

**AA-5 SERIES  
MAINTENANCE MANUAL**

**CHAPTER 32**

**LANDING GEAR**

**TABLE OF CONTENTS**

<u>NUMBER</u>		<u>PAGE</u>
32-0	LANDING GEAR	
	Description/Operation	1
	General	1
32-1-1	MAIN LANDING GEAR	
	Description/Operation	1
	General	1
	Maintenance Practices	201
	Removal/Installation of Main Landing Gear	201
	Visual Inspection of Main Landing Gear	204
	Repair of Main Landing Gear Strut	204
32-2-1	NOSE LANDING GEAR	
	Description/Operation	1
	General	1
	Maintenance Practices	201
	Removal/Installation of Nose Landing Gear	201
	Inspection and Minor Repair of Nose Landing Gear	206
	Removal/Installation of Shock Absorbers	206
32-4-1	WHEELS AND TIRES	
	Description/Operation	1
	General	1
	Maintenance Practices	201
	Removal/Installation of Main Gear Wheel Assemblies	201
	Disassembly/Reassembly of Main Gear Wheel Assemblies	201
	Removal/Installation of Nose Wheel Assembly	203
	Disassembly/Reassembly of Nose Wheel Assembly	204
	Removal/Installation of Main Wheel Fairing	206

**AA-5 SERIES  
MAINTENANCE MANUAL**

<u>NUMBER</u>	<u>PAGE</u>
Removal/Installation of Nose Wheel Fairing	207
Main Landing Gear Wheel Alignment	207
<b>32-4-2 BRAKES</b>	
Description/Operation	1
General	1
Special Tools	1
Maintenance Practices	201
Removal/Installation of Master Cylinder	201
Disassembly/Reassembly of Master Cylinder- Non-Reservoir Type	201
Disassembly/Reassembly of Master Cylinder- Reservoir Type	203
Removal/Installation of Wheel Brake Assemblies	205
Bleeding Hydraulic Brake System	205
Cleaning Brake System Parts	206
Inspection of Brake System Parts	206
Testing Brake Master Cylinders	207
Rigging the Parking Brake	208
Relining Brakes	210

**AA-5 SERIES  
MAINTENANCE MANUAL**

LANDING GEAR - DESCRIPTION/OPERATION

1. General

All models of the AA-5 aircraft utilize a non-retractable, tricycle type landing gear. The main gear consists of fiberglass struts attached to forged brackets which mount to the carry through spar. On Aircraft AA-5, Serial No. 0641 and subsequent, AA-5A and AA-5B the main gear struts are enclosed in a streamlining fairing. Forgings attached to the lower end of each main landing gear strut serve as the wheel axles and as an attaching base for the brake torque plate assembly. The nose gear is the castering type and consists of a tubular strut attached to the torque tube and yoke assembly mounted in the fuselage. On Aircraft AA-5, Serial No. 0641 and subsequent, AA-5A and AA-5B the nose gear strut has a streamlining fairing attached to the aft side.

The aircraft is furnished, at the customer's option, with wheel fairings for all three wheels. The fairings are equipped with an adjustable scraper which prevents mud and slush from entering the fairing cavity. Aircraft operation on rough field conditions, with tires out of balance, or in snow, ice, or mud can be detrimental to the life of the wheel fairings and should be avoided, if possible.

AA-5 SERIES  
MAINTENANCE MANUAL

MAIN LANDING GEAR - DESCRIPTION/OPERATION

1. General

The main landing gear consists of the right and left hand gear assemblies. Each assembly consists of a laminated fiberglass strut, forged wheel axle, attaching brackets, strut fairings, and attaching hardware. Wheel fairings are a customer option. When wheel fairings are installed on the landing gear, the strut fairing caps cannot be used.

MAIN LANDING GEAR - MAINTENANCE PRACTICES

1. Removal/Installation of Main Landing Gear

A. Remove Main Landing Gear (See Figure 201)

- (1) Support the aircraft on jacks (refer to Chapter 7).
- (2) Remove the wing and wing root (refer to Chapter 57).
- (3) Bleed the fluid from the brake system and disconnect the brake line at the fuselage.
- (4) Remove the fuel tank sump (refer to Chapter 28).
- (5) Remove main landing gear wheel (refer to 32-4-1).
- (6) Support the main gear strut assembly and remove nuts (3), bolts (4), and washers (5) that secure the strut brackets to the spar mounting bracket (9) and remove the landing gear assembly and shims (6).
- (7) Remove bolts (7), washers (8), and remove spar mounting bracket (9).
- (8) Disassemble the landing gear strut assembly as follows:
  - (a) Remove nuts (10), bolts (11), washers (12), and separate brackets (13, 14, and 15), shims (16, 17, and 18), spacer (19), and spring plate (20) from strut (21).
  - (b) Remove nuts (22), bolts (23), washers (24), and separate axle (25), bracket (26), reinforcement plate (27), and shims (28) from strut (21).
  - (c) Remove nuts (29), bolts (30), and washers (31) to remove torque plate assembly (7, Figure 201, 32-4-1).

B. Install Main Landing Gear

- (1) When installing the main landing gear observe the following torque values:

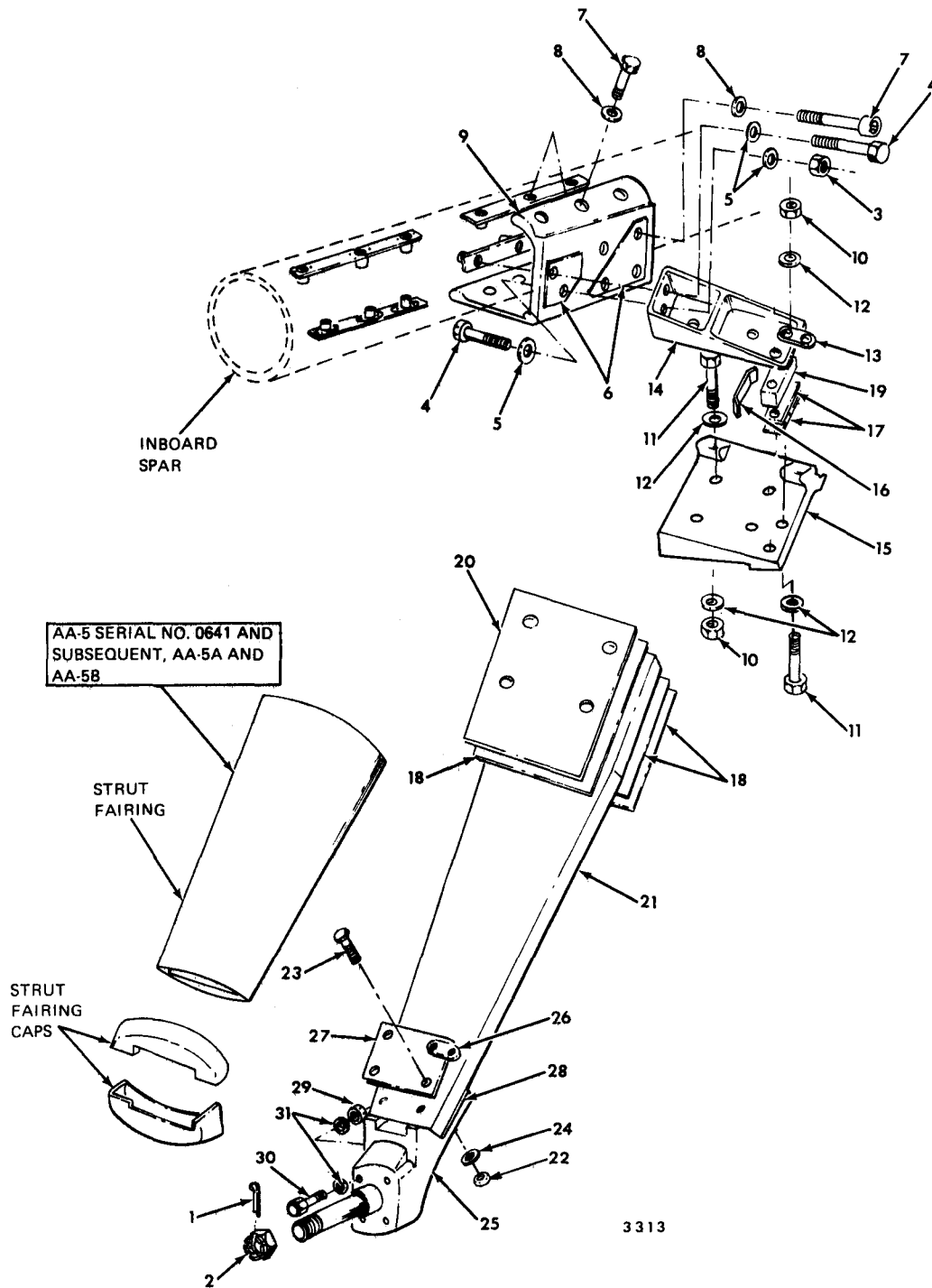
<u>BOLT DIA. (in.)</u>	<u>TORQUE (in. lb)</u>
1/2	650-750
3/8	250-300
5/16	200-225

- (2) Check shims for excessive wear or hole elongation and replace if necessary. Shims must assure a tight fit.

**NOTE:** Install shims in same order and position as prior to disassembly.

- (3) Assemble the landing gear strut assembly as follows:
  - (a) Position torque plate assembly (7, Figure 201, 32-4-1) in place on axle (25, Figure 201) and install bolts (30), washers (31), and nuts (29).
  - (b) Assemble shims (28), axle (25), reinforcement plate (27), and bracket (26) in place on strut (21) and install bolts (23), washers (24), and nuts (22).
  - (c) Assemble shims (18, 17, and 16), spring plate (20), spacer (19), bracket (15, 14, and 13) in place on spar (21) and install bolts (11), washers (12), and nuts (10).

AA-5 SERIES  
MAINTENANCE MANUAL



Main Landing Gear (Sheet 1 of 2)  
Figure 201

**AA-5 SERIES  
MAINTENANCE MANUAL**

1. Cotter Pin	17. Shims
2. Nut	18. Shims
3. Nut	19. Spacer
4. Bolt	20. Spring Plate
5. Washer	21. Strut
6. Shims	22. Nut
7. Bolt	23. Bolt
8. Washer	24. Washer
9. Bracket	25. Axle
10. Nut	26. Bracket
11. Bolt	27. Plate
12. Washer	28. Shim
13. Bracket	29. Nut
14. Bracket	30. Bolt
15. Bracket	31. Washer
16. Shim	

**Main Landing Gear (Sheet 2 of 2)  
Figure 201**

- (4) Apply an approved solid film lubricant to the mating surfaces of the inboard spar and spar mounting bracket (9). Approved solid film lubricants are:
- McLube 1708 by McGee Chemicals Co., Inc.  
Lube-Lok 5396 by Allen Aircraft Products, Inc.
- (5) Position spar mounting bracket (9) in place on inboard spar and install washers (8) and bolts (7).
- (6) Position shims (6) and main gear strut assembly in place and install bolts (4), washers (5), and nuts (3) that secure strut assembly to spar mounting bracket (9) and to the inboard spar.
- (7) Install the fuel tank sump (refer to Chapter 28.)
- (8) Connect brake system fluid line at the fuselage.
- (9) Install main gear wheel on axle (25) and install nut (2) and cotter pin (1).
- (10) Service the brake system as outlined in 32-4-2, Paragraph 5.
- (11) Install wing root and wing (refer to Chapter 57).
- (12) Remove aircraft from jacks.

2. Visual Inspection of Main Landing Gear

A visual inspection of the main landing gear strut and attach brackets should be made at each 100 hour inspection and after any hard or overweight landing. Inspect the laminated fiberglass main gear struts for evidence of nicks, cracks, delamination, and deterioration of the protective paint coating. On aircraft with streamline fairing installed, inspect the struts above and below the fairing. Refer to Chapter 5 for scope of inspections and detailed procedures.

3. Repair of Main Landing Gear Strut

NOTE: (1) Minor surface delaminations are acceptable providing they do not extend more than one ply into the surface of the strut. Corner delaminations (slivers) are acceptable if they are smaller than 1/16 x 1/16 in. in size throughout their length. If airworthiness of a damaged fiberglass strut is in question, close-up photographs of the damaged area may be submitted to Grumman American Aviation Corporation for analysis and recommendations.

Corrective Action - Remove delaminated material. Smooth out minor paint chips or stone bruises with No. 150 Tri-Mite. Clean unpainted areas thoroughly with Methyl Ethyl Ketone. Seal minor surface or corner delaminations with a two-part epoxy adhesive to seal out moisture from the damaged area. Clean strut with wax and grease remover and prime with two light coats of Zinc Chromate Primer per MIL-P-8585 (see Chapter 12) and paint to match aircraft color.

NOTE: (2) Epoxy adhesive is available from the Grumman American Supply Operations or may be purchased locally.



**AA-5 SERIES  
MAINTENANCE MANUAL**

**NOSE LANDING GEAR – DESCRIPTION/OPERATION**

1. **General**

The nose landing gear consists of a fuselage mounted torque tube and yoke assembly connected to a non-steerable strut with a castering nose wheel mounted on the forward end. Normal servicing of the nose wheel strut includes the application of grease to the nose fork swivel and adjustment of the Belleville washers. Aircraft AA5A-0283 and subsequent and AA5B-0400 and subsequent are equipped with a pair of shock absorbers connected to the nose landing gear strut. The shock absorbers eliminate porpoising when the aircraft is rolling over rough terrain.

Shock absorber installations can be made on any AA-5, AA-5A, or AA-5B aircraft. Accessory kit AK-129 and installation services are available through Grumman American Dealers.

NOSE LANDING GEAR – MAINTENANCE PRACTICES

1. Removal/Installation of Nose Landing Gear Assembly

A. Remove Nose Landing Gear Assembly

**NOTE:** If the aircraft is equipped with shock absorbers, refer to Paragraph 3 for removal.

- (1) Remove the weight from the nose gear by either tying down the tail or placing a suitable support under the front of the fuselage.
- (2) Remove bolt (1, Figure 201) and spacer (2).
- (3) Remove cotter pin (3), nuts (4), washers (5), and withdraw axle rod (6) from nose wheel.
- (4) Remove plugs (7), spacers (8), and axle (9).

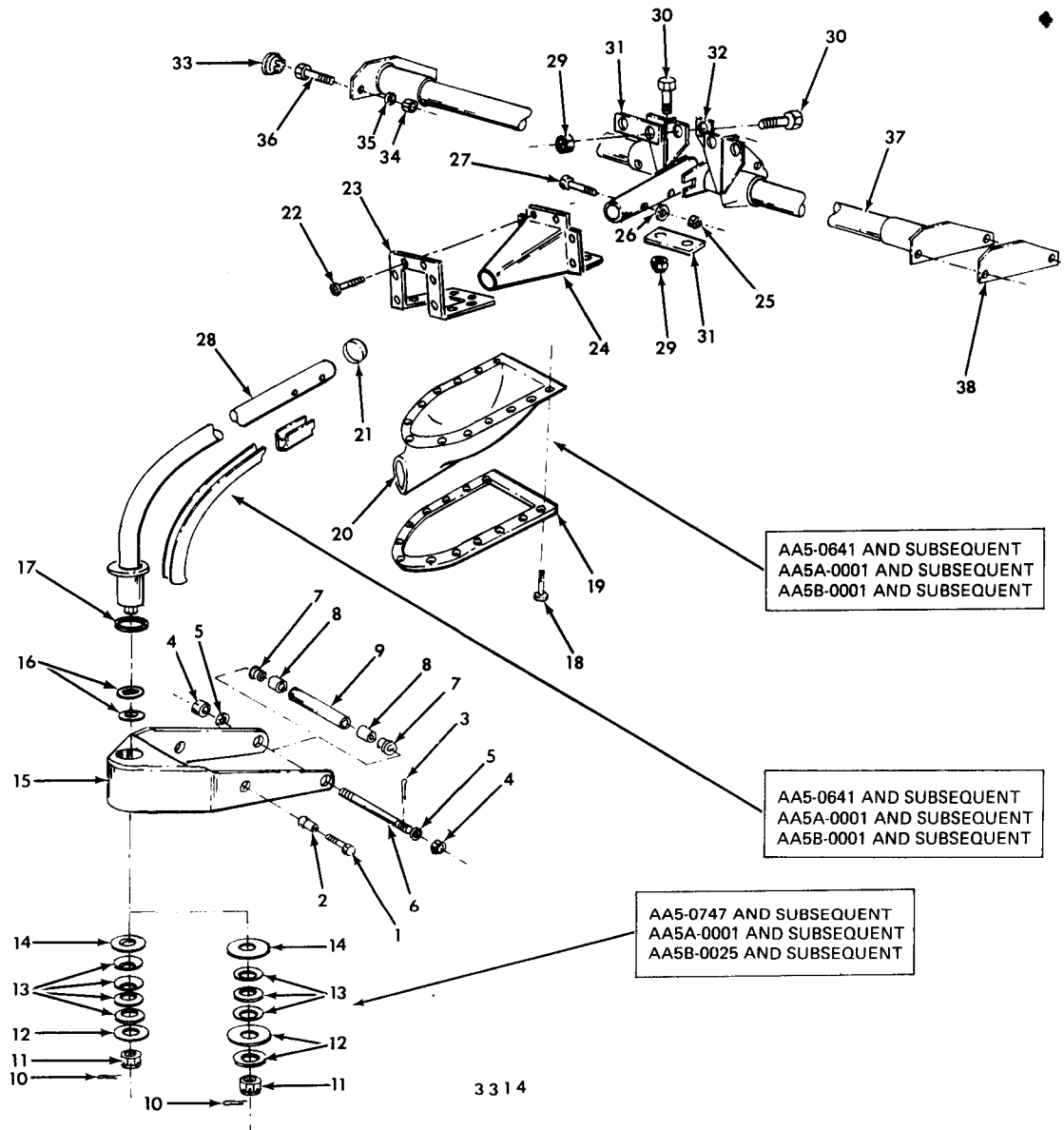
**NOTE:** Some aircraft have nose wheel fairing installed as an optional item.

- (5) Remove cotter pin (10), nut (11), washers (12, 13, and 14), fork assembly (15) with fairing assembly attached, thrust bearing (16), and O-ring (17).
- (6) Remove two attaching bolts and remove nose wheel fairing from fork assembly (15).
- (7) On aircraft AA5-0641 and subsequent, and AA-5A, and AA-5B, remove screws (18), retainer (19), and slide fairing boot (20) down the strut.
- (8) Remove nose gear boot clamp (21), screws (22), nose gear boot plate (23), and slide boot (24) down the strut.
- (9) Remove nuts (25), washers (26), bolts (27), and slide the strut (28) from the torque tube and yoke assembly. Slide boots (20) and (24) off strut (28).

**NOTE:** The torque tube and yoke assembly is located in the front end of the fuselage. To gain access to the torque tube and yoke assembly, some items of equipment must be removed from the cockpit area.

- (10) Remove the front seats (refer to Chapter 25).
- (11) Remove the left-hand and right-hand forward console panels. The panels may be easily removed by grasping the forward edge at the firewall and bending the panels out 90 degrees and parallel with the firewall. Then slide the panels forward far enough so that they slip out from behind the aft portion of the console.
- (12) Remove the left side fresh air box assembly.
- (13) Remove the upholstery side panels and fiberglass insulating material from the left and right-hand forward inside panels.
- (14) Remove the lower cowling (refer to Chapter 71).
- (15) Disconnect the rudder return springs by unbolting the eye bolts from the forward face of the firewall. Note that additional washers are used under the left-hand eye bolt for proper rudder pedal centering and rudder trim.
- (16) Remove the nuts that secure the right forward rudder bar attach bracket to the floor. Lift the rudder bar up and aft to provide clearance for removing left brake cylinder attach brackets on co-pilot's side.
- (17) Remove the nuts that attach the brake cylinder brackets to the floor. Lift brake cylinders free from the floor and allow pedals to rotate aft.

AA-5 SERIES  
MAINTENANCE MANUAL



Nose Landing Gear Assembly (Sheet 1 of 2)  
Figure 201

**AA-5 SERIES  
MAINTENANCE MANUAL**

1. Bolt	20. Boot
2. Spacer	21. Clamp
3. Cotter Pin	22. Screw
4. Nut	23. Plate
5. Washer	24. Boot Ass'y
6. Axle Rod	25. Nut
7. Plug	26. Washer
8. Spacer	27. Bolt
9. Axle	28. Strut Ass'y
10. Cotter Pin	29. Nut
11. Nut	30. Bolt
12. Washers	31. Doubler
13. Belleville Washers	32. Clip
14. Washer	33. Plug Button
15. Fork Assembly	34. Nut
16. Thrust Bearings	35. Washer
17. O-ring	36. Bolt
18. Screw	37. Torque Tube and Yoke Ass'y
19. Retainer	38. Shim

**Nose Landing Gear Assembly (Sheet 2 of 2)  
Figure 201**

- (18) Remove clevis pins from left and right brake cylinder attachment to rudder pedals on pilot's side.
- (19) Disconnect one end of the parking brake chain by cutting the wire which attaches it to the link on the master cylinder (pilot's side).
- (20) Move the left and right master cylinders on the pilot's side up as high as possible and against the firewall and secure them temporarily in this position.
- (21) Remove the screws and nuts which attach the throttle cable clamps to the instrument panel brace.
- (22) Remove the nuts that attach the T-column support to the floor. Lift the T-column and support assembly from the studs which protrude through the floor and allow the assembly to come as far aft as possible.
- (23) Remove nuts (29), bolts (30), doublers (31), and clips (32) that secure the center torque tube and yoke bearing supports to the floor and firewall.

AA-5 SERIES  
MAINTENANCE MANUAL

- (24) Remove the four plug buttons (33) on the lower forward fuselage and the four nuts (34), washers (35), and bolts (36) which secure the ends of the torque tube and yoke assembly (37) to the fuselage side panels.

**CAUTION:** CARE SHOULD BE TAKEN NOT TO WEDGE THE TORQUE TUBE ASSEMBLY INTO THE FUSELAGE PANELS AS DAMAGE TO THE HONEYCOMB SKIN MAY RESULT.

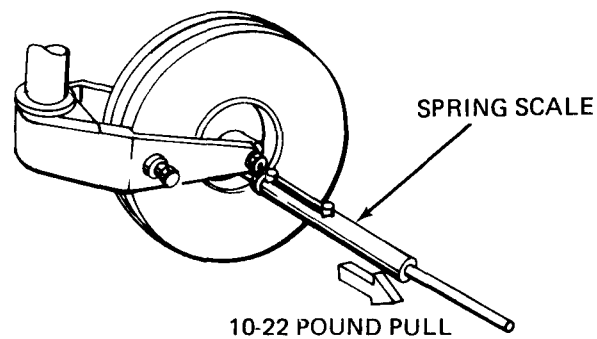
- (25) Remove the torque tube and yoke assembly (37) from the fuselage by working the assembly up and aft, left end first, so that the assembly is withdrawn from under the pilot's side of the instrument panel.
- (26) Remove shims (38).

**B. Install Nose Landing Gear Assembly**

- (1) Carefully position the torque tube and yoke assembly (37, Figure 201) in place and install clips (32), doublers (31), bolts (30), and nuts (29) that secure the center torque tube and yoke assembly bearing supports to the firewall and the floor. Do not tighten nuts (29).
- (2) Check the clearance between the ends of the torque tube and yoke assembly (37) and the inside of the lower engine mount extrusions, and install the proper thickness shims (38) to obtain a minimum clearance between the ends of the torque tube assembly and the inside of the lower engine mount extrusions.
- (3) Install bolts (36), washers (35), and nuts (34).
- (4) Torque the center torque tube bearing support bolts (30) at the firewall and the cabin floor to 185-195 inch pounds and torque the bolts (36) that attach the ends of the torque tube assembly to the fuselage sides to 300-350 inch pounds.
- (5) Install plug buttons (33).
- (6) Position the T-column and support assembly in place and install nuts. Refer to chapter 27.
- (7) Position throttle cable in place on instrument panel brace and install cable clamps, screws, and nuts.
- (8) Position brake master cylinders on co-pilot's side in place and install washers and nuts to secure attach brackets to the floor.
- (9) Position right-hand rudder bar in place and install washer and nuts on attach brackets.
- (10) Attach the left and right brake master cylinders to the floor on the pilot's side. Attach the parking brake chain to the parking brake link on the master cylinder if equipped. Use 0.032 inch stainless steel safety wire and make a double loop through the link and through the chain. Install the two clevis pins which attach the left and right rudder pedals on the pilot's side to the master cylinders.
- (11) Install rudder return spring eye bolts in firewall using same number of washers as were removed.
- (12) Install lower cowling. Refer to Chapter 71.
- (13) Where upholstery side panels and fiberglass insulation have been removed from the forward cabin area, the fiberglass insulation may be cemented to the fuselage side skin with Uniroyal 6306 adhesive or equivalent.

**AA-5 SERIES  
MAINTENANCE MANUAL**

- (14) Install right and left hand forward console panels.
  - (15) Install left side fresh air box assembly.
  - (16) Install the front seats (refer to Chapter 25).
  - (17) Slide fairing boot (20), boot plate (23), and boot assembly (24) over end of strut (28). Position strut into torque tube yoke assembly (37) and install attaching bolts (27), washers (26), and nuts (25). Torque bolts (27) to 95-110 in. lb.
  - (18) Apply sealant, RTV 102 by General Electric or RTV 732 by Dow Corning, to strut-to-torque tube connection and to bolt heads (27) and nuts (25).
  - (19) Apply sealant, Pro-Seal 700 by Coast Pro Seal or 93-004 by Dow Corning, to the mating surface of the boot assembly (24) and the firewall.
  - (20) Slide boot assembly (24) and nose gear boot plate (23) into place and secure with screws (22). Install nose gear boot clamp (21).
  - (21) On AA-5 aircraft Serial No. 0641 and subsequent, AA-5A, and AA-5B, install fairing boot (20), retainer (19), and screws (18).
  - (22) If nose wheel fairing was removed, position strut (28) through cutout in fairing.
  - (23) Assemble O-ring (17), thrust bearings (16), and fork assembly (15) in place on strut (28).
- NOTE:** Proper installation of nose gear strut and fork assembly is essential to prevent nose wheel shimmy. Refer to Figure 201 for proper installation of Belleville washers (13).
- (24) Install washers (14, 13, and 12) and nut (11).
  - (25) Install two attaching bolts that secure nose wheel fairing to fork assembly (15).
  - (26) Assemble axle (9), spacers (8), and plugs (7), in nose wheel. Position nose wheel in fork assembly (15), and insert axle rod (6) through fork and wheel and through fairing mount brackets.
  - (27) Install washers (5), nuts (4) and tighten until a very slight drag is evident when the wheel is rotated. Install cotter pin (3).
  - (28) Install spacer (2) and bolt (1).
  - (29) Proper nose fork friction is attained by adjustment of torque at nut (11). Tighten nuts (11) until a 10-22 lb drag is attained at the axle centerline when the fork is rotated. See Figure 202 for proper nose fork friction measurement. The cotter pin (10, Figure 201) must be in place for this measurement.



Nose Fork Friction Measurement  
Figure 202

**AA-5 SERIES  
MAINTENANCE MANUAL**

**2. Inspection and Minor Repair of Nose Landing Gear**

**A. Visually Inspect Nose Landing Gear**

- (1) Inspect the steel tube nose gear for nicks, rust or damage to protective paint coating.
- (2) Perform a thorough inspection of the nose landing gear at each 100-hour inspection and after any hard or overweight landing. Refer to Chapter 5 for scope of inspections and detailed procedures.

**B. Repair Nose Landing Gear Minor Damage**

- (1) Smooth out minor nicks with fine sandpaper.
- (2) Use 150 Trimate sandpaper to remove all rust and smooth out damaged paint.
- (3) Clean strut with wax and grease remover and prime with two light coats of zinc chromate primer per MIL-P-8585. See Chapter 12.
- (4) Apply final coat of paint to match aircraft color.
- (5) Inspect the nose fork bearing cup to strut fillet for cracks, corrosion, deterioration, and damage. See area D, Figure 203, Chapter 5. If any discrepancies are found, place a 150 foot-pound torque load on cup (suitably protecting the bearing surface), preferably around the stop plate. Any detectable rotation is reason for strut replacement. After testing, replace fillet as follows:
  - (a) Remove cup-to-strut fillet with hand abrasive. Remove rust and paint from strut, 1.5 inch minimum, upward from cup stop plate.
  - (b) Apply Loctite 290 Adhesive/Sealant (wicking). Loctite Corporation, to any cracks remaining in cup to strut bondline.
  - (c) Apply a uniform 0.12 inch radius fillet of sealant\* to replace fillet removed. Also apply sealant on strut up 1.5 inch minimum from cup stop plate.
  - (d) After sealant has cured, prime area with two light coats of zinc chromate primer and paint strut to match aircraft color.

\*Approved Sealants (PR-1422, Class B-1/2 is available through Gulfstream Aerospace Supply Operations:

EC-1675B, Class B-1/2, B-2 or B-4 with EC-1675A accelerator 3M Company.  
890 Class B-2 or B-4 with 890 curing agent, Coast Pro-Seal Company.  
PR-1422, Class B-1/2 or B-2 with accelerator, Products Research and Chemical Corporation.  
PR-1436G, Class B-1/2 or B-4 with accelerator, Products Research and Chemical Corporation.

**3. Removal/Installation of Shock Absorbers**

**A. Remove Shock Absorbers**

**NOTE;** To remove the nose landing gear and the torque tube and yoke assembly from aircraft equipped with shock absorbers, the shock absorbers must be removed. Some steps in this paragraph will duplicate some steps in Paragraph 1. However, this procedure should be used in conjunction with the procedure outlined in Paragraph 1.

**AA-5 SERIES  
MAINTENANCE MANUAL**

- (1) Remove the weight from the nose gear by applying downward pressure on the horizontal stabilizer root and placing a suitable support under the front of the fuselage.
- (2) Remove the lower cowling (refer to Chapter 71).
- (3) Remove nuts (1, Figure 203), washers (2), bolts (3), and remove shock absorbers (4). Remove bushings (5) from upper end of shock absorbers (4).
- (4) Remove nuts (6), washers (7), bolts (8), and remove bracket (9). Slide strut (10) out of torque tube and yoke assembly (11).
- (5) Remove screws (12) from firewall seal box assembly and remove box cover (13) and box (14) from torque tube and yoke assembly (11).
- (6) Remove seals (15) from torque tube and yoke assembly (11).
- (7) Remove nuts (16), washers (17), bolts (18), bracket (19), washers (20) and doublers (21). The two doublers (21) are used behind the bracket against the firewall instead of washers.

**B. Install Shock Absorbers (See Figure 203).**

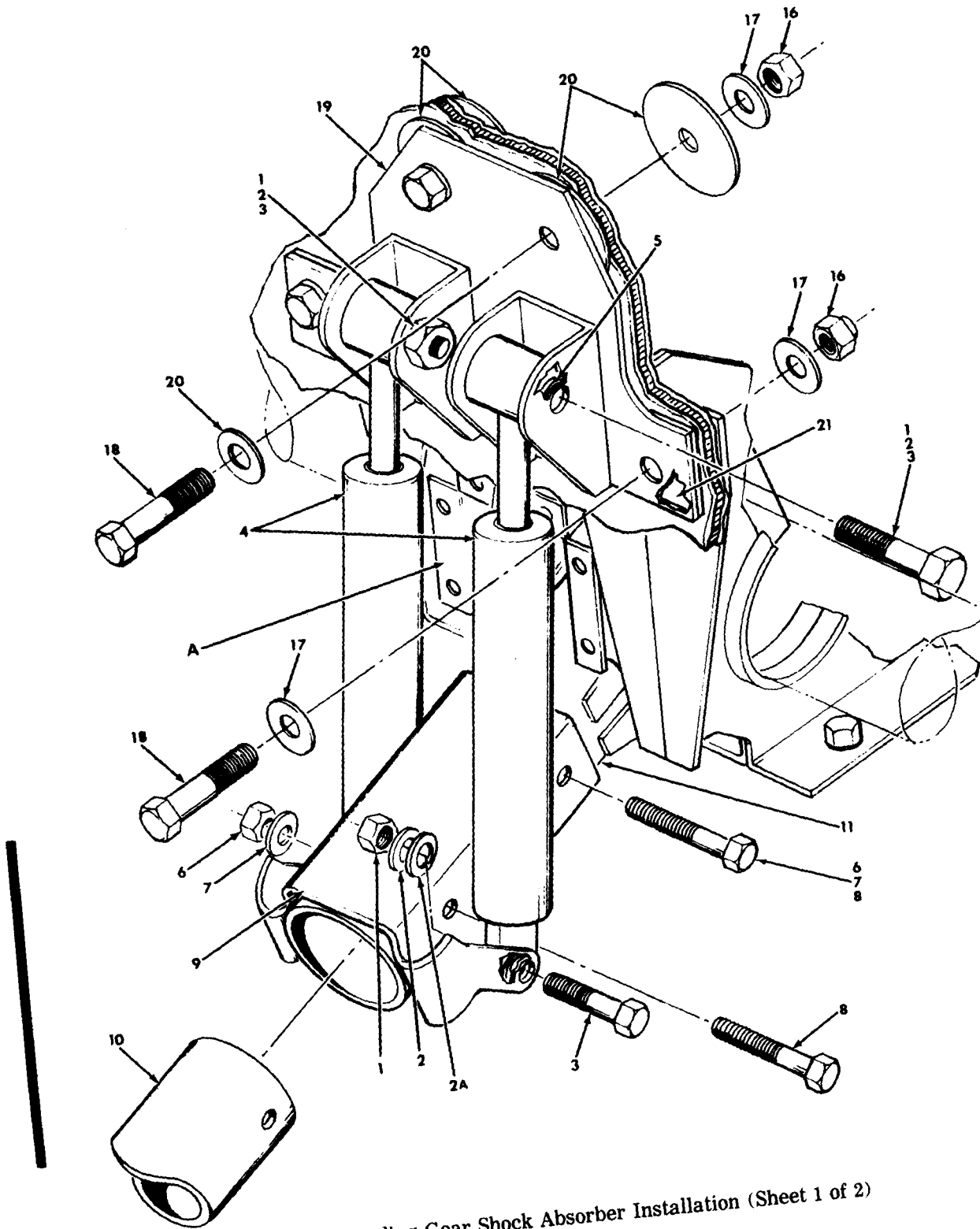
- (1) Assemble washers (20) on bolts (18) and install bolts through firewall.
- (2) Install doublers (21) on the four lower bolts and washers (20) on the two upper bolts.
- (3) Slide bracket (19) onto bolts (18) and install washers (17) and nuts (16). Torque the two upper bolts to  $120 \pm 20$  in. lb and the four lower bolts to  $175 \pm 15$  in. lb.

**WARNING:** USE CLEANING SOLVENT IN A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

- (4) Use Stoddard solvent to clean firewall area around nose gear torque tube and flanges of firewall seal box assembly.
- (5) Install seals (15) on torque tube and yoke assembly (11) with thin edge of seal up and thin seal outboard.
- (6) Coat aft side (firewall side) of box (14) flanges with firewall sealant, Pro-Seal 700 and position box in place against firewall, making sure seals (15) are inside the box. Secure box to firewall with screws (12).
- (7) Be sure that seals (15) remain in place and install box cover (13). Secure cover with four screws (12).
- (8) Use firewall sealant and seal any opening between box and box cover so that the box forms an air tight seal around the torque tube.
- (9) Position shock absorbers (4) in place on lower bracket. Coat bolt (AN4-13) with MIL-G-7711 or equivalent grease and insert bolt (3). Install washers (2) and (2A) (AN960-416 and AN960-416L) as required to obtain a side play of 0.010 to 0.040 inch. Install nut (1) (AN310-4) until snug, then tighten to next hole. Safety with cotter pin (MS24665-132).
- (10) Slide nose gear strut (10) into torque tube and yoke assembly (11); position bracket (9) in place on torque tube and yoke assembly (11); and install bolts (8), washers (7), and nuts (6). Torque bolts to  $175 \pm 15$  in. lb.
- (11) Insert bushings (5) in top mounting holes in shock absorbers (4); align holes in shock absorbers with holes in bracket (19); and install bolts (3), washers (2), and nuts (1). Torque bolts to  $175 \pm 15$  in. lb.
- (12) Remove support from front of fuselage.
- (13) Install lower cowling (refer to Chapter 71).

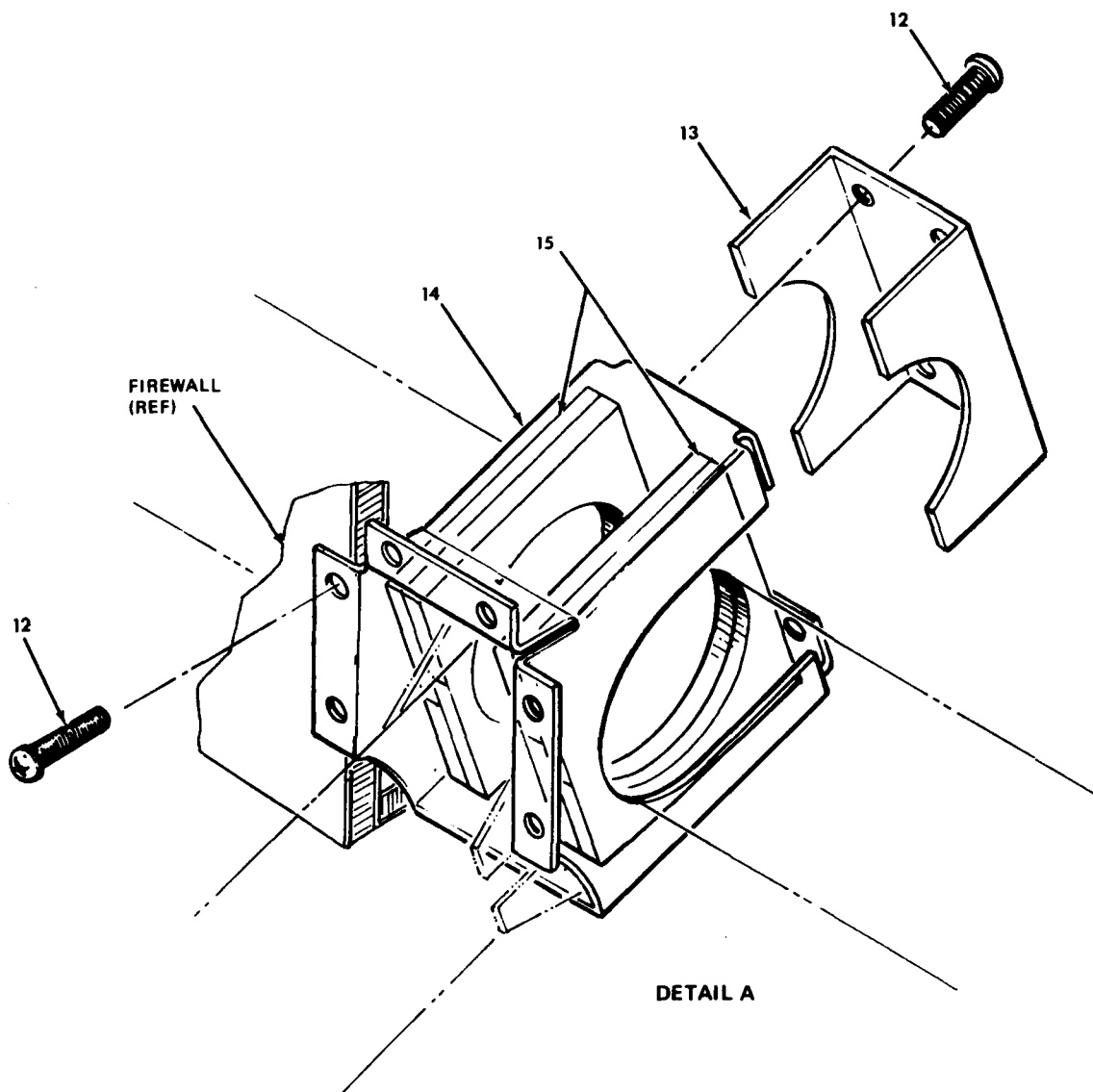


AA-5 SERIES  
MAINTENANCE MANUAL



Nose Landing Gear Shock Absorber Installation (Sheet 1 of 2)  
Figure 203

AA-5 SERIES  
MAINTENANCE MANUAL



- |            |                               |
|------------|-------------------------------|
| 1. Nut     | 11. Torque Tube and Yoke Assy |
| 2. Washer  | 12. Screw                     |
| 2A. Washer | 13. Box Cover                 |
| 3. Bolt    | 14. Box                       |
| 4. Bushing | 15. Seal                      |
| 5. Bushing | 16. Nut                       |
| 6. Nut     | 17. Washer                    |
| 7. Washer  | 18. Bolt                      |
| 8. Bolt    | 19. Bracket                   |
| 9. Bracket | 20. Washer                    |
| 10. Strut  | 21. Doubler                   |

Nose Landing Gear Shock Absorber Installation (Sheet 2 of 2)  
Figure 203

**AA-5 SERIES  
MAINTENANCE MANUAL**

**WHEELS AND TIRES – DESCRIPTION/OPERATION**

1. **General**

AA-5, AA-5A, and AA-5B aircraft are equipped with 4-ply, 5.00 x 5 tube type tires on the nose landing gear. The main landing gear tires on all models are tube type, size 6.00 x 6; however, the AA-5 and AA-5A tires are 4 ply, whereas the AA-5B are 6 ply. Tires should be rotated periodically to obtain maximum tire life. All wheels are of the split-wheel design for easy servicing and each main wheel has an independent disc-type hydraulic brake system. For information and instructions covering the entire brake system, refer to 32-4-2.

All wheels and tires are balanced to within 10 inch-ounces at the factory. It is recommended that replacement tires be balanced to this specification to prevent excessive vibrations in the landing gear assemblies. Balancing is accomplished with a static bubble balancer.

WHEELS AND TIRES - MAINTENANCE PRACTICES

1. Removal/Installation of Main Gear Wheel Assemblies

A. Remove Main Gear Wheel Assembly

- (1) Support the aircraft on jacks (refer to Chapter 7).
- (2) Remove main wheel fairing if installed (refer to Paragraph 5).
- (3) Remove the two bolts (1, Figure 201) and washers (2) which attach the brake pressure plate (4) and backplate (3) to the brake cylinder assembly (5).
- (4) Remove cotter pin (1, Figure 201, Section 32-1-1), nut (2) and remove wheel assembly from axle (25).

B. Install Main Gear Wheel Assembly

- (1) Position wheel on axle (25, Figure 201, Section 32-1-1).
- (2) Check brake anchor bolts (6, Figure 201) for freedom of movement in torque plate assembly (7) and for adequate lubrication.
- (3) Install the axle nut (2, Figure 201, Section 32-1-1) and tighten until a slight drag is evident when rotating the wheel. Back off the nut to the next castellation and install the cotter pin (1).
- (4) Position brake backplate assembly (3, Figure 201) in place and install washers (2) and bolts (1). Torque mounting bolts (1) to 90 in. lb.
- (5) Install wheel fairing where applicable (refer to paragraph 5).
- (6) Remove jacks.

2. Disassembly/Reassembly of Main Gear Wheel Assemblies

A. Disassemble Main Landing Gear Wheel Assembly

- (1) Remove main landing gear wheel assembly (refer to paragraph 1, A.).
- (2) Match-mark the wheel halves and brake discs prior to disassembly to expedite reassembly in the same relative positions.

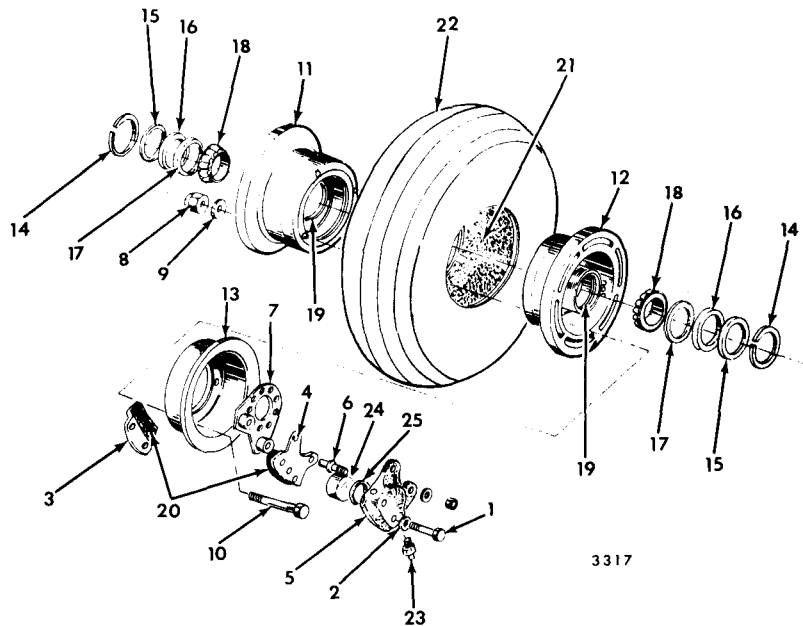
**WARNING: DO NOT ATTEMPT TO SEPARATE THE WHEEL HALVES WHILE TIRE IS UNDER PRESSURE. SERIOUS INJURY COULD RESULT.**

- (3) Deflate the tire by removing the valve core.
- (4) Break the tire bead loose from the wheel half assemblies.

**NOTE: Care should be taken to prevent damage to the wheel halves when breaking the beads loose.**

- (5) Remove nuts (8, Figure 201), washers (9), bolts (10), and separate wheel halves (11 and 12) and disc assembly (13).

AA-5 SERIES  
MAINTENANCE MANUAL



3317

- |                            |                      |
|----------------------------|----------------------|
| 1. Bolt                    | 14. Snap Ring        |
| 2. Washer                  | 15. Grease Seal Ring |
| 3. Backplate Ass'y         | 16. Felt Grease Seal |
| 4. Pressure Plate Ass'y    | 17. Grease Seal Ring |
| 5. Cylinder Ass'y          | 18. Cone Bearing     |
| 6. Anchor Bolt             | 19. Bearing Cup      |
| 7. Torque Plate Ass'y      | 20. Brake Lining     |
| 8. Nut                     | 21. Tube             |
| 9. Washer                  | 22. Tire             |
| 10. Bolt                   | 23. Bleeder          |
| 11. Outer Wheel Half Ass'y | 24. Piston           |
| 12. Inner Wheel Half Ass'y | 25. O-ring           |
| 13. Brake Disc Ass'y       |                      |

Main Wheel and Brake Assembly  
Figure 201

AA-5 SERIES  
MAINTENANCE MANUAL

- (6) Remove the snap rings (14), grease seal rings (15), felt grease seals (16), grease seal rings (17), and the cone bearings (18) from both wheel halves (11 and 12).
- (7) Inspect the bearing cups (19) for nicks and discolorations, and replace if necessary.

NOTE: To remove the bearing cups, heat the wheel halves for 15 minutes in boiling water. With an arbor press, press out the damaged bearing cups and press in the new ones while the wheel is still hot.

- (8) Clean the bearings (18), rings (15 and 17) and seals (16) with solvent and dry thoroughly using clean air blasts from an air hose. Examine bearings (18) for damage or discoloration. Repack the bearings with bearing grease per Lubrication Chart (refer to Chapter 12).
- (9) Inspect wheel halves (11 and 12) for nicks, cracks, gouges, scoring, scratches, and corrosion. Replace cracked wheel halves.
- (10) Repair minor damage by sanding area with fine sandpaper, cleaning thoroughly, applying zinc chromate primer, and painting with aluminum lacquer.
- (11) Inspect the brake disc (13) and linings (20) for excessive wear or scoring and replace if necessary. Small scratches may be sanded smooth.

**B. Reassemble Main Landing Gear Wheel Assembly**

- (1) Position tube (21) inside tire (22) and align the red dot on the tire with the index mark on the tube. If no mark on tube, align dot with tube seam. If no seam on tube, align dot with valve stem.
- (2) Place the outboard wheel half (11) in the tire (22) and position the valve stem through the hole.
- (3) Position the inner wheel half (12) and brake disc (13) in the tire (22) and install bolts (10), washers (9), and nuts (8).

NOTE: Care must be taken not to pinch the tube between the wheel halves.

CAUTION: IMPROPER TORQUE OF BOLTS (10) MAY RESULT IN WHEEL FAILURE.

- (4) Torque bolts (10) to 150 in. lb. Torque value may be indicated on the wheel.
- (5) Install bearings (18), grease seal rings (17), felt grease seals (16), grease seal rings (15) and snap rings (14).
- (6) Inflate the tire to the prescribed pressure given in Chapter 6, SPECIFICATIONS Paragraph.
- (7) If a new tire is installed, balance in accordance with 32-4-1, General Paragraph.

**3. Removal/Installation of Nose Wheel Assembly**

**A. Remove Nose Wheel Assembly**

- (1) Support aircraft on jacks (refer to Chapter 7).
- (2) Remove cotter pin (3, Figure 201, Section 32-2-1), nuts (4), and washers (5).
- (3) Withdraw axle rod (6) and remove nose wheel assembly from nose fork (15).
- (4) Remove plugs (7), spacers (8), and axle (9) from nose wheel assembly.

**AA-5 SERIES  
MAINTENANCE MANUAL**

**B. Install Nose Wheel Assembly**

- (1) Assemble axle (9, Figure 201, Section 32-2-1), spacers (8), and plugs (7) in nose wheel.
- (2) Position the nose wheel in the nose fork (15) and insert axle rod (6).
- (3) Install washers (5), nuts (4), and tighten until a very slight drag is evident when the wheel is rotated. Install cotter pin (3).
- (4) Install nose wheel fairing where applicable.
- (5) Remove jacks.

**4. Disassembly/Reassembly of Nose Wheel Assembly**

**A. Disassemble Nose Wheel Assembly**

- (1) Remove nose wheel (refer to Paragraph 3. A.).

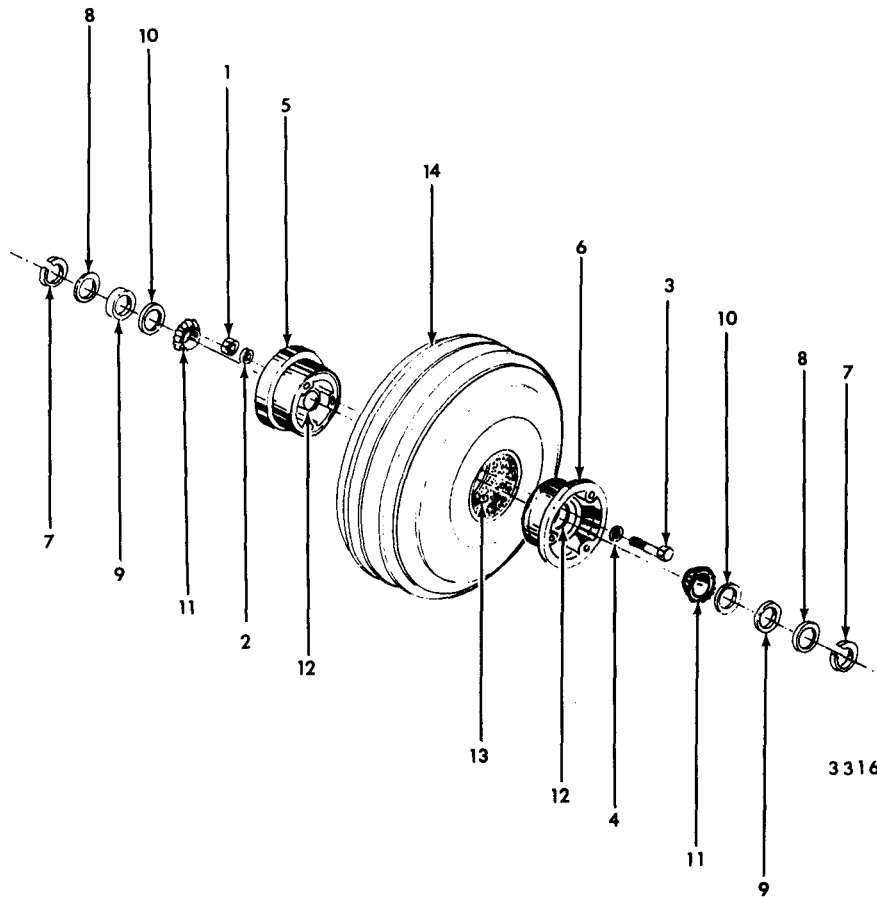
**WARNING: DO NOT ATTEMPT TO SEPARATE THE WHEEL HALVES WITH THE TIRE UNDER PRESSURE. SERIOUS INJURY COULD RESULT.**

- (2) Deflate the tire by removing the valve core.
- (3) Break the tire beads loose from wheel halves.

**NOTE: Care should be taken to prevent damage to the wheel halves when breaking the beads loose.**

- (4) Separate the wheel halves (5 and 6, Figure 202) by removing the nuts (1), washers (2 and 4) and bolts (3).
- (5) Remove the snap ring (7), grease seal rings (8), felt grease seals (9), grease seal rings (10), and cone bearings (11).
- (6) Inspect the bearing cups (12) for nicks and discoloration and replace if necessary.  
**NOTE: To remove the bearing cups, heat the wheel halves for 15 minutes in boiling water. With an arbor press, press out the damaged bearing cups and press in the new ones while the wheel is still hot.**
- (7) Clean the bearings (11), rings (8 and 10) and seals (9) with solvent, and dry thoroughly using clean air blasts from an air hose.
- (8) Inspect the wheel halves (5 and 6) for nicks, cracks, gouges, scoring, scratches, or corrosion. Replace cracked wheel halves.
- (9) Repair minor damage by sanding area with fine sandpaper, cleaning thoroughly, applying zinc chromate primer, and painting with aluminum lacquer.
- (10) Examine bearings (11) for damage or discoloration. Replace damaged bearings. Repack bearings with specified bearing grease in lubrication chart in Chapter 12.

AA-5 SERIES  
MAINTENANCE MANUAL



3316

- |                           |                      |
|---------------------------|----------------------|
| 1. Nut                    | 8. Grease Seal Ring  |
| 2. Washer                 | 9. Felt Grease Seal  |
| 3. Bolt                   | 10. Grease Seal Ring |
| 4. Washer                 | 11. Cone Bearing     |
| 5. Inner Wheel Half Ass'y | 12. Bearing Cup      |
| 6. Outer Wheel Half Ass'y | 13. Tube             |
| 7. Snap Ring              | 14. Tire             |

Nose Wheel Assembly  
Figure 202



**AA-5 SERIES  
MAINTENANCE MANUAL**

**B. Reassemble Nose Wheel Assembly**

- (1) Position the tube (13) inside the tire (14), aligning the red dot on the tire with the index mark on the tube. If no mark on tube, align dot with tube seam. If no seam, align dot with valve stem.
- (2) Position the tire and tube on the wheel half (6) and insert the valve stem through the hole.
- (3) Position the other wheel half (5) in tire (14) and install washers (4), bolts (3), washers (2) and nuts (1).

**NOTE:** Care should be taken not to pinch the tube between the wheel halves.

- (4) If a new tire is installed, balance in accordance with 32-4-1, General paragraph.

**CAUTION:** IMPROPER TORQUE OF BOLTS (3) MAY RESULT IN WHEEL FAILURE.

- (5) Torque the bolts (3) to 90 in. lb. Torque value may be indicated on the wheel.
- (6) Install the bearings (11), grease seal rings (10), felt grease seal (9), grease seal rings (8), and snap ring (7).
- (7) Inflate the tire to the prescribed pressure given in Chapter 6.
- (8) Install nose wheel assembly (refer to paragraph 3. B. ).
- (9) Remove jacks.

**5. Removal/Installation of Main Wheel Fairing Assembly**

**A. Remove Wheel Fairing Assembly (See Figure 203.)**

**NOTE:** AA-5, Serial No. 0641 and Subsequent, AA-5A and AA-5B aircraft having wheel fairing installed is also equipped with a streamlining fairing. The streamlining fairing must be removed to gain access to wheel fairing attaching hardware.

- (1) Remove screws (1), washers (2), and slide streamlining fairing (3) up the strut.
- (2) Remove plug button (4), bolts (5), washers (6), and bearing (7).
- (3) On AA-5 aircraft, remove bolt (8), washers (9), and tilt fairing up so that bracket (10) will clear flex bolt (11), and remove fairing shell assembly (12).

**NOTE:** On AA-5A and AA-5B aircraft, bracket (10) has been replaced by a flat plate bolted directly to the fairing shell assembly (12) and has a cutout that fits over the end of flex bolt (11).

- (4) On AA-5A and AA-5B aircraft, remove nut (13) and washer (14) from flex bolt (11), tilt fairing to clear flex bolt (11), and remove fairing shell assembly (12).

**B. Install Main Wheel Fairing Assembly (See Figure 203.)**

- (1) Position fairing shell assembly (12) in place on wheel with flex bolt (11) in bracket (10) on AA-5, and install washers (9) and bolts (8). On AA-5A and AA-5B, position flex bolt (11) end through flat plate on fairing and install washer (14) and nut (13).
- (2) Install bearing (7), washers (6), bolts (5), and plug button (4).
- (3) Position streamlining fairing (3) in place and install washers (2) and screws (1).
- (4) Check position of scraper (15) in relation to tire, and if necessary adjust scraper for 1/2-inch clearance.

6. Removal/Installation of Nose Wheel Fairing Assembly

A. Remove Nose Wheel Fairing Assembly (See Figure 204).

- (1) Remove plug buttons (1) from both sides of fairing.
- (2) Remove tow bar bolts and spacers.
- (3) Remove nose wheel and fork assembly (refer to paragraph 1).
- (4) Remove bolts (2, Figure 204), washers (3), and fairing (4).

B. Install Nose Wheel Fairing Assembly (See Figure 204).

- (1) Position fairing (4, Figure 204) onto nose strut.
- (2) Install nose fork assembly (refer to 32-4-1, paragraph 1).
- (3) Position fairing in place on nose fork assembly and install washers (3) and bolts (2).
- (4) Install tow bar bolts and spacers.
- (5) Install plug buttons (1) on both sides of fairing.
- (6) Check position of scraper (5, Figure 204) in relation to tire, and if necessary adjust scraper for 1/2 inch clearance from tire.

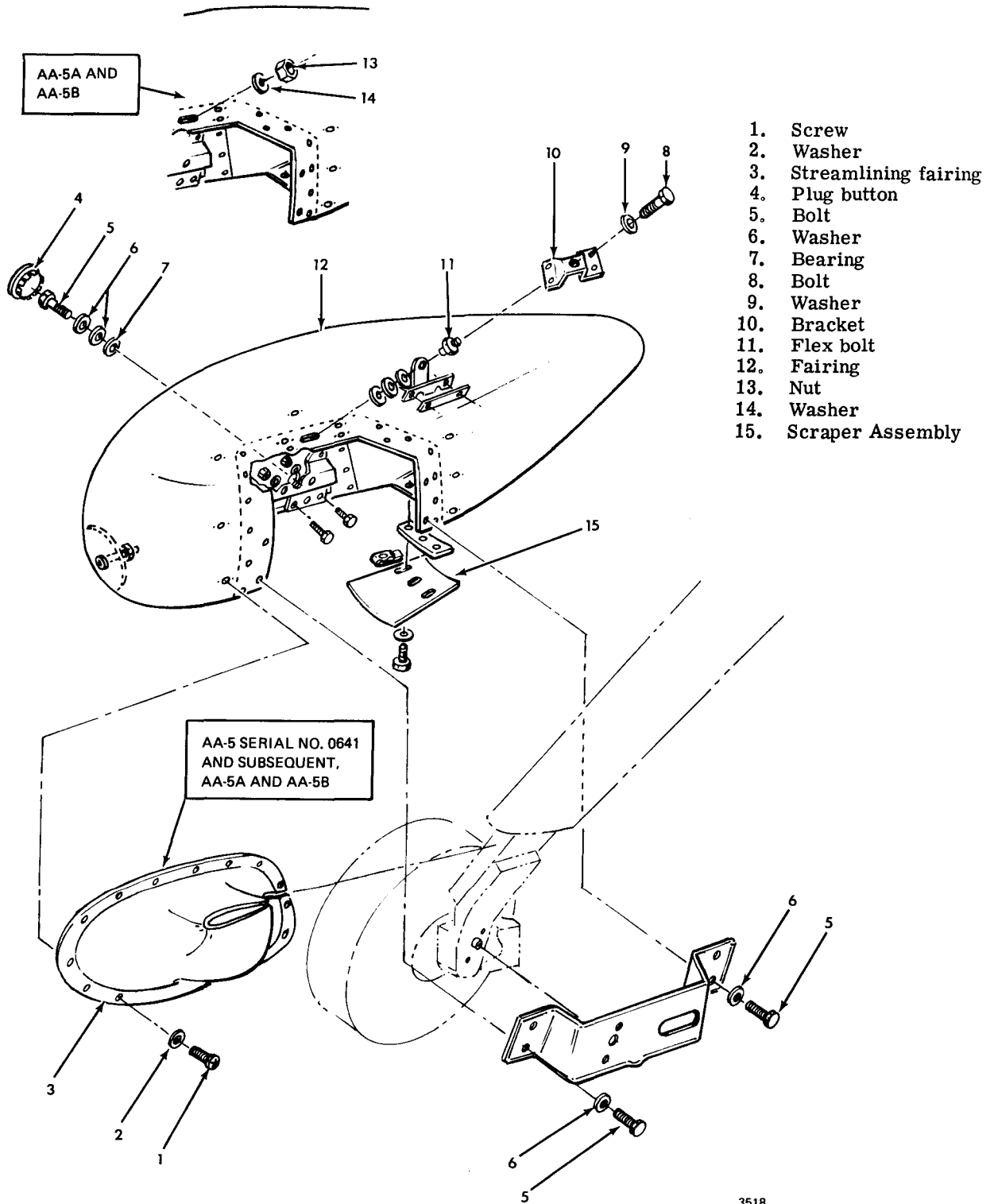
7. Main Landing Gear Wheel Alignment

Toe-in adjustments are made at the factory within the tolerances specified in Figure 205 and the toe-in adjustment should be checked periodically to ensure the wheels are properly aligned. Setting toe-in within the specified tolerances while the cabin and fuel tanks are empty will give approximately zero toe-in at gross weight. Ideal setting is zero toe-in at normal operating weight. Therefore, if normally operated at less than gross weight and abnormal tire wear occurs, the wheel alignment should be adjusted to obtain the ideal setting for the load conditions under which the aircraft normally operates. At wheel alignment the desired procedure is to use the least number of shims possible to obtain the specified tolerances. Shims are available from the factory under the following part numbers.

<u>PART NUMBER</u>	<u>SHIM ANGLE</u>	<u>AMOUNT OF TOW-IN OUT CHANGE</u>
701068-1	0° -30 min. Ref.	15 minutes
701068-2	0° -45 min. Ref.	23 minutes
701068-3	1° -0 min. Ref.	30 minutes

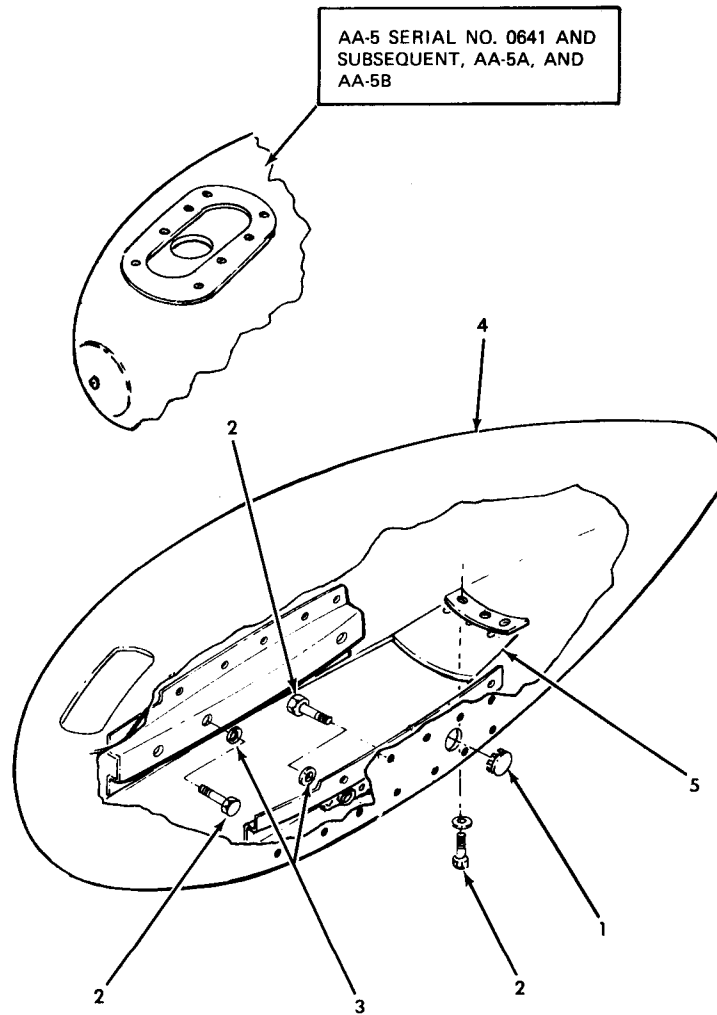
NOTE: The use of toe-in adjustment shims requires the replacement of two AN6-22A bolts with longer AN6-23A bolts on the thick side of the shim.

AA-5 SERIES  
MAINTENANCE MANUAL



Main Wheel Fairing Assembly  
Figure 203

AA-5 SERIES  
MAINTENANCE MANUAL

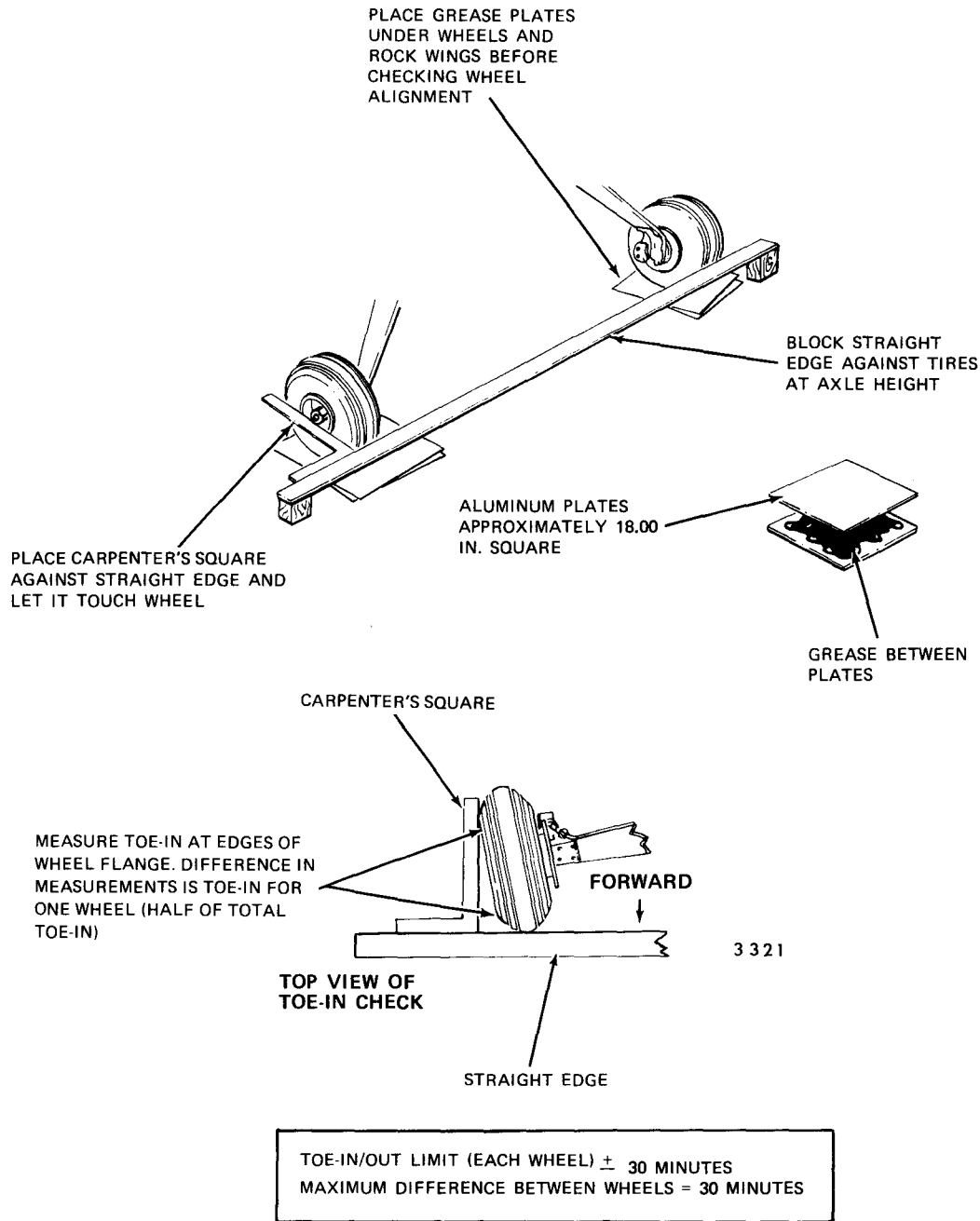


3319

1. Plug button
2. Bolt
3. Washer
4. Fairing
5. Scraper

Nose Wheel Fairing Assembly  
Figure 204

AA-5 SERIES  
MAINTENANCE MANUAL



Wheel Alignment Procedure  
Figure 205

**AA-5 SERIES  
MAINTENANCE MANUAL**

**BRAKES — DESCRIPTION/OPERATION**

**1. General**

The aircraft utilizes hydraulic brakes on each main landing gear. The brakes are controlled by the rudder pedals.

The hydraulic brake system consists of the wheel brake assemblies, two master cylinders for the single brake system, four master cylinders for the dual brake system, and a parking brake assembly. The wheel brake assemblies use a disc which is attached to the main wheel thru-bolts. The floating brake assembly is attached to the inside of the axle assembly.

The optional dual hydraulic brake system used on the AA-5, AA-5A, and AA-5B is unique in the fact it requires no additional reservoir. The system is designed for dual operation and incorporates two types of master cylinders. Pressure applied to the left master cylinder (1, Figure 1) passes through an integral piston by-pass port in the right master cylinder (3) closes the port and applies pressure to the left wheel assembly. If pressure is applied to both cylinders simultaneously, the force from the left cylinder is applied to the top of the piston in the right cylinder, nearly doubling the pressure at the wheel brake assembly. Master cylinders (2) and (4) operate in the same manner.

When the brake pedals for master cylinders (3) and (4) are in neutral position, the ports are open for direct flow to the brake assemblies from cylinders (1) and (2).

The standard single brake system does not use cylinders (3) and (4). However, operation is essentially the same as above, except master cylinders (1) and (2) supply hydraulic pressure directly to the wheel brake assemblies.

On aircraft AA5-0001 through 0834, AA5A-0001 through 0522, and AA5B-0001 through 0692 (see Figure 1.), the optional parking brake system consists of a parking brake control attached by chains and linkage to locking levers on the master brake cylinder shafts. The parking brakes are applied by depressing both the toe brakes on the pilot's side, then pulling out the parking brake control. The locking levers then hold the brakes in the applied position. Brake release is accomplished by depressing both toe brakes on the pilot's side and simultaneously pushing in the parking brake control to release the locks.

On aircraft AA5A-0523 and subsequent and AA5B-0693 and subsequent (See Figure 2.), the parking brake system consists of a parking brake control which operates a dual in-line valve between the brake cylinders and the respective wheel brakes. The parking brakes are applied by pulling the parking brake control out to the stops and depressing both toe brakes at either station. Brake release is accomplished by pushing the control all the way in.

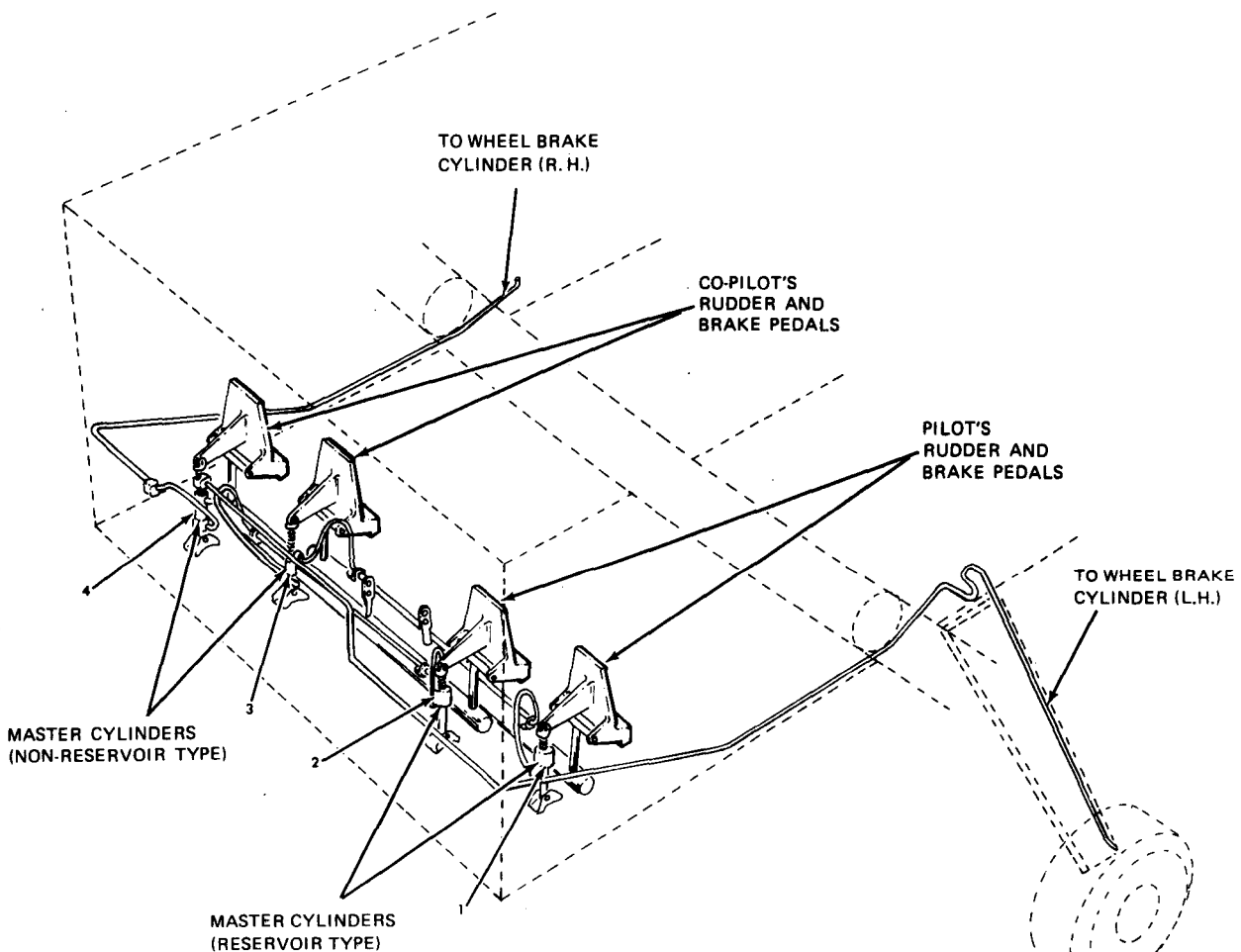
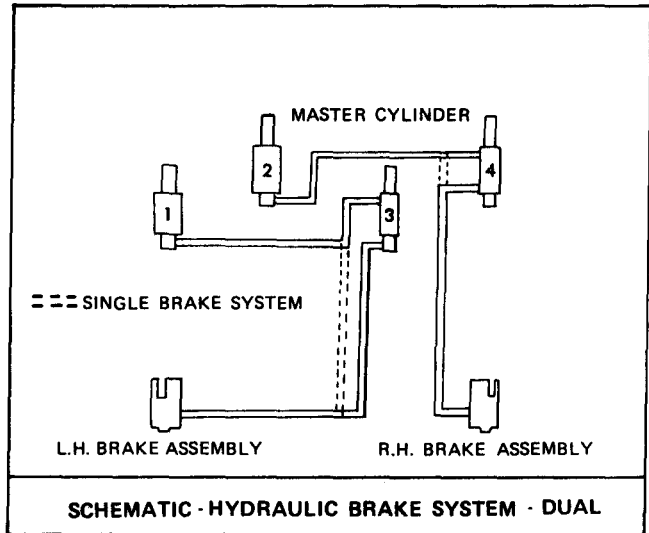
**2. Special Tools**

When disassembling the hydraulic brake master cylinders, special type pliers are required to remove the Truarc snap ring. A separate size pliers will be needed for the reservoir type cylinder and for the non-reservoir type cylinder. Pliers may be purchased locally or ordered from Waldes Kohinoor, Inc., Long Island City, New York. The types of pliers required are:

Truarc Snap Ring Pliers No. 3

Truarc Snap Ring Pliers No. 1120

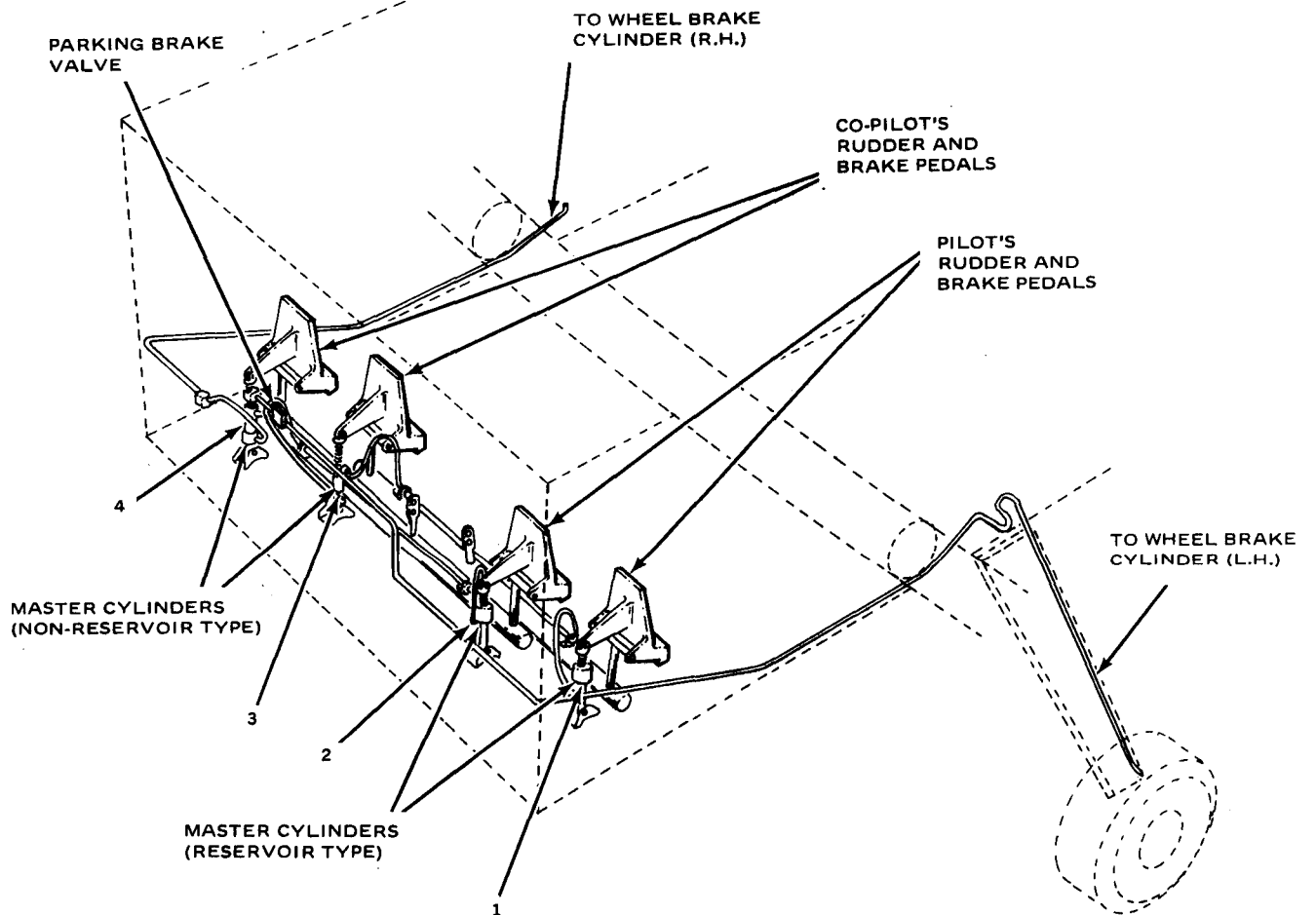
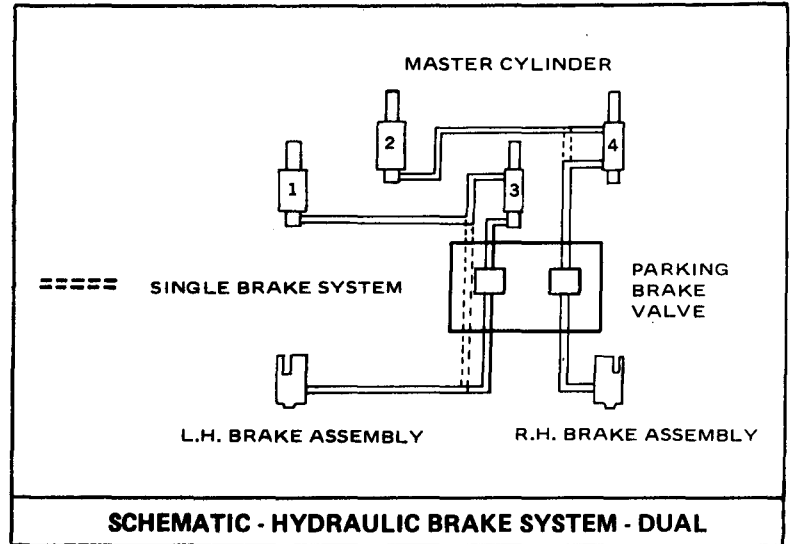
**AA-5 SERIES  
MAINTENANCE MANUAL**



Hydraulic Brake System  
AA5-0001 through 0834  
AA5A-0001 through 0522  
AA5B-0001 through 0692  
Figure 1

3323

**AA-5 SERIES  
MAINTENANCE MANUAL**



**Hydraulic Brake System  
(AA5A-0523 and Subsequent)  
(AA5B-0693 and Subsequent)  
Figure 2**



BRAKES - MAINTENANCE PRACTICES

1. Removal/Installation of Master Cylinder

A. Remove Master Cylinder

- (1) Bleed the fluid from the brake system by removing the bleeder valve in the bottom of the brake assembly.
- (2) Disconnect the flexible hose assembly at the master cylinder connection.
- (3) Remove the cotter pin and withdraw the clevis pin which connects the clevis on the master cylinder to the rudder pedal.
- (4) Remove the cotter pin and withdraw the clevis pin which attaches the mounting lug of the master cylinder to the mounting bracket.
- (5) Disconnect parking brake chain from lever on master cylinder by cutting safety wire at chain to lever attachment.

B. Install Master Cylinder

- (1) Position master cylinder to mounting bracket and install clevis pin and cotter pin.
- (2) Position master cylinder clevis to rudder pedal connection and install clevis pin and cotter pin.
- (3) Connect the flexible hose assembly to the master cylinder connection.
- (4) Connect parking brake chain to parking brake lever on master cylinder with 0.032 inch stainless steel safety wire.
- (5) Service hydraulic brake system with an approved hydraulic fluid conforming to MIL-H-5606. (See Chapter 12.)

2. Disassembly/Reassembly of Master Cylinder - Non-Reservoir Type

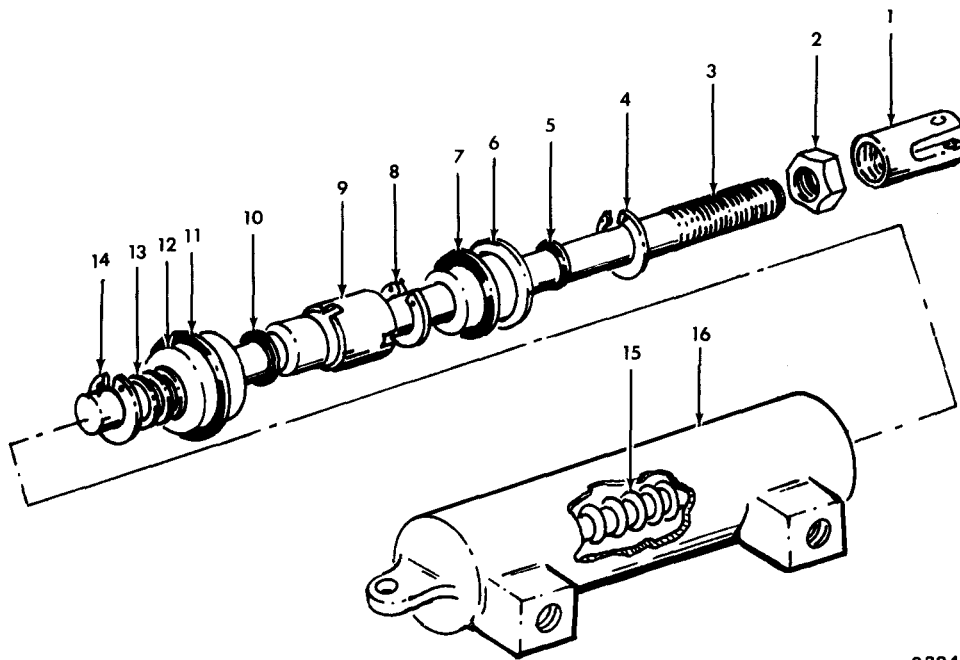
A. Disassemble Master Cylinder (See Figure 201.)

- (1) Remove fittings from cylinder inlet and outlet ports.
- (2) Remove clevis (1) and check nut (2) from shaft (3). Note distance from mounting hole in clevis (1) and mounting hole in brake cylinder housing (16) before removing clevis (1). This distance must be maintained upon reassembly.
- (3) Remove snap ring (4) using special pliers, Truarc No. 1120.
- (4) Remove the end cap (6).
- (5) Remove piston and shaft assembly from housing (16). To disassemble piston (12) from shaft (3) remove snap ring (14) and spring (13).

NOTE: Do not attempt to remove the thrust collar from shaft (3). These parts are pressed together. If either is faulty, replace both.

- (6) Remove snap ring (8).

AA-5 SERIES  
MAINTENANCE MANUAL



3324

- |                        |              |               |
|------------------------|--------------|---------------|
| 1. Clevis              | 7. O-ring    | 13. Spring    |
| 2. Nut                 | 8. Snap Ring | 14. Snap Ring |
| 3. Shaft Assembly      | 9. Spacer    | 15. Spring    |
| 4. Snap Ring           | 10. O-ring   | 16. Housing   |
| 5. O-ring              | 11. O-ring   |               |
| 6. End Cap and Bearing | 12. Piston   |               |

Master Cylinder - Non-Reservoir Type  
Figure 201

B. Reassemble Master Cylinder (See Figure 201.)

**NOTE:** Use new O-rings at reassembly of master cylinder.

- (1) Immediately before reassembly, immerse all seals in hydraulic brake fluid, MIL-H-5606, (See Chapter 12.) and apply a coating of brake fluid to bore of housing (16).
- (2) Assemble O-rings (10 and 11), spacer (9), piston (12), and spring (13) in place on shaft (3) and lock together by installing snap rings (8 and 14).
- (3) Assemble O-rings (5 and 7) and end cap (6) on shaft (3).
- (4) Engage bottom of shaft and piston assembly into small diameter of spring (15) and install into housing (16). Use caution when installing into housing and do not damage O-ring seals.
- (5) Depress shaft assembly and lock into position with snap ring (4).
- (6) Install check nut (2) and clevis (1) and adjust to dimensions that were checked before disassembly.

**CAUTION:** DO NOT OVERTIGHTEN FITTINGS IN MASTER CYLINDER PORTS. OVERTIGHTENING COULD CRACK THE CASTING.

- (7) Install fittings in master cylinder inlet and outlet ports.

3. Disassembly/Reassembly of Master Cylinder — Reservoir Type

**NOTE:** Items 3, 4, 5, and 6 of Figure 202 are not installed in master cylinders on those aircraft with hydraulic parking brake valve system installed.

A. Disassemble Master Cylinder (See Figure 202.)

- (1) Remove fitting from cylinder housing outlet port.
- (2) Remove clevis (1), check nut (2), and spring (3) from shaft (18). Note distance from mounting hole in clevis and mounting hole in brake housing (19) before removing clevis. This distance must be maintained upon reassembly.
- (3) Remove bolt (4), parking brake lever (5), and spacer (6).
- (4) Remove filler plug (7).
- (5) Remove snap ring (8) using special pliers, Truarc No. 3, and remove cover plate (9) and rubber seal (10).
- (6) Use a 1/8-inch allen wrench and remove screw (11) and washer (12).
- (7) Remove piston (15) and shaft assembly from housing (19).
- (8) Remove snap ring (13), spring (14), piston (15), and O-rings (16 and 17) from shaft (18).

**NOTE:** Do not attempt to remove the thrust collar from shaft (18). These parts are pressed together. If either is faulty, replace both. Do not attempt to remove the bushing from cover plate (9). These parts are swaged together and should be ordered as a unit if either is defective.

**AA-5 SERIES  
MAINTENANCE MANUAL**

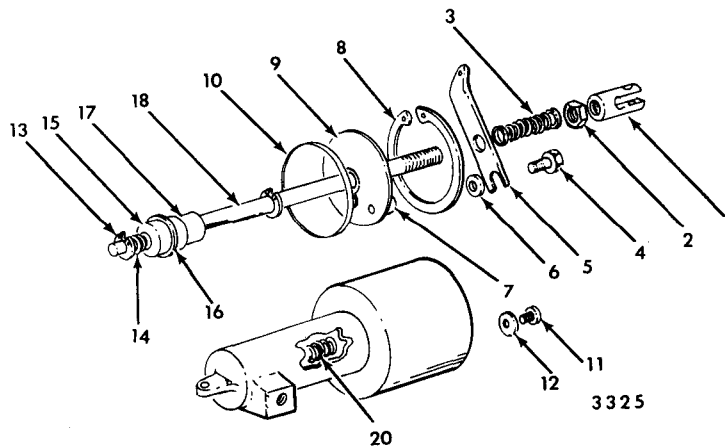
**B. Reassemble Master Cylinder**

**NOTE:** Use new O-rings at reassembly of master cylinder.

- (1) Immediately before reassembly, immerse all seals except (10) in hydraulic fluid (MIL-H-5606, see Chapter 12) and apply a coating of hydraulic fluid to the bore of the cylinder housing (19).
- (2) Assemble O-rings (17 and 16), piston (15), spring (14), on shaft (18), and lock in place with snap ring (13).
- (3) Engage bottom of shaft and piston assembly into small diameter of spring (20) and install assembly into housing (19).

**NOTE:** Use a new screw (11) and washer (12) and snap ring (8) at master cylinder reassembly.

- (4) Depress shaft assembly into housing (19) and lock in position with screw (11) and washer (12).
- (5) Install rubber seal (10), cover plate (9), and lock in place with snap ring (8).
- (6) Install filler plug (7).
- (7) Slide parking brake lever (5) onto shaft (18) and position spacer (6) in place under lever, and secure with bolt (4).
- (8) Install spring (3), nut (2), and clevis (1) on shaft (18). Adjust clevis (1) to dimension noted before disassembly.
- (9) Install fitting cylinder housing outlet port.



- |                        |                      |                      |
|------------------------|----------------------|----------------------|
| 1. Clevis              | 8. Snap Ring         | 15. Piston           |
| 2. Lock Nut            | 9. Cover Plate Ass'y | 16. O-Ring           |
| 3. Spring              | 10. Rubber Seal      | 17. O-Ring           |
| 4. Bolt                | 11. Screw            | 18. Shaft            |
| 5. Parking Brake Lever | 12. Washer           | 19. Cylinder Housing |
| 6. Spacer              | 13. Snap Ring        | 20. Spring           |
| 7. Filler Plug         | 14. Spring           |                      |

Master Cylinder - Reservoir Type  
Figure 202

#### 4. Removal/Installation of Wheel Brake Assemblies

##### A. Remove Wheel Brake Assembly (See Figure 203.)

**NOTE:** The brake disc (11, Figure 203) is removed after wheel removal and disassembly. Torque plate assembly (12) can be removed after wheel has been removed.

- (1) Disconnect hydraulic line at wheel brake assembly fitting.
- (2) Remove bolts (1), washers (2), and remove backplate (3).
- (3) Pull anchor bolts (10) out of torque plate assembly (12) and remove brake cylinder assembly (4).
- (4) Slide pressure plate (5) off anchor bolts.
- (5) Blow lightly with compressed air into hydraulic line fitting to force piston (6) from cylinder (4). Slide O-ring (7) off piston (6).
- (6) Remove nuts (8), washers (9), and anchor bolts (10).

##### B. Install Wheel Brake Assembly

**NOTE:** Keep brake lining (13) dry and completely free from hydraulic fluid. Install new O-ring (7) at reassembly.

- (1) Lubricate piston (6), cylinder bore, and O-ring (7) with clean hydraulic fluid.
- (2) Assemble anchor bolts (10) into cylinder (4) and install washers (9) and nuts (8).
- (3) Assemble O-ring (7) on piston (6) and install in cylinder (4). Hold piston in cylinder until pressure plate (5) is installed.
- (4) Slide pressure plate (5) onto anchor bolts (10).
- (5) Insert anchor bolts (10) into torque plate assembly (12), and install washers (2), bolts (1), and backplate (3). Torque bolts (1) to 75-90 in. lb.

#### 5. Bleeding Hydraulic Brake System

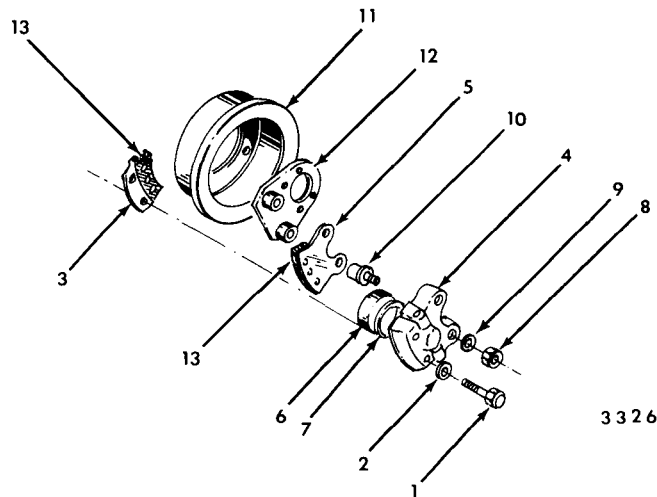
##### A. Bleed Hydraulic Brake System

**NOTE:** When servicing the hydraulic brake system, use an approved hydraulic fluid conforming to MIL-H-5606 (see Chapter 12).

**NOTE:** The following procedure is applicable to both single and dual brake installations.

- (1) Remove the vent plugs from master cylinders (1 and 2, Figure 1, subsection 32-4-2) and replace with overflow lines. Immerse the free ends of the overflow lines in a can containing enough hydraulic fluid to cover the ends of the lines.
- (2) Connect a clean hydraulic pressure source to the brake assembly bleeder valve (11, Figure 202).

AA-5 SERIES  
MAINTENANCE MANUAL



- |                   |                  |
|-------------------|------------------|
| 1. Bolt           | 8. Nut           |
| 2. Washer         | 9. Washer        |
| 3. Backplate      | 10. Anchor Bolt  |
| 4. Cylinder       | 11. Brake Disc   |
| 5. Pressure Plate | 12. Torque Plate |
| 6. Piston         | 13. Lining       |
| 7. O-ring         |                  |

Wheel Brake Assembly  
Figure 203

- (3) Fill the system until the overflow line in the master cylinder being filled shows no more air bubbles. Remove the overflow lines.
- (4) Remove the source of fluid and pressure and allow the fluid to drain back through the system until the fluid level is approximately 1/4 inch from the top of the reservoir in the master cylinder.
- (5) Secure the bleeder valve and replace the vent plugs.

**NOTE:** Do not fill the reservoir higher than 1/4 inch from the top as this will result in spillage. If fluid is accidentally spilled on the rug, it can be removed with Imperial cleaner.

#### 6. Cleaning Brake System Parts

**WARNING:** USE SOLVENTS IN A WELL VENTILATED AREA. AVOID BREATHING FUMES.  
KEEP AWAY FROM FLAMES.

Clean all parts except brake linings with cleaning solvents, Federal Specification No. P-S-661 (see Chapter 12). Thorough cleaning is important to prevent brake malfunction.

#### 7. Inspection of Brake System Parts

##### A. Inspect Brake Cylinders

**NOTE:** Any part damaged or worn beyond minor repair must be replaced.

**AA-5 SERIES  
MAINTENANCE MANUAL**

- (1) After disassembly of brake cylinders inspect all parts for wear, cracks, damage, or distortion.
- (2) Check piston for deep scratches.
- (3) Check bore on cylinder housing for deep scratches.
- (4) Check valve spring (13, Figure 201) for a free length of 3/8 to 7/16 inch.
- (5) Check return spring (15, Figure 201) for a free length of 2-15/16 to 3-1/16 inches.
- (6) Check valve spring (14, Figure 202) for a free length of 3/8 to 7/16 inch.
- (7) Check return spring (20, Figure 202) for a free length 2-3/8 to 2-1/2 inches.
- (8) Inspect brake linings for damage, deterioration, and excessive wear. New brake linings should be installed when linings are worn to less than 1/10 inch.
- (9) Inspect anchor bolts on wheel brake assembly for nicks or damage and sand smooth with fine sandpaper.
- (10) Inspect wheel brake disc for a minimum thickness of 0.205 inch. If brake disc is below minimum thickness, install a new brake disc.

**8. Testing Brake Master Cylinders**

**A. Test Brake Master Cylinder - Non-Reservoir Type**

- (1) After complete assembly, blow air through bottom port hole in cylinder housing (16, Figure 201) and observe air passing out through top port. This assures that the valve is opening. With air still passing through port, depress shaft approximately 1/16 inch. This should cut off air passing through the assembly and out the top port and show that the check valve is closing and sealing properly.
- (2) The following function and proof test should be conducted with hydraulic brake fluid (MIL-H-5606, see Chapter 12) only.
- (3) Bleed all air from system and pressurize cylinder to 1500 psi. Allow 2 minutes for stabilization and check for external leaks.
- (4) Lower pressure to 1000 psi and after a 2-minute stabilization period, check pressure drop. Pressure should remain steady. A 40 psi drop in a 2-minute period is acceptable.
- (5) If cylinder fails to pass the above test, recycle and check again.
- (6) If cylinder still fails test, disassemble and check the O-ring seal (11) for cuts or scratches which might have occurred during assembly. Also check for dirt or contamination around O-ring (11) and O-ring (5).

**B. Test Brake Master Cylinder - Reservoir Type**

- (1) After complete assembly, blow air through port hole in cylinder housing (19, Figure 202) and observe air passing out through vent in filler plug (7). With air still passing through port, depress shaft approximately 1/16 inch. This should cut off air passing through the assembly and out vent in filler plug (7), and show that check valve is closing and sealing properly.

**AA-5 SERIES  
MAINTENANCE MANUAL**

- (2) The following function and proof test should be conducted with hydraulic brake fluid, MIL-H-5606, only. see chapter 12.
- (3) Bleed all air from system and pressurize cylinder to 1500 psi. Allow 2 minutes for stabilization and check for external leaks.
- (4) Lower pressure to 1000 psi and after a 2-minute stabilization period, check pressure drop. Pressure should remain steady. A 40 psi drop in a 2-minute period is acceptable.
- (5) If cylinder fails to pass the above test, recycle and check again.
- (6) If cylinder still fails test, disassemble and check the O-ring (16) for cuts or scratches which might have occurred during assembly. Also check for dirt or contamination around O-ring (16) and O-ring (17).

**9. Rigging the Parking Brake**

**A. Aircraft AA5-0001 through 0834, AA5A-0001 through 0522, and AA5B-0001 through 0692 (See Figure 204.)**

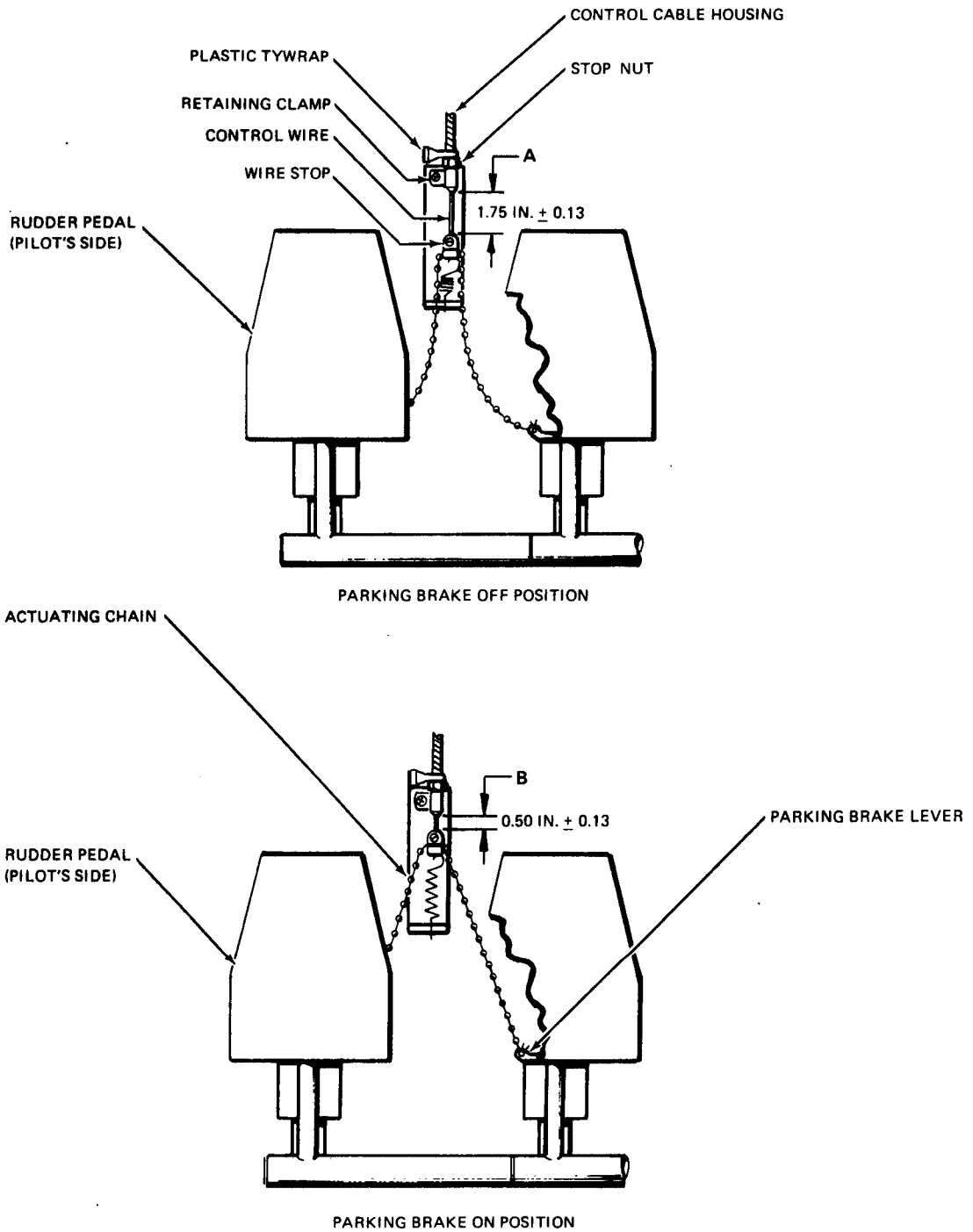
- (1) Place the parking brake control in the OFF position (full in) and measure the dimension at (A). This dimension should be  $1.75 \pm 0.13$  inches. If necessary, adjust the wire stop to obtain this dimension.
- (2) The actuating chain should exert a straight pull on the parking brake levers. The master cylinder cover plate and lever may be rotated to achieve this condition.
- (3) Allow the rudder pedals to center and begin pulling out the parking brake control until all slack is removed from the actuating chain.
- (4) Measure the dimension at (B). This dimension should be  $0.5 \pm 0.13$  inch. If this dimension is less than specified, remove enough chain to obtain  $0.5 \pm 0.13$  inch; if this dimension is greater than specified, the chain length will have to be increased.
- (5) Check the parking brake for proper operation. After disengaging, apply full rudder pedal deflection in each direction and ensure that neither master cylinder parking brake lever is lifting.

**B. Aircraft AA5A-0523 and Subsequent, AA5B-0693 and Subsequent (See Figure 205.)**

- (1) If not previously accomplished, bleed and service brake system (Paragraph 5 above).
- (2) Install the wire through the cable stop on the lever but do not tighten. Push the parking brake control in as far as it will go.
- (3) Push the lever on the valve to the up stop. Tighten the wire stop securely.
- (4) Position the outer cable housing as shown and tighten clamp hardware. Pull the parking brake control until the lever contacts the cable housing. The control travel should be  $1.5 \pm 0.25$  inches. Readjust cable housing position as required.
- (5) With the control out as far as it will go, press both toe brakes in as far as they will go and release them. Both main landing gear wheels should be locked.
- (6) Push the parking brake control in as far as it will go. Both main landing gear wheels should turn freely.
- (7) Bend the end of the wire beyond the wire stop as shown in Figure 205.



AA-5 SERIES  
MAINTENANCE MANUAL



Parking Brake Rigging  
AA5-0001 thru 0834  
AA5A-0001 thru 0522  
AA5B-0001 thru 0692  
Figure 204

10. Relining Brakes

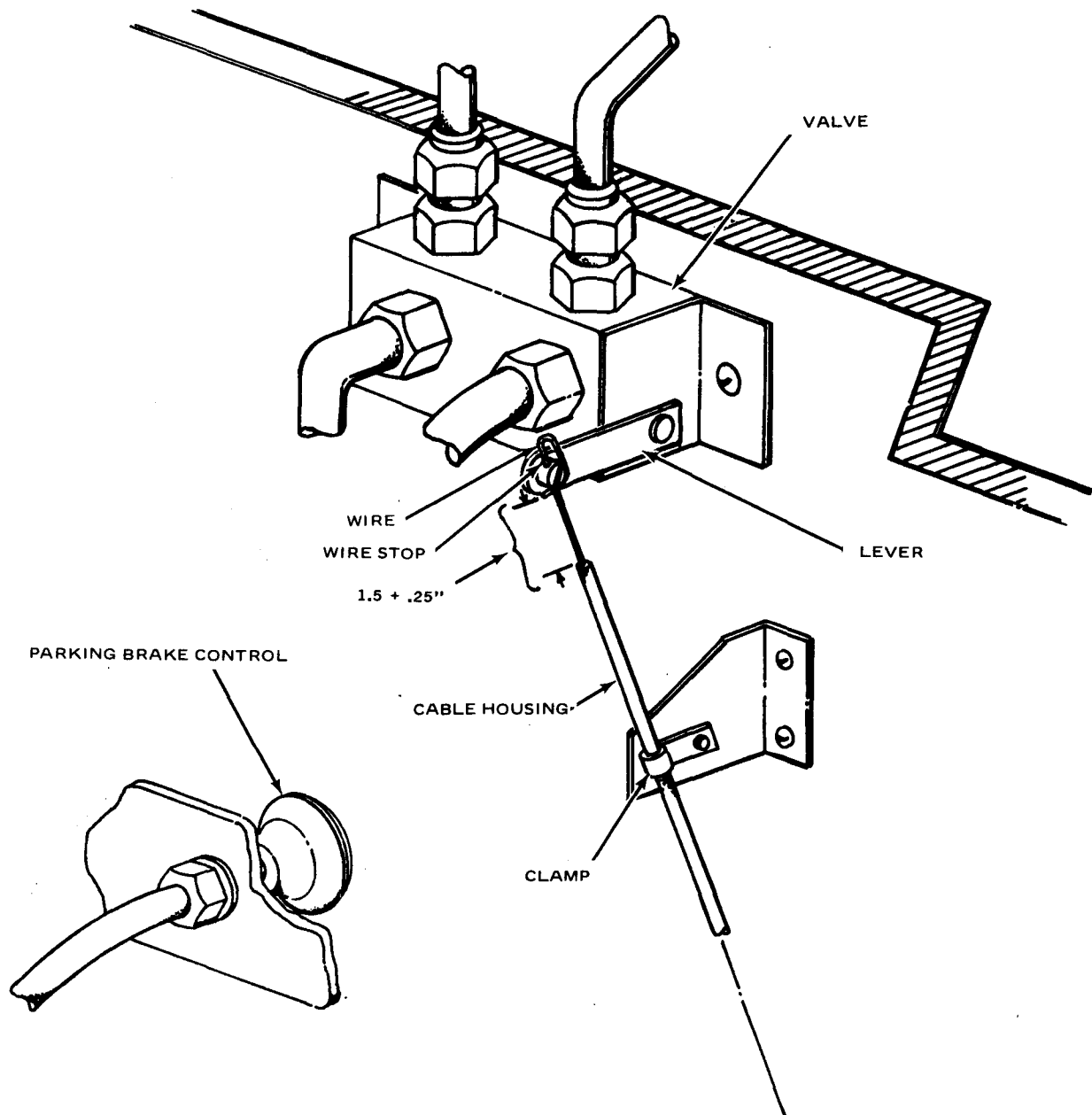
A. Reline Brakes (See Figure 203).

- (1) Remove wheel brake assembly (refer to Paragraph 4).
- (2) Place backplate (3) 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 backplate and pressure plate (5) in the same manner.

NOTE: A rivet relining kit, Part No. 199-00100, is available from Grumman American Aviation Corporation. This kit consists of an anvil and punch.

- (3) Clamp the flat side of the anvil in a vise.
- (4) Align new lining on back plate and place brake rivet in hole with rivet head in the lining. Place the rivet head against the anvil.
- (5) Center the rivet setting punch on the lips of the rivet. While holding the back plate down firmly against the lining, hit the punch with a hammer to set the rivet. Repeat blows on the punch until lining is firmly against the back plate.
- (6) Realign the lining on the backplate and install rivets in the remaining holes.
- (7) Install a new lining on pressure plate in the same manner.

AA-5 SERIES  
MAINTENANCE MANUAL



Parking Brake Rigging  
(Dual Controls AA5A-0523 and Subsequent, AA5B-0693 and Subsequent)  
Figure 205