-skid annunciator indicates a malfunction.

C. On Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 equipped with Reduced Approach Speed System, the brake anti-skid system consists of two anti-skid pressure control valves, four wheel speed transducers, an anti-skid control box, an anti-skid light panel, an anti-skid shutoff switch, and a system control switch. The Anti-Skid Switch supplies system electrical power and energizes the anti-skid interface adapter (nose wheel steering 32-50-00). Depressing the MSTR WARN Switch checks the system, illuminating the four individual anti-skid annunciators. During normal operation, illumination of an anti-skid annunciator indicates a malfunction.

D. On Aircraft 35-054 thru 35-629, except 35-626 and 35-627 and 36-018 thru 36-058, except 36-056, the brake anti-skid system consists of two anti-skid pressure control valves, four wheel speed transducers, an anti-skid control box, an anti-skid light panel, an anti-skid shutoff switch, and a system control switch. The Anti-Skid Switch supplies system electrical power. On Aircraft 35-054 thru 35-070 when modified by AMK 76-3, and 35-071 thru 35-133 and 36-018 thru 36-034, the anti-skid switch also energizes the anti-skid interface adapter (nose wheel steering 32-50-00). Depressing the MSTR WARN Switch checks the system, illuminating the four individual anti-skid annunciators. During normal operation, illumination of an anti-skid annunciator indicates a malfunction. On Aircraft 35-626, 35-627 and 35-630 and Subsequent and 36-056 and 36-059 and Subsequent, the anti-skid system consists of four wheel transducers, two pressure control valves, a control box, an anti-skid light panel, an anti-skid shutoff switch, a park brake annunciator control box, a park brake switch, and a system control switch.

NOTE: Perform Functional Test of Anti-Skid System after any maintenance requiring component removal/installation has been performed. (Refer to Adjustment/Test, 32-44-00.)

E. Component Description

(1) The wheel speed transducers transmit to the control box signals that are in direct proportion to the revolutions of the wheels.

(2) Each anti-skid pressure control valve is electro-hydraulically operated and regulates the amount of hydraulic pressure (applied at the brake pedals) admitted to the brake assemblies.

(3) The control box is comprised of integral circuits which receive signals from the wheel speed transducers and determine the control signals to be sent to the anti-skid control valves. The circuits also monitor the wheel speed transducers and will cause the respective annunciator on the anti-skid annunciator panel to illuminate if a wheel speed transducer malfunctions.

(4) The anti-skid annunciator panel consists of four indicator annunciators: two annunciators for left landing gear brake system and two annunciators for the right landing gear brake system. The indicator annunciators will be extinguished with the landing gear retracted. With the landing gear extended and the Anti-Skid Switch in the ON position, the indicator annunciators will be extinguished unless there is a malfunction in the anti-skid system.

(5) Refer to 32-50-00 for information on nose wheel steering interface adaptation.

2. OPERATION

A. Anti-Skid System Operation (Aircraft 35-002 thru 35-629, except 35-626 and 35-627 and 36-002 thru 36-058, except 36-056.)

(1) With the Anti-Skid Switch set to ON, 28 vdc power is applied to the anti-skid control box and the left and right pressure control valves thru the park brake switch (anti-skid shutoff, S173). Power application to the pressure control valves opens the pressure control valve return solenoid, allowing brake application.

(2) During brake application, the output signal from each wheel transducer is applied to the anti-skid control box. These signals are compared and, if any wheel transducer decelerates faster than the remaining wheel transducers (an impending skid condition), a rate-of-change voltage is measured. If an rate-of-change voltage exceeds a predetermined level, an output signal is applied to the applicable pressure control valve servo. The energized servo releases the braking pressure being applied to its respective brake, allowing that wheel to "spin up."

(3) Indicator lights, located on the anti-skid light assembly, provide the crew with an indication of anti-skid operation. A fault in any one of the four wheel transducer circuits completes a ground circuit to illuminate its applicable indicator light. Power for the anti-skid indicator light is provided from the warning light control box. The light assembly incorporates a test circuit, which applies a ground to the indicator lights, from glareshield test switch.

(4) On Aircraft 35-002 thru 35-053 and 36-002 thru 36-017, not equipped with Reduced Approach Speed System, an anti-skid test switch is used to check the anti-skid electrical system.

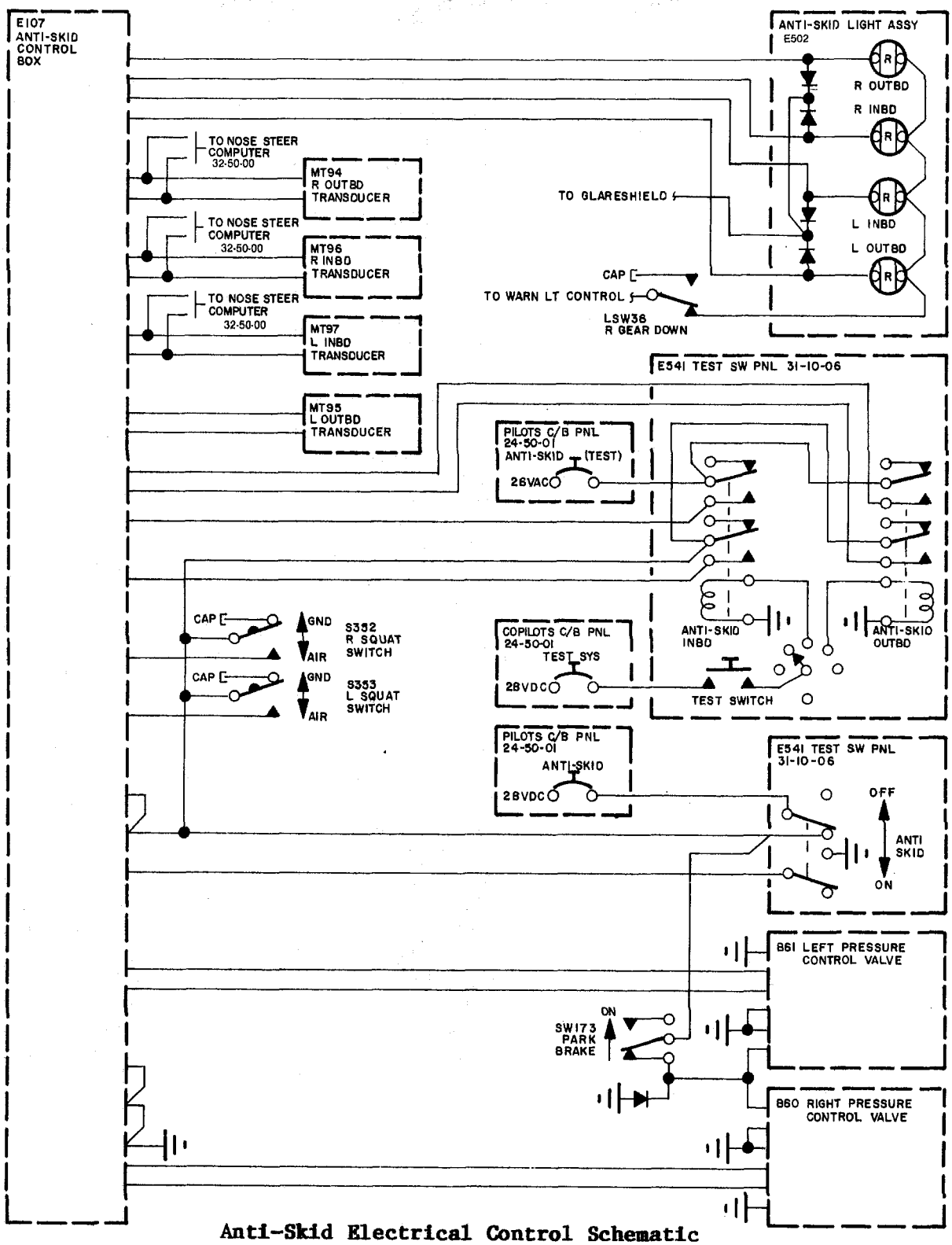
B. **Anti-Skid System Operation** (Aircraft 35-626, 35-627 and 35-630 and Subsequent and 36-056 and 36-059 and Subsequent.)

(1) With the Anti-Skid Switch set to ON, the following shall occur:
   (a) 28 vdc power is applied to the anti-skid control box.
   (b) 28 vdc power is applied to the right and left pressure control valves thru the anti-skid disconnect switch (S173, park brake off).
   (c) 28 vdc power is applied to relays K1 and K2, within the park brake annunciator control box. This removes the ground circuit from the park brake switch (S386) to the anti-skid indicators.
   (d) Power is removed from relay K4, which completes a 28 vdc test circuit to the anti-skid control box and a 28 vdc power circuit for the anti-skid indicator lights. This circuit provides for the continuous anti-skid system test in flight.

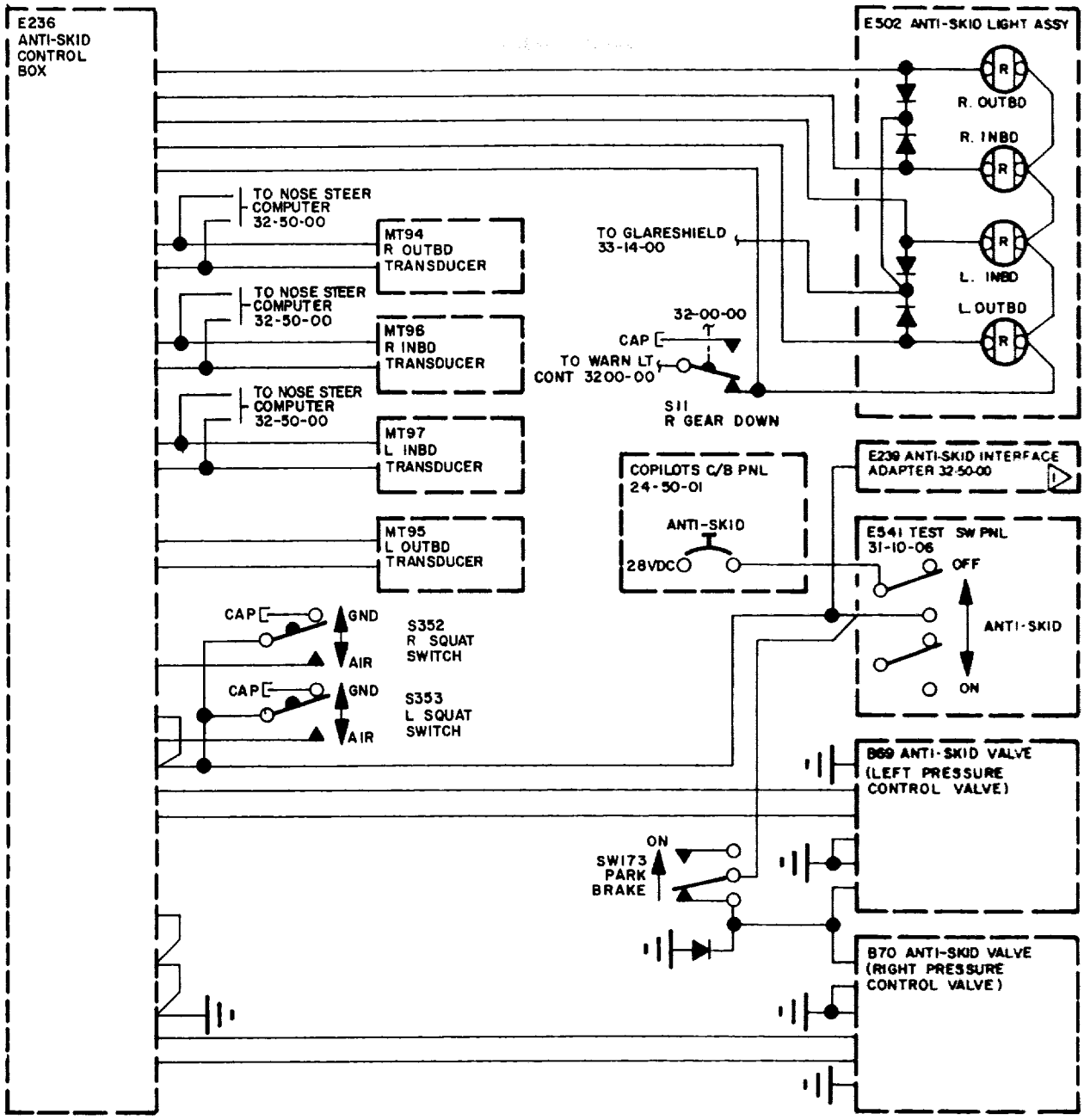
(2) During brake application, the output signal from each wheel transducer is applied to the anti-skid control box. These signals are compared and, if any wheel transducer decelerates faster than the remaining wheel transducers (an impending skid condition) a rate-of-change voltage is measured. If any rate-of-change voltage exceeds a predetermined level, an output signal is applied to the applicable pressure control valve servo. The energized servo releases the braking pressure being applied to its respective brake, allowing that wheel to "spin up". When the affected wheel spins up and the rate-of-change falls back below the predetermined level, braking pressure is reapplied.

(3) Indicator lights, located on the anti-skid assembly, provide the crew with an indication of anti-skid operation. A fault in any one of the four wheel transducer circuits completes a ground circuit to illuminate its applicable indicator light. The control circuit, between relays K3 and K4, within the park brake annunciator control box provide for continuous anti-skid test in flight.

(4) A park brake indicator light, located on the anti-skid assembly, provide the crew with an indication of when the park brake is engaged or that 28 vdc is not available at the return solenoid shutoff on each control valve (B69 and B70). When power is applied to the aircraft and the park brake is set, a ground circuit is completed to illuminate the park brake indicator light. A resistor connected between the circuit and ground provides a filament pre-heater circuit for the indicator light. The indicator light is connected to the anti-skid indicator light test circuit through diode CR5 and will illuminate when the anti-skid indicator lights are illuminated.

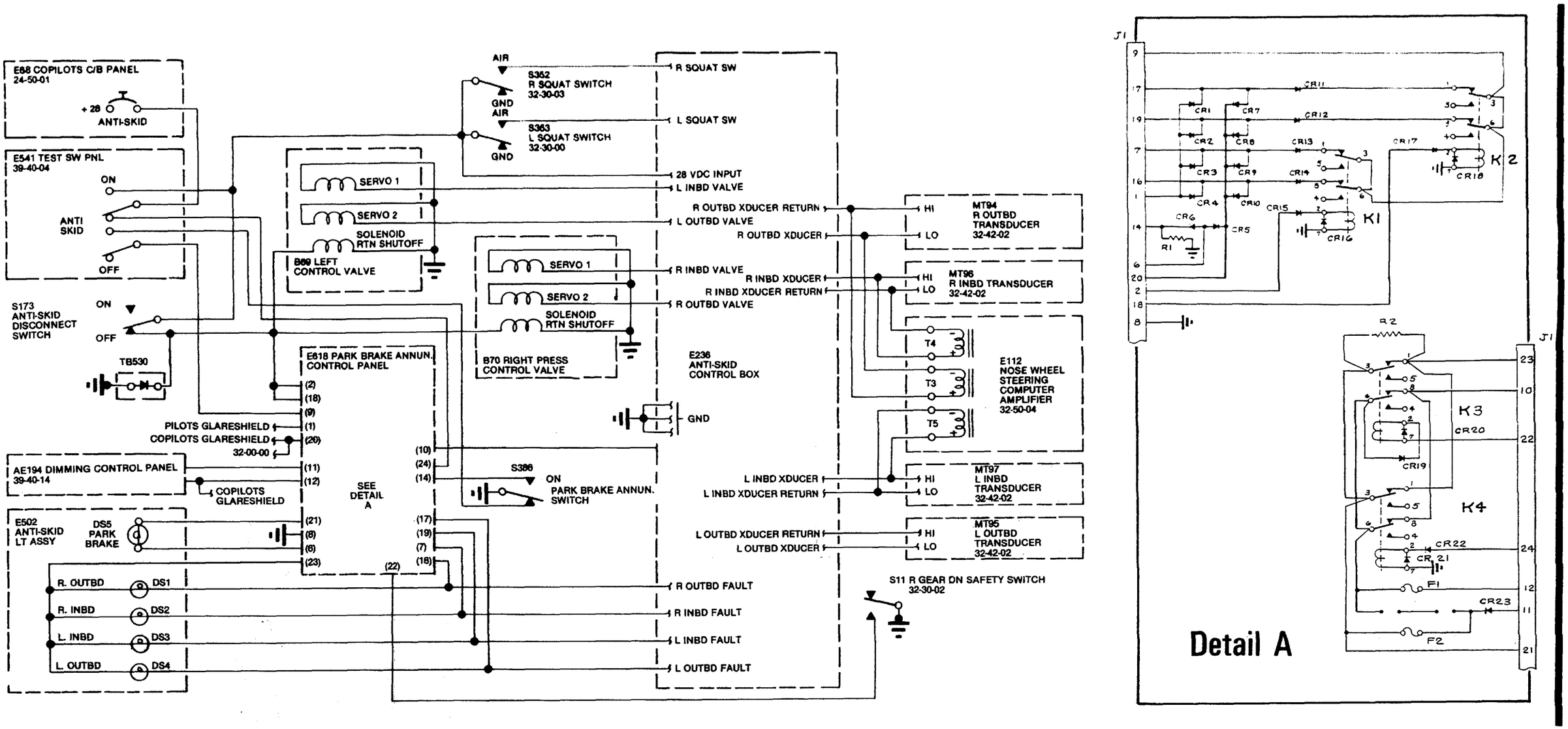


Anti-Skid Electrical Control Schematic
Figure 1 (Sheet 1 of 3)



1 Installed on Aircraft 35-002 through 35-053 and 36-002 through 36-017 equipped with reduced approach speed system, 35-054 through 35-070 modified by AMK 76-3, and 35-071 through 35-183 and 36-018 through 36-034.

Anti-Skid Electrical Control Schematic
Figure 1 (Sheet 2 of 3)



Anti-Skid Electrical Control Schematic
Figure 1 (Sheet 3 of 3)

ANTI-SKID SYSTEM - TROUBLESHOOTING

1. TROUBLESHOOTING

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following.

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	260	Simpson	Check voltages and continuity.

B. Prepare Aircraft for Anti-Skid Troubleshooting - Part I *(Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 not equipped with Reduced Approach Speed System)*.
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Pull all circuit breakers except anti-skid test, anti-skid power, warning annunciators, left low-oil pressure, and inverters.
   (3) Disconnect anti-skid control box electrical connector.
   (4) Figure 101 has been provided for use as an aid when performing troubleshooting procedures. The pin numbers are those of P551 plug which was disconnected from anti-skid control box.

C. Perform Anti-Skid Troubleshooting - Part I *(Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 not equipped with Reduced Approach Speed System)*.
   (1) Connect an external electrical power source to aircraft. With squat switches in air mode, check for 28 vdc at P551, pins 25 and 26. With the squat switches in ground mode, check for open circuit to pins 25 and 26.
   (2) Verify that pins 27, 28, and 29 are at ground potential. Measured (multimeter - preselect ohms mode) resistance of pins to ground post shall be no greater than 0.5 ohms.
   (3) Set Anti-Skid Control Switch to OFF and check for open circuit to pins 23 and 24. Verify that pin 30 is grounded.
   (4) Set Anti-Skid Control Switch to ON and check (multimeter - preselect volts DC mode) for 28 vdc at pins 23 and 24. Verify open circuit at pin 30.
   (5) Actuate Landing Gear Switch to UP position; pins 17, 18, 19, and 20 will lose 28 vdc power (go to open circuit). Actuate Landing Gear Switch to DN position and pins 17, 18, 19, and 20 will have 28 vdc.

CAUTION: WHEN USING ANTI-SKID TEST SWITCH, DO NOT HOLD SWITCH IN ONE POSITION FOR MORE THAN 20 SECONDS.

   (6) Set and hold Anti-Skid Test Switch to INBD position; pin 3 (system enable INBD) shall go from open to 28 vdc. Set and hold Anti-Skid Test Switch to OUTBD position; pin 4 (system enable OUTBD) shall go from open to 28 vdc. With Anti-Skid Test Switch in its neutral position, pins 3 and 4 shall be open.

Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 not equipped with Reduced Approach Speed System

P551 PIN NO.	RELATED SYSTEM
1	- System Test Inboard
2	- System Test Outboard
3	- System Test Enable Inboard
4	- System Test Enable Outboard
5	- Left Anti-Skid Control Valve
6	- Right Anti-Skid Control Valve
7	- Left Anti-Skid Control Valve
8	- Right Anti-Skid Control Valve
9	- Left Wheel Inboard Transducer
10	- Left Wheel Outboard Transducer
11	- Right Wheel Inboard Transducer
12	- Right Wheel Outboard Transducer
13	- Left Wheel Inboard Transducer Return
14	- Left Wheel Outboard Transducer Return
15	- Right Wheel Inboard Transducer Return
16	- Right Wheel Outboard Transducer Return
17	- Left Wheel Inboard Indicator Lamp
18	- Left Wheel Outboard Indicator Lamp
19	- Right Wheel Inboard Indicator Lamp
20	- Right Wheel Outboard Indicator Lamp
21	- Not Used
22	- Not Used
23	- System Power
24	- System Power
25	- Left MLG Squat Switch
26	- Right MLG Squat Switch
27	- Case Ground
28	- System Ground
29	- System Ground
30	- Reset
31	- Spare

P551 Pins and Related Systems
Figure 101

(7) Set and hold Anti-Skid Test Switch to INBD position; pin 1 (system enable INBD) shall go from open to 26 vac, 400 Hz. Set and hold Anti-Skid Test Switch to OUTBD position; pin 2 (system enable OUTBD) shall go from open to 26 vac, 400 Hz.

(8) Check for proper annunciator actuation as follows:
  (a) Ground pin 17 and LI annunciator shall illuminate.
  (b) Ground pin 18 and LO annunciator shall illuminate.
  (c) Ground pin 19 and RI annunciator shall illuminate.
  (d) Ground pin 20 and RO annunciator shall illuminate.

(9) Perform voltage and resistance test of anti-skid control valve solenoid as follows:
  (a) Disconnect electrical connector (P552) from right anti-skid control valve.
  (b) Connect multimeter (preselect volts DC mode) across pins d and g.
  (c) Set Parking Brake Handle off. Multimeter shall indicate 28 vdc.
  (d) Set Parking Brake Handle on. Multimeter shall indicate 0 vdc.
  (e) Set multimeter to ohms mode. Resistance between pins d and g shall be 30 to 50 ohms.
  (f) Connect electrical connector (P552) to the right anti-skid control valve.
  (g) Disconnect electrical connector (P553) from left anti-skid control valve.
  (h) Perform steps 1.C.(9)(b) thru (e) for left anti-skid control valve.
  (i) Connect electrical connector (P553) to left anti-skid control valve.

(10) Set Anti-Skid Switch to OFF.

(11) Ensure that anti-skid control valve electrical connectors (P552 and P553) are installed properly by performing the following resistance checks at P551.
  (a) Resistance between pin 5 and ground shall be 180 to 200 ohms.
  (b) Resistance between pin 6 and ground shall be 180 to 200 ohms.
  (c) Resistance between pin 7 and ground shall be 180 to 200 ohms.
  (d) Resistance between pin 8 and ground shall be 180 to 200 ohms.

(12) Ensure that wheel transducer connectors are properly installed by performing the following resistance checks at P551 as follows:
  (a) Check resistance from pin 10 to pin 14 (LO transducer) for 400 (±25) ohms at 70°F (21.1°C).
  (b) Check resistance from pin 13 to pin 9 (LI transducer) for 400 (±25) ohms at 70°F (21.1°C).
  (c) Check resistance from pin 16 to pin 12 (RO transducer) for 400 (±25) ohms at 70°F (21.1°C).
  (d) Check resistance from pin 11 to pin 15 (RI transducer) for 400 (±25) ohms at 70°F(21.1°C).

D. Prepare Aircraft for Troubleshooting - Part II (Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 Not Equipped with Reduced Approach Speed System).

(1) Connect anti-skid control box electrical connector.

(2) Verify that parking brake is released.

(3) Place aircraft on jacks. (Refer to Chapter 7.)

(4) Verify that Anti-Skid Test and Anti-Skid Power and Warning Annunciators circuit breakers are depressed.

E. Perform Anti-Skid Troubleshooting - Part II (Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 Not Equipped with Reduced Approach Speed System).

NOTE: The ANTI-SKID annunciators are reset by momentarily setting the Anti-Skid Switch to OFF and back to ANTI-SKID. If a malfunction is present, the affected annunciator shall illuminate after resetting switch to ANTI-SKID.

(1) Connect external electrical power source to aircraft.
(2) Set Anti-Skid Switch to OFF.
(3) Disconnect electrical connector from left anti-skid control valve.
(4) Block squat switches to ground mode.
(5) With Anti-Skid Switch set to OFF, all four ANTI-SKID annunciators shall illuminate.
(6) Set Anti-Skid Switch to ANTI-SKID. The right inboard and right outboard annunciators shall not illuminate. The left inboard and left outboard annunciators shall illuminate after an 8-second delay (maximum).
(7) Set Anti-Skid Switch to OFF and return squat switches to flight mode. All four ANTI-SKID annunciators shall illuminate.
(8) Set Anti-Skid Switch to ANTI-SKID. The right inboard and right outboard annunciators shall not illuminate. The left outboard and left inboard annunciators shall illuminate after an 8-second delay (maximum).
(9) Return squat switches to ground mode.
(10) Connect electrical connector to left anti-skid control valve.
(11) Set Anti-Skid Switch to OFF and disconnect electrical connector from right anti-skid control valve.
(12) All four ANTI-SKID annunciators shall illuminate.
(13) Set Anti-Skid Switch to ANTI-SKID. The left outboard and left inboard annunciators shall not illuminate. The right inboard and right outboard annunciators shall illuminate after an 8-second delay (maximum).
(14) Set Anti-Skid Switch to OFF and return squat switches to flight mode. All four ANTI-SKID annunciators shall illuminate.
(15) Set Anti-Skid Switch to ANTI-SKID. The left outboard and left inboard annunciators shall not illuminate. The right inboard and right outboard annunciators shall illuminate after an 8-second delay (maximum).
(16) Connect electrical connector to right anti-skid control valve.
(17) Set Anti-Skid Switch to OFF. All four ANTI-SKID annunciators shall illuminate.
(18) Return squat switches to ground mode. All four ANTI-SKID annunciators shall illuminate.
(19) Set Anti-Skid Switch to ANTI-SKID and set parking brake. Check that no wheels will rotate.

(20) Release Parking Brake Handle. All wheels shall be free to rotate.
(21) Remove external electrical power source from aircraft, blocks from squat switches, and aircraft from jacks.

F. Prepare Aircraft for Anti-Skid Troubleshooting - Part I as follows: *(Aircraft 35-054 and Subsequent and 36-018 and Subsequent and Earlier Aircraft Equipped with Reduced Approach Speed System)*.
(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Pull all circuit breakers except anti-skid power, gear, warning annunciators, bus ties, and bus breakers.
(3) Disconnect anti-skid control box electrical connector.
(4) Figure 102 has been provided for use as an aid when performing trouble shooting procedures. The pin numbers are those of P551 plug which was disconnected from anti-skid control box.

G. Perform Anti-Skid Troubleshooting - Part I as follows: *(Aircraft 35-054 and Subsequent and 36-018 and Subsequent and Earlier Aircraft Equipped with Reduced Approach Speed System)*.
(1) Connect an external electrical power source to aircraft. With squat switches in air mode, check for 28 vdc at P551, pins 25 and 26. With squat switches in ground mode, check for open circuit to pins 25 and 26.
(2) Verify that pins 27, 28, and 29 are at ground potential. Measured (multimeter - preselect ohms mode) resistance of pins to ground post shall be no greater than 0.5 ohms.
(3) Set Anti-Skid Switch to OFF and check for open circuit to pins 23 and 24. Verify 28 vdc at pin 30.
(4) Set Anti-Skid Switch to ANTI-SKID and check (multimeter - preselect volts DC mode) for 28 vdc at pins 23 and 24.
(5) With squat switches in air mode, raise landing gear; pins 17, 18, 19, and 20 shall lose power (go to open circuit). Lower landing gear; pins 17, 18, 19, and 20 shall have 28 vdc.
(6) Check for proper annunciator actuation as follows:
(a) Ground pin 17 and LI annunciator shall illuminate.
(b) Ground pin 18 and LO annunciator shall illuminate.
(c) Ground pin 19 and RI annunciator shall illuminate.
(d) Ground pin 20 and RO annunciator shall illuminate.
(7) Perform voltage and resistance test of anti-skid control valve solenoid as follows:
(a) Disconnect electrical connector (P552) from right anti-skid control valve.
(b) Connect multimeter (preselect volts DC mode) across pins d and g.
(c) Set Parking Brake Handle off. Multimeter shall read 28 vdc.
(d) Set Parking Brake Handle on. Multimeter shall read 0 vdc.
(e) Set multimeter to ohms mode. Resistance between pins d and g shall be 30 to 50 ohms.
(f) Connect electrical connector (P552) to right anti-skid control valve.
(g) Disconnect electrical connector (P553) from left anti-skid control valve.
(h) Perform steps 1.G.(7)(b) thru (e) for left anti-skid control valve.
(i) Connect electrical connector (P553) to left anti-skid control valve.

Aircraft 35-054 and Subsequent and 36-018 and Subsequent
and earlier Aircraft Equipped with Reduced Approach Speed System

P551 PIN NO.	RELATED SYSTEM
1	- Not used
2	- Not used
3	- Not used
4	- Not used
5	- Left Anti-Skid Control Valve
6	- Right Anti-Skid Control Valve
7	- Left Anti-Skid Control Valve
8	- Right Anti-Skid Control Valve
9	- Left Wheel Inboard Transducer
10	- Left Wheel Outboard Transducer
11	- Right Wheel Inboard Transducer
12	- Right Wheel Outboard Transducer
13	- Left Wheel Inboard Transducer Return
14	- Left Wheel Outboard Transducer Return
15	- Right Wheel Inboard Transducer Return
16	- Right Wheel Outboard Transducer Return
17	- Left Wheel Inboard Indicator Lamp
18	- Left Wheel Outboard Indicator Lamp
19	- Right Wheel Inboard Indicator Lamp
20	- Right Wheel Outboard Indicator Lamp
21	- Not used
22	- Not used
23	- System Power
24	- System Power
25	- Left MLG Squat Switch
26	- Right MLG Squat Switch
27	- Case Ground
28	- System Ground
29	- System Ground
30	- Warning Lamp Voltage
31	- Spare

P551 Pins and Related Systems
Figure 102

(h) Perform steps 1.G.(7)(b) through (e) for left anti-skid control valve.
(i) Connect electrical connector (P553) to left anti-skid control valve.

(8) Set Anti-Skid Switch to OFF.
(9) Ensure that anti-skid control valve electrical connectors (P552 and P553) are installed properly by performing the following resistance checks at P551.
(a) Resistance between pin 5 and ground shall be 180 to 200 ohms.
(b) Resistance between pin 6 and ground shall be 180 to 200 ohms.
(c) Resistance between pin 7 and ground shall be 180 to 200 ohms.
(d) Resistance between pin 8 and ground shall be 180 to 200 ohms.
(10) Ensure that wheel transducer connectors are properly installed by performing the following resistance checks at P551 as follows:
(a) Check resistance from pin 10 to pin 14 (LO transducer) for 400 (±25) ohms at 70°F (21.1°C).
(b) Check resistance from pin 13 to pin 9 (LI transducer) for 400 (±25) ohms at 70°F (21.1°C).
(c) Check resistance from pin 16 to pin 12 (RO transducer) for 400 (±25) ohms at 70°F (21.1°C).
(d) Check resistance from pin 11 to pin 15 (RI transducer) for 400 (±25) ohms at 70°F (21.1°C).

H. **Prepare Aircraft for Troubleshooting - Part II as follows:** (Aircraft 35-054 and Subsequent and 36-018 and Subsequent.)

NOTE: Paragraphs H and I do not apply to earlier aircraft equipped with Reduced Approach Speed System.

(1) Connect anti-skid control box electrical connector.
(2) If aircraft is on jacks, block squat switch to ground mode.
(3) Verify that Parking Brake Handle is released.
(4) Set Anti-Skid Switch to OFF.
(5) Ensure that ANTI-SKID circuit breaker is depressed.

I. **Perform Anti-Skid Troubleshooting - Part II as follows:** (Aircraft 35-054 and Subsequent and 36-018 and Subsequent.)

NOTE: Paragraphs H and I do not apply to earlier aircraft equipped with Reduced Approach Speed System.

(1) Connect external electrical power source to aircraft. All four ANTI-SKID annunciators shall illuminate.
(2) Set Anti-Skid Switch to ANTI-SKID. All four ANTI-SKID annunciators shall extinguish.
(3) Disconnect electrical connect from left anti-skid control valve. Both left ANTI-SKID annunciators shall illuminate.
(4) Connect electrical connector to left anti-skid control valve.
(5) Reset system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.

(6) Disconnect electrical connector from right anti-skid control valve. Both right ANTI-SKID annunciators shall illuminate.
(7) Connect electrical connector to right anti-skid control valve.
(8) Reset system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.
(9) Remove transducer drive cap and transducer and disconnect electrical connector from left outboard wheel transducer. Left outboard ANTI-SKID annunciator shall illuminate.
(10) Connect electrical connector to left outboard wheel transducer.
(11) Reset system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.
(12) Repeat steps 1.I.(9), (10), and (11) with the three remaining wheel transducers and their respective ANTI-SKID lights.
(13) Remove external electrical power source from aircraft.

ANTI-SKID SYSTEM - MAINTENANCE PRACTICES

1. Inspection/Check

CAUTION: ERRATIC BRAKING, BLOWN TIRES, OR FLAT SPOTS ON TIRES ARE INDICATIVE OF POSSIBLE ANTI-SKID SYSTEM MALFUNCTION. A COMPLETE FUNCTIONAL TEST OF THE SYSTEM MUST BE ACCOMPLISHED TO ISOLATE HYDRAULIC OR ELECTRICAL FAULT.

NOTE: Cleanliness during maintenance procedures cannot be overemphasized due to the extremely close tolerances used during manufacturing of hydraulic components. The slightest amount of contamination can cause a malfunction.

Entrapped air in the system is the most common cause of malfunction and is usually the result of allowing the fluid level to drop below the sight gage on the hydraulic reservoir.

If not already operating, do not turn on the refrigeration system with the anti-skid system operating. The electrical system voltage drop caused by the initial high current draw of the compressor motor creates a false signal to the anti-skid system. As a result, the anti-skid will dump the brake pressure for approximately 2 to 3 seconds if the compressor is turned on while the brakes are applied.

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Spin Adapter	*	Learjet Inc. Wichita, KS	Adapt drill to transducer.
Reversible Electric Drill Motor (700 to 1000 rpm)		Commercially Available	Spin transducer.
Hydraulic Cart (6 gpm @ 1500 psig)		Commercially Available	Pressurize brakes.
Pressure Gages (0 to 2000 psi)		Commercially Available	Check test pressures.

* *35-002 thru 35-027, 35-029, 35-030; 36-002 thru 36-013, 36-015 and 36-016 not incorporating AAK 75-1, "Anti-Skid Transducer Drive Assembly Improvement," use spin adapter P/N 2571003-1.*

35-002 thru 35-027, 35-029, 35-030; 36-002 thru 36-013, 36-015 and 36-016 incorporating AAK 75-1, "Anti-Skid Transducer Drive Assembly Improvement," and 35-028, 35-031 and Subsequent; 36-014, 36-017 and Subsequent, use spin adapter P/N 2571005-1.

B. Perform Anti-Skid Functional Test *(Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 not equipped with Reduced Approach Speed System.)*
(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Install a 0 to 2000 psi gage in each brake line.
(3) Connect external hydraulic (set at 1500 psi minimum) and electrical power sources to aircraft.

(4) Remove transducer drive cap from each wheel, exposing transducer.
(5) Block squat switches to ground mode.
(6) Set Anti-Skid Switch to ANTI-SKID.
(7) Set parking brake. Check each wheel to ensure that no wheel will rotate.
(8) Check pressure indication on brake line gages. Hydraulic pressure shall be 200 psi of pressure supplied by external hydraulic power source.
(9) Release parking brake. Ensure that all wheels will now rotate.
(10) Return squat switches to air mode.
(11) Block both brake pedals so that braking pressure is applied. All four wheels shall be unlocked and free to rotate.
(12) Perform operations 1 thru 4 in Table I (AIR MODE).

NOTE: When spinning transducer, maintain a constant speed of 700 to 1000 rpm.

Pressure applied at brakes shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.

After each transducer spin, reset the system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.

(13) Return squat switches to ground mode.
(14) Perform operations 1 thru 4 in Table II (GROUND MODE).

NOTE: When spinning transducer, maintain a constant speed of 700 to 1000 rpm.

After each transducer spin, reset the system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.

(15) Remove blocks from brake pedals.
(16) Set Battery and Primary Inverter Switches on and allow 30-second warmup period. Set Anti-Skid Switch to OFF. This will simulate an electrical power failure; all four ANTI-SKID annunciators shall illuminate.
(17) Set Anti-Skid Switch to ANTI-SKID. The annunciators shall extinguish.

CAUTION: WHEN USING ANTI-SKID TEST SWITCH *(AIRCRAFT 35-002 THRU 35-053 AND 36-002 THRU 36-017 NOT EQUIPPED WITH REDUCED APPROACH SPEED SYSTEM)* DO NOT HOLD SWITCH TO INBOARD OR OUTBOARD POSITION FOR MORE THAN 20 SECONDS.

(18) Hold Anti-Skid Test Switch to OUTBD (minimum 4 seconds, maximum 20 seconds); annunciator shall illuminate. Release test switch; annunciators shall extinguish.
(19) Hold Anti-Skid Test Switch to INBD (minimum 4 seconds, maximum 20 seconds); annunciators shall illuminate. Release test switch; annunciators shall extinguish.
(20) Restore squat switches to air mode.
(21) Replace transducer drive caps.
(22) Bleed residual hydraulic pressure by pumping brakes, then remove pressure gage from each brake line.
(23) Bleed brake system. (Refer to 32-43-00, Servicing).
(24) Disconnect external hydraulic and electrical power sources from aircraft.
(25) Check hydraulic reservoir fluid level in accordance with procedures outlined in Chapter 12.
(26) Remove aircraft from jacks.
(27) Restore aircraft to normal.

TABLE I (AIR MODE)

Operation	Transducer Spin	Wheels Free To Rotate	Wheel With Brake Pressure [1]
1	R-OUTBD*	L-INBD L-OUTBD R-INBD	R-OUTBD
2	R-INBD*	L-INBD L-OUTBD R-OUTBD	R-INBD
3	L-INBD*	R-OUTBD R-INBD L-OUTBD	L-INBD
4	L-OUTBD*	R-INBD R-OUTBD L-INBD	L-OUTBD

*When spinning force is removed, that wheel should be free to rotate after a period of 2 to 10 seconds.

TABLE II (GROUND MODE)

Operation	Transducer Spin	Wheels Free To Rotate	Wheels With Brake Pressure [1]	Brake Pressure Within 5 Sec.	Indicator Light Within 5 Sec.
1	R-OUTBD*	L-OUTBD	R-OUTBD L-INBD R-INBD	L-OUTBD	L-OUTBD
2	R-INBD*	L-INBD	R-INBD L-OUTBD R-OUTBD	L-INBD	L-INBD
3	L-INBD*	R-INBD	L-INBD L-OUTBD R-OUTBD	R-INBD	R-INBD
4	L-OUTBD*	R-OUTBD	L-OUTBD L-INBD R-INBD	R-OUTBD	R-OUTBD

* When spinning force is removed, that wheel should be free to rotate after a period of 2 to 10 seconds.

[1] Pressure applied at brake shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.

C. Perform Anti-Skid Functional Test (*Aircraft 35-054 and Subsequent and 36-018 and Subsequent and Earlier Aircraft Equipped with Reduced Approach Speed System).*

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Install a 0 to 2000 psi gage in each brake line.
(3) Connect external hydraulic (set at 1500 psi minimum) and electrical power sources to aircraft.
(4) Remove transducer drive cap from each wheel, exposing transducer.
(5) Block squat switches to ground mode.
(6) Set Anti-Skid Switch to ANTI-SKID.
(7) Set parking brake. Check each wheel to ensure that no wheel will rotate.
(8) Check pressure indication on brake line gages. Hydraulic pressure shall be 1300 psi minimum with 1500 psi supplied by external hydraulic power source.
(9) Release parking brake. Ensure that all wheels are free to rotate.
(10) Return squat switches to air mode.
(11) Block both brake pedals so that braking pressure is applied. All four wheels shall be unlocked and free to rotate.
(12) Perform operations 1 thru 4 in Table III (AIR MODE).

NOTE:
- When spinning transducer, maintain a constant speed of 700 to 1000 rpm.
- Pressure applied at brakes shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.
- After each transducer spin, reset the system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.

(13) Return squat switches to ground mode.
(14) Perform operations 1 thru 4 in Table IV (GROUND MODE).

NOTE:
- When spinning transducer, maintain a constant speed of 700 to 1000 rpm.
- Pressure applied at brakes shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.
- After each transducer spin, reset the system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.

(15) Remove blocks from brake pedals.
(16) Set Battery Switches on and allow 30-second warmup period. Set Anti-Skid Switch to OFF. This will simulate an electrical power failure; all four ANTI-SKID annunciators shall illuminate.
(17) Set Anti-Skid Switch to ANTI-SKID. The annunciators shall extinguish.
(18) Restore squat switches to air mode.
(19) Replace transducer drive caps.
(20) Bleed residual hydraulic pressure by pumping brakes, then remove pressure gage from each brake line.
(21) Bleed brake system. (Refer to 32-43-00, Servicing).
(22) Disconnect external hydraulic and electrical power sources from aircraft.
(23) Check hydraulic reservoir fluid level in accordance with procedures outlined in Chapter 12.
(24) Remove aircraft from jacks.
(25) Restore aircraft to normal.

TABLE III (AIR MODE)

Operation	Transducer Spin	Wheels Free To Rotate	Wheel With Brake Pressure ▷1
1	R-OUTBD*	L-INBD L-OUTBD R-INBD	R-OUTBD
2	R-INBD*	L-INBD L-OUTBD R-OUTBD	R-INBD
3	L-INBD*	R-OUTBD R-INBD L-OUTBD	L-INBD
4	L-OUTBD*	R-INBD R-OUTBD L-INBD	L-OUTBD

*When spinning force is removed, that wheel should be free to rotate after a period of 2 to 10 seconds.

TABLE IV (GROUND MODE)

Operation	Transducer Spin	Wheel With Brake Pressure ▷1	Wheel With Brake Release Then Reapplication Of Pressure **
1	R-OUTBD*	R-OUTBD L-INBD R-INBD	L-OUTBD
2	R-INBD*	R-INBD L-OUTBD R-OUTBD	L-INBD
3	L-INBD*	L-INBD L-OUTBD R-OUTBD	R-INBD
4	L-OUTBD*	L-OUTBD L-INBD R-INBD	R-OUTBD

* When spinning force is removed, that wheel shall be free to rotate for a period of 2 to 10 seconds.

** When spinning force is removed, the opposite brake shall reapply pressure within 2 to 10 seconds.

▷1 Pressure applied at brake shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.

D. Perform Anti-Skid Operational Check *(Aircraft 35-002 thru 35-053 and 36-002 thru 36-017 Not Equipped with Reduced Approach Speed System.)*

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Set Battery and Primary Inverter Switches to ON.
(3) Connect external hydraulic (set at 1500 psi minimum) and electrical power sources to aircraft.
(4) Remove transducer drive cap from each wheel, exposing transducer.
(5) Block squat switches to ground mode.
(6) Set Anti-Skid Switch to ANTI-SKID and allow 30-second warmup period.
(7) Apply brakes. Check for proper operation and leaks.
(8) Perform operations 1 thru 4 in Table V.

NOTE:
- When spinning transducer, maintain a constant speed of 700 to 1000 rpm.
- After each transducer spin, reset the system by setting the Anti-Skid Switch to OFF and back to ANTI-SKID.

(9) Set Anti-Skid Switch to OFF.
(10) Set Battery and Primary Inverter Switches to OFF.
(11) Restore squat switches to air mode.
(12) Replace transducer drive caps.
(13) Bleed residual hydraulic pressure by pumping brakes.
(14) Bleed brake system. (Refer to 32-43-00, Servicing).
(15) Disconnect external hydraulic and electrical power source from aircraft.
(16) Check hydraulic reservoir fluid level in accordance with procedures outlined in Chapter 12.
(17) Remove aircraft from jacks.
(18) Restore aircraft to normal.

TABLE V

Operation	Transducer Spin	Wheels Free To Rotate	Wheels With Brake Pressure [1]	Brake Pressure Within 5 Sec.	Indicator Light Within 5 Sec.
1	R-OUTBD*	L-OUTBD	R-OUTBD L-INBD R-INBD	L-OUTBD	L-OUTBD
2	R-INBD*	L-INBD	R-INBD L-OUTBD R-OUTBD	L-INBD	L-INBD
3	L-INBD*	R-INBD	L-INBD L-OUTBD R-OUTBD	R-INBD	R-INBD
4	L-OUTBD*	R-OUTBD	L-OUTBD L-INBD R-INBD	R-OUTBD	R-OUTBD

* When spinning force is removed, that wheel should be free to rotate after a period of 2 to 10 seconds.

[1] Pressure applied at brake shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.

E. Perform Anti-Skid Operational Check *(Aircraft 35-054 and Subsequent and 36-018 and Subsequent and Earlier Aircraft Equipped with Reduced Approach Speed System).*

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Set Battery Switches to ON.
(3) Connect external hydraulic (set at 1500 psi minimum) and electrical power sources to aircraft.
(4) Remove transducer drive cap from each wheel, exposing transducer.
(5) Block squat switches to ground mode.
(6) Set Anti-Skid Switch to ANTI-SKID and allow 30-second warmup period.
(7) Apply brakes. Check for proper operation and for leaks.
(8) Perform operations 1 thru 4 in Table VI.

NOTE:
- When spinning transducer, maintain a constant speed of 700 to 1000 rpm.
- Pressure applied at brakes shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.
- After each transducer spin, reset the system by setting Anti-Skid Switch to OFF and back to ANTI-SKID.

(9) Set Anti-Skid and Battery Switches to OFF.
(10) Restore squat switches to air mode.
(11) Replace transducer drive caps.
(12) Bleed residual hydraulic pressure by pumping brakes.
(13) Bleed brake system. (Refer to 32-43-00, Servicing).
(14) Disconnect external hydraulic and electrical power sources from aircraft.
(15) Check hydraulic reservoir fluid level in accordance with procedures outlined in Chapter 12.
(16) Remove aircraft from jacks.
(17) Restore aircraft to normal.

TABLE VI

Operation	Transducer Spin	Wheel With Brake Pressure [1]	Wheel With Brake Release Then Reapplication Of Pressure **
1	R-OUTBD*	R-OUTBD L-INBD R-INBD	L-OUTBD
2	R-INBD*	R-INBD L-OUTBD R-OUTBD	L-INBD
3	L-INBD*	L-INBD L-OUTBD R-OUTBD	R-INBD
4	L-OUTBD*	L-OUTBD L-INBD R-INBD	R-OUTBD

* When spinning force is removed, that wheel shall be free to rotate for a period of 2 to 10 seconds.
** When spinning force is removed, the opposite brake shall reapply pressure within 2 to 10 seconds.

[1] Pressure applied at brake shall be 1300 psi minimum with 1500 psi supplied by the external hydraulic source.

2. Approved Repairs

A. Repairs are allowed on the anti-skid control box, wheel speed transducers, and the anti-skid valves, provided the repair facility obtains the applicable vendor repair manuals and test equipment specified by the vendor.

NOTE: Components of the anti-skid system which are still under factory warranty must be returned to the factory for repair.

B. Vendor manuals are listed under "Supplementary Publications" in the Introduction section of the Maintenance Manual.

ANTI-SKID WHEEL TRANSDUCER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Pro-Seal	890	Courtaulds Aerospace Glendale, CA	Seal entry hole of gear hub.
Red RTV	Refer to Chapter 20	Commercially Available	Seal ends of fire sleeve.

B. Remove Anti-Skid Wheel Transducer (MT95, LH Outbd; MT97, LH Inbd; MT 94, RH Outbd; MT 96, RH Inbd) (See Figure 201.)

(1) Remove safety wire and screws that secure hub assembly to main gear wheel.

CAUTION: PULL OUT TRANSDUCER JUST FAR ENOUGH TO GAIN ACCESS TO ELECTRICAL CONNECTOR, OTHERWISE WIRING SEAL THROUGH AXLE MAY BE DAMAGED.

(2) Remove safety wire, loosen retaining screws in axle, remove transducer and disconnect electrical connector.

C. Install Anti-Skid Wheel Transducer (MT95, LH Outbd; MT97, LH Inbd; MT 94, RH Outbd; MT 96, RH Inbd) (See Figure 201.)

CAUTION: PULL OUT TRANSDUCER WIRING JUST FAR ENOUGH TO GAIN ACCESS TO ELECTRICAL CONNECTOR, OTHERWISE WIRING SEAL THROUGH AXLE MAY BE DAMAGED.

(1) Connect electrical connector to transducer, insert wiring and transducer into axle, and secure with retaining screws. Safety wire retaining screws.

CAUTION: ENSURE HUB ENTRY HOLE IS SEALED TO PREVENT MOISTURE ENTRY.

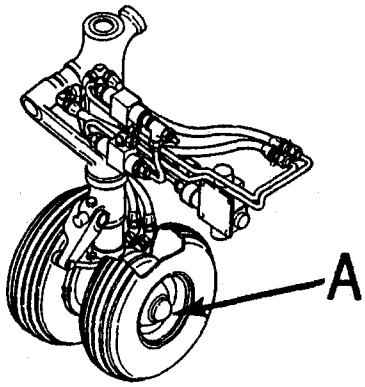
(2) Ensure anti-skid transducer wiring is still sealed at entry hole of gear hub.

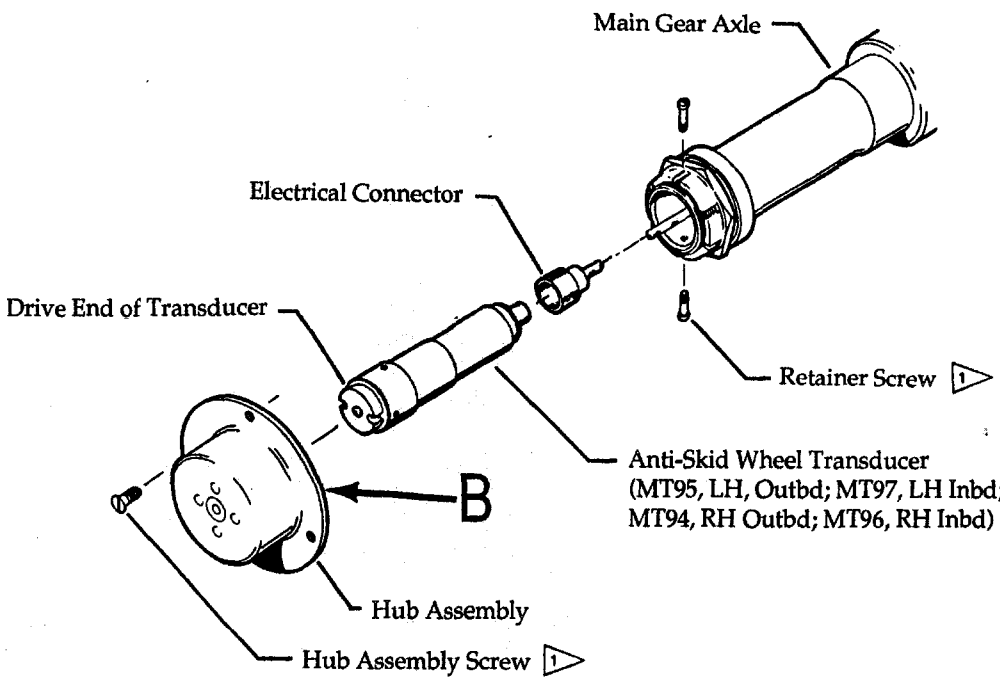
CAUTION: ENSURE 12 INCHES OF FIRE SLEEVE IS INSTALLED ON ELECTRICAL WIRING AND IS SEALED AT BOTH ENDS.

(3) Ensure 12 inches of fire sleeve is installed on electrical wiring and is sealed at both ends.

(4) Position hub assembly on main gear wheel ensuring that hub assembly is properly engaged with transducer drive and secure with screws. Safety wire screws.

(5) Perform Functional Test of Anti-Skid System. (Refer to Adjustment/Test, 32-42-00.)



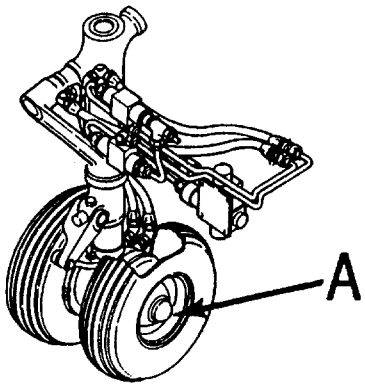


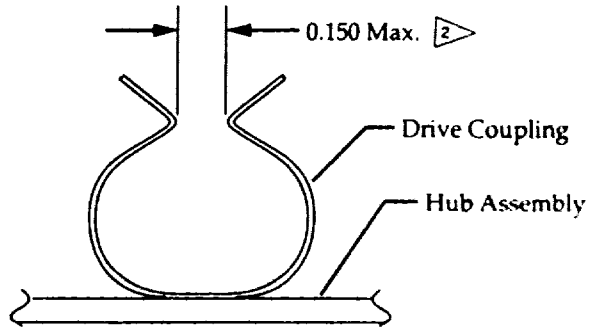
1 Safety wire using double twist method.

Detail A

6-19B-1
6-18B-2
11-59C-2

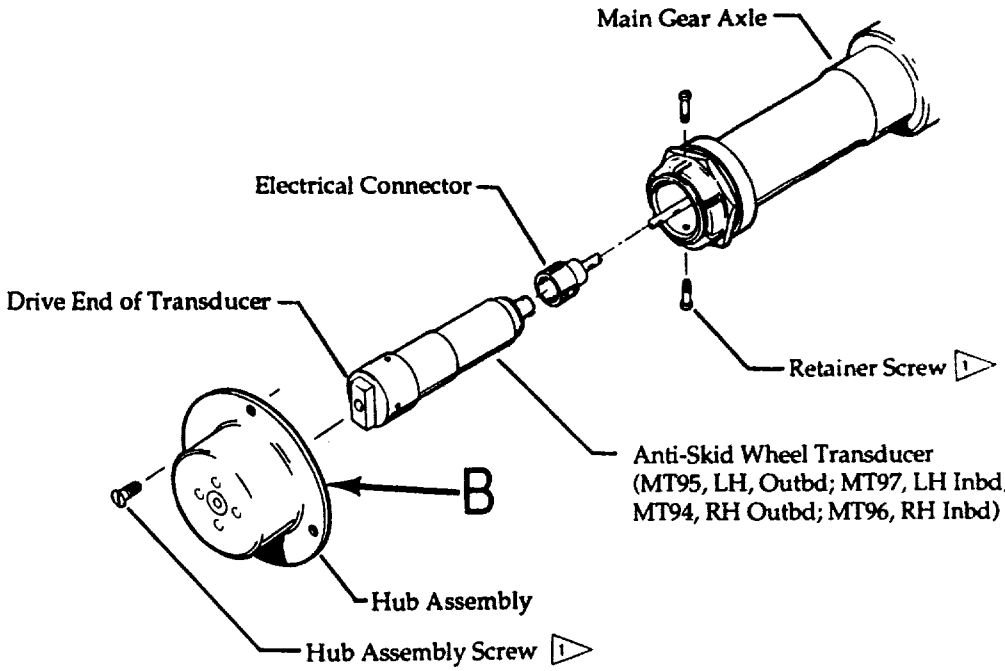
Anti-Skid Wheel Transducer Installation
Figure 201 (Sheet 1 of 2)





2 Inspect and adjust to obtain 0.0 inch clearance fit on transducer drive.

Detail B



1 Safety wire using double twist method.

Detail A

6-19B-1
6-18B-2
11-59C-2

Anti-Skid Wheel Transducer Installation
Figure 201 (Sheet 2 of 2)

ANTI-SKID VALVE - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Anti-Skid Valve (See figure 201.)

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Remove electrical power from aircraft.
(3) Remove hydraulic pressure from brake system.

CAUTION: USE EXTREME CARE TO PREVENT ANY FOREIGN MATTER FROM ENTERING HYDRAULIC LINES OR ANTI-SKID VALVE.

(4) Disconnect plumbing connections from anti-skid valve. Cap and plug exposed fittings.
(5) Disconnect electrical connector from the anti-skid valve.
(6) Remove attaching parts securing anti-skid valve to wing spar and remove valve from aircraft.

B. Install Anti-Skid Valve (See figure 201.)

(1) Position anti-skid valve on wing spar and secure with attaching parts.
(2) Remove plumbing caps and plugs, and connect plumbing to anti-skid valve.
(3) Connect electrical connector to anti-skid valve.
(4) Restore electrical power to aircraft. Connect external hydraulic source to aircraft.
(5) Depress brake pedals to apply pressure to anti-skid system, and check for leaks. Perform functional test of anti-skid system. (Refer to "Adjustment Test," 32-44-00.)
(6) Disconnect external hydraulic power from aircraft. Remove electrical power from aircraft.
(7) Remove aircraft from jacks.

2. CLEANING/PAINTING (See figure 201.)

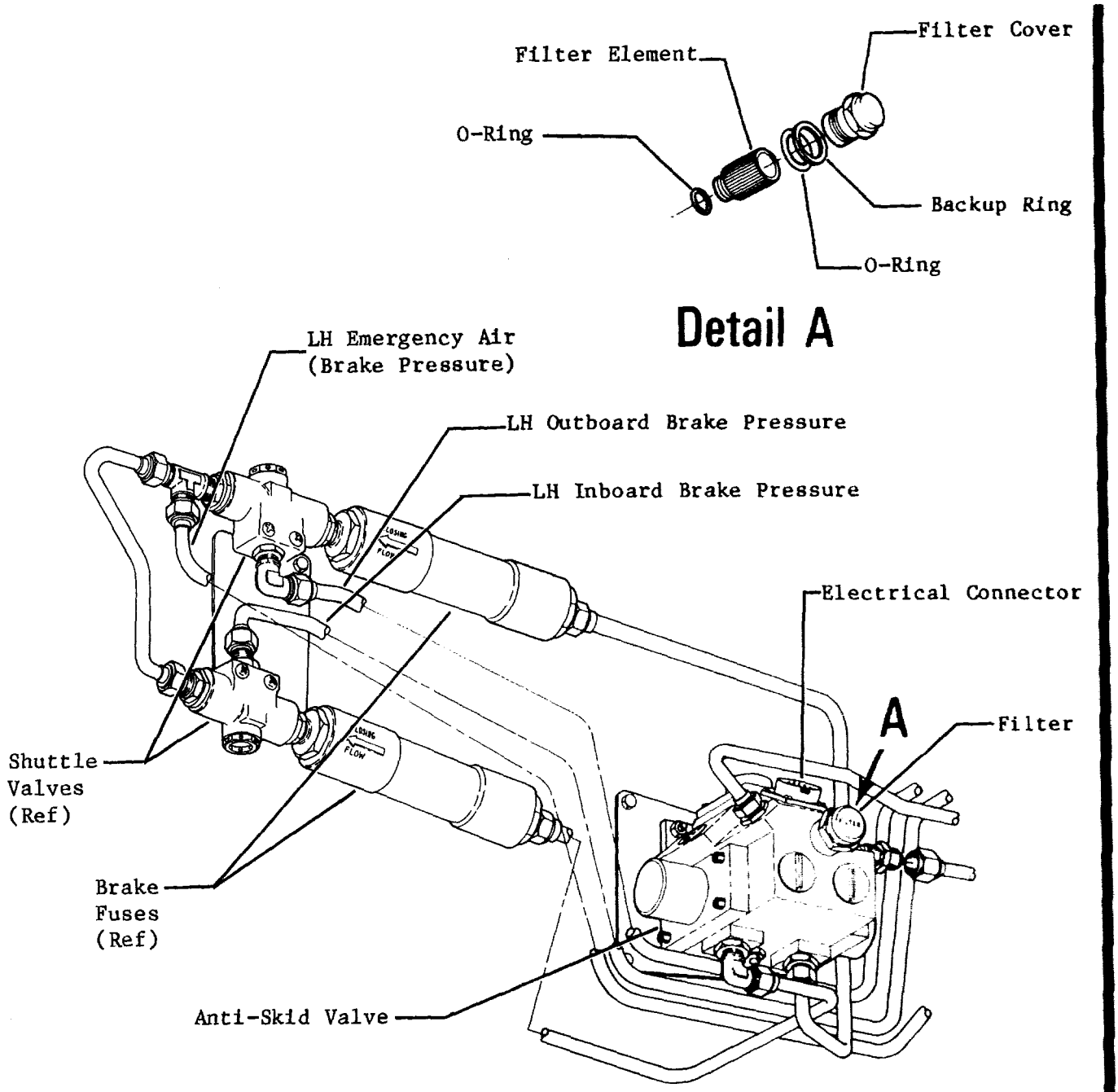
NOTE: ° Each anti-skid valve contains a filter element which must be removed and clean in accordance with the current inspection interval specified in Chapter 5.

° For additional information on the anti-skid valve refer to Supplementary Publications in the introduction to this maintenance manual.

A. Clean Filter Element

(1) Unscrew filter cover from anti-skid valve. Remove and discard O-ring and backup ring.
(2) Extract filter element from anti-skid valve. Remove O-ring from filter element and discard.
(3) Fill filter element cavity with full-strength liquid detergent (biodegradable).
(4) Insert a rubber plug with a center hole into element neck and, using clean dry air, force detergent out through element.

(5) Remove rubber plug and reverse flush element with tap water to remove soap.
(6) Insert rubber plug and blow water out of element.
(7) Remove rubber plug and reverse flush element with tap water until water runs clear from element.
(8) Repeat steps 2.A.(3) thru (7) until element is clean.
(9) Dry element with clean dry air or nitrogen.
(10) Install new O-ring on filter element and insert element into anti-skid valve.
(11) Install new backup ring and O-ring on filter cover and screw filter cover into anti-skid valve. Torque filter cover to 5 to 10 inch-pounds and safety wire.



LH Installation, Viewed looking forward in wheel well.

Anti-Skid Valve Installation
Figure 201

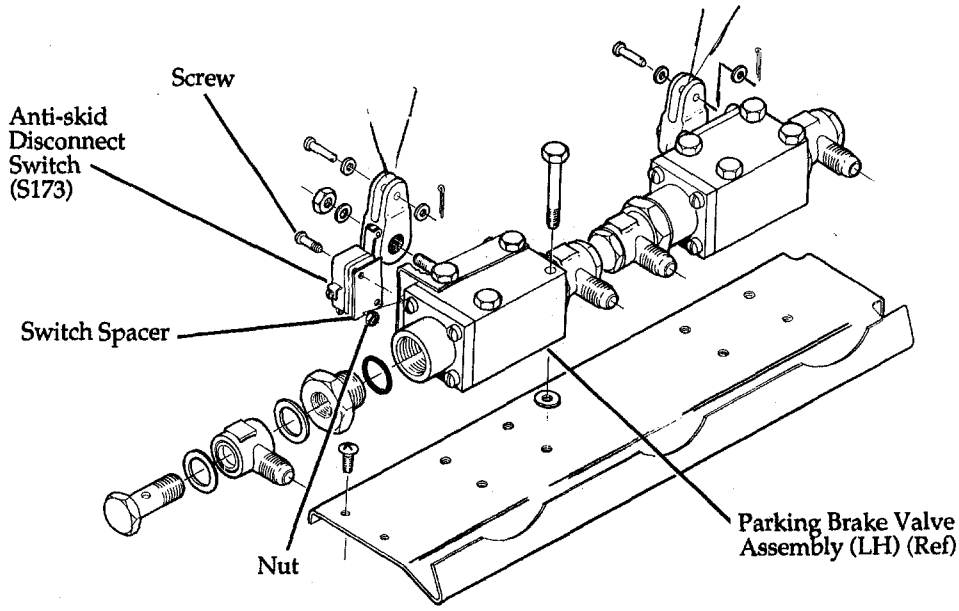
ANTI-SKID DISCONNECT SWITCH - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Removal of Anti-Skid Disconnect Switch (S173) (See Figure 201.)
      (1) Set Battery Switches off and disconnect aircraft batteries.
      (2) Remove applicable carpet and floorboards as required to gain access to anti-skid disconnect switch.
      (3) Disconnect and identify electrical wiring at switch.
      (4) Remove attaching parts securing switch to parking brake valve switch bracket and remove switch from aircraft.
   B. Installation of Anti-Skid Disconnect Switch (S173) (See Figure 201.)
      (1) Position switch spacer and switch on switch bracket.
      (2) Loose secure with attaching parts.
      (3) Connect electrical wiring to switch.
      (4) Connect electrical connectors to aircraft batteries.
      (5) Adjust Anti-Skid Disconnect Switch. (Refer to Adjustment/Test, this section.)
      (6) Install previously removed floorboards and carpet.

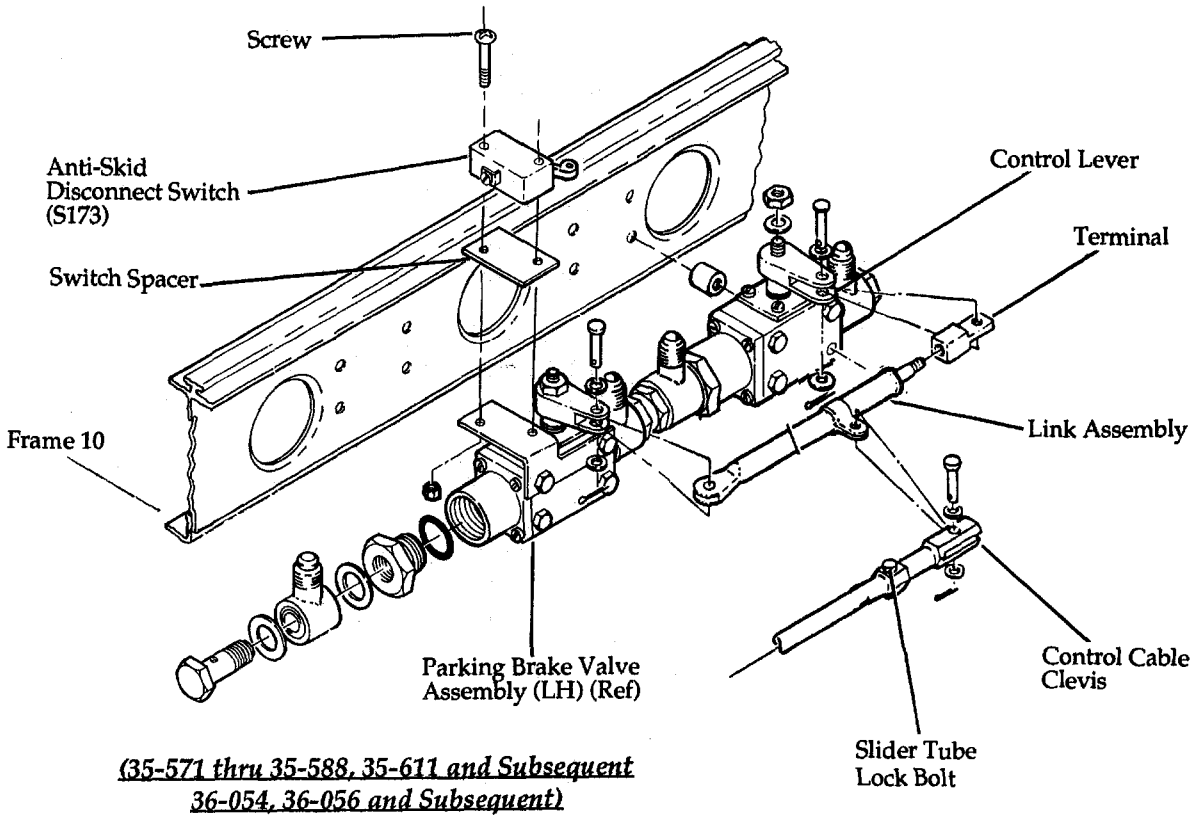
2. **Adjustment/Test**
   A. Rig Anti-Skid Disconnect Switch (See Figure 201 and Figure 202.)

      NOTE: The following procedures are also used to rig the parking brake valves.

      (1) Connect an ohmmeter between C and NC terminals of anti-skid disconnect switch installed on forward parking brake valve.
      (2) Disconnect link assembly from control cable clevis end and aft control lever.
      (3) Check that anti-skid disconnect switch actuates (continuity) when valve control lever is at 15° to 18° forward of vertical. If adjustment is required, loosen switch attaching screws and position switch as required to obtain actuation.
      (4) Turn control levers on both valves to forward position.
      (5) Adjust terminal end of link assembly so that attaching holes align with both control levers, and install link assembly between control levers.
      (6) Pull parking brake handle aft into detent position.
      (7) If control cable clevis end does not align with hole in link assembly, loosen slider tube lock bolt and adjust slider tube as required.
      (8) Tighten slider tube lock bolt, and secure cable clevis end to link assembly.
      (9) With parking brake handle in detent position ensure ohmmeter indicates no continuity.
      (10) Slowly push handle in toward quadrant. At 0.80 to 0.60 inch [2.032 to 1.524 cm] from quadrant, switch will actuate to closed (continuity).
      (11) If adjustment is required, loosen slider tube lock bolt and adjust slider tube as required to obtain actuation.
      (12) Tighten slider tube lock bolt.
      (13) Cycle parking brake handle several times while monitoring ohmmeter to ensure correct adjustment.
      (14) Disconnect ohmmeter from switch, and install floorboards removed to gain access to parking brake valve.



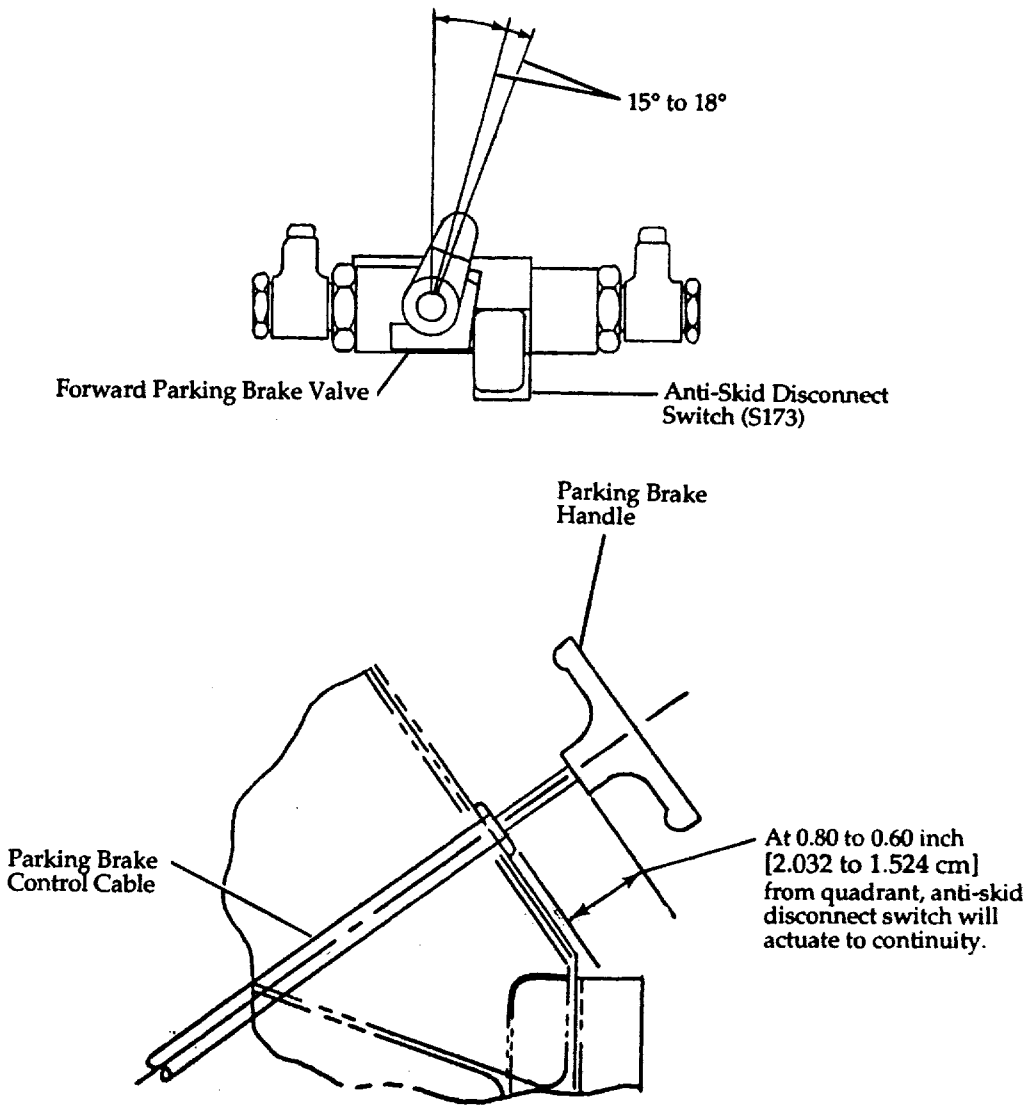
(35-002 thru 35-570, 35-589 thru 35-610
36-002 thru 36-053, 36-055)



(35-571 thru 35-588, 35-611 and Subsequent
36-054, 36-056 and Subsequent)

10-11C-1
11-10B-1

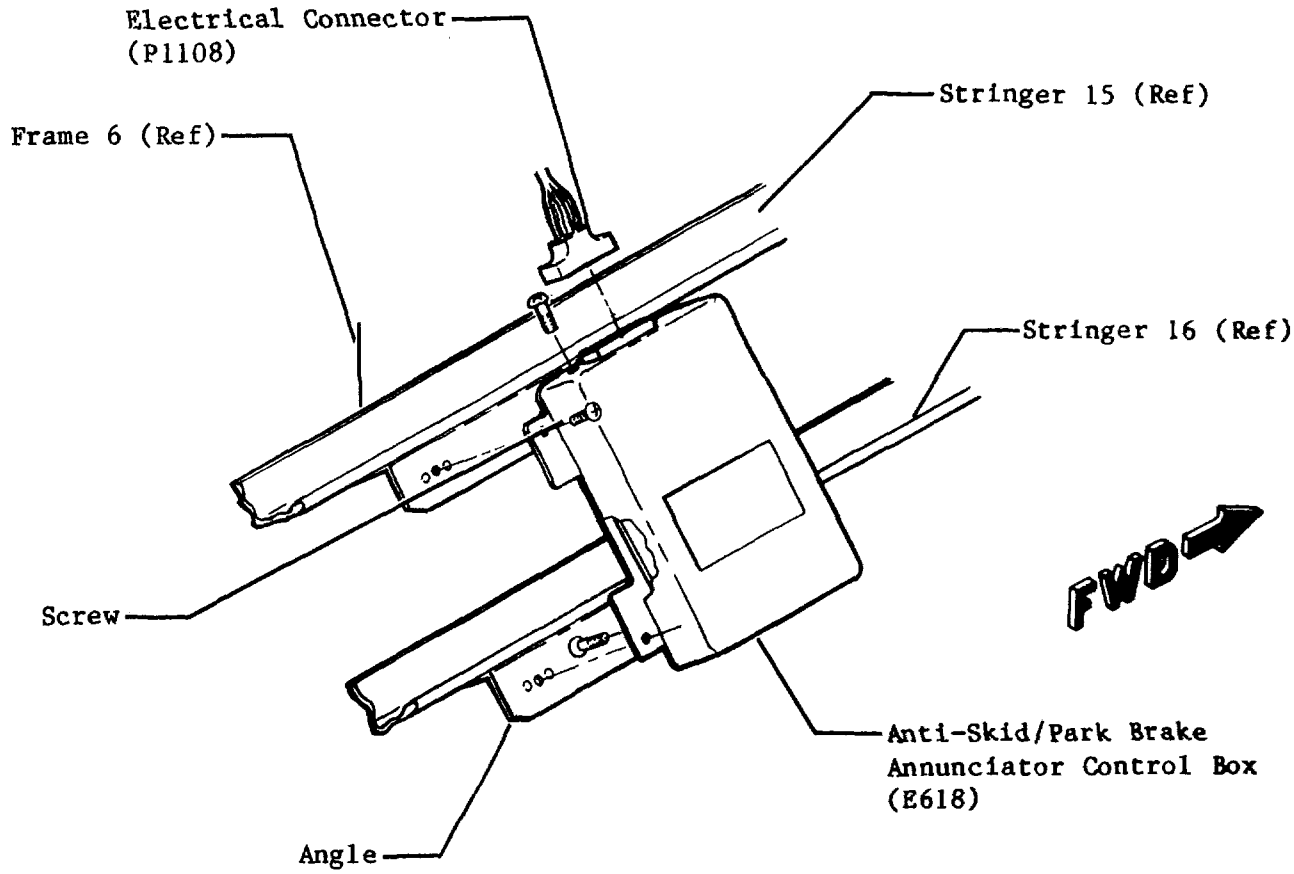
Anti-Skid Disconnect Switch Installation
Figure 201



Anti-Skid Disconnect Switch Rigging
Figure 202

ANTI-SKID/PARK BRAKE ANNUNCIATOR CONTROL BOX - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - A. ***Remove Anti-Skid/Park Brake Annunciator Control Box*** (See figure 201.)
     - (1) Remove electrical power from aircraft.
     - (2) Remove pilot's seat to gain access to control box installation.
     - (3) Disconnect electrical plug from control box.
     - (4) Remove attaching parts and control box from aircraft.
   - B. **Install Anti-Skid/Park Brake Annunciator Control Box** (See figure 201.)
     - (1) Position control box on angles and secure with attaching parts.
     - (2) Connect electrical connector to control box.
     - (3) Perform functional test of anti-skid system. Refer to Adjustment/ Test, 32-44-00.



Anti-Skid/Park Brake Annunciator Control Box
Figure 201

1. Removal/Installation

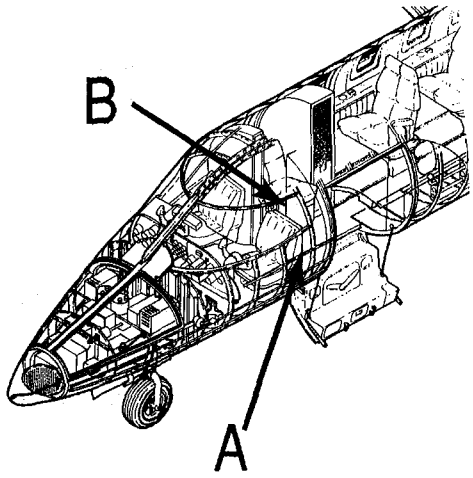
NOTE:
- *Effective 35-002 thru 35-033; 36-002 thru 36-016 Modified per AAK 76-4 "Reduced Approach Speed System," the anti-skid diode is mounted on PCB 139, Autopilot Flap Switch Interface, located on the LH forward side of frame 9 at stringer 15.*
- *Effective 35-034 thru 35-523; 36-017 thru 36-053, TB 530 is mounted on the RH aft side of frame 10, under the cabin floor.*
- *Effective 35-524 and Subsequent; 36-054 and Subsequent TB 530 is enclosed in a box located on the RH forward side of frame 11, under the cabin floor.*

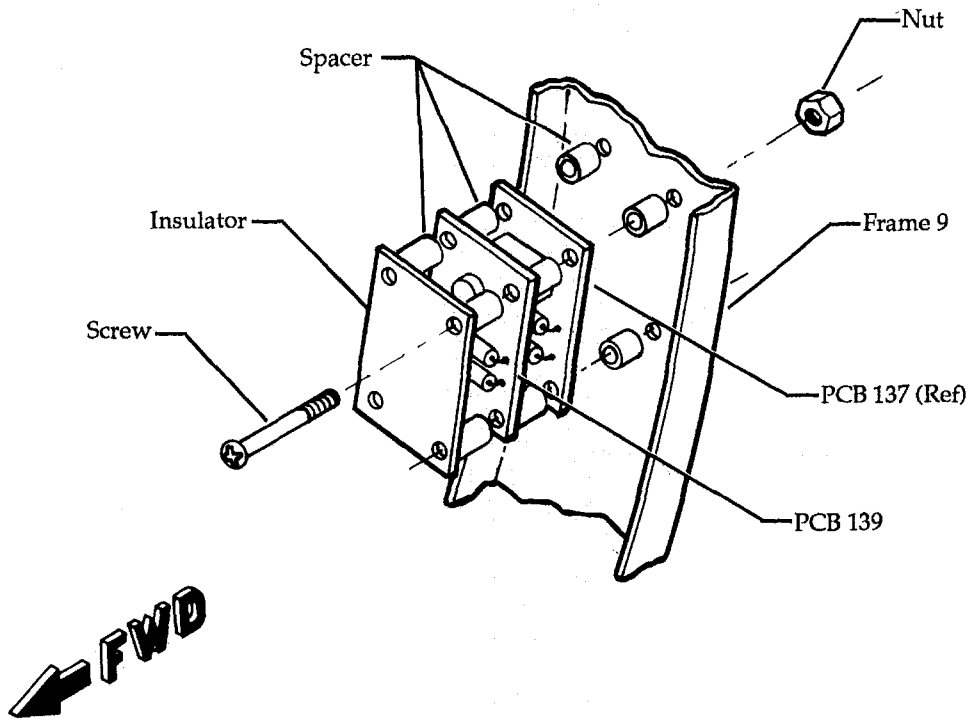
A. Remove Anti-Skid Diode (PCB 139). *(35-002 thru 35-033; 36-002 thru 36-016 Modified per AAK 76-4, "Reduced Approach Speed System".)* (See Figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Remove pilot's seat and map case to gain access to forward side of frame 9.
   (3) Identify and tag wires attached to PCB 139 and disconnect wires.
   (4) Remove nuts securing PCB 139 and insulator to frame 9.
   (5) Remove PCB 139 and attaching parts from aircraft.

B. Install Anti-Skid Diode (PCB 139). *(35-002 thru 35-033, 36-002 thru 36-016 Modified per AAK 76-4, "Reduced Approach Speed System".)* (See Figure 201.)
   (1) Connect wires to terminals of PCB 139.
   (2) Assemble PCB 137, PCB 139, spacers and insulator on forward side of frame 9 and secure with attaching hardware.
   (3) Check electrical resistance between wire terminal and aircraft structure. Resistance shall not be greater than value specified in Chapter 20 of the Wiring Manual.
   (4) Restore electrical power to aircraft.
   (5) Perform operational check of anti-skid system. (Refer to 32-44-00.)
   (6) Perform operational check of autopilot system. (Refer to Chapter 22.)
   (7) Install pilot's map case and seat.

C. Remove Anti-Skid Diode (TB 530). *(35-034 and Subsequent, 36-017 and Subsequent)* (See Figure 202.)
   (1) Remove electrical power from aircraft.
   (2) Remove equipment and furnishings as required to gain access to RH floorboards between frames 10 and 13.
   (3) Remove RH floorboards between frames 10 and 13 to access terminal board or box.
   (4) Remove nuts securing terminal board or box to aircraft.
   (5) Remove nuts securing TB 530 in box and using care not to lose insulator, remove TB 530 from box, if installed.
   (6) Identify and tag electrical wires attached to terminals of TB 530 and remove wires.
   (7) Remove TB 530 and attaching parts from aircraft.

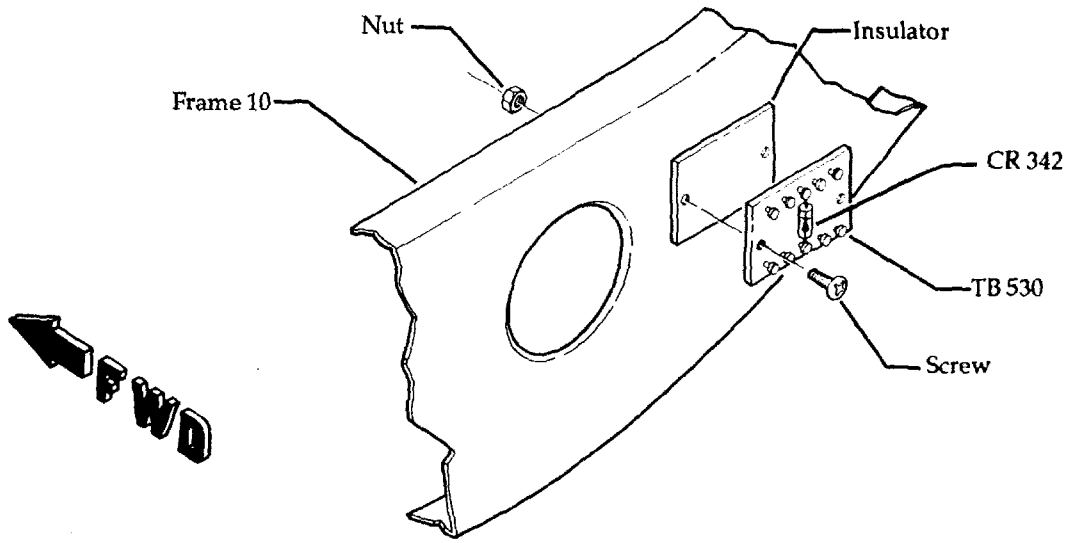
D. Install Anti-Skid Diode (TB 530). *(35-034 and Subsequent, 36-017 and Subsequent)* (See Figure 202.)
   (1) Attach wires to terminals of TB 530.
   (2) Install TB 530 and terminal board insulator into box, if installed, or onto frame and secure with attaching hardware.
   (3) Secure box to frame with attaching hardware.
   (4) Restore electrical power to aircraft.
   (5) Perform operational check of anti-skid system. (Refer to 32-44-00.)
   (6) Install RH floorboards and all removed equipment and furnishings.



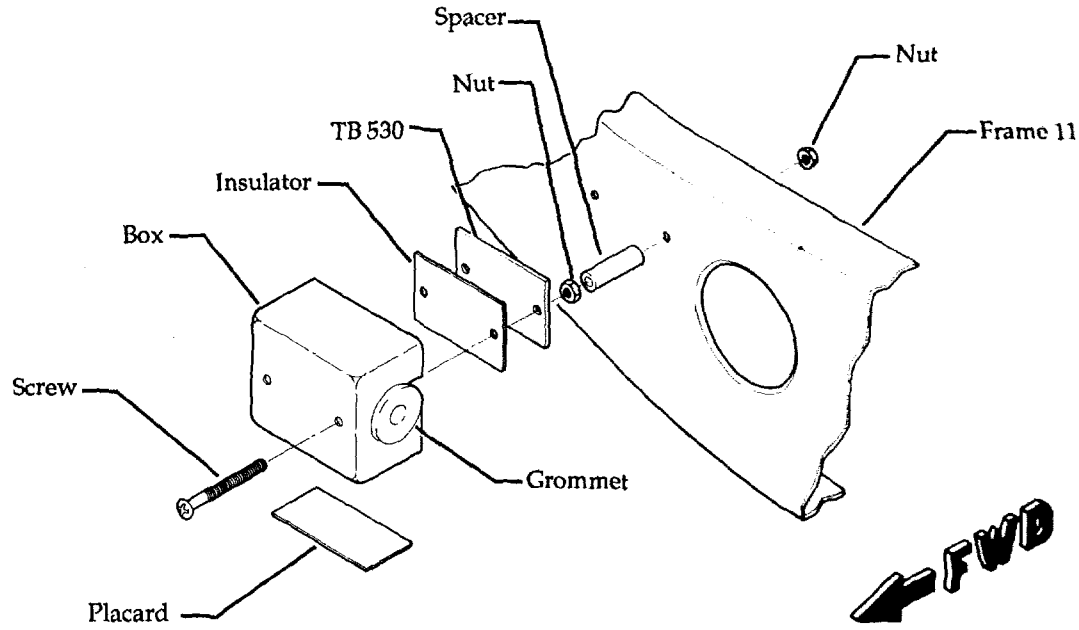


Detail A

Brake Anti-Skid Diode Installation
Figure 201



(35-034 thru 35-523; 36-017 thru 36-053)



(35-524 and Subsequent; 36-054 and Subsequent)

Detail B

Brake Anti-Skid Diode Installation
Figure 202

9-196A
9-196A-1

EMERGENCY AIR BRAKE SYSTEM - DESCRIPTION AND OPERATION

1. Description
   A The emergency air brake system consists of one (1) emergency brake control valve which is connected to a high-pressure emergency air bottle and to the hydraulic brake system at each of the four (4) shuttle valves.
   B. Component Description
      (1) The emergency brake control valve (32-45-02) is installed on the LH side of the pedestal and is manually operated to regulate emergency air pressure applied to the brake assemblies.
      (2) The shuttle valves (32-45-01) consist of two (2) inlet ports, one (1) outlet port, and a shuttle. When pressure is applied at one (1) of the inlet ports, the shuttle will block off the other inlet port and allow flow through the outlet port.

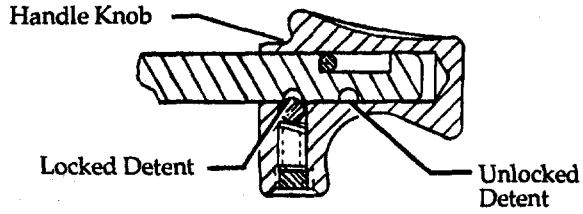
2. Operation
   A. To operate the emergency air brake system, the emergency brake control valve handle knob must first be pulled (away from quadrant) out of locked detent to unlocked detent. Lowering the emergency brake control valve handle admits high-pressure air to the hydraulic system shuttle valves. The shuttles seal off the hydraulic pressure side and admit high-pressure air through the open hydraulic line to apply brake pressure. Utilizing small movements of emergency brake handle, after braking action begins, will produce improved feel and reduce the probability of tire skid. When using emergency braking, anti-skid protection is not available. As the lever is raised, excess air pressure in the brake system is vented overboard while the valve closes against the emergency air pressure source. With the valve lever fully raised, push the knob forward (into quadrant) and into the locked detent.

      NOTE: To restore to normal operation, bleed the brakes (Refer to 32-43-00, Servicing, Hydraulic Brake System) and recharge the bottle with dry air or nitrogen when the indicated pressure falls below the green line on the gage.

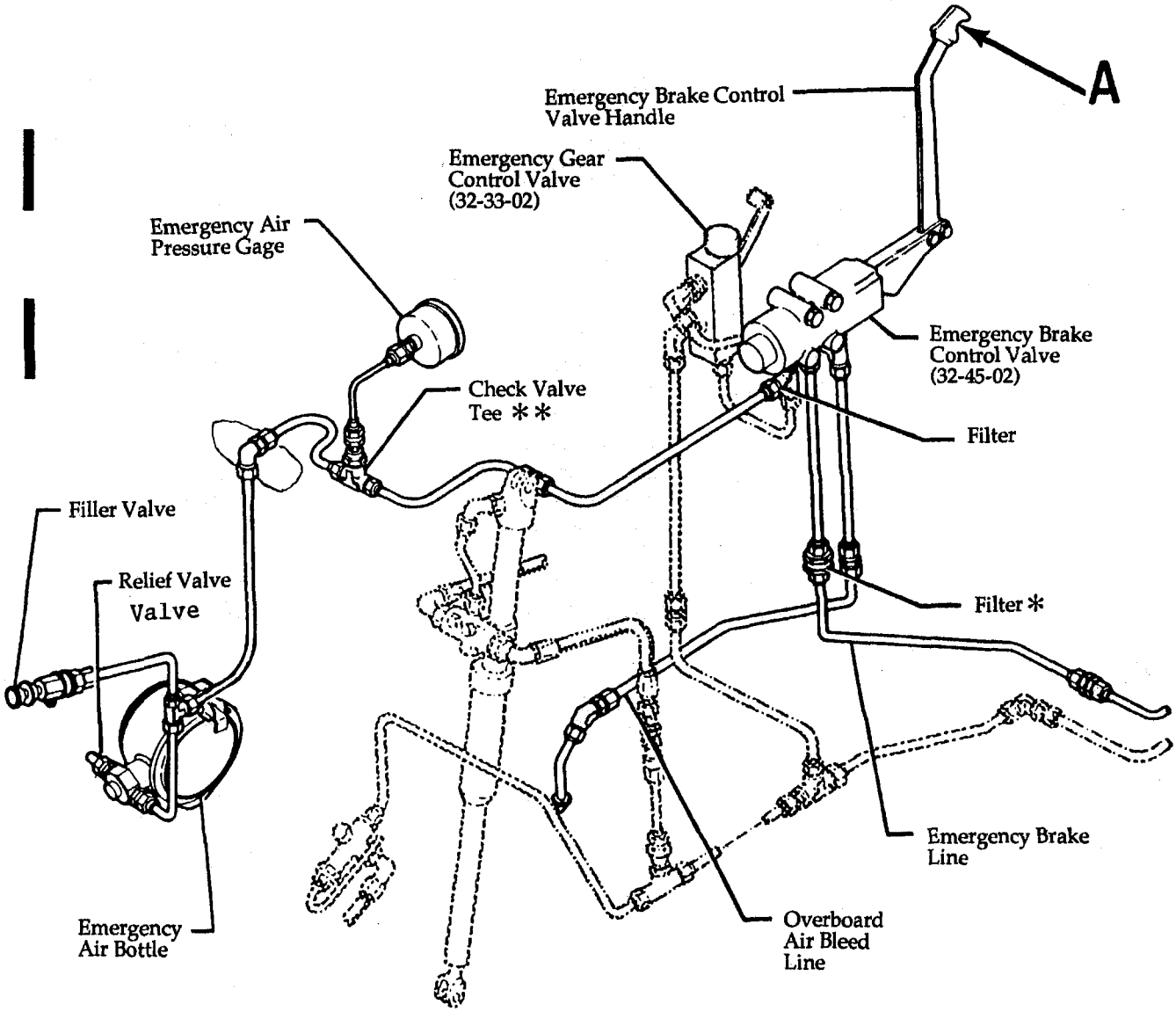
   B. One (1) emergency air filter is installed in the emergency air pressure tee at the emergency brake control valve. On *Aircraft 35-028, 35-034 and Subsequent and 36-018 and Subsequent*, a second filter is installed 11 inches below the control valve in the emergency air brake line. (Inspect filters in accordance with the current inspection interval specified in Chapter 5.)
   C. Shuttle valves isolate the hydraulic system from the emergency air system. During emergency brake application, air pressure exceeds hydraulic pressure and the shuttle in the valve repositions to admit air pressure to the brake assemblies. The shuttle valves will return to normal position when hydraulic pressure exceeds air pressure.

* *Effective Aircraft 35-028, 35-034 and Subsequent and 36-018 and Subsequent*

** *Effective Aircraft 35-231 and Subsequent and 36-045 and Subsequent*



Detail A



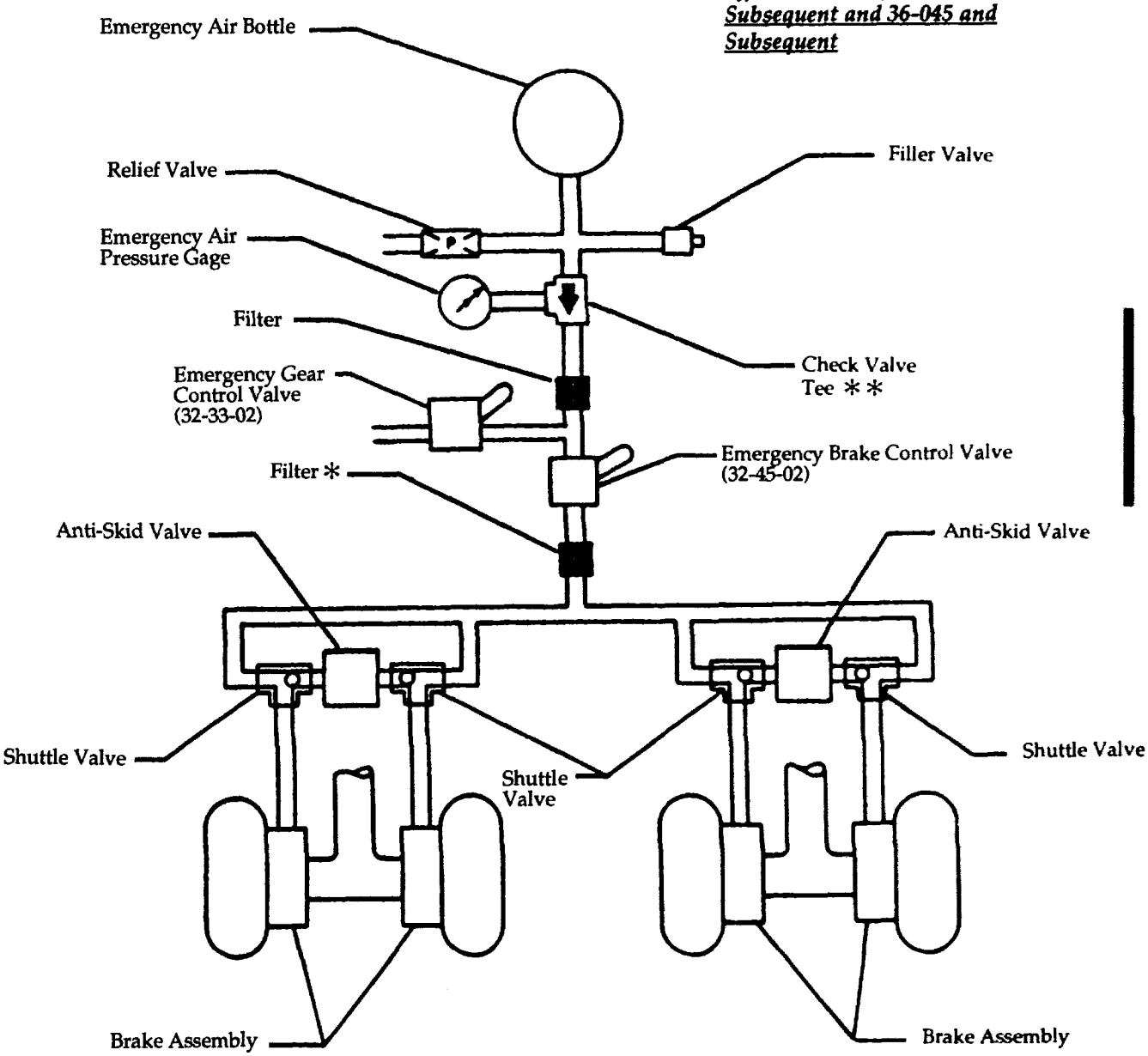
11-66C
11-89C

Emergency Air Brake System Components Locator
Figure 1

EFFECTIVITY: NOTED

* *Effective Aircraft 35-028, 35-034 and Subsequent and 36-018 and Subsequent*

** *Effective Aircraft 35-231 and Subsequent and 36-045 and Subsequent*



Emergency Air Brake System Schematic
Figure 2

EMERGENCY AIR BRAKE SYSTEM - MAINTENANCE PRACTICES

1. Servicing

A. Return System To Normal Operation

(1) Ensure that emergency brake control valve handle is up and knob is in locked position.
(2) Repair hydraulic brake system as required.
(3) Bleed hydraulic brake system. (Refer to 32-43-00.)
(4) Service hydraulic reservoir and emergency air bottle as required. (Refer to Chapter 12.)

2. Adjustment/Test

NOTE: Perform Check of Emergency Brake System for Leaks in accordance with the current inspection interval specified in Chapter 5.

Check of Emergency Brake System for Leaks may be performed concurrently with Check Emergency Extension System for Leaks. (Refer to 32-33-00, Adjustment/Test.)

A. Check of Emergency Brake System for Leaks

(1) Remove emergency air bottle filler cap, loosen valve end nut, and bleed pressure down to approximately 800 psi [5515.2 kPA]. This prevents repositioning of the brake system shuttle valves, introducing air into the hydraulic system and disturbing O-ring seal when emergency brake control valve is opened.
(2) Pressurize hydraulic system to 1500 psi [10,341 kPA] using a ground power cart.
(3) While system pressure is at 1500 psi [10,341 kPA], fully depress either pilot's or copilot's brake pedals and set parking brake. This assures adequate hydraulic pressure maintained to prevent repositioning of brake system shuttle valves by emergency air pressure.
(4) Place emergency brake valve lever in down position and secure in place.
(5) After emergency air pressure has stabilized, monitor emergency air pressure gage for a minimum of three (3) minutes for loss of air pressure.
(6) If loss of air pressure is not evident, bleed air pressure from system by returning emergency brake valve lever to its original position.
(7) Service emergency air bottle. (Refer to Chapter 12.)

3. Cleaning/Painting

NOTE: Clean emergency air filter in accordance with the current inspection interval specified in Chapter 5.

A. Clean Air Filter(s)

WARNING: DO NOT ATTEMPT TO REMOVE THE EMERGENCY AIR PRESSURE FILTER (LOCATED ON THE INPUT SIDE OF THE EMERGENCY BRAKE CONTROL VALVE) UNTIL EMERGENCY AIR BOTTLE HAS BEEN COMPLETELY DISCHARGED, OTHERWISE BODILY INJURY MAY RESULT.

(1) Discharge emergency air bottle. (Refer to Chapter 12.)
(2) Remove LH side panel from forward pedestal to gain access to filter(s).

CAUTION: NOTE THE POSITION OF THE DIRECTIONAL ARROW ON FILTER FITTING PRIOR TO REMOVAL SO FITTING CAN BE PROPERLY POSITIONED ON INSTALLATION.

(3) Remove filter(s) from air line, discard fitting seals (if installed), and plug open air line. Note directional arrow on filter fitting PRIOR TO REMOVAL to aid in installation.
(4) Backflush filter(s) with safety solvent until filter(s) element is clean.
(5) Blow dry filter element with clean, dry shop air.
(6) Remove plugs from air line, install new fitting (if required) seals, and noting directional arrow,
(7) Install forward pedestal panel on LH side of pedestal.
(8) Charge emergency air bottle. (Refer to Chapter 12.)

SHUTTLE VALVE - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Shuttle Valve
      (1) Depressurize hydraulic system. (Refer to Chapter 29.)
      (2) Ensure that emergency brake control valve handle is in off position.
      (3) Disconnect hydraulic and pneumatic lines at shuttle valve. Discard pneumatic line B-nut fitting seal.
      (4) Remove attaching parts and shuttle valve from aircraft.
   B. Install Shuttle Valve
      (1) Install shuttle valve into its original position and secure with its attaching hardware.
      (2) Connect hydraulic and pneumatic lines to their original fittings. Use a new fitting seal at pneumatic B-nut connection.
      (3) Pressurize hydraulic system. (Refer to Chapter 29.)
      (4) Bleed hydraulic system. (Refer to 32-43-00.)

2. **Adjustment/Test**
   A. Functional Test of Shuttle Valve
      (1) With outlet port capped and valve connected to a hydraulic test bench, apply a proof pressure of 2250 psi for 3 minutes to each inlet port. There shall be no signs of leakage.

EMERGENCY BRAKE CONTROL VALVE - MAINTENANCE PRACTICES

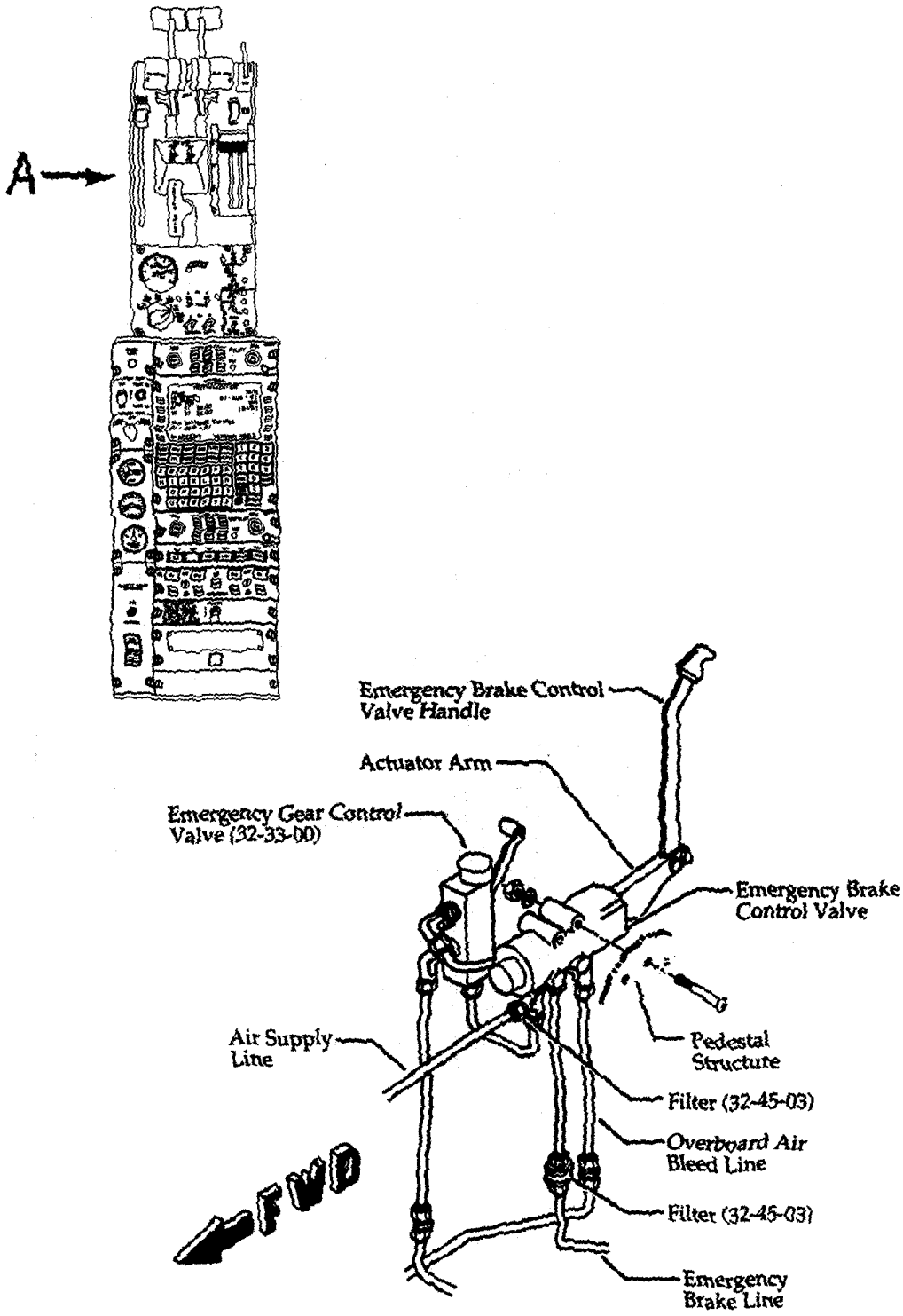
1. **Removal/Installation**
   A. Removal of Emergency Brake Control Valve (See Figure 201.)
      (1) Discharge air pressure from emergency air bottle. (Refer to Chapter 12.)
      (2) Remove left-hand side panel from pedestal.
      (3) Remove attaching parts securing emergency brake control lever to actuator arm of emergency brake control valve.
      (4) Disconnect and plug plumbing connections attached to control valve.
      (5) Remove attaching parts securing control valve to pedestal structure and remove valve from aircraft.
   B. Installation of Emergency Brake Control Valve (See Figure 201.)
      (1) Center control valve in slot using washers as required. Install the screws, washers and nuts securing the valve to the pedestal
      (2) Connect plumbing to control valve.
      (3) Install the emergency brake control lever on the valve lever and secure with bolt, washer, lockwasher and nut.
      (4) Recharge emergency air bottle. (Refer to Chapter 12.)
      (5) Check brake control valve for leaks. (Refer to 32-45-00, Adjustment/Test.)
      (6) Install left-hand side panel on pedestal.
   C. Removal of Emergency Brake Lever Knob (See Figure 201.)
      (1) Remove threaded plunger from bottom of knob; and retain plunger, spring, and ball which will be released.
      (2) Remove retaining pin from knob and slide knob from emergency brake control lever.
   D. Installation of Emergency Brake Lever Knob (See Figure 201.)
      (1) Slide knob onto emergency brake control lever and insert retaining pin.

      WARNING: AFTER INSTALLATION OF BALL, SPRING, AND PLUNGER, EMERGENCY BRAKE LEVER KNOB MUST BE CAPABLE OF BEING MOVED FROM ONE DETENT POSITION TO THE NEXT WITH 2 TO 4 POUNDS [1 to 1.8 KG] OF FORCE. DO NOT OVERTIGHTEN PLUNGER OR BALL MAY BECOME LOCKED INTO THE "LOCKED" DETENT AND PREVENT OPERATION OF EMERGENCY AIR BRAKE SYSTEM.

      (2) Install ball, spring, and plunger in knob.

      NOTE: Coat plunger threads with epoxy primer and install in knob wet.

      (3) Ensure that spring pressure is sufficient to maintain knob in either detent position while permitting disengagement at 2 to 4 pounds [1 to 1.8 kg] of force.



14-236A
11-113A

Detail A

Emergency Brake Control Valve *Installation*
Figure 201

STEERING - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The variable authority nose wheel steering system is operable only when the aircraft is on the ground and either the pilot's or copilot's Control Wheel Master Switch (MSW) is depressed or the STEER LOCK Switch is engaged.

B. Nose steering turn angle varies with ground speed. At ground speeds of approximately 45 knots, steering travel is approximately 8°. Steering travel tapers inversely with ground speed to a maximum of 50° when ground speed is less than 10 knots.

C. A momentary steering lock switch energizes the steering lock circuit which applies a continuous 28 vdc to energize the nose wheel steering computer. Depressing a Control Wheel Master Switch (MSW) automatically removes the steering lock from the circuit.

D. System components consist of an electrically powered steering actuator and position sensor (followup) mounted on top of the nose gear strut, a steering computer-amplifier mounted in the right side of the nose section, a position sensor (followup) mechanically connected to the rudder pedals, two steering relays located on the forward side of frame 2 on the right side, a master switch on each control wheel, and a STEER LOCK Switch located on the trim switch panel. The system also utilizes the left inboard, right outboard, and right inboard wheel speed transducers to provide an input signal to the computer-amplifier. The system also utilizes the squat switch relay panel to provide the rudder pedal position sensor with an excitation voltage.

E. System power is 28 vdc for the actuator servo motor and 115 vac for the steering computer-amplifier.

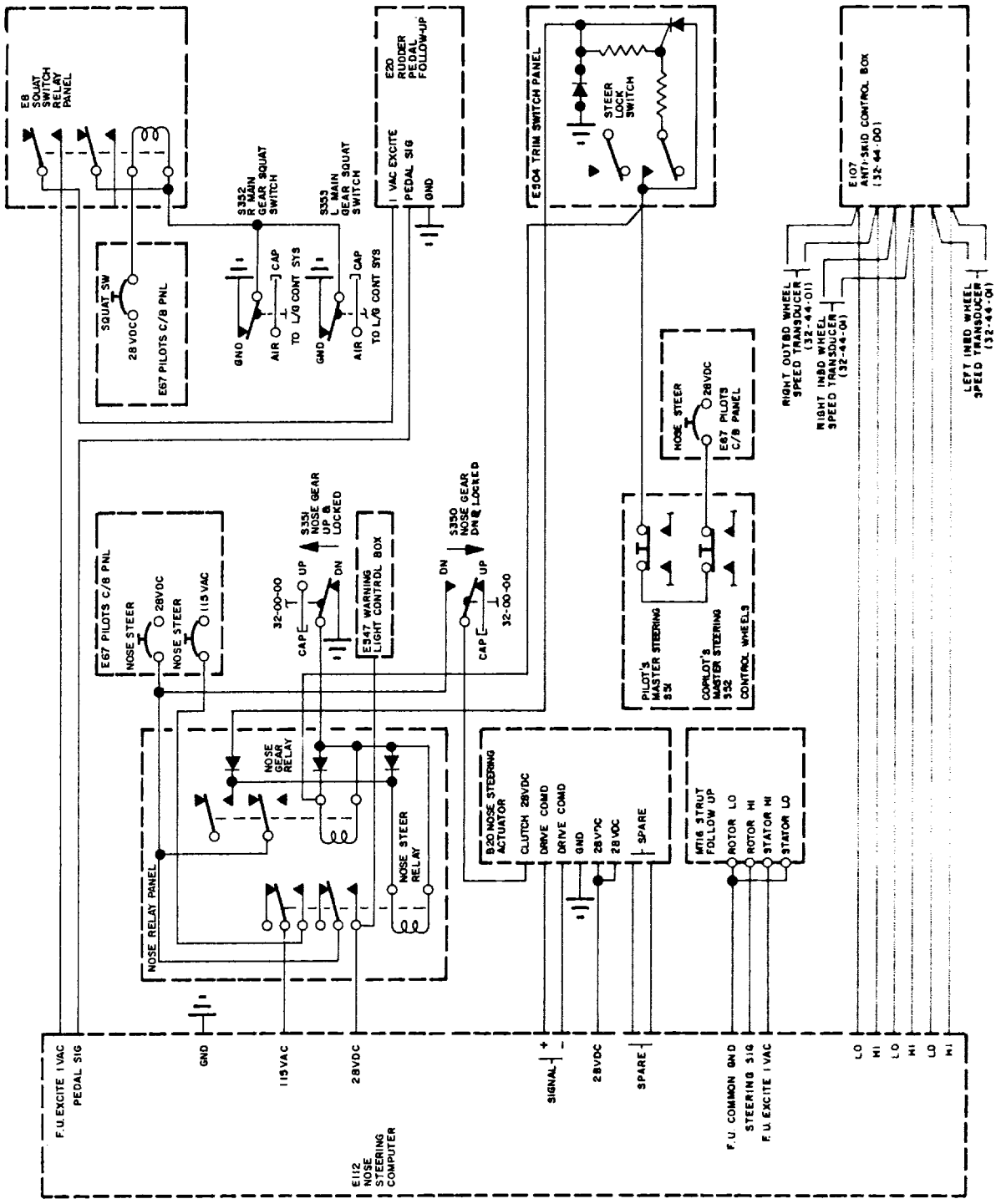
F. *On Aircraft 35-071 thru 35-133 and 36-018 thru 36-034 and Aircraft 35-054 thru 35-070 when modified by AMK 76-3, 35-002 thru 35-053 when equipped with Reduced Approach Speed System, and 36-002 thru 36-017 when equipped with Reduced Approach Speed System,* an interface adapter is installed electrically between the right hand outboard transducer, right hand inboard transducer, and left hand inboard transducer and the steering computer. The interface box is installed on the RH side of the nose wheel box at frame 3.

2. OPERATION (See figure 1)

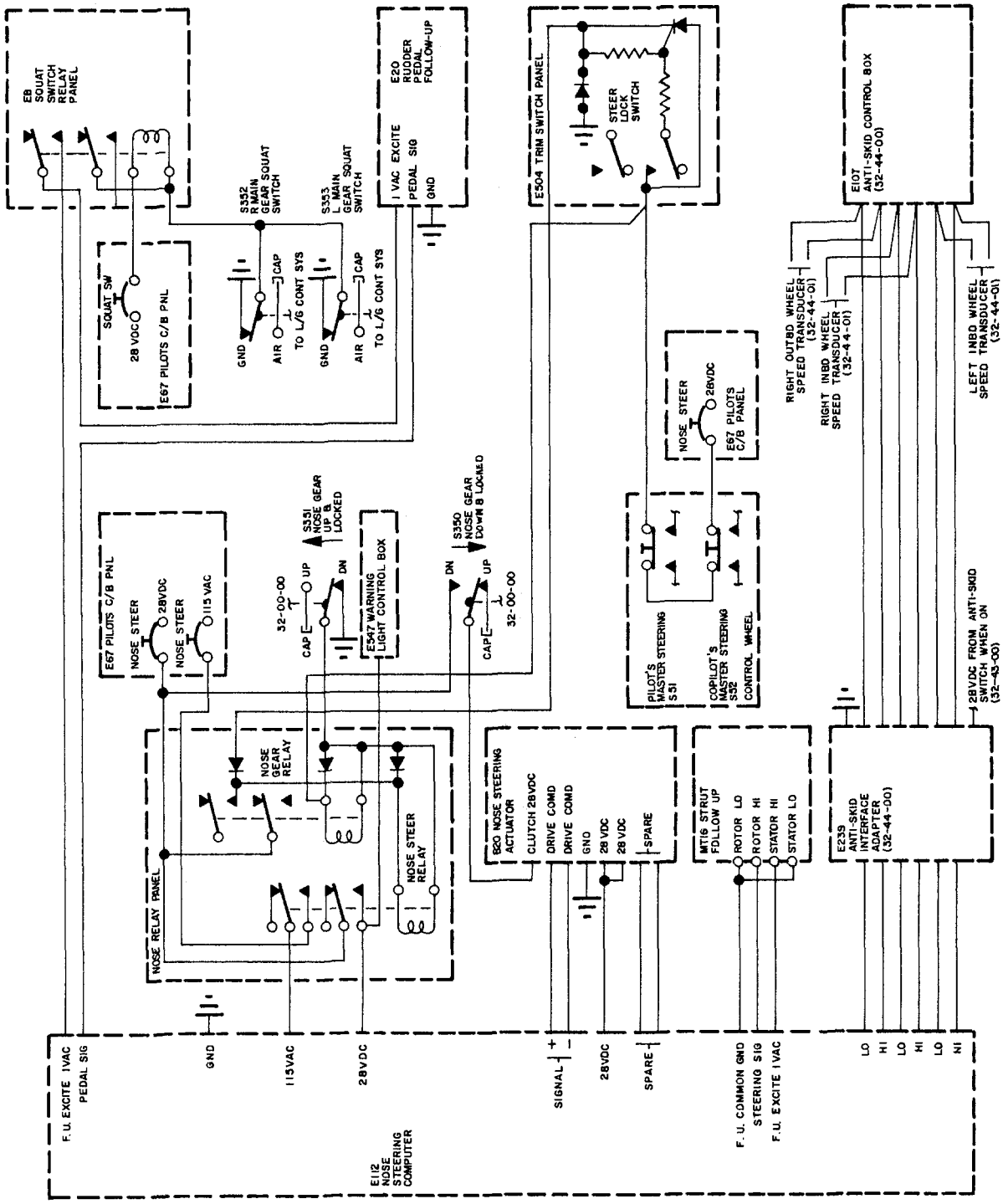
A. *On Aircraft 35-002 thru 35-133 and 36-002 thru 36-034*, a one (1) vac excitation voltage is applied to the rudder pedal position sensor (followup) when the aircraft is on the ground and the squat switch relay panel is energized. Rudder pedal movement drives the rudder pedal position sensor which applies a voltage displacement signal to the nose steering computer-amplifier. The computer-amplifier applies a clockwise or counterclockwise signal to the steering actuator. Signal application causes the actuator clutch to engage the actuator motor. The clutch output torque drives the actuator gear train and positions the nose wheel to the selected position. As the actuator starts to rotate, a position sensor (followup) on top of the nose steering gear box applies a feedback signal to the computer- amplifier. The input signals from the left inboard, right inboard, and right outboard transducers modifies the rudder pedal position sensor signal to accomplish the degree of deflection in the steering system. The nose steering position sensor signal cancels the rudder pedal position sensor signal when the nose gear reaches its selected position.

On Aircraft 35-071 thru 35-133 and 36-018 thru 36-034 and Aircraft 35-054 thru 35-070 when modified by AMK 76-3, 35-002 thru 35-053 when equipped with Reduced Approach Speed System, and 36-002 thru 36-017 when equipped with Reduced Approach Speed System, an interface adapter box is installed. This adapter is electrically connected between the outputs of the left inboard, right inboard, and right outboard transducers and the steering computer-amplifier. The adapter is used to modify the input signals when the anti-skid system is being utilized.

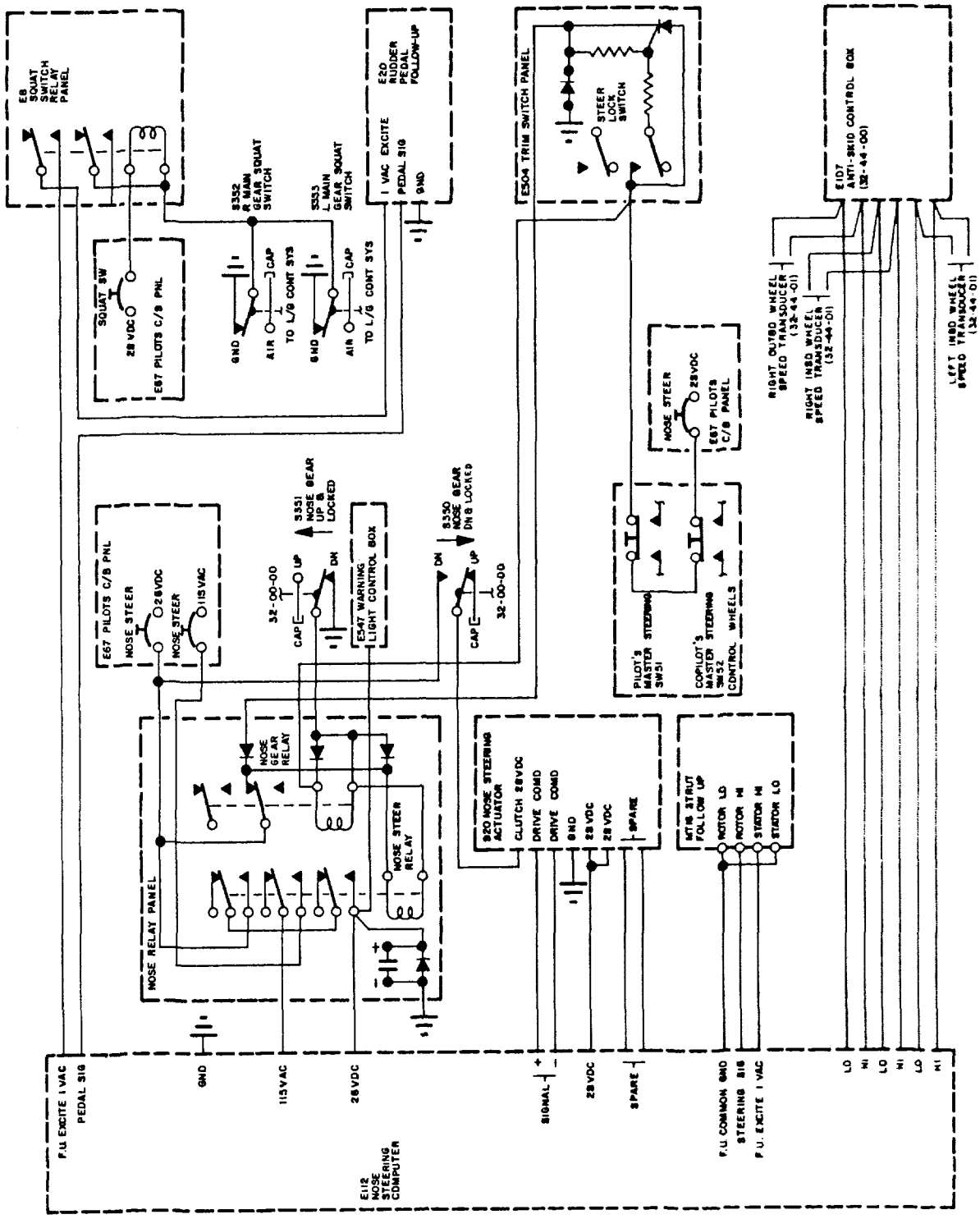
B. *On Aircraft 35-134 and Subsequent and 36-035 and Subsequent*, a one (1) vac excitation voltage is applied to the rudder pedal position sensor when the aircraft is on the ground and the squat switch relay panel is energized. Rudder pedal movement drives the rudder pedal position sensor which applies a voltage displacement signal to the nose steering computer-amplifier. The computer-amplifier applies a clockwise or counterclockwise signal to the steering actuator. The steering actuator clutch is engaged whenever the MLG is down and locked through switch S6. As the actuator starts to rotate, a position sensor on top of the nose steering gear box applies a feedback signal to the computer-amplifier. The input signals from the left inboard, right inboard, and right outboard wheel speed transducers are applied to circuits in the computer-amplifier. The input signals are compared and then used to modify the rudder pedal signal (increase or decrease steering displacement). The nose steering position sensor signal cancels the modified rudder pedal position sensor signal when the nose gear reaches its selected position.



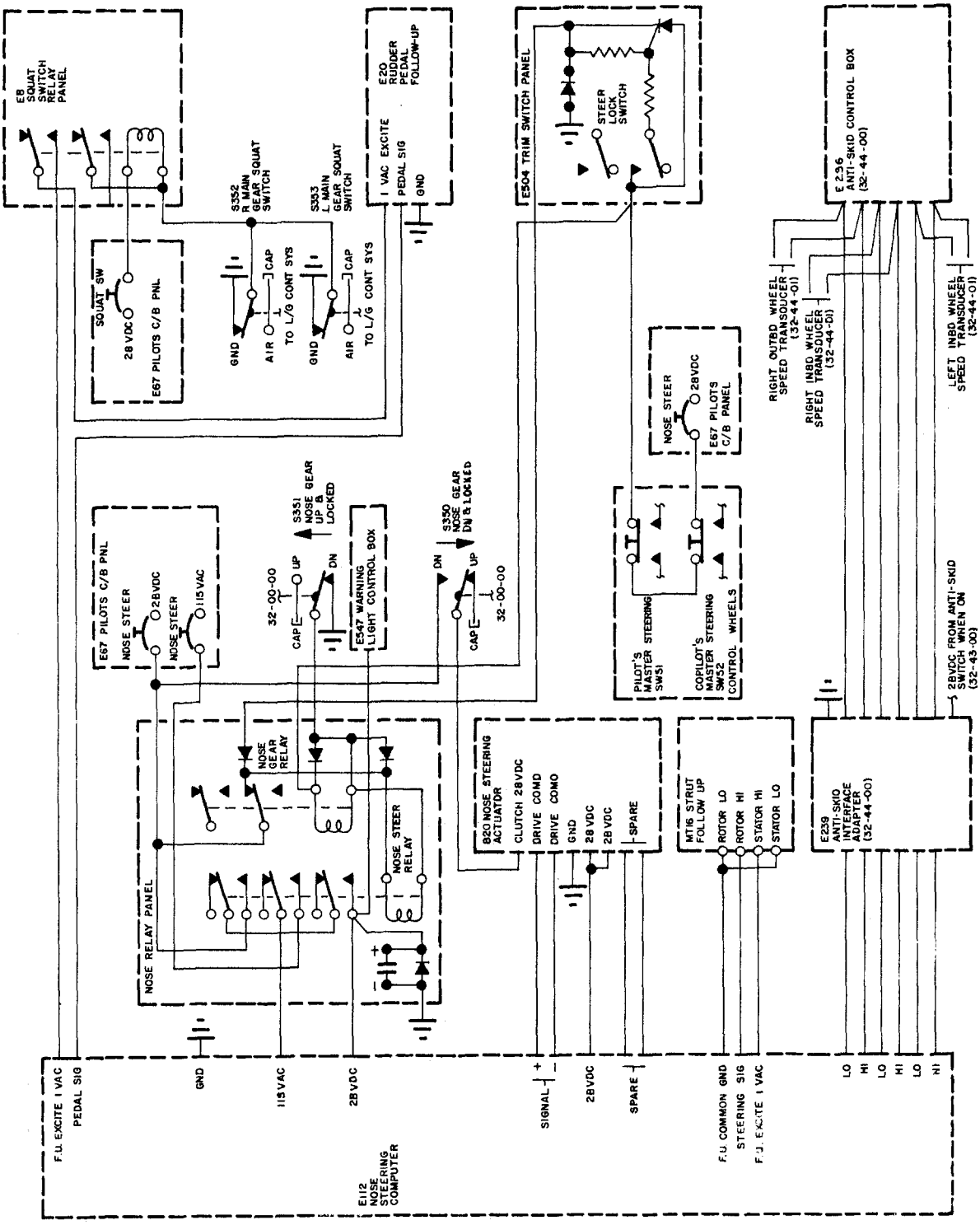
Nose Wheel Steering Electrical Control Schematic
Figure 1 (Sheet 1 of 6)



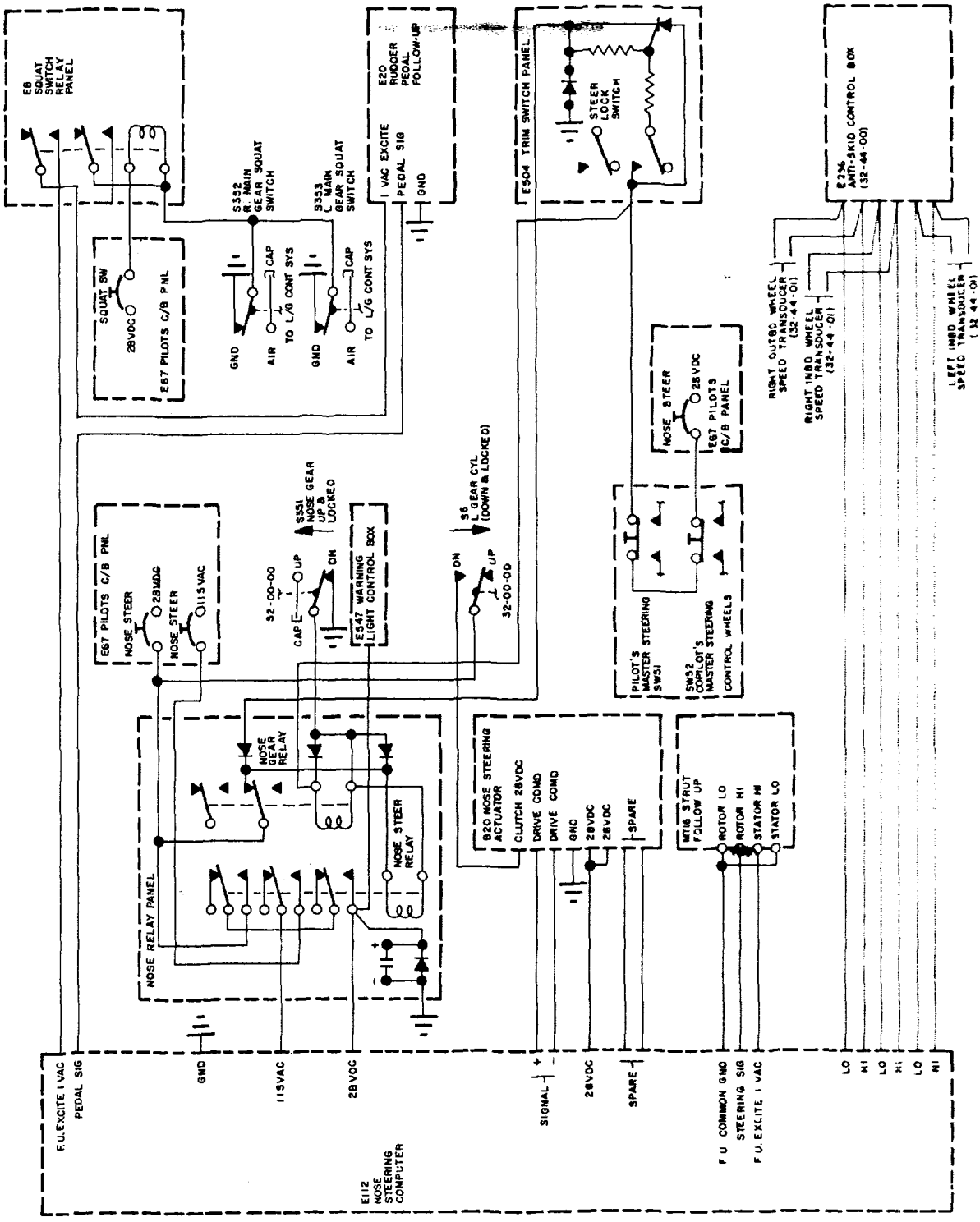
Nose Wheel Steering Electrical Control Schematic
Figure 1 (Sheet 2 of 6)



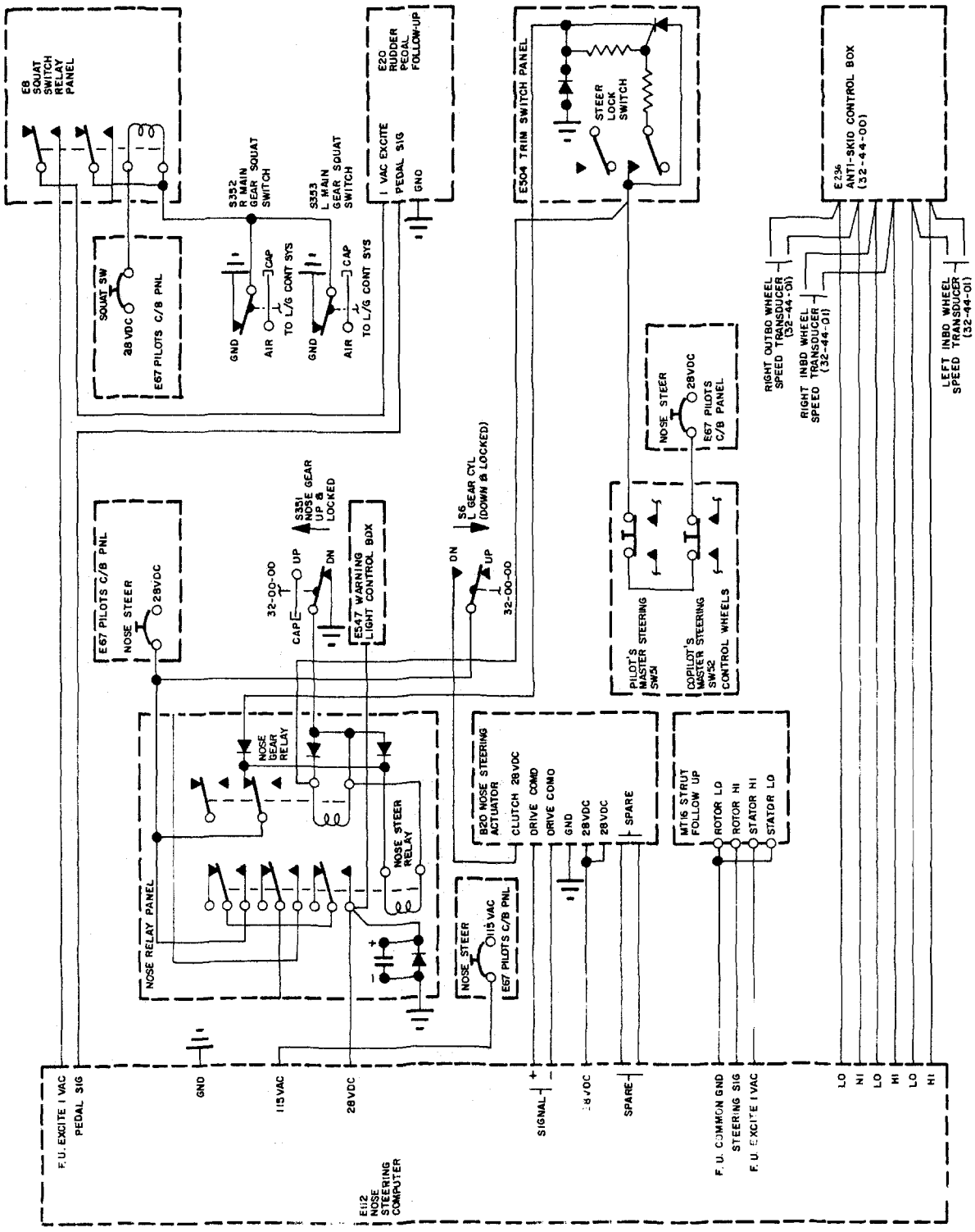
Nose Wheel Steering Electrical Control Schematic
Figure 1 (Sheet 3 of 6)



Nose Wheel Steering Electrical Control Schematic
Figure 1 (Sheet 4 of 6)



Nose Wheel Steering Electrical Control Schematic
Figure 1 (Sheet 5 of 6)



Nose Wheel Steering Electrical Control Schematic
Figure 1 (Sheet 6 of 6)

1. ADJUSTMENT/TEST
   A. Tools and Equipment

      NOTE: Equivalent substitutes may be used in lieu of the following.

NAME	PART NUMBER	MANUFACTURER	USE
Nose Wheel Protractor	2471001	Learjet Inc.	Measure deflection
Test Set	800585-01	LearAvia	To simulate aircraft ground speed for variable authority check
Jumper Cable	Fabricate		Connect nose gear to aircraft
6 ft. Electrical Wiring	Refer to Wiring Manual for type and size.	Commercially Available	Jumper Cable
Plug	PT06SE-14-12P	Bendix	Jumper Cable
Receptacle	PT00SE-14-12S	Bendix	Jumper Cable
Transducer Spin Adapter	2571003-1 or 2571004-1	Learjet Inc.	To adapt electric drill to transducer
Reversible Drill Motor (Capable of 1700 RPM)		Commercially Available	Simulate aircraft ground speed
Digital Multimeter	Mod 8000A-01	Fluke	Check voltages
Ground Power Unit			Provide electrical power
Rigging Pin	Fabricate from 3/16 rod		Center rudder pedals

   B. Rig Nose Wheel Steering System (See figure 201.) *(Aircraft 35-002 thru 35-133 and 36-002 thru 36-034 not modified per AAK 90-2, "Replacement of Variable Authority Nose Wheel Steering Components".)*
      (1) Place jack under nose of aircraft and remove nose gear shock strut. (Refer to 32-21-00.)
      (2) Place nose gear shock strut in stand. Stand must be high enough to allow clearance of wheel when strut is fully extended.

WARNING: ENSURE ALL AIR PRESSURE HAS BEEN RELEASED THROUGH AIR VALVE. DO NOT RELEASE AIR BY LOOSENING OR REMOVING AIR VALVE. FAILURE TO COMPLY CAN CAUSE BODILY INJURY.

(3) Remove cap from air valve and loosen valve end nut 3/4 of a turn to release air pressure.

NOTE: This releases the self-centering mechanism, allowing the steering actuator to turn the nose wheel left and right.

(4) After all air is released, close air valve.
(5) Fabricate a jumper cable to reconnect nose steering actuator and follow-up electrically with aircraft. Use same type and size wires as those which were disconnected, a Bendix P/N PT06SE-14-12P plug and a Bendix P/N PT00SE-14-12S receptacle. Wire lengths should be approximately six feet. Connect jumper cable between nose gear and aircraft.
(6) Ensure pedals are in neutral position and insert rigging pin by using one of the following methods:
(a) Rigging hole in floorboard.
1) Lift up corner of pilot's carpet next to center pedestal between frames 7 and 8 to expose bellcrank rigging hole in floorboard.

NOTE: If a wide center pedestal is installed, the LH side will cover the rigging hole. It will be necessary to remove or move the pedestal to gain access to the rigging hole; or use floorboard removal method, step 1.B.(6) (b).

2) Insert a 3/16 x 7 inch rigging pin down through floorboard hole, top bracket hole, bellcrank holes, and bottom bracket hole.

NOTE: If rigging pin does not engage hole in bottom bracket, bellcrank may move and pedals may not remain neutral when nulling pedal followup.

(b) Removal of floorboard.
1) Remove floorboard that is between and aft of copilot's rudder pedals. Insert rigging pin through rigging pin hole in rudder outboard bellcrank assembly. This will ensure that pedals are neutral when nulling pedal followup.
(7) Remove RH nose compartment door to gain access to nose wheel steering computer-amplifier. Using a small screwdriver, turn BAL potentiometer and FU potentiometer clockwise approximately ten complete turns.
(8) Actuate nose gear down lock switch by extending nose gear actuator as far as possible. Nose gear down lock switch must be actuated to apply 28 vdc to nose steering actuator clutch (P222, pin R).
(9) Ensure that squat switches are in ground mode. Squat switches must be in ground mode to apply 1 vac excitation to rudder pedal followup (P144, pin A).
(10) Set Battery, Primary Inverter, and Anti-Skid Switches on.
(11) Insert one lead of voltmeter into back connector P224, pin C and ground other voltmeter lead.
(12) Loosen rudder pedal followup retaining screws (located on frame 5 forward of copilot's rudder pedals) and adjust followup for a low voltage null (as close to zero as possible). (Refer to 32-50-03.) Retighten retaining screws and remove voltmeter lead from pin C.
(13) Insert one lead of voltmeter into back of connector P224, pin G and insert other voltmeter lead (Gnd) into back of connector P224, pin F.
(14) Remove safety wire from steering followup retaining screws (steering followup located on top of nose wheel steering actuator), loosen steering followup retaining screws, and adjust followup for a voltage null (as close to zero vac as possible). (Refer to 32-50-01.) Retighten and safety wire steering followup retaining screws and remove voltmeter leads from back of P224.
(15) Set Battery and Primary Inverter, and Anti-Skid Switches to off.

(16) Remove jumper cable.
(17) Install nose gear shock strut. (Refer to 32-21-00.)
(18) Place aircraft on nose wheel protractor and adjust so that, with nose gear centered, protractor is positioned at zero degrees.
(19) Set Battery, Primary Inverter, and Anti-Skid Switches on.
(20) Remove rigging pin from rudder bellcrank and, with rudder pedals centered, energize nose wheel steering system.
(21) Adjust FU potentiometer (on computer) until nose wheel total travel is 90° (±5°) with full left and full right rudder.
(22) Adjust BAL potentiometer (on computer) to obtain nose wheel travel of 45° (±5°) both left and right of center with full rudder pedal deflection.
(23) Disconnect P227 at computer-amplifier and connect test set (P/N 800585-01) between computer-amplifier and P227.
(24) Remove wheel speed transducer drive caps from left inboard, right inboard, and right outboard wheels.
(25) Set test switch to position 1. Attach spin adapter to drill motor and drive right outboard transducer at 1700 rpm.
(26) Energize steering switch on control wheel and fully depress right and then left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(27) Set test switch to position 2.
(28) Drive left inboard transducer at 1700 rpm.
(29) Energize steering switch and fully depress right and left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(30) Set test switch to position 3.
(31) Drive right inboard transducer at 1700 rpm.
(32) Energize steering switch and fully depress right and then left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(33) Repeat steps (24) thru (31) with Anti-Skid Switch set to off.

NOTE: When Anti-Skid Switch is set to off, nose wheel may momentarily deflect slightly either right or left; then return to center.

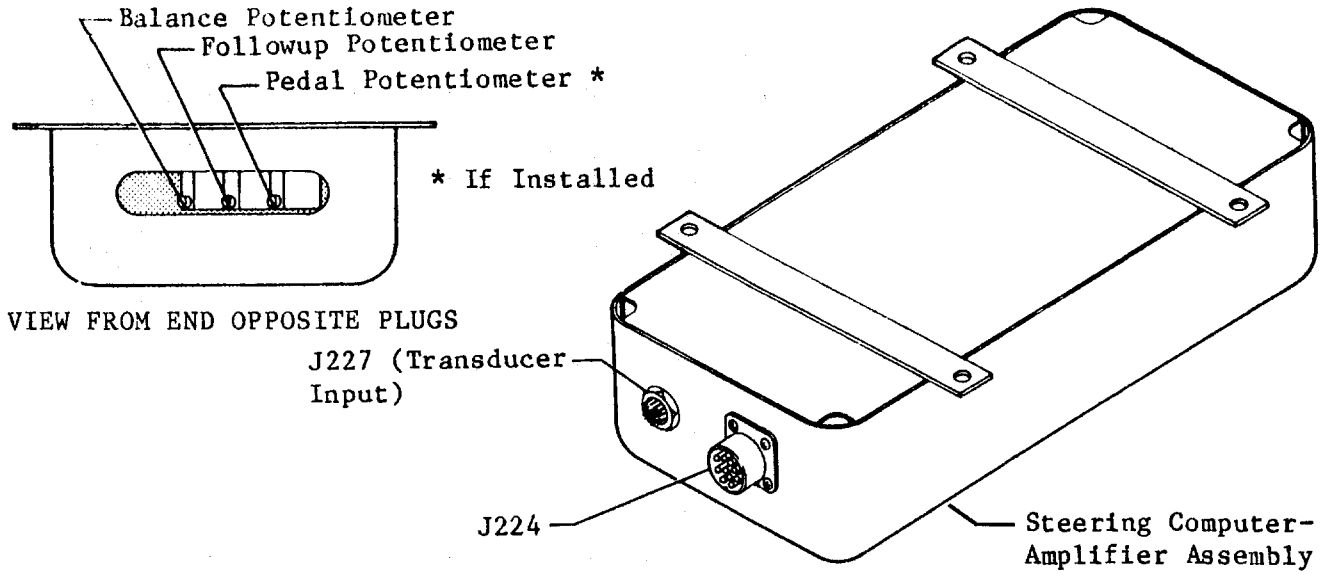
(34) Set Battery and Primary Inverter Switches to off.
(35) Disconnect test set and connect P227 to computer-amplifier.
(36) Remove aircraft from nose wheel protractor.
(37) Service nose gear strut. (Refer to Chapter 12.)
(38) Install wheel speed transducer drive caps.
(39) Install floorboard aft of rudder pedals, if removed, and RH nose compartment access door.

C. Rig Nose Wheel Steering System (See figure 201.) *(Aircraft 35-134 and Subsequent and 36-035 and Subsequent; and prior Aircraft modified per AAK 90-2, "Replacement of Variable Authority Nose Wheel Steering Components".)*
(1) Place jack under nose of aircraft and remove nose gear shock strut. (Refer to 32-21-00.)
(2) Place nose gear shock strut in a stand. Stand must be high enough to allow clearance of wheel when strut is fully extended.

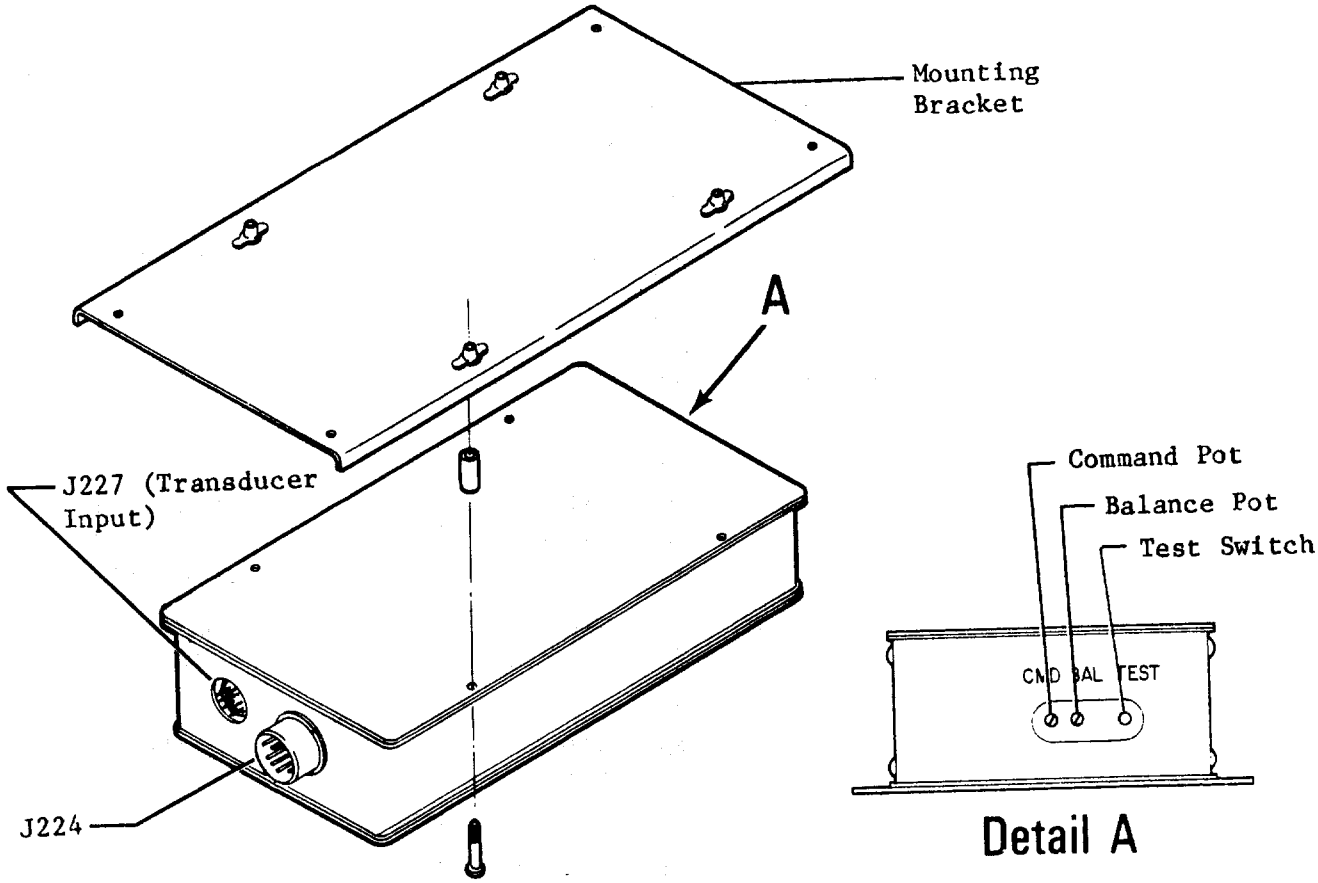
WARNING: ENSURE ALL AIR PRESSURE HAS BEEN RELEASED THROUGH AIR VALVE. DO NOT RELEASE AIR BY LOOSENING OR REMOVING AIR VALVE. FAILURE TO COMPLY CAN CAUSE BODILY INJURY.

(3) Remove cap from air valve and loosen valve end nut 3/4 of a turn to release air pressure.

NOTE: This releases the self-centering mechanism, allowing the steering actuator to turn the nose wheel left and right.



(Aircraft 35-002 thru 35-133 and 36-002 thru 36-034 not modified per AAK 90-2, "Replacement of Variable Authority Nose Wheel Steering Components".)



(Aircraft 35-134 and Subsequent and 36-035 and Subsequent; and prior Aircraft modified per AAK 90-2, "Replacement of Variable Authority Nose Wheel Steering Components".)

Rigging Nose Wheel Steering System
Figure 201

(4) After all air is released, close air valve.
(5) A jumper cable must be fabricated to reconnect nose steering actuator and followup electrically with aircraft. Use same type and size wires as those which were disconnected, a Bendix PT06SE-14-12P plug, and a Bendix P/N PT00SE-14-12S receptacle. Wire lengths should be approximately six feet. Connect jumper cable between nose gear and aircraft.
(6) Ensure pedals are in neutral position and insert rigging pin by using one of the following methods:
  (a) Rigging hole in floorboard.
    1) Lift up corner of pilot's carpet next to center pedestal between frames 7 and 8 to expose bellcrank rigging hole in floorboard.

      NOTE: If a wide center pedestal is installed, the LH side will cover the rigging hole. It will be necessary to remove or move pedestal to gain access to the rigging hole; or use floorboard removal method, step 1.C.(6) (b).

    2) Insert a 3/16 x 7 inch rigging pin down through floorboard hole, top bracket hole, bellcrank holes, and bottom bracket hole.

      NOTE: If rigging pin does not engage hole in bottom bracket, bellcrank may move and pedals may not remain neutral when nulling pedal followup.

  (b) Removal of floorboard.
    1) Remove floorboard that is between and aft of copilot's rudder pedals. Insert rigging pin through rigging pin hole in rudder outboard bellcrank assembly. This will ensure that pedals are neutral when nulling pedal followup.
(7) Remove RH nose compartment door to gain access to nose wheel steering computer-amplifier. CMD potentiometer and BAL potentiometer are located beneath a cover on end of computer.
(8) Verify that left MLG down lock switch S6 is actuated. Left MLG down lock switch must be actuated to apply 28 vdc to nose steering actuator clutch (P222, pin R).
(9) Ensure that squat switches are in ground mode. Squat switches must be in ground mode to apply 1 vac excitation to rudder pedal followup (P144, pin A).
(10) Set Battery and Primary Inverter and Anti-Skid Switches on.
(11) Insert one lead of voltmeter into back of connector P224, pin C and other lead to ground.
(12) Loosen rudder pedal followup retaining ring screws and adjust followup for a low voltage null (as close to zero vac as possible). Tighten retaining ring screws. Followup is located on frame 5 forward of copilot's rudder pedals. (Refer to 32-50-03.)
(13) Remove voltmeter from connector P224.
(14) Insert one lead of voltmeter into back of connector P224, pin G and other lead into P224, pin F.
(15) Remove safety wire from steering followup retaining ring screws. Loosen retaining ring screws. Adjust followup for a voltage null (as close to zero vac as possible). Tighten retaining ring screws and safety wire. (Refer to 32-50-01.) Remove voltmeter from connector P224.
(16) Set Battery, Inverter and Anti-Skid Switches to OFF.
(17) Remove jumper cable.
(18) Install nose gear shock strut. (Refer to 32-21-00.)
(19) Place aircraft on nose wheel protractor and adjust so that with nose gear centered, protractor is positioned at zero degrees.
(20) Set Battery, Inverter and Anti-Skid Switches on.
(21) Remove rigging pin from rudder bellcrank and, with rudder pedals centered, energize nose wheel steering system.
(22) Adjust CMD potentiometer for 90° (±5°) total nose wheel travel with full left to full right rudder applied.
(23) Adjust BAL potentiometer to obtain nose wheel deflection of 45° (±5°) both right and left of center.

(24) Remove wheel speed transducers drive caps from left inboard, right inboard, and right outboard wheels.
(25) Attach spin adapter to drill motor and spin right outboard transducer at 1700 rpm.
(26) Energize steering switch on control wheel and fully depress right and then left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(27) Spin right inboard transducer at 1700 rpm.
(28) Energize steering switch and fully depress right and then left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(29) Spin left inboard transducer at 1700 rpm. Energize steering switch and fully depress right and then left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(30) Repeat steps (24) thru (28) with Anti-Skid Switch set to off.

NOTE: When Anti-Skid Switch is set to off, nose wheel may momentarily deflect slightly either right or left; then return to center.

(31) Check steering computer test feature. (Refer to step E. (14).)
(32) Center rudder and set squat switches in flight mode. Check that nose wheel remains centered when rudder pedals are moved full left and full right.
(33) Set Battery and Primary Inverter Switches to off.
(34) Remove aircraft from nose wheel protractor.
(35) Service nose gear strut. (Refer to Chapter 12.)
(36) Install wheel speed transducer drive caps.
(37) Secure steering computer potentiometer protective cover.
(38) Install nose compartment access doors.
(39) Install floorboards aft of rudder pedals, if removed.

D. Functional Test of Nose Wheel Steering System *(Aircraft 35-002 thru 35-133 and 36-002 thru 36-034 not modified per AAK 90-2, "Replacement of Variable Authority Nose Wheel Steering Components".)*

NOTE:
- The following items shall be completely installed, checked and rigged: Nose strut (including servo, gear box, and position sensors) and rudder control system (including rudder stops and pedal mechanism).
- Ensure that nose jack has removed sufficient weight from nose wheel.
- If too much weight remains on nose wheel, high torque levels (created by a responding nose steering actuator) will make steering system appear sloppy or sluggish.
- If too little weight remains on nose wheel, positioned nose wheel protractor (P/N 2471001-1) will slip over floor surface and not perform accurately.
- It is recommended that the strut be depressurized, refer to steps 1. B. (3) and (4), and nose jack be used to provide approximately 0.25 inch of strut extension. This will avoid nose wheel loading, strut centering cam interference and scoring of strut piston.

(1) Place nose jack under nose of aircraft. Raise nose wheel sufficient to slide nose wheel protractor under nose wheel.
(2) Lower nose jack so that nose wheel sets in wheel channel on nose wheel protractor.
(3) Adjust nose wheel protractor to zero degrees with nose wheel centered.
(4) Disconnect P227 at computer-amplifier and connect test set (P/N 800585-01) between computer-amplifier and P227.
(5) Connect external electrical power to aircraft.
(6) Set Battery, Primary Inverter and Anti-Skid Switches on.

(7) Remove wheel speed transducer drive caps from left inboard, right inboard, and right outboard wheels.
(8) Set test switch to position 1. Attach spin adapter to drill motor and drive right outboard transducer at 1700 rpm.
(9) Energize steering switch on control wheel and fully depress right and then left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(10) Set test switch to position 2.
(11) Drive left inboard transducer at 1700 rpm.
(12) Energize steering switch and fully depress right and left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(13) Set test switch to position 3.
(14) Drive right inboard transducer at 1700 rpm.
(15) Energize steering switch and fully depress right and then left rudder pedals. Nose wheel deflection shall be 8° (±2°) in both directions.
(16) Repeat steps (8) thru (15) with Anti-Skid Switch set off.

NOTE: When Anti-Skid Switch is set off:
(a) Anti-Skid Lights shall all illuminate without perceptible delay.
(b) Nose wheel will have a momentary side-kick of up to 10° and then return to initial position.

(17) With rudder pedals centered, position squat switches to flight mode.
(18) Depress and hold Control Wheel Master Switch and depress rudder pedals left and right. Note that nose wheel does not deflect. Release Control Wheel Master Switch.

NOTE: If nose wheel steering system fails functional test, system shall be rerigged and adjusted per paragraph 1.B.

(19) Set Battery and Primary Inverter Switches off and disconnect external electrical power from aircraft.
(20) Disconnect test set and connect P227 to computer-amplifier.
(21) Return squat switches to ground mode and install wheel speed transducer drive caps.
(22) Remove nose wheel protractor and nose jack.
(23) Service nose gear strut. (Refer to Chapter 12.)
(24) Restore aircraft to normal.

E. Functional Test of Nose Wheel Steering System *Aircraft 35-134 and Subsequent and 36-035 and Subsequent; and prior Aircraft modified per AAK 90-2, "Replacement of Variable Authority Nose Wheel Steering Components".)*

NOTE:
- The following items shall be completely installed, checked and rigged: Nose strut (including servo, gear box, and position sensors) and rudder control system (including rudder stops and pedal mechanism).
- Ensure that nose jack has removed sufficient weight from nose wheel.
- If too much weight remains on nose wheel, high torque levels (created by a responding nose steering actuator) will make steering system appear sloppy or sluggish.

- If too little weight remains on nose wheel, positioned nose wheel protractor (P/N 2471001-1) will slip over floor surface and not perform accurately.

- It is recommended that the strut be depressurized, refer to steps 1. C. (3) and (4), and nose jack be used to provide approximately 0.25 inch of strut extension. This will avoid nose wheel loading, strut centering cam interference and scoring of strut piston.

(1) Place nose jack under nose of aircraft. Raise nose wheel sufficient to slide nose wheel protractor under nose wheel.
(2) Lower nose jack so that nose wheel sets in wheel channel on nose wheel protractor.
(3) Adjust nose wheel protractor to zero degrees with nose wheel centered.
(4) Connect external electrical power to aircraft.
(5) Set Battery, Primary Inverter and Anti-Skid Switches on.
(6) Remove wheel speed transducer drive caps from left inboard, right inboard, and right outboard wheels.
(7) Attach transducer spin adapter to electric drill and spin right outboard transducer at 1700 rpm.
(8) Fully depress rudder pedals right then left. Nose wheel deflection shall not exceed 8° (±2°).
(9) Attach transducer spin adapter to right inboard transducer and spin at 1700 rpm.
(10) Fully depress rudder pedals right then left. Nose wheel deflection shall not exceed 8°(±2°).
(11) Spin left inboard transducer at 1700 rpm.
(12) Fully depress rudder pedals right then left. Nose wheel deflection shall not exceed 8°(±2°).
(13) Repeat steps (7) thru (12) with Anti-Skid Switch set off.

NOTE: When Anti-Skid Switch is set off:
(a) Anti-Skid Lights shall all illuminate without perceptible delay.
(b) Nose wheel will have a momentary side-kick of up to 10° and then return to initial position.

(14) Check nose steering computer test feature as follows:
(a) Fully depress rudder pedal right. Depress and hold Control Wheel Master Switch. Nose wheel shall deflect 45° (±5°) right. When Test Switch on computer is depressed, nose wheel shall return to 8° (±2°) right.
(b) Release Test Switch and Control Wheel Master Switch.
(c) Fully depress rudder pedal left. Depress and hold Control Wheel Master Switch. Nose wheel will deflect 45° (±5°) left. When Test Switch is depressed, nose wheel shall return to 8° (±2°) left.
(d) Release Test Switch and Control Wheel Master Switch.
(15) With rudder pedals centered, position squat switches to flight mode.
(16) Depress and hold Control Wheel Master Switch and depress rudder pedals left and right. Note that nose wheel does not deflect. Release Control Wheel Master Switch.

NOTE: If nose wheel steering system fails functional test, system shall be rerigged and adjusted per paragraph 1.C.

(17) Set Battery and Primary Inverter Switches off and disconnect external electrical power from aircraft.
(18) Return squat switches to ground mode and install wheel speed transducer drive caps.
(19) Remove nose wheel protractor and nose jack.
(20) Service nose gear strut. (Refer to Chapter 12.)
(21) Restore aircraft to normal.

STEERING POSITION SENSOR (FOLLOWUP) - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Steering Position Sensor (Followup) (See figure 201.)

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Remove nose gear shock strut. (Refer to 32-21-00.)
(3) Place nose gear shock strut in a stand. Stand must be high enough to allow clearance of wheel when strut is fully extended.
(4) Ensure that nose gear shock strut is fully extended.

WARNING: BEFORE PERFORMING ANY DISASSEMBLY OF PARTS ON STRUT, ENSURE THAT ALL AIR PRESSURE HAS BEEN RELEASED THROUGH AIR VALVE. FAILURE TO DO SO CAN CAUSE BODILY INJURY OR DAMAGE TO THE GEARBOX. DO NOT RELEASE AIR BY LOOSENING OR REMOVING AIR VALVE.

(5) Remove cap from air valve and loosen valve end nut 3/4 of a turn to release air pressure.
(6) After all air is released, close air valve.
(7) Remove safety wire from gearbox lid attachment screws.

CAUTION: USE EXTREME CARE TO PREVENT DAMAGE TO GEARBOX LID OR CASE WHEN REMOVING LID FROM CASE. BOTH LID AND CASE HAVE MACHINED SURFACES AND ANY DAMAGE MAY CAUSE AN OIL LEAK.

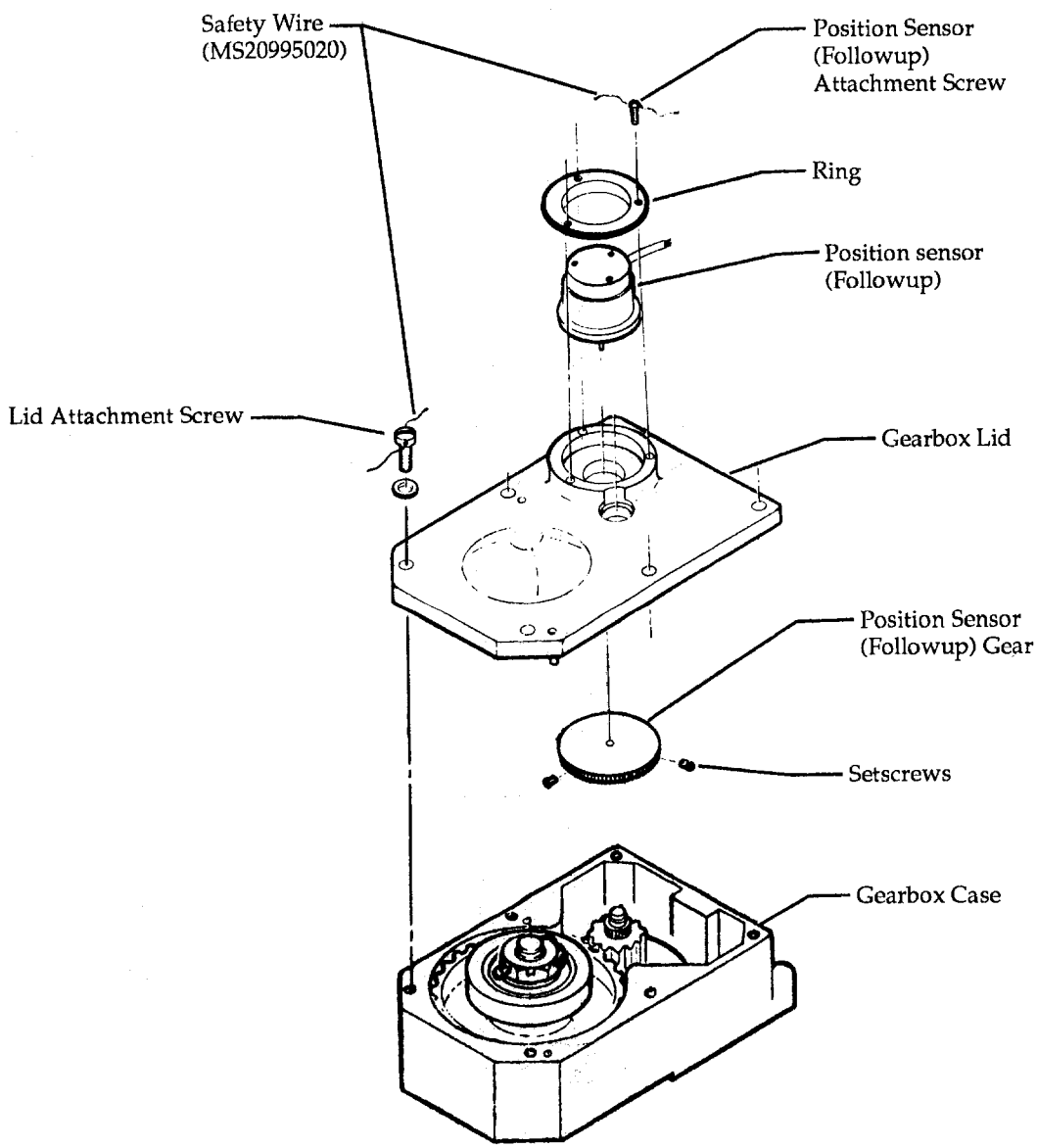
(8) Remove attaching parts and remove gearbox lid from gearbox case.
(9) Loosen setscrews and remove position sensor (followup) gear from position sensor (followup) shaft.
(10) Remove safety wire from position sensor attachment screws.
(11) Remove position sensor attachment screw, ring, and position sensor from lid.

B. Install Steering Position Sensor (Followup) (See figure 201.)

(1) Install position sensor and ring on gearbox lid and secure finger tight with attachment screws.
(2) Apply retaining compound Loctite 680 to position sensor gear shaft hole and position position sensor gear on position sensor shaft approximately 0.0625 inch from bottom surface of lid.
(3) Secure position sensor gear to position sensor shaft with setscrews.

CAUTION: WHEN INSTALLING GEARBOX LID, THE GEARS MUST MESH PERFECTLY OR GEAR DAMAGE WILL OCCUR WHEN LID IS IN PLACE.

(4) Insert a small metal strip between gearbox lid and case, moving position sensor gear slightly until it meshes with gear cluster and close lid.
(5) Apply NEVER SEEZ compound to lid attachment screws.
(6) Secure lid with washers and lid attachment screws. Torque screws 50 to 70 inch-pounds and safety wire.
(7) Adjust steering position sensor. (Refer to Step 2, Adjustment/Test.)
(8) Tighten and safety wire position sensor attachment screws.
(9) Install nose gear shock strut. (Refer to 32-21-00.)
(10) Remove aircraft from jacks. (Refer to Chapter 7.)
(11) Restore aircraft to normal.



Nose Steering Position Sensor (Followup) Installation
Figure 201

2. **Adjustment/Test**
   A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Power Supply		Commercially Available	Energize follow-up.
Digital Multimeter (preferred) or	Model 8000	Fluke Mfg. Inc. Everett, WA.	Followup null and phasing.
Multimeter	Model 260	Simpson Electric Co. Elgin, IL.	Followup null and phasing.
Safety Wire	MS20995020	Commercially Available	Safetying screws

B. Adjust Steering Position Sensor (Followup) to null.

NOTE: To adjust the steering position sensor, it is necessary to have the strut removed from the aircraft and placed in a stand. (Refer to 32-21-00.)

(1) Ensure nose gear strut is fully extended and in mechanical detent position.
(2) Remove safety wire from position sensor attachment screws and loosen screws.
(3) Connect a 1.0 vac, 400 Hz power supply to connector P33 Pin C (Stator High) and Pin A (Common).
(4) Connect multimeter to P33 Pin B (Rotor High) and Pin A (Common).
(5) Turn followup sensor housing to obtain a voltage indication between zero and 0.03 vac, then tighten attachment screws.

C. Adjust Steering Followup output signal phase.
(1) Adjust steering followup to null per steps B.(3) thru B.(5).
(2) Measure excitation voltage at P33 Pin C (Stator High) and Pin A (Common). Record voltage.
(3) Measure voltage between P33 Pin C (Stator High) and Pin B (Rotor High). With followup at null, voltage shall be within 0.1 vac of value recorded in step C.(2).
(4) Loosen attachment screws and slowly rotate sensor housing clockwise. Voltage shall decrease (followup output is in phase with excitation signal).
(5) If voltage increases (followup output out of phase with excitation signal) rotate followup shaft 180° and repeat steps C.(1) thru (4).
(6) Reset followup to null per steps B.(3) thru (5).
(7) Tighten and safety wire position sensor attachment screws.
(8) Perform Functional Test of Nose Wheel Steering system. (Refer to Adjustment/Test, 32-50-00.)

STEERING ACTUATOR - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Steering Actuator (See figure 201.)

NOTE: The nose steering actuator servo may be removed without disassembly or removal of steering actuator gear box. Nose gear removal is required to gain access to the servo attach bolts. (Refer to 32-21-00.)

(1) Remove nose gear from aircraft. (Refer to 32-21-00.)

WARNING: BEFORE PERFORMING REMOVAL OF ACTUATOR, ENSURE THAT ALL AIR PRESSURE HAS BEEN RELEASED FROM STRUT THROUGH AIR VALVE. FAILURE TO DO SO CAN CAUSE BODILY INJURY. DO NOT RELEASE AIR BY LOOSENING OR REMOVING AIR VALVE.

(2) Remove safety wire from gearbox lid attachment screws.
(3) Remove screws and washers from gearbox lid.

CAUTION: USE EXTREME CARE TO PREVENT DAMAGE TO GEARBOX LID OR CASE WHEN REMOVING LID FROM CASE. BOTH THE LID AND CASE HAVE MACHINED SURFACES, AND ANY DAMAGE MAY CAUSE AN OIL LEAK.

(4) Carefully remove gearbox lid from gearbox case.
(5) Remove cotter pin, strut attachment nut, washer, and ball bearing from strut.
(6) Fabricate main drive gear removal tool as shown in figure 201.
(7) Screw main drive gear removal tool fully onto strut shaft. Strike tool with a series of sharp blows until main drive gear is loosened on shaft.
(8) Unscrew main drive gear removal tool from shaft, ensuring that shaft does not fall into strut.
(9) Remove main drive gear and cluster gear from shaft.

NOTE:
- Removal of roller bearing pressed into case is not required.
- Removal of bushing pressed into lower portion of lid is not required.

(10) Remove two bearing races and needle bearing from case and inspect for damage caused by driving shaft out of main drive gear.
(11) Remove strut screws and case, with steering servo attached, from nose gear strut.

NOTE: When removing gearbox case, shim washers will be released from in between strut and case. Retain these shim washers for reinstallation.

(12) Remove steering servo attachment bolts and remove steering servo from gearbox case.
(13) Remove setscrews and position sensor gear from followup shaft.
(14) Remove position sensor attachment screws, ring, and position sensor from lid.

B. Install Steering Actuator (See figure 201.)
(1) Apply Loctite 222 to threads of all screws immediately prior to installation.
(2) Apply MIL-G-23827A or MIL-G-81322 grease to all gears as required prior to installation.
(3) Install position sensor on actuator lid using ring and position sensor attachment screws.
(4) Apply Loctite 680 retaining compound to position sensor gear shaft hole and position position sensor gear on position sensor shaft approximately 0.0625 inch from bottom surface of lid. Secure with setscrews.

(5) Attach steering servo to gearbox case using steering servo attachment bolts. Tighten bolts and safety wire.
(6) Position case on strut and measure gap between case and strut. Peel shim washers to same thickness of gap and insert between case and strut and align with screw holes. Secure case to strut and torque screws 50 to 70 inch-pounds.
(7) Install bearing races and needle bearing on strut.
(8) Install cluster gear and bushing.
(9) Install main drive gear on strut as follows:
  (a) Clean surfaces of main drive gear internal spline and strut external spline with trichloroethane.
  (b) Prime surfaces with Locquic Grade T and allow to dry a minimum of 5 minutes.
  (c) Apply Loctite 35 retaining compound to internal spline of main drive gear and external spline of strut and install main drive gear on strut.

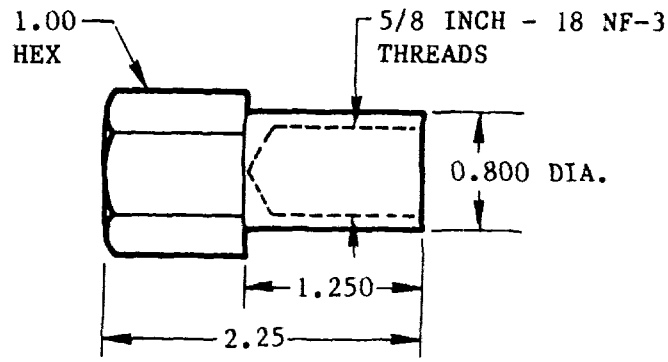
NOTE: Proceed with assembly of nose gear steering actuator before Loctite cures (within a maximum of three hours.

(10) Install ball bearing, washer, and strut attachment nut. Torque nut 18 to 25 inch-pounds and install cotter pin.

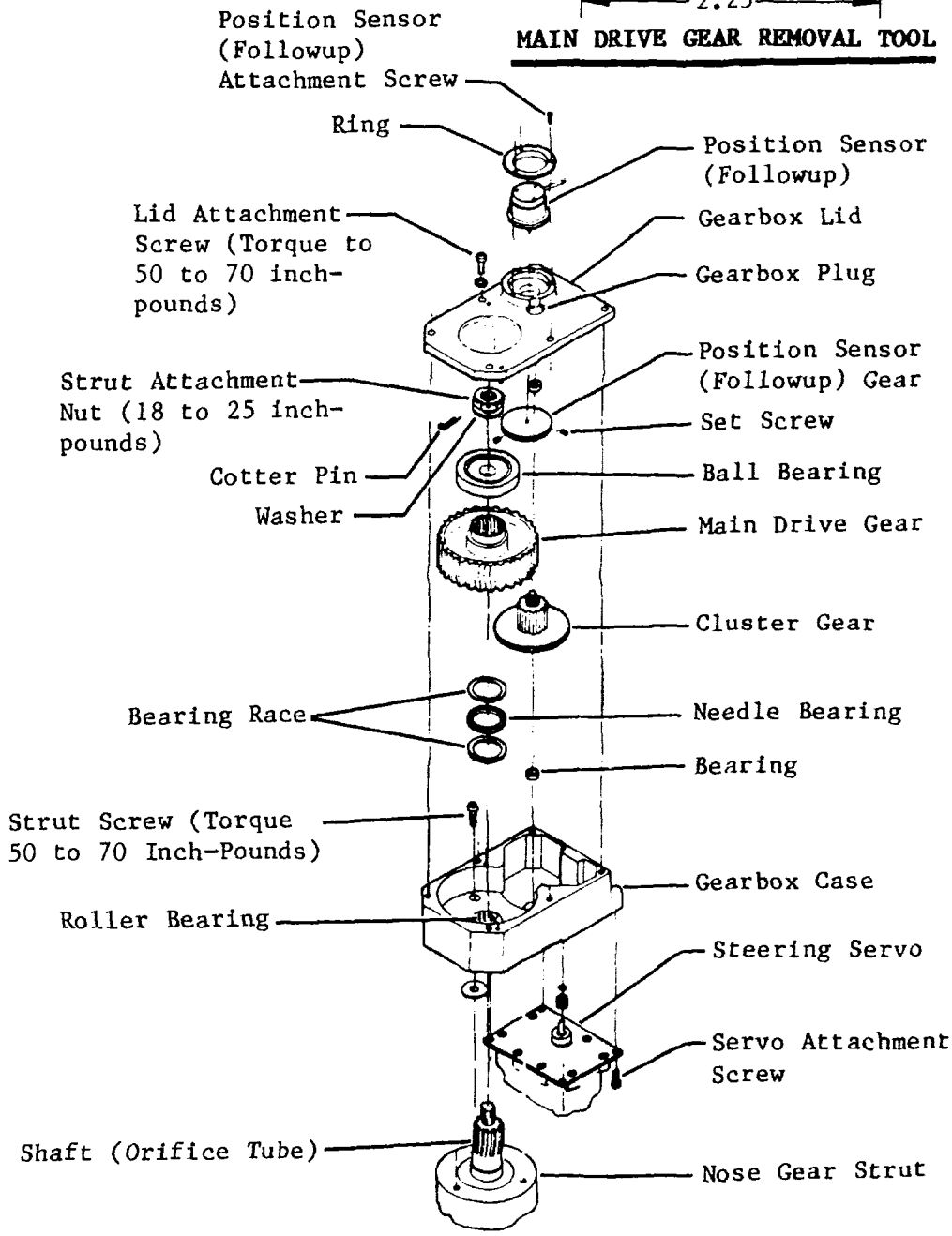
CAUTION: WHEN REPLACING GEARBOX LID ON GEARBOX CASE, IT IS EXTREMELY IMPROTANT THAT GEARS MESH PERFECTLY OR DAMAGE WILL OCCUR WHEN LID IS IN PLACE.

(11) Insert a small metal strip between lid and case. Move position sensor gear slightly until it meshes with gear cluster.
(12) Secure gearbox lid with washers and screws. Torque screws 50 to 70 inch-pounds and safety wire.
(13) Install nose gear on aircraft. (Refer to 32-21-00.)
(14) Adjust steering position sensor. (Refer to 32-50-00, Adjustment/Test.)

NOTE: All dimensions are in inches. Fabricate from 4130 steel and heat treat to 160 to 180 KSI.



MAIN DRIVE GEAR REMOVAL TOOL



Steering Actuator Installation
Figure 201

RUDDER PEDAL FOLLOWUP - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

NOTE: The rudder pedal followup is located on frame 5 forward of the copilot's rudder pedals.

A. Tools and Equipment

NAME	NUMBER	MANUFACTURER	USE
Nose wheel protractor	2471001	Gates Learjet Corp.	Measure nose wheel deflection.

B. Remove Rudder Pedal Followup (See figure 201.)

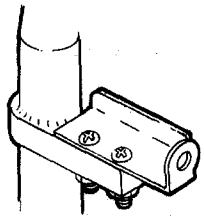
(1) Place aircraft on nose wheel protractor.
(2) Set Battery Switches to OFF.
(3) Remove floorboards immediately aft of the rudder pedals. Position rudder pedals to neutral and insert rigging pin through rigging pin hole in rudder bellcrank. This will hold rudder pedals in neutral during followup installation.
(4) Disconnect followup arm from followup shaft.
(5) Disconnect followup electrical connector.
(6) Remove attaching parts and followup from aircraft.

C. Install Rudder Pedal Followup (See figure 201.)

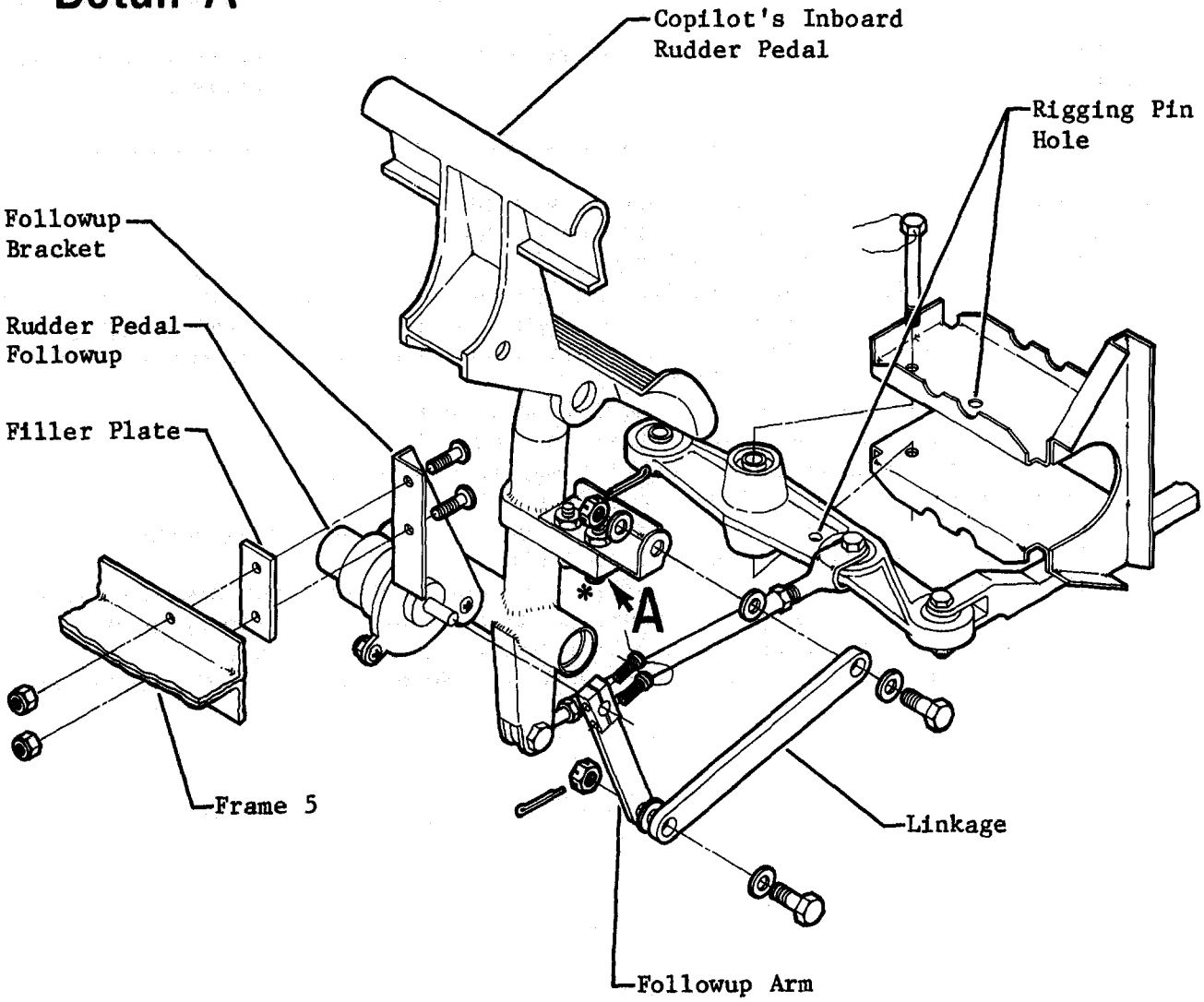
(1) Position followup in aircraft and secure with attaching parts.
(2) Connect followup electrical connector.
(3) If red dots are present on followup shaft and followup housing, assure that they are aligned. Connect followup arm to followup shaft. Do not secure followup arm to shaft until after adjustment.
(4) Rig the nose wheel steering system. (Refer to 32-50-00, Adjustment/Test.)

Aircraft 35-002 thru 35-400
and 36-002 thru 36-047

* Aircraft 35-401 and Subsequent
and 36-048 and Subsequent



Detail A



Rudder Pedal Followup Installation
Figure 201

8-91C

POSITION AND WARNING SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The Position and Warning system provides an indication of landing gear position and warns of malfunctions during normal landing gear extension and retraction.

B. A malfunction of any of the position and warning system electrical components will not affect ultimate landing gear operation as the two systems are on different circuits.

C. Integral switches in the nose gear actuator and both main gear actuators provide a down-and-locked position indication. Uplatch switches located on the nose gear uplatch mechanism and on both main gear doors provide an up-and-locked position indication.

D. Whenever the landing gears are neither up-and-locked nor down-and-locked, the red UNSAFE annunciators shall be illuminated.

E. On Aircraft 35-002 thru 35-505, 36-002 thru 36-053 not modified per AAK83-2, "Installation of FC-530 Autopilot," an aural warning horn is installed and sounds when the gear is retracted and the throttle levers are retarded below 70% N_1 rpm or the flaps are extended more than 25°. Refer to Chapter 76 for gear aural warning switch adjustment. On Aircraft 35-506 and Subsequent, 36-054 and Subsequent, and prior Aircraft modified per AAK83-2, "Installation of FC-530 Autopilot," an aural warning sounds when the gear is retracted, thrust levers are retarded below 60% N_1 rpm, altitude is less than 14,000 (±500) feet, and aircraft indicated airspeed is less than 170 (±5) knots. The aural warning also sounds when the gear is retracted and flaps are extended more than 25°.

F. A main gear down and locked switch is installed on each main gear actuator, energizes main gear down green DN annunciator, and energizes the main gear door control valve in the correct sequence.

G. A main gear door up switch is installed adjacent to each door uplatch hook and energizes the main gear red UNSAFE annunciator while the gear is not down-and-locked and the inboard door is not up-and-locked.

H. The nose gear down-and-locked switch is installed on the nose gear actuator and energizes the nose gear green DN annunciator.

I. The nose gear up-and-locked switch is installed adjacent to the uplatch mechanism and energizes the nose gear red UNSAFE annunciator while the gear is not down-and-locked or up-and-locked.

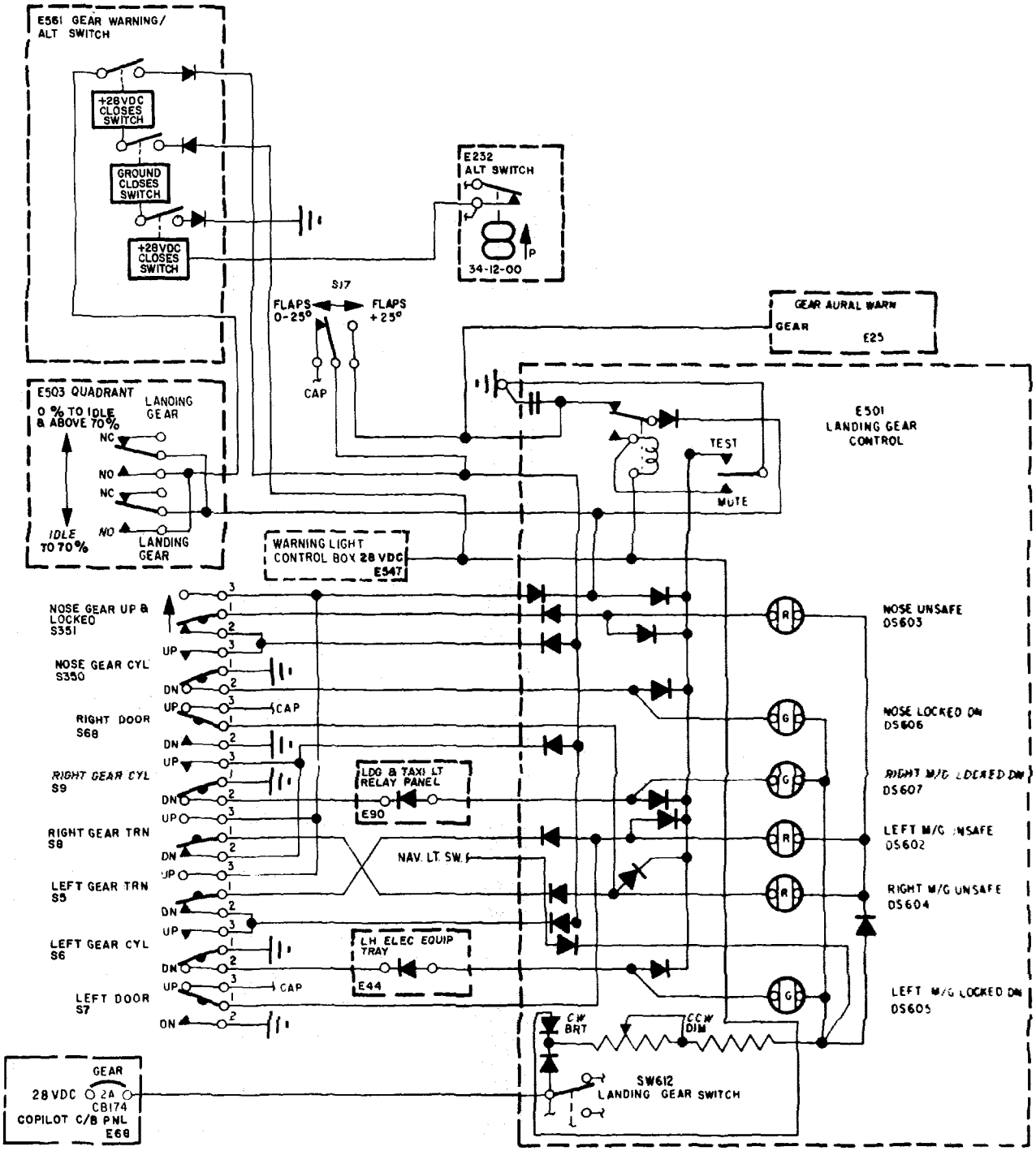
2. OPERATION

A. When the landing gear selector switch is set to DN, the uplatch mechanisms disengage and the red UNSAFE annunciators illuminate. As each gear reaches down-and-locked position its corresponding green LOCKED DN annunciator shall illuminate. If a gear fails to lock in the extended position, its corresponding red UNSAFE annunciator shall remain illuminated.

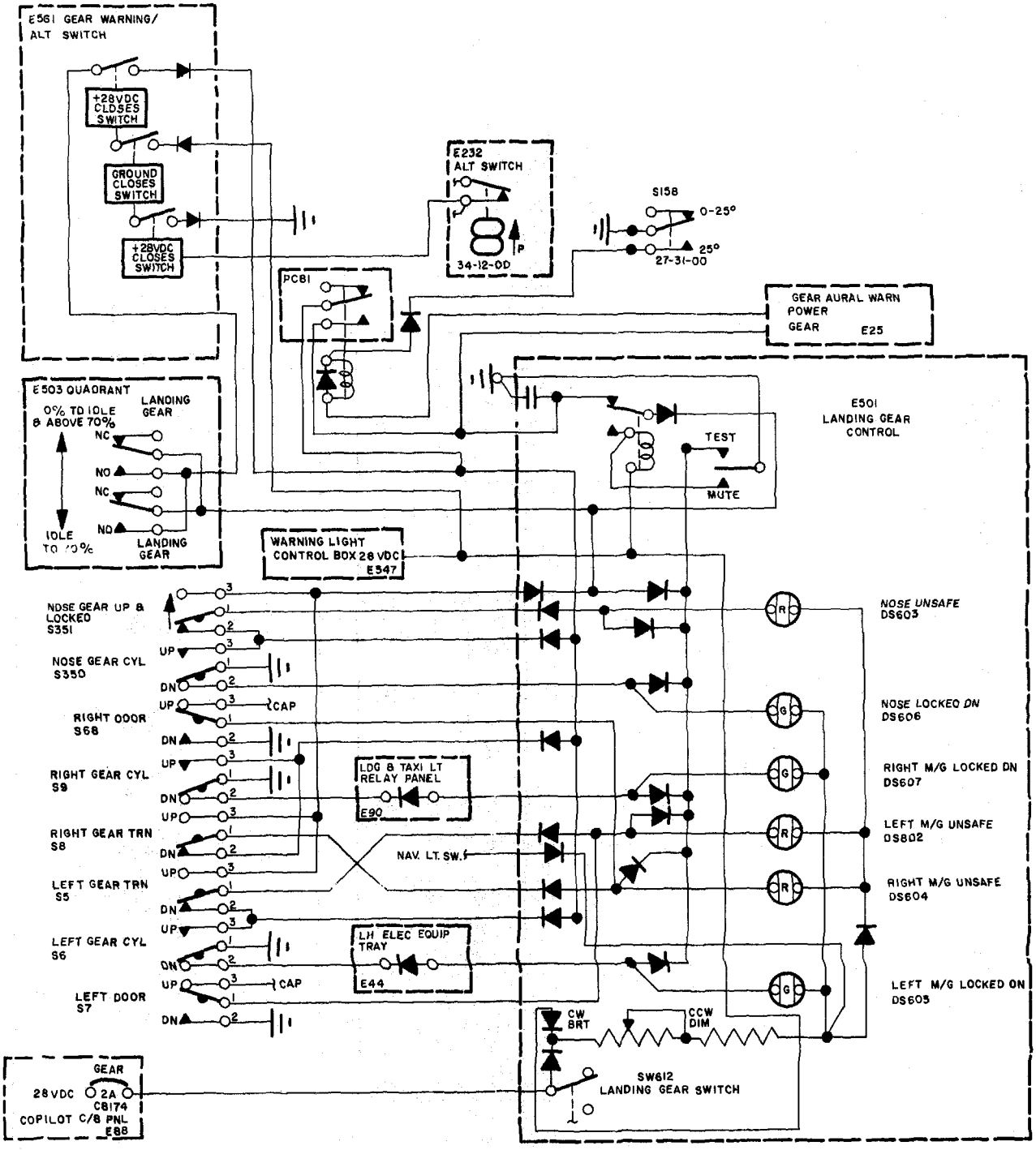
B. When the landing gear selector switch is set to UP, the internal downlock in the actuators will disengage and the red UNSAFE annunciators shall illuminate. As each gear reaches the up-and-locked position, its corresponding UNSAFE annunciator shall extinguish. If a gear fails to lock in

the up position, its corresponding UNSAFE annunciator shall remain illuminated.

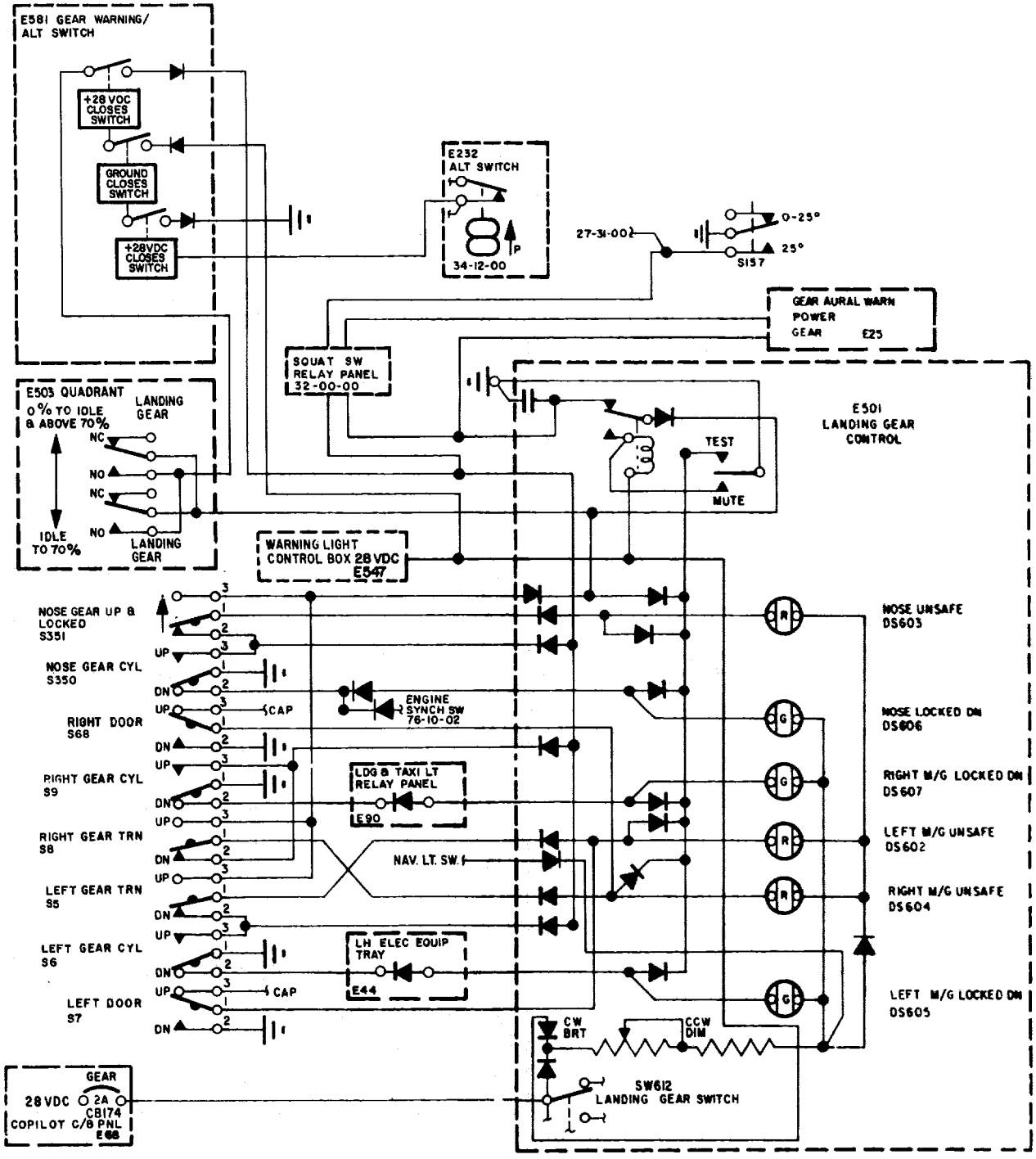
C. On Aircraft 35-002 thru 35-505, 36-002 thru 36-053 not modified per AAK83-2, "Installation of FC-530 Autopilot," the landing gear warning horn will sound when the gear is retracted and the throttle levers are set lower than 70% N_1 rpm below 14,500 feet altitude or the flaps are lower more than 25°. If the norn sounds because the throttle levers are set below 70% N_1 rpm below 14,000 feet altitude, the horn can be silenced by lowering the gear, increasing power, or moving the TEST/MUTE Switch to MUTE. If the horn sounds because the flaps are lowered below 25°, the horn can be silenced by lowering the gear or retracting the flaps. Setting the TEST/MUTE Switch to TEST will sound the horn and illuminate the landing gear position lights. On Aircraft 35-506 and Subsequent, 36-054 and Subsequent, and prior aircraft modified per AAK83-2, "Installation of FC-530 Autopilot," the landing gear warning horn will sound when the gear is retracted, thrust levers are set lower than 60% N_1 rpm below 14,500 feet altitude, and indicated airspeed is less than 170 (±5) knots. The horn will sound also when the gear is retracted and the flaps are lowered more than 25°. If the horn sounds because the throttle levers are set below 60% N_1 rpm below 14,000 feet altitude at less than 170 (±5) KIAS, the horn can be silenced by lowering the gear, increasing power, or moving the TEST/MUTE Switch to MUTE. If the horn sounds because the flaps are lowered below 25°, the horn can be silenced by lowering the gear or retracting the flaps. Setting the TEST/MUTE Switch to TEST will sound the horn and illuminate the landing gear position lights.



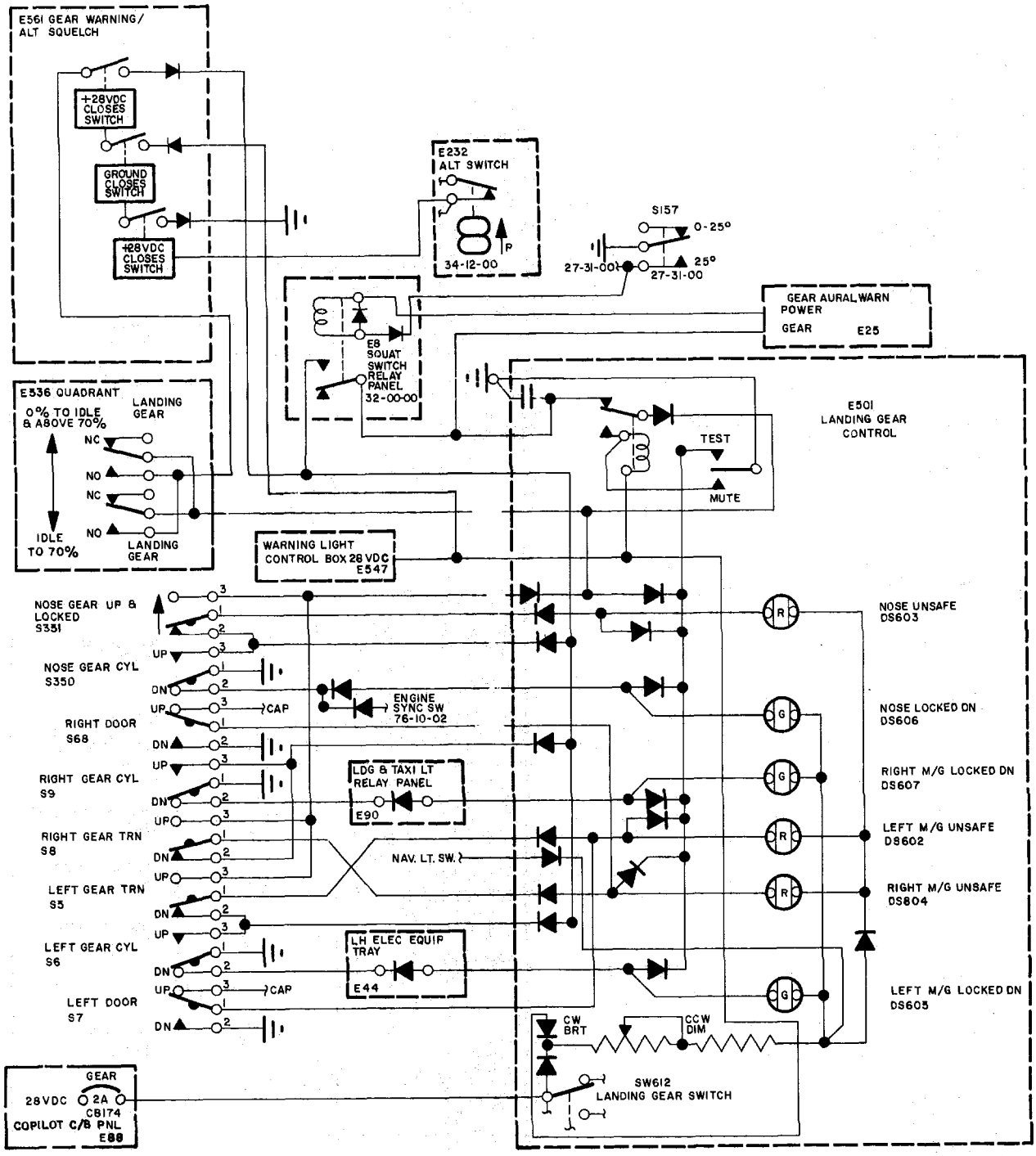
Position and Warning System Electrical Schematic
Figure 1 (Sheet 1 of 5)



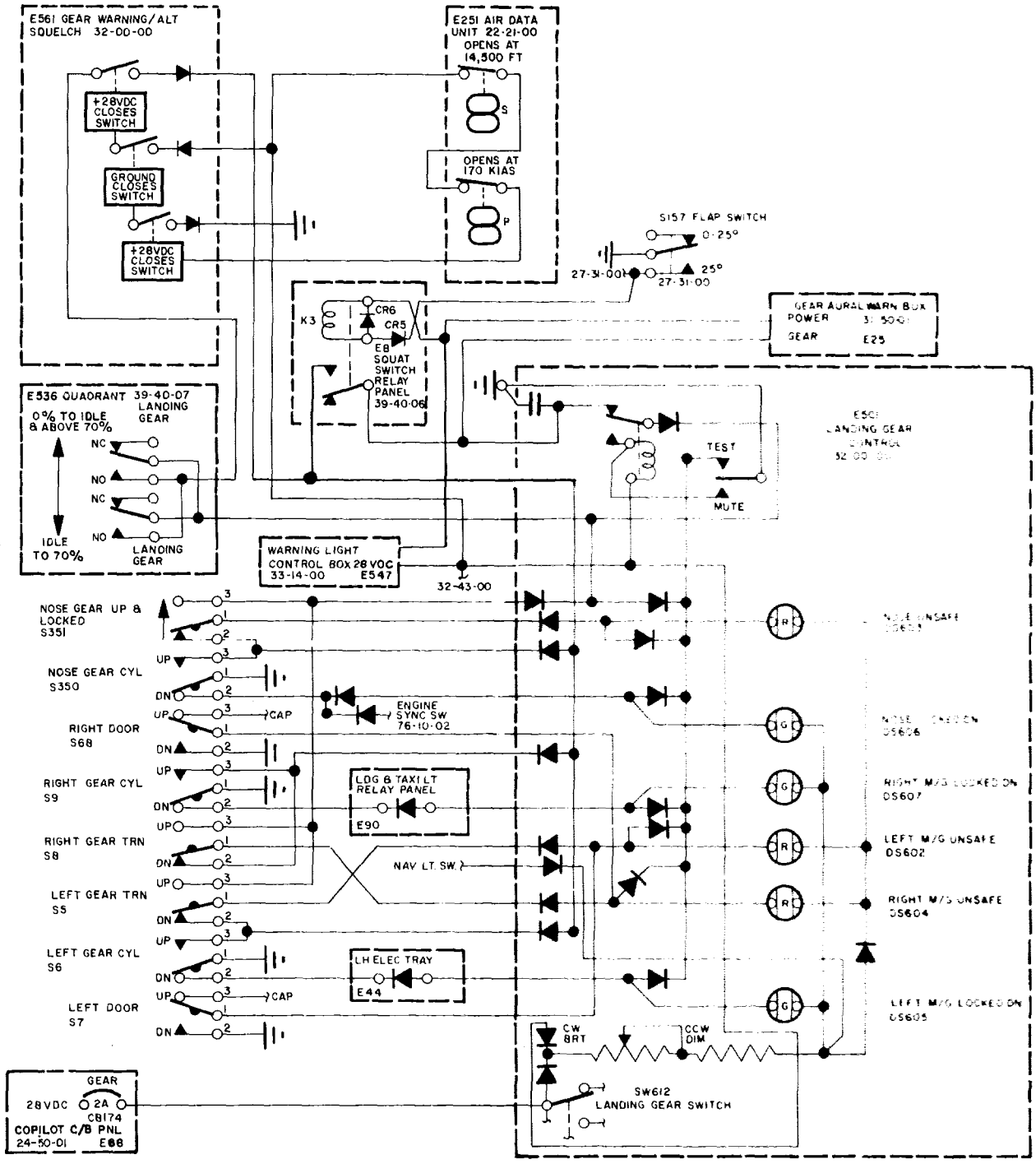
Position and Warning System Electrical Schematic
Figure 1 (Sheet 2 of 5)



Position and Warning System Electrical Schematic
Figure 1 (Sheet 3 of 5)



Position and Warning System Electrical Schematic
Figure 1 (Sheet 4 of 5)



Position and Warning System Electrical Schematic
Figure 1 (Sheet 5 of 5)

EFFECTIVITY: **35-506 and Subsequent and 36-054 and Subsequent and prior aircraft modified per AAK83-2, "Installation of FC-530 Autopilot"**

MM-99
D584

MAIN GEAR DOWN-AND-LOCKED SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: Removal and installation procedures for the left and right main gear down-and-locked switches are identical.

A. Remove Main Gear Down-and-Locked Switch (See Figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Place aircraft on jacks. (Refer to Chapter 7.)
   (3) Remove all clamps and attaching parts securing wire leads from main gear down-and-locked switch to aircraft's wiring bundle (in main gear wheel well).
   (4) Locate where main gear down-and-locked switch wiring interferes with aircraft's wiring bundle. Disconnect and identify main gear down-and-locked switch wiring leads.

      NOTE: On *Aircraft 35-630 and Subsequent and 36-058 and Subsequent and prior aircraft modified per AAK86-2, "Installation of Landing Gear Actuator Down Lock Switch Connectors,"* disconnect electrical connector.

   (5) Loosen jamnuts on main gear down-and-locked switch sufficiently to allow freedom of movement.
   (6) Unscrew main gear down-and-locked switch from main gear actuator and remove from aircraft.
   (7) Remove switch actuator ball from main gear actuator.

B. Install Main Gear Down-and-Locked Switch (See Figure 201.)
   (1) The switch actuator ball shall be thoroughly cleaned, inspected, and lubricated before installation.

      NOTE: To lubricate, hold switch actuator ball with a pair of tweezers (not with fingers) and lightly spray with LPS 3 lubricant. Do not spray lubricant into hole of actuator. (Refer to Chapter 12.)

   (2) Install switch actuator ball in main gear down-and-locked switch mounting hole.
   (3) Install jamnuts and key washer on main gear down-and-locked switch as shown in Detail A.
   (4) Screw main gear down-and-locked switch into main gear actuator approximately 6 or 8 revolutions.
   (5) Route and clamp (with attaching parts) main gear down-and-locked switch wire leads to aircraft's wiring bundle.
   (6) Identify and connect main gear down-and-locked switch wire leads to aircraft's wiring bundle.

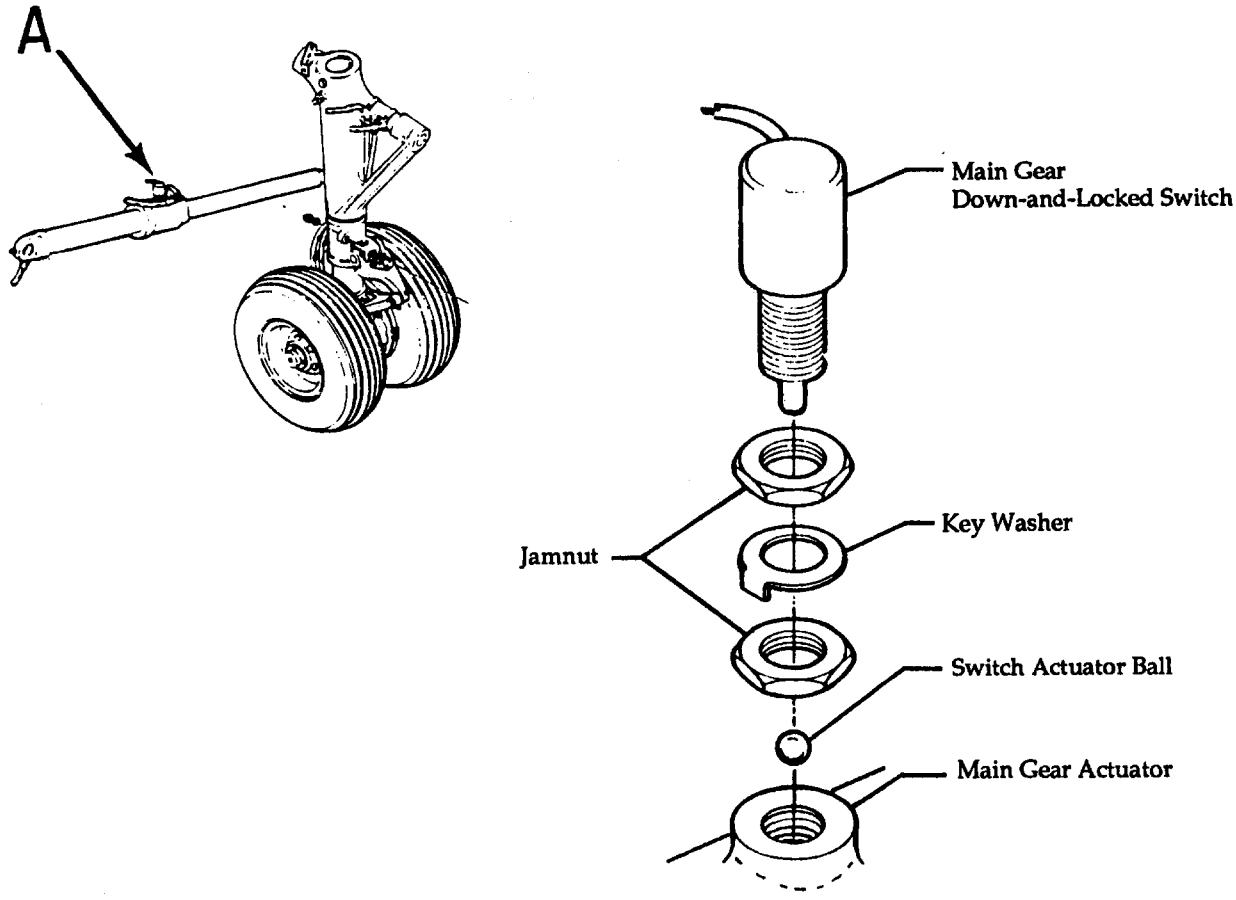
      NOTE: *On Aircraft 35-630 and Subsequent and 36-058 and Subsequent and prior aircraft modified per AAK86-2, "Installation of Landing Gear Actuator Down Lock Switch Connectors,"* connect electrical connector.

   (7) Adjust main gear down-and-locked switch. (Refer to Adjustment/Test, this section.)

2. Adjustment/Test

A. Adjust Main Gear Down-and-Locked Switch (See Figure 201.)
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Loosen jamnuts on main gear down-and-locked switch sufficiently to allow freedom of movement.

(3) Using a multimeter (Simpson 260 or equivalent) with ohms mode preselected, attach multimeter probes to main gear down-and-locked switch wires No. 1 and 3. On *Aircraft 35-630 and Subsequent and 36-058 and Subsequent, and previous aircraft modified per AAK 86-2, "Installation of Landing Gear Down Lock Switch Connectors,"* attach probe to main gear down-and-locked switch connector pins A and B.
(4) Screw main gear down-and-locked switch into main gear actuator just until multimeter needle deflects. Back off (unscrew) switch a minimum of 1/2 to a maximum of 1-1/2 turns so that main gear down-and-locked switch wires are on centerline of actuator.
(5) Secure jamnuts and key washer on main gear down-and-locked switch and safety wire.
(6) Remove multimeter from aircraft.
(7) Connect external electrical power source to aircraft.
(8) Connect external hydraulic power source to aircraft.
(9) Pressurize hydraulic system, cycle landing gear system, and check for proper operation and indication.
(10) Remove external hydraulic power source from aircraft.
(11) Remove external electrical power source from aircraft.
(12) Remove aircraft from jacks.
(13) Restore aircraft to normal.



Detail A

Main Gear Down-and-Locked Switch Installation
Figure 201

MAIN GEAR DOOR UPLATCH SWITCH - MAINTENANCE PRACTICES

1. RemovaL/Installation

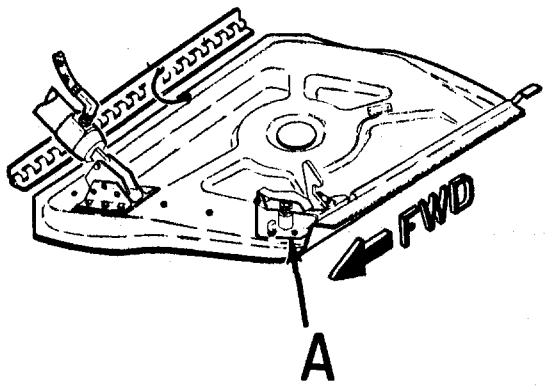
NOTE: Removal and installation procedures for the left and right main gear door uplatch switches are identical.

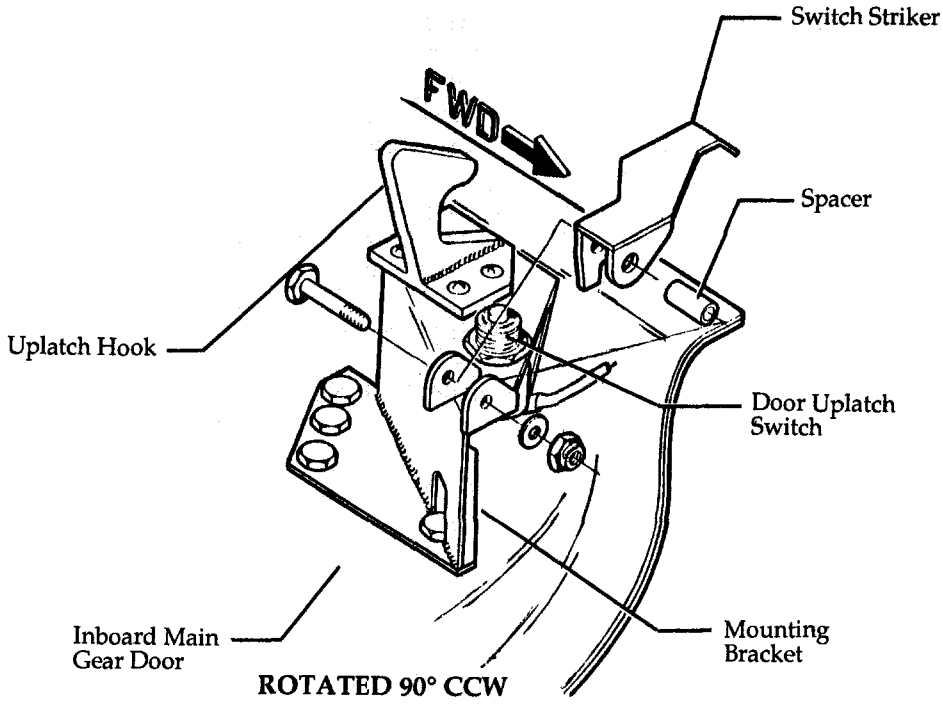
A. Remove Main Gear Door Uplatch Switch (See Figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Place aircraft on jacks. (Refer to Chapter 7.)
   (3) Depressurize landing gear and brake system. (Refer to Chapter 12.)
   (4) Override uplatch actuator with a screwdriver and release main gear uplatch hook from roller.

CAUTION: THE BRAKES MUST BE PUMPED DURING MANUAL LOWERING OF THE MAIN GEAR INBOARD DOOR TO PREVENT POSSIBLE ACTUATOR DAMAGE AND TO AID IN LOWERING OUTBOARD GEAR DOOR.

   (5) To service personnel are required to lower main gear inboard door. One person will pump brakes while the other person pulls down on main gear inboard door.
   (6) Remove all clamps and attaching parts securing wire leads from main gear door uplatch switch to entrance of wire leads into conduit in aircraft's wheel well.
   (7) Pull wire lead slack from inside conduit. Disconnect and identify main gear door uplatch switch wire leads.
   (8) Remove safety wire from jamnuts on main gear door uplatch switch.
   (9) Remove jamnut (atop mounting bracket) from main gear door uplatch switch and remove from aircraft.

B. Install Main Gear Door Uplatch Switch (See Figure 201.)
   (1) Position main gear door uplatch switch on mounting bracket and secure with jamnut, finger tight only.
   (2) Identify and connect main gear door uplatch switch wire leads.
   (3) Route and clamp (with attaching parts) main gear door uplatch switch wire leads. Work wire lead slack from mounting bracket, up main gear inboard door edge to conduit. Stow slack in conduit.
   (4) Raise main gear inboard door, override uplatch actuator with screwdriver and hook main gear uplatch hook on roller.
   (5) Adjust Main Gear Door Uplatch Switch. (Refer to Adjustment/Test, this section.)





Detail A

Main Gear Door Uplatch Switch Installation
Figure 201

2. **Adjustment/Test**
   A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Model 260	Simpson Electric Co. Elgin, Il	Check continuity of switch.
Safety Wire	MS33540	Commercially Available	Safety wire check nut.

B. Adjustment of Main Gear Door Uplatch Switch - Method I
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Connect external electrical power source to aircraft. (Refer to 24-40-01.)
   (3) Disconnect main gear outboard door closure link assembly from strut.
   (4) Pressurize hydraulic system and fully retract landing gear. (Refer to Chapter 29.)
   (5) Depressurize hydraulic system so that main gear door uplatch hook rests (hangs) on roller.
   (6) Using a multimeter with ohms mode pre- selected, attach multimeter probes to main gear door uplatch switch wire leads #1 and #3.
   (7) Loosen jamnuts and adjust main gear door uplatch switch up (against switch striker) until multimeter needle deflets. Continue (after multimeter deflection) to adjust jamnut, one full revolution.
   (8) Secure jamnuts on main gear door uplatch switch and safety wire.
   (9) Remove multimeter from aircraft.
   (10) Pressurize hydraulic system and extend landing gear. (Refer to Chapter 29.)
   (11) Connect main gear outboard door closure link assembly to strut.
   (12) Cycle landing gear system and check for proper operation and indication.
   (13) Remove external hydraulic power source from aircraft. (Refer to Chapter 29.)
   (14) Remove external electrical power source from aircraft. (Refer to 24-40-01.)
   (15) Remove aircraft from jacks. (Refer to Chapter 7.)

C. Adjustment of Main Gear Door Uplatch Switch - Method II
   (1) Place aircraft on jacks. (Refer to Chapter 7.)
   (2) Extend landing gear.
   (3) Connect inboard door actuator.
   (4) Remove hydraulic pressure so hook rests (hangs) on roller.
   (5) Adjust inboard door uplatch switch until red unsafe light, located on the landing gear control panel, is extinguished.
   (6) Rotate lower jamnut one full turn to obtain switch over travel.
   (7) Secure upper jamnut and safety wire with double-twist method.
   (8) Cycle landing gear system and check for proper operation and indication.

NOSE GEAR DOWN-AND-LOCKED SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Nose Gear Down-and-Locked Switch. (See Figure 201.)

(1) Remove electrical power from aircraft.

(2) Place aircraft on jacks. (Refer to Chapter 7.)

(3) Open RH nose compartment access door and gain access to nose gear down-and-locked switch on nose gear actuator.

(4) Locate where nose gear down-and-locked switch wiring attaches to aircraft's wiring bundle. Disconnect and identify nose gear down-and-locked switch wiring leads.

NOTE: On *Aircraft 35-630 and Subsequent and 36-058 and Subsequent and prior aircraft modified per AAK86-2, "Installation of Landing Gear Actuator Down Lock Switch Connectors."* disconnect electrical connector.

(5) Loosen jamnuts on nose gear down-and-locked switch sufficiently to allow freedom of movement.

(6) Unscrew nose gear down-and-locked switch from nose gear actuator and remove from aircraft.

(7) Remove switch actuator ball from nose gear actuator.

B. Install Nose Gear Down-and-Locked Switch. (See Figure 201.)

(1) The switch actuator ball shall be thoroughly cleaned, inspected, and lubricated before installation.

NOTE: To lubricate, hold switch actuator ball with a pair of tweezers (not with fingers) and lightly spray with LPS 3 lubricant. Do not spray lubricant into hole of actuator. (Refer to Chapter 12.)

(2) Install switch actuator ball in nose gear down-and-locked switch mounting hole.

(3) Install jamnuts and key washer on nose gear down-and-locked switch as shown in Detail A.

(4) Screw nose gear down-and-locked switch into nose gear actuator approximately 6 or 8 revolutions.

(5) Identify and connect nose gear down-and-locked switch wire leads to aircraft's wiring bundle.

NOTE: *On Aircraft 35-630 and Subsequent and 36-058 and Subsequent and prior aircraft modified per AAK86-2, "Installation of Landing Gear Actuator Down Lock Switch Connectors."* connect electrical connector.

(6) Adjust nose gear down-and-locked switch. (Refer to Adjustment/Test, this section.)

2. Adjustment/Test

A. Adjust Nose Gear Down-and-Locked Switch

(1) Place aircraft on jacks. (Refer to Chapter 7.)

(2) Open RH nose compartment access door and gain access to nose gear down-and-locked switch on nose gear actuator.

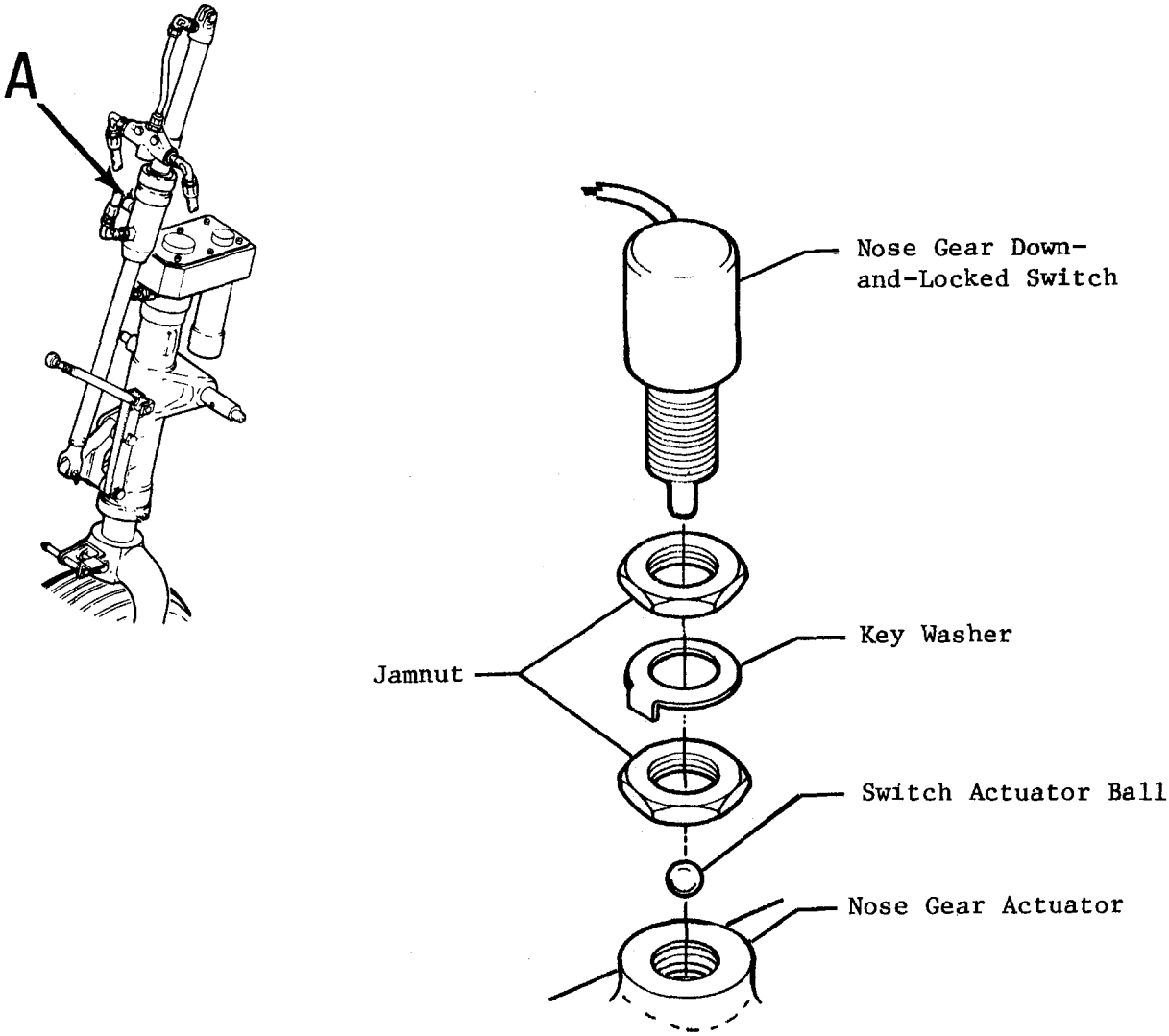
(3) Loosen jamnuts on nose gear down-and-locked switch sufficiently to allow freedom of movement.

(4) Using a multimeter (Simpson 260 or equivalent) with ohms mode preselected, attach multimeter probes to nose gear down-and-locked switch wires No. 1 and 3.

(5) Screw nose gear down-and-locked switch into nose gear actuator just until multimeter needle deflects. Then back off (unscrew) one revolution.

NOTE: The objective of this adjustment is to set the nose gear down-and-locked switch actuation threshold.

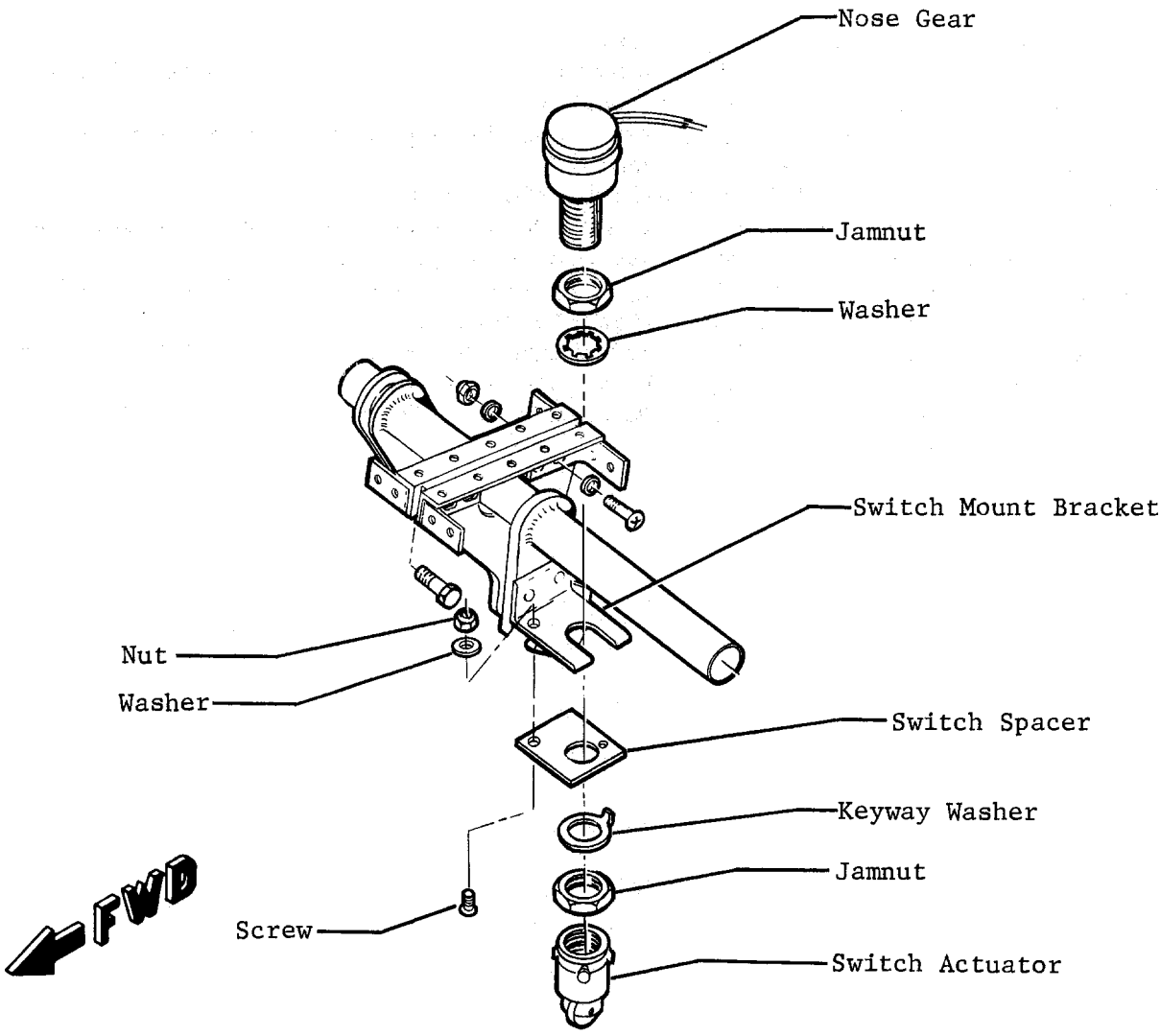
(6) Secure jamnuts and key washer on nose gear down-and-locked switch and safety wire.
(7) Remove multimeter from aircraft.
(8) Connect external electrical power source to aircraft.
(9) Connect external hydraulic power source to aircraft.
(10) Pressurize hydraulic system, cycle landing gear system, and check for proper operation and indication.
(11) Remove external hydraulic power source from aircraft.
(12) Remove external electrical power source from aircraft.
(13) Remove aircraft from jacks.
(14) Install previously removed equipment in RH nose compartment and secure access door.
(15) Restore aircraft to normal.



Nose Gear Down-and-Locked Switch Installation
Figure 201

NOSE GEAR UP-AND-LOCKED SWITCH - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - **A. Remove Nose Gear Up-and-Locked Switch** (See figure 201.)
     - (1) Remove electrical power from aircraft.
     - (2) Place aircraft on jacks. (Refer to Chapter 7.)
     - (3) Remove all clamps (with attaching parts) securing nose gear up-and-locked switch wiring. Note routing path of wiring for reinstallation.
     - (4) Disconnect nose gear up-and-locked switch electrical connector from receptacle located at top of wheel well.
     - (5) Remove attaching parts securing switch spacer to switch mounting bracket.
     - (6) Remove safety wire from jamnuts.
     - (7) Loosen top jamnut and slide switch spacer off switch mounting bracket and down to a more convenient work area.
     - (8) Remove switch actuator, jamnut, and keyway washer from switch and remove switch from switch spacer.
   - **B. Install Nose Gear Up-and-Locked Switch** (See figure 201.)
     - (1) Loose assemble up-and-locked switch on switch spacer. Assure that switch wiring and keyway washer are in proper position.
     - (2) Slide switch spacer with up-and-locked switch attached on switch mounting bracket and secure with attaching parts.
     - (3) Route up-and-locked switch wiring and secure in place. Connect electrical connector to receptacle at top of wheel well.
     - (6) Adjust Nose gear up-and-locked switch. (Refer to Adjustment/Test, this section.)



Nose Gear Up-and-Locked Switch Installation
Figure 201

2. **ADJUSTMENT/TEST**

A. Adjust Nose Gear Up-and-Locked Switch

(1) Place aircraft on jacks. (Refer to Chapter 7.)
(2) Connect external electrical power source to aircraft.
(3) Connect external hydraulic power source to aircraft.
(4) Disconnect nose gear door linkage. (Refer to 32-22-00.)
(5) Pressurize hydraulic system and fully retract landing gear.
(6) Inspect for clearance of 0.10 (+0.03/-0.00) inch between switch striker attaching parts (on nose strut) and side of switch actuator.
(7) Check nose gear up-and-locked mechanism for correct adjustment and adjust if required. (Refer to 32-32-03.)
(8) If UNSAFE annunciator illumintes, extend landing gear.
(9) Adjust nose gear up-and-locked switch and jamnuts in 1/2 turn increments, retracting landing gear each time, until UNSAFE annunciator does not illuminate.
(10) Adjust nose gear up-and-locked switch and jamnuts one full turn more to assure positive actuation of nose gear up-and-locked switch actuator.
(11) Secure nose gear up-and-locked switch jamnuts and safety wire.
(12) Cycle landing gear system and check for proper operation and indication.
(13) Remove external electrical power source from aircraft.
(14) Remove external hydraulic power source from aircraft.
(15) Remove aircraft from jacks.
(16) Restore aircraft to normal.