

Component Maintenance Manual

Main Brake Assembly Aircraft Wheel and Brake, LLC Part No. 30-144

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Publication No.: CM30-144, Revision B

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TO: HOLDERS OF CM30-144 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 30-144.

Attached to this transmittal letter is Revision NC of CM30-144 (dated July 01, 2005)

Revision NC, Dated July 01, 2005

REVISION NC CONTAINS ALL PAGES OF THE MANUAL. Pages that have been added or revised are outlined below together with the highlights of the revision.

Please retain all **REVISION HIGHLIGHTS** pages, inserting them into the manual for future reference.

REVISION HIGHLIGHTS

Section/Page No.

Description of Change

All Sections/All Pages	Initial Release (DCN 0364-50)
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TO: HOLDERS OF CM30-144 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 30-144.

Attached to this transmittal letter is Revision A of CM30-144 (dated October 15, 2011)

Revision A, Dated October 15, 2011

REVISION A CONTAINS ALL PAGES OF THE MANUAL. Pages that have been added or revised are outlined below together with the highlights of the revision.

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REVISION HIGHLIGHTS

Section/Page No.

Description of Change

As follows	DCN 0394-55
Title Page/T-1	(ADD) proprietary and export statements
Record of Revisions/ RR-1	(UPDATE) to reflect latest revision
List of Effective Pages/ LEP-1	(UPDATE) applicable pages to reflect latest revision
Introduction/Intro-1	(UPDATE) proprietary statement (ADD) export statement
Illustrated Parts List/ 10006	(ADD) 101-39800 (M83461/2-904) P/N for items 165 and 175

TO: HOLDERS OF CM30-144 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 30-144.

Attached to this transmittal letter is Revision B of CM30-144 (dated November 15, 2023)

Revision B, Dated November 15, 2023

REVISION B CONTAINS ALL PAGES OF THE MANUAL. Pages that have been added or revised are outlined below together with the highlights of the revision.

Please retain all **REVISION HIGHLIGHTS** pages, inserting them into the manual for future reference.

REVISION HIGHLIGHTS

<u>Section/Page No.</u>	<u>Description of Change</u>
All Follows	Per CA-00000079
All Sections/All Pages	Page Header (NOW) Aircraft Wheel and Brake, By Kaman logo (WAS) Parker Logo
Title Page/T-1	(NOW) Aircraft Wheel and Brake proprietary rights statement, logo, and format (WAS) Parker proprietary rights statement, logo and format
Record of Revisions/RR-1	Updated to reflect current revision
Service Bulletin List	(NOW) Aircraft Wheel and Brake, LLC (WAS) Parker Hannifin
List of Effective Pages/LEP-1	Updated to reflect current revision
Introduction/ Pg INTRO-1	(NOW) Aircraft Wheel and Brake, LLC name, contact info, and format (WAS) Parker Hannifin name, contact info, and format (DELETED) Data rights and Export Statement
Pg INTRO-2	(NOW) Aircraft Wheel and Brake, LLC name, contact info, and format (WAS) Parker Hannifin name, contact info, and format
Description and Operation/ Pg 1	(ADD) Safety Warning (NOW) Aircraft Wheel and Brake, LLC name, and format (WAS) Parker Hannifin name, and format
Disassembly/ Pg 3001	(NOW) Aircraft Wheel and Brake, LLC or distributor (WAS) Parker Hannifin Corp., Aircraft Wheel & Brake Division or Parker Hannifin distributor
Repair/ Pg 6001	Table 6001 (NOW) Aircraft Wheel and Brake, LLC or distributor (WAS) Parker Hannifin Corp., Aircraft Wheel & Brake Division or Parker Hannifin distributor (NOW) MIL-DTL-5541, Type I, Class 1A (WAS) MIL-C-5541, Class 1A

Revision B Highlights (continued)

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Assembly/ Pg 7001	Table 7001 (NOW) Aircraft Wheel and Brake, LLC or distributor (WAS) Parker Hannifin Corp., Aircraft Wheel & Brake Division or Parker Hannifin distributor
Pg 7002	(NOW) Aircraft Wheel and Brake, LLC (WAS) Parker
Special Equipment and Consumables/ Pg 9001	Table 9001 (NOW) Aircraft Wheel and Brake, LLC or distributor (WAS) Parker Hannifin Corp., Aircraft Wheel & Brake Division or Parker Hannifin distributor
Illustrated Parts List/ Pg 10001	(NOW) Updated to current Aircraft Wheel and Brake, LLC format. IPL description sections A., B., C., and D. moved to page 10001. (WAS) IPL description section A. only.
Pg 10002	(NOW) IPL Figure 1 (WAS) IPL description sections B. and C.
Pg 10003	(NOW) Detailed Parts List Sheet 1 of 2 (WAS) IPL description section D. and E. Detailed parts list Item 10 (NOW) NAS1149F0463P (WAS) AN960-416 Detailed parts list Item 60 (NOW) NAS1149F0363P (WAS) AN960-10
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Pg 10005	(NOW) Removed (WAS) Detailed Parts List Sheet 1 of 2
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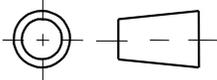
INTRODUCTION

1. General

 **SAFETY WARNING:** ALL TORQUE AND SPECIFIC LIMITS OR VALUES CONTAINED HEREIN MUST BE STRICTLY OBSERVED. IGNORING OF TORQUE LIMITS AND OTHER SPECIFIC VALUES GIVEN BY THIS MANUAL CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH.

This manual is published for the guidance of personnel responsible for the overhaul and/or general maintenance of the Aircraft Wheel and Brake, LLC Assembly covered in this publication.

THIRD ANGLE PROJECTION



Third angle projection is used in this manual. All weights and measurements are in U.S. English units with metric units in parentheses.

The manual for the aircraft shall take precedence for the component's interface connections with the functional features as used in the aircraft. This manual may also describe functional features that may or may not be used when installed as a component of a system in the aircraft.

The manufacturer recommends that you ask for the latest revision of the manual before continuing with overhaul or maintenance operations. Ask the Technical Services Department of Aircraft Wheel and Brake, LLC (AWB) for the latest revision.

Substitutions of critical parts or changes of processes or materials are not permitted without the written approval of the manufacturer.

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2. Data rights

(Deleted)

3. Export statement

(Deleted)

4. TSO notice

This assembly is certified for FAR Part 23 usage. It is identified with a "TSO-C26c" marking. This assembly has been tested and qualified to FAA (Federal Aviation Administration) requirements and specifications.

INTRODUCTION

5. Manual use

This manual is divided into various section blocks such as Testing and Fault Isolation, Disassembly, Inspection / Check, Repair, etc. Refer to the Table of Contents for the location of the applicable section.

6. Warnings, cautions, and notes

These adjuncts to the text shall be used to highlight or emphasize important points when necessary. Refer to the descriptions of these statements that follow:

- A “**SAFETY WARNING**” flagged by this symbol  , calls attention to possible serious or life threatening situations if procedures are not followed.
- A “**WARNING**” calls attention to use of materials, processes, methods, procedures, or limits which must be followed precisely to avoid injury to persons.
- A “**CAUTION**” calls attention to methods and procedures, which must be followed to avoid damage to equipment.
- A “**NOTE**” calls attention to an essential operating or maintenance procedure, condition, or statement, which must be highlighted.

7. Replacement parts



SAFETY WARNING: AIRCRAFT WHEEL AND BRAKE, LLC (AWB) DOES NOT WARRANT OR ASSUME THE RISK OF THE USE OF REPLACEMENT PARTS NOT AUTHORIZED FOR USE BY AWB. OPERATORS WHO USE REPLACEMENT PARTS NOT AUTHORIZED BY AWB DO SO AT THEIR OWN RISK AND TAKE FULL RESPONSIBILITY FOR ALL PROPERTY DAMAGE, PERSONAL INJURY OR DEATH CAUSED BY SUCH REPLACEMENTS.

Use only the approved parts that are listed in the illustrated parts list of this manual.

DESCRIPTION AND OPERATION

1. Description

Refer to IPL Figure 1 for component identification.

SAFETY WARNING:  THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH (5), (10), (60), (65), (75), (100), (130), (145). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

The brake assembly provides the primary decelerating and holding forces during aircraft ground operations. The brake assembly is a piston actuated, dual cylinder, external disc design. It uses metallic linings. The brake is designed to operate with MIL-H-5606 and MIL-PRF-5606 hydraulic fluid.

Each brake assembly is composed of the following base parts:

- two brake housing subassemblies (20). The housing is made from an aluminum alloy casting and is anodized and painted for corrosion protection.
- two pressure plate assemblies (70).
- four piston assemblies (30).
- four backplate assemblies (95).
- one torque plate assembly (180).
- one hose assembly (195).
- hardware and fittings.

Each piston assembly uses a friction ring (40) to maintain ideal piston positioning that limits piston travel for fluid displacement concerns.

The cylinder housing piston bores contain a preformed packing (25) to prevent leakage of hydraulic fluid. A piston insulator (50) in each piston (45) works to minimize heat transfer to the brake fluid generated during braking.

2. Operation

Braking action occurs when hydraulic pressure is applied to the brake via the pilot's or co-pilot's master cylinders. As hydraulic pressure reaches the cylinders, the pistons move outward forcing the pressure plate assembly against the surface of the brake disc. This causes the cylinder to align itself so that the pressure plate linings and back plate linings provide uniform contact against both rubbed surfaces of the brake disc. Kinetic energy is transformed into thermal energy as braking action takes place.

3. Handling procedures

Handle and maintain the brake components properly to protect the paint and surface finishes.

4. Specifications

Brake Cylinder Material.....	Aluminum Alloy Casting
Brake Tie Bolt Torque	85 to 90 in-lb (9,6 to 10,2 N-m)
Hydraulic Fluid	MIL-H-5606 or MIL-PRF-5606
Seals	Compatible with MIL-H-5606 and MIL-PRF-5606 Hydraulic Fluid
Brake Cylinder Coatings	Surface Pretreatment:..... MIL-A-8625, Type II, Class 1
	Primer Coating:..... Refer to the Repair Section
	Finish Coating:..... Refer to the Repair Section

DESCRIPTION AND OPERATION

5. Brake Lining Wear Check

Maximum wear limits for the brake linings are shown below.

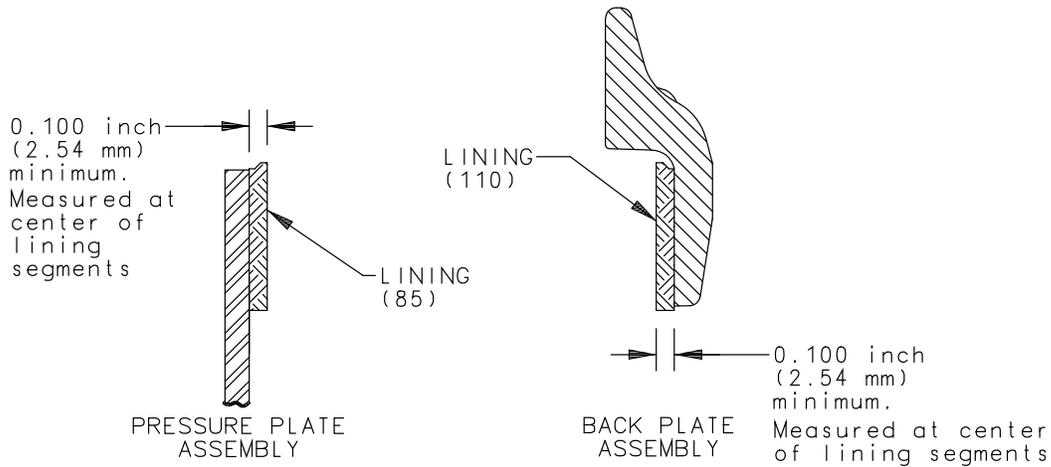


Figure 1 Minimum Lining Thickness

6. Maintenance Schedule

The maintenance schedule is intended to be a guideline based on laboratory testing environments that simulate normal braking conditions. Field operating requirements can vary from aircraft to aircraft. These variations will directly affect the wear rate of the brake assembly components. You must evaluate your own operating conditions to determine a suitable schedule to support and maintain the equipment.

NOTE: All task procedures in Table 1 refer to paragraphs in the CHECKS section.

Table 1 Maintenance Schedule

INTERVAL	ITEM	TASK
Every time the linings (85, 110) have reached the in-service wear limits as specified in Figure 1 and Table 8001 of the <u>FITS AND CLEARANCES</u> section 1.	All parts	a. Paragraph 1.B., visual examination. and b. Paragraph 2., detailed examination as necessary.
	Bolts (5) <u>or (5A)</u>	Paragraph 2. A. detailed examination including magnetic particle inspection.
	Preformed Packings (25, 55, 140, 165, 175)	Replace
At the 3 rd (third) set of lining replacement and every other set of lining replacement thereafter.	Brake Cylinder (20)	Paragraph 2.B. detail examination including liquid penetrant inspection.
	Torque Plate (185)	Paragraph 2.H. detail inspection including liquid penetrant inspection.

TESTING AND FAULT ISOLATION

1. General

Refer to IPL Figure 1 to identify the brake assembly components.

This section contains test procedures that can be used both as troubleshooting measures and means to test overhauled brake assemblies. A test data sheet is included at the end of this section for reference.

SAFETY WARNING:  **FULLY ASSEMBLE BRAKE BEFORE TESTING. SERIOUS INJURY OR DEATH CAN OCCUR FROM TESTING A BRAKE THAT IS NOT FULLY ASSEMBLED.**

WARNING: PUT ON PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

A. Equipment and Consumables

The term “Commercial Source” lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, you can use equivalent alternatives for the items listed.

Table 1001 Equipment and Consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Fluid, Hydraulic	MIL-H-5606 or MIL-PRF-5606	Commercial
Powered Hydraulic Test Stand	0 to 68,9 bar capacity, $\pm 1,38$ bar gauge increment, (0 to 1000 psig, ± 20 psig gauge increment)	Commercial
Hydraulic Pump	0 to 68,9 bar capacity (0 to 1000 psig)	Commercial
Hydraulic Hose	68,9 bar minimum, (1000 psig)	Commercial
Pressure Regulator	0 to 68,9 bar (0 to 1000 psig)	Commercial
Pressure Gauge	0 to 68,9 bar (0 to 1000 psig)	Commercial
Automatic Cyclor	Not applicable	Commercial
Hydraulic Filter	10 micron	Commercial
Socket Set/ Wrench Set	Standard Hex Head (inch units)	Commercial
Torque Gage	Not applicable	Commercial

TESTING AND FAULT ISOLATION

2. Test the Brake Assembly

Examine all brake assemblies that do not meet the test standards of this section. Disassembly will be necessary for further inspection of individual components to find the reason for failure. Replacement or repair of components may be necessary.

A. Pretest Check

Do these inspections and check procedures to approve the brake assembly for testing. Do not do a test on a brake assembly that shows signs of damage.

- (1) Examine the cylinder (20) surfaces for dents, cracks, or other visible damage.
- (2) Examine all fasteners and threaded components for loose fit. If a loose fastener is found, tighten it. Refer to Table 8002, Torque Values.

B. Bleed and Pressure Test the Brake Assembly

CAUTION: DO NOT EXCEED 1,35 N-M (12 IN-LB) WHEN TIGHTENING THE BLEEDER SCREW (150). TORQUE IN EXCESS OF 1,35 N-M (12 IN-LB) WILL DAMAGE THE BLEEDER SEAT (145).

- (1) Connect the hydraulic supply line to the brake inlet fitting assembly (170).

NOTE: Pressure bleeding is recommended for best results.

- (2) Check the brake system reservoir for adequate fluid level and bleed the brake system
 - (a) No fluid flow from the bleeder screw is cause for examination. Refer to Table 1002, Troubleshooting.
- (3) Tighten the bleeder screw (150) snug to prevent leakage.
- (4) Apply 600 psi to the brake and check for leakage.
- (5) Depress and release the toe pedal several times.
 - (a) Check for brake drag by rotating the wheel by hand. Check for excessive play. A slight amount of drag is acceptable; however, a tightly bound wheel should be investigated and corrected before releasing the aircraft to service.

NOTE: An improperly seated lining or air in the hydraulic system can cause excessive drag.

TESTING AND FAULT ISOLATION

3. Troubleshooting

Refer to IPL Figure 1 for identification of brake assembly components.

Table 1002 Troubleshooting is a list of the possible problems you can find while operating the brake assembly. The table cannot list all possible problems and is intended to assist with troubleshooting the brake assembly.

Table 1002 Troubleshooting

PROBLEM	COMMON CAUSE	CORRECTION
Hydraulic fluid leaking from brake assembly piston bore areas	Worn or damaged preformed packing (25)	Replace preformed packing
	Pistons (45) worn or damaged	Examine per <u>CHECKS</u> section and replace if necessary
	Piston bores of cylinder (20) worn or damaged	Examine per <u>CHECKS</u> section and replace if necessary
Hydraulic fluid leaking from inlet fitting (170), bleeder components (145, 150), hose (195) or fitting assembly (160)	Loose hydraulic connection; worn or damaged preformed packing (140, 165 or 175) or damaged fitting (160, 170) or bleeder components (145, 150)	Tighten hydraulic connection; replace packing; or replace fitting or bleeder components
No fluid flow from fittings	Obstruction in hydraulic line, fitting or brake port	Clear obstruction – flush system if necessary
Brake not engaging or releasing correctly.	Air in the brake system	Bleed the brake
	Obstruction in hydraulic line or fluid passage	Remove obstruction – flush system if necessary
	Pistons (45) sticking or binding	Replace preformed packing (25) or Examine parts per <u>CHECKS</u> section
	Pistons (45) damaged	Replace pistons
	Brake cylinder (20) damaged	Replace cylinder
	Anchor bolts (125) not sliding freely in torque plate bushings (190)	Apply a lubricant such as dry graphite or silicone spray to the anchor bolts.
	Anchor bolts (125) bent or damaged.	Replace anchor bolts.
	Torque plate assembly (180) damaged or bushings (190) worn	Examine per <u>CHECKS</u> section and replace if necessary
	Pressure plate assembly (70) not sliding freely on anchor bolts (125)	Examine per <u>CHECKS</u> section and replace if necessary
Brake cylinder (20) damaged.	Examine per <u>CHECKS</u> section and replace if necessary	
Maximum pedal effort does not decelerate aircraft properly or does not actuate brake.	Linings (85, 110) and/or brake disc on wheel worn beyond limits	Replace linings and/or disc
	Air in the brake system	Bleed the brake
	Brakes have overheated	Allow the brakes to cool and inspect

TEST DATA SHEET

Date _____ Brake Serial No. _____

Pretest Check and Bleed Brake refer to paragraphs 2.A and 2.B.

- | | | |
|---------------------------------------|--------------|--------------|
| (1) Brake cylinder condition | Accept _____ | Reject _____ |
| (2) Brake assembly hardware condition | Accept _____ | Reject _____ |
| (3) Brake bleed | Pass _____ | Fail _____ |

Comments: _____

Pressure Test refer to paragraph 2.D.

Pressure Applied _____ bar/psig Required: 600 psig ± 20 psig (41,4 bar ± 1,4 bar)
Leakage: Yes _____ No _____

Comments: _____

Tester: _____ Date: _____

DISASSEMBLY

1. General

Refer to IPL Figure 1 to identify the brake assembly components.

WARNING: PUT ON PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

NOTE: The brake assembly should only be disassembled as far as necessary to repair or replace defective parts.

A. Equipment and Consumables

The term “Commercial Source” lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, you can use equivalent alternatives for the items listed.

Table 3001 Equipment and Consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Preformed packing tool set	199-18	Aircraft Wheel and Brake, LLC or distributor
Standard tools (inch units)	Wrenches/sockets: <ul style="list-style-type: none"> • 12pt, external, (inch, units) • Hex head, external, (inch, units) 	Commercial

2. Remove the Brake Assembly

NOTE: Wheel removal is not necessary unless removal of the torque plate assembly (180) is required. Follow instructions in the wheel maintenance manual for wheel removal.

Do not remove the torque plate assembly (180) from the axle strut flange unless:

- The maintenance schedule requires removal.
- The torque plate needs repair or it needs to be replaced.

SAFETY WARNING:  MAKE SURE THE AIRCRAFT IS SECURE AND STABLE BEFORE BEGINNING ANY WORK. WORKING AROUND AN AIRCRAFT THAT IS NOT SECURE AND STABLE CAN CAUSE INJURY OR DEATH.

CAUTION: MAKE SURE PARKING BRAKE IS IN THE OFF POSITION AND THE WHEELS ARE BLOCKED.

- #### A. Remove and cap the hydraulic inlet line that is attached to the brake inlet fitting assembly (170). Cap the brake inlet fitting (170).

DISASSEMBLY

- B. To keep the back plate assembly (95) from falling, hold each back plate assembly (95) while loosening the bolts (5 or 5A) and washers (10) that secure the back plate assemblies to the brake cylinder (20).
- C. With the back plate assemblies (95) removed, carefully slide the brake cylinder from the torque plate assembly (180).
- D. If the torque plate assembly (180) is being removed, remove it now by removing the axle flange mounting hardware that attaches the torque plate assembly to the axle strut flange.

3. Disassemble the Brake Assembly

SAFETY WARNING:  **FOLLOW ALL SAFETY PRECAUTIONS AND WEAR PROTECTIVE CLOTHING AND SAFETY GLASSES WHEN WORKING WITH THE BRAKE ASSEMBLY AND HYDRAULIC FLUIDS. FAILURE TO COMPLY CAN RESULT IN PERSONAL INJURY.**

CAUTION: BE CAREFUL TO KEEP BRAKE FLUID FROM SPLASHING ONTO THE BRAKE LININGS (85, 110). BRAKE FLUID THAT HAS SOAKED INTO THE FRICTION MATERIAL CAN AFFECT THE BRAKING PROCESS.

NOTE: The anchor bolts (125) are pressed into the brake cylinder (20) and secured with a washer (130) and nut (135). Do not remove the anchor bolts unless replacement is necessary. Replacement will be necessary if the anchor bolts are damaged or if a more thorough inspection of the brake cylinder is to be made.

NOTE: Drain the hydraulic fluid into an approved container.

- A. Remove the bolts (5 or 5A) and washers (10) from the assembled brake cylinder. This will also free the insulator shim (120).
- B. Slide the pressure plate assembly (70) off of the anchor bolts (125).
- C. Remove the hose assembly (195) that connects the two assembled brake cylinders together.

DISASSEMBLY

SAFETY WARNING:  USE CAUTION IN BLOWING THE PISTONS OUT OF THE CYLINDER WITH COMPRESSED AIR. THE PISTONS CAN FLY OUT AT HIGH VELOCITY. TURN THE CYLINDER OVER SO THAT THE PISTONS ARE FACING THE WORK TABLE SURFACE. USE A RAG TO CUSHION THE PISTON AND TO PREVENT DAMAGE TO THE PISTON AND WORK TABLE SURFACE.

SAFETY WARNING:  DEATH OR SERIOUS INJURY CAN OCCUR IF COMPRESSED AIR IS DIRECTED AGAINST THE SKIN. DO NOT EXCEED 20 PSI (2,1 BAR). USE CHIP GUARDS, EYE PROTECTION, AND OTHER PERSONAL PROTECTIVE EQUIPMENT.

- D. Remove the pistons (45) by injecting air into the ports.
- E. The piston insulator (50) is press fit into the piston (45). Do not remove the insulator unless it needs to be replaced. Refer to the CHECKS section for replacement criteria.

NOTE: A new stat-o-seal (55) must be used whenever the bolt (65) is removed for any reason because the original one will not seal properly if reinstalled.

- F. This brake design has an internal piston guide (35) attached to the cylinder by a bolt (65), washer (60) and stat-o-seal (55). It is recommended that this unit not be removed unless it is necessary due to:

- Damage or corrosion to the piston guide (35) or the attaching hardware.

NOTE: Do not remove the friction ring (40) from the piston guide (35) unless it needs to be replaced because of damage or corrosion.

- Damaged or worn stat-o-seal (55).
- Stripping and repainting of the cylinder (20).
- Detailed inspection of the cylinder including liquid penetrant inspection.

- G. Remove the preformed packings (25) from the seal cavity of the cylinder piston bores.
- H. Remove the two hose fittings (160) from the brake cylinders.
- I. Remove the bleeder seat (145) and inlet fitting (170).

CLEANING

1. General

Refer to IPL Figure 1 to identify the brake assembly components.

WARNING: PUT ON PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

A. Equipment and Consumables

The term "Commercial Source" lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, you can use equivalent alternatives for the items listed.

Table 4001 Equipment and Consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Blast stripping equipment for Plastic blast media	Plastic media: MIL-P-85891, Type II or V, Grade 20/30, 3.5 MOH max.	U.S. Technology Corp.
Air Supply	2,1 bar maximum (30 psig)	Commercial
Clean Cloths	Lint Free	Commercial
Brushes	Non-Metallic Soft and Stiff Bristle	Commercial
Stoddard solvent	Type 1 per MIL-PRF-680	Commercial
Cleaner/Degreaser	AMS1526	Commercial
Soap Solution	Mild Dishwashing Liquid	Commercial

2. Cleaning Procedures

SAFETY WARNING:  **MAKE SURE THAT THE AREA WHERE YOU WILL USE THE CLEANING SOLVENTS HAS GOOD AIRFLOW. DO NOT TOUCH OR GET FLUID ON YOUR BODY AND DO NOT BREATHE VAPORS. KEEP CONTAINERS COVERED WHEN NOT IN USE.**

WARNING: **USE NO MORE THAN 2,1 BAR (30 PSIG) AIR PRESSURE. EYE PROTECTION IS NECESSARY. EYE INJURY FROM DIRT PARTICLES OR SOLVENT SPRAY IS POSSIBLE WHEN COMPRESSED AIR IS USED.**

A. Clean the Metal Components

- (1) Clean the metal parts that follow in Stoddard Solvent (MIL-PRF-680). Use a non-metal soft bristle brush to remove the heavy dirt deposits: (5, 10, 60, 75, 100, 125, 130, 135, 145, 150, 160, 170).
- (2) Dry the parts using compressed air and lint-free cloths.

CLEANING

B. Clean the Non-Metal Components

- (1) The preformed packings (25, 140, 165, 175), and bleeder cap (155) can be cleaned with a cloth dampened with hydraulic fluid. This will loosen the dirt.
- (2) The insulator shim (120) can be wiped clean with a cloth dampened with a mild soap and water solution. Wipe dry with a clean cloth.

C. Clean the Aluminum Components and Magnesium Components

NOTE: The piston insulator (50) is press fit into the piston (45). It is a fiber-based material and will not be harmed if the piston is cleaned with the Stoddard Solvent.

NOTE: Do not remove the friction ring (40) from the piston guide (35) unless it needs to be replaced because of damage or corrosion. The stainless steel friction ring will not be harmed if the piston guide is cleaned with the Stoddard Solvent.

- (1) Clean the parts that follow in Stoddard Solvent (MIL-PRF-680): (20, 35, 45, 180). Use a non-metal soft bristle brush to remove the heavy dirt deposits.
 - (a) Use a soft wire brush to remove any corrosion on the cylinder port threads.
- (2) To remove chemical residue, clean parts in a water based cleaner/degreaser (per AMS1526).
- (3) Rinse the parts with a mild soap and water solution.
- (4) Rinse the parts in clean water.
- (5) Dry the parts using compressed air and lint free cloths.

F. Protective Coating Removal for the Brake Cylinder (20) and Torque Plate Assembly (180)

SAFETY WARNING:  **DUE TO THE TOXICITY AND VOLATILITY OF CHEMICAL STRIPPING SOLVENTS, THEY ARE A HEALTH CONCERN AND NOT A RECOMMENDED SOURCE OF PROTECTIVE COATING REMOVAL.**

NOTES: Removal of the protective coating (primer and topcoat) is necessary when doing the liquid penetrant inspection of the brake cylinder.

To achieve best results, always refer to the manufacturer's instructions for use and disposal of blast media.

NOTES: Stainless steel bushings (190) are press fit into the cast magnesium torque plate. The use of plastic media to remove the paint coating of the torque plate will not damage the bushings.

- (1) Clean the parts in accordance with paragraph 2.
- (2) Blast the parts per MIL-STD-1504 with plastic media per MIL-P-85891, Type II or V, Grade 20/30, maximum media hardness of 3.5 MOH.

CHECKS

1. General

Refer to IPL Figure 1 to identify the brake assembly components.

After a check is performed on a component, refer to the REPAIR section for applicable repairs.

Refer to Table 1 Maintenance Schedule for a timetable of scheduled maintenance tasks for the brake assembly components. All parts must be cleaned before examination. Refer to the CLEANING section.

WARNING: PUT ON PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

A. Equipment and Consumables

The term "Commercial Source" lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, you can use equivalent alternatives for the items listed.

Table 5001 Equipment and Consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Inspection Surface Plate	No specification / no part no.	
Magnifier	X10 Magnification	Commercial
Micrometers	No specification / no part no.	Commercial
Vernier dial calipers	No specification / no part no.	Commercial
Magnetic particle inspection kit	ASTM E1444	Commercial
Liquid penetrant inspection kit	ASTM E1417 or MIL-STD-6866, Type 1, method A, sensitivity level 2	Commercial

B. Visual Examination

Examine all of the parts for cuts, tears, cracks, breaks, nicks, scratches, gouges, corrosion, wear, distortion, scoring, stripped or crossed threads and other damage. Replace a part that is cracked, worn beyond limits or has exceeded allowable repair or is not a repairable or reworkable part.

CHECKS

SAFETY WARNING:  THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH (5, 10, 60, 65, 75, 100, 130, 135, 145). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD. USE APPROPRIATE SAFETY PRECAUTIONS.

2. Detailed Brake Examination

A. Examine the hardware that is listed below.

CAUTION: REWORK OF BOLTS IS NOT ALLOWED.

- (1) Examine the bolts (5 or 5A) for distortion, cracks, corrosion, or thread damage. Closely examine for cracks in the radius under the bolt head and in the threaded area next to the bolt shank. Use magnetic particle inspection (ASTM E1444).
 - (a) The supplied bolts (5) have a patch lock added (nylon material embedded in the threaded end) which serves as a self-locking element. These bolts will require replacement after 6 to 8 installations or whenever the bolts can be run in past the locking feature by the use of your fingers only.
 - (b) The optional field alternate bolts (5A) do not have a patch lock. They have drilled heads for safety wire retention.

NOTE: If one or more of the bolts are damaged, then replace all of the bolts.

- (2) Examine the anchor bolts (125) for distortion, cracks, corrosion, or thread damage.

NOTE: The anchor bolts are press fit into the brake cylinder (20). Refer to the REPAIR section for anchor bolt replacement.

- (3) Examine the washers (10, 130) for corrosion, distortion or damage. Replace a part that is distorted or damaged.
- (4) Examine the nuts (135) for damage to the self-locking feature. The self-locking feature can be a deformation of the nut (elliptical), segmented beam lock, or a non-metallic insert that provides the self-locking effect. The self-locking feature is defective if:
 - The self-locking feature does not tighten when you turn the nut onto the mating thread of the anchor bolt (125).
 - The nut is loose and you cannot tighten the nut to the necessary torque value.
- (5) Examine the hose assembly (195). Replace if the wire braiding is damaged, if the threads are damaged or any other indication of damage that would cause the hose to fail or leak.
- (6) Examine the fittings (160 and 170) for damage to the threads and sealing surfaces. Replace a part that is corroded or damaged.

CHECKS

- (7) Examine the bleeder seat (145) and bleeder screw (150) for damage to the threads and sealing surfaces. Replace a part that is corroded or damaged.

B. Examine the Brake Cylinder (20)

SAFETY WARNING:  MAKE SURE THAT THE AREA WHERE YOU WILL USE THE LIQUID PENETRANT FLUID HAS GOOD AIRFLOW. DO NOT TOUCH OR GET FLUID ON YOUR BODY AND DO NOT BREATHE VAPORS. KEEP CONTAINERS COVERED WHEN NOT IN USE. LIQUID PENETRANT FLUID CAN BE TOXIC AND EXPLOSIVE.

NOTE: A new stat-o-seal (55) must be used whenever the bolt (65) is removed for any reason because the original one will not seal properly if reinstalled.

- (1) This brake design has an internal piston guide (35) attached to the cylinder by a bolt (65), washer (60) and stat-o-seal (55). It is recommended that this unit not be removed unless it is necessary due to:

- Damage or corrosion to the piston guide (35) or the attaching hardware.

NOTE: Do not remove the friction ring (40) from the piston guide (35) unless it needs to be replaced because of damage or corrosion.

- Damaged or worn stat-o-seal (55).
- Stripping and repainting of the cylinder (20).
- Detailed inspection of the cylinder including liquid penetrant inspection.

If the piston guide is removed for any reason, then examine the following:

- Piston guide (35) for heavy scratches, nicks and burrs which can prevent the pistons from properly retracting, resulting in brake drag.
- Friction ring (40) for burrs or distortion which can prevent the pistons from properly retracting, resulting in brake drag.
- Bolts (65) and washers (60) for distortion, corrosion, or thread damage. A new stat-o-seal (55) must be used because the original one will not seal properly.

- (2) Examine the exterior surface for missing paint caused by erosion, wear, inspection methods or surface repair.
- (3) Visually examine the cylinder for surface cracks, nicks, corrosion, or other damage.
- (4) Visually examine the cylinder for cracks to the areas around the anchor bolt holes, the piston bores and the ports.

CHECKS

- (5) Examine for dimpled areas around the back plate to cylinder bolt holes. Refer to Figure 5001. Maximum allowable depression is 0.005 inch (0,127 mm).

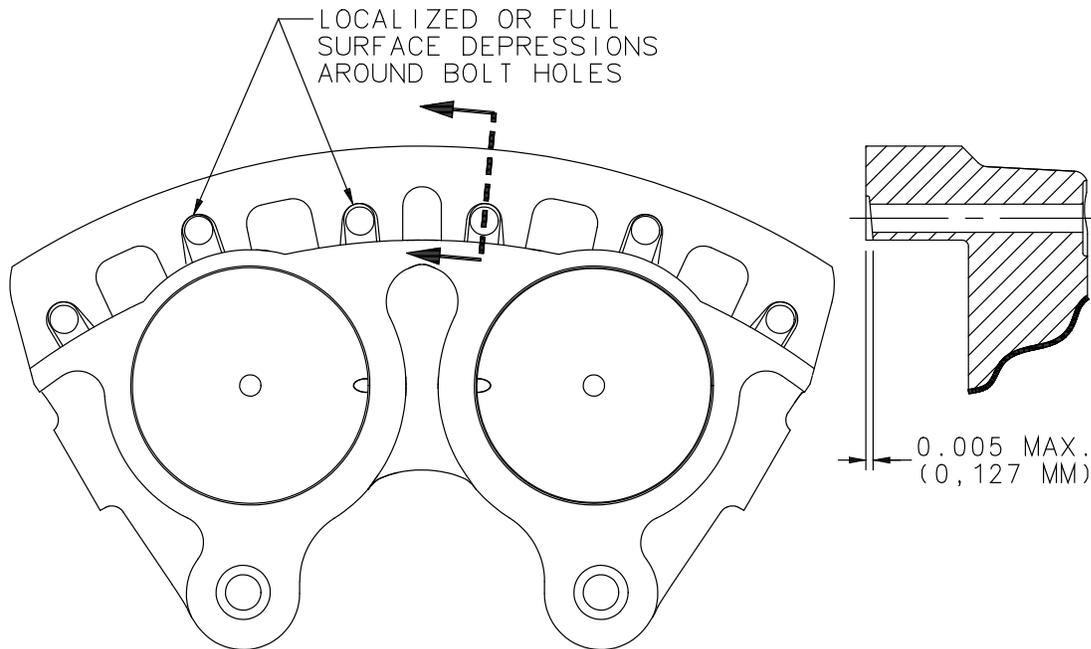


Figure 5001 Cylinder to Back Plate Surface Inspection

- (6) Examine the port threads for corrosion or damage to the sealing surfaces or threads.
- (7) Use a 10 power magnifier and examine the cylinder piston bores. Examine for scratches, nicks and burrs which can prevent the pistons from properly retracting, resulting in brake drag. Also examine the piston bores for wear and corrosion. Replace the cylinder if the bore diameter measures more than \varnothing 2.150 inch maximum (54,61 mm).
- (8) When it is required to perform liquid penetrant inspection, use ASTM E1417 or MIL-STD-6866, Type 1, Method A, Sensitivity Level 2.

NOTE: The protective coating (topcoat and primer) must be removed from the part and the part must be clean before doing a liquid penetrant inspection procedure. Refer to the CLEANING section for removal of the coating and cleaning instructions.

- (a) Examine for cracks paying particular attention to the areas around the anchor bolt holes, the piston bores and the ports.

CHECKS

- C. Examine the Pistons (45) and Insulators (50)
The insulator is not repairable.
- (1) Examine the piston guide bore area for scratches, nicks and burrs which can prevent the pistons from properly retracting, resulting in brake drag.
 - (2) Examine the external surfaces for wear, minor scratches, nicks, burrs, and other signs of damage that can lead to fluid leakage past the preformed packing (25).
 - (3) Replace the pistons if the outside diameter measures less than \varnothing 2.123 inch minimum (53,92 mm).
 - (4) Constant heat and pressure will compress the insulators over time. Replace the insulator when it is flush with the head of the piston. Refer to the REPAIR section for removal instructions.
- D. Examine the Insulator Shims (120)
The insulator shim is not repairable.
- (1) Replace insulators that are delaminating, cracked, or that show evidence of severe heat damage (e.g. charred).
- E. Examine the Pressure Plate Assembly (70)
- (1) Visually examine the pressure plate for cracks, nicks, corrosion, or other damage.
 - (2) Examine the linings (85) for looseness. Refer to para. 2.G. for detailed examination of the linings.
 - (a) If any rivets (90) are loose, damaged, or are missing, then replace per the REPAIR section.
 - (b) It is not necessary to remove the pins (80) on the pressure plate (75) unless the outside diameter of the pin is worn and does not allow for secure engagement of the pins into the counterbore areas of the steel backed lining segments.
 - (3) Examine the two anchor bolt holes for elongation or cracks. Badly elongated holes will prevent the pressure plate from moving or sliding freely on the anchor bolts and requires the replacement of the pressure plate.
 - (4) When it is required to replace the pressure plate assembly linings (85), check the pressure plate (75) for the following.
 - (a) Examine for distortion. Replace any pressure plate that is dished or out-of-flatness more than 0.020 inch (0,508 mm).
 - (b) Visually examine for cracks at the rivet holes and surrounding areas. Replace if cracked.

CHECKS

- (c) Visually examine the pins (80) for looseness, mushroomed heads or other visible damage. Refer to the REPAIR section to replace loose or damaged pins.
- (d) If the pins (80) are removed, then check the pin holes for elongation. Replace the pressure plate if the pin holes are elongated.

F. Examine the Back Plate Assembly (95)

- (1) Visually examine the back plate for cracks, nicks, corrosion, or other damage.
- (2) Examine the linings (110) for looseness. Refer to para. 2.G. for detailed examination of the linings.
 - (a) If any rivets (115) are loose, damaged, or are missing, then replace per the REPAIR section.
 - (b) It is not necessary to remove the pins (105) on the back plate (100) unless the outside diameter of the pin is worn and does not allow for secure engagement of the pins into the counterbore areas of the steel backed lining segments.
- (3) Examine the three threaded holes for thread damage.
- (4) When it is required to replace the back plate assembly linings (110), check the back plate (100) for the following.
 - (a) Visually examine for cracks at the rivet holes and surrounding areas. Replace if cracked.
 - (b) Visually examine the pins (105) for looseness or damage. Refer to the REPAIR section to replace loose or damaged pins.
 - (c) If the pins (105) are removed, then check the pin holes for elongation. Replace the back plate if the pin holes are elongated.

G. Examine the Linings (85, 110)

The linings are not repairable.

- (1) Examine the linings for looseness. Examine for edge chipping and surface deterioration. Replace damaged or worn pads per the REPAIR section.

NOTE: The wear limits for the linings on the pressure plate and back plate assemblies are the same. See paragraph 5. Brake Lining Wear Check in the DESCRIPTION AND OPERATION section

CHECKS

H. Examine the Torque Plate Assembly (180)

NOTES: Stainless steel bushings (190) are press fit into the cast aluminum torque plate and swaged on the backside for retention. The bushings are not replaceable. A bushing that is not repairable will require the replacement of the torque plate assembly. Individual components are not available.

- (1) Examine the exterior surface for missing paint caused by erosion, wear, or inspection techniques.
- (2) Visually examine the torque plate for surface cracks, nicks, corrosion, or other damage.
- (3) Visually examine the torque plate for cracks to the areas around the anchor bolt holes and the mounting bolt holes.
- (4) Examine the mounting bolt holes areas for elongation. Badly elongated holes requires the replacement of the torque plate assembly.
- (5) Examine the bushings for internal corrosion or contamination. Also examine for elongation of the inside diameter which can prevent the brake from sliding freely resulting in excessive brake drag.
- (6) Examine the bushings for internal stepping which could indicate severe cocking of the cylinder anchor bolts in the torque plate.
- (7) When it is required to perform liquid penetrant inspection, use ASTM E1417 or MIL-STD-6866, Type 1, Method A, Sensitivity Level 2.

NOTE: The protective coatings (topcoat and primer) must be removed from the part and the part must be clean before doing a liquid penetrant inspection procedure. Refer to the CLEANING section for removal of the coatings and cleaning instructions.

- (a) Examine for cracks paying close attention to the areas around the anchor bolt bushings and the mounting bolt holes.

REPAIR

1. General

Refer to IPL Figure 1 to identify the brake assembly components.

WARNING: PUT ON PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

NOTE: Repairs are limited to the replacement of parts and to the repairs specified in this section.

A. Equipment and Consumables

The term “Commercial Source” lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, you can use equivalent alternatives for the items listed.

Table 6001 Equipment and Consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Brake Lining Rivet Tool Kit	P/N 199-579	Aircraft Wheel and Brake, LLC or distributor
Drill Bit	Ø 3.17 mm (0.125 inch)	Commercial
Hand Files	Assorted	Commercial
Bench Vise	Not applicable	Commercial
Aluminum Oxide Cloth	600 Grade or Finer, Wet or Dry	Commercial
Alodine 1200 or Equiv	MIL-DTL-5541, Type I, Class 1A	Commercial
Iridite 15 or Equiv.	MIL-M-3171, Type VIII	Commercial
Pin Punch Set	Inch or Metric	Commercial
Paint Application Equipment	Not applicable	Commercial
Primer and Topcoat	Refer to Table 6002	Refer to Table 6002
Screw Driver	Standard-Flat Head	Commercial

CAUTION: DO NOT USE ABRASIVES CONTAINING IRON OR COPPER (STEEL WOOL, IRON OXIDE, BRASS OR STEEL WIRE). IRON OR COPPER PARTICLES WILL BECOME EMBEDDED IN THE ALUMINUM COMPONENTS AND WILL INCREASE THE AMOUNT OF CORROSION.

REPAIR

2. Detailed Repairs

A. Repair the Brake Cylinder (20)

The cylinder is made from a cast aluminum alloy.

(1) Surface damage repair

(a) Blend out small nicks, burrs, scratches and light corrosion.

(2) Piston bore repair

(a) Light scratches and nicks can be polished out. Repair of piston bore cavity must not exceed \varnothing 2.150 inch maximum (54,61 mm). If blend or polishing repair exceeds limits and prohibits the brake cylinder from retaining pressure during testing, then the cylinder must be replaced.

(3) Clean and surface treat the repaired areas

(a) Clean the cylinder. Refer to paragraph 2.D., CLEANING section.

(b) Prepare the repaired areas with corrosion preventative (Alodine 1200 or equivalent). Refer to MIL-DTL-5541, Type I, Class 1A.

B. Repair the Torque Plate Assembly (180)

The torque plate is made from a cast magnesium alloy.

(1) Light scratches nicks and corrosion in the bushing (190) inside diameter can be polished out.

(2) Torque plate surface damage repair

(a) Blend out small nicks, scratches and light corrosion.

(3) Clean and surface treat the repaired areas

(a) Clean the torque plate. Refer to paragraph 2.D., CLEANING section.

(b) Prepare the repaired areas with corrosion preventative (Iridite 15 or equivalent). Refer to MIL-M-3171, Type VIII.

C. Painting the Brake Cylinder (20) and Torque Plate Assembly (180)

SAFETY WARNING:  **PAINT MATERIALS CAN BE TOXIC AND VOLATILE. USE**

ONLY IN WELL VENTILATED AREAS. AVOID PHYSICAL CONTACT WITH PAINTS AND DO NOT INHALE VAPORS. KEEP PAINT CONTAINERS COVERED WHEN NOT IN USE. OBSERVE FIRE PRECAUTIONS.

REPAIR

NOTE: Because of local EPA low VOC requirements, Aircraft Wheel & Brake uses Columbia or Sherwin Williams primers and topcoats in the production of the brake assembly. Alternative products can be used by the repair facility but should be aircraft quality finishes.

- (1) For small areas requiring a paint touchup.
 - (a) Prepare the area by sanding lightly with 600 grade or finer, wet or dry aluminum oxide cloth and feather out all edges of the adjacent area.
- (2) Clean the surfaces to be painted.
 - (a) Plug the cylinder piston bores and cylinder ports to prevent paint material overspray.
 - (b) Mask the torque plate bushings (190) to prevent paint material overspray on internal surfaces of the bushings.
- (3) Apply the primer and topcoat per Table 6002.

NOTE: To achieve best results, always refer to the manufacturer's instructions for mixing, application and use; for forced dry (oven heating) schedule and also for disposal of primer and topcoat media.

Table 6002 Primer and Topcoat Product Characteristics

MANUFACTURER	PRIMER	TOPCOAT	DRY FILM THICKNESS AND AIR DRY TIMES
Columbia Paint Corp. Huntington, WV	P/N 18-017A (water reducible) No mixing required.	P/N 17-250A (524 Aluminum) (water reducible) No mixing required. It is desirable to apply topcoat without thinning, however, topcoat material may be thinned up to 10% by volume with either water (use distilled) or a mixture of 4 parts water to 1 part butyl cellosolve..	Primer: 0.0002-0.0005 in. 15 minutes min. (to touch or topcoat) 60 minutes (to handle) 4-24 hours (dry hard) Topcoat (includes primer): 0.0008-0.0014 in. 15 minutes (to touch) 30 minutes (to handle) 48 hours (dry hard)
Alternate: Sherwin Williams Co. Cleveland, OH	2 parts washcoat (P/N P60G2) 3 parts catalyst reducer (P/N R7K44)	P/N F63BXS58-4337 6 parts base 1 part catalyst (P/N V66V27) Thin using up to 20% polane reducer (P/N R7K84).	Primer: 0.0002-0.0004 in. 3-10 minutes (to touch) 10-60 minutes (to topcoat) Topcoat (includes primer): 0.0008-0.0014 in. 20 minutes (to touch) 60 minutes (to handle) 24 hours (dry hard)

REPAIR

D. Repair the Piston Guide (35)

The piston guide is made from an aluminum alloy.

- (1) If the piston guide required removal, then repair is limited to polishing out small nicks, scratches and light corrosion. Replace the piston guides if the outside diameter measures less than \varnothing 0.558 inch minimum (14,17 mm). Damage to the threads requires replacement of the guide.

E. Repair the Pistons (45)

The piston is made from an aluminum alloy and hard anodized.

NOTE: The piston insulator (50) is press fitted into the piston (45).

- (1) Piston repair is limited to polishing out small nicks, scratches and light corrosion. Replace the pistons if the outside diameter measures less than \varnothing 2.123 minimum (53,92 mm).
- (2) Worn insulators (50) can be replaced by drilling a \varnothing 0.125 (1/8) (3,17 mm) hole directly into the insulator approximately 0.100 (2,54 mm) deep, slightly off center, but not close to outside of piston. Use a small screwdriver to work through the \varnothing 1/8 diameter hole and lift to pry off insulator. Then, press in a new insulator.

F. Replace the Anchor Bolt (125)

The anchor bolt is made from stainless steel.

Refer to Figure 6001 and use an arbor press to remove and install the anchor bolts.

- (1) Polish out small nicks, burrs, and scratches.

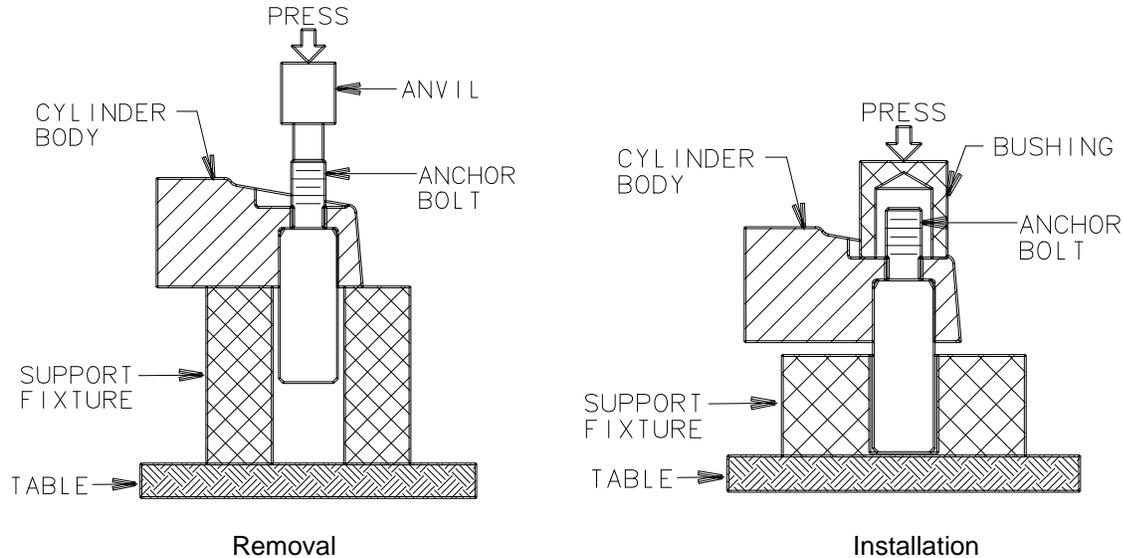


Figure 6001 Replace Anchor Bolt

REPAIR

G. Remove the Linings (85, 110)

The metallic lining used on the brake assembly is a hard composition and is attached by pins which press fit into the back surface (steel carrier plate) of the lining. A center rivet completes the attachment. The holes for the pins are not visible on the lining surface unless the lining is worn beyond its wear limit.

WARNING: **USE PROTECTIVE GOGGLES OR GLASSES WHEN REMOVING RIVETS TO AVOID INJURY TO EYES. AVOID GRABBING SHARP EDGES OF RIVETS WITH HANDS.**

CAUTION: DO NOT ENLARGE THE RIVET HOLES IN THE PRESSURE PLATE, OR BACK PLATE. IF THE RIVET HOLE EXCEEDS \varnothing 5,1 MM (0.201 INCH) THE PRESSURE PLATE OR BACK PLATE MUST BE REPLACED.

- (1) Use a \varnothing 0.125 inch (3,17 mm) drill bit, to drill out the rivets (90, 115). Discard the rivets.
- (2) Pry the lining off of the pressure plate (75) and the back plate (100) with a thin screwdriver.
- (3) Damaged attachment pins (80, 105) can be removed by carefully drilling out the pin with a \varnothing 0.187 inch drill.
- (4) The pressure plate (75) should now be examined for continued service per the CHECKS section.
 - (a) After the pressure plate is judged serviceable, refer to paragraph 2.H. and install the linings (85).
- (5) The back plate (100) should now be examined for continued service per the CHECKS section.
 - (a) After the back plate is judged serviceable, refer to paragraph 2.H. and install the linings (110).

H. Install the Linings (85, 110)

Refer to Figure 6003 for pin / rivet installation acceptance criteria.

- (1) Install a pin in the holes of the pressure plate (75) or back plate (100). Align each pin (85) or (105) with the tail of the pin toward the counterbored side of the part. Refer to Figure 6002.
- (2) If new pins are required, then place the pins and the pressure plate or back plate on a flat metal surface.
- (3) Use the Cleveland Brake Lining Rivet Tool Kit P/N 199-579 (or equivalent) and install the pins on the pressure plate or back plate.
- (4) Check to be sure the pins are tight and movement free with no distortion of parts.

REPAIR

- (5) Install the lining segment onto the pins. Check to make sure the metal backing is tight against the pressure plate or back plate surface. A fiber mallet may be used to tap the lining onto the pins lightly to seat it.
- (6) Next, install the center retention rivet (90) or (115) using the Cleveland Brake Lining Rivet Tool Kit P/N 199-579 (or equivalent). Refer to Figure 6002.

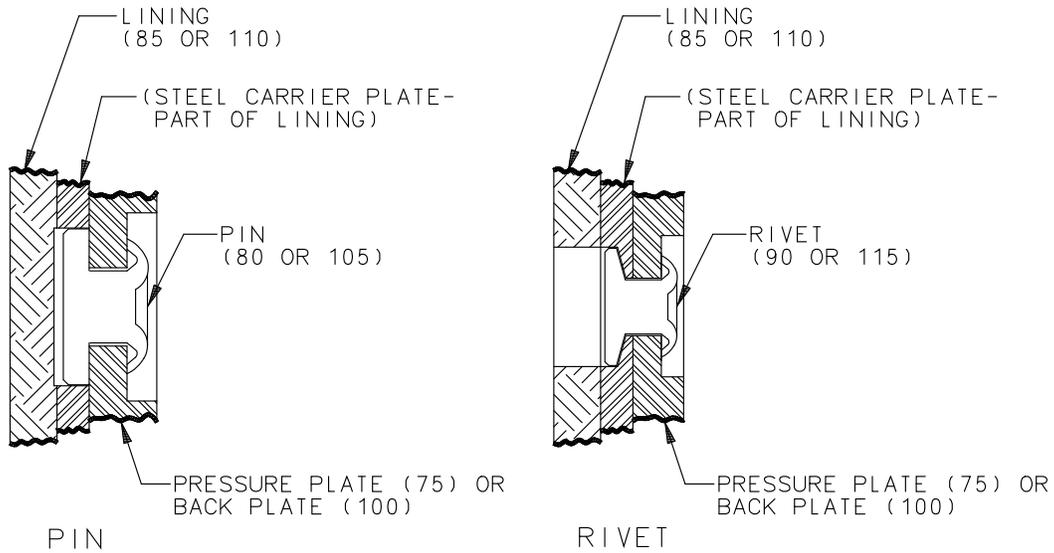


Figure 6002 Pin / Rivet Installation

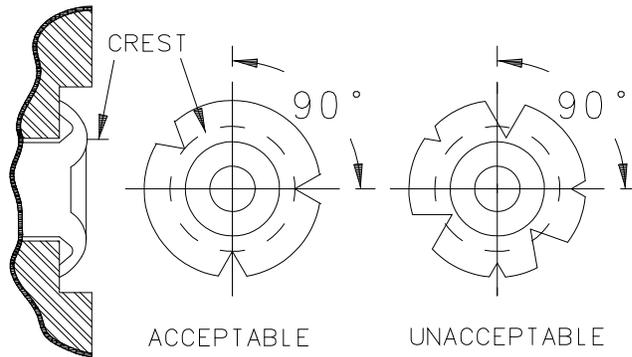


Figure 6003 Pin / Rivet Installation Acceptance Criteria

REPAIR

SAFETY WARNING:  REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD. USE APPROPRIATE SAFETY PRECAUTIONS.

- I. Repair the Pressure Plate (75) and Back Plate (100)
The pressure plate and back plate are made of steel and are cadmium plated.

NOTE: Stripping and re-cadmium plating steel parts is generally cost prohibitive in small lot sizes. Therefore, the pressure plate and back plate can be protected with an application of a zinc rich cold galvanizing compound.

- (1) Blend out small nicks, burrs, scratches and light corrosion.

ASSEMBLY

1. General

Refer to IPL Figure 1 to identify the brake assembly components.

A. Equipment and Consumables

The term “Commercial Source” lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, you can use equivalent alternatives for the items listed.

Table 7001 Equipment and Consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Fluid, Hydraulic	MIL-H-5606 or MIL-PRF-5606	Commercial
Standard tools (inch units)	Wrenches/sockets: <ul style="list-style-type: none"> • 12pt, external (inch, units) • Hex head, external (inch, units) Torque wrench	Commercial
Preformed packing tool set	199-18	Aircraft Wheel and Brake, LLC or distributor

2. Assembly Procedures

A. Assemble the Main Brake Assembly

- (1) If the anchor bolts were removed, then install them now (refer to REPAIR section). After the anchor bolts have been installed, then install a washer (130) onto the threaded end of the anchor bolt. Install a nut (135) and tighten to 85 to 95 in-lb (9,6 to 10,7 N-m).
- (2) Lubricate the preformed packing (140) with MIL-H-5606 or MIL-PRF-5606 hydraulic fluid and install the packing on the bleeder seat (145). Install the bleeder seat into the cylinder. Tighten to between 65 to 70 in-lb (7,3 to 7,9 N-m).

CAUTION: DO NOT TORQUE BLEEDER SCREW (150) TO A VALUE GREATER THAN 12 IN-LB (1,35 N-M). TORQUE GREATER THAN 12 IN-LB (1,35 N-M) WILL DAMAGE THE BLEEDER SEAT.

- (3) Install the bleeder screw (150) into the bleeder seat (145). Tighten the bleeder screw snug to prevent leakage.
- (4) Install the fittings (160, 170) into the cylinder. Tighten to 50 to 70 in-lb (5,6 7,9 N-m).
- (5) Lubricate the preformed packings (25) with MIL-H-5606 or MIL-PRF-5606 hydraulic fluid and install in the cylinder (20) piston bore groove.

ASSEMBLY

- (6) If the piston guide unit (35) was removed, install it now as follows:

NOTE: A new stat-o-seal must be used because the original one will not seal properly.

- (a) Lubricate a new stat-o-seal (55) with MIL-H-5606 or MIL-PRF-5606 hydraulic fluid. Install the Washer (60), then the new lubricated stat-o-seal (55) on the bolt (65).
- (b) Position the piston guide (35) in the cylinder piston bore and from the opposite side (exterior of cylinder bore) insert the bolt through the hole and thread the bolt into the guide (35). Ensure that the friction ring (40) is installed on the piston guide (35).
- (c) Tighten the bolt (65) to 25 to 30 in-lb (2,8 to 3,4 N-m).

- (7) Install the piston (45) as follows:

- (a) Lubricate the piston, preformed packing (25), piston guide (35) and cylinder piston bore with a small amount of MIL-H-5606 or MIL-PRF-5606 hydraulic fluid.
- (b) Place the piston in the bore and rotate while pressing down to seat the friction ring and insure that the piston and the preformed packing (25) are in the proper alignment.
- (c) Tap the piston with a wooden or plastic mallet while alternately rotating the piston.

NOTE: If considerable effort is required, then remove the piston and inspect the pilot bore area for damage. If the bore is damaged, check the corresponding area of the piston guide for damage. Repair or replace if necessary and repeat the procedure.

- (8) Install the pressure plate assembly (70) by aligning the anchor bolt holes with the anchor bolts and slide onto the cylinder.

NOTE: The pressure plate must float freely on the anchor bolts.

- (9) Install the hose assembly (195) between the two cylinders. Tighten the hose ends to between 100 to 110 in-lb (11,3 to 12,4 N-m).

NOTE: Hold the fittings (160, 170) stationary while tightening the hose ends.

B. Mount the Main Brake Assembly onto the Aircraft

Refer to Aircraft Wheel and Brake, LLC drawing no. 50-80, sheet 1

NOTE: The torque plate mounting bolts, washers and nuts are included in the 199-90 kit.

- (1) If removed, re-install the torque plate assembly (180) now. Attach the torque plate assembly to the axle strut-mounting flange with the 12 bolts, 24 washers (one under each bolt head and nut), and 12 nuts. Tighten the nuts to 130 to 150 in-lb (14,7 to 17,0 N-m).

ASSEMBLY

- (2) Slide the brake assembly onto the torque plate assembly (180) while aligning the anchor bolts (125) to the torque plate holes.

NOTE: The cylinder anchor bolts must slide freely in the torque plate bushings (190).

- (3) Install the washers (10) and bolts (5 or 5A) and insulator shim (120).
- (4) Install the back plate assemblies (95) between the brake disc and the wheel flange, and align with the bolts (5 or 5A). Tighten the bolts to 85 to 90 in-lb (9,6 to 10,2 N-m).

NOTE: The optional field alternate bolts (5A) will require safety wire. Safety wire the bolts after pressure testing the brake assembly. See step 2.B. (7).

- (5) Re-connect the aircraft system hydraulic supply line to the fitting (170).
- (6) Refer to the TESTING AND FAULT ISOLATION section to bleed and pressure test the brake assembly.
- (7) If using the optional field alternate bolts (5A), safety in accordance with NASM33540.

C. Brake Lining Conditioning Procedure

NOTE: PRM14A is included in the 199-90 kit.

It is important to condition new linings properly to obtain the service life designed into them. Condition the linings by following the instructions in product reference memo PRM14A.

FITS AND CLEARANCES

1. General

Refer to IPL Figure 1 to identify the brake assembly components.

A. Assembly Wear Limits

Table 8001 In-Service Wear Limits

PART NAME (IPL item number)	FIGURE	WORN AREA DESCRIPTION	WORN DIMENSION
Pressure Plate Assembly (70): Lining (85)	1	Thickness	0.100 inch (2,540 mm) minimum
Back Plate Assembly (95): Lining (110)	1	Thickness	0.100 inch (2,540 mm) minimum
Cylinder Piston Bores	N/A	Diameter	∅ 2.150 inch (54,61 mm) maximum
Piston (45)	N/A	Outside Diameter	2.123 inch (53,9 mm) minimum
Pressure Plate Assembly (70): 2 Anchor Bolt Holes	N/A	Diameter	∅ 0.505 inch (12,827 mm) maximum

B. Assembly Torque Values

Table 8002 Assembly Torque Values

PART NAME (IPL item number)	TORQUE LIMITS
Bolt (5)	85 to 90 in-lb (9,6 to 10,2 N-m)
Bolt (65)	25 to 30 in-lb (2,8 to 3,4 N-m)
Nut (135)	85 to 95 in-lb (9,6 to 10,7 N-m)
Bleeder Seat (145)	65 to 70 in-lb (7,3 to 7,9 N-m)
Bleeder Screw (150)	Close the screw, then tighten snug to prevent leakage. Do not tighten to a value greater than 12 in-lb. (1,35 N-m). Torque greater than a value of 12 in-lb (1,35 N-m) will damage the bleeder seat (145)
Fitting Assembly (170)	50 to 70 in-lb (5,6 to 7,9 N-m)
Fitting Assembly (160)	50 to 70 in-lb (5,6 to 7,9 N-m)
Hose Assembly (195)	100 to 110 in-lb (11,3 to 12,4 N-m)

SPECIAL EQUIPMENT AND CONSUMABLES

1. General

This section contains source of supply information for all applicable sections of this manual.

A. Source of Supply

NOTE: Unless specified differently, you can use equivalent alternatives for items listed.

Table 9001 List of Manufacturers

PRODUCT Nomenclature	SPECIFICATION OR REQUIREMENT	SOURCE OF SUPPLY	DISASSEMBLY	CLEANING	REPAIR	ASSEMBLY
Preformed Packing Extraction Tool Set P/N 199-18	N/A	Aircraft Wheel and Brake, LLC Avon, OH 44011 U.S.A. or distributor	X			X
Plastic Media for stripping paint	MIL-P-85891, Type II or V, Grade 20/30, 3.5 MOH max	U.S. Technology Corporation Canton, OH 44702 U.S.A.		X		
Lining Rivet Tool Kit P/N 199-579	N/A	Aircraft Wheel and Brake, LLC Avon, OH 44011 U.S.A. or distributor			X	
Primer and Topcoat	Refer to the <u>REPAIR</u> section	Refer to the <u>REPAIR</u> section			X	

ILLUSTRATED PARTS LIST

1. General

All parts are listed, except parts, which lose their identities by being permanently fastened to other parts of assemblies and cannot be disassembled.

A. Explanation of Columns

- (1) Fig: Refers to the applicable illustrated parts figure. A hyphen "-" is used to indicate that the item is not illustrated.
- (2) Item: Refers to the applicable item in the illustrated parts list figure.
- (3) Units per assembly: Number of units required for the next higher assembly.
AR..... As Required (for bulk items) REF..... Reference
NP..... Item is Non-procurable
- (4) CAGE: Commercial And Government Entity code of part supplier.
- (5) Part No.: Part number of the item.
- (6) Description: This column identifies the parts being listed by noun name followed by modifiers when applicable. An indenture system using dots are used to show the relationship of the parts to the assembly.
Assembly
 - Subassembly or Item
 - • Item
- (7) Usable on code: This code is used to identify more than one configuration of the basic part number. Effectivity codes only apply to the figure in which they are used.

B. Part Numbering System

Unless specified differently by contract, the assigned Aircraft Wheel and Brake, LLC part number will be used in the part number column for all purchased and government standard off-the-shelf parts (such as MS, AN, NAS, etc.). If required by contract or if the original manufacturer of a purchased part has FAA manufacturing approval then; the original manufacturer's part number along with the manufacturer's federal supply code will be shown in parentheses following the part description. The letter "V" will precede the federal supply code.

C. Parts Replacement Data

The interchangeability relationship between parts is identified in the Nomenclature column of the parts list. A list of the terms used to show interchangeability and their definition is as follows:

<u>Term</u>	<u>Abbreviation</u>	<u>Definition</u>
Optional	OPT	This part is optional to and interchangeable with other parts in the same item number variant group or other item number if designated.
Superseded by	SUPSD BY	The part is replaced by and is not interchangeable with the item listed.
Supersedes	SUPSDS	The part replaces and is not interchangeable with the item listed.
Replaced by	REPLD BY	The part is replaced by and interchangeable with the item listed.
Replaces	REPLS	The part replaces and is interchangeable with the item listed.

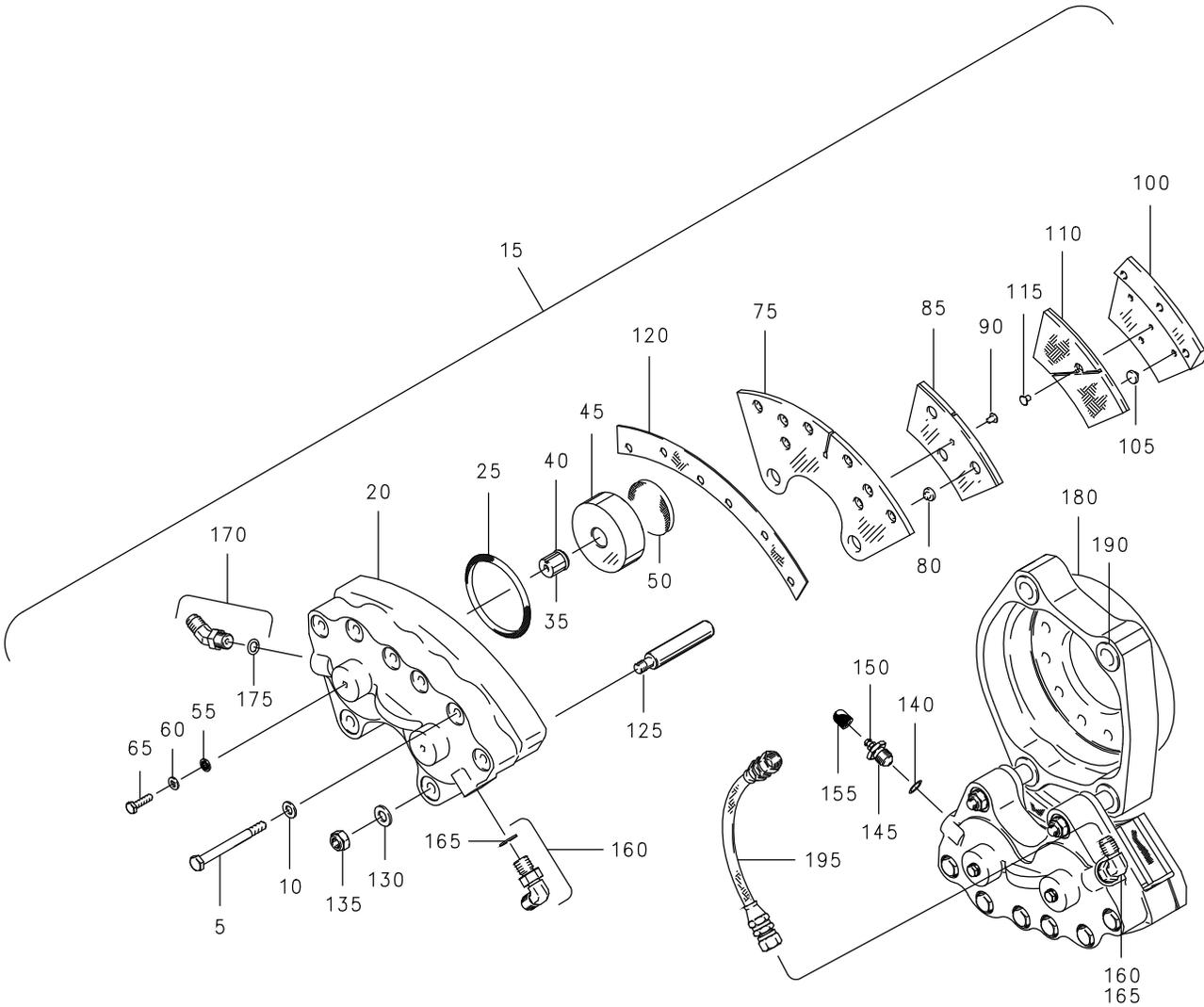
D. Alpha Variant Item Numbers

Alpha variants A through Z (except I and O) are assigned to existing numbers when necessary to show:

- (1) Added items
- (2) Modification or configuration differences
- (3) Optional parts

Alpha variant item numbers are not shown on the exploded view when the appearance and location of the alpha variant item is the same as the basic item.

ILLUSTRATED PARTS LIST



IPL Figure 1 Main Brake Assembly Exploded View

ILLUSTRATED PARTS LIST

2. Detailed parts list – main brake assembly (Sheet 1 of 2)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY.
1 -1	30-144		BRAKE ASSEMBLY, MAIN		RF
5	103-14200		BOLT (with patch lock)		12
5A	103-14400		BOLT (AN4H-23A) (OPT – Field alternate for Item 5)		RF
10	095-10400		WASHER, (NAS1149F0463P)		12
			* * *		
15	091-13900		. CYLINDER ASSEMBLY		2
20	061-10600		. . CYLINDER		1
25	101-24200		. . . PREFORMED PACKING		2
- 30	092-07300		. . . PISTON ASSEMBLY		2
35	139-08100		. . . . PISTON GUIDE		1
40	082-02000		. . . . FRICTION RING		1
45	062-04100		. . . . PISTON		1
50	088-00100		. . . . INSULATOR		1
55	095-02600		. . . . STAT-O-SEAL		1
60	095-10300		. . . . WASHER (NAS1149F0363P)		1
65	103-00200		. . . . BOLT (AN3-7A)		1
- 70	073-06200		. . . PRESSURE PLATE ASSEMBLY		2
75	063-03500		. . . . PRESSURE PLATE		1
80	177-01600		. . . . PIN		6
85	066-09000		. . . . LINING		2
90	105-00200		. . . . RIVET		2
- 95	074-04800		. . . BACK PLATE ASSEMBLY		4
100	064-03200		. . . . BACK PLATE		1
105	177-01600		. . . . PIN		3
110	066-09000		. . . . LINING		1
115	105-00200		. . . . RIVET		1

ILLUSTRATED PARTS LIST

2. Detailed parts list – main wheel assembly (Sheet 2 of 2)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY.
120	068-03300		. . INSULATOR SHIM		2
125	069-02400		. . ANCHOR BOLT		4
130	095-10500		. . WASHER (NAS1149F0563P)		4
135	094-10400		. . NUT (MS21044-N5)		4
140	101-24600		. . PACKING, PREFORMED		1
145	081-00200		. . BLEEDER SEAT		1
150	079-00300		. . BLEEDER SCREW		1
155	183-00100		. . BLEEDER CAP		1
160	104-03100		. . FITTING ASSEMBLY		2
165	101-39800		. . . PACKING, PREFORMED (M83461/2-904)		1
170	104-04700		. . FITTING ASSEMBLY		1
175	101-39800		. . . PACKING, PREFORMED (M83461/2-904)		1
180	075-15500		. TORQUE PLATE ASSEMBLY		1
185	065-13800		. . TORQUE PLATE		NP
190	145-08300		. . BUSHING		NP
195	207-00700		. HOSE ASSEMBLY		1
- 200	166-08600		. NAMEPLATE		1

STORAGE

CAUTION: BRAKES STORED IN CARDBOARD BOXES, WHICH HAVE BECOME WET OR HAVE BEEN EXPOSED TO HIGH HUMIDITY, CAN BECOME CORRODED.

1. Procedures

A. Brake Assembly Storage

Brake assemblies which are not to be immediately installed on the aircraft must be properly stored. Acceptable storage conditions are listed below.

(1) Rubber Based Components

The shelf life of components that are made of or contain a rubber based material is listed below. The serviceable life can be decreased by exposure to sunlight, very high or low temperatures, low humidity, ozone, contamination of fluids or lubricants, severe operating conditions, etc.

(a) The preformed packings (25, 55, 140, 165, 175) have a shelf life of 15 years from the date of manufacture (also known as the cure date).

(2) Seal all fittings with covers to prevent contaminants from entering the brake.

(3) Wipe all excess oil and foreign material from exposed surfaces of the brake assembly with a clean shop towel.

(4) THE BRAKE ASSEMBLY SHOULD BE STORED IN A CLEAN, DRY ENVIRONMENT. THE DESIRABLE TEMPERATURE RANGE IS FROM 10° TO 25°C (50° TO 77°F). EXPOSURE TO EXTREME TEMPERATURES CAN AFFECT SERVICE LIFE.

