Aircraft Wheel & Brake
Parker Hannifin Corporation
1160 Center Road
Avon, Ohio 44011

FAA-PMA

PARTS LIST
199-282 CONVERSION KIT
Pilatus Aircraft – Model PC-7

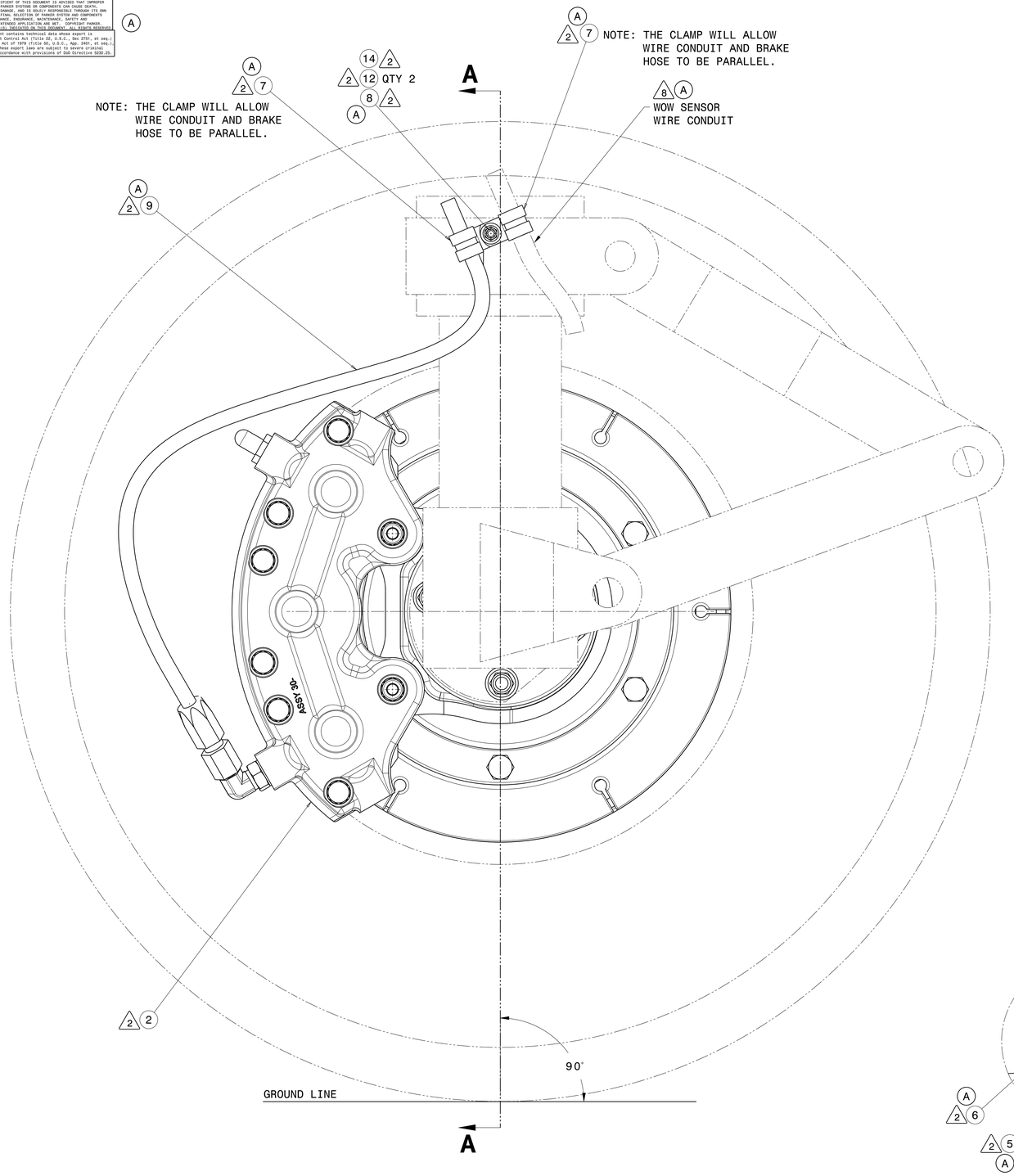
PART NUMBER	DRAWING REVISION	DESCRIPTION	QUANTITY
30-93F	Rev. C dated 11-03-2015	Brake Assembly, Left Hand	1
30-93F RH	Rev. C dated 11-02-2015	Brake Assembly, Right Hand	1
40-128F	Rev. B dated 11-02-2015	Wheel Assembly	2
094-10100	----------	Nut (MS21042-6)	8
094-14000	----------	Nut (MS21042-3)	2
095-03100	----------	Washer (MS20002C6)	16
095-10300	----------	Washer (NAS1149F0363P)	4
103-00100	----------	Bolt (AN3-5A)	1
103-36000	Rev. N/C dated 03-04-2015	Bolt (NAS6606-7)	8
103-86700	----------	Bolt (AN3H3A)	1
185-01100	Rev. N/C dated 03-04-2015	Clamp, Loop Type (AS21919WCF05)	3
185-01200	----------	Clamp, Loop Type (AS21919DG58)	1
207-07800	Rev. C dated 07-26-2017	Hose Assembly, Hydraulic (MS8005E480A)	2
221-07500	----------	Cotter Pin (MS24665-362)	2
		Publication Package (P/N PP199-282)	
199-282		Kit Parts List (This Document)	
IM199-282	Rev. A dated 07-20-2017	Installation Manual	1
50-165	Rev. A dated 07-20-2017	Installation Drawing	1
CM30-93F	Rev. A dated 07-20-2017	Component Maintenance Manual, Brake	1
CM40-128F	Rev. A dated 07-20-2017	Component Maintenance Manual, Wheel	1
PRM14A	Rev. A dated 07-01-1995	Conditioning Procedure Metallic Linings	1
SA04264CH	----------	Supplemental Type Certificate	1
AMMS199-282	Rev. A dated 03-01-2018	Airplane Maintenance Manual Supplement	1
MDL199-282	Rev. A dated 03-01-2018	Master Data List	1

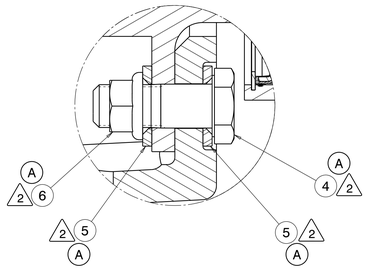
NOTES:

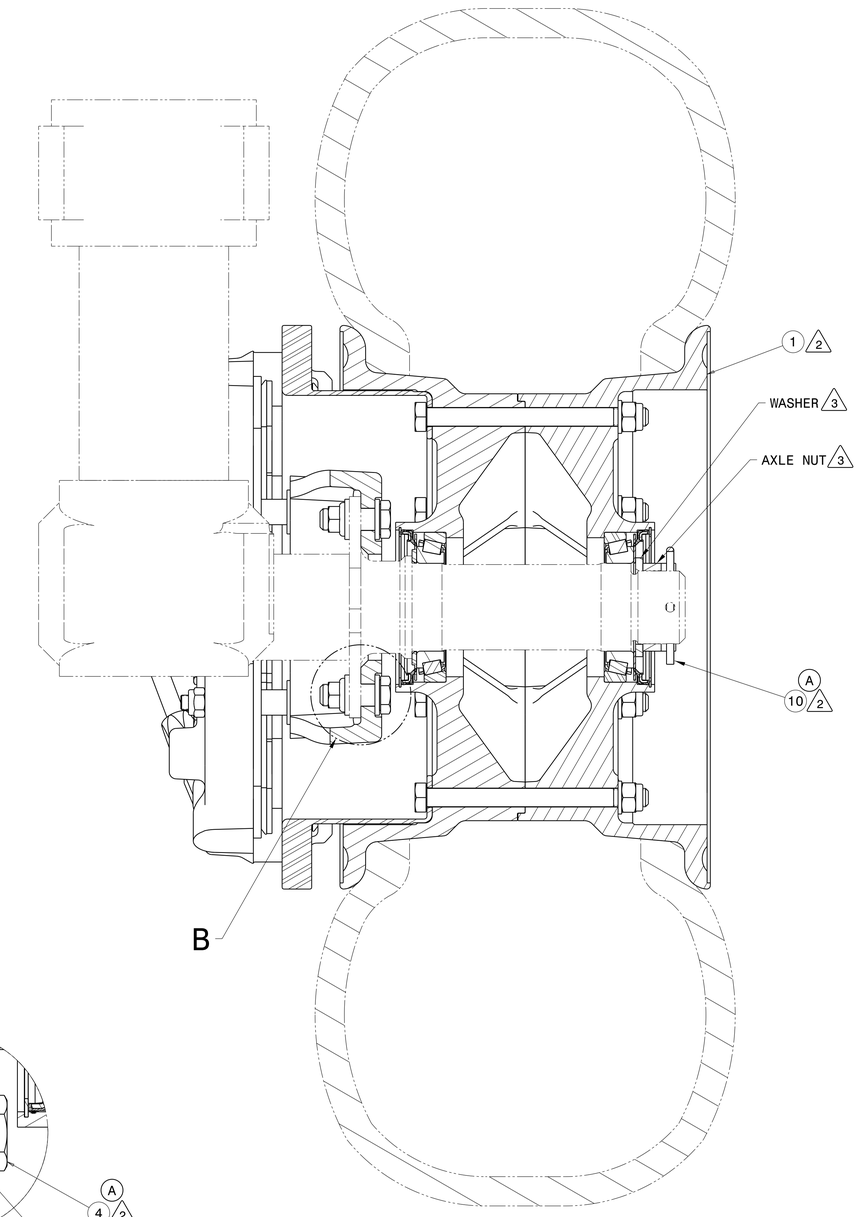
1. This kit will convert one aircraft to Cleveland Wheels and Brakes.
2. The 30-93F and 30-93F RH brake assemblies designed for use with MIL-H-5606 or MIL-PRF-5606 hydraulic fluid.
3. The 40-128F wheel assembly designed for use with 6.50 - 8, 8 PR tube type bias ply tire.
4. This kit applicable only to PC-7 aircraft with 8 inch wheels (will not fit PC-7 Mark II).

199-282
Rev. NC 11-20-2015 (ECO-0057666)
Rev. A 03-24-2017 (ECO-0078493)
Rev. B 07-28-2017 (ECO-0082435)
Rev. C 04-04-2018 (ECO-0087767)

REVISIONS					
ECO#	REV	DESCRIPTION OF CHANGE	CHG BY	CHK BY	DATE	APPROVED
0048959	N/C	INITIAL RELEASE	RPR	PH	06-09-2015	M. LACONTE
0082221	A	SEE ECO	PH	RR	07-20-2017	M. LACONTE







	Number	Qty	Part Number	Nomenclature
	1	2	40-128F	WHEEL ASSEMBLY
	2	1	30-93F	BRAKE ASSEMBLY, LEFT HAND
A	3	1	30-93F RH	BRAKE ASSEMBLY, RIGHT HAND
A	4	8	103-36000	BOLT, TENSION, HEX HEAD, 160 KSI
A	5	16	095-03100	WASHER
A	6	8	094-10100	NUT
A	7	3	185-01100	CLAMP, LOOP TYPE
A	8	1	103-86700	BOLT
A	9	2	207-07800	TUBE ASSEMBLY
A	10	2	221-07500	PIN, COTTER
A	11	1	185-01200	CLAMP, LOOP TYPE
A	12	4	095-10300	WASHER
A	13	1	103-00100	BOLT
A	14	2	094-14000	NUT

NOTES:

1. READ INSTALLATION MANUAL IM199-282 BEFORE INSTALLING.
2. THESE PARTS ARE SUPPLIED AS PART OF THE 199-282 KIT.
3. THIS EXISTING HARDWARE MUST BE RETAINED AND REUSED FOR THIS INSTALLATION.
4. USE THIS KIT WITH MIL-PRF-5606 HYDRAULIC FLUID.
5. REFER TO INSTALLATION MANUAL IM199-282 FOR WEIGHT AND BALANCING DATA COMPUTATIONS.
6. QUANTITIES ARE PER KIT (ONE SHIPSET).
7. THE WHEEL ASSEMBLY IS COMPATIBLE WITH A 6.50-8, 8 PLY TUBE TYPE BIAS PLY TIRE.
8. WIRING TO WEIGHT ON WHEELS SENSOR IN CONDUIT THAT ROUTES THROUGH THE FORWARD CLAMP.

QTY	FINAL ASSY	QTY	NEXT ASSY

APPLICATION (NOT MAINTAINED)

DO NOT SCALE DRAWING

THIS PLOT IS COMPLETELY DEFINED BY THE COMPUTER DATASET, WHICH IS THE SOLE AUTHORITY FOR THE INFORMATION PROVIDED. DIMENSIONALLY STABLE COPIES MUST BE OBTAINED FROM THE DATASET. ALL REVISIONS TO THIS PLOT MUST BE BY DATASET REVISION ONLY - NO REVISIONS MAY BE MADE BY HAND.

A CONTRACT ALTERED ITEM EXISTS FOR THIS PART NUMBER

GENERAL NOTES: UNLESS OTHERWISE SPECIFIED

DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
DIMENSIONS ARE IN INCHES
TOLERANCES THIRD ANGLE PROJECTION
2 PLACE (.XX): ±.03
3 PLACE (.XXX): ±.010
ANGULAR: ±0.5°
REMOVE ALL BURRS
BREAK CORNERS .010 MAX.
INTERNAL RADII .005-.010
GENERAL MACHINED SURFACES 125 PER ANSI B46.1

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS AND MICROFINISHES APPLY TO COMPLETED PART, LESS PAINT

		DATE
PROGRAM/CONTRACT NO.	B96	
DRAWN	SEE ECO	SEE ECO
CHECKED	SEE ECO	SEE ECO
ENGINEER	SEE ECO	SEE ECO
DESIGN APPROVAL	SEE ECO	SEE ECO
PROJ APPROVAL	SEE ECO	SEE ECO
MFG ENGRG	SEE ECO	SEE ECO
QUAL ASSUR	SEE ECO	SEE ECO

CLEVELAND WHEELS & BRAKES
Aircraft Wheel and Brake Division
Parker Hannifin Corporation
Avon, Ohio 44011

DWG. TITLE

INSTALLATION DRAWING

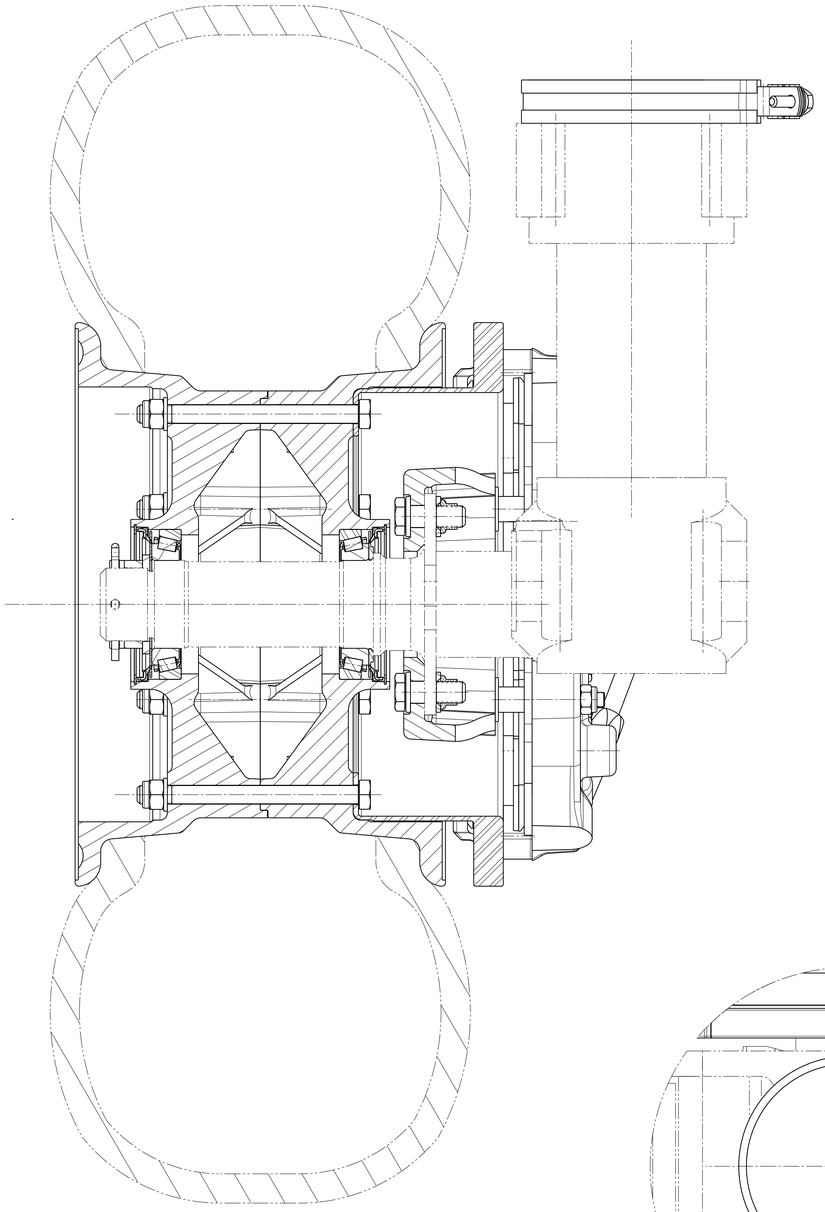
SIZE	CAGE CODE	DWG. NO.	REV.
E	33269	050-16500	A

SCALE: 1:1 | UNIT WGT.: | SHEET: 1 OF 2

DWG. NO. 050-16500 | SHEET 1/2 | REV A

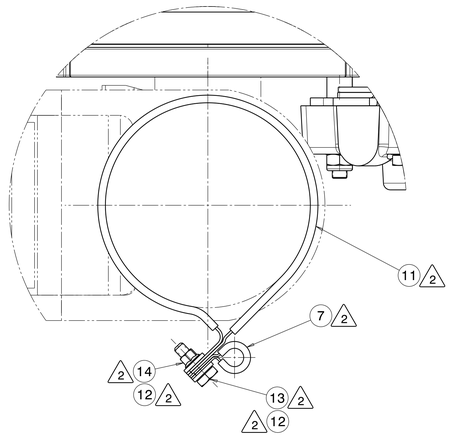
PD-E-GENL-CT-01

REVISIONS						
ECO#	REV	DESCRIPTION OF CHANGE	CHG BY	CHK BY	DATE	APPROVED
0082221	A	THIS SHEET ADDED	PH	RR	07-20-2017	M. LACONTE



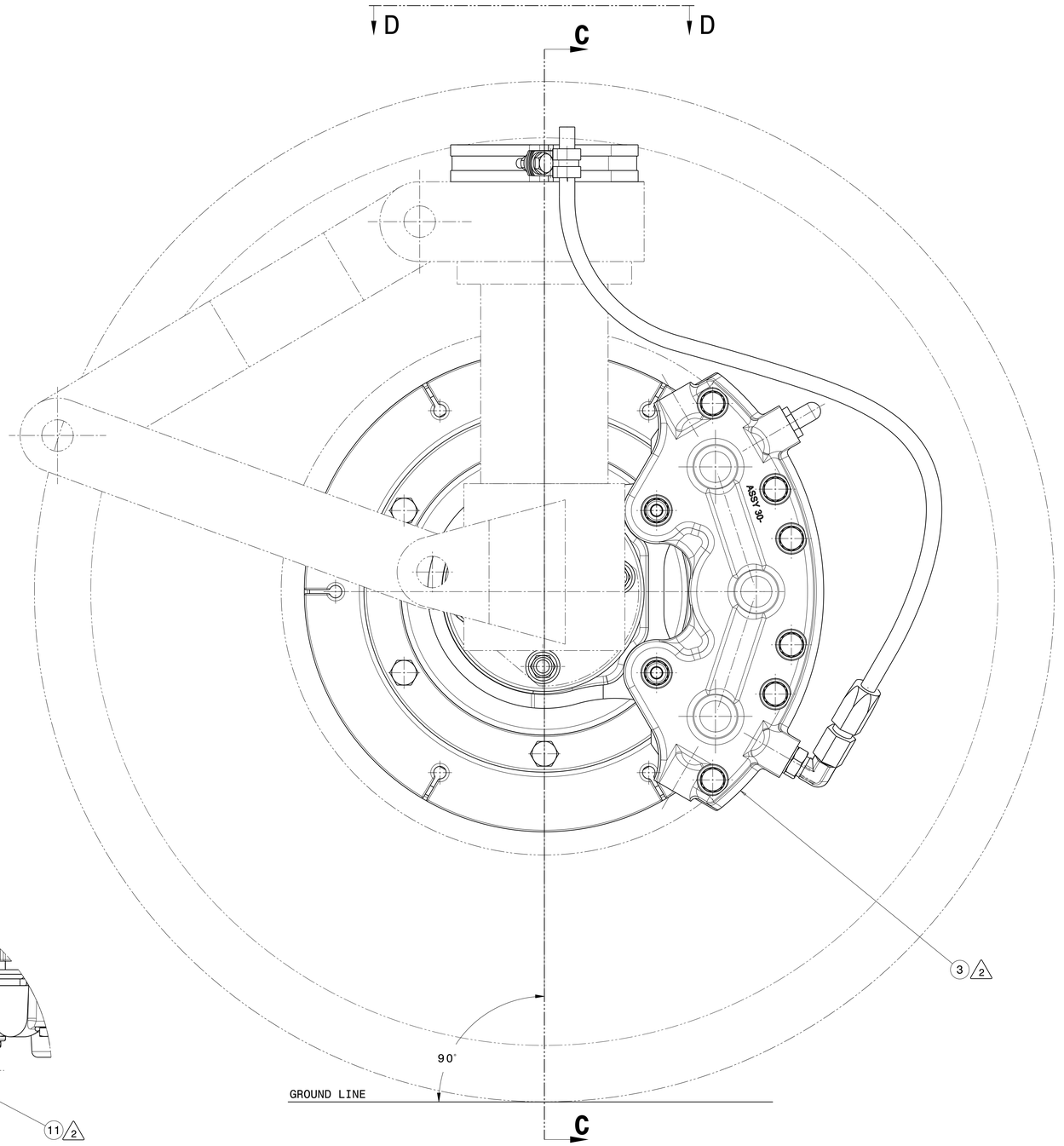
SECTION C-C
SCALE: 1:1

OUTBOARD



Auxiliary view D

OUTBOARD
FORWARD



RIGHT HAND GEAR
FORWARD

NOTES:

1. REFER TO SHEET 1 FOR ALL NOTES AND BILL OF MATERIAL.

.	.	.	.
QTY	FINAL ASSY	QTY	NEXT ASSY

APPLICATION (NOT MAINTAINED)

DO NOT SCALE DRAWING

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A CONTRACT ALTERED ITEM EXISTS FOR THIS PART NUMBER

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DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
DIMENSIONS ARE IN INCHES
TOLERANCES
2 PLACE (.XX): ±.03
3 PLACE (.XXX): ±.010
ANGULAR: ±0.5°
REMOVE ALL BURRS
BREAK CORNERS .010 MAX.
INTERNAL RADII .005-.010
GENERAL MACHINED SURFACES 125 PER ANSI B46.1

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS AND MICROFINISHES APPLY TO COMPLETED PART, LESS PAINT

PROGRAM/CONTRACT NO.		
B96		
DRAWN	SEE ECO	DATE SEE ECO
CHECKED	SEE ECO	SEE ECO
ENGINEER	SEE ECO	SEE ECO
DESIGN APPROVAL	SEE ECO	SEE ECO
PROJ APPROVAL	SEE ECO	SEE ECO
MFG ENGRG	SEE ECO	SEE ECO
QUAL ASSUR	SEE ECO	SEE ECO

CLEVELAND WHEELS & BRAKES
Aircraft Wheel and Brake Division
Parker Hannifin Corporation
Avon, Ohio 44011

DWG. TITLE

INSTALLATION DRAWING

SIZE	CAGE CODE	DWG. NO.	REV.
E	33269	050-16500	A

SCALE: 1:1 | UNIT WGT.: | SHEET: 2 OF 2

DWG. NO 050-16500 | SHEET 2/2 | REV. A

PD-E-GENL-CT-01

Kit Installation Publication

Main Wheel & Brake Conversion Kit
Parker Hannifin Part No. 199-282

IM199-282

Publication No.: IM199-282, Revision A

Manufacturer:

Parker

Parker Hannifin Corporation
Aircraft Wheel and Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.

Cleveland
Wheels & Brakes

TO: HOLDERS OF IM199-282 INSTALLATION MANUAL FOR MAIN WHEEL ASSEMBLY PART NO. 40-128F AND MAIN BRAKE ASSEMBLY PART NO. 30-93F.

Attached to this transmittal letter is Revision NC of IM199-282 (dated August 20, 2014)

Revision NC, Dated August 20, 2014

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 (ECO-0055861)

TO: HOLDERS OF IM199-282 INSTALLATION MANUAL FOR MAIN WHEEL ASSEMBLY PART NO. 40-128F AND MAIN BRAKE ASSEMBLY PART NO. 30-93F.

Revision A, Dated July 20, 2017

REVISION HIGHLIGHTS

Section/Page No.	Description Of Change
As follows	(ECO-0082452)
All page footers	Replace proprietary and export statement with disclosure pointing to first page.
Title pg/T-1	(UPDATE) Proprietary statement.
Record of Revisions/ RR-1	(UPDATE) to reflect latest revision.
Table of Contents/TC-1	(UPDATE) to reflect revised sections.
9.0/pg 5	Install the Parker Equipment (NOW) 9.1 Install the torque plate assembly (on page 5). 9.1, subheading 1: Refer to Figure 1 Figure 1 Install the torque plate assembly (1) (WAS) 9.2 Install the torque plate assembly (on page 6). 9.2, subheading 1: Refer to Figure 2 Figure 2 Install the torque plate assembly (1)
9.0/pg 6	Install the Parker Equipment (NOW) 9.2 Disassemble the Parker wheel assembly, P/N 40-128F (on page 6). 9.2, subheading 1: Refer to Figure 2… Figure 2 Disassemble the wheel assembly (WAS) 9.3 Disassemble the Parker wheel assembly, P/N 40-128F (on page 7). 9.3, subheading 1: Refer to Figure 3 Figure 3 Disassemble the wheel assembly
9.0/pg 7-9	Install the Parker Equipment (NOW) 9.3 Mount a tire on the Parker wheel assembly, P/N 40-128F (on page 7-9). 9.3, subheading 1, task 1.3: correct typo “cean” to read “clean”. 9.3, subheading 2: Refer to Figure 2… 9.3, subheading 4: Refer to Figure 3… Figure 3 Install bearing cones (4), seal components (2), (3), (6),… (WAS) 9.4 Mount a tire on the Parker wheel assembly, P/N 40-128F (on page 8-10). 9.4, subheading 2: Refer to Figure 3… 9.4, subheading 4: Refer to Figure 4… Figure 4 Install bearing cones (4), seal components (2), (3), (6),…

Revision A (continued)

Section/Page No.	Description Of Change
9.0/pg 9	Install the Parker Equipment (NOW) 9.3 Install the Parker wheel assembly, P/N 40-128F (on page 9). (WAS) 9.4 Install the Parker wheel assembly, P/N 40-128F (on page 10).
9.0/pg 10-11	Install the Parker Equipment (NOW) 9.5 Install the Parker brake assembly, P/N 30-93F (on page 10-11). Refer to Figure 4… Figure 4 Install the cylinder assembly (2) 9.4, subheading 4: Refer to Figure 5. Figure 5 Reinstall the three back place assemblies (5) (WAS) 9.6 Install the Parker brake assembly, P/N 30-93F (on page 11-12). Refer to Figure 5… Figure 5 Install the cylinder assembly (2) 9.5, subheading 4: Refer to Figure 6. Figure 6 Reinstall the three back place assemblies (5)
9.0/pg 12	Install the Parker Equipment (NOW) 9.6 Install left hand gear hose support hardware (on page 12). 9.6, subheading 2: Refer to Figure 6. Figure 6 Install the left hand gear hose support hardware Figure 6 revised to reflect actual LH gear hose hardware configuration. (WAS) 9.1 Install the hose support hardware (on page 5). 9.1, subheading 1: Refer to Figure 1. Figure 1 Install the hose support hardware
9.0/pg 13	Install the Parker Equipment (NOW) 9.7 Install right hand gear hose support hardware (on page 13). Figure 7 Install the right hand gear hose support hardware Figure 7 revised to show RH gear and reflect actual gear hose hardware configuration. (WAS) 9.7 Completed installation (on page 13). Figure 7 Parker equipment installed (LH gear shown)
10.0/pg 14	Return to Service and System Checks (NOW) 1.1 Pressure test the brake assemblies and check for leaks. (WAS) 1.1 Pressure test the brake assembly at 600 psig and check for leakage. (ADD) steps 1.5 and 1.6
12.0/pg 14	Weight and Balance Computations (ADD) “Weigh the removed wheel & brake assemblies to support the updated empty weight and balance calculations”.

RECORD OF REVISIONS

Check in the following record that all earlier changes have been incorporated.

Rev	Incorporated date	by (signature)	Rev	Incorporated date	by (signature)
NC	08-20-2014	P. Hunyad	___	_____	_____
A	07-20-2017	P. Hunyad	___	_____	_____
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STEP 1: VERIFY EQUIPMENT

VERIFY THAT THE ASSEMBLY PART NUMBERS AS LISTED ON THE KIT PARTS LIST MATCH THE PART NUMBERS AS INDICATED ON THE ASSEMBLY NAMEPLATES.

STEP 2: REVIEW KIT HIGHLIGHTS

REVIEW USAGE RESTRICTIONS (IF ANY), AIRCRAFT MODIFICATIONS (IF ANY) AND INSTALLATION HARDWARE THAT IS INCLUDED IN THE KIT.

STEP 3: RETURN REGISTRATION CARD

COMPLETE AND RETURN THE REGISTRATION CARD. PLEASE PRINT INFORMATION LEGIBLY. THIS DATA WILL ASSIST PARKER HANNIFIN, AIRCRAFT WHEEL & BRAKE DIVISION TO NOTIFY END USERS OF SPECIFIC AIRWORTHINESS DOCUMENTS WHEN REQUIRED.

STEP 4: TECHNICAL ASSISTANCE

FOR TECHNICAL ASSISTANCE, CONTACT THE TECHNICAL SERVICES HOTLINE:

E-mail: clevelandwbhelp@parker.com
Fax: 440-937-5409
Tel: 1-800-BRAKING (272-5464)

TABLE OF CONTENTS

1.0 INTRODUCTION

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

This manual provides the necessary procedures to accomplish the installation of a Parker Hannifin, Aircraft Wheel & Brake Division Conversion Kit. It is published for the guidance of qualified maintenance personnel responsible for the installation of a Parker Hannifin, Aircraft Wheel & Brake Division Conversion Kit.

Instructions are per landing gear.

Installation of this kit should be performed by a qualified, licensed Airframe and Powerplant mechanic (A & P).

1.1 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.

2.0 KIT HIGHLIGHTS

CAUTION: READ THIS INSTALLATION MANUAL AND REVIEW THE INSTALLATION DRAWING, NO. 050-16500, BEFORE DOING ANY WORK.

The 199-282 Kit is designed to replace the OEM equipment main wheels and brakes on the aircraft model listed in Table 1. The 199-282 Kit will retrofit one aircraft.

Use the following publications in addition to this conversion kit publication for all kit component identification and installation instructions:

- Kit Parts List, P/N 199-282.
- Installation Drawing, No. 050-16500.

2.1 Usage restrictions

There are no restrictions for this conversion kit.

2.2 Modifications

There are no modifications required to the aircraft.

2.3 Installation hardware

Refer to Installation Drawing, No. 050-16500 for hardware details such as:

- Replacement hardware included in this conversion kit
- Installation specific hardware required for this conversion kit
- Existing hardware that will be reused for this conversion kit

2.4 Aircraft model applicability

The equipment supplied under Kit No. 199-282 is applicable to the following aircraft.

NOTE: This kit applicable only to PC-7 aircraft with 8-inch wheels. Will not fit PC-7 Mark II aircraft.

Table 1 Aircraft model applicability

MAKE	MODEL
Pilatus	PC-7

3.0 TSO NOTICE

The main wheel and brakes used in this conversion kit carry a “TSO” marking which identifies them as having been fully laboratory tested and qualified to meet the applicable Federal Aviation Agency (FAA) specifications and requirements.

Modifications to the wheel and brake assemblies provided in this kit or use of unapproved parts will void the TSO qualification and warranty for the wheel and brake assemblies.

4.0 PRODUCT REGISTRATION

A product registration card is included in the shipment of this conversion kit. The card is used to track the conversion kits and your guarantee of receiving any future airworthiness information applicable to Conversion Kit No. 199-282. Please fill out the registration card completely and return promptly. Postage is prepaid.

5.0 EQUIPMENT MAINTENANCE SUPPORT PUBLICATIONS

Refer to the following publications, published by Parker Hannifin, Aircraft Wheel & Brake Division, for illustrated parts list identification, service limits, maintenance, component overhaul and applicable related data. Always obtain the latest issue in effect.

CM40-128F..... Component maintenance manual for 40-128F main wheel assembly (Includes Illustrated Parts List)

CM30-93F..... Component maintenance manual for 30-93F main brake assembly (Includes Illustrated Parts List)

6.0 ORDERING INFORMATION

To order spare parts, contact the nearest Parker Hannifin, Aircraft Wheel & Brake distributor in your area, or contact Aircraft Wheel and Brake:

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline

Web site: www.parker.com
E- mail: clevelandwbhelp@parker.com
Fax: (440) 937-5409
Tel: 1-800-BRAKING (272-5464)

7.0 EQUIPMENT DESCRIPTION AND OPERATION

The brake assembly is a single fixed cylinder, three piston, hydraulically actuated. The brake is designed to operate with MIL-PRF-5606 hydraulic fluid.

The main wheel assembly is the primary interface between the main landing-gear strut and the tire during ground operation. The wheel is designed for use with a 6.50-8, 8 PR tube type tire. The divided type design facilitates tire installation and removal. The wheel provides partial support of the weight of the aircraft and a means of steering control.

Brake action occurs when hydraulic pressure is applied to the brake. As hydraulic pressure reaches the cylinder, the pistons move outward forcing the pressure plate 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. The main wheels transfer stopping forces from the brake to the ground.

8.0 REMOVE THE ORIGINAL EQUIPMENT

Read this installation manual and review Installation Drawing, No. 050-16500, before removing and installing components.

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.

SAFETY WARNING: FULLY DEFLATE THE TIRE BEFORE REMOVING THE VALVE CORE. THE AIR IN A TIRE PUTS PRESSURE ON THE VALVE CORE. THE VALVE CORE CAN EJECT WITH GREAT FORCE AND CAN CAUSE INJURY OR DEATH.

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: ALWAYS CHECK THE CONDITION OF ORIGINAL EQUIPMENT HARDWARE THAT WILL BE RETAINED. REPLACE THESE ITEMS AS NEEDED.

1 Refer to the airframe manufacturer's instructions to lift and support the aircraft.

2 Fully deflate the tire by depressing the valve stem plunger in the tube valve stem until air can no longer be heard escaping from the tube.

3 When all the tire pressure is released, then carefully remove the valve core from the tube valve stem.

4 Remove and retain the axle hardware. Discard the cotter pins.

NOTE: New cotter pins are included in the 199-282 kit.

5 Remove the wheel/tire unit from the axle.

6 Following instructions per the airframe manufacturer's manual to disconnect and remove the brake assembly from the aircraft. Discard the brake connector hose.

NOTE: New hydraulic hose assemblies are included in the 199-282 kit.

7 Repeat steps 1 through 7 for the other landing gear wheels and brakes.

9.0 INSTALL THE PARKER EQUIPMENT

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.

9.1 Install the torque plate assembly

Reference: Installation Drawing, No. 050-16500.

NOTE: New axle flange mounting hardware for each torque plate assembly is included in the 199-282 Kit.

The torque plate assembly is a component of the brake assembly, P/N 30-93F (left hand) or 30-93F RH (right hand).

1 Refer to Figure 1

1.1 Slide the torque plate assembly, left hand or right hand as required, on the axle and attach to the axle flange with the mounting hardware as shown. Torque the nuts, P/N 094-10100, to 230 to 250 in-lb (26 to 28 N-m), dry torque.

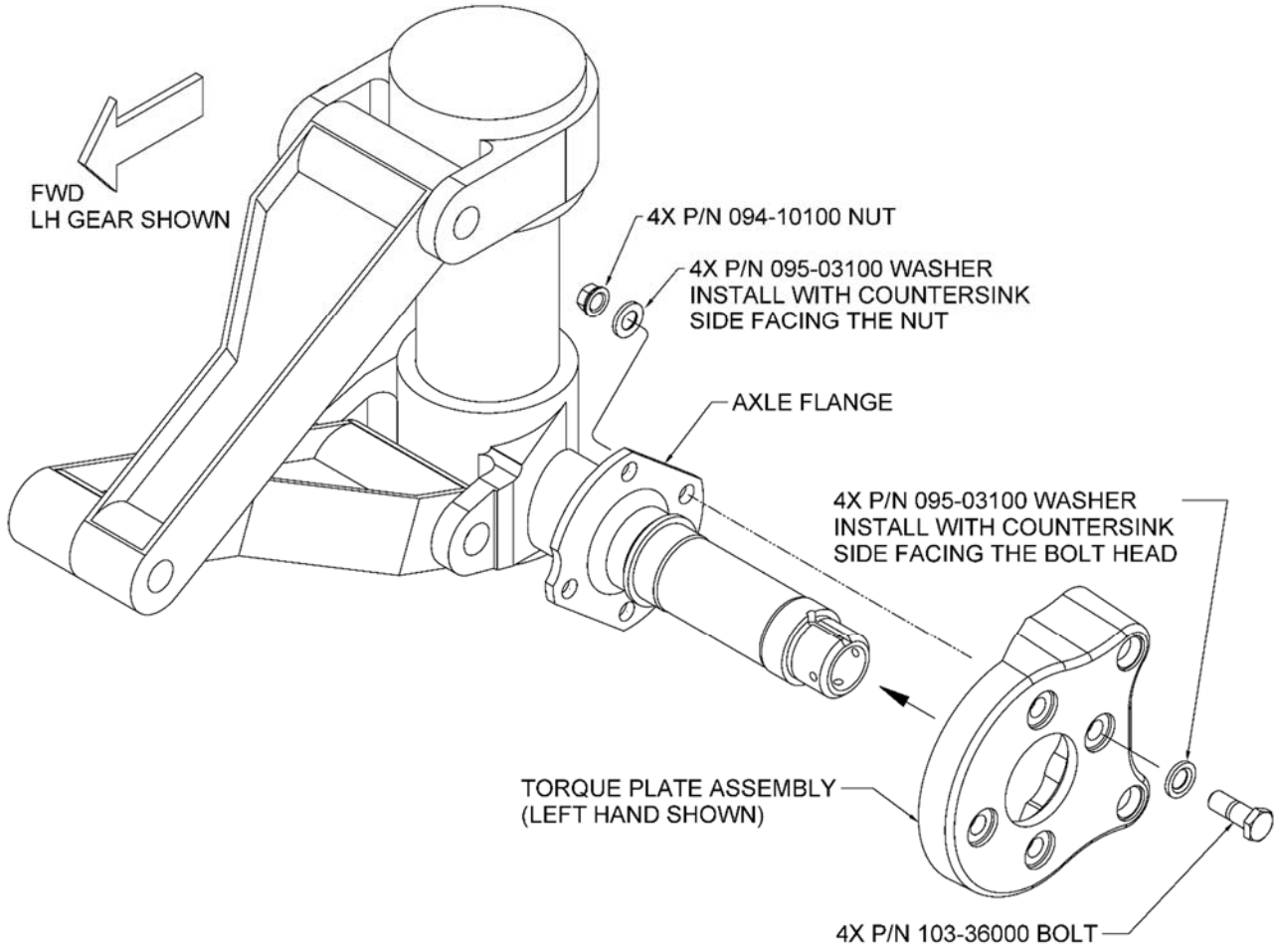

Figure 1 Install the torque plate assembly

9.2 Disassemble the Parker wheel assembly, P/N 40-128F

The wheel assembly must be disassembled to the level required for mounting a tire.

1 Refer to Figure 2 and disassemble the wheel as follows:

NOTE: Removal of components is recommended to prevent possible damage and/or contamination of the bearing cone.

1.1 Remove the following from the inner wheel half (5): snap ring (1), grease seal (2), grease seal ring (3), and bearing cone (4).

1.2 Remove the following from the outer wheel half (7): snap ring (1), bearing seal (2), grease seal ring (6), and bearing cone (4).

1.3 Remove the six bolts (8), nuts (9), and washers (10).

1.4 Remove the brake disc (11).

ITEM	DESCRIPTION
1	SNAP RING - INNER AND OUTER WHEEL HALF
2	GREASE SEAL - INNER AND OUTER WHEEL HALF
3	GREASE SEAL RING - INNER WHEEL HALF
4	BEARING CONE - INNER AND OUTER WHEEL HALF
5	INNER WHEEL HALF
6	GREASE SEAL RING - OUTER WHEEL HALF
7	OUTER WHEEL HALF
8	BOLT
9	NUT
10	WASHER
11	BRAKE DISC

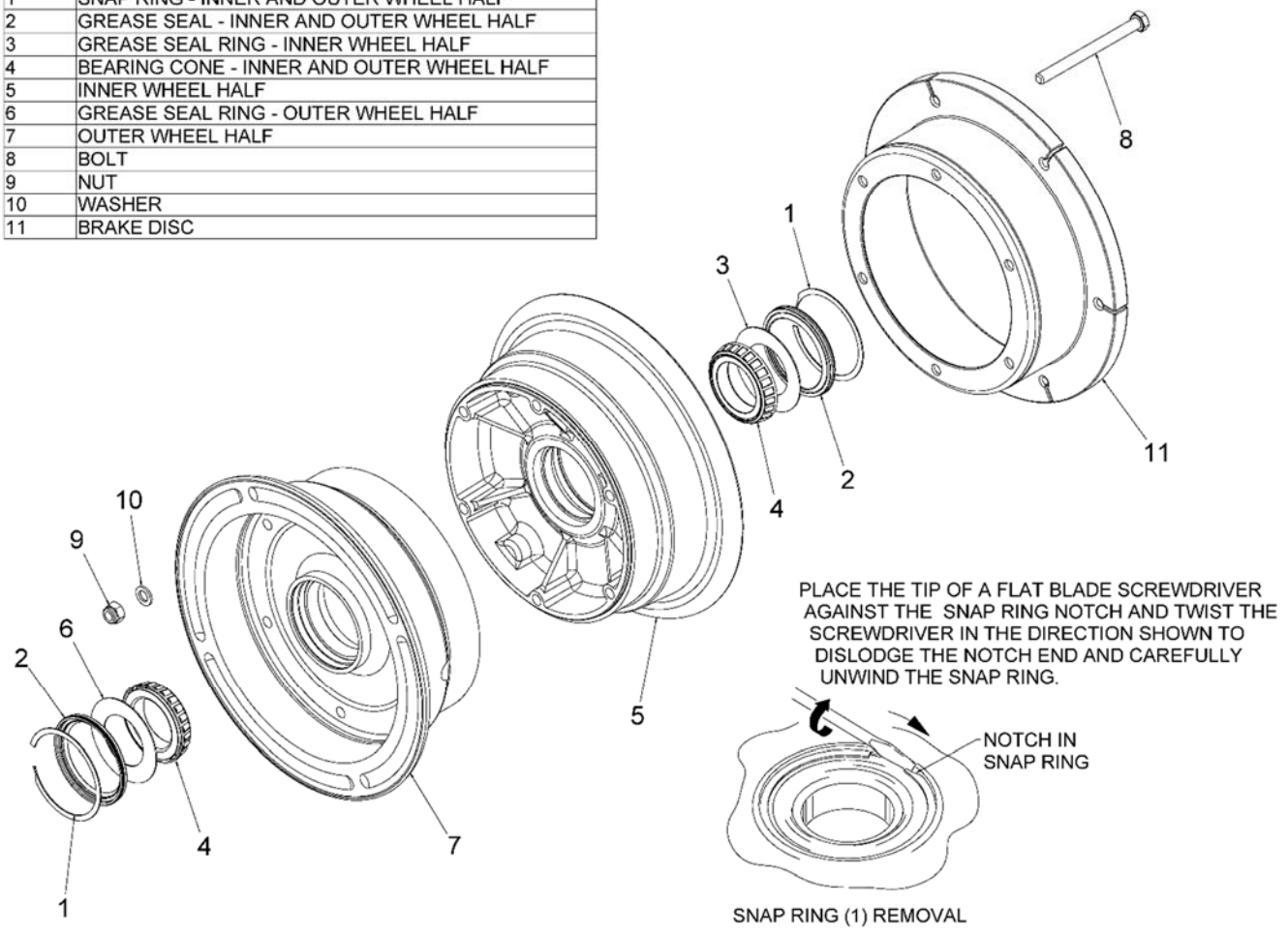

Figure 2 Disassemble the wheel assembly

9.3 Mount a tire on the Parker wheel assembly, P/N 40-128F

1 Wheel and tire pre-assembly preparation.

1.1 Examine the bead seat area of the wheel halves. If necessary, remove all lubricant, grease or foreign material with a clean cloth moistened with a mild soap and water solution or with denatured alcohol.

1.2 The mating surfaces of the wheel halves should not have nicks, burrs, small dents, or other damage. Damaged mating surfaces can prevent the wheel halves from mating or sealing.

1.3 Make sure that the tire is clean inside. If it is not clean, then wipe the bead base with a clean cloth moistened with a mild dishwashing soap and water solution or a suitable rubber cleaner.

NOTE: A new tube should be used when installing a new tire.

2 Tire mounting and assembly of wheel.

Refer to Figure 2 for wheel assembly component identification.

NOTE: The term dry torque refers to the torqueing of hardware without the application of anti-seize compound.

2.1 After the inside of the tire has been cleaned, lubricate lightly with tire talc.

2.2 Inflate the tube with dry nitrogen to slightly round, and insert in the tire. The tube heavy spot is indicated by a painted yellow stripe about ½ inch wide by 2 inches long. Align the stripe on the tube with the tire red balance dot. If the tube has no balance mark, align the tube valve with the tire red balance dot.

2.3 Position the tire on the outer wheel half (7), inserting the valve stem through the valve hole in the wheel.

2.4 Place the inner wheel half (5) inside the tire, aligning as necessary to clear the valve stem.

2.5 Install the brake disc (11) in the inner wheel half (5) aligning the bolt holes.

2.6 Install three bolts (8) equally spaced through the brake disc.

NOTE: The washers (10) and nuts (9) must be located on the outer wheel half (7).

2.7 Compress the wheel halves and install a washer (10) and nut (9) on each of the three bolts. Run the nuts down by hand as far as possible.

2.8 Install the remaining bolts, washers and nuts.

CAUTION: DO NOT USE IMPACT OR POWER WRENCHES TO TORQUE THE WHEEL NUTS AND BOLTS. THE USE OF IMPACT OR POWER WRENCHES CAN CAUSE OVER TIGHTENING.

CAUTION: THE FASTENERS MUST BE TIGHTENED BY APPLYING THE TORQUE TO THE NUT (9) WHILE SECURING THE BOLT HEAD.

2.9 The nuts should first be snugged in a criss-cross pattern to seat the flange.

2.10 Apply the final torque evenly in a criss-cross pattern using calibrated tools until all nuts are properly torqued. Final torque the nuts (9) to 175 to 185 in-lb (19.8 to 20.9 N-m) dry torque.

3 Testing.

Refer to CM40-128F, Component Maintenance Manual, for the wheel assembly.

3.1 Test the wheel/tire assembly. Refer to the TESTING AND FAULT ISOLATION section in CM40-128F.

SAFETY WARNING: ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

4 Final assembly of the wheel.

Refer to Figure 3 for wheel assembly component identification.

After successfully completing the wheel/tire testing, complete the remaining assembly procedures as follows.

4.1 Reduce tire pressure to 10 psig max (0.7 bar max).

4.2 Before installing the bearing cones, apply a light coat of wheel bearing grease to the following:

- Exposed surfaces of the inner and outer wheel half bearing cups.
- All contact surfaces of the molded rubber grease seals (2).

4.3 Install the following in the order listed.

4.3.1 Install the following in the outer wheel half (7):

- Bearing cone (4).
- Grease seal ring (6).
- Bearing seal (2). Observe “This Side In” marking in molded characters.
- Snap ring (1). Install the end of the snap ring into the groove in the hub of the wheel half and wind or spiral the ring into the groove.

4.3.2 Install the following in the inner wheel half (5):

- Bearing cone (4).
- Grease seal ring (3). The smaller diameter surface will face out.
- Bearing seal (2). Observe “This Side In” marking in molded characters.
- Snap ring (1). Install the end of the snap ring into the groove in the hub of the wheel half and wind or spiral the ring into the groove.

TIRE NOT SHOWN TO PROVIDE CLARITY

ITEM	DESCRIPTION
1	SNAP RING - INNER AND OUTER WHEEL HALF
2	GREASE SEAL - INNER AND OUTER WHEEL HALF
3	GREASE SEAL RING - INNER WHEEL HALF
4	BEARING CONE - INNER AND OUTER WHEEL HALF
5	INNER WHEEL HALF
6	GREASE SEAL RING - OUTER WHEEL HALF
7	OUTER WHEEL HALF

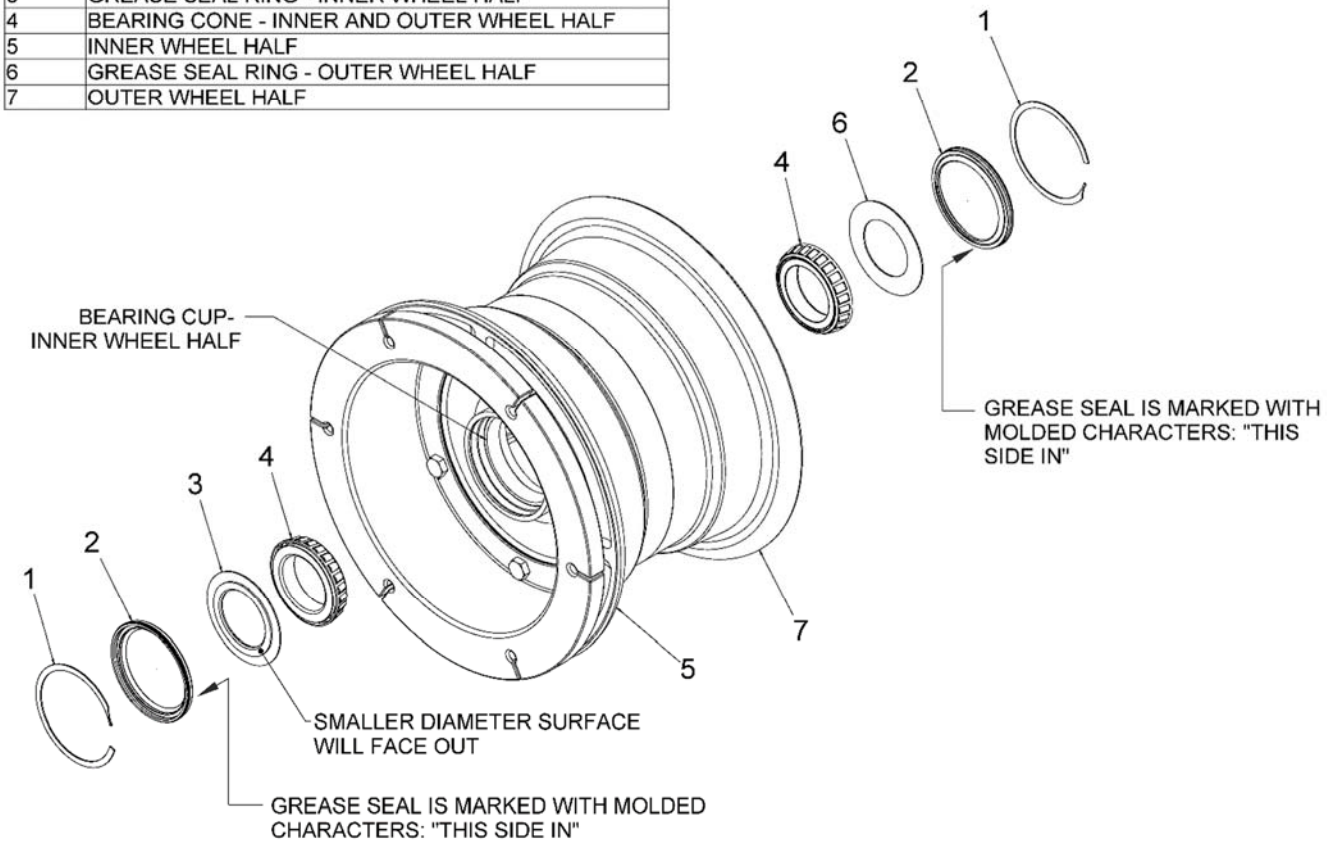

Figure 3 Install bearing cones (4), seal components (2), (3), (6), and snap rings (1)

SAFETY WARNING: ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

9.4 Install the Parker wheel assembly, P/N 40-128F

1 Inflate the tire to the airframe manufacturer's recommended inflation pressure.

2 Install the wheel/tire unit on the axle making certain that the bearing cones are seated.

3 Install the axle hardware in accordance with the airframe manufacturer's manual.

9.5 Install the Parker brake assembly, P/N 30-93F

Refer to Figure 4 for brake assembly component identification.

CAUTION: DO NOT USE GREASE OR OIL TO LUBRICATE THE INSIDE OF THE TORQUE PLATE BUSHINGS (3) OR ANCHOR BOLTS (1). THIS WILL ATTRACT CONTAMINANTS.

1. Loosen the six bolts (4) that secure the three back plate assemblies and remove the back plate assemblies (5).

   NOTE: The shim (6) will stay positioned on the bolts (4).

2 Apply a light coat of dry film lubricant, such as silicone spray, Dri-Slide® Multi-Purpose lubricant (molybdenum disulfide) or LPS Force 842® Dry Moly lubricant to the I.D. of the torque plate bushings (3) and the O.D. of the anchor bolts (1).

   NOTE: Reapply dry film lubricant periodically to maintain friction free operation.

3 Install the cylinder assembly (2) by sliding the anchor bolts (1) into the torque plate bushings (3).

   NOTE: The anchor bolts must slide freely in the torque plate bushings for proper operation.

TIRE NOT SHOWN TO PROVIDE CLARITY

ITEM	DESCRIPTION
1	ANCHOR BOLT
2	CYLINDER ASSEMBLY
3	TORQUE PLATE BUSHING
4	BOLT
5	BACK PLATE ASSEMBLY
6	SHIM

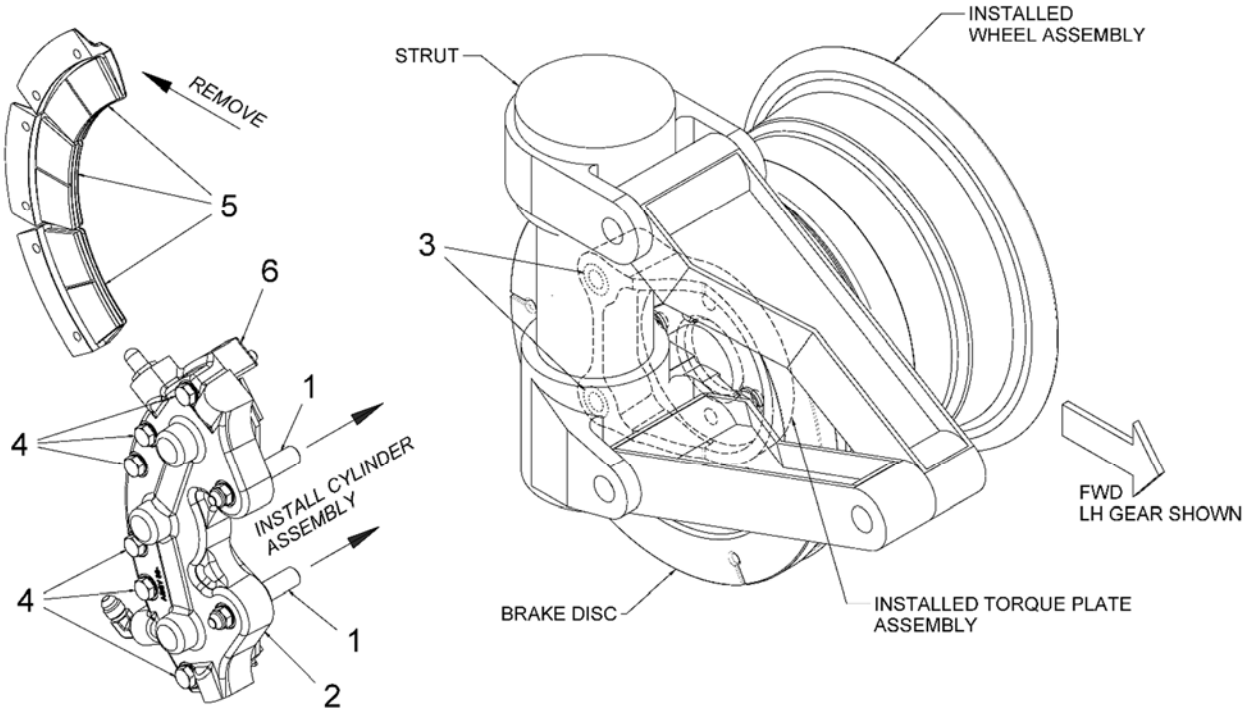

Figure 4 Install the cylinder assembly (2)

4 Refer to Figure 5.

4.1 Reinstall the three back plate assemblies (5) between the brake disc and the wheel flange.

4.2 Thread the brake bolts (4) into the back plate assemblies. Tighten the bolts to 80 to 90 in-lb (9.0 to 10.2 N-m).

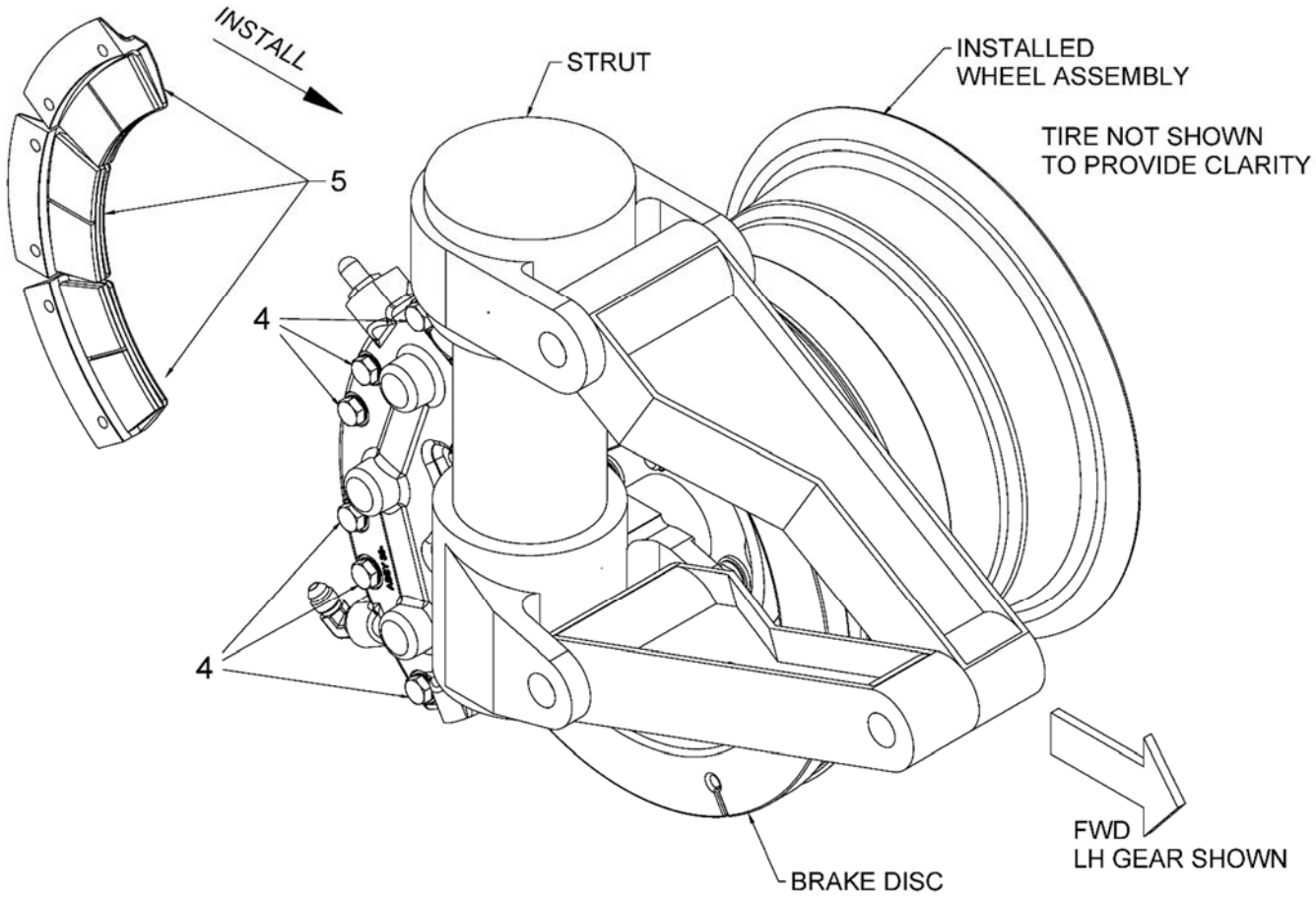

Figure 5 Reinstall the three back plate assemblies (5)

5 Refer to Installation Drawing, No. 050-16500 for hose routing.

5.1 Connect each brake assembly to the aircraft system hydraulic line with hose assembly P/N 207-07800. Torque the hose fittings in accordance with airframe manufacturer's manual.

9.6 Install the left hand gear hose support hardware

Reference: Installation Drawing, No. 050-16500.

NOTE: Clamps and attachment hardware are included in the 199-282 Kit.

1 The brake hose assembly P/N 207-07800 and the existing WOW sensor wire conduit will be secured together with two loop clamps, P/N 185-01100. This will allow the wiring conduit and the brake hose to be parallel.

2 Refer to Figure 6

2.1 Attach the loop type clamps P/N 185-01100, one to the brake hose and one to the existing WOW sensor wire conduit.

2.2 Secure both together with the bolt P/N 103-86700, washers P/N 095-10300, and nut P/N 094-14000. Torque the bolt to 27 to 32 in-lb (3.1 to 3.6 N-m) dry torque.

2.3 Safety wire the bolt P/N 103-86700, to the loop type clamp P/N 185-01100, to prevent rotation.

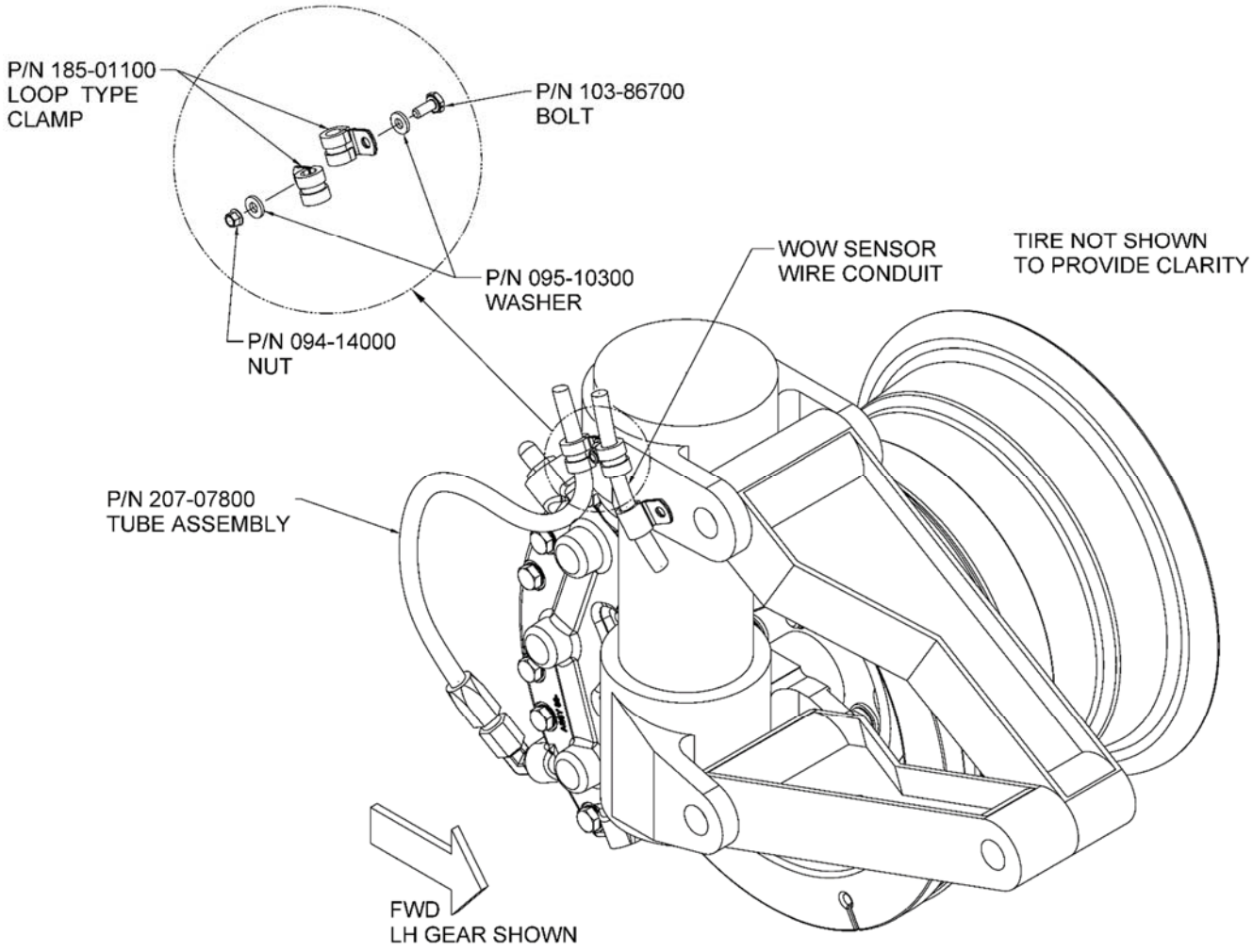

Figure 6 Install the left hand gear hose support hardware

9.7 Install the right hand gear hose support hardware

Reference: Installation Drawing, No. 050-16500.

NOTE: Clamps and attachment hardware are included in the 199-282 Kit.

1 Refer to Figure 7

1.1 Position the loop type clamp P/N 185-01200 against the lower strut.

1.2 Secure the second loop type clamp, P/N 185-01100, to the clamp around the strut as shown.

1.3 Secure both together with the bolt P/N 103-00100, washers P/N 095-10300, and nut P/N 094-14000. Torque the bolt to 27 to 32 in-lb (3.1 to 3.6 N-m) dry torque.

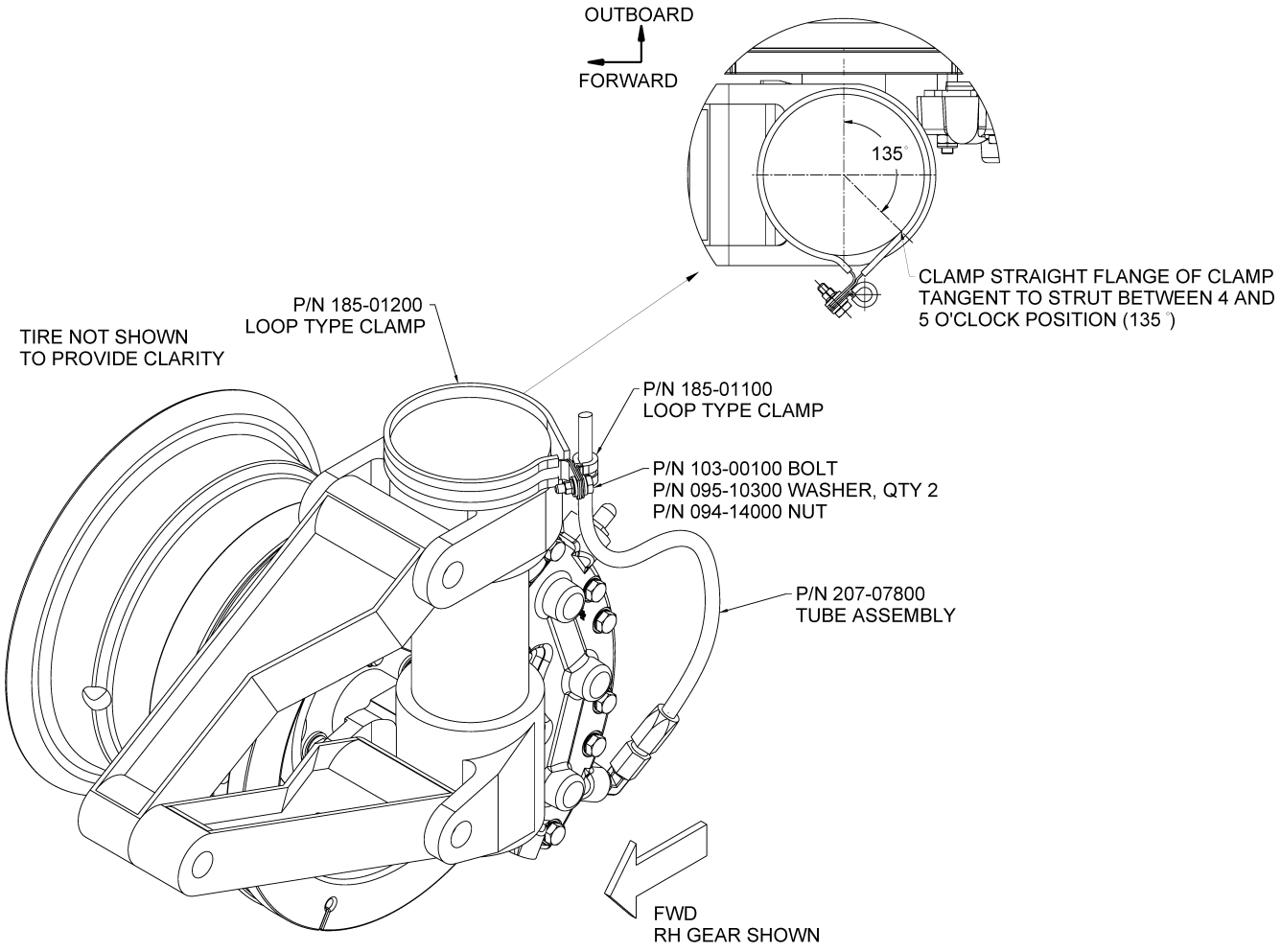

Figure 7 Install the right hand gear hose support hardware

10.0 RETURN TO SERVICE AND SYSTEM CHECKS

1 After left and right hand brake assemblies have been installed and connected to the aircraft hydraulic system, bleed the hydraulic system and perform the following:

1.1 Pressure test the brake assemblies and check for leaks.

1.2 Check the pedal for proper feel and travel.

1.3 Check the mating wheel assemblies rotate freely. There should be no evidence of binding or excessive brake drag.

1.4 Check for proper operation of main gear and that no hoses are binding.

1.5 Put airplane on jacks according to aircraft manufacturer's instructions. Check that the hoses remain clear of aircraft structure during gear extension and retraction.

1.6 After final gear extension, remove the jacks per aircraft manufacturer's instructions to return aircraft to the ground.

11.0 METALLIC BRAKE LINING CONDITIONING

The brake lining material used is a metallic composition. It must be properly conditioned (glazed) to provide optimum service life. Dynamometer tests have shown that at low braking energies, unglazed linings experience greater wear and the brake discs become severely scored.

1 Perform conditioning procedure for new lining segments. Refer to Parker Hannifin Product Reference Memo, PRM14A, for conditioning procedures.

12.0 WEIGHT AND BALANCE COMPUTATIONS

Weights do not include the tire or tube.

Weigh the removed wheel & brake assemblies to support the updated empty weight and balance calculations.

New installed (per gear leg):

Brake assembly: ..... 5.1 lb. (calculated)
Wheel assembly: .....13.6 lb. (calculated)

Complete form 337 and make the appropriate log book entries.

13.0 AIRCRAFT FLIGHT MANUAL AND EQUIPMENT LIST ENTRIES

Update the 'Weight and Balance' section of the Aircraft Flight Manual as well as the Aircraft Equipment List for the change in both weight and moment created by the installation of this conversion kit.

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AIRPLANE MAINTENANCE MANUAL SUPPLEMENT
WITH
INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

FOR

PILATUS AIRCRAFT LTD.
AIRCRAFT MODEL
PC-7

THOSE AIRCRAFT MODIFIED IN
ACCORDANCE WITH
STC SA04264CH

This supplement, which includes the Component Maintenance Manuals for Cleveland Wheels & Brakes Main Wheel Model 40-128F and Main Brake Model 30-93F, must be attached to the Airplane Maintenance Manuals when the aircraft is modified per the above listed STC.

In addition, an aircraft logbook entry referring to this document must be made to ensure that maintenance personnel have available a record of this inspection requirement.

The information in this document supplements or supersedes the basic airplane maintenance manual only where covered in the items contained herein. For limitations and procedures not contained in this supplement, consult the basic Airplane Maintenance Manuals.

It is intended that these instructions be employed as Federal Aviation Administration (FAA) approved data for installation of STC SA04264CH on aircraft Serial No. _____ in accordance with 14 CFR Part 43. These instructions for continued airworthiness apply only to this aircraft and may not be extended to other aircraft without written permission from Parker Hannifin Corporation ("Parker"). An STC permission statement is required from Parker in order to install the STC approved design on to an aircraft; this statement is provided separately from these instructions.

Aircraft: Registration Number _____

Serial Number _____

Parker Aerospace

LOG OF REVISIONS

REV	PAGE(S)	DESCRIPTION	APPROVAL	DATE
N/C	All	Original Issue		10/05/2017
A	All 1 5 6	All pages: add Export Warning and Proprietary Statement. Page 1: Add STC number SA04264CH two locations. Page 5: Parker Hannifin Publications Table, remove Rev. & Date column, add (Note 1); Latest approved document revision. Page 6: Pilatus Publications Table, add: (Note 1) under Document Number.	(ECO-0087767) M. La Conte	03/01/2018

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TABLE OF CONTENTS

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1.0 INTRODUCTION

The Parker Hannifin Corporation Main Wheel & Brake Conversion Kit, P/N 199-282, includes wheel assemblies, as well as left and right brake assemblies, for replacement of the wheel and brake at each main wheel on the Pilatus PC-7. The instructions for continued airworthiness contained within this document address the modification of the Pilatus PC-7 aircraft through installation of the Parker Hannifin Corporation wheels and brakes.

2.0 DESCRIPTION

2.1 General

The brake assembly is a single fixed cylinder, three piston, hydraulically actuated. The brake is designed to operate with MIL-PRF-5606 hydraulic fluid.

The main wheel assembly is the primary interface between the main landing-gear strut and the tire during ground operation. The wheel is designed for use with a 6.50-8, 8 PR tube type tire. The divided type design facilitates tire installation and removal. The wheel provides partial support of the weight of the aircraft and a means of steering control.

Brake action occurs when hydraulic pressure is applied to the brake. As hydraulic pressure reaches the cylinder, the pistons move outward forcing the pressure plate 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. The main wheels transfer stopping forces from the brake to the ground.

2.2 Applicability

The instructions for continued airworthiness specified in this document apply only to the Pilatus PC-7 aircraft.

2.3 Major Components

The conversion kit, P/N 199-282, includes hydraulic hose and hardware, as well as the following major components:

Description	Part Number
Wheel	40-128F
Brake Assembly, Left Hand	30-93F
Brake Assembly, Right Hand	30-93F RH

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Also required for installation of the wheels and brakes, but not included in the conversion kit, are the following:

Tire, 6.5-8, 8 PR (Tube Type) that meets TSO-C62 & tube

OR:

Description	Pilatus Part Number
Tire, 6.5-8, 8 PR (Tube Type)	959.63.81.171
Tube	959.61.81.172

2.4 Record Retention

The instructions for continued airworthiness will be included in the aircraft's permanent records.

2.5 Reference Documentation

The following publications may be referenced during continued maintenance of the Parker Hannifin Corporation wheels and brakes:

Parker Hannifin Publications

Document Number (Note 1)	Document Title
050-16500	Installation Drawing
199-282	Parts List, 199-282 Conversion Kit, Pilatus Aircraft – Model PC-7
199-282 AFMS	Airplane Flight Manual Supplement
199-282 MDL	Master Data List
CM30-93F	Component Maintenance Manual, Main Brake Assembly, Parker Hannifin Part No. 30-93F, Parker Hannifin Part No. 30-93F, Right Hand
CM40-128F	Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F
IM199-282	Kit Installation Publication, Main Wheel & Brake Conversion Kit, Parker Hannifin Part No. 199-282
PRM14A	Metallic Brake Lining Conditioning Procedure

Notes:
1. Latest approved document revision

Parker Aerospace

Pilatus Aircraft Publications

Document Number (Note 1)	Document Title
01715	Pilatus PC-7 Aircraft Maintenance Manual
01678	Pilatus PC-7 Airplane Flight Manual

Notes:
1. Latest approved revision

Industry

Document Number	Document Title	Rev.	Date
AC 43.13-1B	Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair		Sep 8, 1998

2.6 Ordering Information

To order replacement parts, contact the nearest Parker Hannifin, Aircraft Wheel & Brake distributor in your area, or contact Aircraft Wheel and Brake:

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline

Web site: www.parker.com
E-mail: clevelandwbhelp@parker.com
Fax: (440) 937-5409
Tel: 1-800-BRAKING (272-5464)

3.0 OPERATION

There is no change in operation between the original wheels and brakes and the Parker Hannifin Corporation wheels and brakes.

4.0 AIRWORTHINESS LIMITATIONS

NOTE: The airworthiness limitations section is FAA approved and describes maintenance required under 14 CFR Part §43.16 and §91.403 of the Federal Aviation Regulations, unless an alternate FAA approved program has been identified.

There are no airworthiness limitations associated with the wheels and brakes or their installation on the PC-7 aircraft.

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5.0 INSPECTIONS

5.1 Scheduled

The wheel and brake assemblies must be inspected at all Annual and 100 Hour (if required) inspections.

While remaining installed on the aircraft, the brake assembly shall be inspected as follows:

- Visually inspect all components for corrosion, cracks, or other visible damage.
- Check brake lines and brake line fittings for signs of damage or leakage.
- Check for proper torque and proper safetying on all visible bolts.
- Check all brake linings for minimum thickness per Parker Hannifin Publication No. CM30-93F, *Component Maintenance Manual, Main Brake Assembly, Parker Hannifin Part No. 30-93F*, Rev NC, June 15, 2014, or later Parker Hannifin approved revision.

The brake assembly shall be maintained in accordance with Parker Hannifin Publication No. CM30-93F, *Component Maintenance Manual, Main Brake Assembly, Parker Hannifin Part No. 30-93F*, Rev NC, June 15, 2014, or later Parker Hannifin approved revision.

While remaining installed on the aircraft, the wheel assembly shall be inspected as follows:

- Visually inspect the wheel for corrosion, cracks, nicks, or other visible damage.
- Check the condition of the axle attaching hardware.

The wheel assembly shall be maintained in accordance with Parker Hannifin Publication No. CM40-128F, *Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F*, Rev NC, August 15, 2014, or later Parker Hannifin approved revision.

5.2 Unscheduled

Conduct an inspection when there is indication of a problem with the wheel and brake system. Reference Section 8.0 for troubleshooting information.

Conduct an inspection after a rejected take off, or heavy braking event.

6.0 REMOVAL AND REPLACEMENT

6.1 Brake Assembly

Lift and support the aircraft per Doc. 01715, *Pilatus PC-7 Aircraft Maintenance Manual*, Rev 036, July 30, 2015 (or later approved revision).

Remove and install all axle hardware per Doc. 01715, *Pilatus PC-7 Aircraft Maintenance Manual*, Rev 036, July 30, 2015 (or later approved revision).

Remove, disassemble, assemble and install the brake assembly in accordance with Parker Hannifin Publication No. CM30-93F, *Component Maintenance Manual, Main Brake Assembly,*

Parker Aerospace

Parker Hannifin Part No. 30-93F, Rev NC, June 15, 2014, or later Parker Hannifin approved revision.

6.2 Wheel Assembly

Lift and support the aircraft per Doc. 01715, Pilatus PC-7 Aircraft Maintenance Manual, Rev 036, July 30, 2015 (or later approved revision).

Remove and install all axle hardware per Doc. 01715, *Pilatus PC-7 Aircraft Maintenance Manual*, Rev 036, July 30, 2015 (or later approved revision).

Remove, disassemble, assemble and install the wheel assembly in accordance with Parker Hannifin Publication No. CM40-128F, *Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F*, Rev NC, August 15, 2014, or later Parker Hannifin approved revision.

7.0 MAINTENANCE

7.1 Brake Assembly

Reference Parker Hannifin Publication No. CM30-93F, *Component Maintenance Manual, Main Brake Assembly, Parker Hannifin Part No. 30-93F*, Rev NC, June 15, 2014, or later Parker Hannifin approved revision for a maintenance schedule.

The maintenance schedule is intended to be a guideline based on laboratory testing environments that simulate normal braking conditions. Field operating conditions can vary from aircraft to aircraft. These variations will directly affect the wear rate of the brake assembly components. Operating conditions must be evaluated to determine a suitable schedule to main the equipment.

All maintenance tasks shall be done in accordance with Parker Hannifin Publication No. CM30-93F, *Component Maintenance Manual, Main Brake Assembly, Parker Hannifin Part No. 30-93F*, Rev NC, June 15, 2014, or later Parker Hannifin approved revision.

7.2 Wheel Assembly

Reference Parker Hannifin Publication No. CM40-128F, *Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F*, Rev NC, August 15, 2014, or later Parker Hannifin approved revision for a maintenance schedule.

The maintenance schedule is intended to be a guideline based on laboratory testing environments that simulate normal conditions. Field operating conditions can vary from aircraft to aircraft. These variations will directly affect the wear rate of the wheel assembly components. Operating conditions must be evaluated to determine a suitable schedule to main the equipment.

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All maintenance tasks shall be done in accordance with Parker Hannifin Publication No. CM40-128F, *Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F*, Rev NC, August 15, 2014, or later Parker Hannifin approved revision.

7.3 Conditioning

When new brake lining segments have been installed, brake lining conditioning must be accomplished per *Parker Hannifin Product Reference Memo, Metallic Brake Lining Conditioning Procedure*, Rev A, July 1, 1995, or later Parker Hannifin approved revision.

8.0 TROUBLESHOOTING INFORMATION

For troubleshooting a problem with the brake assembly refer to the TESTING AND FAULT ISOLATION section of Parker Hannifin Publication No. CM40-128F, *Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F*, Rev NC, August 15, 2014, or later Parker Hannifin approved revision.

For troubleshooting a problem with the main wheel assembly refer to the TESTING AND FAULT ISOLATION section of Parker Hannifin Publication No. CM40-128F, *Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F*, Rev NC, August 15, 2014, or later Parker Hannifin approved revision.

Cleveland
Wheels & Brakes

Parker Hannifin Corporation
Aircraft Wheel & Brake
1160 Center Road
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.

Component Maintenance Manual

Main Brake Assembly
Parker Hannifin Part No. 30-93F
Parker Hannifin Part No. 30-93F, Right Hand

CM30-93F

Publication No.: CM30-93F, Revision A

Manufacturer:

Parker

Parker Hannifin Corporation
Aircraft Wheel and Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.

Cleveland
Wheels & Brakes

REVISION HIGHLIGHTS

TO: HOLDERS OF CM30-93F COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 30-93F.

Revision NC, Dated June 15, 2014

Section/Page No.	Description Of Change
All Sections/All Pages	Initial Release (ECO-0055861)

REVISION HIGHLIGHTS

TO: HOLDERS OF CM30-93F COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 30-93F.

Revision A, Dated July 20, 2017

Section/Page No.	Description Of Change
As follows	(ECO-0082452)
All page footers	Replace proprietary and export statement with disclosure pointing to first page.
Title pg/T-1	(UPDATE) Proprietary statement.
Record of Revisions/ RR-1	(UPDATE) to reflect latest revision.
Service Bulletin List/ SB-1	Corrected footer title and page number to read Service Bulletin List, Page SB-1 from Record of Revisions, RR-1
List of Effective Pages/ LEP-1	(UPDATE) to reflect latest revision.
Disassembly/3002	Figure 3001 (REVISE) LH gear configuration to reflect actual hose hardware and to add RH gear configuration.
Pg 3003	Figure 3002 (REVISE to reflect actual hose hardware on LH gear.
Repair/6002	CAUTION: Correct typo “procureable” to read “procurable”
Pg 6005	Para. 6.B., Safety Warning: Correct typo “treament” to read “treatment”
Pg 6005	Para 6.C. (ADD) Note identifying Oxsilan® as non-chromate and REACH compliant.
Pg 6006	Table 6002 (NOW) Topcoat thickness 0.0008 (WAS) 0.008 (ADD) (including primer) after topcoat thickness
Pg 6008	Para. 7.,B., Safety Warning: Correct typo “treament” to read “treatment”
Pg 6008	Para. 7.B.(3) (ADD) Note identifying Oxsilan® as non-chromate and REACH compliant.
Pg 6009	Table 6003 (NOW) Topcoat thickness 0.0008 (WAS) 0.008 (ADD) (including primer) after topcoat thickness
Assembly/7004	Figure 7002 (REVISE) to reflect actual hose hardware on LH gear.
Pg 7005	Figure 7003 (REVISE) to reflect actual hose hardware on LH gear.
Pg 7006	Para. 4. Return to service, Step A. (ADD) …”inlet fitting (13)”…
Pg 7006	Figure 7004 (REVISE) to reflect actual hose hardware on LH gear.

RECORD OF REVISIONS

Check in the following record that all earlier changes have been incorporated.

Rev	Incorporated date	by (signature)	Rev	Incorporated date	by (signature)
NC	06-15-2014	P. Hunyad	___	_____	_____
A	07-20-2017	P. Hunyad	___	_____	_____
___	_____	_____	___	_____	_____
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SERVICE BULLETIN LIST

Parker Hannifin Service Bulletins are issued in order to provide general information on product line concerns. The bulletin listings contained herein identify subject matter directly related to the support and function of the assembly and components.

Number	Subject	Rev	Date incorporated

LIST OF EFFECTIVE PAGES

SUBJECT	PAGE	DATE
Title Page	T-1	July 20, 2017
Record of Revisions	RR-1	July 20, 2017
Service Bulletin List	SB-1	July 20, 2017
List of Effective Pages	LEP-1	July 20, 2017
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	4	Blank
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	6009	July 20, 2017
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TABLE OF CONTENTS

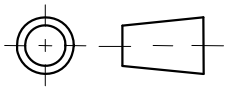
INTRODUCTION

1. General

SAFETY WARNING: STRICTLY OBSERVE ALL TORQUE AND SPECIFIC LIMITS OR VALUES CONTAINED HEREIN. 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 maintenance of the Parker Hannifin 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 the Aircraft Wheel & Brake Division for the latest revision.

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline

Websites: www.parker.com
www.clevelandwheelsandbrakes.com
E-mail: clevelandwbhelp@parker.com
Fax: (440) 937-5409
Tel: 1-800-BRAKING (1-800-272-5464)

2. TSO notice

This assembly is certified with a "TSO-C26b" marking. This assembly has been tested and qualified to FAA (Federal Aviation Administration) requirements and specifications.

INTRODUCTION

3. Manual use

Instructions are per landing gear.

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

4. 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.

5. Replacement parts

SAFETY WARNING:  PARKER HANNIFIN WHEEL & BRAKE DIVISION DOES NOT WARRANT OR ASSUME THE RISK OF THE USE OF REPLACEMENT PARTS NOT AUTHORIZED FOR USE BY PARKER HANNIFIN WHEEL & BRAKE DIVISION. OPERATORS WHO USE REPLACEMENT PARTS NOT AUTHORIZED BY PARKER HANNIFIN WHEEL & BRAKE 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 (4), (5), (6), (14), (21), (22), (24). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

The brake assembly is a hydraulically operated, piston actuated, external disc unit designed for use with MIL-PRF-5606 hydraulic fluid.

The brake assembly is a left hand unit, P/N 30-93F or a right hand unit, P/N 30-93F RH. The torque plate assembly (26) configures a left hand unit and (29) configures a right hand unit. The bleeder and inlet ports are identical to allow a left or right hand mounting configuration.

Each brake assembly is composed of the following base parts:

- one brake cylinder (2). The cylinder is made from a magnesium alloy and is surface treated and painted for corrosion protection.
- one pressure plate assembly (20) with replaceable lining pads (19).
- three back plate assemblies (23) with replaceable lining pads (19).
- left hand (26) and right hand (29) torque plate assembly. The torque plate is made from magnesium alloy and is painted for corrosion protection.
- three pistons asseblies (9). Each piston uses a friction spring (12) to maintain ideal piston positioning. Piston insulators (11).
- one shim (7) to minimize the conduction of heat into the brake fluid.

2. Operation

Brake action occurs when hydraulic pressure is applied to the brake via the pilot's or copilot's master cylinders. As hydraulic pressure reaches the cylinder, the pistons move outward forcing the pressure plate against the surface of the wheel assembly 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 wheel assembly 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.

DESCRIPTION AND OPERATION

4. Specifications

Hydraulic fluid MIL-PRF-5606
Brake bolt torque ..... 80 to 90 in-lb (9.0 to 10.2 N-m), dry torque

NOTE: The term dry torque refers to the torqueing of hardware without the application of anti-seize.

Brake cyulinder material ..... Magnesium alloy casting
Brake cylinder coatings ..... Surface treatment ..... Refer to the REPAIR section
Primer coating: ..... Refer to the REPAIR section
Finish coating: ..... Refer to the REPAIR section

5. Brake lining wear check

Refer to Figure 1 for minimum lining thickness.

CAUTION: REPLACE ALL LINING SEGMENTS (19) ON THE PRESSURE PLATE ASSEMBLY (20) AND BACK PLATE ASSEMBLIES (23) TOGETHER REGARDLESS OF WHICH ONE HAS REACHED IN-SERVICE WEAR LIMITS.

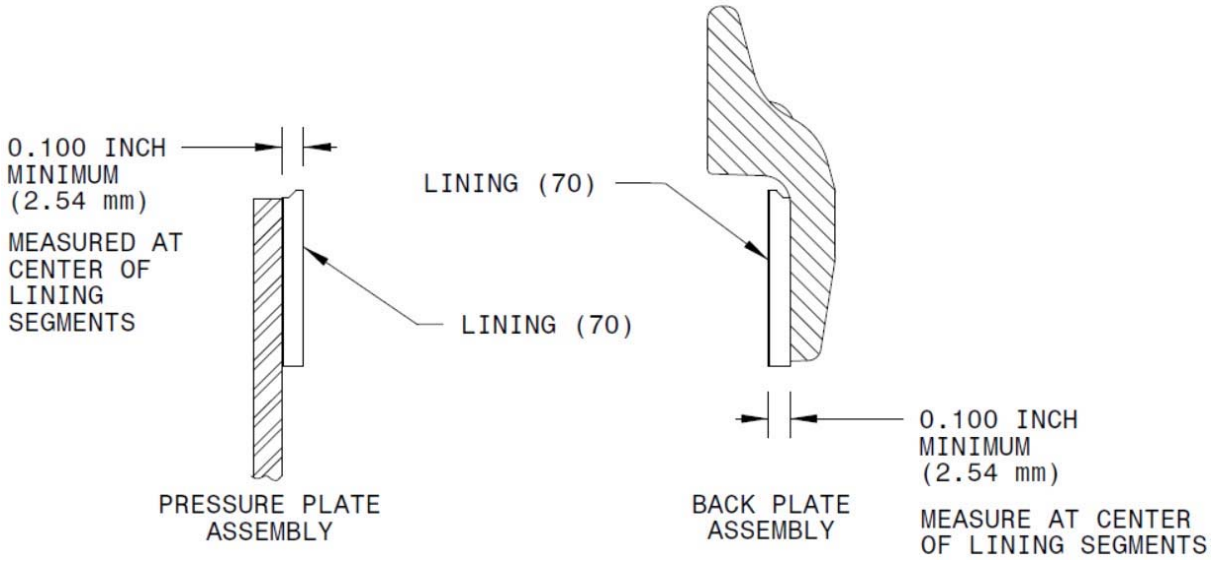


Figure 1 Minimum lining thickness

DESCRIPTION AND OPERATION

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.

Table 1 Maintenance schedule

INTERVAL OR CONDITION	ITEM	TASK
Every time a lining segment (19) has reached the in-service wear limits as specified in Figure 1.	All parts	Visual and detailed examination.
	Bolts (6)	Visual and detailed examination including magnetic particle inspection.
	Preformed packings (8), (15); bleeder cap (17), insulator shim (7), piston insulators (11)	Replace.
After 6 to 8 installations or whenever the bolts can be run in past the locking feature (nylon material embedded in threaded end) by use of fingers only.	Bolts (6)	Replace all bolts.
Worn condition when flush with the head of the piston (10)	Piston insulator (11)	Replace all insulators.
At the 3rd (third) set of lining replacement and every other set of lining replacement thereafter.	Brake cylinder (2)	Visual and detailed examination including liquid penetrant inspection.
	Torque plate (27), (30)	Visual and detailed examination including liquid penetrant inspection.
UNSCHEDULED INTERVAL	ITEM	TASK
After an RTO (Rejected Take Off) or heavy braking event.	Brake cylinder (2)	Visual and detailed examination.
	Linings (19)	Visual and detailed examination.
	Preformed packings (8), (15); bleeder cap (17), insulator shim (7), piston insulators (11)	Replace.

TESTING AND FAULT ISOLATION

1. General

Refer to IPL Figure 1 for component identification.

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.

A. Equipment and consumables

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

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 1001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Hydraulic fluid	MIL-PRF-5606	Commercial
Hydraulic test stand	• Hydraulic pump: 0 to 600 psig (0 to 41.4 bar) capacity • Filter • Pressure gage: ○ 0 to 600 psig (0 to 41.4 bar), accuracy ± 2%	Commercial
Disc test segment	Figure 9001	Fabrication
Standard tools (inch units)	Wrenches/sockets: • Hex head, external: for (5), (6), (13), (14), (16) Torque wrench	Commercial

TESTING AND FAULT ISOLATION

2. Bench test each brake assembly

Examine all brake assemblies that do not meet the test standards of this section. Refer to Table 1002 Troubleshooting for possible causes.

SAFETY WARNING: USE SHATTER RESISTANT ENCLOSURES DURING TESTING. YOU MUST OBEY ALL SAFETY INSTRUCTIONS AND WEAR PROTECTIVE CLOTHING. BRAKE ASSEMBLIES ARE UNDER PRESSURE DURING TESTING AND MAY EXPLODE. FAILURE TO OBEY THESE SAFETY INSTRUCTIONS CAN RESULT IN SERIOUS INJURY OR DEATH.

SAFETY WARNING: DO NOT PERFORM TESTING ON ANY BRAKE ASSEMBLY THAT SHOWS SIGNS OF DAMAGE.

NOTE: Discard all used hydraulic fluid. Obey local regulations.

A. Pretest examination of product

(1) Examine the cylinder (2) surfaces for visible defects such as cracks, or any other imperfections.

(2) Examine all fasteners and threaded components for loose fit. Tighten loose fasteners. Refer to Table 8002, Assembly torque values.

(3) Examine all moving parts to ensure that they operate freely without sticking or binding.

B. Bleed and pressure test the brake assembly

SAFETY WARNING: THE FABRICATED DISC SEGMENT REPLICATES THE THICKNESS OF THE WHEEL ASSEMBLY BRAKE DISC. THE DISC SEGMENT MUST BE INSERTED BETWEEN THE PRESSURE PLATE LINING AND THE BACK PLATE LINING PRIOR TO APPLICATION OF HYDRAULIC PRESSURE. THIS WILL PREVENT DAMAGE TO THE BRAKE ASSEMBLY AND PREVENT SERIOUS INJURY TO TESTING PERSONNEL.

(1) Insert the test disc segment between the linings prior to the application of hydraulic pressure. Refer to Figure 9001 for disc segment fabrication data.

(2) Connect the hydraulic supply line to the brake inlet fitting (13).

(3) Bleed the brake.

(a) No fluid flow from the bleeder screw is cause for examination. Refer to Table 1002, Troubleshooting.

CAUTION: DO NOT EXCEED 12 IN-LB (1.35 N-M) WHEN TIGHTENING THE BLEEDER SCREW (16). TORQUE IN EXCESS OF 12 IN-LB (1.35 N-M) WILL DAMAGE THE SEAT.

(4) Tighten the bleeder screw (16) snug to preclude leakage.

TESTING AND FAULT ISOLATION

C. Piston actuation and flow through check

(1) Pressurize the brake to 600 ± 25 psig. (41.4 ± 1.7 bar)

(2) Actuate the pistons a minimum of three times. Pistons should not bind. If pistons bind, further examination is required.

(3) Shut off pressure to the brake.

(4) Slowly loosen bleeder screw while observing the bleeder fitting. No fluid flow is cause for further examination.

CAUTION: DO NOT EXCEED 12 IN-LB (1.35 N-M) WHEN TIGHTENING THE BLEEDER SCREW (16). TORQUE IN EXCESS OF 12 IN-LB (1.35 N-M) WILL DAMAGE THE SEAT.

(5) Tighten the bleeder screw (16) snug to prevent leakage.

D. Pressure test

(1) Pressurize the brake to 600 ± 25 psig. (41.4 ± 1.7 bar)

(2) Maintain 600 ± 25 psig. (41.4 ± 1.7 bar) for a minimum of two minutes. Check the areas around the piston, and ports. Leakage in any area of the brake assembly is cause for further examination.

(3) Release hydraulic pressure to the brake.

(4) Compress the pistons (10) back into the cylinder piston bores. Check for freedom of movement of the disc test segment. Failure of the disc segment to move freely is cause for further examination.

CAUTION: DO NOT EXCEED 12 IN-LB (1.35 N-M) WHEN TIGHTENING THE BLEEDER SCREW (16). TORQUE IN EXCESS OF 12 IN-LB (1.35 N-M) WILL DAMAGE THE SEAT.

(5) Tighten the bleeder screw (16) snug to prevent leakage.

E. Preparation for return to service

(1) Disconnect the brake assembly from hydraulic supply line.

(2) Push pistons back into piston bores.

(3) Install protective cap (17) on the bleeder screw (16).

(4) Wipe off the brake with a clean shop towel.

TESTING AND FAULT ISOLATION

3. Troubleshooting

Table 1002 cannot list all possible problems and is intended to assist with troubleshooting the brake assembly.

Table 1002 Troubleshooting

PROBLEM	COMMON CAUSE	CORRECTION
Unable to obtain sufficient hydraulic brake pressure. Excessive toe pedal travel; spongy pedal.	Air in hydraulic system.	Check for source, then bleed hydraulic system.
	Vent in master cylinder reservoir clogged.	Clean vent or overboard drain.
	Leak in system; brake, master cylinder, fittings, or lines.	Locate leak and repair.
	Defective master cylinder.	Replace or repair.
	Back plate bolts (6) loose (not properly torqued), causing excessive brake deflection.	Torque bolts to proper value. Refer to Table 8002.
	Excess bolt torque has caused back plate (24) to crush cylinder (2), evidenced by depressions around bolt holes.	Replace cylinder and follow manufacturer's recommended torque value.
	Defective brake line (ballooning)	Replace.
	Improper adjustment of master cylinder rod length restricting the development of maximum stroke.	Adjust length per the aircraft maintenance manual.
Brake drag.	Piston (10) cocked in cylinder resulting in overheating brake and/or excessive lining wear	Remove and repair cylinder or piston or replace brake.
	Foreign matter wedged in brakes.	Locate and remove.
	Back pressure due to malfunction of master cylinder or parking valve.	Bleed hydraulic system and/or repair/replace master cylinder or parking valve.
	Water or ice in hydraulic system.	Flush and bleed hydraulic system (thaw ice first).
	Excess bolt torque has caused back plate (24) to crush cylinder (2), evidenced by depressions around bolt holes.	Replace cylinder and follow manufacturer's recommended torque value.
	Piston (10) does not retract.	Bleed system and/or remove piston. Inspect for damage.
	Warped pressure plate (21).	Replace pressure plate or flatten to within 0.010 inch (0.254 mm).
	Corroded anchor bolts (3).	Clean and lubricate or replace.
	Cocked anchor bolts (3).	Replace.

TESTING AND FAULT ISOLATION

Table 1002 Troubleshooting (continued)

PROBLEM	COMMON CAUSE	CORRECTION
Brake drag.	Corroded torque plate bushings (28).	Clean and lubricate or replace torque plate assembly (26) or (29).
	Cocked torque plate bushings (28).	Replace torque plate assembly (26) or (29).
	Bent/cracked torque plate (27), (30)	Replace torque plate assembly (26) or (29)..
	Warped brake disc – can be checked by laying a straightedge across disc face.	Replace and use caution during operation to prevent excessive energy input into brake.
	Out of position/stuck lining (19).	Repair/replace.
	Restriction in hydraulic line.	Isolate and remove restriction.
	Lining not firmly seated flush against pressure plate or back plate.	Debur rivet hole on surface adjacent to lining.
Rapid disc and lining wear.	Dragging brakes.	Refer to Brake drag.
	Improper conditioning of brake linings (19).	Refer to Parker Hannifin product reference memo, PRM14A for lining conditioning procedure.
	Excessive rusting, scoring, or pitting of brake disc.	Clean or replace disc. Refer to the wheel assembly maintenance manual.
	Excessive back plate (24) deflection caused by bent bolts (6) or over torquing bolts.	Check and replace bolts. Check torque.
	Incorrect lining and/or disc.	Replace with correct parts.
Brakes will not hold.	Contaminated lining.	Replace linings.
	Improper conditioning of brake linings (19).	Refer to Parker Hannifin product reference memo, PRM14A for lining conditioning procedure.
	Lining (19) worn below minimum wear limits.	Replace linings.
	Brake disc worn below minimum wear.	Replace disc. Refer to the wheel assembly maintenance manual.
	Insufficient hydraulic pressure.	Refer to Unable to obtain sufficient hydraulic brake pressure.
	New lining installed with worn disc, lining not seated in wear track creating partial contact with disc.	Replace disc. Refer to the wheel assembly maintenance manual.

TEST DATA SHEET

Test Date: _____ **Brake P/N:** _____ **Brake Serial No.:** _____

Pretest check and bleed brake

(1) Brake cylinder condition **Pass** _____ **Fail** _____
(2) Brake assembly hardware condition **Pass** _____ **Fail** _____
(3) Brake bleed **Pass** _____ **Fail** _____

Comments: _____

_____

_____

Piston actuation and flow through check **Pass** _____ **Fail** _____

Pressure applied _____ bar/psig Required: 600 psig ± 20 psig (41.4 bar ± 1.4 bar)
Leakage: **Yes** _____ **No** _____

Piston actuation _____ times Required: three times minimum
Binding: **Yes** _____ **No** _____

Shut off pressure to the brake
Bleeder screw fluid flow: **Yes** _____ **No** _____

Comments: _____

_____

_____

Pressure test **Pass** _____ **Fail** _____

Pressure applied _____ bar/psig Required: 600 psig ± 20 psig (41.4 bar ± 1.4 bar)
Duration _____ minutes Required: two minutes minimum
Leakage: **Yes** _____ **No** _____

Shut off pressure to the brake and compress pistons
Disc movement: **Yes** _____ **No** _____

Comments: _____

_____

_____

Tester: _____ **Date:** _____

DISASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

WARNING: WEAR 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, equivalent alternatives can be used for the items listed.

Table 3001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Preformed packing tool set	199-18	Parker Hannifin Corp. Aircraft Wheel & Brake Division or Parker Hannifin distributor
Standard tools (inch units)	Wrenches/sockets: • Hex head, external: for (5), (6), (13), (14), (16)	Commercial

B. Replace components

(1) If removed for any reason, replace the following components regardless of condition: (8), (15).

2. Remove each brake assembly from the aircraft

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.

A. Refer to the airframe manufacturer’s instructions to lift and support the aircraft.

B. Disconnect and cap the hydraulic inlet line that is attached to the brake inlet fitting (13). Cap the brake inlet fitting.

NOTE: The wheel assembly brake disc is sandwiched between the back plate linings and the pressure plate linings. The back plate assemblies (23) must first be removed to disengage the brake from the torque plate assembly (26) or (29).

NOTE: The wheel assembly must first be removed to allow removal of the torque plate assembly (26) or (29). Refer to CM40-128F, Component Maintenance Manual for wheel assembly component identification.

C. Remove the axle mounting hardware and remove the wheel/tire unit from the axle.

D. Refer to Figure 3001. To keep each back plate assembly (23) from falling, hold each back plate assembly while loosening and removing the bolts (6) and washers (4). Remove each back plate assembly (23) and the insulator shim (7).

NOTE: It is recommended that the insulator shim (7) be replaced at each overall regardless of condition.

DISASSEMBLY

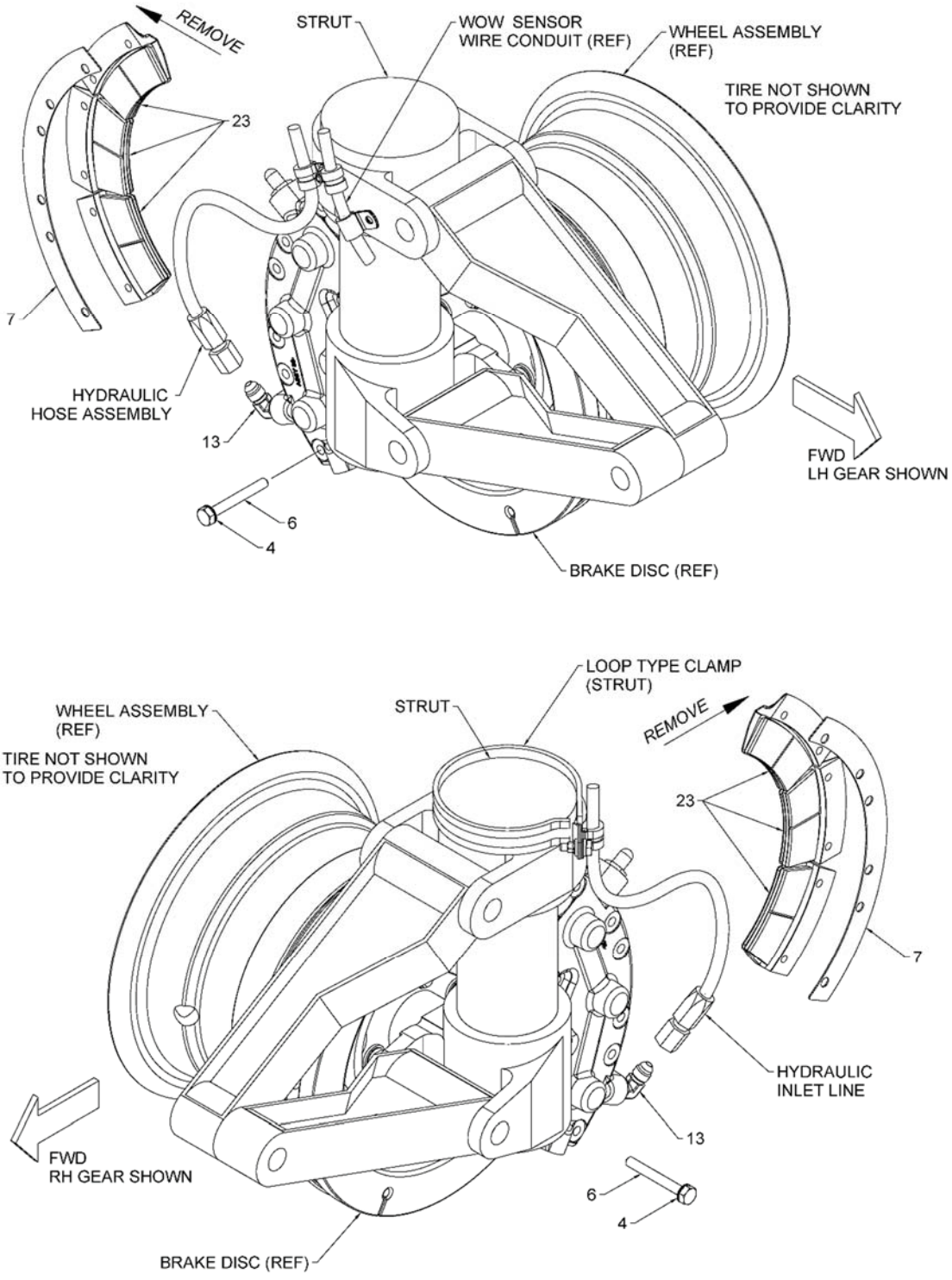


Figure 3001 Remove the back plate assemblies (23) and shim (7)

DISASSEMBLY

E. Refer to Figure 3002. Slide the cylinder assembly (1) out of the torque plate assembly (26) or (29) and slide the wheel assembly off the axle.

F. Remove the axle flange mounting hardware that attaches the torque plate assembly to the axle flange and slide the torque plate assembly off the axle.

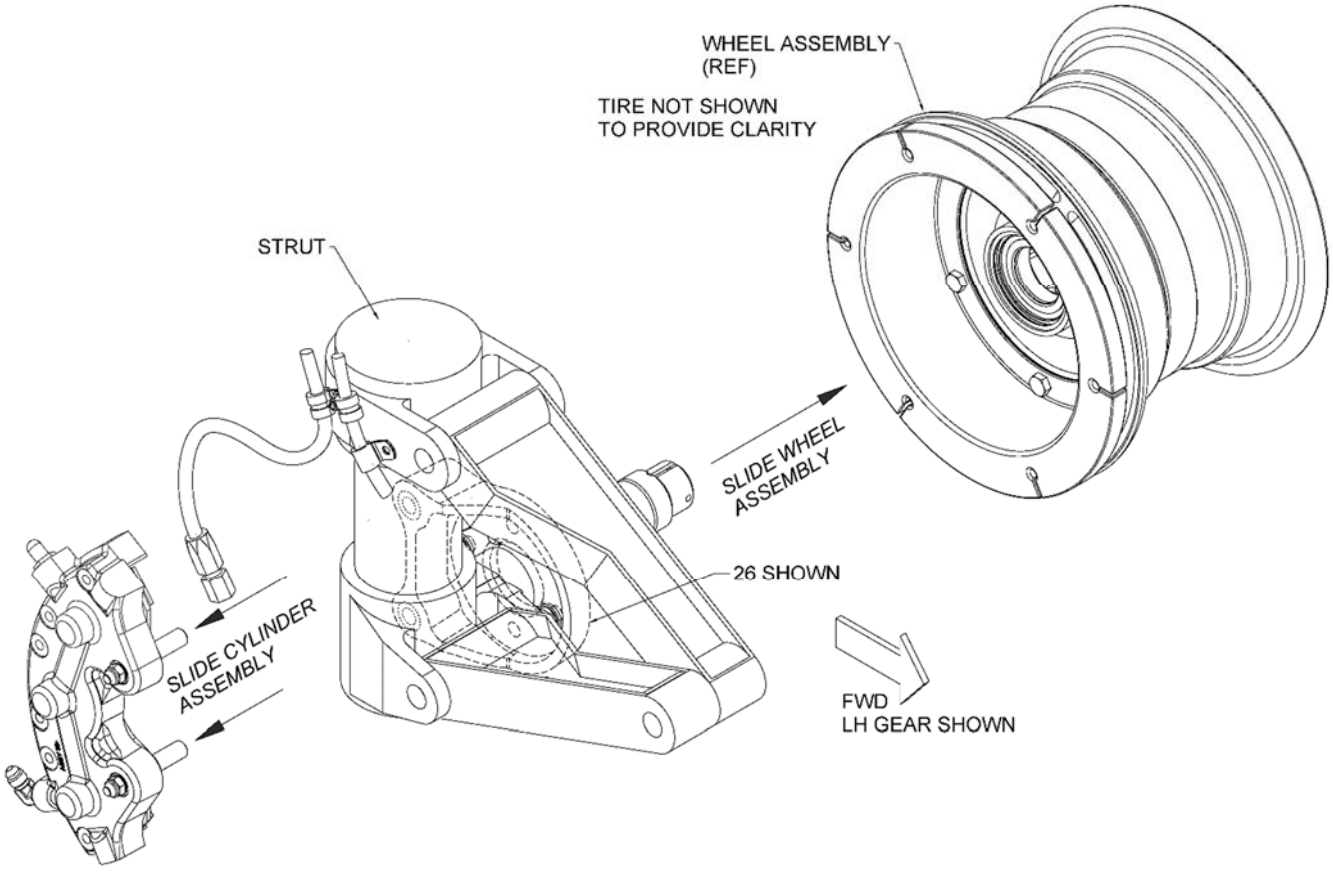


Figure 3002 Remove the cylinder assembly (1)

DISASSEMBLY

3. Disassemble each 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 (19). BRAKE FLUID THAT HAS SOAKED INTO THE FRICTION MATERIAL CAN AFFECT THE BRAKING PROCESS.

A. Cylinder assembly (1)

NOTE: The anchor bolts (3) are pressed into the brake cylinder (2) and secured with a washer (4) and nut (5). Do not remove the anchor bolts unless replacement is necessary due to damage or if a more thorough inspection of the brake cylinder is required. Refer to the REPAIR section for replacement instructions.

(1) Slide the pressure plate assembly (20) off the anchor bolts (3).

(2) Remove the bleeder cap (17), and then remove the bleeder screw (16) from the bleeder seat (14).

NOTE: It is recommended that the bleeder cap be replaced at each overall regardless of condition.

(3) Remove the bleeder seat (14).

(4) Remove the inlet fitting (13).

(5) Remove the fitting and bleeder seat preformed packings (15).

NOTE: It is recommended that the preformed packings be replaced at each overall regardless of condition.

(6) Drain the hydraulic fluid from the cylinder (2).

DISASSEMBLY

SAFETY WARNING: USE CAUTION IN BLOWING THE PISTON ASSEMBLIES (9) 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 PSIG (2,1 BAR). USE CHIP GUARDS, EYE PROTECTION, AND OTHER PERSONAL PROTECTIVE EQUIPMENT.

B. Piston assemblies (9)

NOTE: Do not remove the friction spring (12) from the piston unless it needs to be replaced because of corrosion or damage. Refer to the REPAIR section for replacement instructions.

NOTE: The piston insulator (11) is press fit into the piston (10). Do not remove the insulator from the piston unless it is worn or damaged. Refer to the REPAIR section for replacement instructions.

(1) Remove the piston assemblies by injecting air into the ports (15 to 20 psig) maximum pressure.

(2) Remove the preformed packing (8) from each piston bore groove.

NOTE: It is recommended that the preformed packings be replaced at each overall regardless of condition.

C. Remove the nuts (5) and washers (4) from the anchor bolts (3).

D. Torque plate assembly (26) or (29)

NOTE: The wheel assembly must first be removed off the axle to allow removal of the torque plate assembly (26) or (29).

(1) Remove the mounting hardware that attaches the torque plate assembly to the axle flange.

NOTE: The bushings (28) are press fit into the cast torque plate and are not replaceable. The torque plate assembly must be replaced as a unit.

CLEANING

1. General

Refer to IPL Figure 1 for component identification.

WARNING: WEAR 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, equivalent alternatives can be used for the items listed.

Table 4001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Blast stripping equipment	• Plastic blast media: MIL-P-85891, Type II or V,Grade 20/30, 3.5 MOH max.	U.S. Technology Corp.
Air supply	30 psig maximum (2.1 bar)	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

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.

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

2. Clean the hardware

The hardware is made from steel: (4), (5), (6), (13), (14), (16), (21), (24),

A. Use an alkaline based degreasing solution or Stoddard Solvent (per MIL-PRF-680) and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

CLEANING

3. Clean the piston assembly (9)

The piston is made from aluminum alloy.

NOTE: Do not remove the friction spring (12) from the piston (10) unless it needs to be replaced because of distortion or damage. Refer to the REPAIR section.

NOTE: A piston insulator (11) is press fit into each piston (10). Do not remove the insulator unless it is worn or damaged. Refer to the REPAIR section.

A. Use an alkaline based degreasing solution or Stoddard Solvent (per MIL-PRF-680) and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

4. Clean the cylinder (2) and torque plates (27), (30)

The cylinder and torque plates are made from magnesium alloy.

NOTE: The anchor bolts (3) are press fit into the cylinder (2). Do not remove the anchor bolt unless replacement is necessary due to distortion or damage.

NOTE: The bushings (28) are press fit into the torque plate (27) or (30). The bushings are not to be removed.

A. Use an alkaline based degreasing solution and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

C. Remove the protective coating (primer and topcoat) from the cylinder and torque plates.

CAUTION: IN ADDITION TO REMOVING THE COATINGS, THE PLASTIC MEDIA WILL ALSO REMOVE ANY NAMEPLATES THAT ARE ATTACHED (25). ANY NAMEPLATE THAT IS DAMAGED OR REMOVED DURING THE PLASTIC MEDIA PROCESS WILL REQUIRE REPLACEMENT. REFER TO IPL FIGURE 1 FOR THE NAMEPLATE PART NUMBER.

NOTE: Removal of the protective coatings (primer and topcoat) is necessary when doing the liquid penetrant inspection of the brake cylinder, and torque plate.

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

NOTE: The press fit components: anchor bolts (3) and bushings (28) will not be damaged by the plastic media.

(1) Part must be clean. This will remove dirt and grease deposits that can contaminate the blast media.

(2) Blast the parts per MIL-STD-1504 with plastic media.

CHECKS

SAFETY WARNING: THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH (4), (5), (6), (14), (21), (22), (24). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

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

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

CAUTION: REPAIR OR REWORK OF PLATED HARDWARE INCLUDING STRIPPING AND RE-PLATING IS NOT ALLOWED. DO NOT STRIP PLATING MATERIAL TO INSPECT A BOLT. REMOVAL OF PLATING MATERIAL WILL CAUSE THE BOLTS TO CORRODE.

1. General

Refer to IPL Figure 1 for component identification.

Refer to Table 1 Maintenance Schedule in DESCRIPTION AND OPERATION for a timetable of recommended scheduled maintenance tasks for the brake assembly components. All parts must be cleaned before examination. Refer to the CLEANING 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, equivalent alternatives can be used for the items listed.

Table 5001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Inspection surface plate	Not applicable	Commercial
Magnifier	X10 Magnification	Commercial
Micrometers	N/A	Commercial
Vernier dial calipers	Not applicable	Commercial
Magnetic particle inspection kit	ASTM E1444	Commercial
Liquid penetrant inspection kit	ASTM E1417 Type 1, method A, sensitivity level 2	Commercial

2. General inspection

NOTE: Replace hardware that has damage to any protective coating, such as cad plate.

A. Examine visible surfaces of the following for corrosion, distortion, wear, burrs, pitting, nicks, cracks, chips, or other visual signs of damage: (2), (3), (4), (5), (6), (10), (11), (13), (14), (16), (19), (21), (24), (27), (28), (30). Pay particular attention to parts with sealing surfaces and grooves. Damage to the sealing surfaces could damage preformed packings during installation.

B. Visually examine the following for damage to threaded areas: (2), (3), (5), (6), (13), (14), (16).

CHECKS

3. Examine the bolts (6) and nuts (5)

NOTE: If a bolt or nut needs to be replaced, then replace all of the bolts and nuts at the same time.

A. In addition to the general inspection of the bolts, examine the patch lock for wear or deterioration. The patch lock (nylon material embedded in the threaded end) provides the locking feature of the bolt. The bolts will require replacement at the scheduled maintenance interval.

B. Examine the bolts 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).

C. Examine and replace the nuts for damage to the self-locking feature. If the nut can be turned onto the bolt by hand, past the nut's self-locking section or the nut cannot be tightened to the required torque value, then replace.

4. Examine the cylinder (2)

In addition to the general inspection of the cylinder, examine for evidence of the following conditions:

A. Examine the exterior surface of the cylinder for missing paint caused by erosion or wear.

B. Visually examine the cylinder for surface cracks, nicks, corrosion, or other damage.

C. Visually examine the cylinder for cracks in areas around the anchor bolt holes, piston bores and ports.

D. 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).

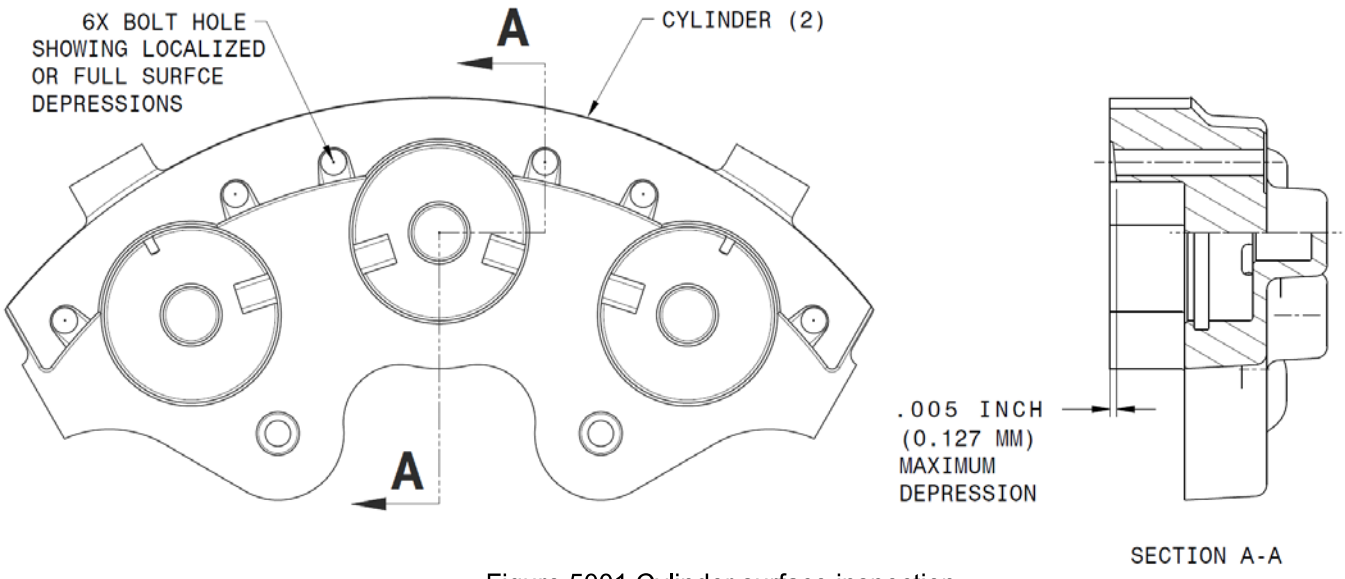


Figure 5001 Cylinder surface inspection

CHECKS

E. Examine the port threads for corrosion or damage to the sealing surfaces or threads.

F. Use a 10 power magnifier and examine the cylinder piston bores and pay special attention to the packing groove. Examine for corrosion, scratches, nicks and burrs which can prevent the pistons from properly retracting, resulting in brake drag.

G. Examine the piston bores for wear. Measure the bore diameter at three places. Replace the cylinder if the bore diameter measures more than ∅ 1.754 inch (44.55 mm) maximum at any point.

H. Examine for loose, corroded or bent anchor bolts (3). Examine anchor bolts for thread damage. Refer to the REPAIR section for anchor bolt replacement instructions.

I. Examine the cylinder for cracks using liquid penetrant Inspection.

NOTE: Remove the anchor bolts for a more thorough inspection. 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.

(1) Remove the anchor bolts. Refer to the REPAIR section for removal instructions.

(2) Remove the protective coatings (topcoat and primer) and clean the part. Refer to the CLEANING section for paint removal and cleaning instructions.

(3) Examine for cracks paying particular attention to the lug area around the anchor bolt holes, the piston bores and the ports.

5. Examine the piston assembly (9)

A. Examine the piston (10) for corrosion, minor scratches, nicks, burrs, and other signs of damage that can lead to fluid leakage past the preformed packing (8).

B. Examine the piston O.D. for wear by measuring the O.D. at three places around the circumference. Replace all pistons with an O.D. measuring less than ∅ 1.748 inch minimum (44.39 mm) at any point.

C. Examine the insulator (11) and replace those that show evidence of delamination, are cracked or have severe heat damage (charred). Constant heat and pressure will compress the insulators over time. Replace the insulator when it is flush with the head of the piston. The insulator is not repairable. Refer to the REPAIR section for removal instructions.

D. Examine the friction spring (12) for burrs or distortion which can prevent the pistons from properly retracting, resulting in brake drag. The friction spring is not repairable. Refer to the REPAIR section for replacement instructions.

6. Examine the insulator shim (7)

The insulator shim is not repairable. If removed for any reason prior to the scheduled maintenance interval, examine and replace as follows:

A. Replace shims that are delaminating, cracked, or that show evidence of severe heat damage resulting from a high energy braking event.

CHECKS

7. Examine the pressure plate assembly (20)

NOTE: The linings (19) are not a component of the pressure plate assembly (20), but are attached to the pins (22).

A. Examine the linings (19) for looseness.

B. If the linings (19) are removed, check the pressure plate (21) for the following.

(1) Visually examine for cracks, nicks, corrosion, or other damage. Replace if cracks are found.

(2) 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.

(3) Pins (22). It is not necessary to remove the pins unless the outside diameter of the pin is worn and does not allow for secure engagement of the linings (19). Examine the pins for looseness, distorted or mushroomed heads or other visible damage. Refer to the REPAIR section for replacement of the pins.

NOTE: It is recommended that all pins be replaced if one is found to be damaged or worn.

(a) If the pins are removed, then check the pin installation holes in the pressure plate for elongation. Replace the pressure plate if the pin holes are elongated.

(4) Examine for distortion. Replace any pressure plate that is dished or out-of-flatness more than 0.010 inch (0.25 mm).

8. Examine the back plate assembly (23)

A. If the linings (19) are removed, check the back plate (24) for the following.

(1) Visually examine for cracks, nicks, corrosion, or other damage. Replace if cracks are found.

(2) Examine the three threaded holes for thread damage. Replace if thread damage is found.

(3) Pins (22). It is not necessary to remove the pins unless the outside diameter of the pin is worn and does not allow for secure engagement of the linings (19). Examine the pins for looseness, distorted or mushroomed heads or other visible damage. Refer to the REPAIR section for replacement of the pins.

NOTE: It is recommended that all pins be replaced if one is found to be damaged or worn.

(a) If the pins are removed, then check the pin installation holes in the pressure plate for elongation. Replace the pressure plate if the pin holes are elongated.

CHECKS

9. Examine the linings (19)

The linings are not repairable.

NOTE: The linings are secured to the back plates by pins (22).

A. 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.

10. Examine the torque plate assembly (26) and (29)

NOTE: Stainless steel bushings (28) are press fit into the cast magnesium torque plate and swaged on the backside for retention. The bushings are not replaceable and a bushing that is damaged beyond the repair limits (refer to the REPAIR section) will require the replacement of the torque plate assembly.

A. Examine the bushings (28) for the following:

(1) Bushings must be flat against the torque plate surface. Examine for corrosion, cracks, looseness or other visible damage. Also examine for elongation of the inside diameter which can prevent the brake from sliding freely resulting in excessive brake drag.

(2) Examine the for internal stepping which could indicate severe cocking of the cylinder anchor bolts in the torque plate.

B. Examine the torque plate (26) and (29) for the following:

(1) Examine the exterior surface for missing paint caused by erosion, wear, or inspection techniques.

(2) Visually examine for surface cracks, nicks, corrosion, or other damage.

(3) Visually examine for cracks to the areas around the anchor bolt holes and the mounting bolt holes.

(4) Examine the mounting bolt hole areas for elongation. Badly elongated holes requires the replacement of the torque plate assembly.

C. When it is necessary to examine the torque plate for cracks at the surface use Liquid Penetrant Inspection.

NOTE: The paint must be removed from the part when using liquid penetrant inspection methods. Refer to the CLEANING section for paint removal and cleaning instructions.

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

REPAIR

1. General

Refer to IPL Figure 1 for component identification.

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, equivalent alternatives can be used for the items listed.

Table 6001 Repair Equipment and Consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Twist drill bits	For steel	Commercial
Pin punch set	Inch or metric	Commercial
Screwdriver	Standard flat head	Commercial
Aluminum oxide cloth	400 to 600 grade or finer, wet or dry	Commercial
Abrasive media for items (21), (24)	80 Grit aluminum oxide	U.S. Technology Corporation
Cold galvanizing compound for (21), (24)	ZRC Galvilite, P/N 11011-10014 MIL-PRF-26915, Type I, Class A	ZRC Products Company
Surface treatment for (2), (27), (30)	MIL-M-3171, Type VI chromic acid or Oxsilan®	Commercial
Surface treatment for (10)	Alodine 1200 or equivalent MIL-DTL-5541, Type I or Type II, Class 1A (Ref. QPL-81706)	Commercial
Bench vise	Not required	Commercial
Arbor press	Not required	Commercial
Paint application equipment	Not required	Commercial
Protective coatings for (2)	Refer to Table 6002	Sherwin Williams Company
Protective coatings for (27), (30)	Refer to Table 6003	
Spray adhesive	3M™ case sealing adhesive	Commercial

REPAIR

SAFETY WARNING: THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH (4), (5), (6), (14), (21), (22), (24). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

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 MAGNESIUM COMPONENTS AND WILL CAUSE CORROSION.

CAUTION: REPAIR IS LIMITED TO THE PARTS LISTED IN THIS SECTION. THE FOLLOWING ITEMS ARE NOT REPAIRABLE AND MUST BE REPLACED IF WORN OR DAMAGED:

- HARDWARE: (4), (5), (6), (13), (14), (16), (25)
- INSULATOR SHIM (7)
- PREFORMED PACKINGS: (8), (15), (17)
- LINING (19) AND LINING ATTACHMENT HARDWARE (22)
- PISTON ASSEMBLY COMPONENTS: (11), (12)

CAUTION: THE FOLLOWING ITEMS ARE NOT PROCURABLE. ORDER THE NEXT HIGHER ASSEMBLY IF ITEM CANNOT BE REPAIRED:

- TORQUE PLATE (27). MUST ORDER ITEM (26).
- TORQUE PLATE (30). MUST ORDER ITEM (29).
- BUSHING (28). MUST ORDER ITEM (26) OR (29).

2. Repair the pistons (10)

The piston is made from an aluminum alloy and anodized.

A. Piston repair is limited to polishing out small nicks, scratches and light corrosion. Surface finish must be 64 rms or better. Replace the pistons if the outside diameter measures less than ∅ 1.748 minimum (44.39 mm).

(1) Clean the piston. Refer to the CLEANING section.

NOTE: To achieve best results, always refer to the manufacturer's instructions for use and disposal of corrosion preventative.

(2) Apply a surface treatment (Alodine 1200 or equivalent) to repaired areas.

3. Replace the piston insulators (11)

CAUTION: DO NOT DAMAGE THE PISTON WHEN REPLACING THE INSULATOR.

NOTE: The piston insulator (11) is press fit into the piston.

A. Worn or damaged insulators can be replaced by drilling a ∅ .125 inch diameter hole directly into the insulator approximately 0.100 inch deep, slightly off center, but not close to the outside diameter of the piston.

B. Use a small flat head screwdriver to work through the ∅ .125 inch diameter hole to lift and pry off the insulator.

C. Use an arbor press to install a new insulator.

REPAIR

4. Replace the piston friction spring (12)

CAUTION: DO NOT DAMAGE THE PISTON WHEN REPLACING THE SPRING. CAREFULLY REMOVE SHARP EDGES ON THE OLD AND NEW SPRINGS BY LIGHT FILING OR SANDING THE OPEN ENDS BEFORE REMOVING AND INSTALLING.

A. Remove the spring by pressing the closed end of the spring up and off the piston tail with use of fingers. A brass pick can also be used to aid in removal.

B. Install a new spring by aligning the spring over the end of the piston and press over the end until the spring is seated in the groove.

5. Repair or replace the anchor bolts (3)

The anchor bolt is made from alloy steel and cad plated.

A. Surface damage repair

(1) Repair is limited to blending out light corrosion as long as the protective cadmium plating is not removed by the repair procedure. If repair removes the protective plating, then the anchor bolt must be replaced.

CAUTION: THE CYLINDER MUST BE SQUARE WITH THE ARBOR PRESS SO THAT THE ANCHOR BOLT DOES NOT COCK.

B. Replace damaged anchor bolts

(1) Refer to Figure 6001. The anchor bolts can be removed by using a support fixture and arbor press with a press anvil. Place the anchor bolts into the support fixture so that the anchor bolt is piloted while being removed.

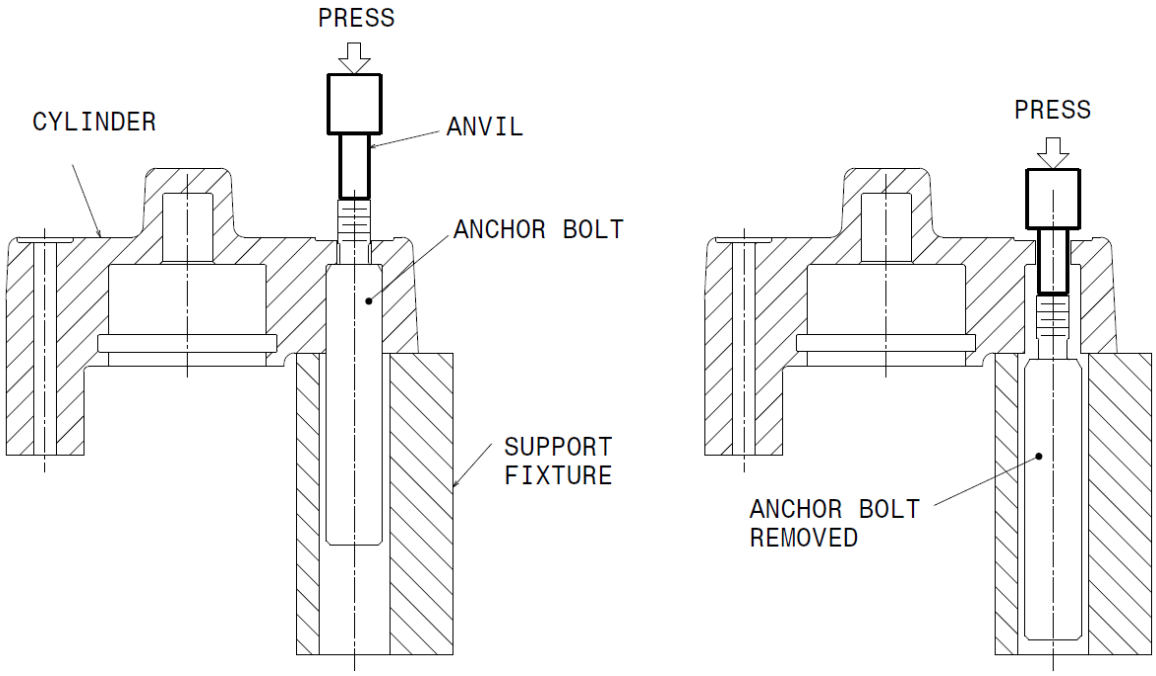


Figure 6001 Remove the anchor bolt (3)

REPAIR

CAUTION: THE CYLINDER MUST BE SQUARE WITH THE ARBOR PRESS AND THE ANCHOR BOLT PERPENDICULAR TO THE CYLINDER SO THAT THE ANCHOR BOLT DOES NOT COCK.

(2) Refer to Figure 6002. The anchor bolts can be installed by using a support fixture and arbor press with a press bushing. Place the anchor bolts into the holding fixture so that the anchor bolt is supported and piloted while being installed.

(3) Position the cylinder (2) anchor bolt hole over the anchor bolt.

(4) Press the cylinder down over the anchor bolt. Ensure that the anchor bolt is seated in the cylinder.

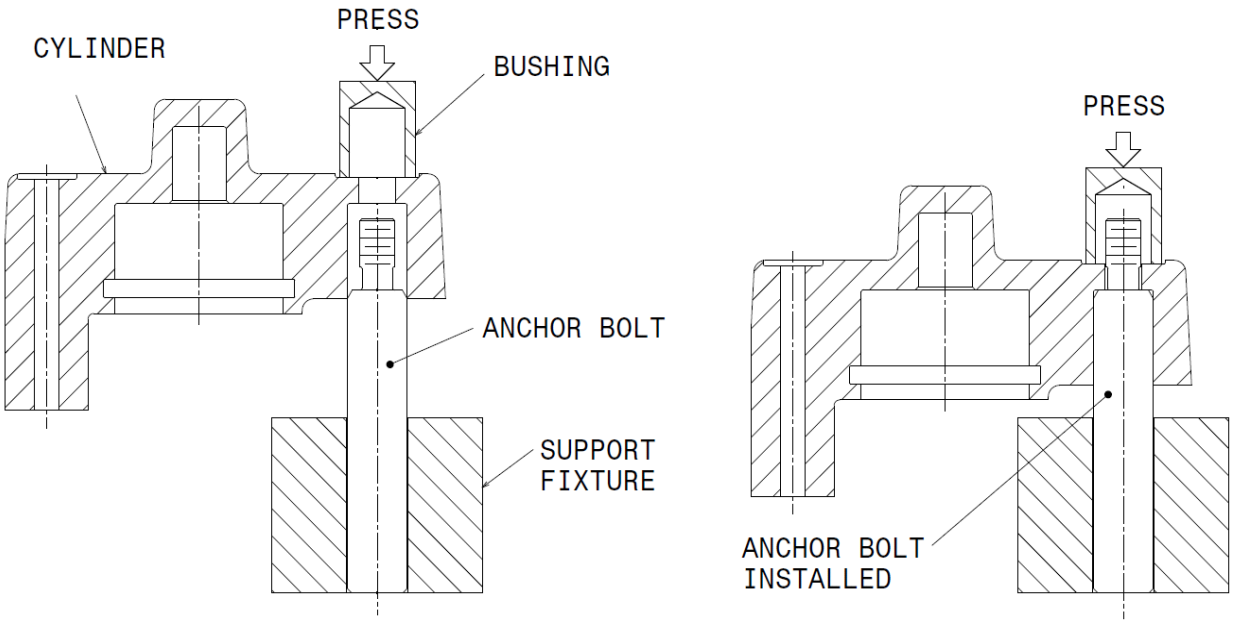


Figure 6002 Install the anchor bolt (3)

REPAIR

6. Repair and paint the cylinder (2)

A. Repair the cylinder

The cylinder is made from cast magnesium alloy. Repair is limited to the following.

(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 ∅ 1.754 inch maximum (44.55 mm). Surface finish must be 64 rms or better.

B. Clean the cylinder. Refer to the CLEANING section.

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. SURFACE TREATMENT SOLUTIONS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR MIXING, APPLYING, DISPOSAL AND FOR ALL SAFETY INSTRUCTIONS.

C. Apply a surface treatment

Magnesium parts may be treated with surface treatment per MIL-M-3171 Type VI chromic acid or Oxsilan®.

NOTE: Oxsilan® is a non-chromate coating and REACH (Registration, Evaluation and Authorization of Chemicals) compliant.

(1) MIL-M-3171 Type VI (for use on parts with a dull bronze to bright gold surface treatment appearance)

(a) Apply mixed solution liberally at room temperature and allow to dry. Parts may be dipped for 1/2 to 2 minutes in solution at room temperature.

(b) Remove excess coating by flushing with clean, cold water.

(c) Dry in oven or hot air. Never rinse in hot water.

(d) Alternate option would be to re-coat with Oxsilan® (see instructions below).

(2) Oxsilan® (for use on parts with a clear to iridescent surface treatment appearance)

(a) Scrub surface with an abrasive material such a Scotch-Brite® pad.

(b) Rinse surface with water.

(c) Wipe excess water with clean cloth.

(d) Spray with a liberal amount of Oxsilan® so that the entire scrubbed area is saturated.

(e) Let stand for 5 minutes. To expedite the dry process, a mild airflow source can be used.

REPAIR

D. Paint the cylinder

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. COATING MATERIALS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR ALL SAFETY INSTRUCTIONS.

(1) For small area paint touchup.

(a) Prepare the area by sanding lightly with 400 to 600 grade or finer, wet or dry aluminum oxide cloth and feather out all edges of the adjacent area.

(b) Clean the area.

(c) Touch up the area with primer and topcoat.

(2) For complete primer and topcoat application.

NOTE: Performed if primer and topcoat was removed from entire part by plastic media blasting.

(a) Confirm that the part has been cleaned and surface treatment was applied if repair work was performed

(b) Mask the cylinder. Refer to Figure 6003.

(c) Apply the primer and topcoat to the entire part, except as masked, 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 Cylinder primer and topcoat product specifications

MANUFACTURER	PRIMER	TOPCOAT
Sherwin Williams Co. Cleveland, OH	P/N P60G2 primer (2 parts) P/N R7K44 reducer (3 parts) -or- P/N P60G10 primer P/N R2K4 reducer (as needed)	P/N F63BXS58-4337 (silver) (2 component polyurethane) 6 parts base 1 part catalyst, P/N V66V27 P/N R7K84 reducer (as needed)
	Primer Thickness: 0.0002-0.0004 inch Drying Time (air dry): To touch: 3 to 10 minutes Tack free: 10 to 15 minutes To topcoat: 10 to 60 minutes	Topcoat Thickness: 0.0008-0.0014 inch (including primer) Drying Time (air dry): To touch: 20 minutes To handle: 60 minutes Dry hard: overnight

REPAIR

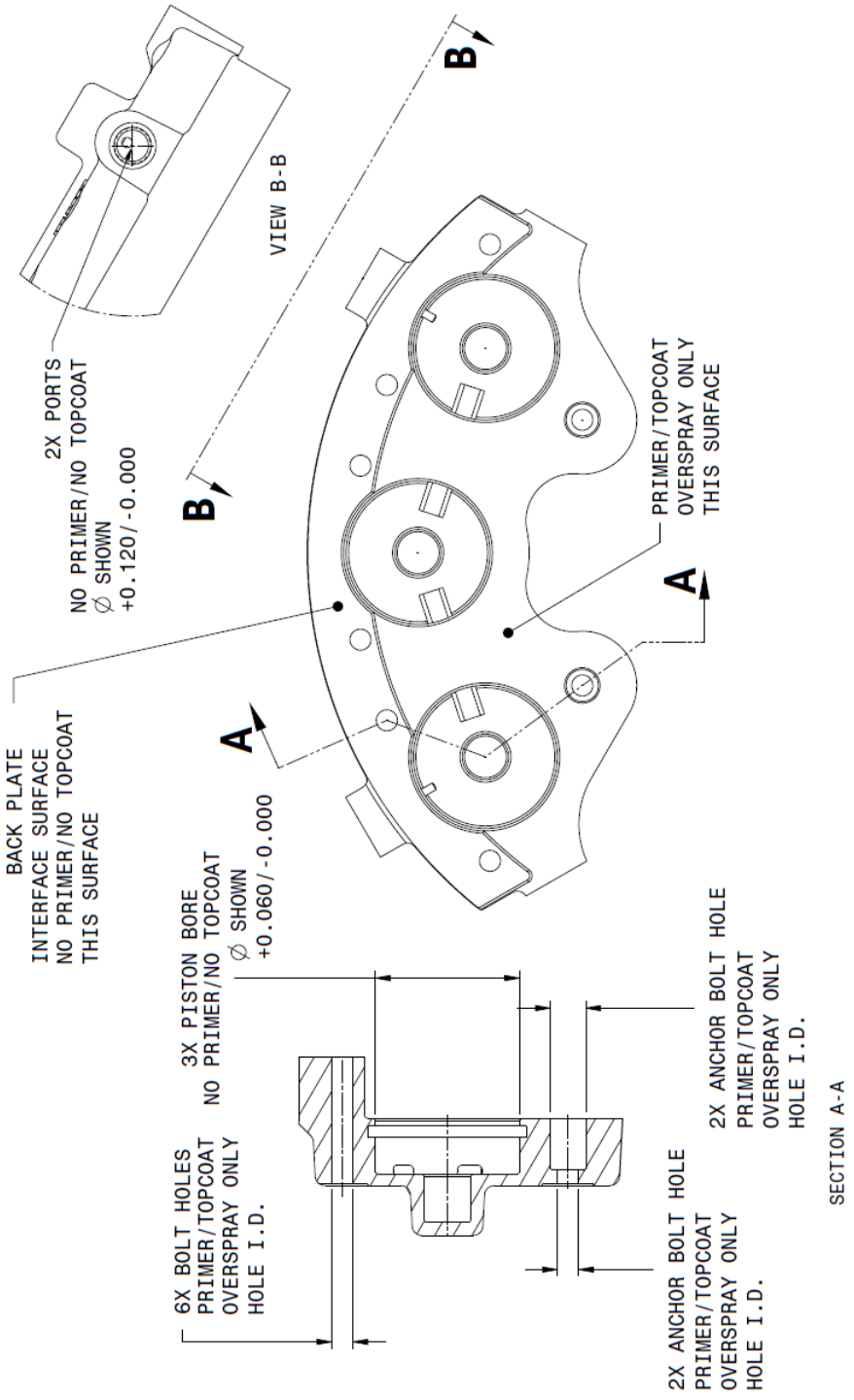


Figure 6003 Mask the cylinder (2)

REPAIR

7. Repair and paint the torque plate assembly (26) and (29)

A. Bushing (28)

(1) Bushing repair
The bushings are made from stainless steel and are not replaceable. Repair is limited to the following.

(a) Light scratches, nicks, and corrosion on the bushings inside diameter can be polished out. I.D. of the bushing must not exceed ∅ 0.445 inch (11.30 mm) maximum.

B. Torque plate (27) and (30)

The torque plate is made from cast magnesium alloy. Repair is limited to the following.

(1) Surface damage repair.

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

(2) Clean the torque plate. Refer to the CLEANING section.

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. SURFACE TREATMENT SOLUTIONS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR MIXING, APPLYING, DISPOSAL AND FOR ALL SAFETY INSTRUCTIONS.

(3) Apply a surface treatment

Magnesium parts may be treated with surface treatment per MIL-M-3171 Type VI chromic acid or Oxsilan®.

NOTE: Oxsilan® is a non-chromate coating and REACH (Registration, Evaluation and Authorization of Chemicals) compliant.

(a) MIL-M-3171 Type VI (for use on parts with a dull bronze to bright gold surface treatment appearance)

1 Apply mixed solution liberally at room temperature and allow to dry. Parts may be dipped for 1/2 to 2 minutes in solution at room temperature.

2 Remove excess coating by flushing with clean, cold water.

3 Dry in oven or hot air. Never rinse in hot water.

4 Alternate option would be to re-coat with Oxsilan® (see instructions below).

(b) Oxsilan® (for use on parts with a clear to iridescent surface treatment appearance)

1 Scrub surface with an abrasive material such a Scotch-Brite® pad.

2 Rinse surface with water.

3 Wipe excess water with clean cloth.

4 Spray with a liberal amount of Oxsilan® so that the entire scrubbed area is saturated.

5 Let stand for 5 minutes. To expedite the dry process, a mild airflow source can be used.

REPAIR

C. Paint the torque plate (27) and (30)

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. COATING MATERIALS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR ALL SAFETY INSTRUCTIONS.

(1) For small area paint touchup.

(a) Prepare the area by sanding lightly with 400 to 600 grade or finer, wet or dry aluminum oxide cloth and feather out all edges of the adjacent area.

(b) Confirm that the area is clean and surface treatment was applied if repair work was performed.

(c) Touch up the area with primer and topcoat.

(2) For complete primer and topcoat application.

NOTE: Performed if primer and topcoat was removed from entire part by plastic media blasting.

(a) Confirm that the area is clean and surface treatment was applied if repair work was performed

(b) Mask the torque plate. Refer to Figure 6004.

(c) Apply the primer and topcoat to the entire part, except as masked, per Table 6003.

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 6003 Torque plate - primer and topcoat product specifications

MANUFACTURER	PRIMER	TOPCOAT
Sherwin Williams Co. Cleveland, OH	P/N P60G2 primer (2 parts) P/N R7K44 reducer (3 parts) -or- P/N P60G10 primer P/N R2K4 reducer (as needed)	P/N F63BXS58-4337 (silver) (2 component polyurethane) 6 parts base 1 part catalyst, P/N V66V27 P/N R7K84 reducer (as needed)
	Primer Thickness: 0.0002-0.0004 inch Drying Time (air dry): To touch: 3 to 10 minutes Tack free: 10 to 15 minutes To topcoat: 10 to 60 minutes	Topcoat Thickness: 0.0008-0.0014 inch (including primer) Drying Time (air dry): To touch: 20 minutes To handle: 60 minutes Dry hard: overnight

REPAIR

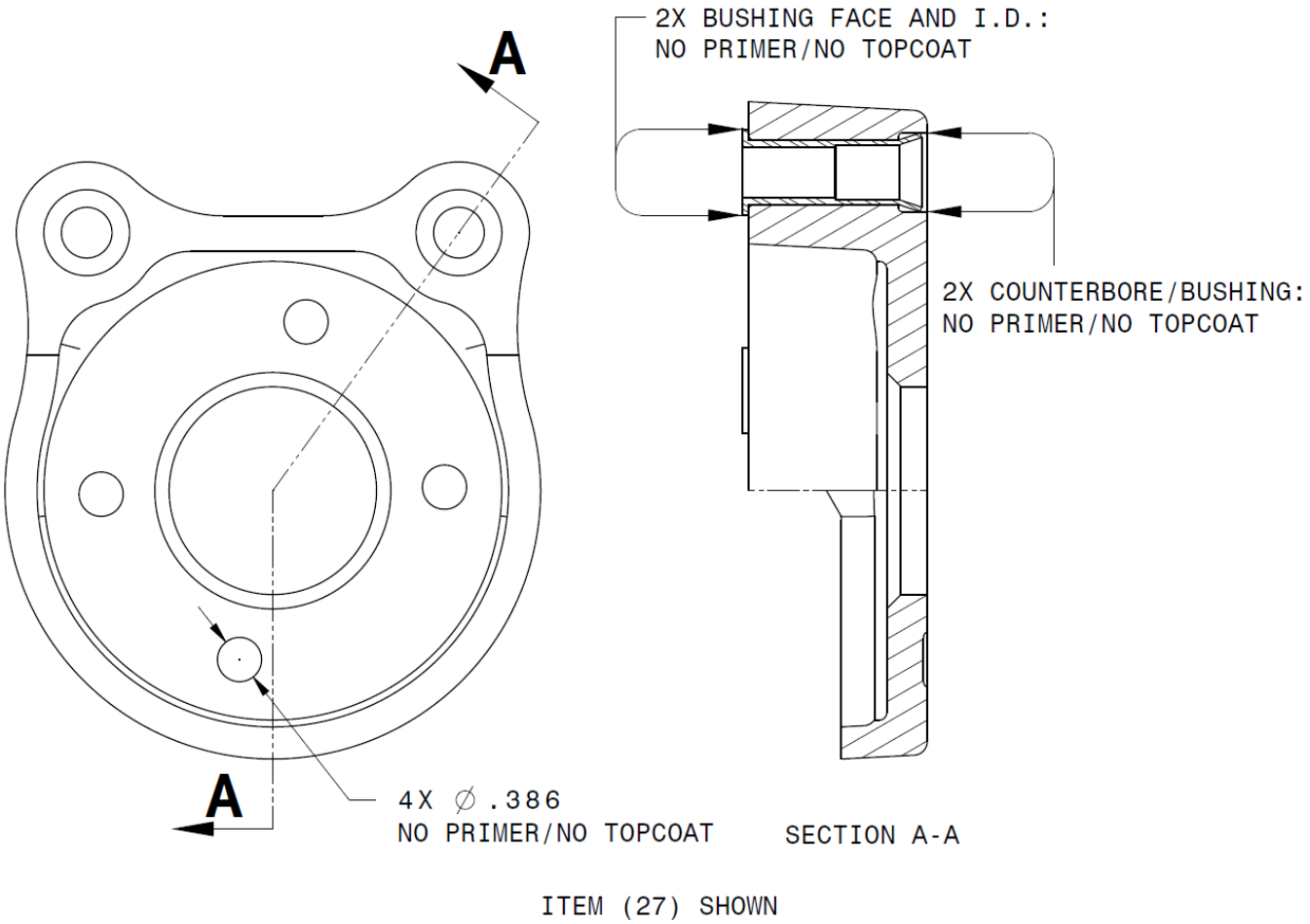


Figure 6004 Mask the torque plate (27) and (30)

REPAIR

8. Replace the linings (19)

Each metallic lining pad used on the brake assembly is a hard composition with a steel backing. Each pad is seated onto two corresponding steel pins (22). The pins are attached to the pressure plate and each back plate.

A. Lining removal

(1) Pry the lining pads off the pins (22) with a thin, flat blade screwdriver. Position the screwdriver between the pressure plate or back plate and the lining's steel backing. Pry evenly around the lining pad.

(2) The pressure plate (21) should now be examined for continued service per the CHECKS section.

(3) The back plates (24) should now be examined for continued service per the CHECKS section.

B. Lining Installation

(1) Refer to Figure 6005. Apply a light film of spray adhesive to the metal backing of each lining pad and install each lining pad onto the corresponding pins (22). Check to insure that the metal backing of each lining pad is tight against the pressure plate and each back plate. A rubber mallet may be used to lightly tap the lining pads onto the pins.

NOTE: The adhesive is used to maintain position of the lining pads until the brake is assembled onto the brake disc (a component of the wheel assembly). The adhesive will be burned off in the first few stops. The lining pads will remain in place on the assembly trapped between the brake disc and the pressure plate and back plates.

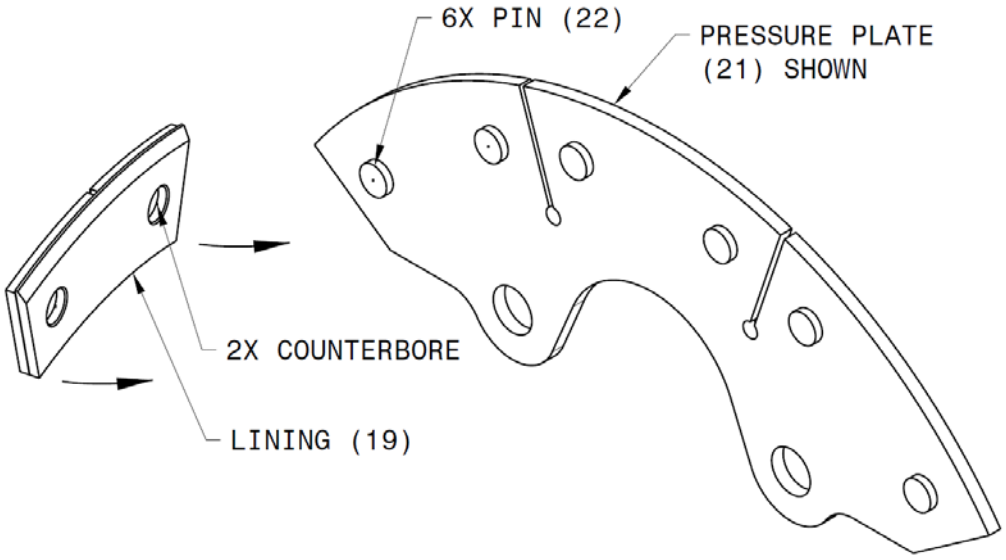


Figure 6005 Install the lining (19)

REPAIR

9. Repair the pressure plate assembly (20) and back plate assemblies (23)

The pressure plate and back plates are made from alloy steel and are cad plated. Order of repair is as follows:

- Remove the pins (22)
- Repair the pressure plate (21) and back plates (24).
- Install new pins (22)

A. Remove the Pins (22)

The pins are made from alloy steel and are cad plated.

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

CAUTION: DO NOT ENLARGE THE PIN HOLES IN THE PRESSURE PLATE OR BACK PLATE. IF ANY PIN HOLE EXCEEDS ∅ 0.159 INCH (4.04 MM) THE PRESSURE PLATE OR BACK PLATE MUST BE REPLACED.

(1) Refer to Figure 6006. Use a twist drill bit and carefully drill into the clinched end of the pin. Remove only enough material to allow a press punch or pin punch to force the pin out of the hole without deforming or enlarging the hole. Discard the pin.

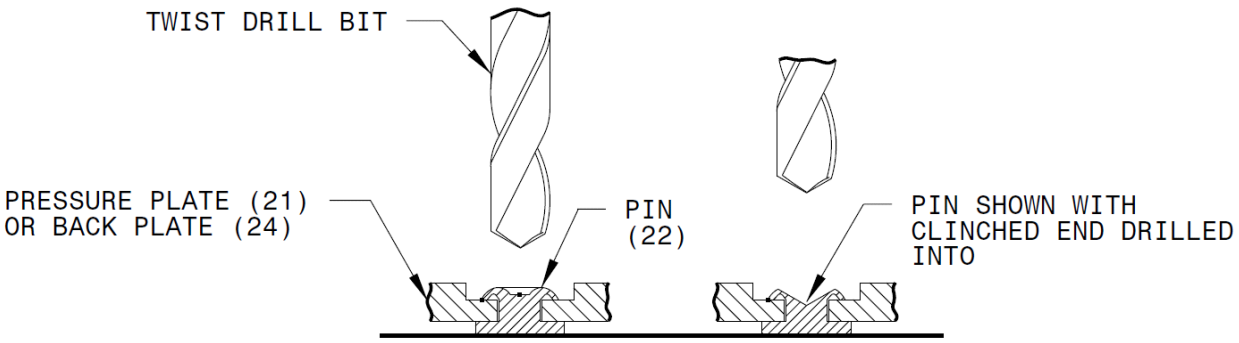


Figure 6006 Remove the pins (22)

REPAIR

SAFETY WARNING: EXPOSURE TO CADMIUM DUST IN UNVENTILATED GRINDING ACTIVITIES AND WORKING WITH CADMIUM AND ITS COMPOUNDS CAN BE A POTENTIAL HEALTH HAZARD.

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. COATING MATERIALS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR ALL SAFETY INSTRUCTIONS.

B. Repair the pressure plate (21) and back plates (24)

(1) Small nicks and light corrosion may be hand finished using 400 to 600 grade or finer aluminum oxide cloth.

(2) Warped pressure plates can cause brake drag. Slightly warped pressure plates can be cold straightened. When laid on a flat surface, flatness should be within 0.010 inch (0.254 mm).

(3) Stripping and re-cadmium plating steel parts is generally cost prohibitive in small lots. Therefore, steel parts that have had the cadmium plating removed by abrasive blast methods may be protected with an application of zinc rich cold galvanizing compound. Finish with an application of the topcoat.

C. Install the pins (22)

(1) Refer to Figure 6007. Install the pins on the pressure plate (21) and back plates (24) using appropriate rivet tools.

(2) Splits resulting from the clinching operation are permitted as follows.

- The split shall not occur inside the crest of the clenched surface.
- No more than two splits shall occur in a 90° area.
- A total of no more than three splits shall be allowed.

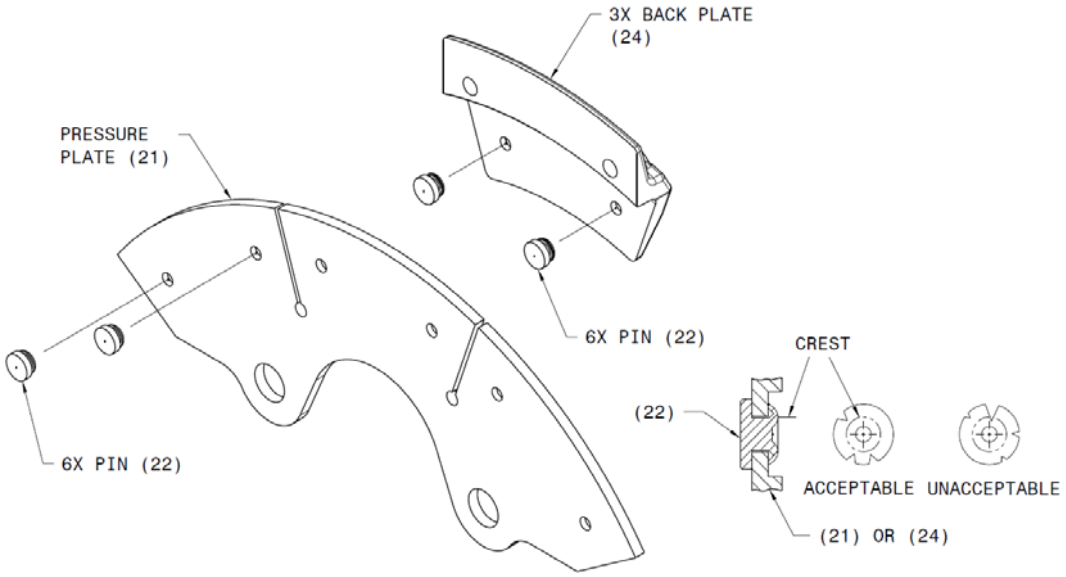


Figure 6007 Install the pins (22)

ASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

NOTE: The term dry torque refers to the torqueing of hardware without the application of anti-seize compound.

A. Equipment and consumables

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

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 7001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Hydraulic fluid	MIL-PRF-5606 (equiv. alternatives are not allowed)	Commercial
Preformed packing tool set	P/N 199-18	Parker Hannifin Corp., Aircraft Wheel & Brake Division or Parker Hannifin distributor
Dry film lubricant for item (3)	One of the following for non-amphibious environment: • Silicone spray • Dri-Slide® Multi-Purpose Lubricant • LPS Force 842® Dry Moly Lubricant	Commercial
Standard tools (inch units)	Wrenches/sockets: • Hex head, external: for (5), (6), (13), (14), (16) Torque wrench	Commercial

B. Reference Documents

Parker Hannifin, Aircraft Wheel & Brake Division product reference memo

- PRM14A ..... Metallic Brake Lining Conditioning Procedure.

ASSEMBLY

2. Assemble each brake

NOTE: The shim (7) and back plate assemblies (23) will be installed after the cylinder is installed in the torque plate assembly (26) or (29).

A. Install a washer (4) onto the threaded end of each anchor bolt (3). Install the nuts (5) and tighten to 70 to 90 in-lb (7.9 to 10.2 N-m), dry torque.

NOTE: The inlet and bleeder ports are identical to allow for left and right hand configuration. Install the bleeder components and inlet fitting as required.

B. Install the preformed packing (15) on the bleeder seat (14). Install the bleeder seat into the bleeder port of the cylinder. Tighten the bleeder seat to 65 to 70 in-lb (7.3 to 7.9 N-m), dry torque.

CAUTION: DO NOT EXCEED 12 IN-LB (1.35 N-M) WHEN TIGHTENING THE BLEEDER SCREW (16). TORQUE IN EXCESS OF 12 IN-LB (1.35 N-M) WILL DAMAGE THE SEAT.

C. Install the bleeder screw (16) into the bleeder seat (14). Tighten the bleeder screw snug to prevent leakage.

D. Install the fitting (13) into the inlet port of the cylinder. Tighten the fitting to 50 to 60 in-lb (5.6 to 6.8 N-m), dry torque.

E. Lubricate the preformed packings (8) with Dow Corning Molykote 55M silicone grease and install in each of the cylinder (2) piston bore grooves.

F. Insert the pistons (9) as follows.

(1) Lubricate the following with a small amount of hydraulic fluid:

- Cylinder piston bores.
- Piston O.D.

(2) Place each piston into a piston bore and rotate to seat the friction spring (12) and to insure that the piston and preformed packing (8) are in proper alignment.

(3) Tap the piston with a wooden, plastic, or rubber mallet while alternately rotating.

(a) If considerable effort is required, remove the piston and inspect both the main piston bore and the piston pilot bore for damage.

(b) If either bore is damaged, check the corresponding area of the piston for damage. Repair or replace parts if necessary and repeat the procedure.

G. Install the pressure plate assembly (20) as follows.

(1) The lining side must face away from the pistons.

(2) Align the anchor bolt holes in the pressure plate with the anchor bolts and slide the pressure plate onto the cylinder.

NOTE: The pressure plate must slide freely over the anchor bolts for proper operation.

ASSEMBLY

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.

3. Install each brake assembly on the aircraft

A. Refer to Figure 7001.

(1) Slide the torque plate assembly (26) or (29) on the axle and attach to the axle flange with the mounting hardware as shown. Torque the nuts, P/N 094-10100, to 230 to 250 in-lb (26 to 28 N-m), dry torque.

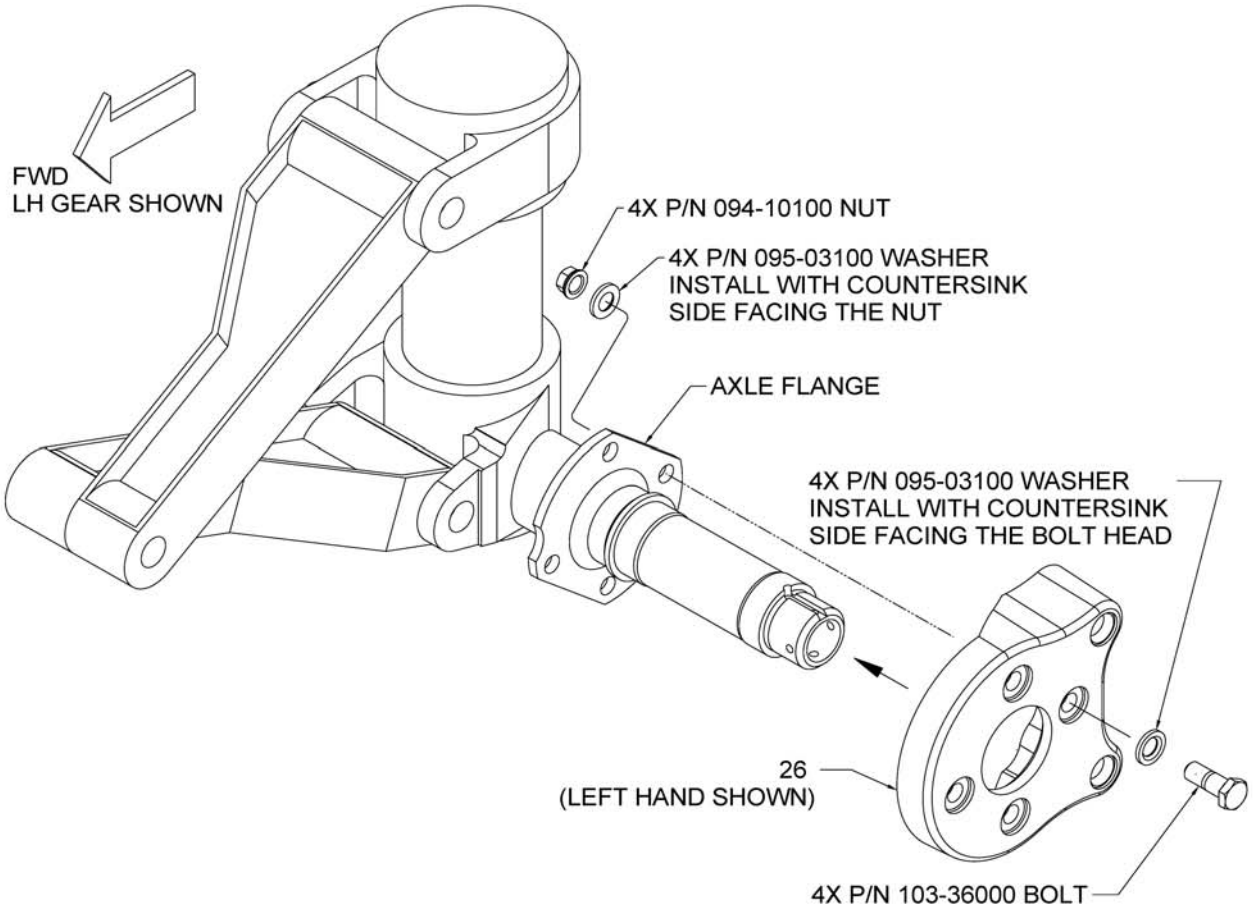


Figure 7001 Install the torque plate assembly (26) or (29)

ASSEMBLY

B. Refer to CM40-128F, Component Maintenance Manual, and install the wheel/tire unit on the axle.

C. Refer to Figure 7002.

CAUTION: DO NOT USE GREASE OR OIL TO LUBRICATE THE INSIDE OF THE TORQUE PLATE BUSHINGS (28) OR ANCHOR BOLTS (3). THIS WILL ATTRACT CONTAMINANTS.

(1) Apply a light coat of dry film lubricant, such as silicone spray, Dri-Slide® Multi-Purpose lubricant (molybdenum disulfide) or LPS Force 842® Dry Moly lubricant to the I.D. of the torque plate bushings (28) and the O.D. of the anchor bolts (3).

NOTE: Reapply dry film lubricant periodically to maintain friction free operation.

(2) Install the cylinder by sliding the anchor bolts (3) into the torque plate bushings (28).

NOTE: The anchor bolts must slide freely in the torque plate bushings for proper operation.

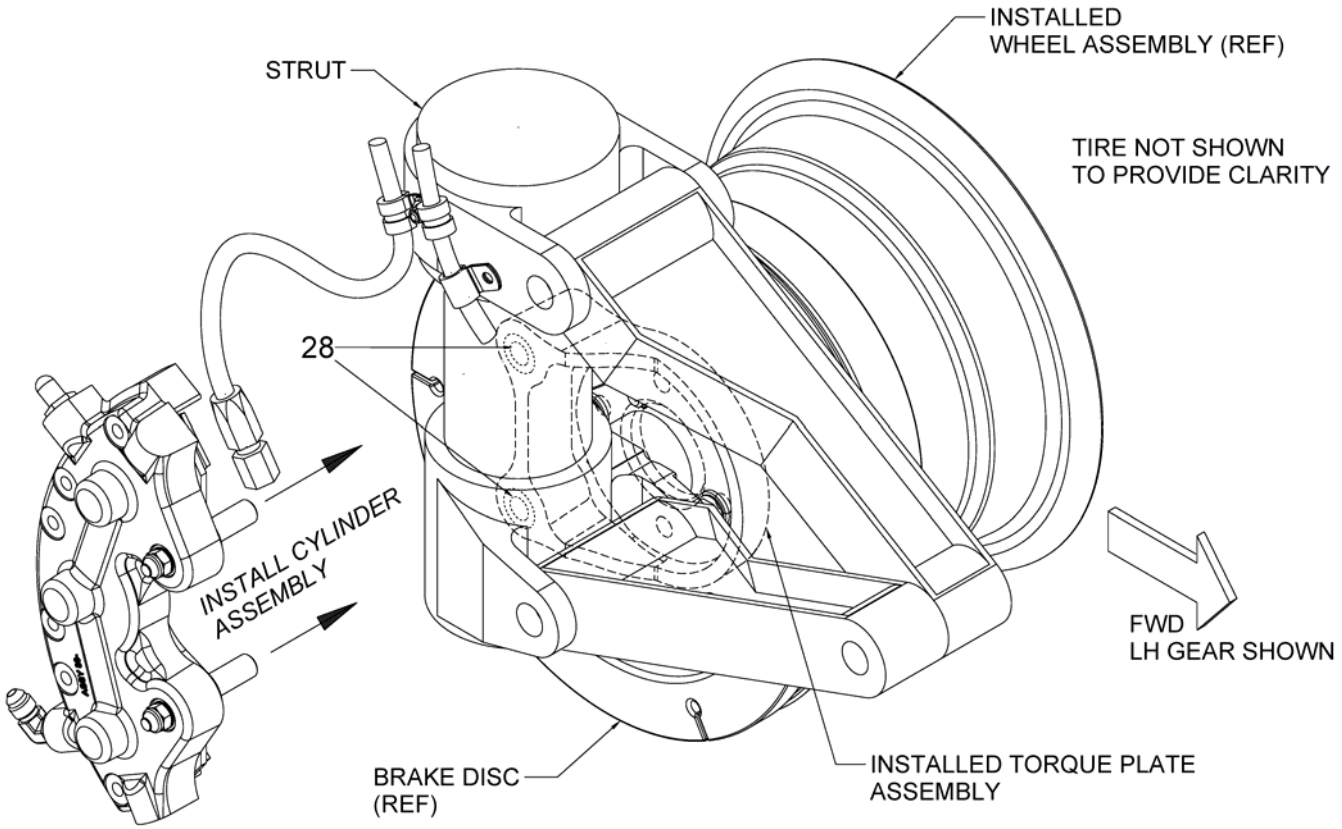


Figure 7002 Install the cylinder

ASSEMBLY

D. Refer to Figure 7003.

(1) Install the six bolts (6) and washers (4) into the brake cylinder.

(2) Install the shim (7) on the bolts (6).

(3) Slide the three back plate assemblies (23) between the brake disc and the wheel flange.

(4) Install the washers (4) and bolts (6). Thread the bolts (6) into the back plate assemblies. Tighten the bolts to 80 to 90 in-lb (9.0 to 10.2 N-m), dry torque.

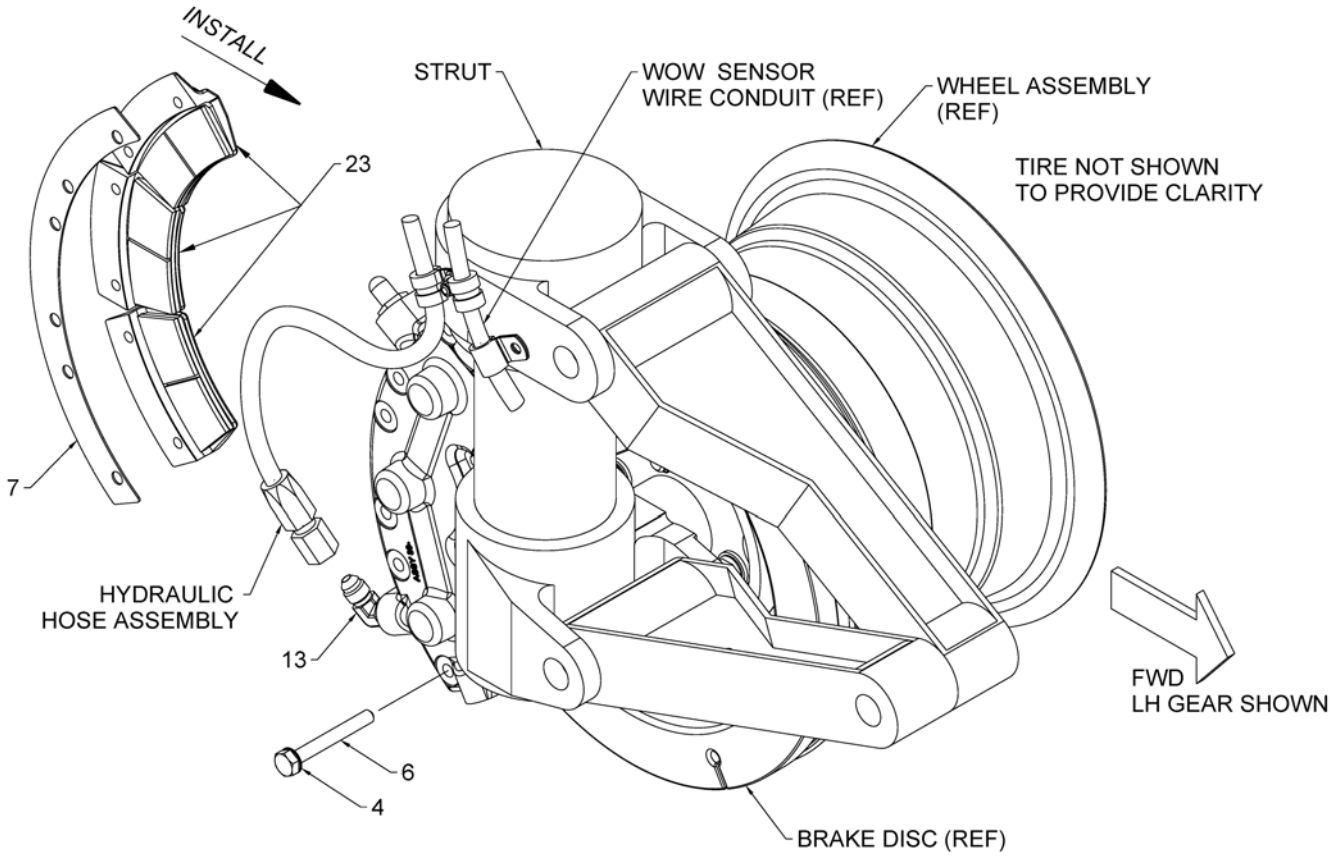


Figure 7003 Install the shim (7) and back plate assemblies (23)

ASSEMBLY

4. Return to service

A. Refer to Figure 7004. Reconnect the hydraulic hose assembly to the brake assembly inlet fitting (13) and torque the hose fittings in accordance with airframe manufacturer's manual.

B. Bleed the hydraulic system and perform the following:

(1) Pressure test the brake assembly at 600 psig and check for leakage.

(2) Check the pedal for proper feel and travel.

(3) Check the mating wheel assemblies rotate freely. There should be no evidence of binding or excessive brake drag.

(4) Check for proper operation of main gear and that no hoses are binding.

C. The brake lining material used is a metallic composition. It must be properly conditioned (glazed) to provide optimum service life. Dynamometer tests have shown that at low braking energies, unglazed linings experience greater wear and the brake discs become severely scored.

(1) Perform conditioning procedure for new lining segments. Refer to Parker Hannifin Product Reference Memo, PRM14A, for conditioning procedures.

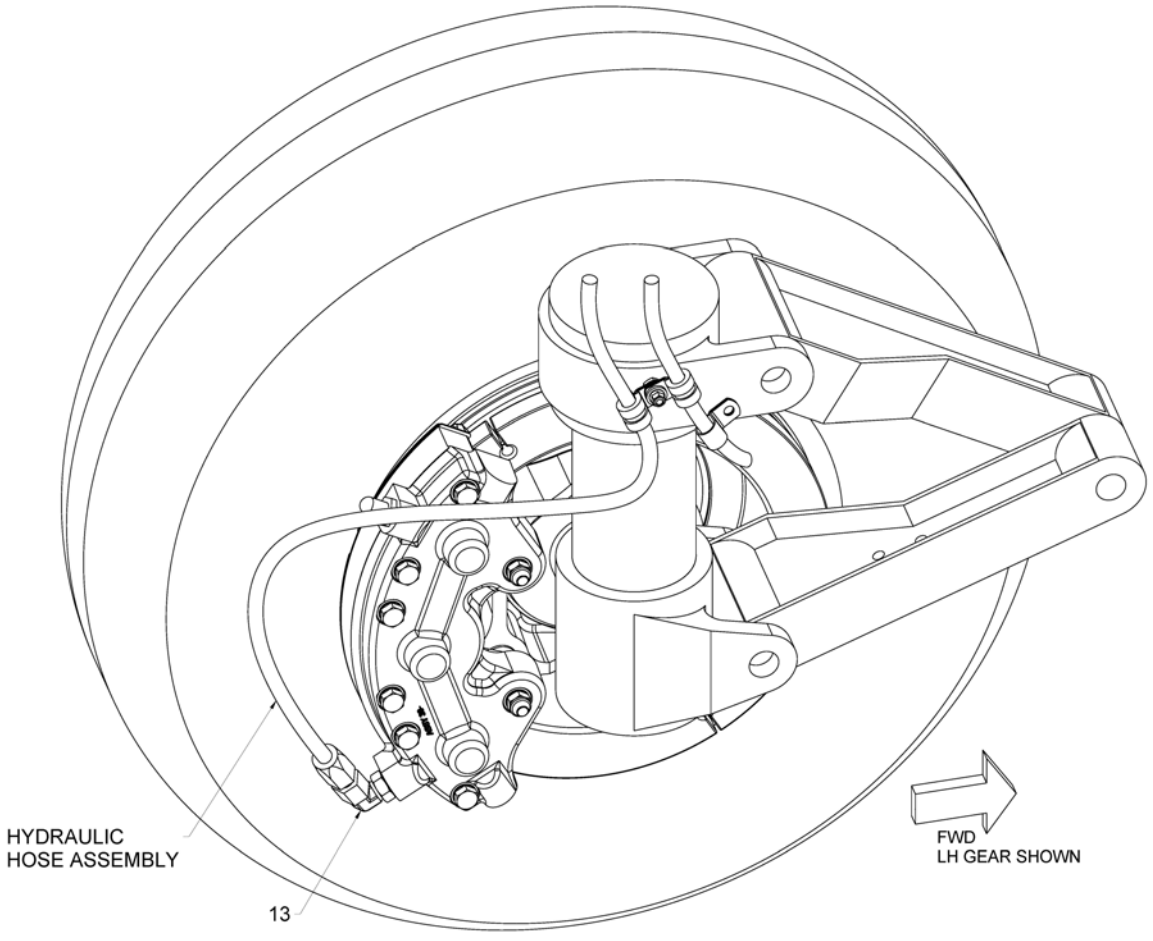


Figure 7004 Connect the system hydraulic line

FITS AND CLEARANCES

1. General

Refer to IPL Figure 1 for component identification.

A. Assembly wear limits

Table 8001 In-service wear limits

PART NAME (IPL item number)	REFER TO	WORN AREA DESCRIPTION	WORN DIMENSION
Lining (19)	Figure 1	Thickness	0.100 inch (2.54 mm) minimum
Cylinder (2) Piston bore	CHECKS	Bore dia.	∅ 1.754 inch (44.55 mm) maximum
Piston (10)	CHECKS	Outside dia.	∅ 1.748 inch (44.39 mm) minimum
Insulator (11)	CHECKS	Height above piston	When flush with piston

B. Assembly torque values

NOTE: The term dry torque refers to the torqueing of hardware without the application of anti-seize.

Table 8002 Assembly torque values

PART NAME (IPL item number)	TORQUE LIMITS
Bolt (6)	80 to 90 in-lb (9.0 to 10.2 N-m), dry torque.
Nut (5)	70 to 90 in-lb (7.9 to 10.2 N-m), dry torque.
Fitting (13)	50 to 60 in-lb (5.6 to 6.8 N-m), dry torque.
Bleeder seat (14)	65 to 70 in-lb (7.3 to 7.9 N-m), dry torque.
Bleeder screw (16)	Tighten snug to prevent leakage. **CAUTION:** DO NOT EXCEED 12 IN-LB (1.35 N-M) WHEN TIGHTENING THE BLEEDER SCREW. TORQUE IN EXCESS OF 12 IN-LB (1.35 N-M) WILL DAMAGE THE SEAT.

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, equivalent alternatives can be used for the items listed.

Table 9001 List of manufacturers

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Preformed packing tool set	P/N 199-18	Parker Hannifin Corp. Aircraft Wheel & Brake Div. Avon, OH 44011 USA www.parker.com or Parker Hannifin distributor
Plastic media	MIL-P-85891, Type II or V, Grade 20/30, 3.5 MOH max	U.S. Technology Corporation www.ustechnology.com
Abrasive media	80 Grit aluminum oxide	
Primer and topcoat for items (2), (27), (30)	Primer: P/N P60G2 or P/N P60G10 Topcoat: P/N F63BXS58-4337	Sherwin Williams Co. www.sherwin-williams.com
O-Ring lubricant	Dow Corning 55 lube (equiv. alternatives are not allowed)	Dow Corning Corporation www.dowcorning.com
ZRC galvilite cold galvanizing compound for items (21), (24)	P/N 11011-10014 MIL-PRF-26915, Type I, Class A	ZRC Products Company www.zrcworldwide.com
Test disc segment	Figure 9001	Fabrication

SPECIAL EQUIPMENT AND CONSUMABLES

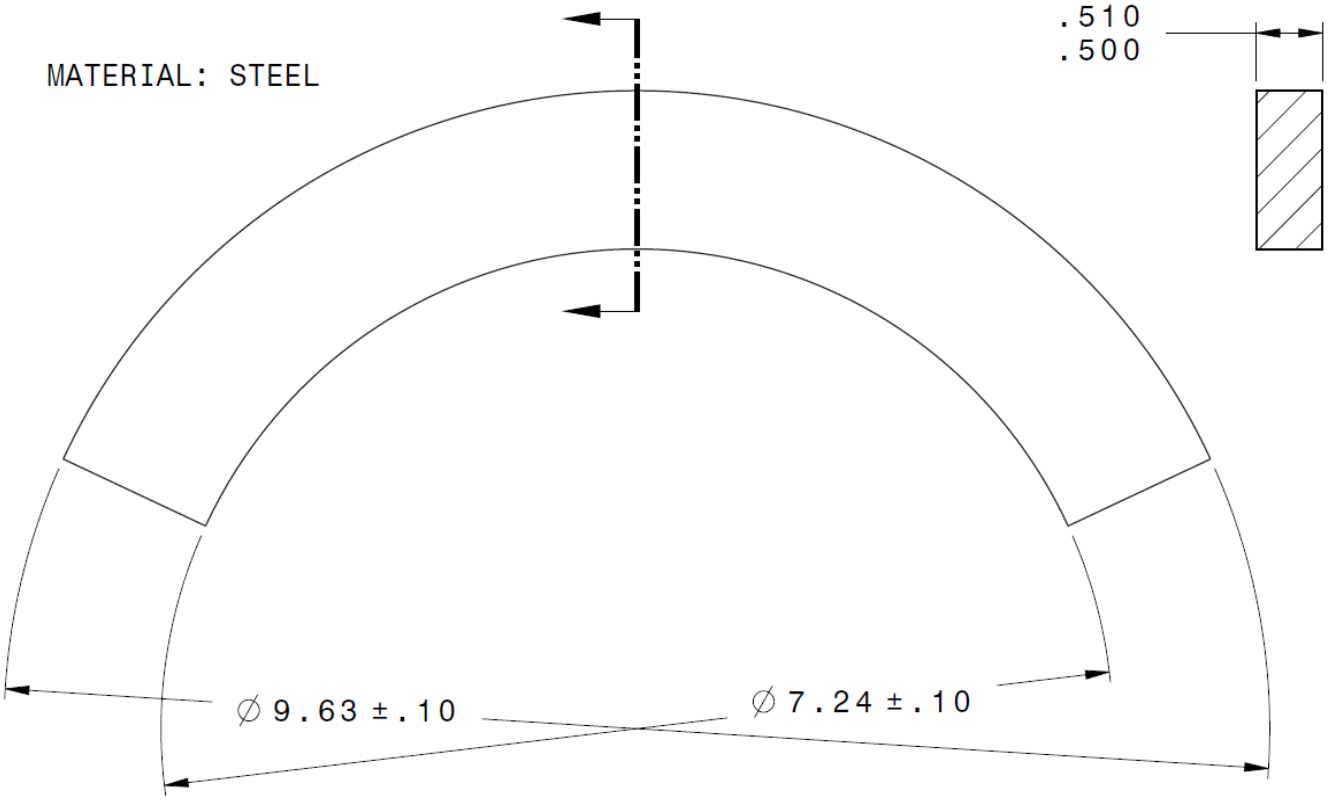


Figure 9001 Test Disc Segment

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 Parker Hannifin AWB 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:

Term	Abbreviation	Definition
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.

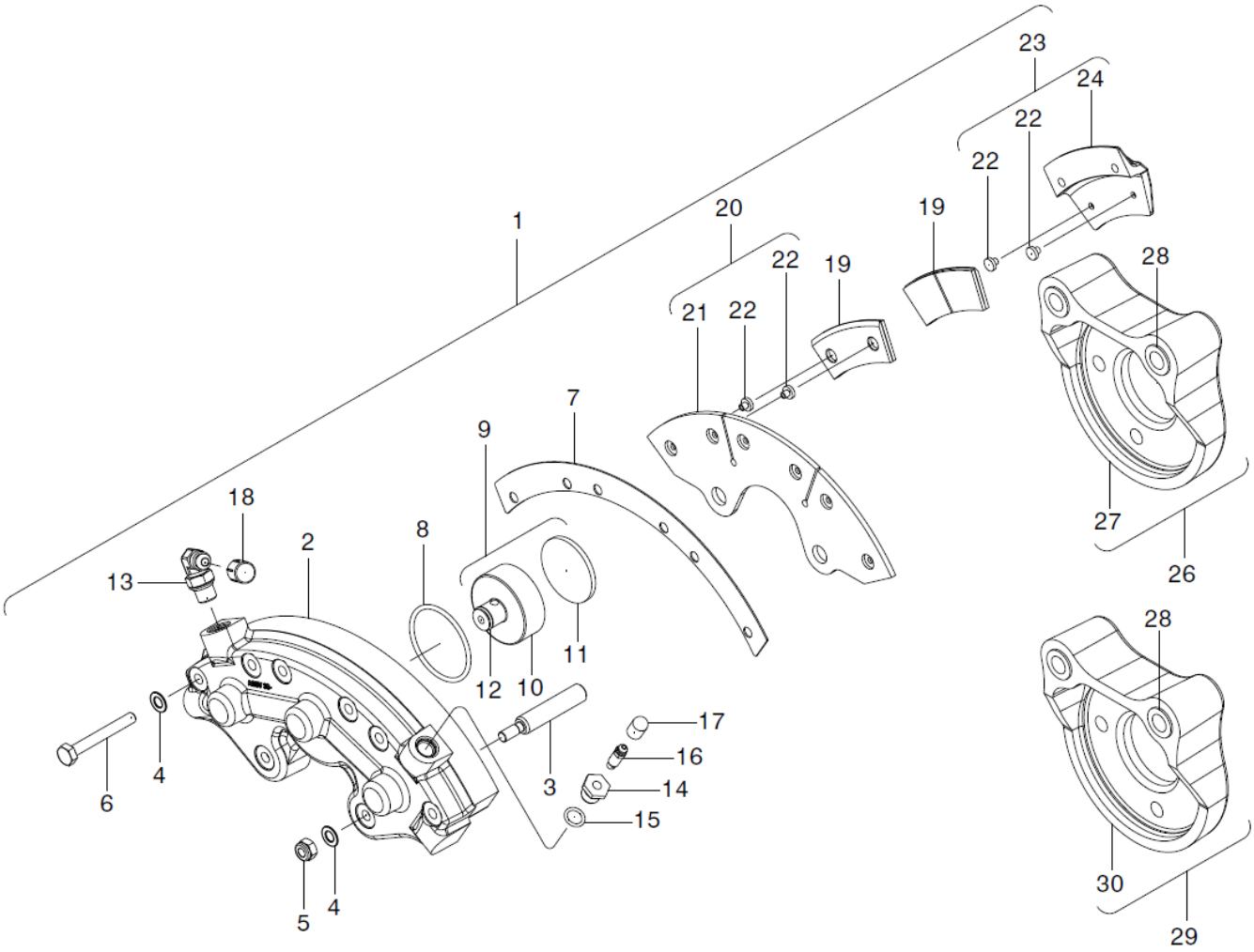
D. Alpha variant item numbers

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



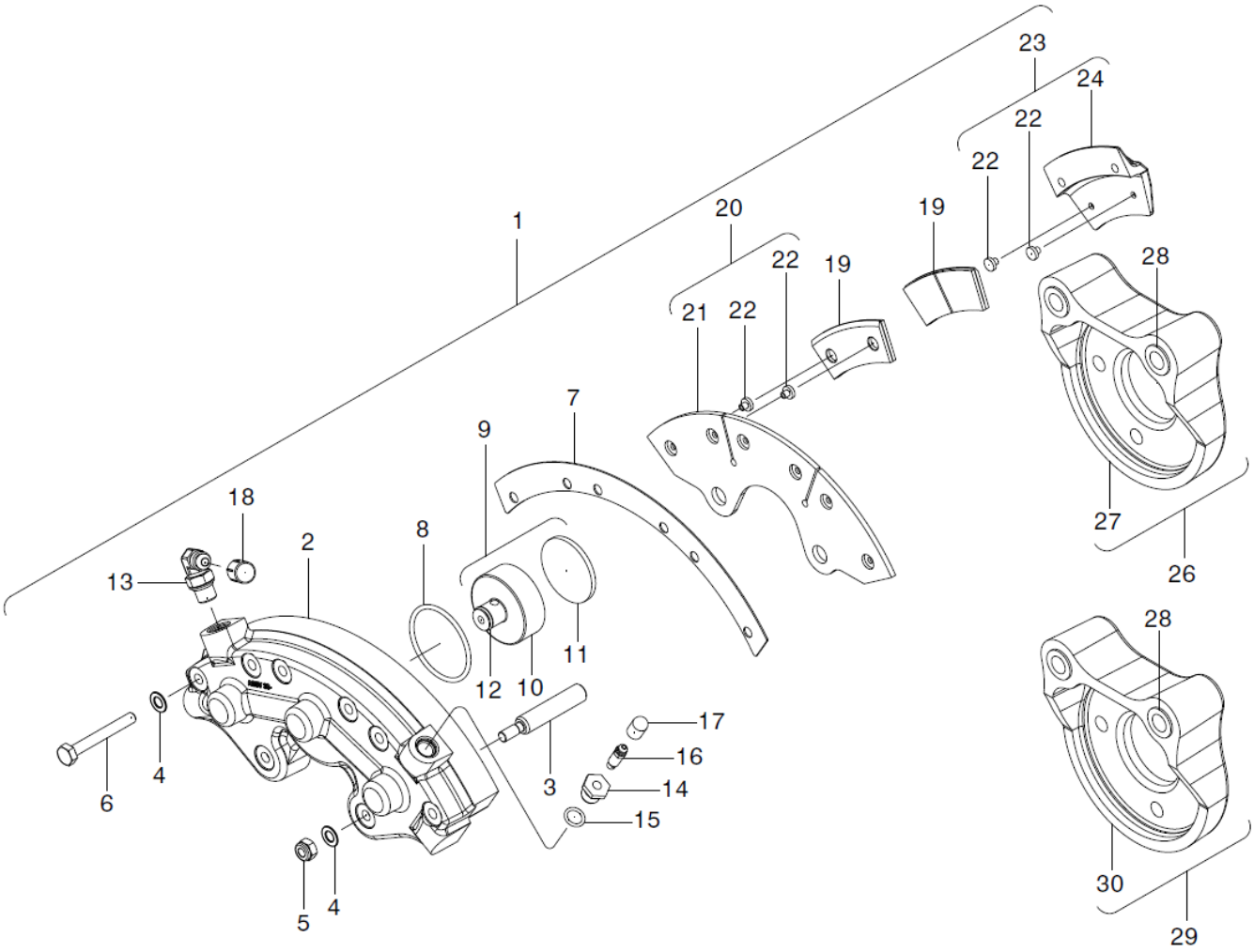
IPL Figure 1 Main brake assembly, exploded view

ILLUSTRATED PARTS LIST

2. Detailed parts list

Fig	Item	Units per assembly	CAGE	Part No.	Description	Usable on code
1	0	REF	33269	30-93F	BRAKE ASSEMBLY, MAIN, LEFT HAND	A
	0	REF	33269	30-93F RH	BRAKE ASSEMBLY, MAIN, RIGHT HAND	B
	1	1		091-19601	• ASSEMBLY, CYLINDER	A, B
	2	1		061-14900	• • CYLINDER	A, B
	3	2		069-02800	• • BOLT-ANCHOR	A, B
	4	8		095-10200	• • WASHER (AN960-416L)	A, B
	5	2		094-10300	• • NUT (MS21044-N4)	A, B
	6	6		103-11700	• • BOLT	A, B
	7	1		068-02700	• • SHIM	A, B
	8	3		101-23200	• • PACKING, PREFORMED (MS28775-132)	A, B
	9	3		092-02800	• • ASSEMBLY, PISTON	A, B
	10	1		062-02600	• • • PISTON	A, B
	11	1		088-00100	• • • INSULATOR	A, B
	12	1		082-02000	• • • SPRING, FRICTION	A, B
	13	1		104-03100	• • FITTING	A, B
	14	1		081-00200	• • SEAT, BLEEDER	A, B
	15	1		101-00700	• • PACKING, PREFORMED (AS28775/MS28775-012)	A, B
	16	1		079-00300	• • VALVE, BLEEDER	A, B
	17	1		183-00100	• • BLEEDER CAP SHIPPING	A, B
	18	1		215-00100	• • CAP, SHIPPING	A, B
	19	6		066-15600	• • LINING	A, B
	20	1		073-02500	• • PRESSURE PLATE, ASSEMBLY	A, B
	21	1		063-02400	• • • PRESSURE PLATE	A, B
	22	2		177-00300	• • • PIN	A, B
	23	3		074-01200	• • BACK PLATE ASSEMBLY	A, B
	24	1		064-01700	• • • BACK PLATE	A, B
	22	2		177-00300	• • • PIN	A, B
	25	1		166-20100	• • NAMEPLATE	A, B

ILLUSTRATED PARTS LIST



IPL Figure 1 Main brake assembly, exploded view

ILLUSTRATED PARTS LIST

2. Detailed parts list

Fig	Item	Units per assembly	CAGE	Part No.	Description	Usable on code
	26	1		075-10902	• TORQUE PLATE ASSEMBLY	A
	27	NP		065-09302	• • TORQUE PLATE	A
	28	NP		145-05200	• • BUSHING	A
	29	1		075-10952	• TORQUE PLATE ASSEMBLY	B
	30	NP		065-09352	• • TORQUE PLATE	B
	28	NP		145-05200	• • BUSHING	B

STORAGE

1. General

Refer to IPL Figure 1 for component identification.

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

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

2. Procedures

A. Cap all fittings.

B. The length of time that a brake assembly can be stored is governed by the storage life of its elastomer-based components. Basically, rubber components are considered to have a storage life of up to 10 years from the date of cure. The storage life may be shortened by exposure to sunlight, extreme temperatures, humidity, ozone, contamination of fluids, severe operating conditions, etc.

C. Normal storage environmental temperatures of 50° to 77°F (10° to 25°C) are desired. If this temperature range cannot be maintained, temperatures as high as 125°F (51.7°C) and as low as -20°F (-28.9°C) can be tolerated for shorter periods. Total time above 100°F (37.8°C) shall not exceed three months.

Component Maintenance Manual

Main Wheel Assembly
Parker Hannifin Part No. 40-128F

CM40-128F

Publication No.: CM40-128F, Revision A

Manufacturer:

Parker

Parker Hannifin Corporation
Aircraft Wheel and Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.

Cleveland
Wheels & Brakes

REVISION HIGHLIGHTS

TO: HOLDERS OF CM40-128F COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-128F.

Revision NC, Dated August 15, 2014

Section/Page No.	Description Of Change
All Sections/All Pages	Initial Release (ECO-0055861)

REVISION HIGHLIGHTS

TO: HOLDERS OF CM40-128F COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-128F.

Revision A, Dated July 20, 2017

Section/Page No.	Description Of Change
As follows	Initial Release (ECO-0082452)
All page footers	Replace proprietary and export statement with disclosure pointing to first page.
Title pg/T-1	(UPDATE) Proprietary statement.
Record of Revisions/ RR-1	(UPDATE) to reflect latest revision.
Service Bulletin List/ SB-1	Corrected footer title and page number to read Service Bulletin List, Page SB-1 from Record of Revisions, RR-1
List of Effective Pages/ LEP-1	(UPDATE) to reflect latest revision.
Testing and Fault Isolation/Pg 1003	Para. 2.C.(5)(b) (DELETE) "the tire bead area."
Pg 1004	Para. E. (DELETE) steps (2) (a) thru (d) and (3) (a) thru (c) which are not applicable to tube type tire application.
Disassembly/3001	Para. 2. (NOW) Remove each wheel assembly from the aircraft (WAS) Remove the wheel assembly
Pg 3001	Para 2., step D. (NOW) D. Refer to Figure 3001. Loosen the six bolts that secure the three back plate assemblies and remove the back plate assemblies, brake shim, and bolts and washers. **NOTE:** Physically support and secure the cylinder assembly while removing the wheel assembly. (WAS) D. Refer to Figure 3001. Loosen the six bolts that secure the three back plate assemblies and remove the back plate assemblies.
Pg 3002	Figure 3001 (REVISE) LH gear configuration to reflect actual hose hardware and to add RH gear configuration.

Revision A (continued)

Section/Page No.	Description Of Change
Repair/6002	CAUTION: Correct typo “procureable” to read “procurable”
Pg 6002	Para. 2.,B., Safety Warning: Correct typo “treament” to read “treatment”
Pg 6002	Para. 2.C.(1) (ADD) Note identifying Oxsilan® as non-chromate and REACH compliant.
Pg 6003	Table 6002 (NOW) Topcoat thickness 0.0008 (WAS) 0.008 (ADD) (including primer) after topcoat thickness
Pg 6009	Table 6003 (NOW) Topcoat thickness 0.0008 (WAS) 0.008 (ADD) (including primer) after topcoat thickness
Assembly/7006	Para. 8.A.: (ADD) “..brake shim and…”
Pg 7005	Para. 7.A. (ADD) “(1) install the inflation valve cap. The cap is the positive…”
Pg 7006	Para. 8.B.: (ADD) “Reinstall the washers and bolts.”
Pg 7006	Figure 7003: (REVISE) to reflect actual hose hardware on LH gear.

RECORD OF REVISIONS

Check in the following record that all earlier changes have been incorporated.

Rev	Incorporated date	by (signature)	Rev	Incorporated date	by (signature)
NC	08-15-2014	P. Hunyad	___	_____	_____
A	07-20-2017	P. Hunyad	___	_____	_____
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SERVICE BULLETIN LIST

Parker Hannifin Service Bulletins are issued in order to provide general information on product line concerns. The bulletin listings contained herein identify subject matter directly related to the support and function of the assembly and components.

Number	Subject	Rev	Date incorporated at manual revision

LIST OF EFFECTIVE PAGES

SUBJECT	PAGE	DATE
Title Page	T-1	July 20, 2017
Record of Revisions	RR-1	July 20, 2017
Service Bulletin List	SB-1	July 20, 2017
List of Effective Pages	LEP-1	July 20, 2017
Table of Contents	TC-1	August 15, 2014
Introduction	INTRO-1	August 15, 2014
	2	August 15, 2014
Description and Operation	1	August 15, 2014
	2	August 15, 2014
Testing	1001	August 15, 2014
	1002	August 15, 2014
	1003	July 20, 2017
	1004	July 20, 2017
	1005	August 15, 2014
	1006	August 15, 2014
Disassembly	3001	July 20, 2017
	3002	July 20, 2017
	3003	August 15, 2014
	3004	August 15, 2014
Cleaning	4001	August 15, 2014
	4002	August 15, 2014
Checks	5001	August 15, 2014
	5002	August 15, 2014
	5003	August 15, 2014
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	6010	Blank
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	7003	August 15, 2014
	7004	August 15, 2014
	7005	July 20, 2017
	7006	July 20, 2017
Fits and Clearances	8001	August 15, 2014
	8002	Blank
Special Equipment and Consumables	9001	August 15, 2014
	9002	August 15, 2014
	9003	August 15, 2014
	9004	Blank
Illustrated Parts List	10001	August 15, 2014
	10002	August 15, 2014
	10003	August 15, 2014
	10004	Blank
Storage	15001	August 15, 2014
	15002	Blank

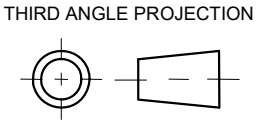
TABLE OF CONTENTS

INTRODUCTION

1. General

SAFETY WARNING: STRICTLY OBSERVE ALL TORQUE AND SPECIFIC LIMITS OR VALUES CONTAINED HEREIN. 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 maintenance of the Parker Hannifin Assembly covered in this publication.



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 the Aircraft Wheel & Brake Division for the latest revision.

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
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Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline

Websites: www.parker.com
www.clevelandwheelsandbrakes.com
E-mail: clevelandwbhelp@parker.com
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Tel: 1-800-BRAKING (1-800-272-5464)

2. TSO notice

This assembly is certified with a "TSO-C26b" marking. This assembly has been tested and qualified to FAA (Federal Aviation Administration) requirements and specifications.

INTRODUCTION

3. Manual use

Instructions are per landing gear.

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.

4. 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.

5. Replacement parts

SAFETY WARNING:  PARKER HANNIFIN WHEEL & BRAKE DIVISION DOES NOT WARRANT OR ASSUME THE RISK OF THE USE OF REPLACEMENT PARTS NOT AUTHORIZED FOR USE BY PARKER HANNIFIN WHEEL & BRAKE DIVISION. OPERATORS WHO USE REPLACEMENT PARTS NOT AUTHORIZED BY PARKER HANNIFIN WHEEL & BRAKE 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 PLATED FINISH (14), (15), (16). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

The wheel assembly has a rim contour designed for a 6.50-8, 8 PR tube type tire.

The wheel halves are magnesium alloy castings.

The wheel assembly rotates on two tapered roller bearings consisting of the cups (3) and cones (9). The bearing cups are shrink fit into the hub of the wheel halves. Bearing seals (10) provide retention of bearing grease and exclusion of contaminants.

2. Operation

The main wheel assembly is the primary interface between the main landing-gear strut and the tire during ground operation. The main wheels transfer stopping forces from the brake to the ground.

3. Handling procedures

Handle the wheel bearing cones with extreme care. Many bearing failures can be traced to dropping or mishandling the bearings during maintenance.

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

4. Specifications

Wheel material/tire size..... Magnesium alloy casting / 6.50-8, 8 PR tube type
Wheel nut torque.....180 in-lb (20.3 N-m) dry torque

NOTE: The term dry torque refers to the torqueing of hardware without the application of anti-seize.

Bearing lubricant ..... Mobil Aviation Grease SHC 100
Wheel half coatings..... Surface treatment: ..... Refer to the REPAIR section
Primer coating: ..... Refer to the REPAIR section
Finish coating: ..... Refer to the REPAIR section

DESCRIPTION AND OPERATION

5. Brake disc wear and warpage limits

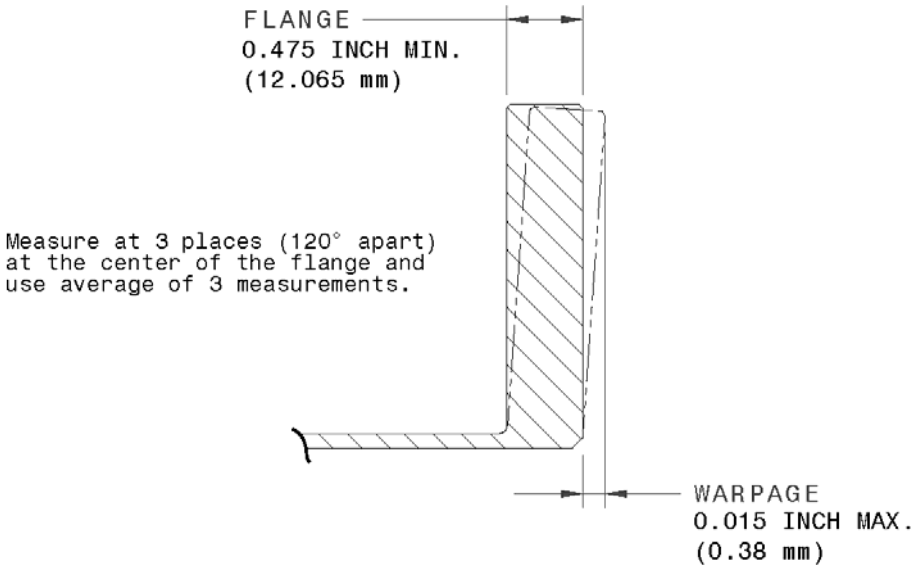


Figure 1 Disc limits

6. Maintenance schedule

The maintenance schedule is a guideline based on laboratory testing environments that simulate normal conditions. Field operating requirements can vary from aircraft to aircraft. These variations will directly affect the wear rate of the wheel assembly components. Operating conditions must be evaluated to determine a suitable schedule to maintain the equipment.

Table 1 Maintenance schedule

INTERVAL OR CONDITION	ITEM	TASK
At every tire change	All components except wheel halves	Visual and detailed examination.
	Wheel halves (2), (6)	Visual examination only.
	Bolts (14)	➢ Visual and detailed examination. ➢ Magnetic particle inspection.
At the following tire changes: 5th, 8th, 10th, 12th, 14th, 16th, then every tire change after.	Wheel halves (2), (6)	➢ Visual and detailed examination. ➢ Liquid penetrant inspection.
Every tire change or every 12 months (whichever occurs first)	Bearing cones (9)	Clean and repack with clean grease. Refer to the ASSEMBLY section.
UNSCHEDULED INTERVAL	**ITEM**	**TASK**
After an RTO (Rejected Take Off) or heavy braking event.	Wheel halves (2), (6)	Visual and detailed examination.
	Bearing cups (3),bearing cones (9), seals (10)	Visual and detailed examination.

TESTING AND FAULT ISOLATION

1. General

Refer to IPL Figure 1 for component identification.

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

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

A. Equipment and consumables

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

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 1001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Tire inflation safety equipment	Commercial source	Commercial
Dry nitrogen	Commercial source	Commercial
Standard tools (inch units)	Wrenches/sockets: • Hex head, external: for (14), (16) Torque wrench Tire pressure gauge	Commercial
Soap solution	Mild dishwashing liquid	Commercial

TESTING AND FAULT ISOLATION

2. Bench test the wheel assembly

Examine all wheel assemblies that do not meet the test standards of this section. Refer to Table 1002 Troubleshooting for possible causes.

SAFETY WARNING: WEAR THE APPROPRIATE PROTECTIVE CLOTHING AND ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

SAFETY WARNING: DO NOT PERFORM TESTING ON ANY WHEEL ASSEMBLY THAT SHOWS SIGNS OF DAMAGE.

A. Tire inflation guidelines

- Use a clip-on chuck and an extension hose.
- Use a direct reading or dial type pressure gauge that is calibrated on a regular basis.
- When inflating a wheel/tire assembly, regulate the supply line to a pressure no more than 50% higher than the tire service pressure.
- Use only dry nitrogen to inflate the tire.
- Do not inflate a tire above the rated service pressure to seat the beads.

B. Pretest examination of product

(1) Examine the wheel for corrosion, loose bearing cups, or visible damage.

(2) Examine all fasteners and threaded components for loose fit. Tighten loose fasteners. Refer to Table 8002, Assembly torque values.

(a) The self-locking feature of the nuts (16) is defective if the nut is loose and you cannot tighten the nut to the assembly torque value. If one nut is damaged, then replace all of the nuts.

(3) Examine the tires for cuts, flat spots, or damage to the tread or sidewall.

NOTE: Refer to the tire manufacturer's service and maintenance manual.

TESTING AND FAULT ISOLATION

C. 24 Hour Pressure retention test

CAUTION: COVER OR PLUG THE BEARING HUB OPENINGS TO PREVENT CONTAMINATION OF THE BEARING BORE AREAS.

(1) Use the proper tire inflation safety equipment.

(2) Inflate the tire with dry nitrogen to the airframe manufacturer's recommended inflation pressure.

(a) Deflate the tire to equalize stretch.

(b) Re-inflate the tire to airframe manufacturer's recommended inflation pressure

(c) Allow 12 hours minimum for a new tire to stretch.

(d) Measure the tire pressure. If necessary, re-inflate the tire to the service inflation pressure.

(3) The wheel/tire assembly must hold the service inflation pressure for 24 hours. A maximum 5% pressure drop is allowed.

(4) If pressure drop is 5% or less:

(a) The pressure retention test is successfully completed.

(5) If pressure drop is greater than 5%:

(a) Inflate the tire with dry nitrogen to the service inflation pressure.

(b) Apply a soap and water solution to the following:

- Juncture around the tire tube valve stem.
- (Deleted)

(c) Examine for air leaks. Refer to E. Leakage diagnosis for additional procedures.

D. Preparation for return to service

(1) Complete the final assembly of the wheel by installing any remaining components. Refer to the ASSEMBLY section.

TESTING AND FAULT ISOLATION

E. Leakage diagnosis

(1) Perform the following examinations to determine if an air leak exists at the tire tube valve stem.

(a) Check the valve core for leakage and replace if necessary.

(b) Repeat the pressure retention test.

1 If the leakage continues, refer to the DISASSEMBLY section and remove the tire from the wheel assembly.

2 Check the tube for leaks and replace the tube if necessary.

CAUTION: USE ONLY ENOUGH PRESSURE TO ROUND OUT THE TUBE. EXCESSIVE INFLATION STRAINS SPLICES AND MAY CAUSE FABRIC SEPARATION OF REINFORCED TUBES.

NOTE: Aircraft tubes are made of 100% natural rubber and will diffuse limited amounts of inflation gas.

3 Repeat the pressure retention test.

(2) (Deleted)

(3) (Deleted)

TESTING AND FAULT ISOLATION

3. Troubleshooting

Table 1002 cannot list all possible problems and is intended to assist with troubleshooting the wheel assembly.

Table 1002 Troubleshooting

PROBLEM	POSSIBLE CAUSE	CORRECTION
Loss of tire pressure at the: • tire tube valve stem	Damage to the valve stem. Damage to the tire tube.	Replace the damaged part.
Loss of tire pressure at the tire bead.	Damage to the tire Damage to the bead seat area of the wheel half (2) or (6).	Replace the damaged part.
Loss of tire pressure - other	Loss of the preload on wheel bolts (14)	Examine bolts for damage and the nuts (16) for damage to self-locking feature.
	A possible cracked wheel half (2) or (6).	Use Liquid Penetrant Inspection to examine the wheel half for cracks. Refer to the CHECKS section.
Excessive drag on the wheel when rotating.	Incorrect preload or torque on the axle nut.	Loosen and re-tighten the axle nut to the aircraft manufacturer's specifications.
	Damage to a bearing cone (9) or cup (3). **NOTE**: Damage could result from incorrect axle nut torque, misalignment of bearings; lack of or contamination of bearing grease.	Examine the bearing cones and cups. Replace any parts that are damaged or corroded. Pack new cones with clean bearing grease. Refer to the ASSEMBLY section.

TEST DATA SHEET

Test Date: _____ **Wheel P/N:** _____ **Wheel Serial No.:** _____

Pretest examination of product

(1) Wheel condition **Pass** _____ **Fail** _____

(2) Wheel assembly hardware condition **Pass** _____ **Fail** _____

(3) Tire condition **Pass** _____ **Fail** _____

Comments: _____

_____

_____

_____

24 hour pressure retention test **Pass** _____ **Fail** _____

Tire inflation pressure: _____ psig Required: airframe manufacturer's recommended inflation pressure

Pressure after 24 hr: _____ psig Pressure Drop Allowed: 5% max.

Pass ____ 5% or less.

Fail ____ greater than 5%.

Leakage at tire tube valve stem Yes ____ No ____

Leakage at bead seat: Yes ____ No ____

Leakage through wheel: Yes ____ No ____

Comments: _____

_____

_____

_____

Tester: _____ **Date:** _____

DISASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

WARNING: WEAR 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, equivalent alternatives can be used for the items listed.

Table 3001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Standard tools (inch units)	Wrenches/sockets: • Hex head, external: for (14), (16) Flat blade screwdriver	Commercial
Portable tire bead breaker	Commercial source	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Valve core tool	Commercial source	Commercial

2. Remove each wheel assembly from the aircraft

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.

SAFETY WARNING: FULLY DEFLATE THE TIRE BEFORE REMOVING THE VALVE CORE. THE AIR IN A TIRE PUTS PRESSURE ON THE VALVE CORE. THE VALVE CORE CAN EJECT WITH GREAT FORCE AND CAN CAUSE INJURY OR DEATH.

A. Refer to the airframe manufacturer’s instructions to lift and support the aircraft.

B. Remove air from the tire by depressing the valve stem plunger in the tube valve stem until air can no longer be heard escaping from the tube.

C. When all the tire pressure is released, then carefully remove the valve core from the tube valve stem.

NOTE: The brake disc (12) is sandwiched between components of the brake assembly (back plate and pressure plate assemblies). The back plate assemblies must first be removed before the wheel assembly can be removed from the axle. Refer to CM30-93F, Component Maintenance Manual, for brake assembly component identification.

D. Refer to Figure 3001. Loosen the six bolts that secure the three back plate assemblies and remove the back plate assemblies, brake shim, and bolts and washers.

NOTE: Physically support and secure the cylinder assembly while removing the wheel assembly.

E. Remove the axle mounting hardware and remove the wheel/tire unit from the axle.

DISASSEMBLY

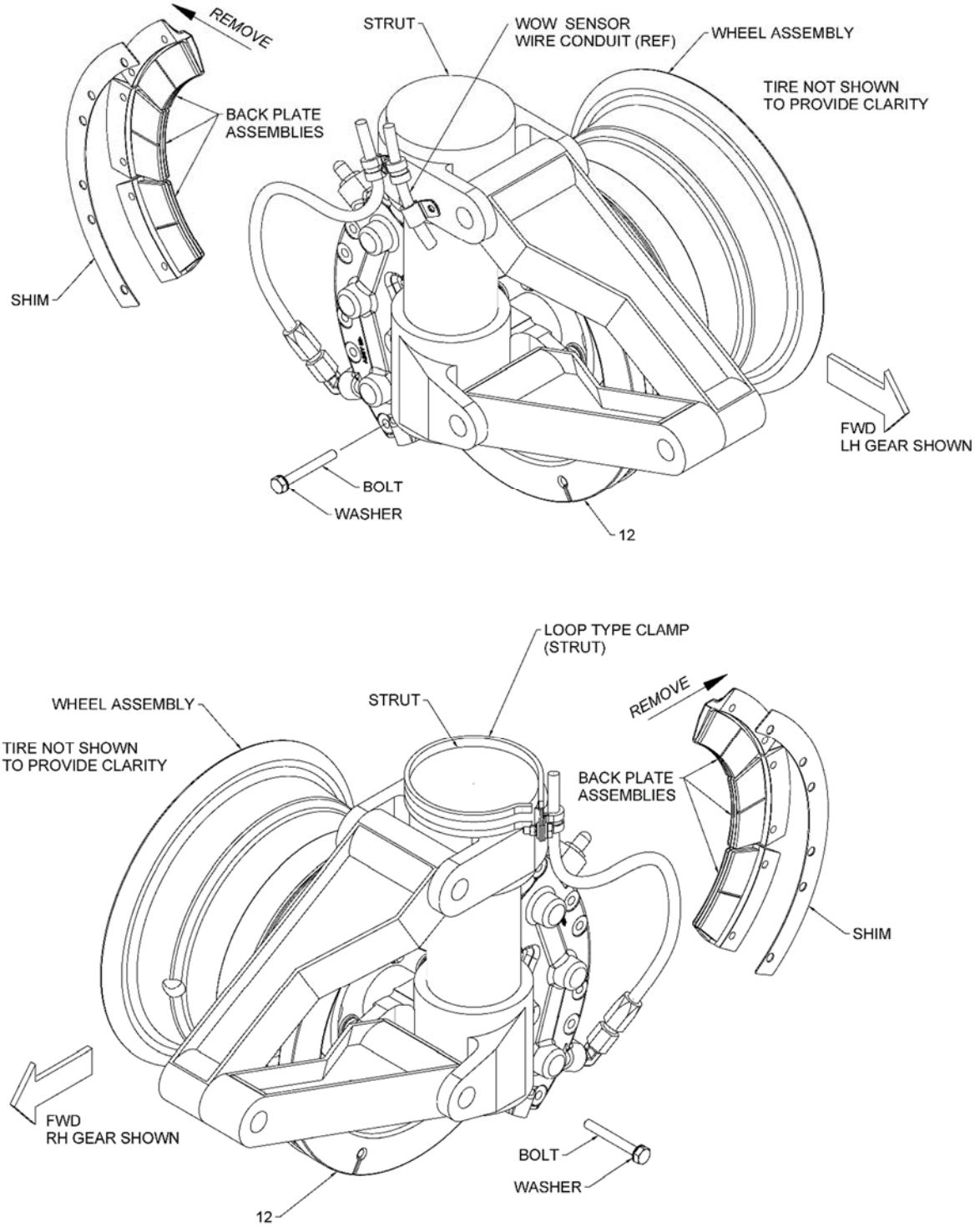


Figure 3001 Remove the brake back plate assemblies

DISASSEMBLY

3. Disassemble the wheel assembly

SAFETY WARNING: DO NOT DISASSEMBLE THE WHEEL UNTIL THE TIRE IS COMPLETELY DEFLATED. SERIOUS INJURY TO PERSONS, OR DAMAGE TO EQUIPMENT CAN RESULT.

NOTE: The bearing cups (3) are pressed into the hub of the wheel halves (2), (6). Do not remove them unless damaged and replacement is necessary or a more thorough inspection of the wheel half is required. Refer to the REPAIR section for replacement instructions.

A. Confirm that the tire is completely deflated.

CAUTION: BE CAREFUL NOT TO DAMAGE THE SNAP RING GROOVE OR WHEEL BORE DURING REMOVAL OF THE SNAP RING (11).

B. Refer to Figure 3002.

(1) Use a flathead screwdriver to remove the snap ring (11) from the inner wheel half (2). Remove the bearing seal (10), grease seal ring (17), and bearing cone (9).

(2) Use a flathead screwdriver to remove the snap ring (11) from the outer wheel half (6). Remove the bearing seal (10), grease seal ring (13), and bearing cone (9).

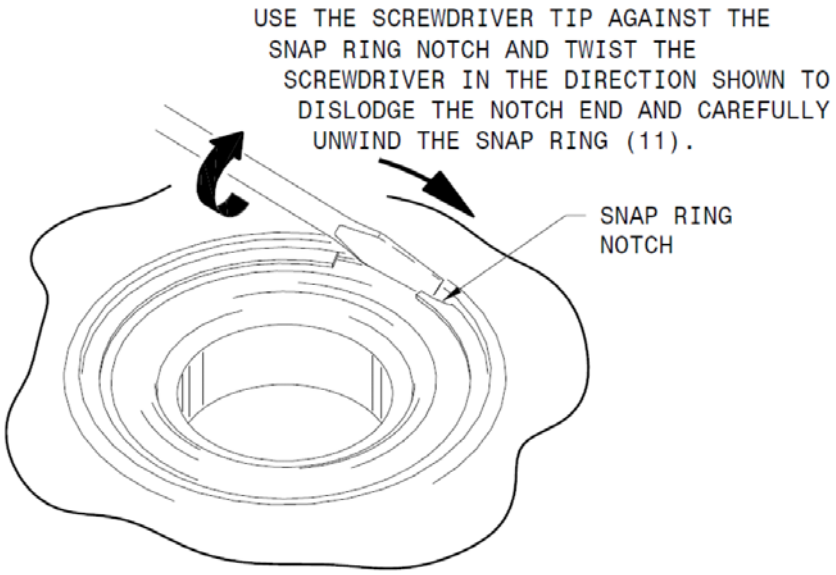


Figure 3002 Snap ring removal

DISASSEMBLY

C. Apply a mild dish soap and water solution around the tire bead and wheel flange to help loosen the tire from the bead seat.

CAUTION: DO NOT USE TIRE IRONS OR SCREWDRIVERS TO PULL THE TIRE AWAY FROM THE WHEEL. SHARP METAL TOOLS WILL DAMAGE THE SURFACES OF THE WHEEL.

D. Use a tire bead breaker and separate the tire beads from both wheel flanges. Apply pressure evenly around the entire sidewall as close to the tire beads as possible.

CAUTION: DO NOT USE AN IMPACT WRENCH OR A POWER WRENCH TO REMOVE THE WHEEL NUTS AND BOLTS. THESE TOOLS CAN DAMAGE THE NUTS AND BOLTS.

E. Remove the nuts (16), washers (15), and bolts (14).

F. Remove the brake disc (12).

G. Separate the wheel halves and remove the tire.

CLEANING

1. General

Refer to IPL Figure 1 for component identification.

WARNING: WEAR 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, equivalent alternatives can be used for the items listed.

Table 4001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Blast stripping equipment	• Plastic blast media: MIL-P-85891, Type II or V, Grade 20/30, 3.5 MOH max. • Abrasive blast media: 80 Grit aluminum oxide	U.S. Technology Corp.
Air supply	30 psig maximum (2.1 bar)	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	Alkaline based	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Mineral spirits	Commercial source	Commercial

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 BREATH VAPORS. KEEP CONTAINERS COVERED WHEN NOT IN USE.

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

2. Clean the hardware

The hardware is made from steel: (11), (13), (14), (15), (16), (17)

A. Use an alkaline based degreasing solution or Stoddard Solvent (per MIL-PRF-680) and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

CAUTION: CLEAN THE BEARING CUPS (3) AND CONES (9) CAREFULLY IN A SEPARATE CONTAINER OF CLEAN SOLVENT TO AVOID CONTAMINATION.

CAUTION: DO NOT SPIN BEARING CONES WHEN USING COMPRESSED AIR TO DRY.

C. Clean the bearing cups (3), (if removed), and bearing cones (9) in a separate container of mineral spirits. Use a non-metallic soft bristled brush to remove all deposits of dirt, grease, and other contamination, then dry thoroughly.

NOTE: Bearing cones will be repacked with grease in accordance with ASSEMBLY section.

CLEANING

3. Clean the bearing seals (10)

The bearing seals have a bonded nitrile material. Wipe the seals with a clean soft cloth dampened in a mild soap and water solution, then dry thoroughly.

4. Clean the wheel halves (2), (6)

The wheel halves are made from magnesium alloy.

A. Use an alkaline based degreasing solution and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

C. Remove the protective coating (primer and topcoat)

CAUTION: IN ADDITION TO REMOVING THE COATING, THE PLASTIC MEDIA WILL ALSO REMOVE ANY NAMEPLATES (4), (7), (8) THAT ARE ATTACHED. ANY NAMEPLATE THAT IS DAMAGED OR REMOVED DURING THE PLASTIC MEDIA PROCESS WILL REQUIRE REPLACEMENT. REFER TO IPL FIGURE 1 FOR THE NAMEPLATE PART NUMBER.

NOTE: Removal of the protective coating (primer and topcoat) is necessary when doing the liquid penetrant inspection of the wheel halves.

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

(1) Part must be clean. This will remove dirt and grease deposits that can contaminate the blast media.

(2) Blast the parts per MIL-STD-1504 with plastic media.

5. Clean the brake disc (12)

The brake disc is made from steel. The abrasive blast process will also help to remove any surface corrosion.

A. Use an alkaline based degreasing solution or Stoddard Solvent (per MIL-PRF-680) and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

C. Remove the protective coating (primer and topcoat).

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

(1) Part must be clean. This will remove dirt and grease deposits that can contaminate the blast media.

(2) Blast the part per MIL-STD-1504 with aluminum oxide media.

CAUTION: FLASH RUST WILL BEGIN TO DEVELOP ON THE BARE METAL IF PROTECTIVE COATING IS NOT APPLIED.

D. Refer to the REPAIR section to apply protective coat on the brake disc.

CHECKS

SAFETY WARNING: THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH (14), (15), (16). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

SAFETY WARNING: MAKE SURE THAT THE AREA WHERE THE LIQUID PENETRANT FLUID IS USED HAS GOOD AIRFLOW. DO NOT COME INTO CONTACT WITH THE FLUID OR BREATHE THE VAPORS. KEEP CONTAINERS COVERED WHEN NOT IN USE. LIQUID PENETRANT FLUID CAN BE TOXIC AND EXPLOSIVE.

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

CAUTION: REPAIR OR REWORK OF PLATED HARDWARE INCLUDING STRIPPING AND RE-PLATING IS NOT ALLOWED. DO NOT STRIP PLATING MATERIAL TO INSPECT A BOLT. REMOVAL OF PLATING MATERIAL WILL CAUSE THE BOLTS TO CORRODE.

1. General

Refer to IPL Figure 1 for component identification.

Refer to Table 1 Maintenance Schedule in DESCRIPTION AND OPERATION for a timetable of recommended scheduled maintenance tasks for the wheel assembly components. All parts must be cleaned before examination. Refer to the CLEANING 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, equivalent alternatives can be used for the items listed.

Table 5001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Inspection surface plate	Commercial source	Commercial
Magnifier	X10 Magnification	Commercial
Micrometers	Commercial source	Commercial
Vernier dial calipers	Commercial source	Commercial
Gage pins	Ø 0.321 to Ø 0.329	Commercial
Magnetic particle inspection kit	ASTM E1444	Commercial
Liquid penetrant inspection kit	ASTM E1417 Type 1, method A, sensitivity level 2	Commercial

2. General inspection

NOTE: Replace hardware that has damage to any protective coating, such as cad plate.

A. Examine the following for corrosion, distortion, wear, burrs, pitting, nicks, cracks, chips, or other visual signs of damage: (2), (3), (6), (9), (10), (11), (12), (13), (14), (15), (16), (17).

B. Visually examine the following for damage to threaded areas: (14), (16).

CHECKS

3. Examine the bearing seals (10)

A. In addition to the general inspection, examine the elastomer to metal bond. Replace the seal if there is a tear in the elastomer to metal bond or if the elastomer is cracked.

4. Examine the bolts (14) and nuts (16)

NOTE: If a bolt or nut needs to be replaced, then replace all of the bolts and nuts at the same time.

A. In addition to the general inspection of the bolts, perform the following in accordance with the maintenance schedule (Table 1, DESCRIPTION AND OPERATION): use magnetic particle inspection (ASTM E1444) to examine the bolts for cracks in the radius under the bolt head and in the threaded area next to the bolt shank.

B. In addition to the general inspection, examine and replace the nuts for damage to the self-locking feature. If the nut can be turned onto the bolt by hand, past the nut's self-locking section or the nut cannot be tightened to the required torque value, then replace.

5. Examine the bearing cups (3) and cones (9)

Refer to Table 1 Maintenance schedule in the DESCRIPTION AND OPERATION section for the maintenance interval.

The bearing cups (3) are press-fit into both wheel halves (2), (6). Do not remove them unless damaged and replacement is necessary or a more thorough inspection of the wheel half is required. Refer to the REPAIR section for removal/installation instructions. In addition to the general inspection of the cups and cones, examine for evidence of the following conditions:

NOTE: [1] Refer to the bearing manufacturer's brochure/manual for visual illustrations.

NOTE: Replace bearing cups and cones as a matched set. If replacing a bearing cup, it is recommended that both bearing cups and cones be replaced at the same time.

A. Examine the cups in the wheel half for loose fit, wear, corrosion, spalling, brinelling, nicks, scratches, water staining, pitting, and heat discoloration.

B. Examine the roller surfaces of the bearing cones for wear, corrosion, spalling, pitting and heat discoloration.

C. Examine the bearing cone cage for dents or distortion. Examine the roller pocket sides, corners, and ends for wear.

6. Examine the brake disc (12)

A. In addition to the general inspection of the disc, refer to Figure 1, DESCRIPTION AND OPERATION section and examine for mininum flange thickness and warpage. Replace the disc when the flange is worn to 0.475 inch (12.065 mm). Replace if warpage exceeds 0.015 inch (0,38 mm).

[1] How to Recognize and Prevent Tapered Roller Bearing Damage
available from Timken Company, Canton, Ohio 44706 U.S.A.

CHECKS

7. Examine the wheel halves (2), (6)

NOTE: Wheel halves are not procurable at the 151- or 152- part level and must be obtained at the 161- or 162- wheel half subassembly level which includes an installed bearing cup.

NOTE: Replace bearing cups and cones as a matched set. If replacing a wheel half subassembly, replace the bearing cup of the remaining wheel half subassembly and replace both bearing cones.

In addition to the general inspection of the wheel halves, examine for evidence of the following conditions:

A. Examine the exterior surface for missing paint caused by erosion or wear.

B. Examine the wheel halves for surface cracks, nicks, corrosion, or other damage.

NOTE: Look closely at the bead seat area for corrosion.

C. Examine the inboard and outboard wheel half register grooves. Examine for burrs, corrosion, or other raised edges.

D. Refer to Figure 5001 and visually inspect wheel halves for surface cracks, nicks, corrosion or other damage. Examine these areas carefully to find out if the wheel is serviceable.

NOTE: These cracks may not be visible without the aid of penetrant inspection methods. Any cracks are cause for replacement.

(1) When it is necessary to examine the wheel halves for cracks at or near the surface, use liquid penetrant inspection (ASTM E1417, Type 1, Method A, Sensitivity Level 2).

NOTE: The paint must be removed from the part when using liquid penetrant inspection methods. Refer to the CLEANING section for paint removal and cleaning instructions.

- Examine the bead seat area. The tire bead seat area is typically an area of stress concentration and possibly subjected to trauma from tire beads and tools used to remove tires.
- Examine the bolt bosses.

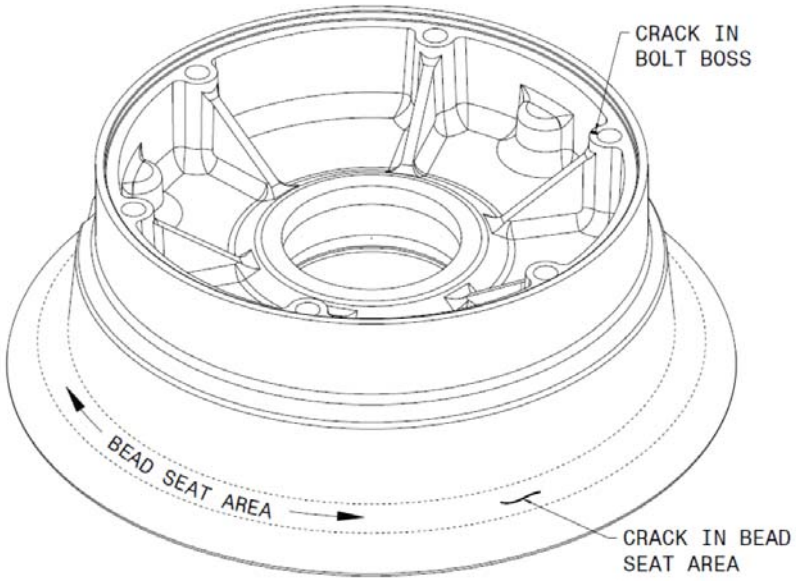


Figure 5001 Wheel half examination

CHECKS

E. Examine the bolt holes

Inspect features of the bolt holes as shown in Figure 5002.

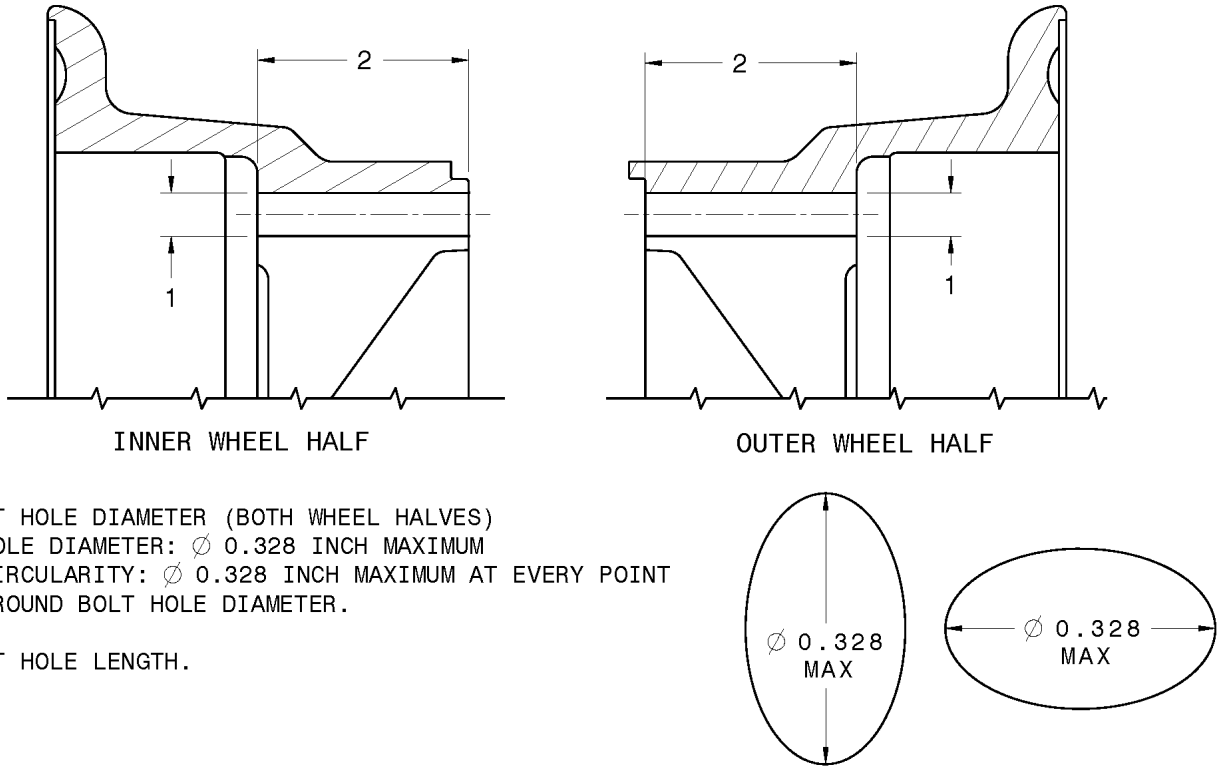


Figure 5002 Wheel half bolt hole features

(1) Refer to Figure 5003. Use gage pin diameters from Ø 0.321 inch to Ø 0.328 inch and measure all the bolt holes of the inboard and outboard wheel halves. The gage pins should fit into each of the bolt holes.

(2) Use a gage pin diameter of Ø 0.329 inches. If the gage pin can fit into one of the bolt holes, then the bolt hole is too large and the wheel half is considered scrap.

CHECKS

Figure 5003 Measure bolt hole diameter

CHECKS

NOTE: With the outboard wheel halves, be sure that the register face is laying on the flat surface and not the register lip. Refer to Figure 5004.

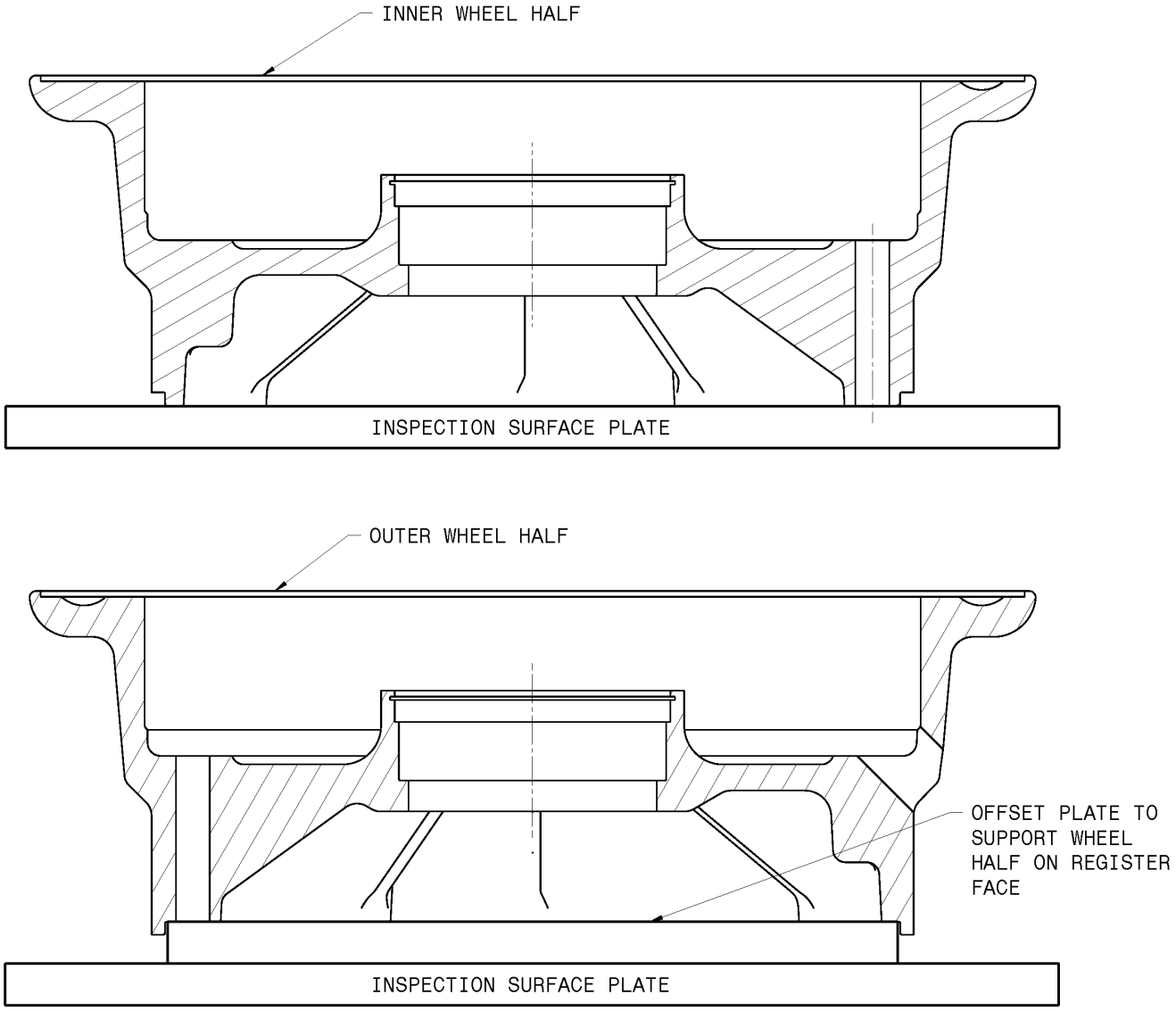


Figure 5004 Setup for bolt hole length measurement

CHECKS

(3) Refer to Figure 5005. With the wheel register side of each wheel half laying on a flat surface, measure the bolt hole length using the depth gage on a Vernier caliper. Refer to Table 5002 for acceptable limits.

(4) Check the base material for noticeable compression from the washer. This is a result of applying a torque greater than the maximum torque allowed for the wheel nuts. If there is notable compression of the base material, then the wheel half is considered scrap.

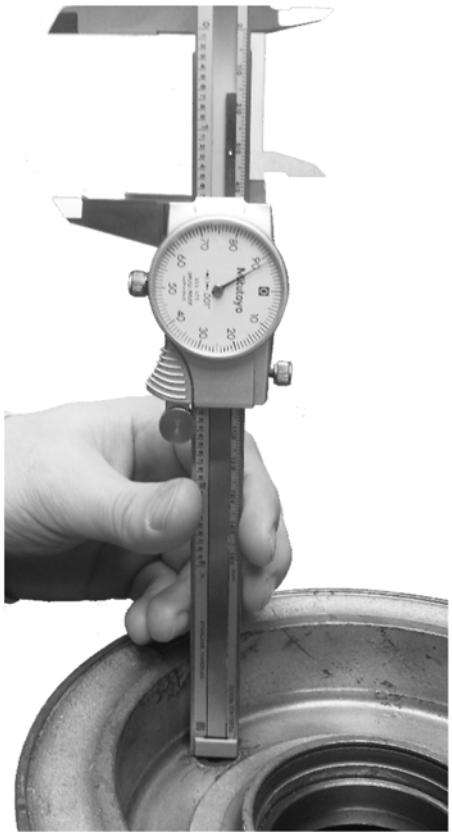


Figure 5005 Measure bolt hole length

Table 5002 Bolt hole length limits

IPL Figure no.	Measurement	Action
Outer wheel half (6)	Less than 1.581 inch	Replace wheel half subassembly
Inner wheel half (2)	Less than 1.581 inch	Replace wheel half subassembly

REPAIR

1. General

Refer to IPL Figure 1 for component identification.

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, equivalent alternatives can be used for the items listed.

Table 6001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Aluminum oxide cloth	400 to 600 grade or finer, wet or dry	Commercial
Blast stripping equipment	Abrasive blast media: 80 Grit aluminum oxide	U.S. Technology Corp.
Surface treatment for (2), (6)	MIL-M-3171, Type VI chromic acid or Oxsilan®	Commercial
Paint application equipment	Commercial source	Commercial
Protective coatings for (2), (6)	Refer to Table 6002	Sherwin Williams Co.
Protective coatings for (12)		
Tools for bearing cups (3)		
Removal tools Installation tools	Figures 9001, 9002 Figures 9003, 9004	Fabrication
Heat source methods	Range capacity: up to 200°F (93°C): • Infrared lamp • Continuous run temperature chamber • Temperature control LOCALIZED thermal A/C Cover (TACCO) • Induction heating system	Commercial
Refrigeration source methods	Range capacity: -25°F to -65°F (-32°C to -54°C): • Subzero freezer • Dry ice	Commercial
Primer	MIL-PRF-23377, Type 1, Class C2	Commercial
Arbor press	Commercial source	Commercial
Feeler gauge	0.002 inch (0.051 mm)	Commercial

REPAIR

SAFETY WARNING: THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH (14), (15), (16). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

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 MAGNESIUM COMPONENTS AND WILL CAUSE CORROSION.

CAUTION: REPAIR IS LIMITED TO THE PARTS LISTED IN THIS SECTION. THE FOLLOWING ITEMS ARE NOT REPAIRABLE AND MUST BE REPLACED IF WORN OR DAMAGED:

- HARDWARE: (3), (9), (11), (13), (14), (15), (16), (17)
- COMPONENTS THAT CONTAIN ELASTOMERS: (10)

CAUTION: THE FOLLOWING ITEMS ARE NOT PROCURABLE. ORDER THE NEXT HIGHER ASSEMBLY IF ITEM CANNOT BE REPAIRED:

- INNER WHEEL HALF (2). MUST ORDER ITEM (1).
- OUTER WHEEL HALF (6). MUST ORDER ITEM (5).

2. Repair and paint the wheel halves (2), (6)

The wheel halves are made from cast magnesium alloy.

A. Surface damage repair:

(1) Blend out small nicks, scratches, or pits.

B. Clean the part. Refer to the CLEANING section.

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. SURFACE TREATMENT SOLUTIONS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR MIXING, APPLYING, DISPOSAL AND FOR ALL SAFETY INSTRUCTIONS.

C. Apply a surface treatment

Magnesium parts may be treated with surface pretreatment per MIL-M-3171 Type VI chromic acid or Oxsilan®.

(1) MIL-M-3171 Type VI (for use on parts with a dull bronze to bright gold surface treatment appearance)

NOTE: Oxsilan® is a non-chromate coating and REACH (Registration, Evaluation and Authorization of Chemicals) compliant.

(a) Apply mixed solution liberally at room temperature and allow to dry. Parts may be dipped for 1/2 to 2 minutes in solution at room temperature.

(b) Remove excess coating by flushing with clean, cold water.

(c) Dry in oven or hot air. Never rinse in hot water.

(d) Alternate option would be to re-coat with Oxsilan® (see instructions below).

(2) Oxsilan® (for use on parts with a clear to iridescent surface treatment appearance)

(a) Scrub surface with an abrasive material such a Scotch-Brite® pad.

(b) Rinse surface with water.

(c) Wipe excess water with clean cloth.

(d) Spray with a liberal amount of Oxsilan® so that the entire scrubbed area is saturated.

(e) Let stand for 5 minutes. To expedite the dry process, a mild airflow source can be used.

REPAIR

D. Paint the wheel halves

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. PAINT MATERIALS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR MIXING, APPLYING, DISPOSAL AND FOR ALL SAFETY INSTRUCTIONS.

(1) For small area paint touchup

(a) Prepare the area by sanding lightly with 400 to 600 grade or finer, wet or dry aluminum oxide cloth and feather out all edges of the adjacent area.

(b) Confirm that the area is clean and surface pretreatment was applied if repair work was performed.

(c) Touch up the area with primer and topcoat.

(2) For complete primer and topcoat application.

NOTE: Performed if primer and topcoat was removed from entire part by plastic media blasting.

(a) Confirm that the part has been cleaned and surface treatment applied if repair work was performed.

(b) Mask the wheel halves. Refer to Figure 6001.

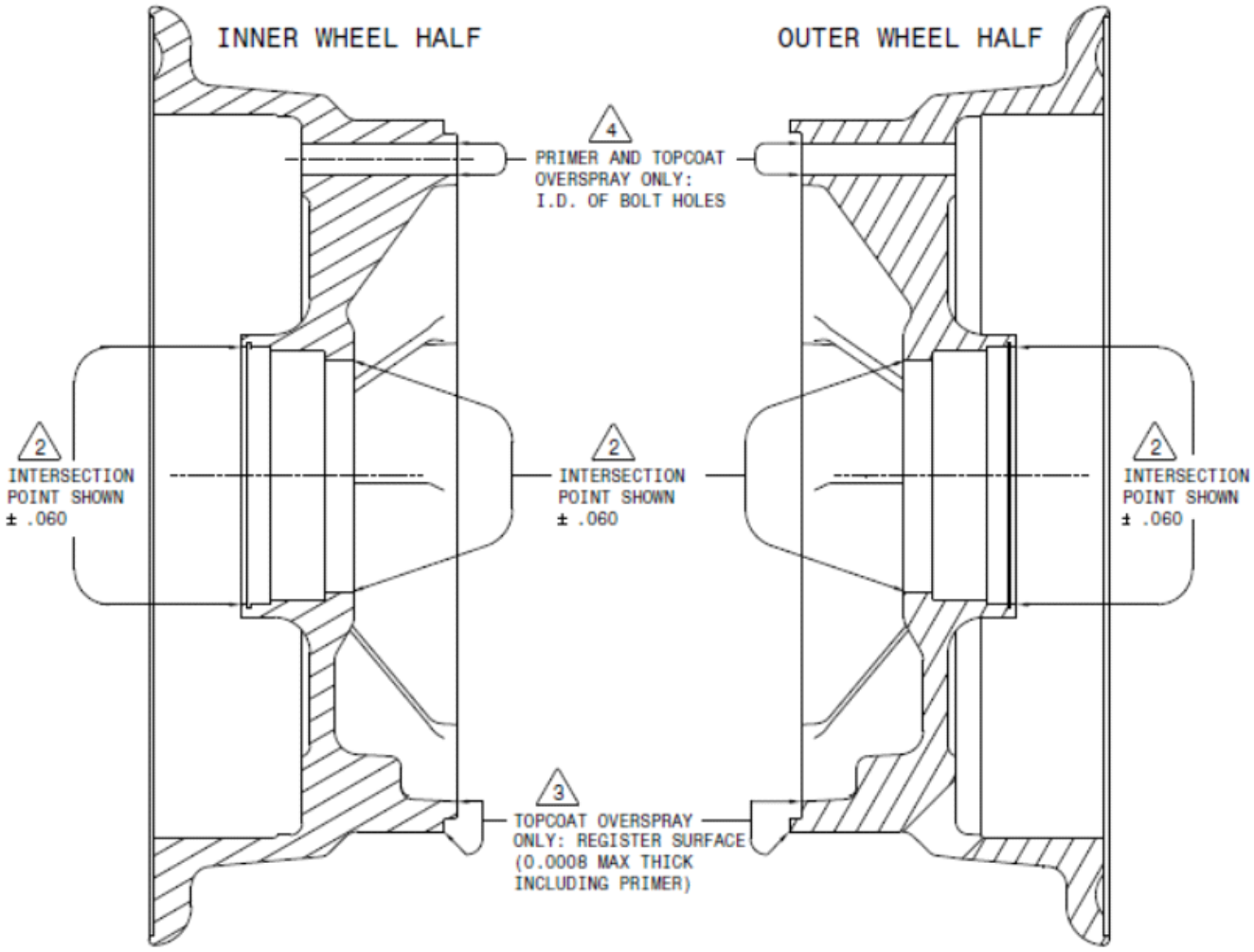
(c) Apply the primer and the topcoat. Refer to Table 6002.

NOTE: Results can vary and depend on the environment and the equipment used. To achieve the best results, always refer to the manufacturer's instructions for mixing, application and use.

Table 6002 Wheel halves primer and topcoat specifications

MANUFACTURER	PRIMER	TOPCOAT
Sherwin Williams Co. Cleveland, OH	P/N P60G2 primer (2 parts) P/N R7K44 reducer (3 parts) -or- P/N P60G10 primer P/N R2K4 reducer (as needed)	P/N F63BXS58-4337 (silver) (2 component polyurethane) 6 parts base 1 part catalyst, P/N V66V27 P/N R7K84 reducer (as needed)
	Primer Thickness: 0.0002-0.0004 inch Drying Time (air dry): To touch: 3 to 10 minutes Tack free: 10 to 15 minutes To topcoat: 10 to 60 minutes	Topcoat Thickness: 0.0008-0.0014 inch (including primer) Drying Time (air dry): To touch: 20 minutes To handle: 60 minutes Dry hard: overnight

REPAIR



NOTES:

1. APPLY PRIMER AND TOPCOAT TO ALL SURFACES EXCEPT AS NOTED.
2. NO PRIMER AND NO TOPCOAT TO THESE SURFACES.
3. TOPCOAT OVERSPRAY ONLY PERMITTED.
4. PRIMER AND TOPCOAT OVERSPRAY ONLY PERMITTED.

Figure 6001 Mask the wheel halves (2) (6)

REPAIR

3. Replace the bearing cups (3)

WARNING: WEAR PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK. DRY ICE AND HOT PARTS CAN CAUSE INJURY.

CAUTION: BEARING CUPS AND CONES MUST BE REPLACED AS A SET.

CAUTION: WORK SWIFTLY. THERMAL EXPANSION AND CONTRACTION OF PARTS WILL AFFECT THE INSTALLATION PROCESS.

CAUTION: DURING BEARING CUP REMOVAL AND INSTALLATION, SUPPORT THE WHEEL HALF ON THE HUB, NOT ON THE FLANGE. SUPPORTING THE WHEEL HALF ON THE FLANGE CAN DAMAGE THE FLANGE.

CAUTION: AVOID RAISING BURRS IN THE WHEEL HALF BORE WHEN REMOVING AND INSTALLING THE BEARING CUP.

NOTE: [2] Refer to the bearing manufacturer's manual for damage allowances.

A. Removal

Refer to Figure 6002 and the following procedure.

CAUTION: DO NOT HEAT THE WHEEL HALF ABOVE 200°F (93°C).

(1) As an option, the removal of the bearing cups can be made easier when the wheel half is heated. See Table 6001 for a list of methods.

(a) Heat one of the wheel halves (2) or (6) to 175°F (79°C).

(2) Remove the wheel half from the heat source.

(3) Position the wheel half on the support base.

(4) Position the push plate on the back face of the bearing cup (3).

(5) Use an arbor press to apply even pressure to the push plate until the bearing cup drops out of the hub.

(6) Repeat for the remaining wheel half.

[2] How to Recognize and Prevent Tapered Roller Bearing Damage
available from Timken Company, Canton, Ohio 44706 U.S.A.

REPAIR

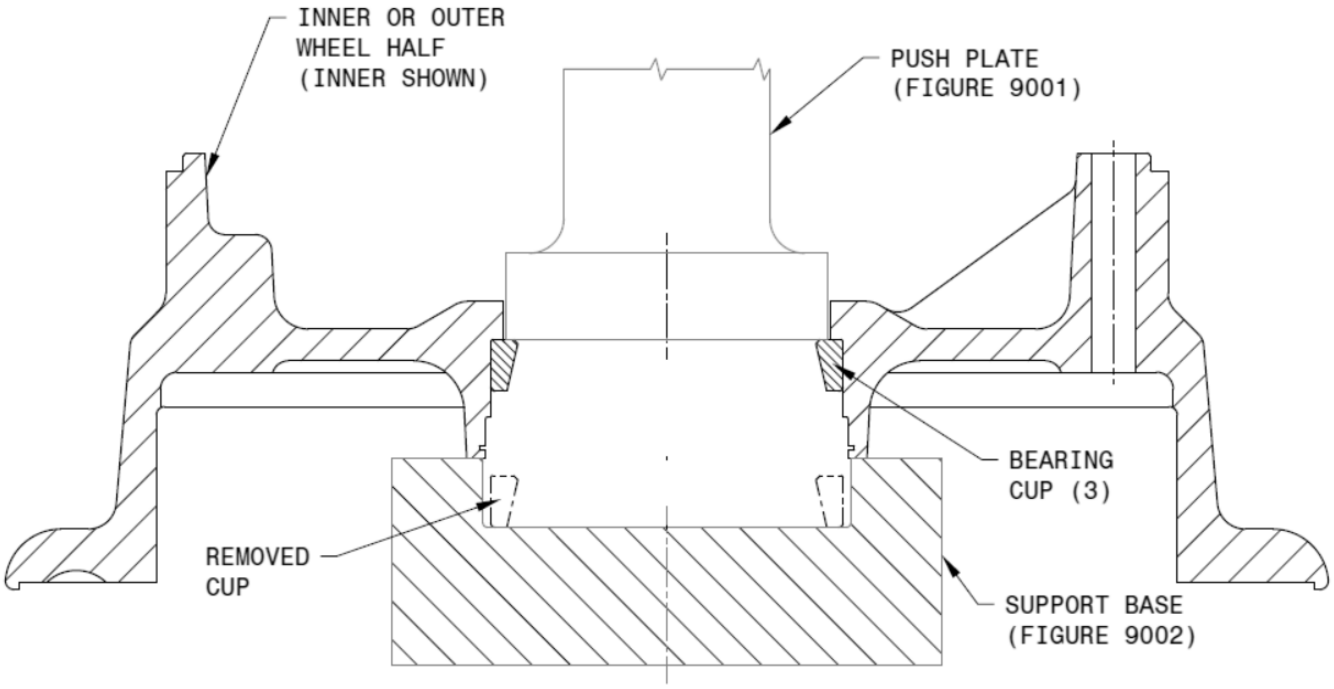


Figure 6002 Remove the bearing cup (3)

B. Installation

Refer to Figure 6003 and install the bearing cups using the following procedure.

CAUTION: THE FOLLOWING PROCEDURE SHOULD BE ACCOMPLISHED QUICKLY WITH SPECIAL ATTENTION GIVEN TO ALIGNMENT OF PARTS. THIS PROCEDURE SHOULD NOT BE DELAYED AS THE PRIMER WILL BEGIN TO CURE IN THE BORE AND LOSE IT'S LUBRICITY.

CAUTION: DO NOT LET THE PRIMER COATING DRY BEFORE INSTALLING THE BEARING CUP.

CAUTION: AVOID COCKING THE CUP DURING INSTALLATION.

(1) Make sure that the bearing bore and the bearing cup are clean and free of burrs.

CAUTION: DO NOT CHILL THE BEARING CUP BELOW -65°F (-54°C).

(2) The installation of the bearing cup is made easier when the bearing cup is chilled. See Table 6001 for a list of refrigeration methods.

(a) Chill the bearing cup (3) to between -25° to -65°F (-32° to -54°C).

(3) Remove the bearing cup from the refrigeration source and wipe off any condensation.

REPAIR

(4) Brush a light wet coat of the MIL-PRF-23377, Type 1, Class C2 primer into the bearing bore. This will help prevent corrosion.

(5) Position the wheel half on the support base and align the bearing cup over the bore.

(6) Position the bearing cup press on the face of the cup.

(7) Use an arbor press to apply even pressure to the cup press. Make sure that the back face of the bearing cup is flush against the surface (shoulder) of the bearing bore.

(8) Check for proper seating of the cup against the housing shoulder. Try to insert a 0.002 inch feeler gauge between the back surface of the bearing cup and the bearing bore shoulder.

  (a) The feeler gauge must not be able to be inserted at any location between the back surface of the cup and the bearing bore shoulder.

(9) Remove excess primer with a clean shop towel so that a fillet of not more than .08 inch (2.0 mm) wide extends beyond the cup.

(10) Apply a light coat of bearing grease to the I.D. of the bearing cups to prevent corrosion.

(11) Repeat for the remaining wheel half.

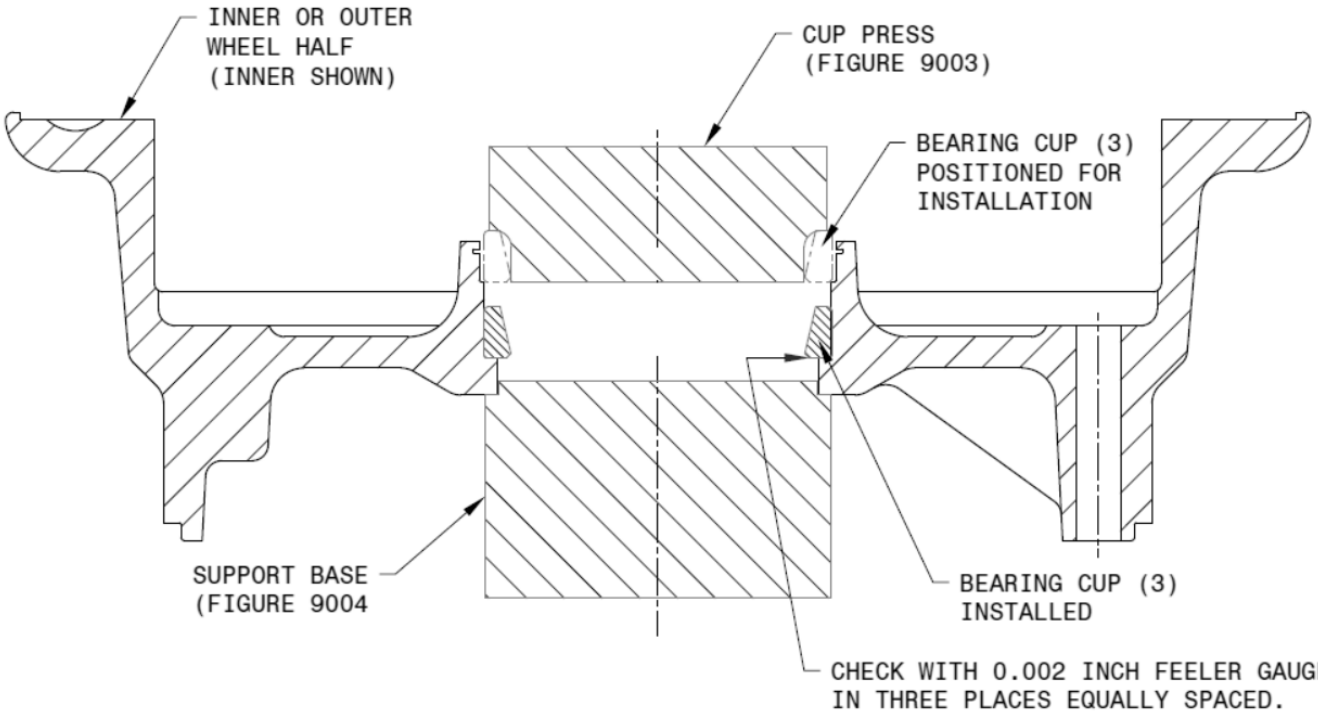


Figure 6003 Install the bearing cup (3)

REPAIR

4. Repair and paint the brake disc (12)

The brake disc is made from alloy steel.

A. Surface damage repair

(1) Blend out small nicks, scratches, or pits.

NOTE: Abrasive media blasting the entire part can be done to remove surface corrosion and pitting. This will also remove the primer and topcoat and will require a primer and topcoat re-application.

(2) Clean the part. Refer to the CLEANING section.

B. Paint the brake disc

SAFETY WARNING: WEAR PROTECTIVE CLOTHING. PAINT MATERIALS CAN BE TOXIC AND VOLATILE. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR MIXING, APPLYING, DISPOSAL AND FOR ALL SAFETY INSTRUCTIONS.

(1) For small area paint touchup

(a) Prepare the area by sanding lightly with 400 to 600 grade or finer, wet or dry aluminum oxide cloth and feather out all edges of the adjacent area.

(b) Clean the area.

(c) Touch up the area with primer and topcoat.

(2) For complete primer and topcoat application

NOTE: Performed if primer and topcoat was removed from entire part by abrasive media blasting.

(a) Clean the part. Refer to the CLEANING section.

(b) Mask the part. Refer to Figure 6004.

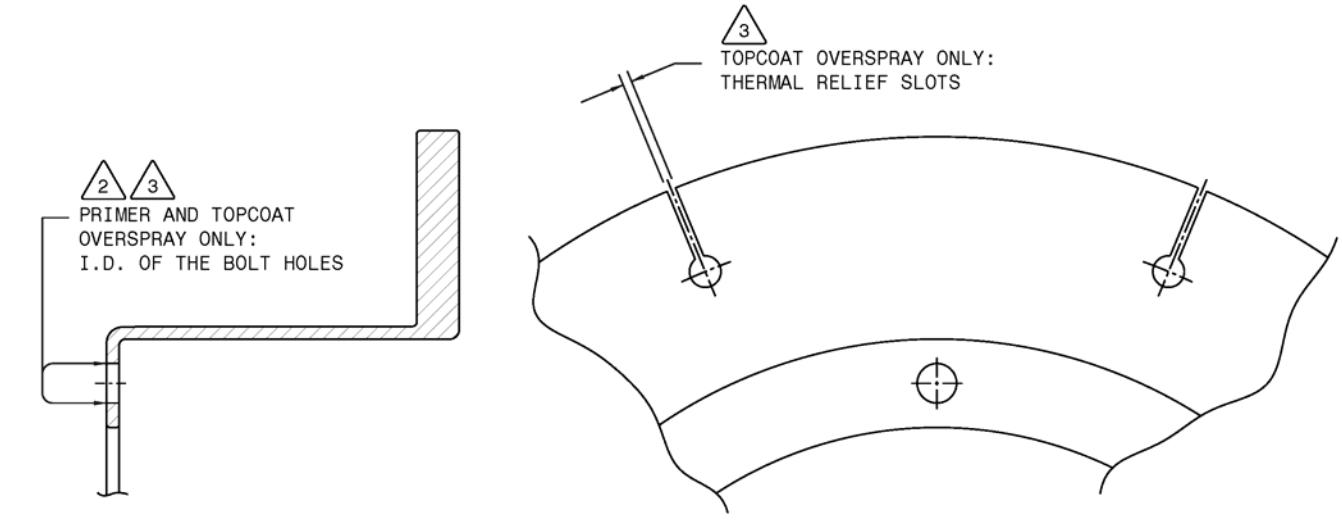
REPAIR

(3) Apply the primer and topcoat. Refer to Table 6003.

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 6003 Brake disc primer and topcoat specifications

MANUFACTURER	PRIMER	TOPCOAT
Sherwin Williams Co. Cleveland, OH	P/N P60G2 primer (2 parts) P/N R7K44 reducer (3 parts) -or- P/N P60G10 primer P/N R2K4 reducer (as needed)	P/N F63BXS58-4337 (silver) (2 component polyurethane) 6 parts base 1 part catalyst, P/N V66V27 P/N R7K84 reducer (as needed)
	Primer Thickness: 0.0002-0.0004 inch Drying Time (air dry): To touch: 3 to 10 minutes Tack free: 10 to 15 minutes To topcoat: 10 to 60 minutes	Topcoat Thickness: 0.0008-0.0014 inch (including primer) Drying Time (air dry): To touch: 20 minutes To handle: 60 minutes Dry hard: overnight



NOTES:

1. APPLY PRIMER AND TOPCOAT TO ALL SURFACES EXCEPT AS NOTED.

2. PRIMER AND TOPCOAT OVERSPRAY ONLY PERMITTED.

3. TOPCOAT OVERSPRAY ONLY PERMITTED.

Figure 6004 Mask the brake disc (12)

ASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

NOTE: The term dry torque refers to the torqueing of hardware without the application of anti-seize compound.

A. Equipment and consumables

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

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 7001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Bearing grease	Mobil Aviation Grease SHC 100 (equivalent alternatives are not allowed)	ExxonMobil Oil Corporation
Standard tools (inch units)	Wrenches/sockets: • Hex head, external: items (14), (16) Torque wrench Tire pressure gauge	Commercial
Tire inflation safety equipment	Commercial source	Commercial
Dry nitrogen	Commercial source	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Clean cloths	Lint free	Commercial

ASSEMBLY

B. Bearing cone (9) grease packing procedure

The correct application of grease to the tapered roller bearing will reduce friction, dissipate heat and maintain a rust and corrosion proof coating on the operating surfaces of the roller bearings.

NOTE: Packing the bearings with grease is best performed with the use of a mechanical lubricating fixture such as a bearing greaser.

(1) Make sure the bearing cones are clean. Refer to the CLEANING section.

(2) Push the grease up between the rollers, cone and cage. Make sure that all empty spaces inside the cone are filled (see Figure 7001). Make sure that a thick coat of grease is applied to the roller surfaces on the outside of the cone.

NOTE: Shaded area shows the recommended quantity of grease.

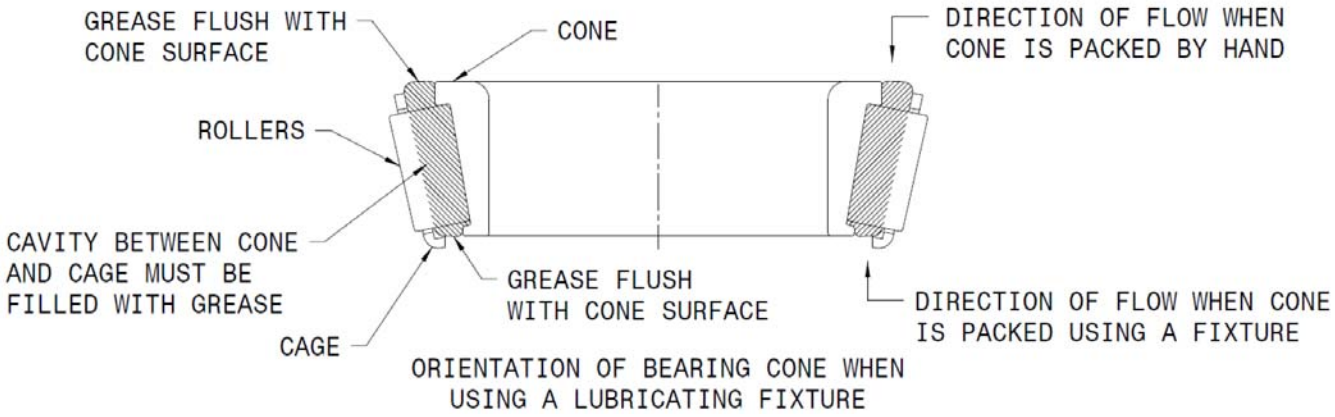


Figure 7001 Pack the bearing cones (9)

C. Wheel pre-assembly verification

(1) Verify that the bearing cups (3) are properly installed in the wheel halves (2) and (6).

2. Wheel and tire pre-assembly preparation

A. Examine the bead seat area of the wheel halves. If necessary, remove dirt with a clean cloth moistened with a mild soap and water solution or with denatured alcohol.

B. The mating surfaces of the wheel halves should not have nicks, burrs, small dents, or other damage. Damaged mating surfaces can prevent the wheel halves from mating.

C. Verify that the tire is clean inside. If it is not cean, then wipe the bead base with a clean cloth dampened with a mild dishwashing soap and water solution or a suitable rubber cleaner.

NOTE: A new tube should be used when installing a new tire.

ASSEMBLY

3. Mount the tire

A. After the inside of the tire has been cleaned, lubricate lightly with tire talc.

B. Inflate the tube with dry nitrogen to slightly round, and insert in the tire. The tube heavy spot is indicated by a painted yellow stripe about ½ inch wide by 2 inches long. Align the stripe on the tube with the tire red balance dot. If the tube has no balance mark, align the tube valve with the tire red balance dot.

C. Position the tire on the outer wheel half, inserting the valve stem through the valve hole in the wheel.

D. Place the inner wheel half inside the tire, aligning as necessary to clear the valve stem,

4. Attach the wheel halves

A. Install the brake disc (12) in the inner wheel half (2) aligning the bolt holes.

NOTE: The washers (15) and nuts (16) must be located on the outer wheel half (6) side.

B. Install three bolts (14) equally spaced through the brake disc and compress the wheel haves together so that the washers (15) can be installed and the nuts (16) can be started on the bolts.

C. Install the remaining bolts, washers and nuts. Tighten by hand initially to fasten the wheel halves together.

CAUTION: DO NOT USE POWER TOOLS FOR THE INSTALLATION OF WHEEL FASTENERS. POWER TOOLS CAN CAUSE OVER TIGHTENING.

CAUTION: THE FASTENERS MUST BE TIGHTENED BY APPLYING THE TORQUE TO THE NUT (16) WHILE SECURING THE BOLT HEAD.

D. Wheel nuts should first be snugged in a criss-cross pattern to seat the wheel flange. Apply the final torque evenly in a criss-cross pattern using calibrated tools until all nuts are properly torqued. Final torque is 180 in-lb (20.3 N-m) dry torque.

ASSEMBLY

5. Test the wheel/tire assembly

A. Test the wheel/tire assembly. Refer to the TESTING AND FAULT ISOLATION section.

SAFETY WARNING: ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

6. Final assembly of the wheel

After successfully completing the 24-hour pressure retention test, complete the remaining assembly procedures as follows.

A. Reduce tire pressure to recommended storage pressure.

NOTE: Make sure the bearing cones (9) have been packed with fresh, clean grease.

B. Before installing the bearing cones, apply a light coat of wheel bearing grease to the following:

- Exposed surfaces of the bearing cups (3).
- The elastomer of the bearing seals (10).

C. Refer to Figure 7002 and install the following in the order listed.

(1) Install the following in the outer wheel half (6):

- Bearing cone (9).
- Grease seal ring (13).
- Bearing seal (10). Observe “This Side In” marking in molded characters.
- Snap ring (11). Install the end of the snap ring into the groove in the hub of the wheel half and wind or spiral the ring into the groove.

(2) Install the following in the inner wheel half (2):

- Bearing cone (9).
- Grease seal ring (17). The smaller diameter surface will face out.
- Bearing seal (10). Observe “This Side In” marking in molded characters.
- Snap ring (11). Install the end of the snap ring into the groove in the hub of the wheel half and wind or spiral the ring into the groove.

ASSEMBLY

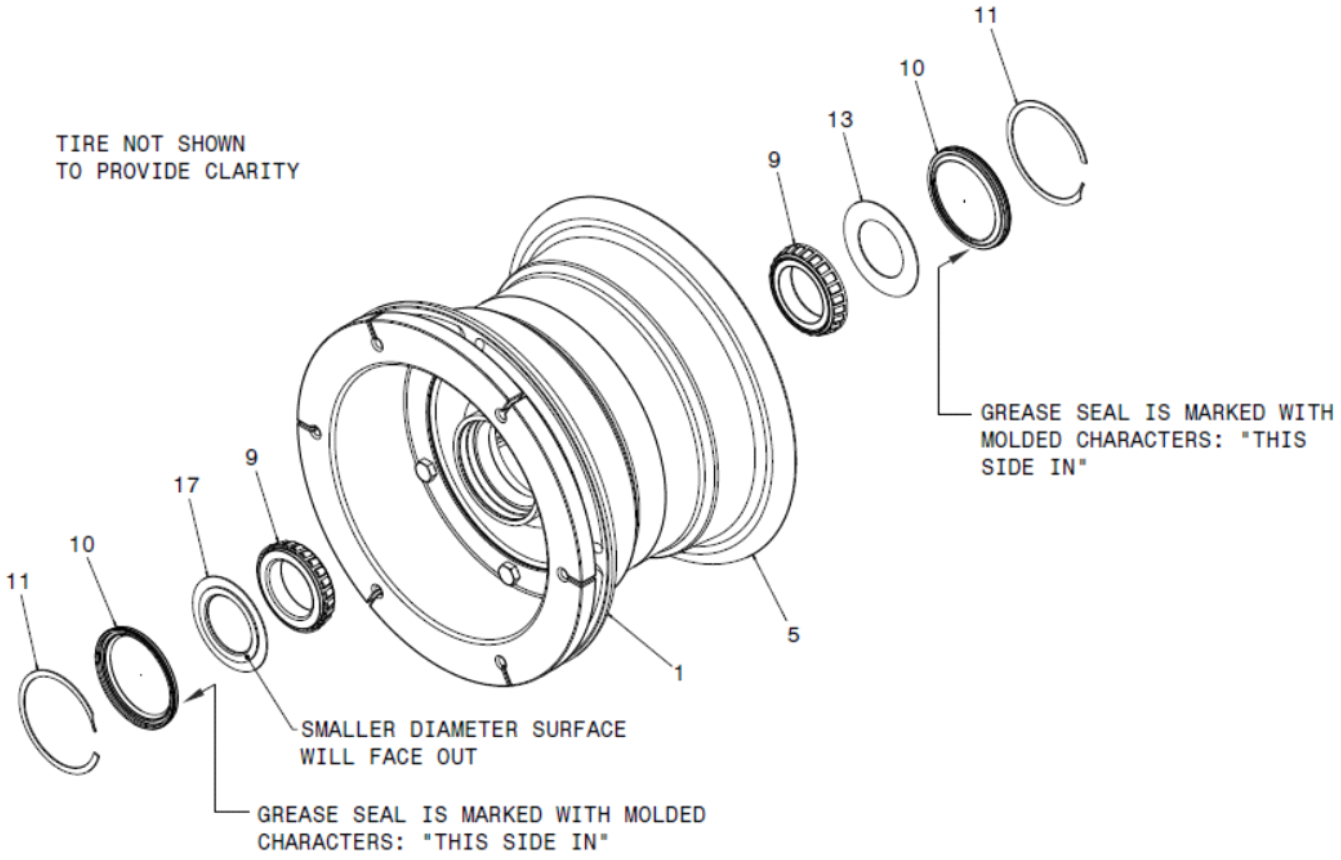


Figure 7002 Install bearing cones (9), seal components (10), (13), (17), and snap rings (11)

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.

SAFETY WARNING: ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

7. Return to service

A. Inflate the tire to the airframe manufacturer's recommended inflation pressure.

(1) Install the inflation valve cap. The cap is the positive means of resisting pressure leakage and should always be used to prevent rapid deflation should a problem occur with the valve core.

B. Slide the wheel/tire unit onto the axle making sure the bearing cones are seated.

C. Install the axle hardware in accordance with the airframe manufacturer's manual.

ASSEMBLY

8. Install the brake assembly components

Refer to Figure 7003.

A. Reinstall the brake shim and three back plate assemblies between the brake disc (12) and the wheel flange.

B. Reinstall the washers and bolts. Thread the brake bolts into the back plate assemblies. Tighten the bolts in accordance with CM30-93F, Component Maintenance Manual, torque values.

C. Reconnect the hydraulic hose assembly to the brake assembly and torque the hose fittings in accordance with airframe manufacturer's manual.

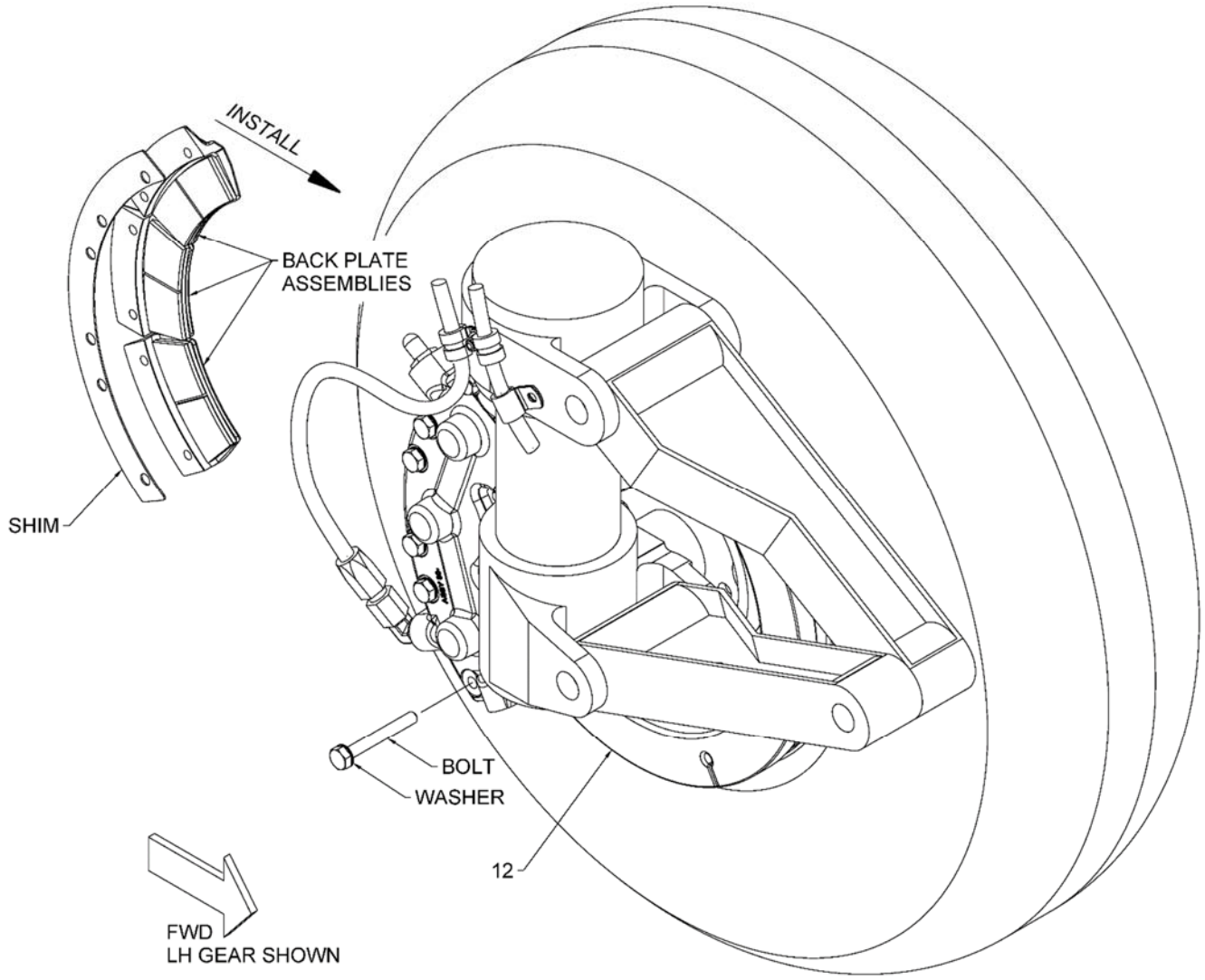


Figure 7003 Install the brake back plate assemblies

FITS AND CLEARANCES

1. General

Refer to IPL Figure 1 for component identification.

A. Assembly wear limits

Table 8001 In-service wear limits

PART NAME (IPL item number)	SECTION	REFERENCE	WORN AREA DESCRIPTION	WORN DIMENSION
Brake disc (12)	Description and Operation	Figure 1	Flange thickness	0.475 inch (12.065 mm) minimum
			Warpage (disc face surface)	0.015 inch (0.38 mm) maximum
Wheel halves (2), (6)	Checks	Figure 5002, Figure 5003	Bolt hole diameter	Ø 0.328 (8.33 mm) maximum
		Figure 5005 Table 5002	Bolt hole length	1.581 (40.157 mm) minimum

B. Assembly torque values

NOTE: The term dry torque refers to the torqueing of hardware without the application of anti-seize.

Table 8002 Assembly torque values

PART NAME (IPL item number)	TORQUE LIMITS
Nut (16)	180 in-lb (20.3 N-m) dry torque.

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, equivalent alternatives can be used for the items listed.

Table 9001 List of manufacturers

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Blast stripping equipment	• Plastic blast media: MIL-P-85891, Type II or V, Grade 20/30, 3.5 Mohs max. • Abrasive blast media: 80 Grit aluminum oxide	U.S. Technology Corp/ www.ustechnology.com
Protective coatings for (2), (6)	Primer: P/N P60G2 or P/N P60G10 Topcoat: P/N F63BXS58-4337	Sherwin Williams Co. www.sherwin-williams.com
Protective coatings for (12)		
Tools for bearing cups (3): Removal tools Installation tools	 Figures 9001, 9002 Figures 9003, 9004	 Fabrication Fabrication
Bearing grease	Mobil Aviation Grease SHC 100 (equiv. alternatives are not allowed)	Exxon-Mobil Oil Company Aviation Lubricants www.mobil.com

SPECIAL EQUIPMENT AND CONSUMABLES

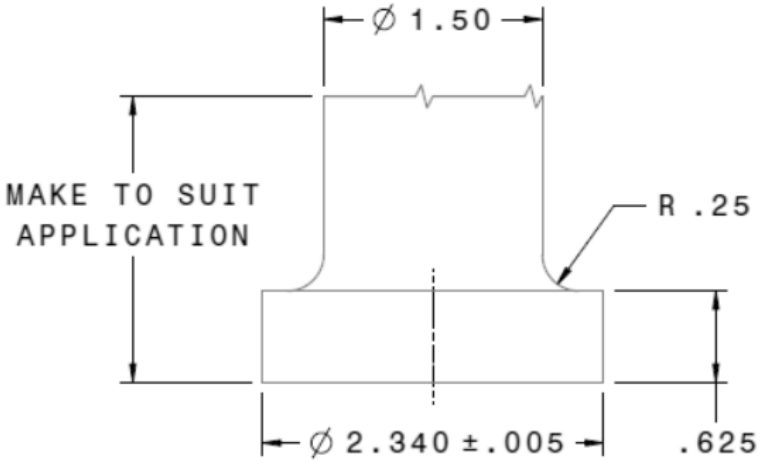


FIGURE 9001
PUSH PLATE

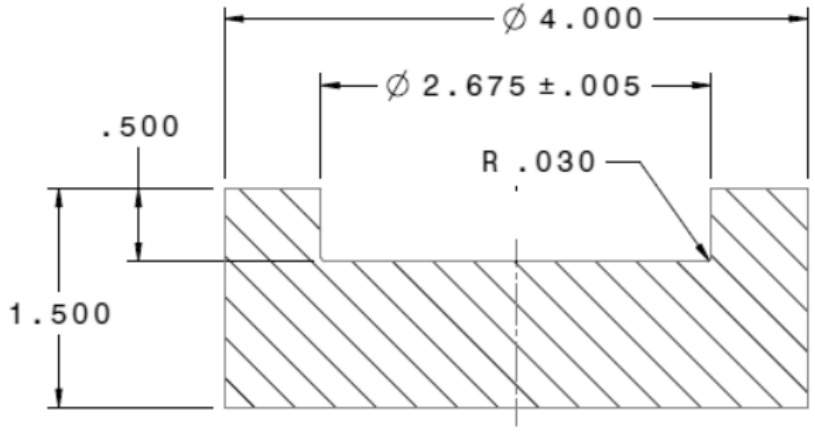


FIGURE 9002
SUPPORT BASE

Notes for Figures 9001 and 9002:

1. Material: 4130 steel or equivalent
   Heat treat to 40-45 Rc
2. Tolerances unless otherwise specified:
   .XXX ± 0.010 inch
3. Break unspecified sharp edges
   0.005-0.015 inch
4. Dimensions are in inch units.

SPECIAL EQUIPMENT AND CONSUMABLES

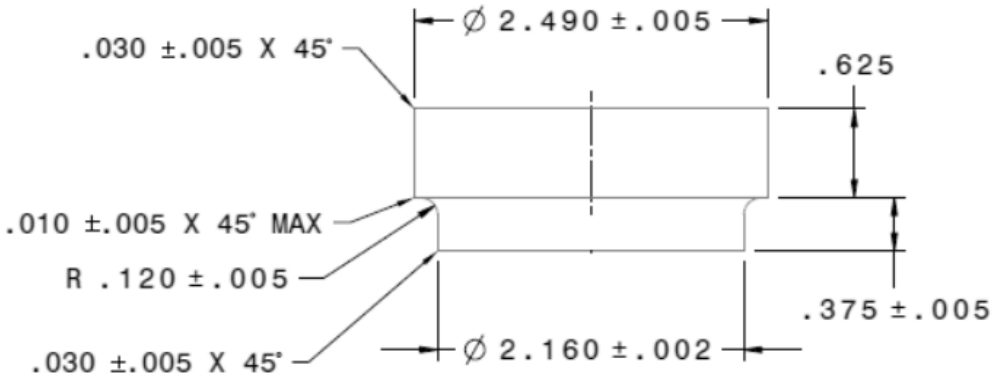


FIGURE 9003
CUP PRESS

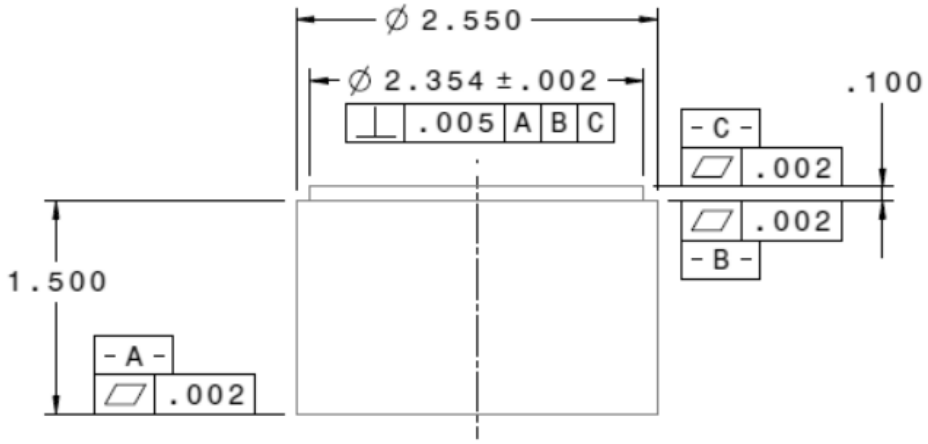


FIGURE 9004
SUPPORT BASE

Notes for Figures 9003 and 9004:

1. Material: 4130 steel or equivalent
   Heat treat to 40-45 Rc
2. Tolerances unless otherwise specified:
   .XXX ± 0.010 inch
3. Break unspecified sharp edges
   0.005-0.015 inch

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 Parker Hannifin AWB 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:

Term	Abbreviation	Definition
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.

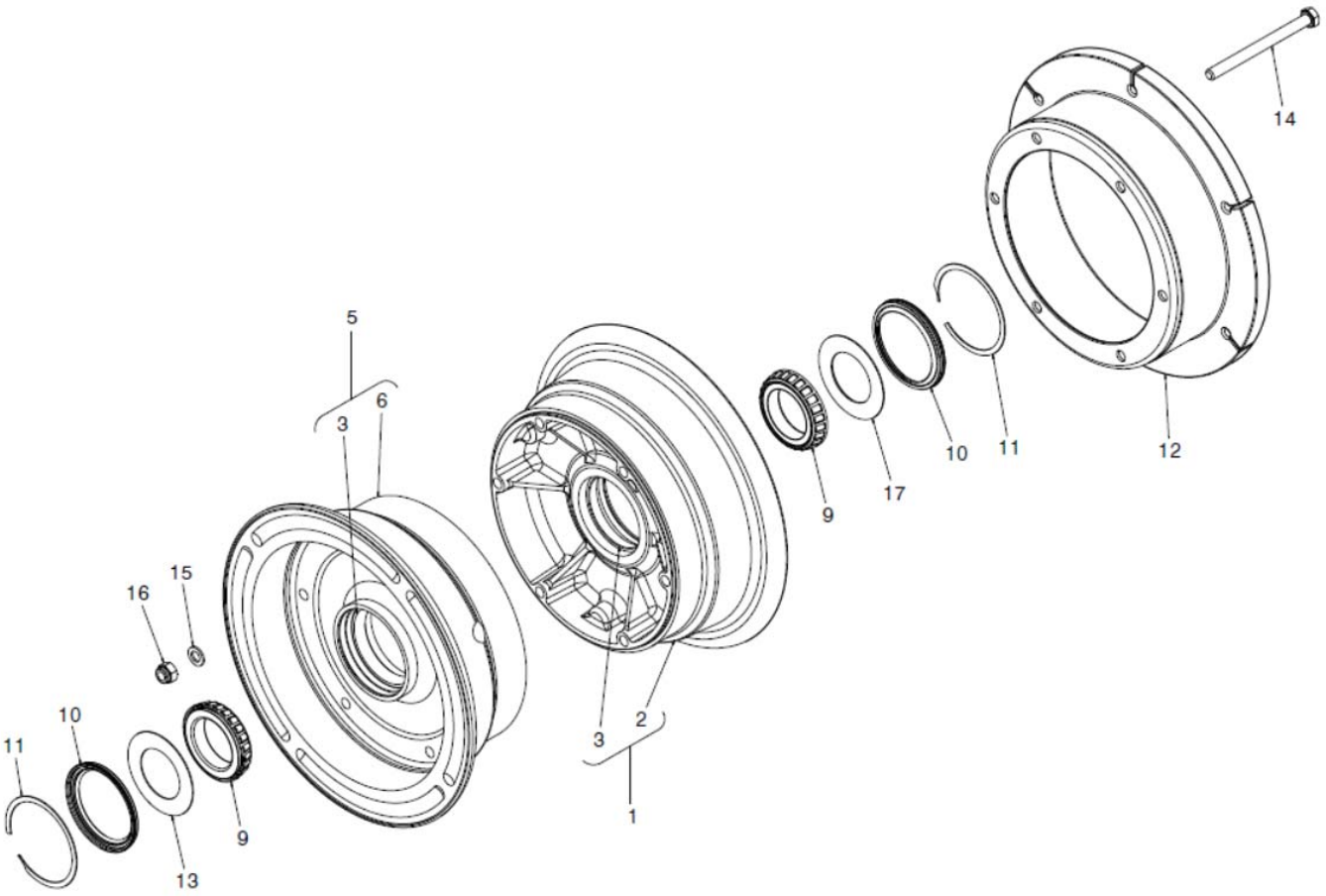
D. Alpha variant item numbers

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 wheel assembly, exploded view

ILLUSTRATED PARTS LIST

2. Detailed parts list

Fig	Item	Units per assembly	CAGE	Part No.	Description	Usable on code
1		REF	33269	40-128F	WHEEL ASSEMBLY, MAIN	
	1	1		161-05300	• ASSEMBLY, WHEEL HALF, INNER	
	2	NP		151-01900	• • WHEEL HALF, INNER	
	3	1		214-00100	• • CUP, BEARING	
–	4	1		166-19700	• • NAMEPLATE (when item 1 is ordered as spares)	
	5	1		162-05100	• ASSEMBLY, WHEEL HALF, OUTER	
	6	NP		152-01700	• • WHEEL HALF, OUTER	
	3	1		214-00100	• • CUP, BEARING	
–	7	1		166-19700	• • NAMEPLATE (when item 5 is ordered as spares)	
–	8	1		166-20000	• • NAMEPLATE, WARNING	
	9	2		214-00200	• CONE, BEARING	
	10	2		154-12400	• SEAL, BEARING	
	11	2		155-00100	• RING, SNAP	
	12	1		164-06106	• DISC, BRAKE	
	13	1		153-00300	• RING, GREASE SEAL	
	14	6		103-21700	• BOLT	
	15	6		095-10500	• WASHER (AN960-516)	
	16	6		094-10400	• NUT (MS21044-N5)	
	17	1		153-04800	• RING, GREASE SEAL	

Note: When ordering a replacement nameplate for the top assembly level, i.e. 40-128F, order P/N 166-19700, qty 1 which will identify the top assembly P/N. When ordering a replacement nameplate for the wheel half assembly level, i.e. 161-05300 or 162-05100, order item 4 or 7 respectively. At the wheel half assembly level, each nameplate identifies the wheel half assembly P/N.

STORAGE

1. General

Refer to IPL Figure 1 for component identification.

Wheel storage procedures differ depending on whether the wheels are stored with or without tires installed.

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

NOTE: Lubricate the bearing cups (3) and cones (9) with the wheel bearing grease and plug or cover bearing hub area during storage to prevent contamination.

2. Procedures

A. Wheels stored with tires installed

(1) The length of time that a wheel assembly can be stored is governed by the storage life of its elastomer based components. Basically, elastomer components are considered to have a usable life of up to 10 years from the date of cure. The usable life may be shortened by exposure to sunlight, ozone, extrememe temperatures, low humidity; and contamination by fluids.

(2) Normal storage environmental temperatures of 50° to 77°F (10° to 25°C) are desired. If this temperature range cannot be maintained, temperatures as high as 125°F (51.7°C) and as low as -20°F (-28.9°C) can be tolerated for shorter periods. Total time above 100°F (37.8°C) shall not exceed three months. The recommended storage pressure for tires is 10 psig (0.69 bar).

(3) Place protective cover over bearing hubs to prevent contamination of grease or bearing damage during storage of wheel.

B. Wheels stored without tires installed

(1) Storage of components containing elastomers for longer than two years should be assembled without the elastomer based components. Those elastomer based components, e.g., bearing seals, etc., are to be placed in an ultraviolet protective package.

(2) Wheels stored without elastomer based components installed have an indefinite storage life.

(3) Place protective cover over bearing hubs to prevent contamination of grease or bearing damage during storage of wheel.

Parker Aerospace

MASTER DATA LIST

FOR

PILATUS AIRCRAFT LTD.
AIRCRAFT MODELS
PC-7

THOSE AIRCRAFT MODIFIED IN
ACCORDANCE WITH
STC: SA04264CH

Parker Aerospace

LOG OF REVISIONS

REV	PAGE(S)	DESCRIPTION	APPROVAL	DATE
N/C	All	Original Issue		10/05/2017
A	All 1, 2 3 4	All pages: Add Proprietary Statement and Export Warning. pages 1 & 2: Add STC number SA04264CH. page 3: 199-282 AMMS now: rev. A, 01-MAR-18 page 4: 199-282 now: rev. C, 01-MAR-18.	(ECO-0087767) M. La Conte	03/01/2018

TABLE OF CONTENTS

1.0 GENERAL

The purpose of this Master Drawing List (MDL) is to specify all descriptive, engineering, procedural and operational data related to Parker Hannifin Project Number 631 for Pilatus PC-7 Installation of Parker Hannifin Wheels and Brakes Conversion Kit 199-282 FAA STC number SA04264CH.

2.0 ADMINISTRATIVE PROJECT DOCUMENTS

Document Number	Document Title	Rev.	Date
32-631-00-01	Parker Hannifin Project Specific Certification Plan (PSCP) for Wheels & Brakes on Pilatus PC-7 Aircraft	A	05-MAY-17
32-631-00-02	Project Compliance Report (CSR) for Wheels & Brakes on Pilatus PC-7 Aircraft	N/C	12-JUN-17

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3.0 ENGINEERING DATA

Document Number	Document Title	Rev.	Date
32-631-15-01	Flight Test Plan for Wheel & Brakes on Pilatus PC-7 Aircraft	A	09-MAY-17
32-631-06-01	Engineering Report, Structural & Mechanical Systems Analysis for Wheels & Brakes on Pilatus PC-7 Aircraft	A	03-MAY-17
32-631-39-02	Design Change Analysis for Wheels & Brakes on Pilatus PC-7 Aircraft	N/C	23-JUN-17

4.0 INSTALLATION DATA

Document Number	Document Title	Rev.	Date
IM199-282	Kit Installation Publication, Main Wheel & Brake Conversion Kit, Parker Hannifin Part No. 199-282	A	20-JUL-17
050-16500	Installation Drawing	A	20-JUL-17

5.0 OPERATIONAL DATA

Document Number	Document Title	Rev.	Date
199-282 AMMS	Airplane Maintenance Manual Supplement with Instructions for Continued Airworthiness for Pilatus Aircraft Ltd Aircraft Model PC-7	A	01-MAR-18
CM30-93F	Component Maintenance Manual, Main Brake Assembly, Parker Hannifin Part No. 30-93F, Parker Hannifin Part No. 30-93F, Right Hand	A	20-JUL-17

Parker Aerospace

Document Number	Document Title	Rev.	Date
CM40-128F	Component Maintenance Manual, Main Wheel Assembly, Parker Hannifin Part No. 40-128F	A	20-JUL-17
PRM14A	Metallic Brake Lining Conditioning Procedure	A	01-JUL-95

6.0 DESIGN DATA

Document Number	Document Title	Rev.	Date
199-282	Conversion Kit, Pilatus Aircraft – Model PC-7	C	01-MAR-18
30-93F	Brake Assembly, LH ***(Approved under TSO-C26b)***	C	03-NOV-15
30-93F RH	Brake Assembly, RH ***(Approved under TSO-C26b)***	C	02-NOV-15
40-128F	Wheel, Main, Assembly ***(Approved under TSO-C26b)***	B	02-NOV-15

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA04264CH

This certificate issued to Parker Hannifin Corporation, Aircraft Wheel & Brake Division
1160 Center Road
Avon, OH 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 23 *of the* Federal Aviation *Regulations*

*Original Product-Type Certificate Number :** A50EU

*Make :** PILATUS

*Model :** PC-7

Description of Type Design Change:
Installation of Parker Hannifin Corporation, Aircraft Wheel & Brake Division 199-282 Conversion Kit for main wheels and brakes in accordance with Parker Aerospace Master Data List 199-282 MDL, Revision N/C, dated October 5, 2017, or later FAA approved revisions.

Limitations and Conditions:
1. A copy of this certificate shall be maintained as part of the permanent records for the modified aircraft.
2. Maintain aircraft wheels and brakes in accordance with FAA accepted Instructions for Continued Airworthiness, Document No. 199-282 AMMS, Revision N/C, dated October 5, 2017, or later FAA accepted revision
3. Compatibility of the design change with previously approved modifications must be determined by the installer.
4. If the holder agrees to permit another person to use this certificate to alter a product, the holder must give the other person written evidence of that permission.

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 : March 3, 2017

Date of issuance : December 13, 2017

Date reissued :

Date amended :

By direction of the Administrator

(*Signature*)

Steven L. Lardinois
Manager, Systems Section
Chicago ACO Branch

(*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.