

MODEL 172 SERIES SERVICE MANUAL

- 5-60. **NOSE WHEEL STEERING SYSTEM.** (See figure 5-7.)
- 5-61. **DESCRIPTION.** Nose wheel steering is accomplished through use of the rudder pedals. Spring-loaded steering rod assemblies connect the nose gear steering arm assembly to arms on the rudder bars. Steering is afforded up to approximately 10 degrees each side of neutral, after which brakes may be used to gain a maximum deflection of 30 degrees right or left of center. A flexible boot seals the fuselage entrance of the steering rod assembly.
- 5-62. **NOSE WHEEL STEERING ROD ASSEMBLIES.** (See figure 5-7.)
- 5-63. **DESCRIPTION.** The steering rods are connected by a clevis to the rod ends extending from the nose gear steering arm, and to an arm on the rudder pedal crossbars.
- 5-64. **NOSE WHEEL STEERING ADJUSTMENT.** Before attaching nose wheel steering rods to the rod ends protruding from the steering arm assembly, adjust rod ends to the dimension specified in section view A-A in figure 5-10. Since the nose wheel steering system and the rudder system are interconnected, adjustment to one system might affect the other system. Refer to Section 10 for instructions for rigging the nose wheel steering and the rudder system.
- 5-65. **BRAKE SYSTEM.** (See figure 5-3.)
- 5-66. **DESCRIPTION.** The hydraulic brake system is comprised of two master cylinders, located immediately forward of the pilot's rudder pedals, brake lines and hose connecting each master cylinder to its wheel brake cylinder, and the single-disc, floating cylinder-type brake assembly, located at each main landing gear wheel.
- 5-67. **TROUBLE SHOOTING.**

TROUBLE	PROBABLE CAUSE	REMEDY
DRAGGING BRAKES.	Brake pedal binding.	Check and adjust properly.
	Parking brake linkage holding brake pedal down.	Check and adjust properly.
	Worn or broken piston return spring (in master cylinder.)	Repair, or install new cylinder.
	Insufficient clearance at Lock-O-Seal or incorrect adjustment of cylinder overall length.	Adjust as outlined in paragraph 5-84. (Thru aircraft serials 17271034 and F17201749.)
	Restriction in hydraulic lines or restrictions in compensating port in brake master cylinder.	Drain brake line and clean the inside of the brake line with filtered compressed air. If cleaning the lines fails to give satisfactory results, the master cylinder may be faulty and should be repaired.

MODEL 172 SERIES SERVICE MANUAL

5-67. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
DRAGGING BRAKES. (Cont).	Worn, scored or warped brake disc.	Install new disc and brake linings.
	Damaged or accumulated dirt restricting free movement of wheel brake parts.	Clean and repair or install new parts as necessary.
BRAKES FAIL TO OPERATE.	Leak in system.	If brake master cylinders or wheel cylinder assemblies are leaking, repair, or install new parts.
	Air in system.	Bleed system.
	Lack of fluid in master cylinders.	Fill and bleed system.
	Defective master cylinder.	Repair, or install new parts.

5-68. HYDRAULIC BRAKE LINES.

5-69. **DESCRIPTION.** The brake lines are rigid tubing, except for flexible hose used at the brake master cylinders. A separate line is used to connect each brake master cylinder to its corresponding wheel brake cylinder.

5-70. WHEEL BRAKE ASSEMBLIES. (See figure 5-3.)

5-71. **DESCRIPTION.** (See figure 5-3.) The wheel brake assemblies use a floating brake assembly and a disc which is attached to the main wheel.

5-72. **WHEEL BRAKE REMOVAL.** (See figure 5-3.) Wheel brake assemblies can be removed by disconnecting the brake line (drain hydraulic brake fluid when disconnecting line) and removing the brake back plate. The brake disc is removed after the wheel is removed and disassembled. To remove the torque plate, remove wheel and axle.

5-73. **WHEEL BRAKE DISASSEMBLY.** See figure 5-3 for a breakdown of wheel brake parts. This figure may be used as a guide for disassembling the wheel brakes.

5-74. WHEEL BRAKE INSPECTION AND REPAIR. (See figure 5-3.)

- Clean all parts except brake linings and O-rings in dry cleaning solvent and dry thoroughly.
- Install all new O-rings. If O-ring reuse is necessary, wipe with a clean cloth saturated in hydraulic fluid and inspect for damage.

NOTE

Thorough cleaning is important. Dirt and chips are the greatest single cause of malfunctions in the hydraulic brake system.

MODEL 172 SERIES SERVICE MANUAL

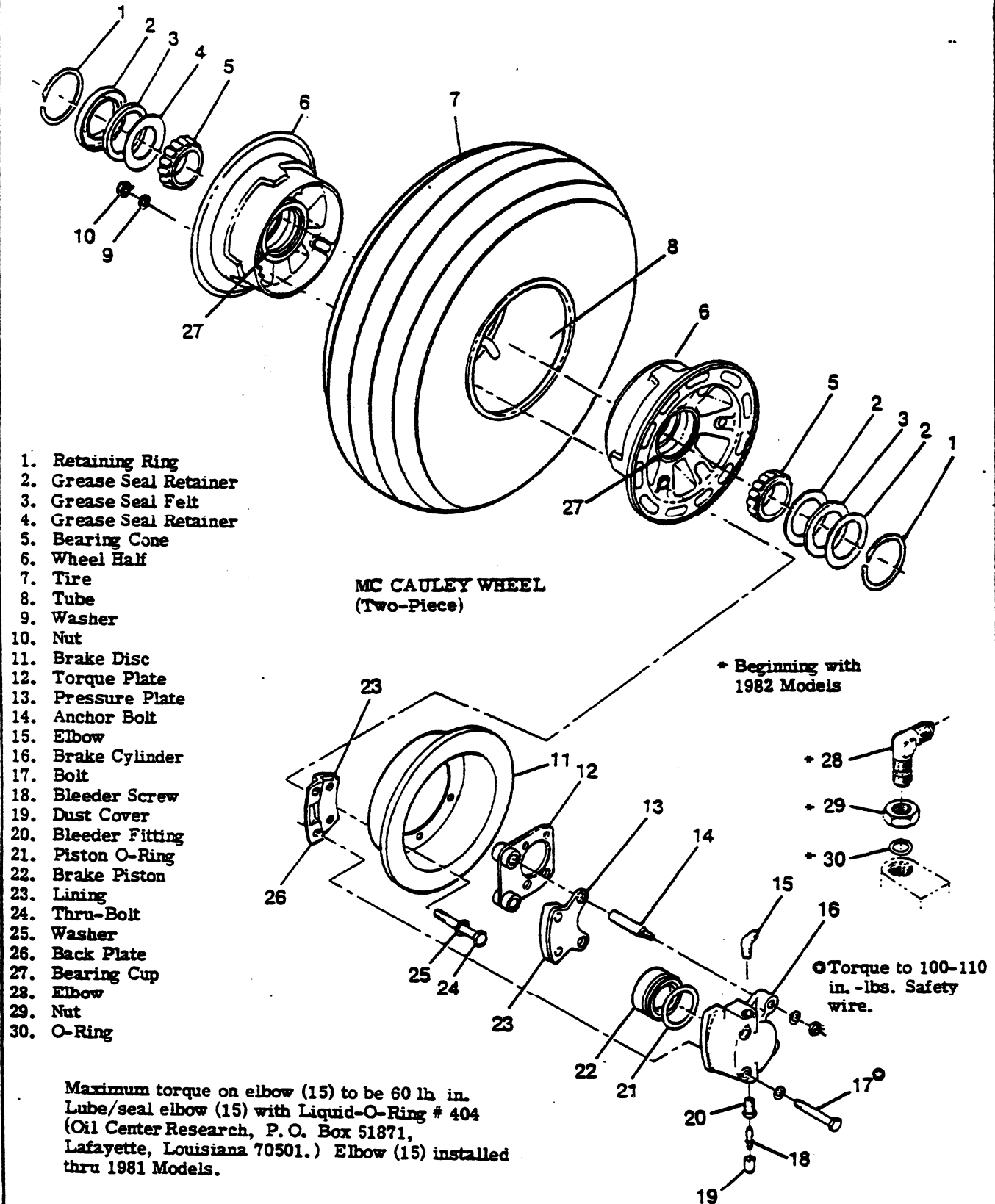


Figure 5-3. Main Wheel and Brake (Sheet 1 of 3)

MODEL 172 SERIES SERVICE MANUAL

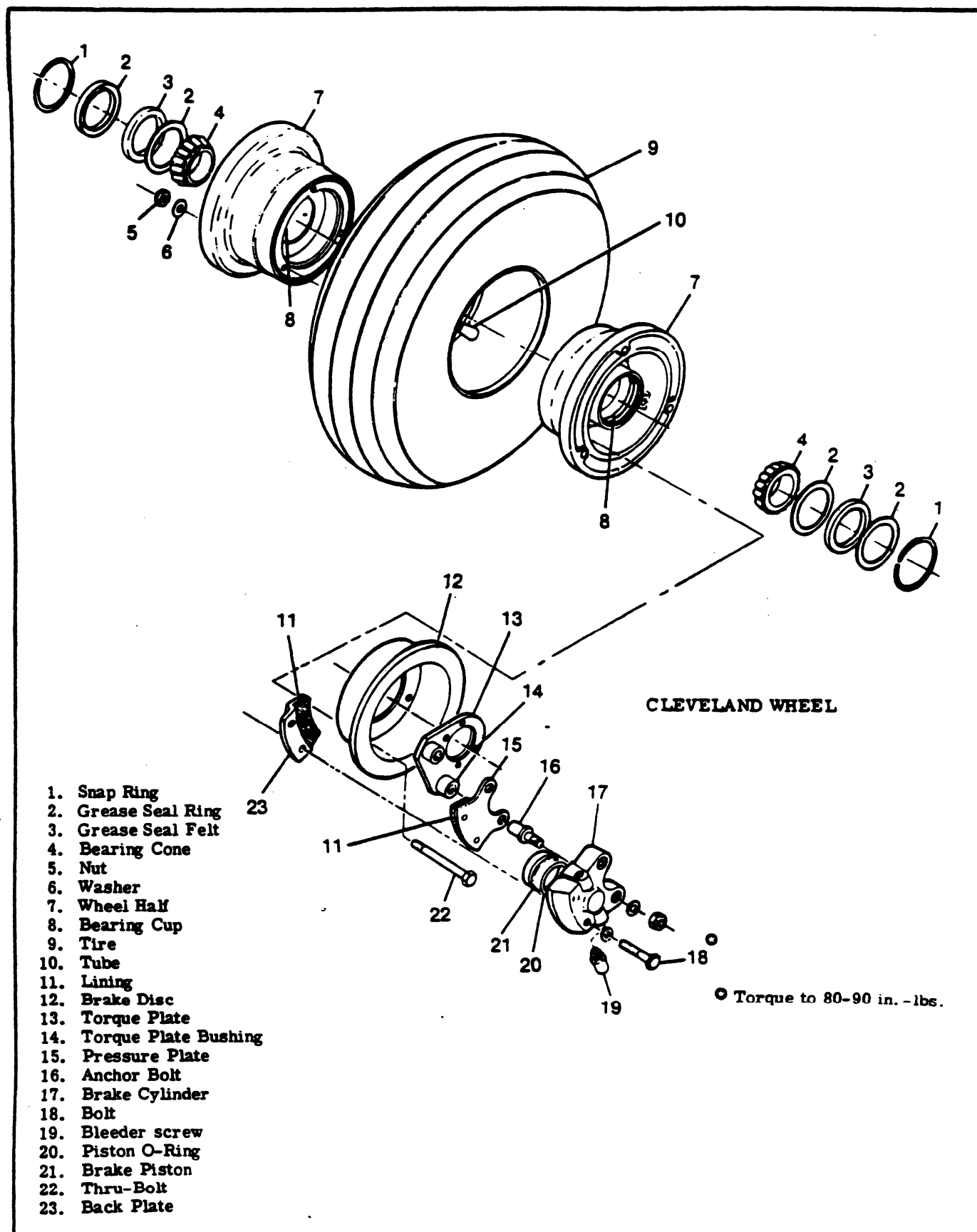


Figure 5-3. Main Wheel and Brake (Sheet 2 of 3)

MODEL 172 SERIES SERVICE MANUAL

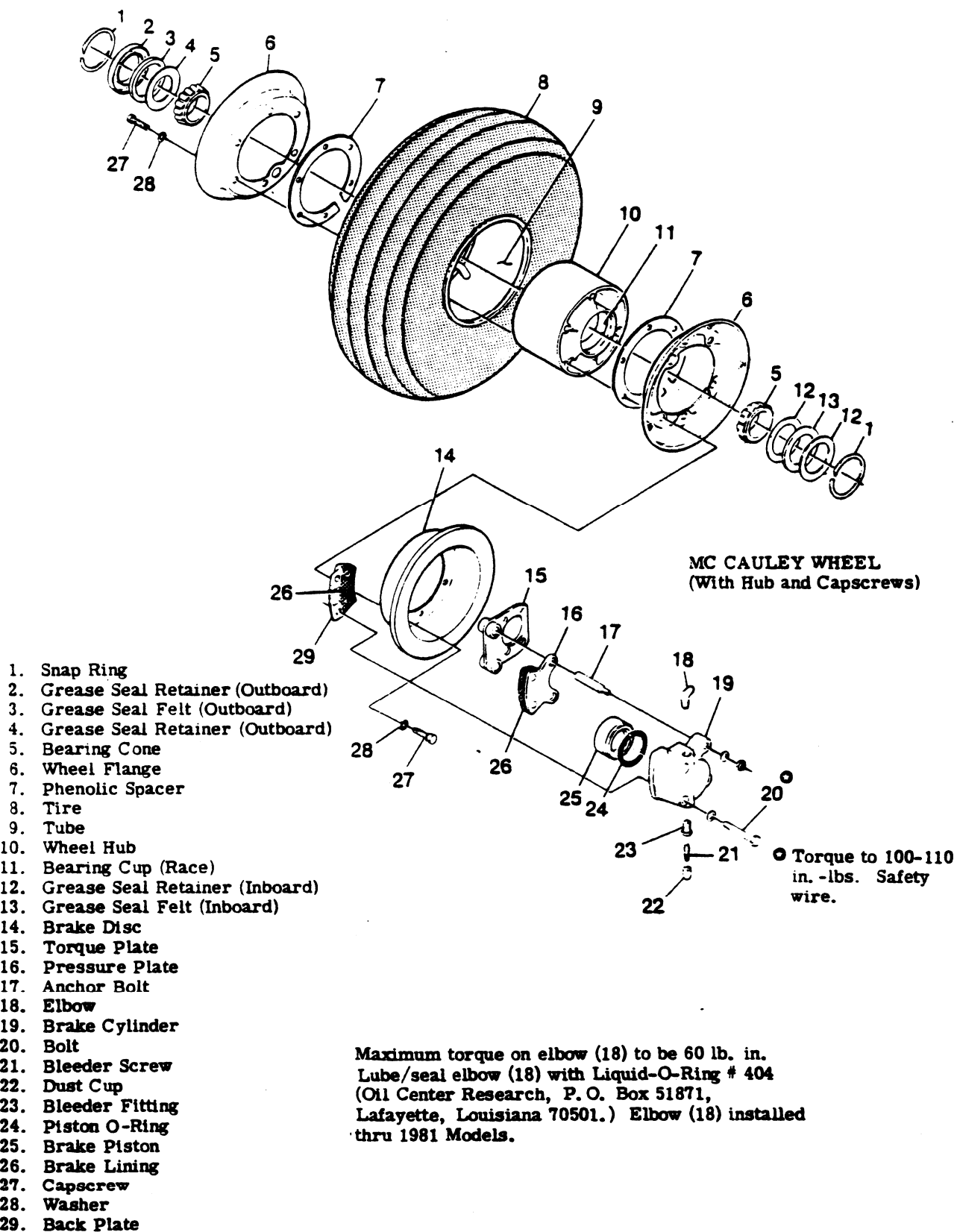


Figure 5-3. Main Wheel and Brake (Sheet 3 of 3)

MODEL 172 SERIES SERVICE MANUAL

- c. Check brake lining for deterioration and maximum permissible wear. (Refer to applicable paragraph for maximum wear limit.)
- d. Inspect brake cylinder bore for scoring. A scored cylinder will leak or cause rapid O-ring wear. Install a new brake cylinder if the bore is scored.
- e. If the anchor bolts on the brake assembly are nicked or gouged, they shall be sanded smooth to prevent binding with the pressure plate or torque plate. When new anchor bolts are to be installed, press out old bolts and install new bolts with a soft mallet.
- f. Inspect wheel brakes disc for a minimum thickness of 0.190 (McCauley) or 0.205 (Cleveland). If brake disc is below minimum thickness, install a new part.

5-75. WHEEL BRAKE REASSEMBLY. (See figure 5-3.)

NOTE

Lubricate parts with clean hydraulic fluid during brake reassembly.

- a. See figure 5-3 for reassembling wheel brakes.
- b. Thru 1981 Models, torque elbow (18) to a maximum of 60 lb. in. Lube/seal with Liquid O-Ring No. 404 (Oil Research, P.O. Box 51971, Lafayette, La. 7050).
- c. Torque bolt (20) to 120-130 lb. in.
- d. Thru 1981 Models, torque bleeder screw (21) to 30-40 lb. in.

5-76. WHEEL BRAKE INSTALLATION.

- a. Place brake assembly in position with pressure plate in place.
- b. Install back plate.

NOTE

If torque plate was removed, install as the axle is installed, or install on axle. If the brake disc was removed, install as wheel is assembled.

5-77. CHECKING BRAKE LINING WEAR. New brake lining should be installed when the existing lining has worn to a minimum thickness of 3/32-inch. A 3/32-inch thick strip of material held adjacent to each lining can be used to determine amount of wear. The shank end of a drill bit of the correct size can also be used to determine wear of brake linings.

5-78. BRAKE LINING INSTALLATION. (See figure 5-3.)

- a. Remove bolts securing back plate, and remove back plate.
- b. Pull brake cylinder out of torque plate and slide pressure plate off anchor bolts.
- c. Place back plate on a table with lining side down flat. Center a 9/64-inch (or slightly smaller) punch in the rolled rivet, and hit the punch sharply with a hammer. Punch out all rivets securing the linings to the back plate and pressure plate in the same manner.

NOTE

A rivet setting kit, Part No. 199-00100, is available from the Cessna Supply Division. This kit consists of an anvil and punch.

- d. Clamp the flat side of the anvil in a vise.
- e. Align new lining on back plate and place brake rivet in hole with rivet head in the

MODEL 172 SERIES SERVICE MANUAL

- lining. Place the head against the anvil.
- f. Center rivet setting punch on lips of rivet. While holding back plate down firmly against lining, hit punch with hammer to set rivet. Repeat blows on punch until lining is firmly against back plate.
- g. Realign the lining on the back plate and install and set rivets in the remaining holes.
- h. Install a new lining on pressure plate in the same manner.
- i. Position pressure plate on anchor bolts and place cylinder in position so that anchor bolts slide into the torque plate.
- j. Install back plate with bolts and washers.
- k. Refer to paragraph 5-90 for brake lining burn-in procedure.

5-79. BRAKE SYSTEM BLEEDING.

NOTE

Bleeding with a clean hydraulic pressure source connected to the wheel bleeder is recommended.

- a. Remove brake master cylinder filler plug and screw flexible hose with appropriate fitting into the filler hole at top of the master cylinder.
- b. Immerse opposite end of flexible hose in a container with enough hydraulic fluid to cover the end of the hose.
- c. Connect a clean hydraulic pressure source, such as a hydraulic hand pump or Hydro-Fill unit, to the bleeder valve in the wheel cylinder.
- d. As fluid is pumped into the system, observe the immersed end of the hose at the master brake cylinder for evidence of air bubbles being forced from the brake system. When bubbling has ceased, remove bleeder source from wheel cylinder and tighten the bleeder valve.

5-80. BRAKE MASTER CYLINDER.

- 5-81. **DESCRIPTION.** The brake master cylinders, located immediately forward of the pilot's rudder pedals, are actuated by applying pressure at the top of the rudder pedals. A small reservoir is incorporated into each master cylinder for the fluid supply. When dual brakes are installed, mechanical linkage permits the copilot pedals to operate the master cylinders.

5-82. BRAKE MASTER CYLINDER REMOVAL.

- a. Remove front seats and rudder bar shield for access to the brake master cylinders.
- b. Remove bleeder screw at wheel brake assembly and drain hydraulic fluid from brake cylinders.
- c. Disconnect parking brake and disconnect brake master cylinders from rudder pedals.
- d. Disconnect hydraulic hose from brake master cylinders and remove cylinders.
- e. Plug or cap hydraulic fittings, hose and lines, to prevent entry of foreign material.

5-83. DISASSEMBLY. (Thru aircraft serials 17271034 and F17201749.) (See figure 5-13, sheet 1 of 2.)

- a. Unscrew clevis (1) and jamnut (2).
- h. Remove screw (18) and washer (19).
- c. Remove filler plug (17) and setscrew(5).
- d. Unscrew cover (4) and remove up over piston rod (3).
- e. Remove piston rod (3) and compensating sleeve (16).
- f. Slide sleeve (16) up over rod (3).
- g. Unscrew nut (12) from threads of piston rod (3).
- h. Remove spring (13) and O-ring (9) from piston (14).

MODEL 172 SERIES SERVICE MANUAL

- i. Remove Lock-O-Seal (15).
- 5-84. **INSPECTION AND REPAIR.** (Thru aircraft serials 17271034 and F17201749.) (See figure 5-13, sheet 1 of 2). Repair is limited to installation of new parts, cleaning and adjusting. (Refer to reassembly paragraph for adjustment.) Use clean hydraulic fluid (MIL-H-5606) as a lubricant during reassembly of the cylinders. Inspect Lock-O-Seal (Parker Seal Co. P/N 800-001-6) and replace if damaged. Replace all O-rings. Filler plug (17) must be vented so pressure cannot build up in the reservoir during brake operation. Remove plug and drill 1/16-inch hole; 30° from vertical, if plug is not vented.
- 5-85. **REASSEMBLY.** (Thru aircraft serials 17271034 and F17201749.) (See figure 5-13, sheet 1 of 2.)
- a. Install Lock-O-Seal (15) at bottom of piston rod (3).
 - b. Install O-ring (9) in groove in piston (14); insert piston spring (13) into piston, and slide assembly up on bottom threaded portion of piston rod (3).
 - c. Run nut (12) up threads to spring (13). Tighten nut (12) enough to obtain 0.040 ± 0.005 -inch clearance between top of piston and bottom of Lock-O-Seal, as shown in the figure.
 - d. Install piston return spring (11) into cylinder (10) portion of body (7).
 - e. Install piston rod end (3) through spring (11).
 - f. Slide compensating sleeve (16) over rod (3).
 - g. Install cover (4), washer (19) and screw (18).
 - h. Install jamb nut (2) and clevis (1).
 - i. Install filler plug (17), making sure vent hole is open.
 - j. Install setscrew (5).
- 5-86. **DISASSEMBLY.** (Beginning with aircraft serials 17271035 and F17201750.) (See figure 5-13, sheet 2 of 2.)
- a. Unscrew clevis (1) and jamb nut (2).
 - b. Remove filler plug (3).

NOTE

A special tool, brake master cylinder wrench No. 34-101 is available from the Cessna Supply Division to accomplish the following step.

- c. Unscrew cover (4) and remove up over piston (5).
 - d. Remove piston (5) and spring (8).
 - e. Remove packing (7) and back-up ring (6) from piston (5).
- 5-87. **INSPECTION AND REPAIR.** (Beginning with aircraft serials 17271035 and F17201750.) (See figure 5-13, sheet 2 of 2.) Repair is limited to installation of new parts and cleaning. Use clean hydraulic fluid (MIL-H-5606) as a lubricant during reassembly of the cylinders. Replace packing and back-up ring. Filler plug (3) must be vented so pressure cannot build up during brake operation. Remove plug and drill 1/16-inch hole, 30° from vertical, if plug is not vented. Refer to view A-A for location of vent hole.
- 5-88. **REASSEMBLY.** (Beginning with aircraft serials 17271035 and F17201750.) (See figure 5-13, sheet 2 of 2.)
- a. Install spring (8) in cylinder body (9).
 - b. Install back-up ring (6) and packing (7) in groove of piston (5).
 - c. Install piston (5) in cylinder body (9).
 - d. Install cover (4) over piston (5) and screw cover into cylinder body (9).

MODEL 172 SERIES SERVICE MANUAL

- e. Install nut (2) and clevis (1).
- f. Install filler plug (3), making sure vent hole is open.

5-89. BRAKE MASTER CYLINDER INSTALLATION.

- a. Connect hydraulic hoses to brake master cylinders and install cylinders.
- b. Connect brake master cylinders to rudder pedals and connect parking brake linkage.
- c. Install bleeder screw at wheel brake assembly and fill and bleed brake system in accordance with paragraph 5-79.
- d. Install rudder bar shield and install front seats.

NOTE

Ensure that seat stops are installed properly.

5-90. BRAKE LINING BURN-IN. The brake pads are equipped with either a non-asbestos organic lining or an iron based metallic lining. These materials must be properly conditioned (glazed) in order to provide maximum performance and service life. This is accomplished by a brake burn-in.

- a. Non-asbestos organic lining.
 - 1. Taxi airplane for 1500 feet with engine at 1700 RPM applying brake pedal force as needed to develop a 5 to 9 knots taxi speed.
 - 2. Allow brakes to cool for 10 to 15 minutes.
 - 3. Apply brakes and check to see if a high throttle static run up may be held with normal pedal force. If so, burn-in is completed.
 - 4. If static run up cannot be held, repeat steps 1 thru 3 as needed to successfully hold.
- b. Iron based metallic lining.
 - 1. Perform two consecutive full stop braking applications from 30 to 35 knots. Do not allow the brake discs to cool substantially between stops.

NOTE

Light brake usage can cause the glaze to wear off, resulting in reduced brake performance. In such cases, the lining may be conditioned again following the instructions set forth in this burn-in procedure.

5-91. PARKING BRAKE SYSTEM. (See figure 5-14.)

5-92. DESCRIPTION. The parking brake system employs a handle and a ratchet mechanism connected by a cable to linkage at the brake master cylinders. Pulling out on the handle depresses both master cylinder piston rods, and the handle ratchet locks the handle in this position until the handle is turned and released.

5-93. REMOVAL AND INSTALLATION OF COMPONENTS. See figure 5-14 for relative location of system components. The figure may be used for removal and installation of parts of the system.

MODEL 172 SERIES SERVICE MANUAL

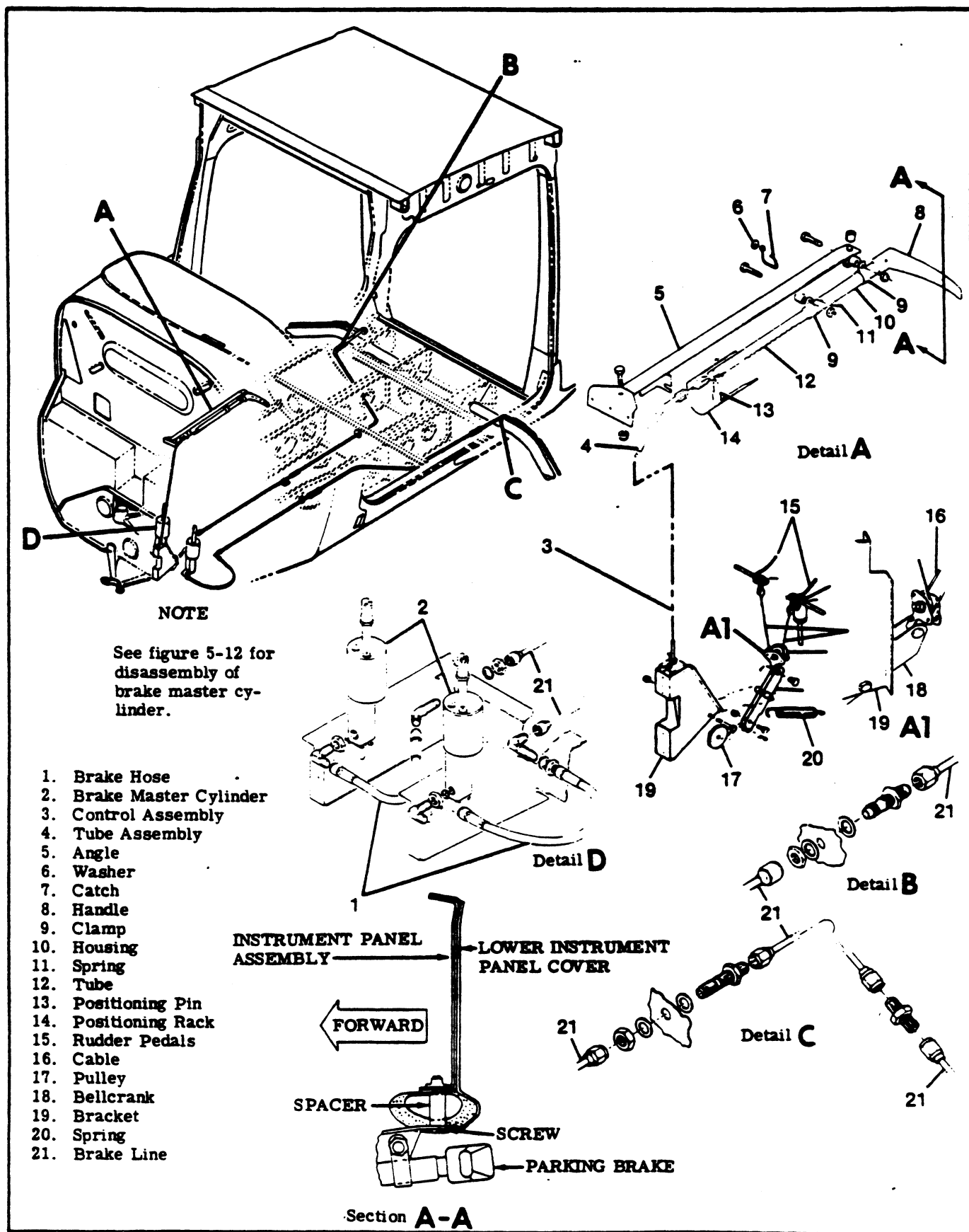


Table 101 - Continued
Brake Assembly Troubleshooting

TROUBLE	PROBABLE CAUSE	CORRECTION
2. Brake drag.	Piston cocked in cylinder, resulting in overheating brake and/or excessive lining wear.	Remove and repair cylinder or piston, or replace brake.
	Foreign matter wedged in brakes.	Locate and remove.
	Back pressure due to malfunction of master cylinder or parking valve.	Bleed hydraulic system and/or repair/replace master cylinder or parking valve.
	Water or ice in hydraulic system.	Flush and bleed hydraulic system (thaw ice first).
	Excessive bolt torque has caused back plate to crush cylinder, evidenced by depressions around bolt holes.	Replace cylinder and follow manufacturer's recommended torque value.
	Piston does not retract.	Bleed system and/or remove piston. Inspect for damage.
	Warped pressure plate.	Replace pressure plate or flatten to within 0.010 inch (0.254 mm).
	Rigid hydraulic line(s) prevents brake from floating freely. Flexible hydraulic lines are recommended.	Check free cylinder movement. Position cylinder and re-tighten fitting.
	Corroded anchor bolts and/or torque plate bushings.	Clean and lubricate or replace.
	Cocked anchor bolts and/or torque plate bushings.	Replace.
	Bent/cracked torque plate.	Replace.
	Warped brake disc - can be checked by laying a straightedge across disc face.	Replace and use caution during operation to prevent excessive energy input into brake.
	Out of position/stuck lining.	Repair/replace.
	Restriction in hydraulic line.	Isolate and remove restriction.
	Lining not firmly seated flush against pressure/back plate.	Debur rivet hole on surface adjacent to lining.