

AIRCRAFT WHEEL & BRAKE DIVISION  
PARKER HANNIFIN CORPORATION  
AVON, OHIO

PARTS LIST

199-122 CONVERSION KIT

ROCKWELL COMMANDER MODELS

500, 500A, 500B, 500S, 500U  
THOSE AIRCRAFT THAT USE MIL-H-5606 BRAKE FLUID

<u>PART NUMBER</u>	<u>DRAWING REVISION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
30-159B	Rev. NC dated 02-03-1989	Brake Assembly	2
40-198	Rev. E dated 06-13-2005	Wheel Assembly	2
103-22100	-----	Bolt (AN5-10A)	24
095-10500	-----	Washer (AN960-516)	48
094-10400	-----	Nut (MS21044-N5)	24

Publication Package (P/N PP199-12200)

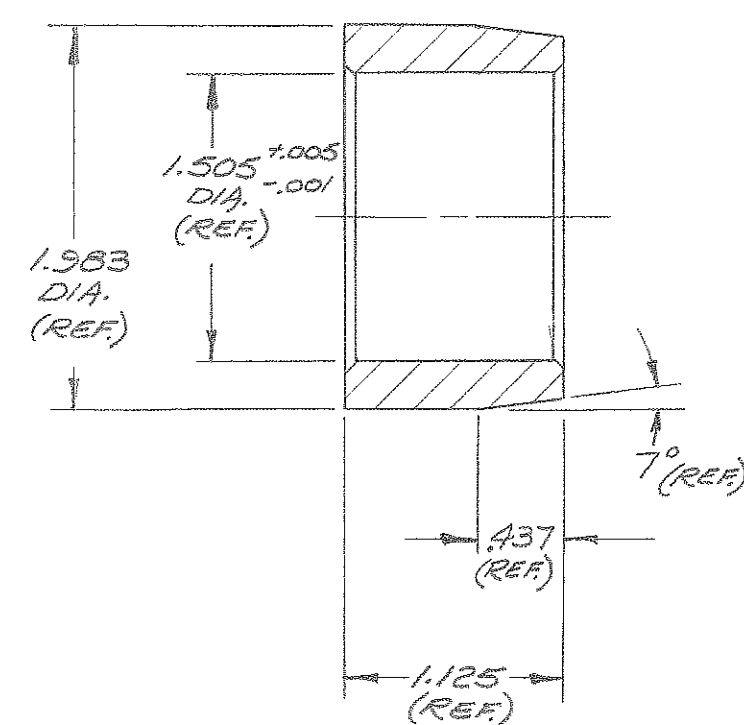
50-86	Rev. E dated 04-20-1989	Installation Drawing
40-198 / 30-159	Rev. B dated 04-19-1989	Maintenance Manual
SA706GL	Last amend date 4-28-88	Supplemental Type Certificate
ANAC 2012S08-20	Issue date 8-23-2012	Brazil Supplemental Type Certificate
PRM14A	-----	Metallic Brake Lining Conditioning Procedure
PRM69	-----	General Maintenance Information
-----		Product Registration Card

**NOTES:**

- This kit will convert one aircraft to Cleveland Wheels and Brakes.
- For use with MIL-H-5606 (Red Fluid).

199-122  
REV. NC 06-29-1983  
REV. A 09-14-1983 (C/N 272-72)  
REV. B 04-27-1988 (C/N 289-56)  
REV. C 05-11-1988 (C/N 289-86)  
REV. D 10-07-1988 (C/N 292-91)  
REV. E 02-03-1989 (C/N 294-51)  
REV. F 04-20-1989 (C/N 296-1)  
REV. G 04-30-2007 (DCN 0374-63)  
REV. H 09-06-2012 (ECO-0014563)

## SKETCH

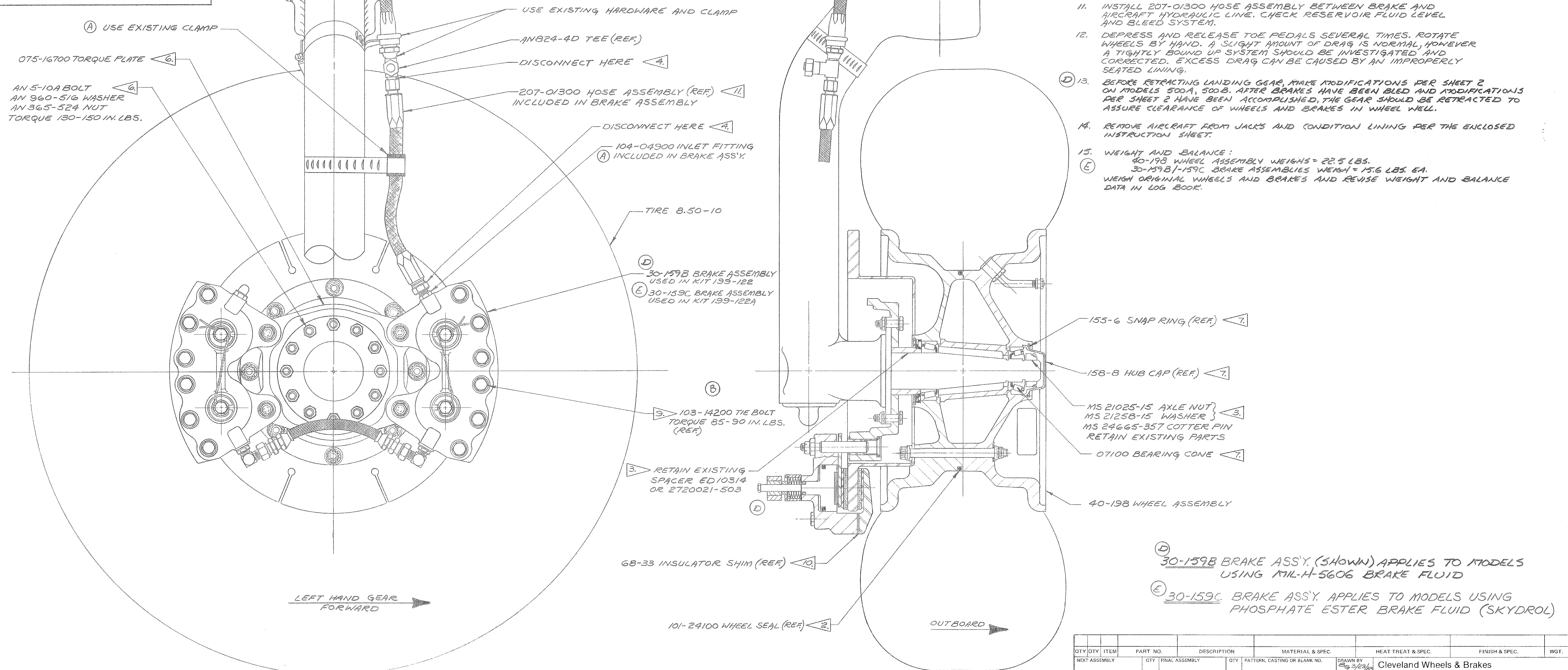


1. KIT 139-122 APPLIES TO THE FOLLOWING MODELS  
OF AERO COMMANDER USING MIL-H-5606 BRAKE FLUID  
KIT 139-122A APPLIES TO THE APPLICABLE MODELS OF  
AERO COMMANDER USING PHOSPHATE ESTER BRAKE FLUID


(A) (C)	MODEL	TIRE SIZE	PLY RATING	TYPE
	500, 500A	8.50-10 TYPE III	6 OR 8	TUBELESS OR TUBE TYPE
	500B, 500S 500U	8.50-10 TYPE III	8	TUBELESS OR TUBE TYPE

2. MOUNT TIRES ON WHEELS AND INFLATE PER MANUAL. WHEEL ASSEMBLY 40-198 INCLUDES TUBELESS VALVE AND WHEEL SEAL.
3. JACK UP AIRCRAFT PER MANUAL. REMOVE AND DISCARD EXISTING MAIN GEAR WHEELS. RETAIN AXLE NUT, WASHER AND SPACER.
4. DISCONNECT LOWER HYDRAULIC LINE FROM BRAKE LINE PORT AND AN 824-4D TEE AND CAP TIGHTLY.
5. REMOVE AND DISCARD EXISTING BRAKES.

6. INSTALL TORQUE PLATE 75-167 LOCATED AS SHOWN. TORQUE MOUNTING BOLTS 130-150 INCH POUNDS.
7. REMOVE 155-G SNAP RING, 158-B HUB CAP, 07100 OUTER BEARING CONE FROM 40-198 WHEEL ASSEMBLY AND STORE ON A CLEAN SURFACE.
8. INSTALL WHEEL ASSEMBLY ON AXLE. INSTALL OUTER BEARING CONE, WASHER AND AXLE NUT. WHILE ROTATING WHEEL, TORQUE AXLE NUT TO 60 IN. LBS., THEN BACK OFF TO 0. WHILE ROTATING WHEEL, RE-TORQUE AXLE NUT TO 30 IN. LBS. IF SLOTS IN NUT DO NOT LINE UP WITH HOLE IN AXLE, CONTINUE TIGHTENING UNTIL FIRST AVAILABLE ALIGNMENT IS REACHED, BUT DO NOT ADVANCE NUT IN EXCESS OF 30°. INSTALL MS24665-357 COTTER PIN. INSTALL HUB CAP IN WHEEL WITH SNAP RING.
9. LOOSEN 12 TIE BOLTS ON 30-159B/159C BRAKE ASSY. (BOTH HOUSINGS) AND REMOVE ALL 4 BACK PLATES. SLIDE NEW BRAKE HOUSINGS IN THE 2 MOUNTING HOLES ON EITHER SIDE OF THE TORQUE PLATE. LOCATE HOUSINGS AS SHOWN. DO NOT LOOSEN OR DISCONNECT THE CONNECTING HOSE.
10. POSITION INSULATOR SHIM 68-33 OVER THE 6 TIE BOLTS IN EACH HOUSING, THEN POSITION BACK PLATES BETWEEN DISC AND WHEEL FLANGE AS SHOWN. ALIGN BACK PLATE WITH BOLTS AND TORQUE BOLTS 85-90 IN. LBS.
11. INSTALL 207-01300 HOSE ASSEMBLY BETWEEN BRAKE AND AIRCRAFT HYDRAULIC LINE. CHECK RESERVOIR FLUID LEVEL AND BLEED SYSTEM.
12. DEPRESS AND RELEASE TOE PEDALS SEVERAL TIMES. ROTATE WHEELS BY HAND. A SLIGHT AMOUNT OF DRAG IS NORMAL, HOWEVER A TIGHTLY BOUND UP SYSTEM SHOULD BE INVESTIGATED AND CORRECTED. EXCESS DRAG CAN BE CAUSED BY AN IMPROPERLY SEATED LINING.
13. BEFORE RETRACTING LANDING GEAR, MAKE MODIFICATIONS PER SHEET 2 ON MODELS 500A, 500B. AFTER BRAKES HAVE BEEN BLEED AND MODIFICATIONS PER SHEET 2 HAVE BEEN ACCOMPLISHED, THE GEAR SHOULD BE RETRACTED TO ASSURE CLEARANCE OF WHEELS AND BRAKES IN WHEEL WELL.
14. REMOVE AIRCRAFT FROM JACKS AND CONDITION LINING PER THE ENCLOSED INSTRUCTION SHEET.
15. WEIGHT AND BALANCE:
- 40-198 WHEEL ASSEMBLY WEIGHT = 22.5 LBS.  
30-159B/159C BRAKE ASSEMBLIES WEIGHT = 15.6 LBS. EA.  
WEIGH ORIGINAL WHEELS AND BRAKES AND REVISE WEIGHT AND BALANCE DATA IN LOG BOOK.



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QTY	QTY	ITEM	PART NO.	DESCRIPTION	MATERIAL & SPEC.	HEAT TREAT & SPEC.	FINISH & SPEC.	WGTS.
NEXT ASSEMBLY			QTY	FINAL ASSEMBLY	QTY			
THIS DESIGN IS THE PROPERTY OF PARKER HANNIFIN CORPORATION. IT IS NOT TO BE REPRODUCED OR COPIED, EITHER WHOLLY OR IN PART, WITHOUT THE WRITTEN PERMISSION OF PARKER HANNIFIN CORPORATION.			2	ZYGLO PER MIL-L-6866 STAMP N ON PART MAGNAFLOX PER MIL-L-6868 STAMP P ON PART ✓ MACHINED SURFACES PER MIL-STD-10-1-1958 OTHERWISE NOTED UNLESS NOTED ALL PARTS TO BE PER MIL-S-7742	WORK TO DIMENSIONS - DO NOT SCALE TOLERANCE FOR XXX ± .010 TOLERANCE FOR XX ± .005 TOLERANCE FOR ANGULAR DIMS ± .030 BREAK SHARP EDGES .010 UNLESS NOTED. REMOVE ALL BURRS BEFORE PLATING, ROLL OR INSP. PROCEDURE NO. 14.	DRAWN BY <i>5-2336</i> CHECKED BY SCALE <i>1/2" = 1"</i> NAME <i>INSALLATION OF KIT</i> <i>1958-1962 AERO</i> <i>COMMANDER</i>		
THIS DESIGN IS THE PROPERTY OF PARKER HANNIFIN CORPORATION. IT IS NOT TO BE REPRODUCED OR COPIED, EITHER WHOLLY OR IN PART, WITHOUT THE WRITTEN PERMISSION OF PARKER HANNIFIN CORPORATION.						Cleveland Wheels & Brakes Aircraft Wheel and Brake Division Parker Hannifin Corporation 1180 Center Road Avon, Ohio 44011 		
						50-86		

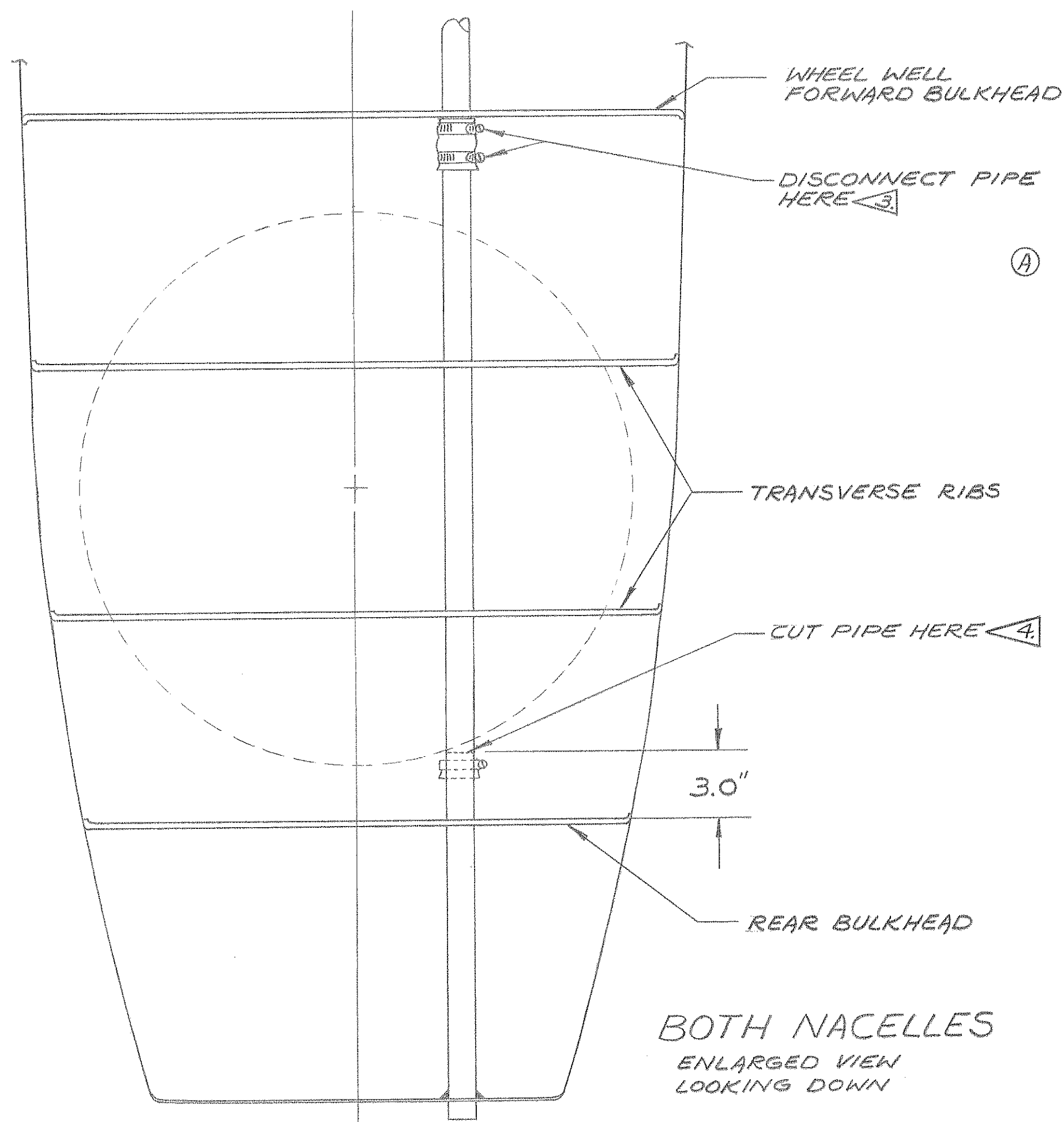
ORIGINAL BREATHES  
CAPPED

## SHORT BREATHING TUBE

-WHEEL WELL  
FORWARD BULKHEAD

## INTERFERENCE BETWEEN PIPE AND BRAKE HOUSING

VIEW LOOKING DOWN  
SECTION THRU NACELLES



1. ON AIRCRAFT WITH FLAT NACELLES THE LANDING GEAR ROTATES DURING RETRACTION, WHICH ALLOWS THE BRAKE HOUSING TO CONTACT THE ENGINE OIL BREATHER PIPE IN BOTH NACELLES.

- ④ 2. PERFORM ROCKWELL SERVICE LETTER 137A PRIOR TO THIS KIT INSTALLATION.

3. REMOVE THE 2 SCREW CLAMPS AT THE WHEEL WELL FORWARD BULKHEAD AND DISCONNECT THE PIPE FROM ITS FORWARD SEGMENT.
4. CUT THE PIPE APPROXIMATELY 3 INCHES FORWARD OF THE REAR BULKHEAD AND REMOVE THE ENTIRE PIPE SECTION FROM THE WHEEL WELL. THIS ALLOWS ROOM IN THE WELL FOR THE BRAKE HOUSING. ON AIRCRAFT WHICH INCORPORATE THE SHORT BREATHER TUBES, THE MODIFICATION IS COMPLETE.

50-86					E
CHANGE NOTICE	LET-TER	DESCRIPTION OF CHANGE	CHG. BY	DATE	CHK'D BY
272/ 7/2	A	INITIAL RELEASE SEE C/P	B G	9-14 83	
275 12/22	B	103-14200 WAS 103-14300, SHEET 1	B B	11-27 84	
283/ 5/56	C	SEE SHEET 1	BR	4-27 -88	BB
294/ 7/51	D	SEE SHEET 1	RAI	02-03 89	BB
296/ 7/51	E	SEE SMT. 1	RAI	1-20 89	BB

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MAINTENANCE INSTRUCTIONS  
FOR THE  
40-198/30-159 WHEEL & BRAKE ASSEMBLIES  
USED ON THE  
AERO COMMANDER SHRIKE

June 1, 1983

# LIST OF REVISIONS

<u>REVISION</u>	<u>DATE</u>	<u>PAGE</u>	<u>DESCRIPTION</u>	<u>APVD</u>
A	1-23-89	3	Section 4.1.5, was "The pistons may be removed after removal of spring stacks per page 8 by applying a slight amount of air pressure to the inlet or outlet ports of the cylinder"	BB
		4	Section 5.1.5, Add: " <u>CAUTION</u> : Do not sandblast or glass bead piston bore surfaces"	
			Section 5.1.6, Delete: "NOTE: Nicks and burrs in the pilot bore area can prevent the pistons from properly retracting, resulting in brake drag."	
		6	Section 7.1: ".360" -was- ".375"	
		8	Add Section Title: "7.2 Spring stack removal, inspection and replacement"	
		10, 11 & 12	Add Section 7.3: Maintenance Instructions for 30-159B Brake Assembly.	
<hr/>				
B	4-19-89	10, 11 & 12	Section 7.3 Title: "30-159B and C" -was- "30-159B"	BB
		10	Section 7.3A "30-159B and 30-159C" -was- "30-159B"	
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## 1. MAIN WHEEL

### 1.1 Disassembly

- 1.1.1 Properly jack up aircraft and fully deflate tires.
- 1.1.2 Remove bolts and washers from brake assembly to remove back plates.
- 1.1.3 Remove wheel from axle.
- 1.1.4 Double check to make sure tire is fully deflated and break tire bead from wheel flange. Use a mallet or nonmetallic instrument (DO NOT USE TIRE IRONS).
- 1.1.5 Remove nuts, washers, and tie bolts to separate wheel halves.
- 1.1.6 If the O-ring is to be reused, mark position to reinstall as closely as possible.
- 1.1.7 Remove brake disc from inner wheel half. If the disc sticks, use a nonmetallic instrument and pry it out.
- 1.1.8 Remove snap ring, molded grease seal, washers and/or hubcap from inner and outer wheel halves.

## 2. MAIN WHEEL

### 2.1 Cleaning, Inspection and Repainting

- 2.1.1 Degrease all metallic parts and dry thoroughly.
- 2.1.2 Visually inspect bearing cups and cones for damage or wear, but do not remove the cups from the wheel half unless replacement is necessary.
- 2.1.3 If a bearing cup is to be replaced, the wheel half must be heated either in boiling water for 30 minutes, or in an oven not to exceed 149°C (300°F) before attempting to remove or install a cup. If the cup does not drop out, tap the cup evenly from the axle bore, using a fiber drift pin, or a suitable arbor press.
- 2.1.4 Inspect bearing cones for grease contamination and/or solidification at every periodic inspection. Repack wheel bearings with Mobilgrease 77, Mobilux EP2, or equivalent. (NEVER EXCEED 500 WHEEL MILES BETWEEN REPACKING INTERVALS)
- 2.1.5 Inspect wheel halves for cracks or damage. If casting is cracked, or shows excessive corrosion, it should be replaced. Small nicks or gouges in the castings should be blended out and polished with (400 grit) sandpaper. Inspect O-ring seating areas for nicks or distortion. Nicks may be lightly blended with a fine grit sandpaper. Badly distorted sections in this area will hamper O-ring sealing characteristics, and is cause for wheel half replacement.



### 2.1.5 (continued)

Areas from which the protective coating has been removed, or that show slight corrosion, should be thoroughly cleaned and repainted with one coat of zinc chromate primer, and one coat of aluminum (color) polyurethane.

NOTE: NEVER PAINT WORKING SURFACES OF THE BEARING CUPS.

- 2.1.6 Inspect snap rings for distortion. Replace molded grease seal if badly worn or contaminated.
- 2.1.7 Inspect brake disc for cracks, corrosion, excessive wear, scoring or warpage. Rust may be removed by hand wire brushing and finishing with a medium grit sandpaper or emery. Brake discs that are warped or scored can be reworked as specified in Section 7.
- 2.1.8 Inspect wheel bolts for cracks and corrosion. Cracked bolts are to be replaced with a new bolt of corresponding part number. Inspect metallic self locking nuts. If the nut can be turned onto the bolt by hand so that the bolt will protrude past the end of the nut, it is to be replaced.

## 3. REASSEMBLY

### 3.1 Main Wheel

- 3.1.1 Place inner wheel half with brake and tie bolts installed on a flat surface, with register portion of the wheel half up. Place O-ring on register portion of wheel half.

NOTE: IF REUSING EXISTING O-RING, INSTALL AS CLOSE AS POSSIBLE TO ORIGINAL POSITION.

Place tire over inner wheel half, and then place outer wheel half in tire, making sure to properly align male and female registers. Install nuts and washers. Torque nuts to limits listed on decal affixed to outer wheel half. When all nuts have been torqued, torque a second time to make sure that the required value has been achieved; sometimes O-ring compression will give false initial readings. Inflate tire to desired pressure.

- 3.1.2 To complete wheel reassembly, reverse steps 1.1.2 through 1.1.7 and torque wheel nuts per limits listed on decal affixed to outer wheel half.

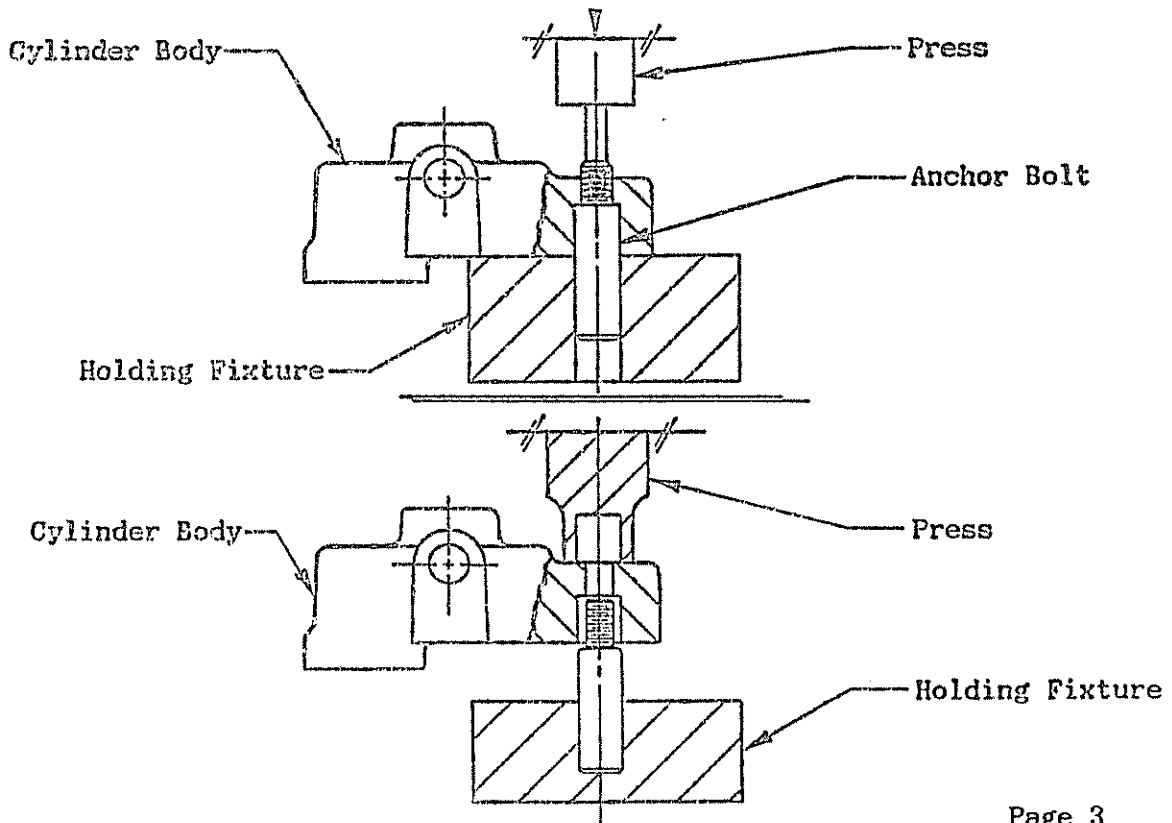
## 4. BRAKE

### 4.1 Disassembly

NOTE: IT IS NOT NECESSARY TO REMOVE THE WHEEL FROM THE AIRCRAFT TO DISASSEMBLE AND SERVICE BRAKE.

- 4.1.1 Remove and cap hydraulic line.
- 4.1.2 Remove the cylinder tie bolts and remove back plate assembly(s).
- 4.1.3 Remove the brake cylinder(s) assembly from the torque plate (the torque plate will remain mounted to the axle).
- 4.1.4 Remove the pressure plate assembly, inlet fitting, and bleeder fitting.
- ④ 4.1.5 The pistons may be removed after removal of spring stacks/retracts per sections 7.2 and 7.3. Screw a back plate attach bolt into each piston, and use hand pressure on each bolt to push the piston from its bore.
- 4.1.6 Remove the O-rings from piston.
- 4.1.7 If necessary, the anchor bolts may be removed by using a holding fixture and arbor press. If possible, place the anchor bolts into the holding fixture so that the anchor bolt is piloted while being removed.

CAUTION: CYLINDER MUST BE SQUARE WITH ARBOR IN STEPS "A" AND "B" SO THAT THE ANCHOR BOLTS DO NOT COCK.





## 5. BRAKE

### 5.1 Cleaning and Inspection

5.1.1 Clean all metal parts in alcohol or suitable solvent.

5.1.2 Clean O-rings in denatured alcohol and dry thoroughly.

5.1.3 Inspect O-rings for cuts, nicks, distortion or excessive wear. If necessary, replace with O-rings of corresponding part numbers.

5.1.4 Inspect brake cylinder(s) for cracks, especially in the lug area around the anchor bolts. Cracks in this area necessitate cylinder replacement.

- (A) 5.1.5 Small nicks and light corrosion may be blended and removed with emery or sandpaper. Any area from which the protective coating is removed, should be thoroughly cleaned and repainted with one coat of zinc chromate primer, and one coat of aluminum (color) polyurethane. -

CAUTION: DO NOT SANDBLAST OR GLASS BEAD PISTON BORE SURFACES.

- (A) 5.1.6 Inspect the fitting ports and piston bores for contamination. Light scratches or nicks in the piston bores, pilot bores, or on the chamfered surfaces within these bores may be polished out with 600 grit emery.

5.1.7 Thoroughly clean out any residue upon completion of step 5.1.6. Any external surfaces around the piston bores from which the protective coating has been removed, should be cleaned and repainted with one coat of zinc chromate primer and one coat of aluminum (color) polyurethane.

**NOTE:** DO NOT PAINT INTERNAL SURFACES OF PISTON BORES.

5.1.8 Inspect pistons for nicks or burrs. Remove nicks or burrs by polishing with 600 grit emery. Thoroughly clean before reinstallation.

5.1.9 Inspect brake lining for edge chipping and surface deterioration. See Section 7 for wear limits.

5.2.0 Lining replacement can be accomplished by removing center rivet, then by prying the old segments off of the carrier with a screwdriver. To install new pads, snap the new pad onto the carrier pins, and then attach with new center rivet, P/N 105-2.

**NOTE:** IF THE LININGS ARE CHANGED, BUT THE PISTONS ARE NOT REMOVED FROM THE CYLINDER, CLEAN THE EXPOSED SURFACES OF THE PISTONS BEFORE DISPLACING THE PISTONS BACK INTO THE CYLINDER.

## 5.1 Cleaning and Inspection (continued)

- 5.2.1 Inspect pressure plate and back plates for cracks or warpage. Replace if cracked or severely deformed. Inspect pins for looseness. If loose, tighten with rivet set and anvil, P/N 199-1A and 199-1B, or replace back plate and pressure plate assembly.

NOTE: SLIGHTLY WARPED PRESSURE PLATES WITH RELIEF SLOTS CAN BE FIXTURED IN A VISE AND STRAIGHTENED WHEN LAID ON A FLAT SURFACE; FLATNESS SHOULD BE WITHIN .015-.020 TIR. WARPED PRESSURE PLATES CAN CAUSE BRAKE DRAG.

- 5.2.2 Inspect anchor bolt holes in torque plate for internal corrosion or contamination. If present, clean with emery and apply a light coat of dry lube.

NOTE: FOR BEST SERVICE LIFE, THE CYLINDERS MUST SLIDE FREELY IN THE TORQUE PLATE.

Check the anchor bolt hole and mounting bolt hole areas for elongation or cracks. Badly elongated or cracked parts should be replaced with new parts of corresponding part number. Minor corrosion on the torque plates may be removed with 600 grit emery.

NOTE: SURFACES FROM WHICH THE PROTECTIVE COATING IS REMOVED SHOULD BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER, AND ONE COAT OF ALUMINUM (COLOR) POLYURETHANE.

- 5.2.3 Inspect bolts for cracks, thread damage or corrosion, and replace if necessary.

## 6. BRAKE

### 6.1 Reassembly

- 6.1.1 If removed, press anchor bolts (Ref. Sketch) into brake and install washers and nuts. Torque nuts to 90 in-lbs.
- 6.1.2 Install inlet and bleeder fittings.
- 6.1.3 For piston installation, lubricate the piston, O-rings, and piston bore with a small amount of MIL-H-5606 hydraulic fluid. Place piston in bore and insure that piston and seal are in proper alignment.

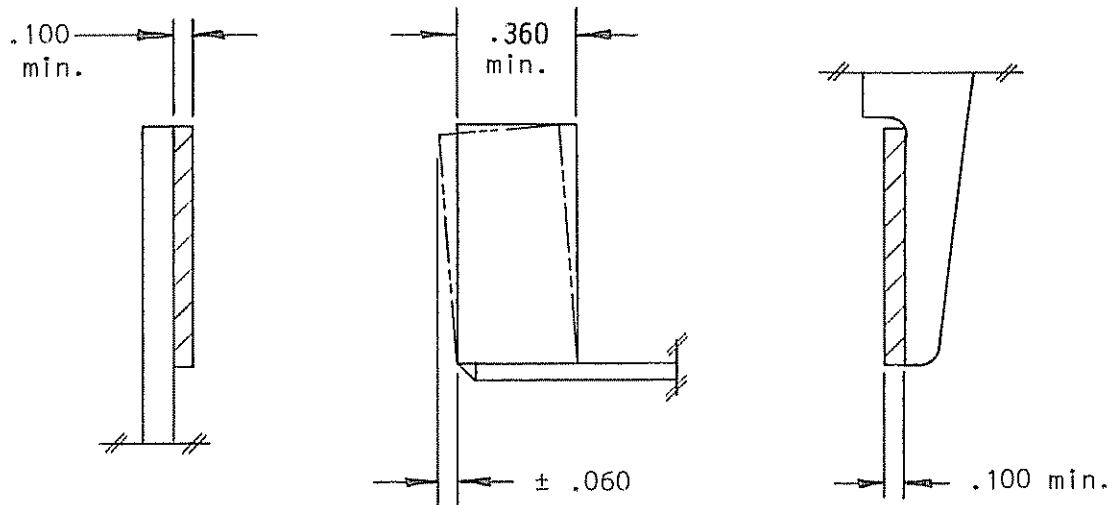
## 6.1 Reassembly (continued)

- 6.1.3 Tap the piston with a wooden or plastic mallet while alternately rotating until completely seated into cylinder bore.
- 6.1.4 Install pressure plate assembly by aligning anchor bolt holes with anchor bolts and slide onto cylinder. The pressure plate must float freely on the anchor bolts.
- 6.1.5 Install brake assembly to torque plate by aligning anchor bolts with torque plate holes and sliding brake assembly onto torque plate (it must slide freely).
- 6.1.6 Install washers, cylinder tie bolts, and insulator shim. Install back plate assemblies between brake disc and wheel flange, and align with tie bolts. Torque bolts to 85-90 in-lbs.
- 6.1.7 Reconnect hydraulic lines and bleed system. Check pedal for proper feel and travel.
- 6.1.8 Reinstall spring stacks per instructions on Page 8.

## 7. WEAR LIMITS

Ⓐ

- 7.1 Maximum wear limits for brake linings and discs are shown in the following sketch. Disc warpage should not exceed .060 inch.



Pressure Plate

Back Plate

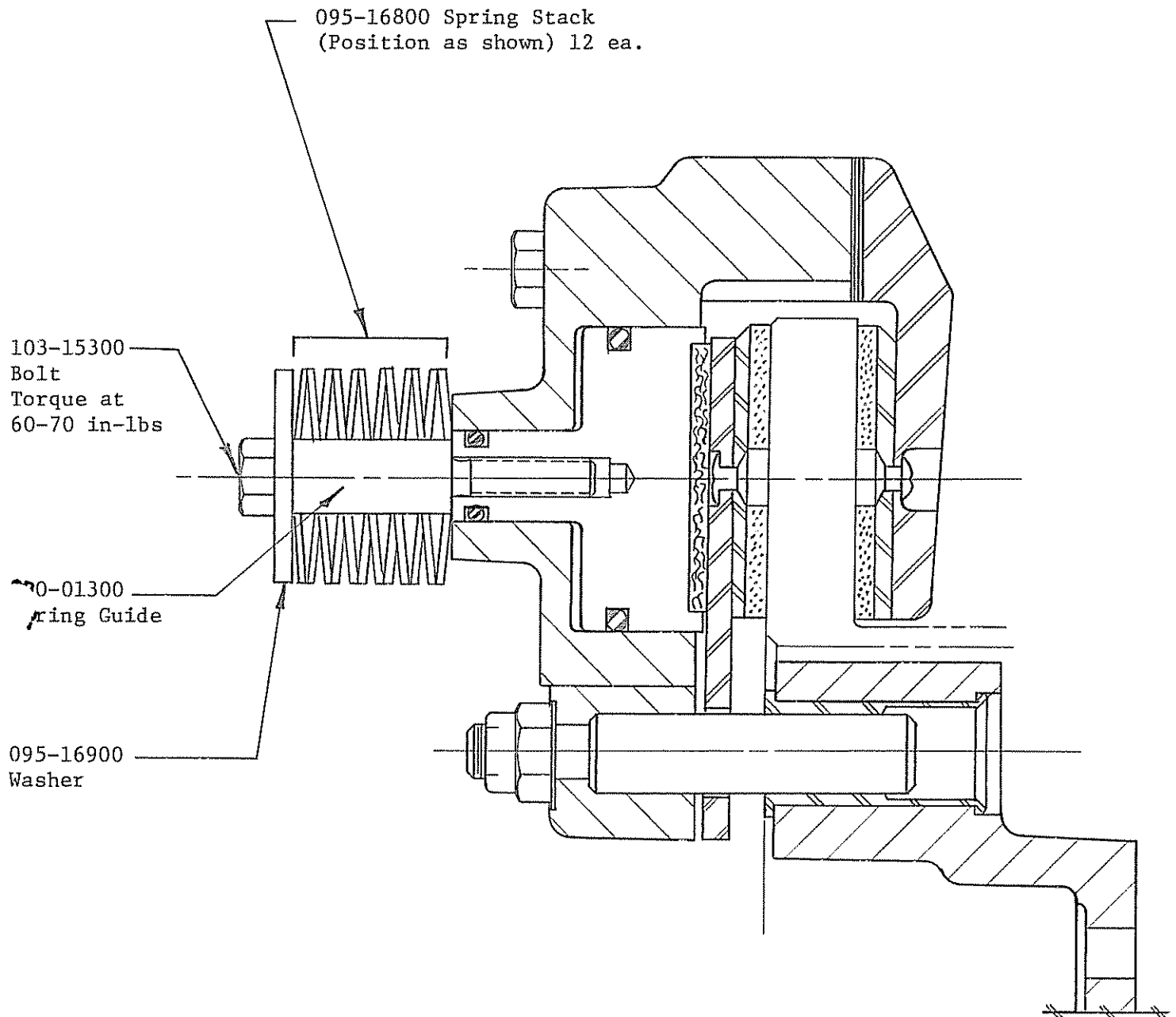
#### Axle Nut Torque Requirements & Procedure

1. While rotating wheel, torque axle nut to 60 in-lbs, then back off to 0. While rotating wheel, retorque axle nut to 30 in-lbs. If slot in nut does not align with hole in axle, continue tightening until first available alignment is reached, but do not advance nut in excess of 30° ( $\frac{1}{2}$  castellation).

## 7.2 Spring Stack Removal Inspection and Replacement

Servicing (removal, inspection, replacement) Retract Spring Stacks on the 30-159/30-159A Brake Assemblies.

- A. With the exception of piston removal, corrosion or damage caused by external (foreign objects), the spring stacks should not require service and/or replacement.
- B. If removal is required, caution must be taken and eye protection worn to avoid injury since we are dealing with a preloaded spring stack.
  1. Apply a slight amount of pressure to the brake system to prevent piston rotation, then break loose each bolt.
  2. Release pressure and slowly remove the bolt (103-15300) spring guide (200-01300) and disc spring (095-16800) from each piston. Slide the disc springs from the bolt and spring guide.
  3. Inspect the springs for nicks or other damage caused by stones or other foreign objects. Damage of this nature is cause for replacement.
  4. Inspect for corrosion; lightly corroded parts may be polished with a fine grit emery and coated with a light film of oil or lubricant. Parts that are deeply corroded and/or pitted must be replaced.
  5. After inspection, slide disc springs (see sketch for correct positioning) over the spring guide and bolt. Reattach the bolt, spring guide and disc springs to each piston as shown in the sketch. Torque bolt at 60-70 in-lbs., while slight pressure is applied to the brake to prevent piston rotation.
  6. Actuate brake 2-3 times and visually inspect each assembly to insure that everything appears normal and seated properly.



### 7.3 MAINTENANCE INSTRUCTIONS, 30-159B AND C BRAKE ASSEMBLY

Utilizing self adjusting retract mechanism.

A. This procedure is applicable to 30-159B and 30-159C Brake Assemblies delivered from the factory or Brake Assemblies that have been modified in the field using Kit No. 199-173 and Product Reference Memo No. 49. All wear limits and torque values apply as previously noted in the original maintenance procedures, with the exception of those noted in the following:

- 1) Remove safety wire from retract mechanisms.
- 2) Using a suitable wrench (3/8") loosen and remove the retract mechanism. (Typ. 8 places). Remove 24 each cylinder tie bolts, hydraulic feed line and remove brakes from aircraft.
- 3) Screw one of the back plate attach bolts into each piston in succession, and with hand pressure, push each piston out of the brake cylinder. (MARK EACH PISTON AND BORE TO ENABLE CORRECT REASSEMBLY)
- 4) Remove "O" Rings from pistons, and thoroughly clean.
- 5) Inspect "O" Rings for cuts, nicks; distortion or excessive wear. If necessary, replace "O" Rings with corresponding part numbers.
- 6) Thoroughly clean cylinders and pistons using available solvent applicable to aluminum.
- 7) Special attention should be given to piston bores and pistons.
  - a. Piston bores and "O" Ring grooves should have foreign material loosened and flushed from all surfaces.
  - b. the small diameter of the piston bore may be polished with steel wool or fine emery but the finish diameter shall not exceed .565 minimum.
  - c. The large diameter of the piston bore may be polished to remove shallow wear scratches and/or nicks. The final diameter, however must be a maximum of 2.001
  - d. The piston may be polished to remove shallow wear scratches and/or nicks. The final diameter (large section), however must be a minimum of 1.993.
  - e. Any rework to the above mentioned components which places them outside of the dimensional limits defined, requires replacement of those components.



7.3 MAINTENANCE INSTRUCTIONS, 30-159B AND C BRAKE ASSEMBLY (Cont'd.)

- 8) Following cleaning and inspection, lubricate the piston bores, "O" Rings and pistons with hydraulic fluid compatible with the aircraft system. Lay the cylinder on a firm surface and insert the pistons until the "O" Rings prohibit further insertion. While applying pressure with your thumbs, rotate the piston in a clockwise direction. After "O" Ring squeeze is overcome, the piston will slide freely into the bore.
- 9) Push piston flush to cylinder face (Typ. 8 places)
- 10) Complete lining, cylinder and other inspections as defined in 5.1.
- 11) Install pressure plates on cylinders, and reinstall cylinders on aircraft.
- 12) Install washers and tie bolts into cylinders. (Typ. 24 places).
- 13) Install one (1) insulator shim on cylinder tie bolts.
- 14) Install back plates and tighten (24 each) cylinder tie bolts. (Final torque 85-90 in-lbs), attach hydraulic lines and bleed brakes.
- 15) Prior to reinstallation of the retract mechanisms, the friction sleeve position must be reset.
  - 15.1 Using a suitable bench press, reset the friction sleeve position on the retract stud to attain a dimension of .690. For reference, see 139-13100 drawing.
  - 15.2 NOTE: Laboratory tests show that this reset procedure may be accomplished 8 times without degradation of the components function. It is recommended that after 8 reset procedures, that the entire retract mechanism be discarded and replaced. Part number for the mechanism is 139-13500. If there is suspicion that the unit is worn prior to accomplishing 8 reset procedures, the 139-13100 retract stud assembly must be checked on a spring tester. Setting the friction sleeve on a suitable fixture having a hole through which the stud can pass, apply the load to either end of the stud. If the stud slips, prior to withstanding a load of 215 lbs., replacement is necessary.

7.3 MAINTENANCE INSTRUCTIONS, 30-159B AND C BRAKE ASSEMBLY (Cont'd.)

- 16) After setting the retract mechanism, screw one each into the back of each piston and tighten with suitable 3/8" wrench or socket. FINAL TORQUE 30-40 IN. LBS. Torquing may require the parking brake be set and a slight amount of pressure be applied to the brakes to prohibit piston rotation.
- 17) Safety wire as required and return the aircraft to service.
- 18) Wear limit indicator - brake pads and disc.  
the retract may be used as a visual indicator relative to brake pad and brake disc wear. When the bolt head on the stud comes within .025 of the friction sleeve, inspection of the brake linings and brake disc is required. Minimum replacement thickness on the pads is .100. Minimum replacement thickness on the brake disc is .360.

# Cleveland

Wheels & Brakes

Parker Hannifin Corporation  
Aircraft Wheel & Brake  
1160 Center Road, P.O. Box 158  
Avon, Ohio 44011 USA  
1-800-BRAKING (272-5464)  
216-937-1272 • FAX 216-937-5409

# PRODUCT REFERENCE MEMO

## METALLIC BRAKE LINING CONDITIONING PROCEDURE

The brake lining material used in this brake assembly is an iron based metallic composition. This material must be properly conditioned (glazed) in order to provide optimum service life.

Dynamometer tests have shown that at low braking energies, unglazed linings experience greater wear and the brake discs can become severely scored.

Conditioning may be accomplished as follows:

1. Perform two (2) consecutive full stop braking applications from 30 to 35 kts. Do not allow the brake discs to cool substantially between stops.
2. On aircraft with tail wheels, exercise caution during stopping to prevent tail lifting. Due to the efficiency of these brakes, extremely hard braking could result in lifting the tail from the ground.

This conditioning procedure will wear off high spots and generate sufficient heat to glaze the linings. Once the linings are glazed, the braking system will provide many hours of maintenance free service.

Visual inspection of the brake disc will indicate the lining condition. A smooth surface, without grooves, indicates the linings are properly glazed. If the disc is rough (grooved), the linings must be reglazed. The conditioning procedure should be performed whenever the rough disc condition is evident.

Light use, such as in taxiing, will cause the glaze to be worn rapidly.

Use caution in performing this procedure, as higher speeds with successive stops could cause the brakes to overheat resulting in warped discs and/or pressure plates.

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# PRODUCT REFERENCE MEMO

## AVAILABILITY OF GENERAL MAINTENANCE INFORMATION AND TORQUING PROCEDURES

**EFFECTIVITY:** All Parker Hannifin (Cleveland Wheels & Brakes) External Disc Design wheel & brake assemblies.

**APPLICABILITY:** Aircraft converted per STC approved kits to use Cleveland External Disc Design wheel & brake assemblies.

**REASON:** This PRM is issued to inform Wheel & Brake Conversion Kit users and installers that information regarding general maintenance and proper bolt / nut torquing procedures is available. This information is contained in the Cleveland Wheels & Brakes Component Maintenance Manual (CMM) and in the Cleveland Technicians Service Guide, PRM64. Most Cleveland Conversion Kits were designed prior to creation of the CMM. Parker Hannifin is in process of upgrading kit paperwork to include a requirement to use the CMM and PRM64 as wheel & brake service information. This PRM serves the same purpose for kits whose paperwork has not yet been upgraded.

**DESCRIPTION:** The Cleveland Wheels & Brakes Component Maintenance Manual and PRM64, Technician's Service Guide shall be used as service information when performing general maintenance on Cleveland External Disc Design wheels & brakes. Particular attention should be paid to instructions regarding wheel bolt torquing procedures.

**NOTE:** Refer to the CMM or PRM64 to determine the required torque procedure (Dry or Lubtork). While using the required torque procedure, observe the torque required to turn the nut (free running torque). This value must be added to the value stated on the casting or nameplate (or in the CMM or PRM64) to obtain a true torque value. Proper torque is imperative to prevent premature bolt or mating component failure.

**COMPLIANCE:** Highly Recommended.

**APPROVAL:** The engineering contents of this Product Reference Memo are FAA DER approved.

**WEIGHT & BALANCE:** Not applicable.

**PUBLICATIONS:** Cleveland Wheels & Brakes Component Maintenance Manual and PRM64 are available from:

Customer Support  
Parker Hannifin Corporation  
Aircraft Wheel & Brake  
1160 Center Road  
Avon, Ohio

Phone: 1-800- BRAKING (272-5464)  
FAX: 216-937-5409

Initial Release February 01, 1997



PRM69  
Page 1 of 1



## CERTIFICADO SUPLEMENTAR DE TIPO

(Supplemental Type Certificate)

**NÚMERO**  
(Number)

**2012S08-20**

Este certificado, emitido com base na Lei nº 7565 "Código Brasileiro de Aeronáutica", de 19 de dezembro de 1986,  
(This certificate, issued in the basis of the Law No. 7565 "Código Brasileiro de Aeronáutica", dated 19 December 1986,

é conferido ao (à): Aircraft Wheel & Brake Division  
(is granted to:) Parker Hannifin Corporation  
1160 Center Road  
Avon, Ohio 44011  
USA

por ter a modificação ao projeto de tipo do produto abaixo citado, observadas as limitações e condições  
(for having the change to the type design of the product mentioned below, with the limitations and conditions therefor as)

especificadas, satisfelto aos requisitos de aeronavegabilidade aplicáveis.  
(specified hereon, met the applicable airworthiness requirements.)

Produto Original - Número do Certificado de Tipo: 6A1 (FAA)  
(Original Product - Type Certificate No:)

Fabricante: Gulfstream American.  
(Manufacturer:)

Modelo(s): 500, 500B, 500S and 500U.  
(Model(s):)

### DESCRIÇÃO DA MODIFICAÇÃO AO PROJETO DE TIPO: (Description of Type Design Change:)

Installation of Cleveland Conversion kit P/N 199-122, Rev. G, dated 30 Apr. 2007 (for aircraft using MIL-H-5606 Brake Fluid); or 199-122A, Rev. E, dated 30 Apr. 2007 (for aircraft using Skydrol Brake Fluid) in accordance with Parker Hannifin's Installation Drawing No. 50-86, Rev. E, dated 20 April 1989 or later revisions.

This CST validates in Brazil the STC # SA706GL, issued by FAA (USA).

### LIMITAÇÕES E CONDIÇÕES: (Limitations and Conditions:)

See continuation sheet for applicable data.

### DATAS: (Dates of:)

Do Requerimento: 28 May 2012  
(Application:)

Da emissão: 23 Aug. 2012  
(Issuance:)

Da reemissão:  
(Reissuance:)

Da emenda:  
(Amendment:)

  
HÉLIO TARQUINIO JÚNIOR

Gerente-Geral, Certificação de Produto Aeronáutico  
(General Manager, Aeronautical Product Certification)

  
DINO ISHIKURA

Superintendente de Aeronavegabilidade  
(Airworthiness Superintendent)



Folha de Continuação ao  
(Continuation Sheet to)

## CERTIFICADO SUPLEMENTAR DE TIPO

(Supplemental Type Certificate)

**NÚMERO** 2012S08-20  
(Number)

### LIMITAÇÕES E CONDIÇÕES: (Limitations and Conditions:)

- I. The approval of this type design change should not be extended to other aircraft of this model on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in Type Design, will introduce no adverse effect upon the airworthiness of that aircraft.
- II. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.
- III. A copy of this Certificate shall be maintained as part of the permanent records of the modified aircraft.

-----END-----





Parker Hannifin Corporation  
Aerospace/Aircraft Wheel & Brake  
1160 Center Road  
Avon, OH 44011

Date: \_\_ \_\_/\_\_ \_\_/20\_\_ \_\_

Subject: Letter of Authorization for Installation of STC'd Conversion Kits

To whom it may concern:

Parker Hannifin Corporation, Aircraft Wheel & Brake Division, hereby states that the following item(s):

KIT NUMBER: 199-\_\_\_\_\_

FAA APPROVAL: 1) STC # \_\_\_\_\_

NO OTHER APPROVALS NECESSARY

AUTHORIZATION TO INSTALL: With the sale of this STC KIT, OWNER of the Supplemental Type Certificate agrees to permit the buyer or buyer's agent or agency to use the certificate to alter the product under the terms and conditions of this STC.

A/C MAKE: \_\_\_\_\_

A/C MODEL \_\_\_\_\_

TAIL # \_\_\_\_\_

Regards,

Technical Support Team  
Technical Hotline (800) 272-5464  
[Clevelandwbhelp@parker.com](mailto:Clevelandwbhelp@parker.com)  
Web-site: [www.clevelandwheelandbrake.com](http://www.clevelandwheelandbrake.com)  
Manufacturer of Cleveland Wheels & Brakes

United States of America  
Department of Transportation — Federal Aviation Administration  
**Supplemental Type Certificate**

*Number* SA706GL

*This certificate, issued to* Aircraft Wheel & Brake Division  
Parker Hannifin Corporation  
1160 Center Road  
Avon, Ohio 44011

*certifies that the change in the type design for the following product with the limitations and conditions*

*therefor as specified hereon meets the airworthiness requirements of Part 3 of the Civil Air*

*Regulations* See Aircraft Specification No. 6A1 for complete certification basis.

*Original Product — Type Certificate Number* 6A1  
*Make* Gulfstream American  
*Model* 500, 500A, 500B, 500S, 500U

*Description of Type Design Change*

Install Cleveland Conversion kit P/N 199-122, Revision B, dated April 27, 1988, (for aircraft using MIL-H05606 brake fluid); or 199-122A, Revision B, dated April 27, 1988 (for aircraft using "Skydrol" brake fluid) in accordance with installation drawing 50-86, Revision C, dated April 27, 1988, or later FAA Approved revisions.

*Limitations and Conditions*

This approval should not be extended to other aircraft of these models on which other previously approved modifications are incorporated unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that aircraft.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

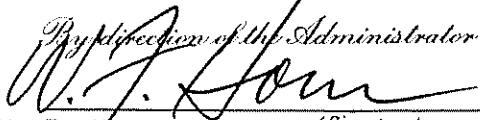
*Date of application* June 30, 1983

*Date reissued*

*Date of issuance* September 8, 1983

*Date amended* April 28, 1988



*By direction of the Administrator*  
  
(Signature)

W. F. Horn  
Manager, Chicago Aircraft Certification Office  
ACE-115C, Central Region  
(Title)

*Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.*

*This certificate may be transferred in accordance with FAR 21.47.*