

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

PARTS LIST **FAA-PMA**

199-125 CONVERSION KIT

BEECH KING AIR AIRCRAFT
MODEL SERIES 99, 100, F90, 200
HIGH FLOATATION GEAR

PART NUMBER	DRAWING REVISION	DESCRIPTION	QUANTITY
30-162	Rev. L dated 12-15-2005	Brake Assembly	4
40-203	Rev. H dated 04-26-2007	Wheel Assembly	4
067-07800	Rev. C dated 06-25-2003	Axle Spacer	4
094-10400	----------	Nut (MS21044-N5)	4
095-14500	Rev. C dated 09-06-1995	Washer	8
101-50337	----------	O-Ring (MS28775-112)	4
101-20400	Rev. A dated 04-01-2003	O-Ring	4
103-24400	----------	Bolt (MS21250-05040)	4
139-19100	Rev. C dated 10-12-2010	Bracket (Hot Air Manifold)	4
221-07100	----------	Cotter Pin (MS24665-428)	4
	Publication Package (P/N PP199-125)		
IM199-125	Rev. L dated 01-21-2010	Installation Manual	
50-90	Rev. K dated 01-21-2010	Installation Drawing	
CM30-162	Rev. H dated 06-24-2020	Component Maintenance Manual for 30-162	
CM40-203	Rev. B dated 03-10-2011	Component Maintenance Manual for 40-203	
SA757GL	dated 02-25-2011	Supplemental Type Certificate for 200 series	
SA1509GL	dated 08-16-1990	Supplemental Type Certificate for 99 & 100 series	
SA1510GL	dated 08-16-1990	Supplemental Type Certificate for F90	
ANAC 2013S02-15	dated 02-26-2013	Brazil STC Validation for Beech Models 200, 200T, B200, B200T, B200GT, B200CGT	
ANAC 2014S04-27	dated 04-30-2014	Brazil STC Validation for Beech Model F90	
EASA 10048423	dated 03-10-2014	EASA STC Validation for Beech Models 200, 200C, 200CT, 200T, B200, B200C, B200CT, B200T, B200GT, B200CGT	
-------		Pilot Operating Manual Inserts	
-------		Product Registration Card	

NOTES:
1. This kit will convert one aircraft to Cleveland Wheels and Brakes.
2. The 30-162 brake assembly is designed for use with MIL-H-5606 or MIL-PRF-5606 hydraulic fluid.

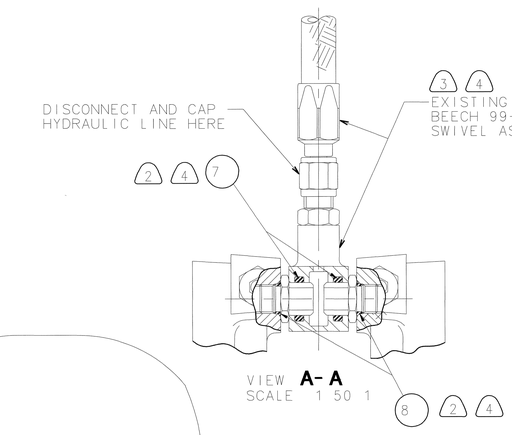
199-125 NC 01-20-1984
Rev. R 09-20-2010 (DCN 0387-68)
Rev. T 04-12-2011 (DCN 0392-92)
Rev. U 04-04-2013 (ECO 0021486)
Rev. V 03-18-2016 (ECO-0065384)
Rev. W 04-12-2017 (ECO-0079315)
Rev. Y 07-31-2017 (ECO-0083217)
Rec. AA 09-09-2020 (ECO-0116154)

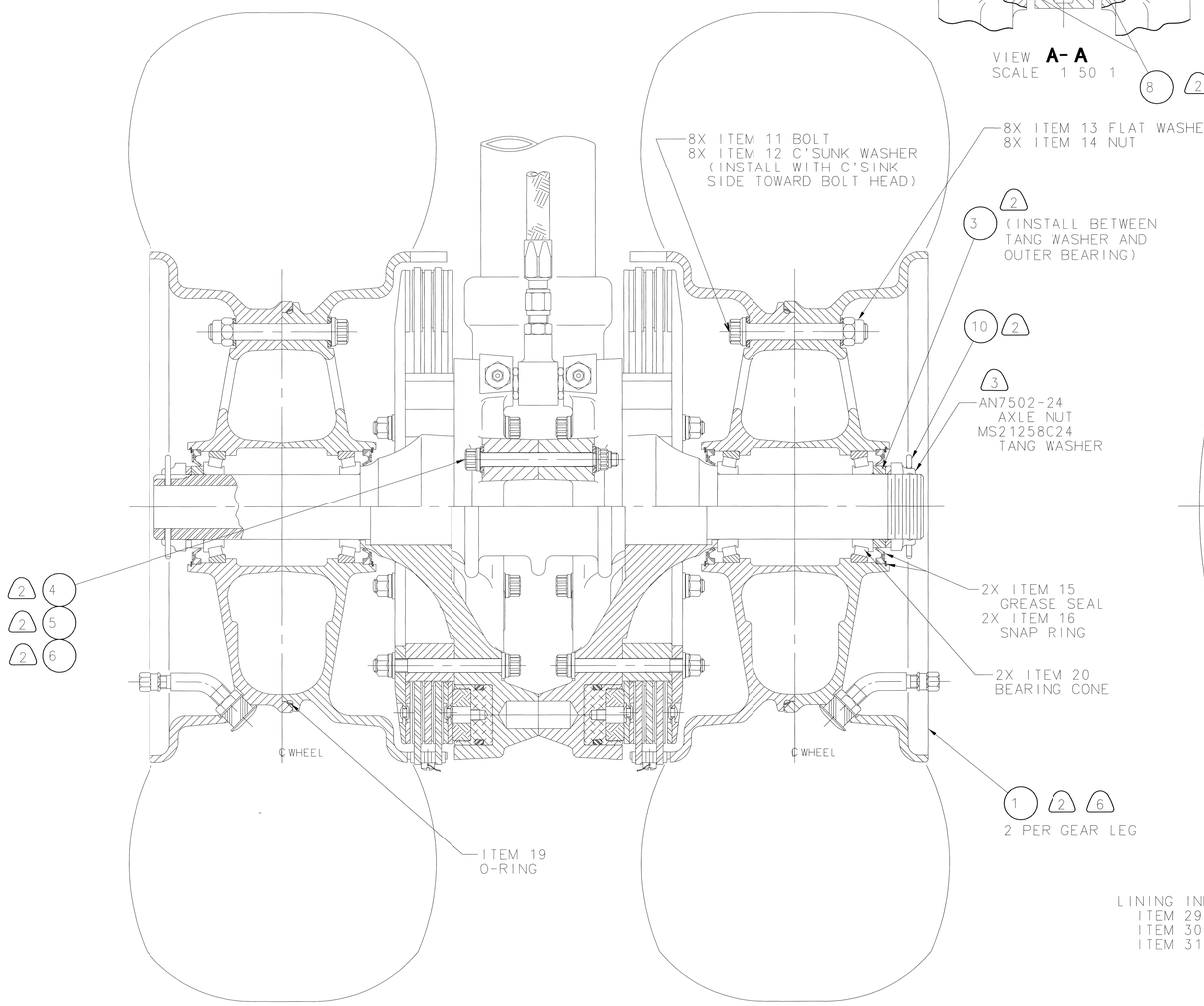
REVISIONS					
CHANGE NOTICE	REV	DESCRIPTION OF CHANGE	CHG BY	CHK BY	DATE	APPROVED
D327-19	J	REFORMAT TO CAD REVISED SEE DCN	PH	BB	09-12-19	R HARTLAUB
D387-68	K	ADD APPLICABILITY MODELS SEE DCN	PH	BB	10-01-21	

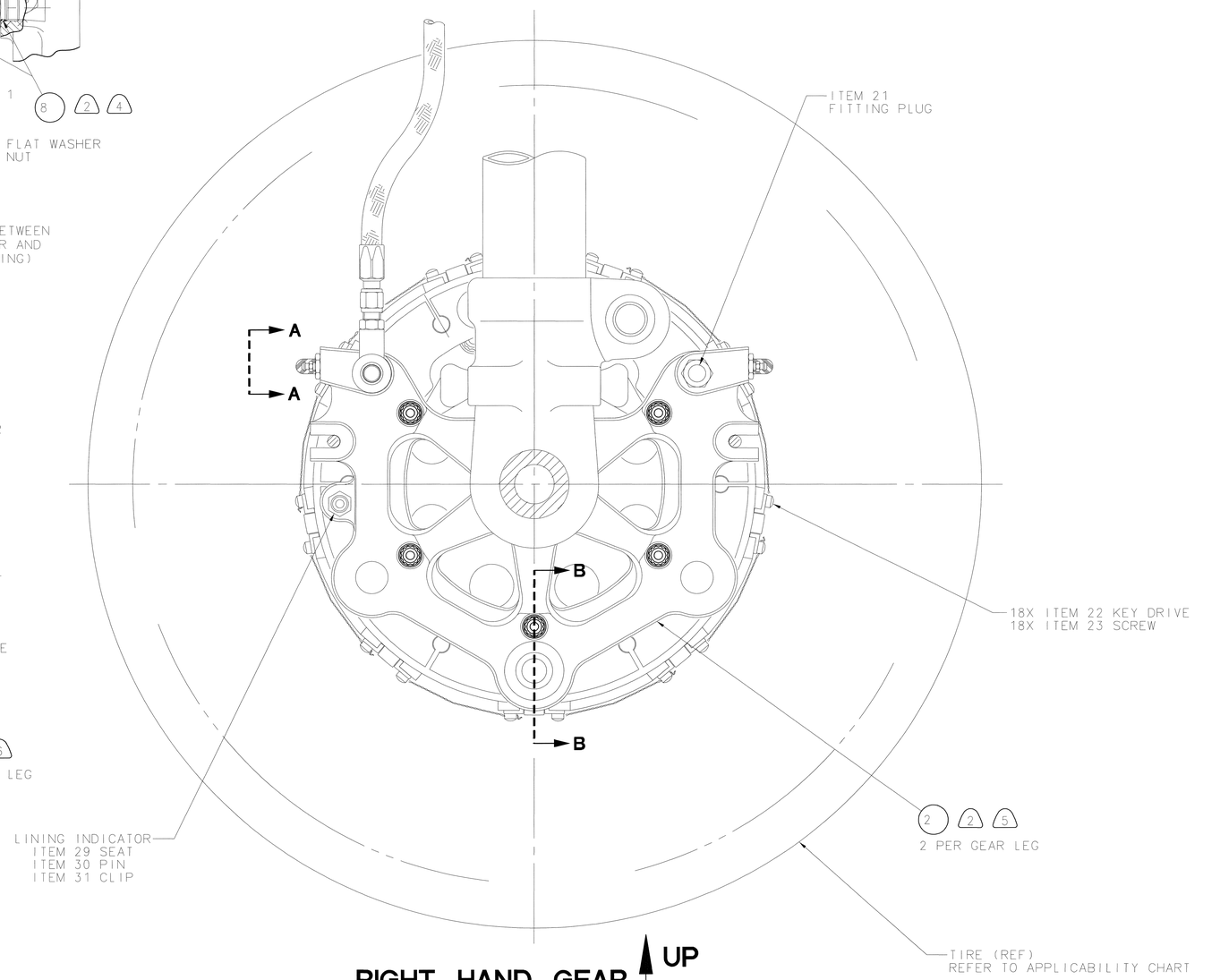
APPLICABILITY OF AIRCRAFT INSTALLATION CLEVELAND KIT 199-125

(K) (J)

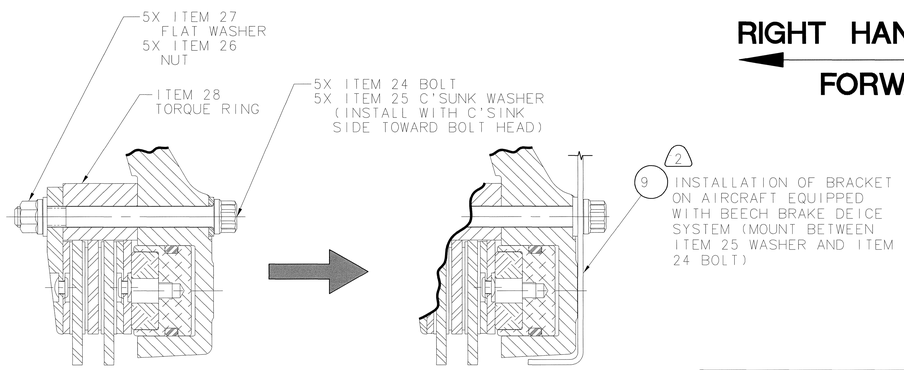
MODEL (7)	TIRE	PRESSURE
HAWKER BEECHCRAFT MODELS 200, 200C, 200CT, 200T B200, B200C, B200CT, B200T B200GT, B200CGT	22X6 75-10, 8 PLY TUBELESS	PER HAWKER BEECHCRAFT MANUAL
HAWKER BEECHCRAFT MODELS F90, 99, 99A, A99A, B99, C99, 100, A100, B100	REQUIRED TIRE USAGE IS EITHER 6 50-10, 6 PLY TUBETYPE OR 22 X 6 75-10, 8 PLY TUBELESS PROVIDED TIRES USED ARE APPROVED BY BEECH (RAYTHEON) FOR THE SPECIFIC APPLICABLE AIRCRAFT MODEL	PER HAWKER BEECHCRAFT MANUAL







RIGHT HAND GEAR
UP
FORWARD
OUTBOARD



NOTES

1 REFER TO IM199-125 INSTALLATION MANUAL FOR DETAILED INSTALLATION INSTRUCTIONS

(2) PARTS SUPPLIED IN 199-125 KIT

(3) EXISTING HARDWARE TO BE RETAINED AND REUSED

(4) REPLACE PACKINGS FROM BEECH SWIVEL KIT (99-8003-27) WITH CLEVELAND'S SUPPLIED PACKINGS

(5) FOR PARTS IDENTIFICATION, SEE CM30-162, FIG 1, 30-162 IPL

(6) FOR PARTS IDENTIFICATION, SEE CM40-203, FIG 1, 40-203 IPL

(7) THIS KIT IS TO BE USED WITH AIRCRAFT EQUIPPED WITH 10 IN , HIGH FLOATATION GEAR

8 THIS KIT IS TO BE USED WITH MIL-H-5606 HYDRAULIC FLUID

9 UNLESS OTHERWISE INDICATED, QUANTITIES ARE PER ASSEMBLY

QTY	ITEM NO	CAGE CODE	PART NO	DESCRIPTION	MATERIAL/SPECIFICATION	WGT (LB)
2	10	33269	221-07100	PIN, COTTER	MS24665-428	
2	9	33269	139-19100	BRACKET		
2	8	33269	101-20400	O-RING	MS28778-4	
2	7	33269	101-50337	O-RING	MS28775-112	
2	6	33269	094-10400	NUT	MS21044-N5	
4	5	33269	095-14500	WASHER		
2	4	33269	103-24400	BOLT	MS21250-05040	
2	3	33269	067-07800	SPACER, AXLE		
2	2	33269	30-162	BRAKE ASSEMBLY		
2	1	33269	40-203	WHEEL ASSEMBLY 6 50-10 TYPE III		

PARTS LIST

QTY	FINAL ASSY	QTY	NEXT ASSY
APPLICATION (NOT MAINTAINED)			

DIMENSIONING AND TOLERANCING PER ASME Y14 5M-1994. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY AFTER HEAT TREATING, PLATING, AND BEFORE PAINTING

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

GENERAL NOTES UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES
2 PLACE (XX) ± 03
3 PLACE (XXX) ± 010
ANGULAR DIMS ±0 5
REMOVE ALL BURRS
BREAK CORNERS 010 MAX
INTERNAL RADII 005- 010
GENERAL MACHINED SURFACES 125 PER ANSI B46 1
RAW MATERIAL
THIRD ANGLE PROJECTION

A CONTRACT ALTERED ITEM EXISTS FOR THIS PART NUMBER

STRESS	DATE
MFG ENGRG	
QUAL ASSUR	

PROGRAM/CONTRACT NO

	DATE
DRAWN D BARNES	83-03-28
CHECKED D G ENGELBERT	83-11-18
ENGINEER	
DESIGN APPROVAL	
PROJ APPROVAL	
RELEASE DATE	

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

DWG TITLE
INSTALLATION WHEEL & BRAKE

SIZE	CAGE CODE	DWG NO	REV
E	33269	50-90	K

SCALE 75 1 | UNIT WGT | SHEET 1 of 1

PD-E-GENL-PC-00

Cleveland Wheels & Brakes

INSTALLATION MANUAL
WITH
ILLUSTRATED PARTS LIST

CONVERSION KIT
PHC Part No. 199-125

BEECH KING AIR
Series 99, 100, F90, 200
-High Floatation Gear-

IM199-125
Initial Issue January 20, 1984

STOP!

PLEASE TAKE A FEW MOMENTS TO COMPLETE AND RETURN THE ATTACHED REGISTRATION CARD. IT IS IMPORTANT THAT ALL INFORMATION IS LEGIBLY PRINTED. THIS DATA WILL ASSIST PARKER HANNIFIN, AIRCRAFT WHEEL & BRAKE IN THE EVENT THAT NOTIFICATION TO END USERS OF SPECIFIC AIRWORTHINESS DOCUMENTS IS NECESSARY.

TABLE OF CONTENTS

LIST OF REVISIONS

Revision	Date	Section/Page No.	Description Of Change	Apvd
J	10-15-00	All sections/ All pages	Revised to latest standard format	BB
K	01-26-05	9.1 / pg 7	Add weights per gear leg	BB
L	01-21-10	3.1 / pg 2 8.1.c. / pg 4 8.2.b. / pg 4 8.2.p. / pg 6	Add models B200GT, B200CGT Correct Beech swivel kit P/N Correct Beech swivel kit P/N change grease to Mobil Aviation Grease SHC100	BB

1.0 INTRODUCTION

The information herein addresses the installation of a Cleveland Conversion Kit. It is published for the guidance of qualified maintenance personnel responsible for the installation of a Cleveland Conversion Kit, manufactured by Parker Hannifin Corporation, Aircraft Wheel and Brake.

1.1 PURPOSE

This manual provides the necessary procedures to accomplish the installation of a Cleveland Conversion Kit. For information regarding service limits, maintenance and component overhaul, a copy of the Cleveland Wheels and Brakes Component Maintenance Manuals, CM30-162 and CM40-203 are included in this kit. The manuals should be passed on to the owner or retained by the maintenance facility for future reference.

1.2 KIT EQUIPMENT

Each kit contains all materials needed to replace existing equipment with Cleveland Wheels and Brakes. Kit 199-125 will completely retrofit one aircraft to Cleveland equipment. Refer to Kit Parts List.

2.0 TSO NOTICE

The wheels 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.

After final certification, substitution of critical parts or changes of processes or materials are not permitted without requalification of the assemblies and resubmittal of the test data to the FAA for approval.

FAA regulations subject both Parker Hannifin, Aircraft Wheel and Brake and the user to constant surveillance to assure that uncompromising Quality Assurance materials and processing controls are maintained in order to provide replacement parts that are the same as the parts originally certified in the assembly.

3.0 APPLICABILITY

3.1 KIT 199-125

The equipment supplied under Kit No. 199-125 is applicable to the following aircraft.

TABLE I, APPLICABILITY

MAKE	MODELS
Beech	99, 99A, A99A, B99, C99
Beech	100, A100, B100
Beech	200, 200C, 200CT, 200T, B200, B200C, B200CT, B200T, B200GT, B200CGT
Beech	F90

4.0 SAFETY

Always follow proper safety precautions when handling or servicing any aircraft braking system or component(s) of such systems.

CAUTIONS and **WARNINGS** are noted throughout this manual, where applicable. Follow them when servicing aircraft wheel and brake equipment.

5.0 PRODUCT REGISTRATION

The product registration card is located at the front of this manual. The card is our way of tracking the conversion kits and your guarantee of receiving any future airworthiness information applicable to Conversion Kit No. 199-125. Please fill out the registration card completely and return promptly. Postage is prepaid.

6.0 ORDER INFORMATION

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

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline
Phone: 1-800-272-5464
Fax: (440) 937-5409

7.0 EQUIPMENT DESCRIPTION

7.1 BRAKE ASSEMBLY

The brake is a single fixed cylinder, 5 piston, hydraulically operated, internal dual floating disc design. It is suitable for use with brake fluid conforming to MIL-H-5606, designed to withstand a 1000 psi maximum operating pressure, with zero psi back pressure.

7.1.1 Brake Operation

By depressing foot pedals, the aircraft master cylinders deliver hydraulic pressure to actuate the brake assemblies. Under pressure, pistons in the cylinder compress the brake stack, there by developing the braking action. When the foot pedals are released, the hydraulic pressure is relieved and the brake stack returns to normal position.

NOTE: Due to the pressure head in the hydraulic system, the brake will exhibit a light dragging with brakes off. This condition is normal and is not detrimental to tire or lining life.

7.2 WHEEL ASSEMBLY

The wheel is forged aluminum and conforms to all tire and rim association standards for a 6.50-10, Type III divided type wheel. It is a tubeless / tube-type design and incorporates an O-ring seal. The wheel incorporates inboard and outboard halves which are fastened together with bolts, washers, and nuts. The brake disc is attached to the wheel by the bolts. The wheel rotates on two tapered roller bearings, which seat in bearing cups in the wheel half hubs. Rubber lip grease seals provide protection and lubricant retention for the bearing.

8.0 KIT INSTALLATION

SAFETY WARNING: **INSURE AIRCRAFT IS SECURE AND STABLE BEFORE BEGINNING ANY WORK. WORKING UNDER AN IMPROPERLY STABILIZED AIRCRAFT COULD CAUSE INJURY OR DEATH.**

8.1 REMOVE EXISTING EQUIPMENT (Refer to Installation Drawing 50-90)

a. Jack aircraft in accordance with Beech Service Manual. Deflate main wheel completely, and remove and retain axle nut and tang washer. Remove existing main gear wheels.

b. Disconnect lower hydraulic line from existing swivel kit, and plug the hydraulic line tightly at location “A”, per View D. Next, disconnect existing brake assemblies from the inlet swivel kit, unfasten the two brake mounting bolts, and remove both brakes from the axle.

c. Disassemble swivel kits and remove O-ring seals. Clean all metal swivel kit parts in suitable solvent. Reassemble Beech Swivel Kit (99-8003-27) with Cleveland supplied O-rings, Items 7 and 8, as shown per View D.

8.2 INSTALL CLEVELAND EQUIPMENT (Refer to Installation Drawing 50-90)

a. The brakes are shipped from the factory as a complete assembly and may be installed as is. However, the following steps must be taken for installation on aircraft equipped with the Beech Brake Deice System.

1) Remove existing Brake Deice manifold from aircraft.

2) Place new brake assembly, Item 2, on bench, cylinder side up, and remove five (5) back plate bolts, Item 24.

3) Install new bracket, P/N 139-19100, Item 9, on the brake, using the five (5) back plate bolts, Item 24, with washer, Item 25, between the bracket and cylinder as shown per View E.

4) Repeat steps 2) & 3) above for the second brake, and then install the Brake Deice Manifold to this brake only, using existing attachment bolts, washers, and nuts.

5) Upon installation of brakes to aircraft, assure that the bracket on the opposite brake and manifold line up properly. Then attach manifold to brake with existing bolts, nuts, and washers.

NOTE: Only twelve (12) bolts, nuts, and washers are used per manifold. The four (4) upper most attachment points are eliminated for this installation.

b. Mount inlet fittings of the Swivel Kit (Beech P/N 99-8003-27) to appropriate port of the cylinder assembly of each brake.

NOTE: The brakes are nonhanded. The plug, item 21 and inlet fitting may be exchanged as needed for alignment with the inlet swivel.

c. Mount one brake assembly, Item 2, on the axle, making sure that the brake cylinder bottoms on the strut, and that the torque ring, Item 28, engages the gear lug.

d. Connect the inlet swivel to the brake that has just been installed. Install the other brake in place on the axle, making sure that the brake cylinder bottoms on the strut and the torque plate engages the gear lug, while assuring that the brake inlet fitting aligns and connects to the inlet swivel previously installed on the opposite brake.

e. Draw the two brakes together using two brake tie bolts, Item 4, two nuts, Item 6, and four washers, Item 5. Torque these bolts to 150 in-lbs.

f. Unplug the lower hydraulic line and reattach to the inlet swivel fitting.

g. If the aircraft has de-ice, wait until the aircraft is lowered off the jacks,and then re-attach the brake de-ice hose assembly.

h. The wheel assemblies are shipped from the factory as a complete assembly. The bearings are packed with grease and installed in the wheel halves.

NOTE: Extended storage of lubricated bearings may require re-lubrication.

i. Remove snap ring, Item 16, grease seal, Item 15, and bearing cone, Item 20 from the outboard side of the wheel assembly, and place on a clean surface to avoid contamination.

j. Separate the wheel halves by removing nuts, Item 14, washers, Item 12, washers, Item 13, and tie bolts, Item 11.

k. Position outer wheel half assembly, item 17, on a flat surface with the register side facing up.

l. Place a serviceable tire over outer wheel half, and install tube in tire if applicable.

m. Lubricate O-ring seal, Item 19, with Dow Corning Molycote 55M grease (or equivalent), and position on register portion of inner wheel half assembly, item 18.

CAUTION: SEAL SHOULD NOT BE TWISTED, BUT FULLY ALIGNED IN GROOVE.

n. Place inner wheel half, in tire making sure to properly align inner and outer registers on wheel as well as valve stem on tube if applicable.

o. After coating both surfaces of washer, Item 12, and under head of bolt, Item 11 with MIL-T-5544 anti-sieze compound, slide tie bolts through wheel assembly.

CAUTION: COUNTERSUNK SIDE OF WASHER, ITEM 12, TO BE TOWARD THE BOLT HEAD.

Coat both surfaces of washer, Item 13, and threaded portion of bolt shank with MIL-T-5544 anti-sieze compound. Instal washers, Item 13, and nuts, Item 14 on outer wheel half, and torque to 300 in-lbs. When all nuts have been torqued, retorque a second time to make sure that the required torque value has been achieved. Sometimes O-ring compression will give a false reading. The wheel may now be inflated to proper pressure in a safety cage.

p. Inspect bearing cone, Item 20, for contamination and/or solidification at every periodic inspection. If needed, re-pack bearings with grease per Mobil Aviation Grease SHC-100.

q. Check for burrs or rough threads on axle and axle nut.

r. Mount the wheel and tire assembly on the axle. Check to insure engagement of brake disc lugs in slots of the inner wheel half flange.

s. Apply a thin coat of bearing grease on axle nut and threads. Install bearing cone, Item 20, grease seal, Item 15, and snap ring, Item 16 in wheel. Install axle spacer, Item 3, tang washer, and axle nut on axle. Tighten axle nut to 150 – 200 in-lbs. of torque while rotating the wheel to insure proper seating of the bearings. Back off the axle nut to zero torque, then re-torque the nut to 40 in-lbs. While rotating the wheel. If the nut slots and axle holes do not align, tighten the axle nut to the next available slot position. Install a new cotter pin, item 10.

NOTE: Axle nut torque to be 40-in-lbs. minimum.

t. Repeat the procedure to install the second wheel and tire assembly on the opposite side of the strut.

u. Repeat this procedure for both struts. After lowering off from the jacks, re-attach both brake de-ice hose assemblies as applicable.

8.3 BLEED BRAKES

Check brake system reservoir fluid level and bleed brakes per Beech maintenance manual.

CAUTION: DO NOT ALLOW THE RESERVOIR TO BECOME EMPTY DURING BLEEDING.

8.4 BRAKE LINING CONDITIONING

When new linings are installed, it is important to condition them properly to obtain the service life designed into them. Condition linings as follows:.

8.4.2 Perform two (2) full stop braking applications from 30 to 35 knots, allowing the brake discs to cool between each stop.

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

8.4.3 Avoid light use, such as taxiing, which will cause the glaze to be worn rapidly

9.0 WEIGHT AND BALANCE COMPUTATIONS

Weigh existing wheels and brakes. Subtract from new weights to derive weight increase created by the kit installation. Multiply weight increase by applicable aircraft moment and revise weight and balance information in log book.

9.1 WEIGHT AND BALANCE DATA

New installed (per gear leg)

Wheel assy..... 11.4 lbs. each x 2 = 22.8 lbs. per gear leg.
Brake assy ..... 19.2 lbs. each x 2 = 38.4 lbs. per gear leg.
Total..... 30.6 lbs. each x 2 = 61.2 lbs. per gear leg.

Complete form 337 and make appropriate log book entries.

10.0 PILOT OPERATING INSERTS

Inserts are located in front with conversion kit documentation.

Attach label in pilot operating manual as close as possible to the original section labeled Main Wheel Assembly. Enter the correct arm and moment in blocks provided. Zero items out for the original main wheel and brake assemblies that have been removed.

Inserts are reprinted below for reference:

X	Four 5 piston internal floating dual disc Brake Assemblies, Cleveland P/N 30-162	19.2 ea.
X	Four 6.50-10 forged aluminum Wheel Assemblies, Cleveland P/N 40-203	11.4 ea.

Cleveland brake P/N 30-162 is a single fixed cylinder, internal dual floating disc design, using 5 pistons per cylinder, which respond to fluid pressure from the master cylinders for brake application.

11.0 KIT PARTS LIST – 199-125 Kit

(1) ITEM NUMBER	PART NUMBER	NOMENCLATURE	QUANTITY
(2) 1	40-203	Wheel Assembly	4
(3) 2	30-162	Brake Assembly	4
3	067-07800	Axle Spacer	4
4	103-24400	Bolt (MS21250-05040	4
5	095-14500	Washer	8
6	094-10400	Nut (MS21044-N5)	4
7	101-50337	O-Ring (MS28775-112)	4
8	101-20400	O-Ring (MS28778-4)	4
9	139-19100	Bracket (Hot Air Manifold)	4
10	221-07100	Cotter Pin (MS24665-428)	4
	IM199-125	Installation Manual for Conversion Kit 199-125	1
	CM30-162	Component Maintenance Manual for 30-162 Brake Assembly	
	CM40-203	Component Maintenance Manual for 40-203 Wheel Assembly	
	50-90	Installation Drawing	1
	SA757GL	Supplemental Type Certificate (200 Series)	1
	SA1509GL	Supplemental Type Certificate (99 & 100 Series)	1
	SA 1510GL	Supplemental Type Certificate F90	1
	-------	Pilot Operating Manual Inserts	1
	-------	Product Registration Card	1

(1) Refer to 50-90 Installation Drawing
(2) For Subassembly and Parts identification, refer to CM40-203, Fig 1; 40-203 IPL
(3) For Subassembly and Parts identification, refer to CM30-162, Fig 1; 30-162 IPL

Cleveland Wheels & Brakes

COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

MAIN BRAKE ASSEMBLY
PHC Part No. 30-162

CM30-162
Revision H June 24, 2020

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision N/C of CM30-162 (initial issue dated Oct 15, 2000)

Revision N/C, Dated October 15, 2000

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

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

REVISION HIGHLIGHTS

Section/Page No.	Description Of Change
All Sections/All Pages	Initial Release (DCN 0327-19)

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision A of CM30-162 (Rev. A dated March 15, 2001)

Revision A, Dated March 15, 2001

REVISION A CONTAINS ONLY THIS PAGE, AND PAGES RR-1, LEP-1, LEP-2, AND 8001 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
RR-1, LEP-1, LEP-2	Updated to reflect revised status (DCN 0345-04)
Page 8001, FITS AND CLEARANCES	Table 8001, Rotating Disc (75) worn dimensions: (NOW) ".010 inches minimum (.254 mm)" ".170 inches minimum (4.318 mm)" (WAS) ".030 inches minimum (.762 mm)" ".180 inches minimum (4.572 mm)" Table 8001, Center Stator (80) worn dimensions: (NOW) ".010 inches minimum (.254 mm)" (WAS) ".030 inches minimum (.762 mm)"

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision B of CM30-162 (Rev. B dated January 26, 2005)

Revision B, Dated January 26, 2005

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

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

REVISION HIGHLIGHTS

Section/Page No.	Description Of Change
RR-1, LEP-1, LEP-2	Updated to reflect current revision level (DCN 0364-55)
TESTING	
Pg 1001	Paragraph 1. B.: (NOW) "A test data sheet is included at the end of this section for reference." (WAS) "Prior to testing, make photocopies of the test data sheet provided at the end of this section. one photocopy of the data sheet is required for each brake assembly to be tested."
INSPECTION – CHECK	
Pg 5003	Paragraph 2. A.: (NOW) "… (IPL, 1-30 or 1-30A)" (WAS) "… (IPL, 1-30)"
Pg 5003	Paragraph 2. A. (5): (NOW) "Bore I.D. must not exceed ∅ 1.377 inch (34,976 mm) maximum." (WAS) "Bore I.D. must not exceed diameter A per FITS AND CLEARANCES, Table 8001."

REVISION HIGHLIGHTS

Section/Page No.	Description Of Change
INSPECTION – CHECK	
Pg 5005	Paragraph D. (3): (NOW) "… Figure 5003." (WAS) "… Figure 5004."
Pg 5006	Figure 5002: (REVISE) to show correct rivet installation.
Pg 5007	Figure 5003: (REVISE) to show correct rivet installation.
REPAIR	
Pg 6001	Table 6001: (NOW) 824-1K-7 Rollset (see Figure 9001) (WAS) 9C783 Rollset
Pg 6007	Paragraph E.: (ADD) "**NOTE:** The Milford rollset must be modified prior to using. Refer to Figure 9001 in the SPECIAL TOOLS…section
Pg 6008	Figure 6002 and Figure 6003: (REVISE) to correct the direction of rivet installation.
FITS AND CLEARANCES	
Pg 8001	Table 8001: (ADD) row for cylinder (30 or 30A) piston bore, ∅ 1.377 inches (34.976 mm) maximum
SPECIAL TOOLS…	
Pg 9002	Table 9001: (NOW) 824-1K-7 Rollset (see Figure 9001) (WAS) 9C783 Rollset
Pg 9005	(ADD) page for Figure 9001.
ILLUSTRATED PARTS LIST	
Pg 10005	Detailed Parts List: 2 places for figure 55: (NOW) 105-00901 (WAS) 105-00900

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision C of CM30-162 (Rev. C dated December 20, 2005)

Revision C, Dated December 20, 2005

REVISION C 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
RR-1, LEP-1, LEP-2	Updated to reflect current revision level (DCN 0368-11)
TESTING	
pg 1003	paragraph E. (2) (b) 1: (NOW) “Any leakage greater than 1 drop is cause for examination.” (WAS) “Any leakage greater than 1 drop is cause for rejection.”
pg 1004	paragraph E. (2) (b) 2 a: (NOW) “Any binding of pistons is cause for examination.” (WAS) “Any binding of pistons is cause for rejection.”
pg 1004	paragraph E. (2) (b) 4: (NOW) “Push the pistons back into the cylinder by hand using the pressure plate assembly (40).” (WAS) “Compress pistons back into brake cylinder.”
pg 1004	paragraph E. (3): (NOW) “(a) 1 Any leakage greater than 1 drop is cause for examination.” “(b) Release the hydraulic pressure.” “(c) Push the pistons back into the cylinder by hand using the pressure plate assembly (40). “(d) Check for freedom of movement of disc. a Failure of disc to move freely in brake assembly is cause for examination.” “(e) Confirm that there is zero pressure to the brake and disconnect the hydraulic supply line.” “(f) Re-install bleeder screw (125) and tighten snug.” “(g) Check all fittings and fasteners for tightness and torque to specifications where required per Table 8002, Assembly Hardware Torque Values.” “(h) Record all test results on the test data sheet.”

Revisions Highlights (continued)

Section/Page No.	Description Of Change
pg 1004	(WAS) "(a) 1 Any leakage greater than 1 drop is cause for rejection." 2 Release the hydraulic pressure and demonstrate that it is possible to rotate the discs by hand." NOTE: Drag may be present since the brake assembly does not incorporate piston retraction mechanisms. a If the discs cannot be rotated by hand or if drag is severe, reject the brake assembly. "(b) Check for zero pressure to the brake and disconnect the hydraulic supply line. Remove bleeder screw (125) and drain the test fluid." "(c) Push the pistons back into the cylinder by hand using the pressure plate assembly (40) to drain the hydraulic test fluid. This is to verify piston retraction without binding, and to verify disc clearance." "(d) Re-install bleeder screw (125) and tighten snug." "(e) Record all test results on the test data sheet."
INSPECTION / CHECK	
pg 5002	paragraph B. (4): (ADD) "…beyond limits specified in this manual." to end of last sentence.
pg 5008	Note in paragraph E.: (NOW) "…rubbing surfaces is normal…" (WAS) "…rubbing surfaces if normal…"
pg 6009	paragraph E.: (DELETE) "(6) Refer to Figure 6004 and verify rivet installation requirements for pressure plate and back plate assemblies." (NOW) paragraph E. (5) (WAS) labeled as E. (7) (NOW) paragraph "(6) With semi-tubular rivets, splits resulting from the clinching operation are not permitted. (WAS) paragra;ph "(8) With semi-tubular rivets, splits resulting from the clinching operation are permitted as follows: (a) The split shall not occur inside the crest of the clenched surface. (b) No more than two (2) splits shall occur in a 90° area. (c) A total of no more than three (3) splits shall be allowed.
pg 6009	(DELETE) Figure 6004, Rivet Installation Requirements

Revisions Highlights (continued)

Section/Page No.	Description Of Change
ASSEMBLY	
pg 7001	Table 7001, Torque Wrench row revised as follows: (NOW) "Refer to Table 8002 Assembly Hardware Torque Values for torque range" (WAS) "0 to 100 in-lb capacity (0 to 11 N-m)"
pg 7002	paragraph 2. A. (9): (NOW) "…Torque nuts to 200 in-lb (22.60 N-m) dry." (WAS) "…Torque to 200 in-lb (22.60 N-m)."
pg 7002	paragraph 2. B. (5): (NOW) "…will be cause for examination of the assembly." (WAS) "…will be cause for rejection of the assembly."
FITS AND CLEARANCES	
pg 8001	Table 8001 revised as follows: Figure and Dimension References column: numerical order corrected: (NOW) "5001 thru 5005" (WAS) "5002 thru 5006" (NOW) for Center Stator: .810 maximum (WAS) .810 minimum. (NOW) for Cylinder: ∅ 1.377 maximum (WAS) ∅ 1.377 minimum.
pg 8002	Table 8002 revised as follows: (NOW) "Nuts (15)" 200 in-lb dry (22.60 N-m) (WAS) "Bolts (5)" 200 in-lb (22.60 N-m)"
SPECIAL TOOLS…	
pg 9001	Table 9001, Torque Wrench row revised as follows: (NOW) "Refer to Table 8002 Assembly Hardware Torque Values for torque range" (WAS) "0 to 100 in-lb capacity (0 to 11 N-m)"
ILLUSTRATED PARTS LIST	
pg 10004	IPL Figure 1 revised as follows: (NOW) callout 35, 35A (WAS) 35 (NOW) callout 30, 30A (WAS) 30 (NOW) show item 55 rivets installed from wear pad side (WAS) shown opposite side.
pg 10005 & pg 10006	Detailed Parts List revised as follows: pg 10006 (NOW) populated with item rows (WAS) blank for item 25, (ADD) "REPLD BY ITEM 25A" for item 30, (ADD) "REPLD BY ITEM 25A" for item 30A, (ADD) "REPLD BY ITEM 25A" (ADD) item 25A, 091-23900, ASSEMBLY, CYLINDER, REPLS ITEMS 25, 30, 30A, qty 1 (ADD) item 140, 139-07500, ASSEMBLY, PIN PLUG, qty 4 for item 35 (ADD), "REPLD BY ITEM 35A" (ADD) item 35A, 065-15401, RING, TORQUE, REPLS ITEM 35, qty 1 (ADD) item 135, 166-20100, NAMEPLATE, qty 1

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision D of CM30-162 (Rev. D dated December 23, 2009)

Revision D, Dated December 23, 2009

REVISION D 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
RR-1, LEP-1, LEP-2	Updated to reflect current revision level (DCN 0387-38)
Repair Pg 6001	Table 6001 (NOW) Orbitform (WAS) Milford Fastening Systems
Pg 6002	Table 6001 (ADD) MIL-P-26915 Type II, Class A (ADD) Flag notes [1] MIL-P-26915, Type I is a low VOC, solvent reducible primer [2] MIL-P-26915, Type II is a low VOC, water reducible primer. Corrosion protection will not be optimum with Type II.
Pg 6010	Para. F. (2) (NOW) (Galvanizing compound per MIL-P-26915, Type I, Class A or Type II, Class A) (WAS) (Galvanizing compound per MIL-P-26915, Type I, Class A) (ADD) CAUTION CORROSION PROTECTION WILL NOT BE OPTIMUM WITH MIL-P-26915, TYPE II, CLASS A.
Fits and Clearances Pg 8001	Table 8001 (NOW) Torque Ring drive lug width: .700 inches minimum (WAS) .450 inches minimum (NOW) Rotating Disc drive tang width: .485 inches minimum (WAS) .810 inches maximum

REVISION HIGHLIGHTS

Section/Page No.	Description Of Change
Special Tools, Fixtures…	
Pg 9002	Table 9001 (NOW) Orbitform (WAS) Milford Fastening Systems
Pg 9003	Table 9002 (ADD) MIL-P-26915 Type II, Class A (ADD) Flag notes [1] MIL-P-26915, Type I is a low VOC, solvent reducible primer [2] MIL-P-26915, Type II is a low VOC, water reducible primer. Corrosion protection will not be optimum with Type II.
Pg 9004	Para. C (NOW) Orbitform (WAS) Milford Fastening Systems (ADD) Chemetall Oakite info
Pg 9005	Figure 9001 (REMOVED) drawing format to enlarge graphics for clarity

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision E of CM30-162 (Rev. E dated March 18, 2016)

Revision E, Dated March 18, 2016

REVISION E 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
RR-1, LEP-1	Updated to reflect current revision level (ECO-0065384)
Inspection/Check Pg 5005	(ADD) step 2. C.(4) (4) Inspect the pressure plate for flatness on wear pad mating surface if wear pads are being replaced. Flatness must not exceed the limits shown in Figure 5002. If flatness exceeds the limit, replace the pressure plate. **NOTE:** Coned or distorted pressure plates are most commonly signs of a high energy brake application.
Pg 5006	Figure 5002 (ADD) flatness requirement on pressure plate to wear pad mating surface.

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision F of CM30-162 (dated February 24, 2017)

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
As follows	ECO-0077667
Record of Revisions/RR-1	Update to reflect latest revision.
List of Effective Pages/LEP-1	Update to reflect latest revision.
Repair Pg 6009	Para. 2.E.(5) (ADD) step (b) regarding acceptable rivet splitting during installation. Para. 2.E. (6) (NOW) (Deleted) (WAS) With semi-tubular rivets, splits resulting from the clinching operation are not permitted. (ADD) Figure 6004

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision G of CM30-162 (dated July 31, 2017)

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
As follows	ECO-0082837
Title Page/T-1	Update to reflect latest revision.
Record of Revisions/RR-1	Update to reflect latest revision.
List of Effective Pages/LEP-1	Update to reflect latest revision. Correct 5009 thru 5011 effective date
Introduction/ INTRO-1	2. Data Rights (DELETED) Data rights are located on title page.
INTRO-2	3. TSO Notice (NOW) FAR Part 23 (WAS) FAR Part 27 and Part 29.
Description and Operation/ Pg 1	1. Main Brake Description (NOW) …"switching the plug fitting (110) and a preformed packing (115) on top of…" (WAS) …"switching the fittings on top of…" (CORRECTED) "…two rotating disc" to read "…two rotating discs…"
Pg 2	Table 1 (NOW) Actual Weight (WAS) Maximum Guaranteed (NOW) AMS-M-3171, Type VI or Oxsilan® (WAS) MIL-M-3171, Type III (NOW) Primer Coating: Sherwin Williams, P/N P60G2 or P60G10 Finish Coating: Sherwin Williams, P/N F63W13 (white) (WAS) Primer Coating: Columbia Paint Corporation, P/N 11-347Z Finish Coating: Columbia Paint Corporation, P/N 11-358/A (Gloss White)

Revision G (continued)

Section/Page No.	Description Of Change
Testing/pg 1002	1.C.(2) (NOW) fitting plug (110) (WAS) hydraulic fittings
	1.C.(3) (NOW) …more than one drop... (WAS) ...less than one drop…
Pg 1007	Test Data Sheet (NOW) Actual Weight (WAS) Maximum Weight
Cleaning/pg4001	Table 4001 (NOW) MIL-PRF-680 (WAS) P-D-680
	2.A.(1) (NOW) MIL-PRF-680 (WAS) P-D-680
Pg 4002	2.E.(1) (NOW) …can be washed with Type 1 Stoddard Solvent (per MIL-PRF-680)… (WAS) …can washed with Type 1 Stoddard Solvent (per P-D-680)…
	2.F.(1) NOTE (CORRECTED) punctuation from colon to period.
Inspection/Check Pg 5001	Table 5001, Fluorescent Penetrant Inspection Kit (NOW) ASTM E1417 (WAS) MIL-STD-6866
Pg 5003	2.A.(2) (NOW) ASTM E1417 (WAS) MIL-STD-6866
Pg 5004	(CORRECTED) page effectivity date
Pg 5008	2.E. (ADD) (4) Examine for distortion and out-of-flatness. Replace a rotating disc if out-of-flatness more than .010 inch (0.25 mm). 2.F. (ADD) (4) Examine for distortion and out-of-flatness. Replace a rotating disc if out-of-flatness more than .010 inch (0.25 mm).

Revision G (continued)

Repair	
Pg 6002	Table 6001 (NOW) AMS-M-3171, Type VI or Oxsilan® (WAS) MIL-M-3171, Type VI, Chromic Acid (NOW) P60G2 or P60G10, Sherwin Williams (WAS) 11-347Z, Columbia Paint Corp. (NOW) F63W13, Sherwin Williams (WAS) 11-358A, Columbia Paint Corp.
Pg 6003	2.A.(4) (NOW) Update step to provide instruction for both AMS-M-3171, Type VI and Oxsilan®. (WAS) Instruction to use Alodine 1200 or equivalent per MIL-C-5541, Class 1A.
Pg 6006	Figure 6001 (UPDATED) to reflect current masking instructions.
Special Tools, Fixtures…/	
Pg 9002 & 9003	Table 9002 (REMOVE) MIL-H-83282 from hydraulic fluid listing (NOW) MIL-PRF-680 (WAS) P-D-680 (NOW) ASTM E1417 (WAS) MIL-STD-6866 (NOW) AMS-M-3171, Type VI or Oxsilan® (WAS) MIL-M-3171, Type VI, Chromic Acid (NOW) P60G2 or P60G10, Sherwin Williams (WAS) 11-347Z, Columbia Paint Corp. (NOW) F63W13, Sherwin Williams (WAS) 11-358A, Columbia Paint Corp.
Pg 9004	1.C. (NOW) Sherwin Williams www.sherwin-williams.com (WAS) Columbia Paint Corp., 641 Jackson Avenue, Huntington, WV 25728 U.S.A.
Illustrated Parts List	
Pg 10005	1.4. Parts List (CORRECTED) P/N 30-262 to 030-26200

TO: HOLDERS OF CM30-162 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN BRAKE ASSEMBLY PART NO. 30-162.

Attached to this transmittal letter is Revision H of CM30-162 (dated June 24, 2020)

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
As follows	ECO-0114970
Title Page/T-1	Update to reflect latest revision.
Record of Revisions/RR-1	Update to reflect latest revision.
List of Effective Pages/LEP-1	Update to reflect latest revision.
Inspection/Check Pg 5004	2. C. Notes 1 and 2 (NOW) On page 5004 (WAS) On page 5005
Pg 5005	2.C. (ADD) (5) Visually inspect and magnetic particle inspect pressure plate per ASTM 1444 or liquid penetrant inspection per ASTM E 1417, type I, method A, sensitivity level 2 or equivalent for cracks around the rivet holes, thermal relief slots and drive slots. Any evidence of cracks requires replacement. **CAUTION:** Any stripping of plating for inspection purposes is prohibited.
Pg 5006	2.D. (ADD) (4) Visually inspect and magnetic particle inspect back plate per ASTM 1444 or liquid penetrant inspection per ASTM E 1417, type I, method A, sensitivity level 2 or equivalent for cracks around the rivet holes, bolt holes and thermal relief slots. Any evidence of cracks requires replacement.

RECORD OF REVISIONS

Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision letter, date inserted and initial.

REV.	DATE ISSUED	DATE INSERTED	BY	REV.	DATE ISSUED	DATE INSERTED	BY
NC	2000-10-15	2000-10-15	PHC				
A	2001-03-15	2001-03-15	PHC				
B	2005-01-26	2005-01-26	PHC				
C	2005-12-20	2005-12-20	PHC				
D	2009-12-23	2009-12-23	PHC				
E	2016-03-18	2016-03-18	PHC				
F	2017-02-24	2017-02-24	PHC				
G	2017-07-31	2017-07-31	PHC				
H	2020-06-24	2020-06-24	JAS				

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 Main Brake Assembly and components.

SERVICE BULLETIN NUMBER	SUBJECT	REV.	DATE INCORPORATED

LIST OF EFFECTIVE PAGES

LIST OF EFFECTIVE PAGES

TABLE OF CONTENTS

INTRODUCTION

1. General

This manual is published for the guidance of personnel responsible for the overhaul and/or maintenance of the Parker Hannifin Main Brake Assembly covered in this publication.

This manual contains shop instructions for maintaining brake assembly 30-162, including testing, checking and repair procedures.

The instructions in this manual only apply to assembly part number 30-162. Ensure that the part number on the unit is listed on the cover page before performing any of these instructions.

NOTE: All torque values and specified limits or values set by Parker Hannifin Engineering and contained herein must be strictly observed.

The manufacturer has verified the contents of this manual by actual performance of Disassembly, Assembly and Testing prior to the distribution of printed copies.

While Parker Hannifin Corporation represents that the information contained in this manual was current at the time of publication, it is recommended that the user inquire as to the latest revision level in existence before proceeding with overhaul or maintenance operations. This can be accomplished by contacting the Technical Services Department of the Aircraft Wheel & Brake Division at the following address or numbers:

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline
Phone: 1-800-272-5464
Fax: (440) 937-5409

2. Data Rights

(Deleted)

INTRODUCTION

3. TSO Notice

   This assembly carries a “TSO C26c” marking for FAR Part 23 usage, which identifies it as having been fully tested in the laboratory and qualified to applicable FAA (Federal Aviation Administration) requirements and specifications. Substitutions of critical parts or changes of processes or materials are not permitted without the written approval of the manufacturer.

4. Manual Use

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

   When a section of text makes occasional reference to figure items for identification of components, the item number will be preceded with the associative figure number and enclosed in parentheses ( ) such as:

   “…..Inspect for loose, cracked, or worn wear pads (IPL, 1-50).” – read as IPL Figure 1, item 50

   When a section of text makes numerous references to a particular figure for identification of components, a note shall precede the applicable text referencing the figure. The item numbers will then be enclosed in parentheses ( ) such as:

   “Refer to IPL, Figure 1”

   “…..Install piston insulators (105) into the pistons (95).” – read as IPL Figure 1, items 105 and 95 respectively

DESCRIPTION AND OPERATION

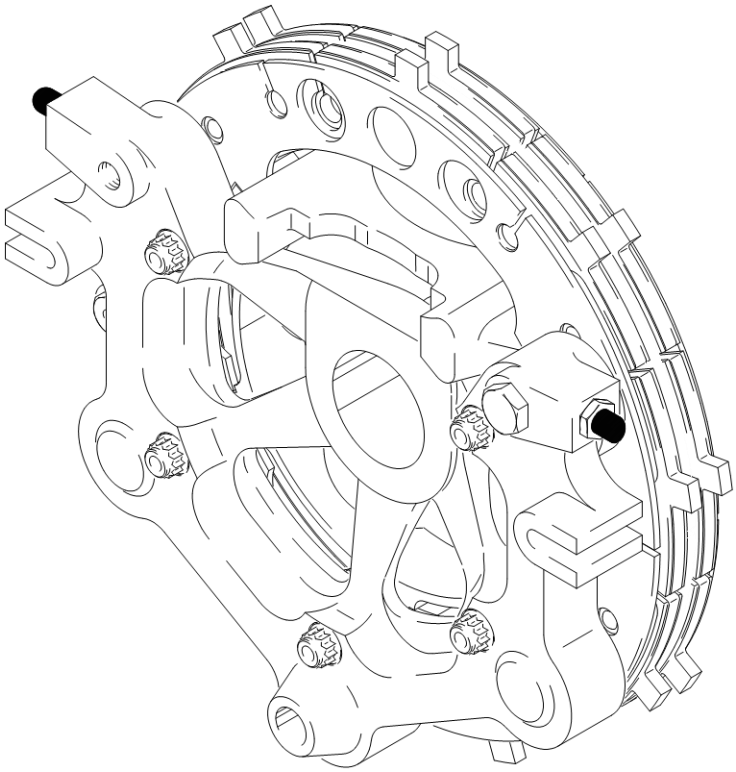
1. Main Brake Description

The main brake assembly is a piston actuated, hydraulically operated, internal dual floating disc unit that is designed to be compatible with MIL-H-5606 hydraulic fluid. The brake assembly is a nonhanded unit and can be used on the opposite side of the aircraft by simply switching the plug fitting (110) and a preformed packing (115) on top of the brake cylinder to the opposite port.

Each brake assembly is composed of the following: One brake cylinder, one pressure plate assembly with replaceable steel wear pads, two rotating discs with sintered friction material on a steel core, one center stator with sintered friction material on a steel core, one backplate assembly with replaceable steel wear pads and, five high strength bolts and washers.

Each of the five pistons contains an installed O-ring to prevent leakage of hydraulic fluid past the pistons.

A piston insulator slides into the pocket of each piston in order to shield the brake fluid from the heat generated during braking.



Main Brake Assembly
Figure 1

DESCRIPTION AND OPERATION

2. Main Brake Operation

Braking action begins to occur when hydraulic pressure is applied to the brake, via the pilot's or copilot's master cylinders. As the hydraulic pressure reaches the brake it forces the pistons outward against the pressure plate assembly (with wear pads) which compresses the brake stack (the rotating discs and center stator) against the back plate assembly (with wear pads). This generated frictional force is transferred to the wheel/tire through the rotating discs; which have drive tangs to engage the main wheel, and thus slows the aircraft.

3. Main Brake Handling Procedures

Strictly observe the torque and lubtork values specified in this manual. Do not overtighten any bolt, nut, or fitting. Handle and maintain the brake cylinder properly to protect the paint and surface finishes.

Table 1
Leading Particulars

PARAMETER	SPECIFICATION
Hydraulic Fluid	MIL-H-5606
Operating Pressure	1000 psig (68.95 bar) maximum
Assembly Weight	19.20 lbs. (8.71 kg) Actual Weight
Brake Cylinder Material	Magnesium Alloy Casting
Seals	Compatible with MIL-H-5606 Hydraulic Fluid
Brake Cylinder Coatings	Surface Pretreatment: AMS-M-3171, Type VI, or Oxsilan® Primer Coating: Sherwin Williams, P/N P60G2 or P60G10 Finish Coating: Sherwin Williams, P/N F63W13 (white)

TESTING

1. General

This section contains test procedures that can be used both as troubleshooting measures and means to test overhauled brake assemblies.

A. Test Equipment and Materials. Refer to Table 1001.

Table 1001
Testing Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Fluid, Hydraulic	MIL-H-5606	Commercial Source
N/A	Powered Hydraulic Test Stand	0 to 1000 psig capacity ± 40 psi gage increment (0 to 68.95 bar) ± 2.76 bar gage increment	Commercial Source
N/A	Hydraulic Filter	10 micron	Commercial Source
N/A	Pressure Regulator	0 to 1000 psig (0 to 68.95 bar)	Commercial Source
N/A	Pressure Gage	0 to 1000 psig (0 to 68.95 bar)	Commercial Source
N/A	Tubing	∅0.156 in. I.D. (∅3.97 mm) rubber or polymer	Commercial Source
N/A	Fitting, Test	7/16-20 UNF-3B	Commercial Source
N/A	Hydraulic Hose	1000 psig minimum (68.95 bar)	Commercial Source

B. Preparation for Testing

A test data sheet is included at the end of this section for reference.

C. Pretest Check (Refer to IPL, Figure 1)

Perform the following inspections and checks to qualify the brake assembly for testing. Do not perform testing on any brake assembly that exhibits visible signs of damage.

(1) Examine exposed cylinder (30) surfaces for breaks, cracks, or other visible damage.

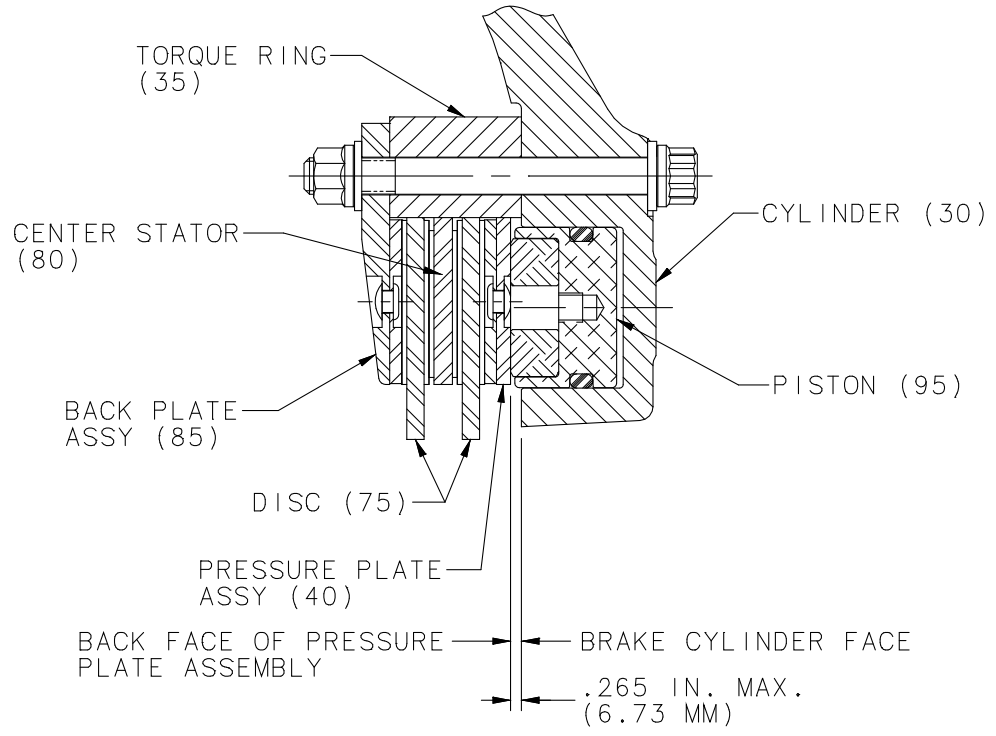
TESTING

(2) Examine plug fitting (110) for deformation, pitting, damage to threads or scoring that would affect sealing.

(3) Examine brake assembly for signs of leakage from piston seals (100), inlet fitting, plug fitting (110), and bleeder fittings (120, 125). Measurable leakage is defined as more than one drop.

D. Brake Wear Check. See Figure 1001

Refer to IPL, Figure 1 for identification of components. With the aircraft on a flat surface, depress the brakes and set the parking brake. While the pressure plate, discs, center stator, and back plate are compressed against one another, check lining indicator for position of the indicator pin (IPL, 1-60). The position of the indicator pin may be seen from either the front or aft of the aircraft. This dimension denotes a standard whereas if the indicator pin cannot be seen, check the brake for wear, measure the distance between the pressure plate assembly and the cylinder housing with a set of long nose Vernier calipers. If this distance exceeds .265 inches, the brake should be fully disassembled and further inspection of the individual wear components should be performed as specified herein.



Brake Wear Check
Figure 1001

TESTING

E. Procedure

A hydraulic test stand (consisting of a hydraulic pump, filter, regulator, automatic cycler, and applicable pressure gages) is required to conduct performance testing. The required test equipment is listed in Table 1001. If the brake assembly meets the pretest check requirements of paragraph 1.C., test the brake assembly in accordance with the following performance test procedures. Refer to IPL, Figure 1.

SAFETY WARNING: BRAKE ASSEMBLIES BEING PRESSURE TESTED HAVE AN EXPLOSIVE POTENTIAL. DURING PRESSURE TESTING, PERSONNEL MUST FOLLOW ALL SAFETY PRECAUTIONS AND WEAR PROTECTIVE CLOTHING AND SAFETY GLASSES. FAILURE TO COMPLY CAN RESULT IN DEATH OR PERSONAL INJURY.

(1) Setup

(a) An inlet fitting is not supplied as a component of the brake assembly, therefore, install a 7/16-20 UNF-3B fitting in the brake inlet port to serve as a test fitting. Check all fittings for tightness and torque to specifications where required.

(b) Connect the hydraulic supply line to the test fitting.

(c) Install an appropriate length of rubber or polymer (∅0.156) I.D. (3.97 mm) tubing over one of the bleeder screws (125).

CAUTION: EXERCISE CARE TO PREVENT BRAKE FLUID FROM CONTACTING THE BRAKE FRICTION SURFACES.

(d) Bleed the brake per the Aircraft Manual.

(2) Piston Actuation and Flow Through Test

(a) Connect the brake assembly on the test stand.

(b) Subject the brake to 3 cycles of 600 ±20 psig (41.37 ±1.38 bar) to zero [0] psig (0 bar).

1 Any leakage greater than 1 drop is cause for examination.

TESTING

2 Check pistons.

a Any binding of pistons is cause for examination.

3 Release the hydraulic pressure.

4 Push the pistons back into the cylinder by hand using the pressure plate assembly (40).

(c) Record all results on the test data sheet.

(3) Pressure Test

(a) Pressurize cylinders to 600 ±20 psig (41.37 ±1.38 bar). Hold pressure for a minimum of two [2] minutes.

1 Any leakage greater than 1 drop is cause for examination.

(b) Release the hydraulic pressure.

(c) Push the pistons back into the cylinder by hand using the pressure plate assembly (40).

(d) Check for freedom of movement of disc.

1 Failure of disc to move freely in brake assembly is cause for examination.

CAUTION: EXERCISE CARE TO PREVENT BRAKE FLUID FROM CONTACTING THE BRAKE FRICTION SURFACES.

(e) Confirm that there is zero pressure to the brake and disconnect the hydraulic supply line.

(f) Re-install bleeder screw (125) and tighten snug.

(g) Check all fittings and fasteners for tightness and torque to specifications where required per Table 8002, Assembly Hardware Torque Values.

(h) Record all test results on the test data sheet.

(4) Sign and date the test data sheet.

TESTING

F. Troubleshooting (Refer to IPL, Figure 1 except where noted).

Table 1002 (Sheet 1 of 2)
Brake Assembly Troubleshooting

TROUBLE	PROBABLE CAUSE	CORRECTION
Hydraulic fluid leaking from brake assembly	Defective hydraulic connection	Tighten connection or replace fitting
	Worn or damaged preformed packings (100)	Replace packings
	Pistons (95) damaged	Check pistons per para. 2.G. of INSPECTION/CHECK and replace as necessary
	Piston bores of brake cylinder (30) damaged	Check brake cylinder per para. 2.A. of INSPECTION/CHECK and replace as necessary
Hydraulic fluid leaking from bleeder seat (120)	Worn or damaged preformed packing (115)	Replace packing
Hydraulic fluid leaking from bleeder screw (125)	Damaged bleeder screw	Replace bleeder screw
Insufficient running clearance	Pressure plate assembly (40) excessively dished	Check per para. 2.C. of INSPECTION/CHECK and replace as necessary
	Back plate assembly (85) excessively dished	Check per para. 2.D. of INSPECTION/CHECK and replace as necessary
Brake not releasing correctly	Obstruction in hydraulic line or fluid passage	Remove obstruction
	Pistons (95) sticking	Replace preformed packings, (100)
	Locked or jammed piston (95)	Check pistons per para. 2.G. of INSPECTION/CHECK and replace as necessary

TESTING

Table 1002 (Sheet 2 of 2)
Brake Assembly Troubleshooting

TROUBLE	PROBABLE CAUSE	CORRECTION
Brake not engaging correctly	Air in brake	Bleed brake per 1.E.(1) steps (a) thru (d)
	Obstruction in hydraulic line or fluid passage	Remove obstruction
	Pistons (95) sticking	Replace preformed packings, (100)
	Pistons (95) damaged	Check per para. 2.E. of INSPECTION/CHECK and replace as necessary
	Brake cylinder (30) damaged	Check per para. 2.A. of INSPECTION/CHECK and replace as necessary
	Torque ring (35) damaged	Check per para. 2.B. of INSPECTION/CHECK and replace as necessary
	Pressure plate assy (40) not sliding freely on torque ring	Check per para. 2.C. of INSPECTION/CHECK and replace as necessary
	Center stator (80) not sliding freely on torque ring	Check per para. 2.G. of INSPECTION/CHECK and replace as necessary
Maximum pedal effort does not decelerate aircraft properly	Back plate assy (85) wear pads (50) worn beyond minimum limits	Check per para. 2.D. of INSPECTION/CHECK and replace as necessary
	Pressure plate assy (40) wear pads (50) worn beyond minimum limts	Check per para. 2.C. of INSPECTION/CHECK and replace as necessary
	Rotating disc (75) friction material worn beyond minimum limits	Check per para. 2.F. of INSPECTION/CHECK and replace as necessary
	Center stator (80) friction material worn beyond minimum limits	Check per para. 2.G. of INSPECTION/CHECK and replace as necessary

TEST DATA SHEET (Sheet 1 Of 2)

Work Order No. _____ **Date** _____ **Brake Serial No.** _____

A. Weight of Brake Assembly: _____lb/kg **Actual Weight:** 19.20 lb (8.71 kg)

B. Quality of Workmanship: **Accept** _____ **Reject** _____

Comments _____

_____

_____

_____

C. Pretest Checks

(1)	Brake cylinder condition	**Accept** _____	**Reject** _____
(2)	Brake assembly hardware condition	**Accept** _____	**Reject** _____
(3)	Check for leakage from fittings	**Accept** _____	**Reject** _____
(4)	Check for leakage from piston seals	**Accept** _____	**Reject** _____

Comments: _____

_____

_____

_____

D. Piston Actuation and Flow Through Test

Pressure Applied:_____ psig/bar Required: 600 ±20 psig (41.37 ±1.38 bar) to 0 psig (0 bar)

Number of Cycles:_____ Required: 3 cycles

Leakage: **Amount**_____ **Accept** _____ **Reject** _____

Piston Retraction: **Accept** _____ **Reject** _____

Comments: _____

_____

_____

_____

_____

TEST DATA SHEET (SHEET 2 OF 2)

F. Pressure Test

Pressure Applied:_____ psig/bar Required: 600 ±20 psig (41.37 ±1.38 bar)

Time:_____ Required: Two [2] minutes minimum

Leakage: **Amount**_____ **Accept** _____ **Reject** _____

Pressure Applied:_____ psig/bar Required: 0 psig (0 bar)

Disc Rotation: **Accept** _____ **Reject** _____

Piston Retraction: **Accept** _____ **Reject** _____

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

Tester: _____ **Date:** _____

Inspector: _____ **Date:** _____

DISASSEMBLY

1. General

To service the brake assembly, it will be necessary to remove it from the aircraft.

NOTE: Refer to TESTING section to establish the condition of the component or most probable cause of detected malfunction(s) to determine extent of disassembly required.

A. Disassembly Equipment and Materials. Refer to Table 3001.

Table 3001
Disassembly Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Socket Set	Hex Head, Inch	Commercial Source
N/A	Wrench Set	Hex Head, Open End, Inch	Commercial Source
N/A	Ratchet	1/2 in. Square Drive	Commercial Source
199-18	Preformed Packing Extraction Tool Set	N/A	Parker Hannifin Corp. Aircraft Wheel & Brake

B. Remove Brake Assembly

SAFETY WARNING: INSURE AIRCRAFT IS SECURE AND STABLE BEFORE BEGINNING ANY WORK. WORKING UNDER AN IMPROPERLY STABILIZED AIRCRAFT COULD CAUSE INJURY OR DEATH.

(1) Jack aircraft per aircraft maintenance manual until tire is clear of ground. It is **strongly** recommended that the tire be **fully deflated** at this time.

(2) Remove the air valve assembly from the main wheel assembly to make sure the tire is fully deflated. Refer to CM40-203 for part identification.

(3) Support wheel/tire and remove and retain applicable axle mounting hardware including axle nut, and tang washer and axle spacer, Parker P/N 067-07800.

(4) Remove wheel/tire from axle as a unit and place on a clean flat surface.

DISASSEMBLY

(5) After the main wheel and tire have been removed, disconnect hydraulic lines and cap open lines and ports.

(6) Disconnect Beech Swivel Kit (P/N 99-80003-27) from the brake assembly.

(7) Slide the brake assembly off of the axle and place it on a clean flat surface.

C. Disassemble Brake Assembly (Refer to IPL, Figure 1)

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

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

(1) Remove five self-locking nuts (15), flat washers (20), bolts (5), and single countersunk washers (10) from the brake assembly.

(2) Remove the back plate assembly (85), pressure plate assembly (40), rotating discs (75), center stator (80) and cylinder (30) from the brake assembly.

(3) Remove the five piston insulators (105) from each piston bore.

CAUTION: PULL OUT PISTONS WITH CARE. DO NOT COCK THE PISTONS WHEN PULLING THEM OUT.

(4) Remove the five pistons (95) by threading an applicable bolt/rod into the 1/4-28-2B hole. Holding the bolt/rod, pull the pistons out.

(5) Remove the preformed packings (100) from the pistons (95) and discard preformed packings.

(6) Remove bleeder seats (120) and bleeder screws (125). Remove and discard preformed packing (115).

(7) Drain hydraulic fluid from the brake cylinder (30).

CLEANING

1. General

   A. Cleaning Equipment and Materials. Refer to Table 4001.

   NOTE: Equivalent substitutes may be used for items listed.

Table 4001
Cleaning Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Air Supply, Compressed Dry Filtered	30 psig maximum (2.07 bar)	N/A
N/A	Cleaning Cloths	Lint Free	Commercial Source
N/A	Brushes	Soft and Stiff Bristled	Commercial Source
N/A	Solvent, Stoddard Type 1	MIL-PRF-680	Commercial Source
N/A	Cleaner/Degreaser, Water Based	AMS 1526	Commercial Source

2. Cleaning Procedures (Refer to IPL, Figure 1)

   WARNING: CLEANING SOLVENTS CAN BE TOXIC AND VOLATILE. USE ONLY IN WELL-VENTILATED AREAS. AVOID PHYSICAL CONTACT WITH SOLVENT AND DO NOT INHALE VAPORS. KEEP SOLVENT CONTAINERS COVERED WHEN NOT IN USE. OBSERVE FIRE PRECAUTIONS.

   A. Cleaning Non-Aluminum Metallic Components

      (1) Non-Aluminum components, such as the torque ring (35), pressure plate assembly (40), and the back plate assembly (85) can washed with Type 1 Stoddard Solvent (per MIL-PRF-680) using a soft bristled cleaning brush to remove stubborn deposits.

      (2) Dry all metal parts thoroughly after cleaning, using low-pressure compressed air, 30 psig maximum (2.07 bar). Wipe dried parts with lint free cleaning cloths.

CLEANING

B. Cleaning Rotating Discs (IPL 1-75)

CAUTION: DO NOT USE CLEANING SOLUTIONS ON FRICTION MATERIAL SURFACES.

(1) Clean rotating discs with compressed air and a stiff bristle brush.

C. Cleaning Center Stator (IPL 1-80)

CAUTION: DO NOT USE CLEANING SOLUTIONS ON FRICTION MATERIAL SURFACES.

(1) Clean center stator with compressed air and a stiff bristle brush.

D. Cleaning Magnesium Components (Refer to IPL, Figure 1)

(1) The brake cylinder (30) can be degreased and cleaned with a water based cleaner/degreaser (per AMS 1526). Use a soft bristled cleaning brush to remove stubborn deposits.

(2) Dry parts thoroughly after cleaning, using low pressure compressed air, 30 psig maximum. Wipe dried parts with lint free cleaning cloths.

E. Cleaning Aluminum Components (Refer to IPL, Figure 1)

(1) Aluminum components, such as the pistons (95), can be washed with Type 1 Stoddard Solvent (per MIL-PRF-680) using a soft bristled cleaning brush to remove stubborn deposits.

(2) Finish cleaning aluminum parts in a water based cleaner/degreaser (per AMS 1526).

(3) Dry parts thoroughly after cleaning, using low pressure compressed air, 30 psig maximum (2.07 bar). Wipe dried parts with lint free cleaning cloths.

F. Cleaning Rubber Components

(1) Clean rubber parts with MIL-H-5606 hydraulic fluid or other solutions are recommended by the O-ring manufacturers. Wipe dry with lint free cleaning cloths.

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

INSPECTION / CHECK

1. General

In order to facilitate inspection of components, parts must be cleaned prior to inspection. Refer to CLEANING section for applicable instructions. Refer to the illustrations in this section for important areas and areas of greatest wear. Where indicated, refer to FITS AND CLEARANCES section to find if the part can be used, repaired, or replaced.

A. Inspection/Check Equipment and Materials. Refer to Table 5001.

NOTE: Equivalent substitutes may be used for items listed.

Table 5001
Inspection/Check Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Magnetic Particle Inspection Kit	ASTM E1444	Commercial Source
N/A	Fluorescent Penetrant Inspection Kit	ASTM E1417, Type 1, Method A, Sensitivity Level 2	Commercial Source
N/A	Inspection Surface Plate	N/A	Commercial Source
N/A	Magnifier	X10 Magnification	Commercial Source
N/A	Vernier Dial Calipers	0 to 6.00 in. (0 to 150 mm)	Commercial Source
N/A	Inside Micrometers	0 to 2.00 in. (0 to 50 mm)	Commercial Source

INSPECTION / CHECK

B. Items that need only a general inspection (in accordance with this paragraph) and general repairs (in accordance with paragraph 1.B of REPAIR) are not included in this section. This section includes only those items that require special inspection procedures. Refer to IPL, Figure 1.

(1) Visually examine the following items for damage or looseness: bolts (5),washers (10 and 20), nuts (15) and bleeder seats (120). Replace all parts with stripped or scored threads or obvious damage. Additionally:

CAUTION: NO REWORKING OF BOLTS IS PERMITTED. ANY STRIPPING OF PLATING FOR INSPECTION PURPOSES IS PROHIBITED.

(a) Inspect for bent, or cracked bolts (5). Inspect for evidence of cracks especially in the radius under the bolt head and in the threaded area adjacent to the bolt shank using magnetic particle inspection in accordance with ASTM E1444 or equivalent.

NOTE: If **any** of the bolts are damaged, replace **all** of the bolts.

(b) Inspect nuts for damaged threads and for loss of self-locking feature. If nut can be turned by hand onto the bolt (IPL, 1-5) past the top of the nut, then self-locking feature is destroyed.

NOTE: If **any** of the nuts are damaged, replace **all** of the nuts.

(2) Visually examine all components of the brake assembly for wear, scoring, cracks, chips, nicks, burrs, pitting, corrosion, flaws, and other obvious signs of damage. Replace or repair all parts showing evidence of these defects.

(3) Visually examine all components of the brake assembly with threaded features. Replace all parts with stripped or scored threads or obvious damage.

(4) Check all parts with sealing surfaces and grooves for distortion, damage, burrs, or corrosion which might damage packings and rings during installation and/or operation or which might permit leakage. Replace part if sealing surfaces and grooves are damaged beyond limits specified in this manual.

(5) Check individual parts as indicated in paragraph 2. Detailed Inspections. Repair or replace any parts that do not meet INSPECTION / CHECK requirements.

(6) The following items are to be replaced at each overhaul regardless of condition: All preformed packings (100 and 115), wear pads (50), rivets (55) and bleeder screw (125).

INSPECTION / CHECK

2. Detailed Inspections

A. Inspect Brake Cylinder (IPL, 1-30 or 1-30A)
Repair per paragraph 2.A. of REPAIR, or replace.

Parker Hannifin recommends a thorough visual and fluorescent penetrant inspection of each brake cylinder at each overhaul.

NOTE: Paint must be removed from the brake cylinder to conduct an accurate method for the flourescent penetrant inspection. Refer to paragraph 2.B. of REPAIR for paint removal instructions.

(1) Visually inspect the brake cylinder per paragraph 1.B.

(2) Use fluorescent penetrant inspection in accordance with ASTM E1417 (Type I, Method A, Sensitivity Level 2), or equivalent, to inspect brake cylinder for cracks or structural damage. Any cracks are cause for replacement.

(3) Visually examine inlet and bleeder port threads for damage. Replace any cylinder with stripped or scored threads or threads showing any obvious damage.

(4) Use a 10-power magnifier to visually examine the sealing surfaces of the cylinder piston bores for nicks, scratches, wear, corrosion or other damage. Any nicks or scratches in the piston bores deeper than .003 inch necessitates replacement of the cylinder. Replace severely corroded cylinders.

(5) Bore I.D. must not exceed ∅ 1.377 inch (34.976 mm) maximum. Replace cylinder if bore exceeds the limit or the area is damaged.

(6) Visually inspect for missing surface paint caused by erosion, wear, inspection or surface repair.

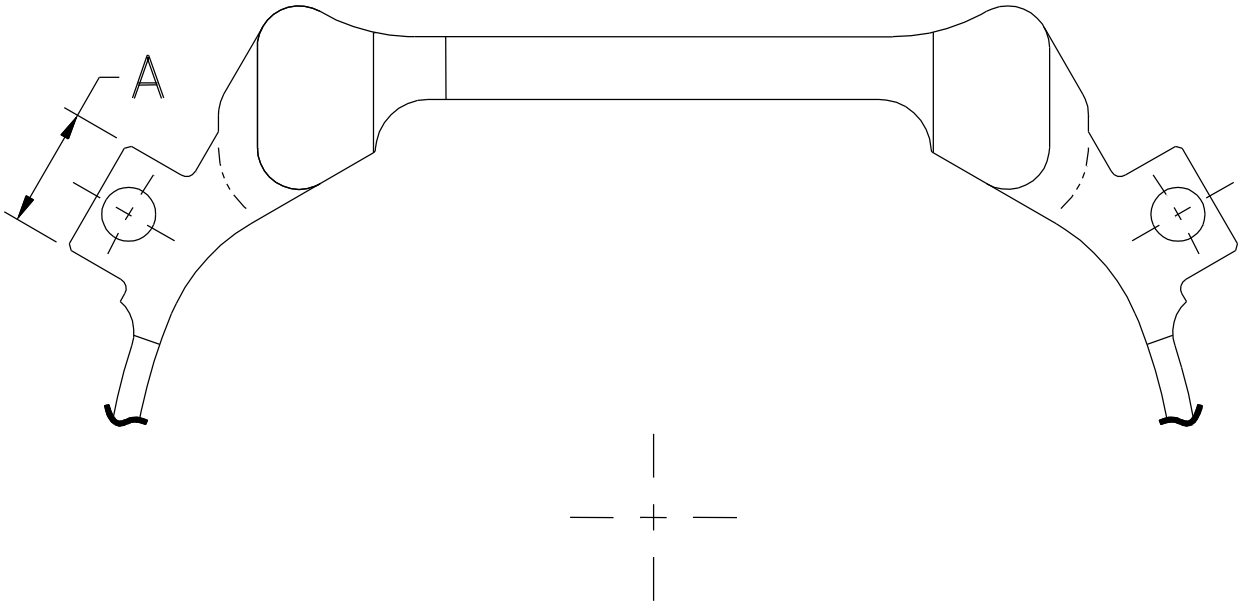
INSPECTION / CHECK

B. Inspect Torque Ring (IPL, 1-35). See Figure 5001
Repair per paragraph 2.F. of REPAIR, or replace.

(1) Visually inspect the torque ring per paragraph 1.B.

(2) Visually inspect and magnetic particle inspect torque ring per ASTM E1444, or equivalent, for cracks around bolt holes. Any evidence of cracks requires replacement.

(3) Inspect torque ring drive lug width. Width must not exceed dimension A per FITS AND CLEARANCES, Table 8001. Replace torque ring if constraint exceeds the limit or the area is damaged.



Torque Ring Inspection Limits
Figure 5001

C. Inspect Pressure Plate Assembly (IPL, 1-40). See Figure 5002
Repair per paragraph 2.F. of REPAIR, or replace.

(1) Visually inspect the pressure plate assembly per paragraph 1.B.

(2) Inspect for loose, cracked, or worn wear pads (IPL, 1-50). Check dimension A. If thickness is beyond the limit specified in FITS AND CLEARANCES, Table 8001, replace the wear pad. Replace loose, damaged or worn wear pads in accordance with paragaraph 2.E. of REPAIR. Do not tighten loose rivets.

NOTE: Replace all wear pads if one wear pad is found to be in need of replacement.

NOTE: Replace wear pads and rivets at each overhaul.

INSPECTION / CHECK

(3) Inspect the five [5] pressure plate key slots (the slots which engage the torque ring). Width of slots must not exceed dimension B per FITS AND CLEARANCES, Table 8001. Replace pressure plate if any slot is found to exceed the limit or is damaged.

(4) Inspect the pressure plate for flatness on wear pad mating surface if wear pads are being replaced. Flatness must not exceed the limits shown in Figure 5002. If flatness exceeds the limit, replace the pressure plate.

NOTE: Coned or distorted pressure plates are most commonly signs of a high energy brake application.

(5) Visually inspect and magnetic particle inspect pressure plate per ASTM 1444 or liquid penetrant inspection per ASTM E 1417, yype I, method A, sensitivity level 2 or equivalent for cracks around the rivet holes, thermal relief slots and drive slots. Any evidence of cracks requires replacement.

CAUTION: Any stripping of plating for inspection purposes is prohibited.

D. Inspect Back Plate Assembly (IPL, 1-85). See Figure 5003
Repair per paragraph 2.F. of REPAIR, or replace.

(1) Visually inspect the back plate subassembly per paragraph 1.B.

(2) Inspect for loose, cracked, or worn wear pads (IPL, 1-50). Check dimensions A. If thickness is beyond the limit specified in FITS AND CLEARANCES, Table 8001, replace the wear pad. Replace loose, damaged or worn wear pads in accordance with paragaraph 2.E. of REPAIR. Do not tighten loose rivets.

NOTE: Replace all wear pads if one wear pad is found to be in need of replacement.

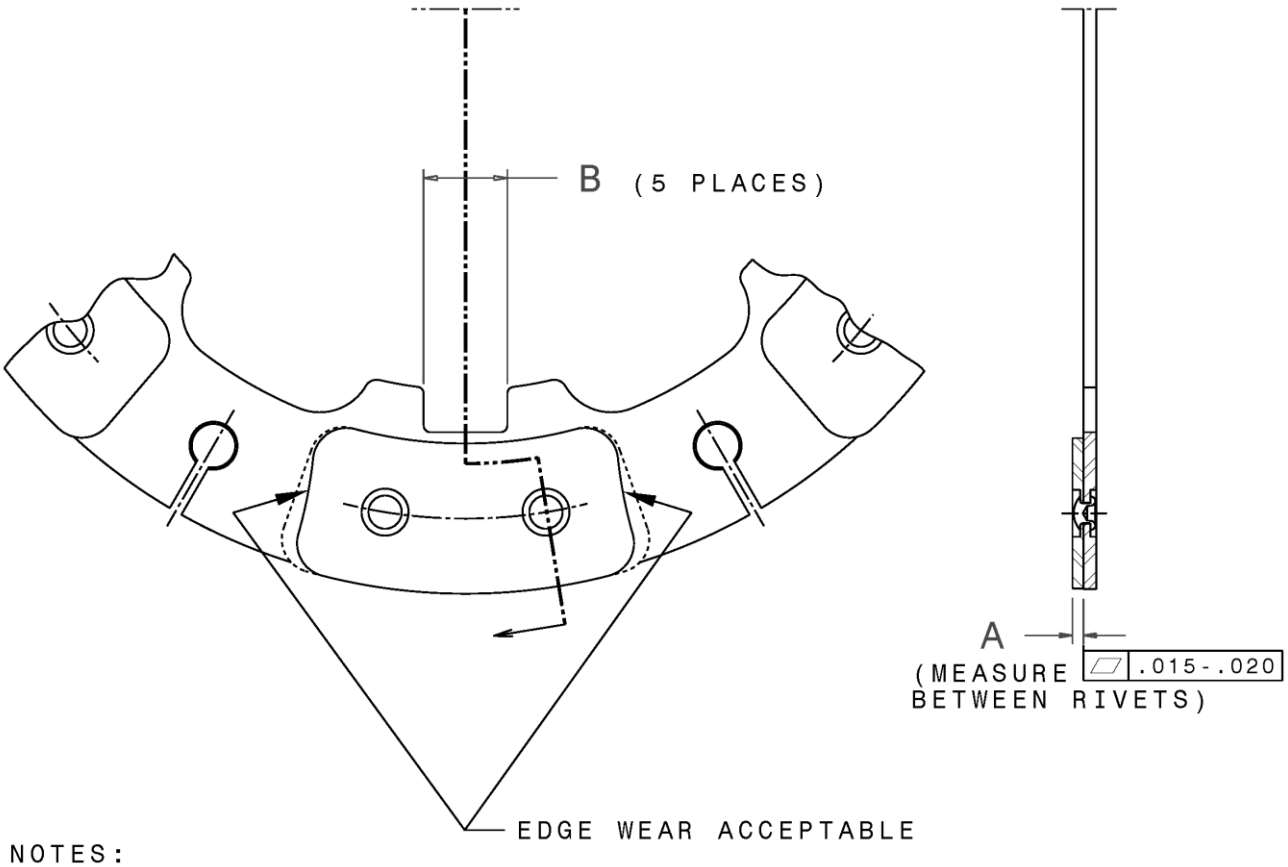
NOTE: Replace wear pads and rivets at each overhaul.

(3) Inspect the back plate for flatness on wear pad mating surface if wear pads are being replaced. Flatness must not exceed the limits shown in Figure 5003. If flatness exceeds the limit, replace the back plate.

NOTE: Coned or distorted back plates are most commonly signs of a high energy brake application.

(4) Visually inspect and magnetic particle inspect back plate per ASTM 1444 or liquid penetrant inspection per ASTM E 1417, type I, method A, sensitivity level 2 or equivalent for cracks around the rivet holes, bolt holes and thermal relief slots. Any evidence of cracks requires replacement.

INSPECTION / CHECK

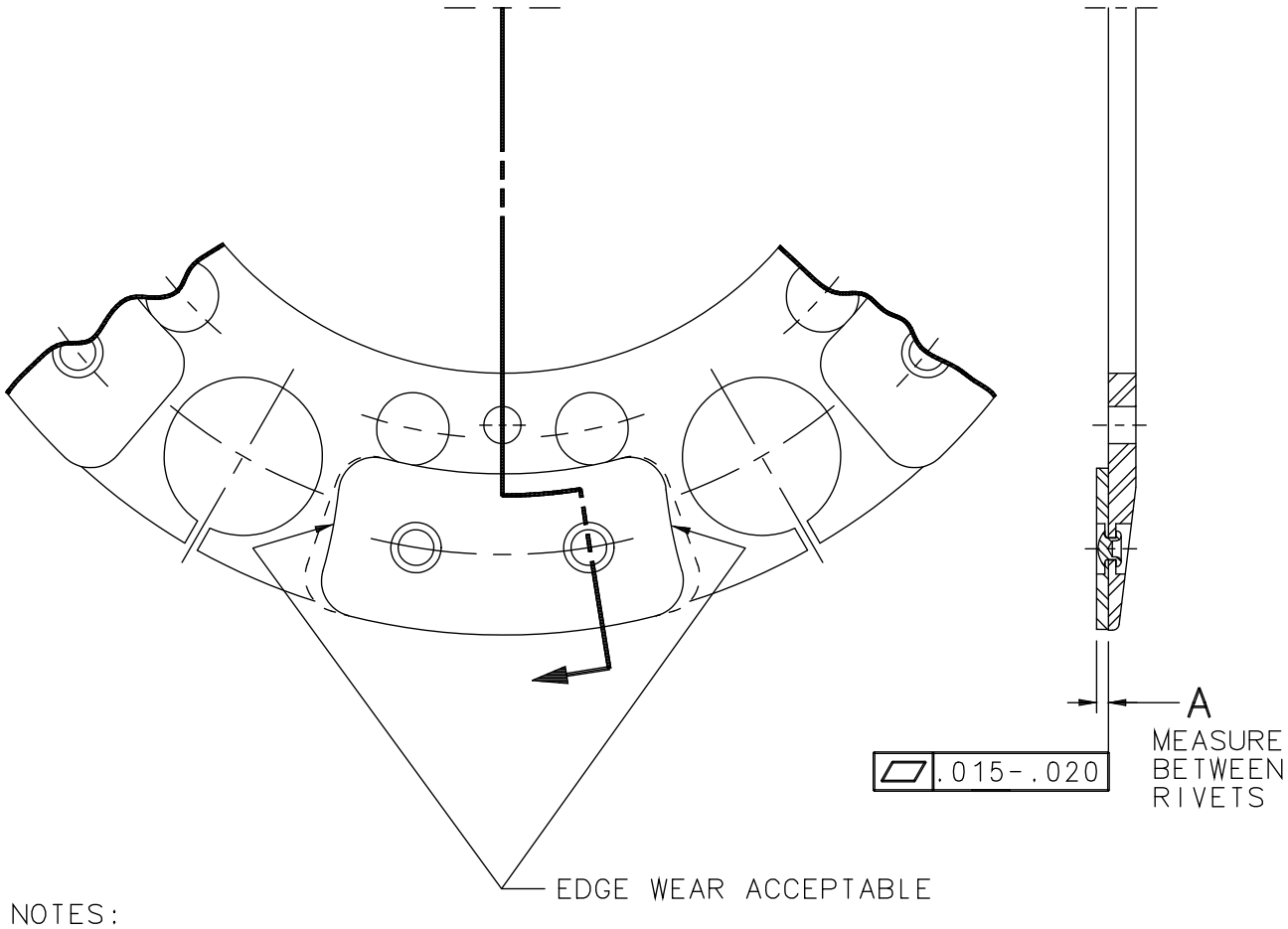


NOTES:

1. WEAR PADS CONTAINING CRACKS MUST BE REPLACED

Pressure Plate Assembly and
Wear Pad Inspection Limits
Figure 5002

INSPECTION / CHECK



NOTES:

1. WEAR PADS CONTAINING CRACKS MUST BE REPLACED

Back Plate Assembly and
Wear Pad Inspection Limits
Figure 5003

INSPECTION / CHECK

E. Inspect Rotating Discs (IPL, 1-75). See Figure 5004.

NOTE: Wear producing grooved rubbing surfaces is normal and should not be used as a basis for removal of brake as worn.

NOTE: Replace rotating discs at each overhaul regardless of condition.

(1) Visually inspect the rotating disc per paragraph 1.B.

(2) Inspect for cracks and lining material pitting, crumbling and edge chipping. Check lining material thickness dimensions, B and C. If thickness is beyond the limit specified in FITS AND CLEARANCES, Table 8001, replace the rotating disc. Replace damaged or worn discs.

(3) Inspect drive tang width on nine [9] wheel engagement drive tangs for wear or damage. Width of slots must not exceed dimension A per FITS AND CLEARANCES, Table 8001. Replace rotating disc if any tang is found to exceed the limit or is damaged.

NOTE: Bent and distorted drive tangs indicate extreme brake usage and constitutes replacement.

(4) Examine for distortion and out-of-flatness. Replace a rotating disc if out-of-flatness more than .010 inch (0.25 mm).

F. Inspect Center Stator (IPL, 1-80). See Figure 5005.

NOTE: Wear producing grooved rubbing surfaces if normal and should not be used as a basis for removal of brake as worn.

NOTE: Replace center stator at each overhaul regardless of condition.

(1) Visually inspect the stator per paragraph 1.B.

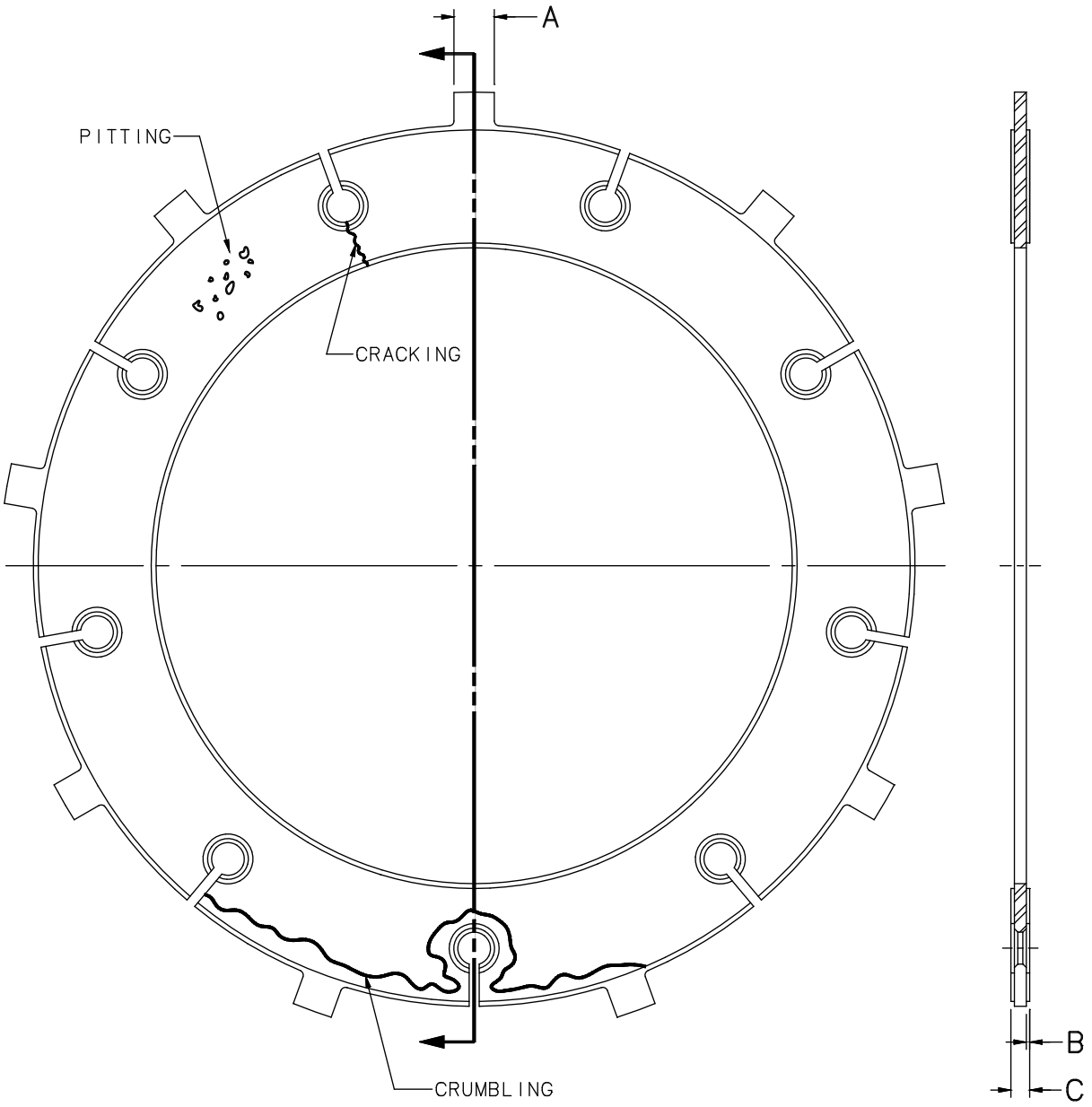
(2) Inspect for cracks and lining material pitting, crumbling and edge chipping. Check lining material thickness dimensions, B and C. If thickness is beyond the limit specified in FITS AND CLEARANCES, Table 8001, replace the center stator. Replace a damaged or worn stator.

(3) Inspect the six [6] center stator key slots (the slots which engage the torque ring). Width of slots must not exceed dimension A per FITS AND CLEARANCES, Table 8001. Replace center stator if any slot is found to exceed the limit or is damaged.

NOTE: Bent and distorted key slots indicate extreme brake usage and constitutes replacement.

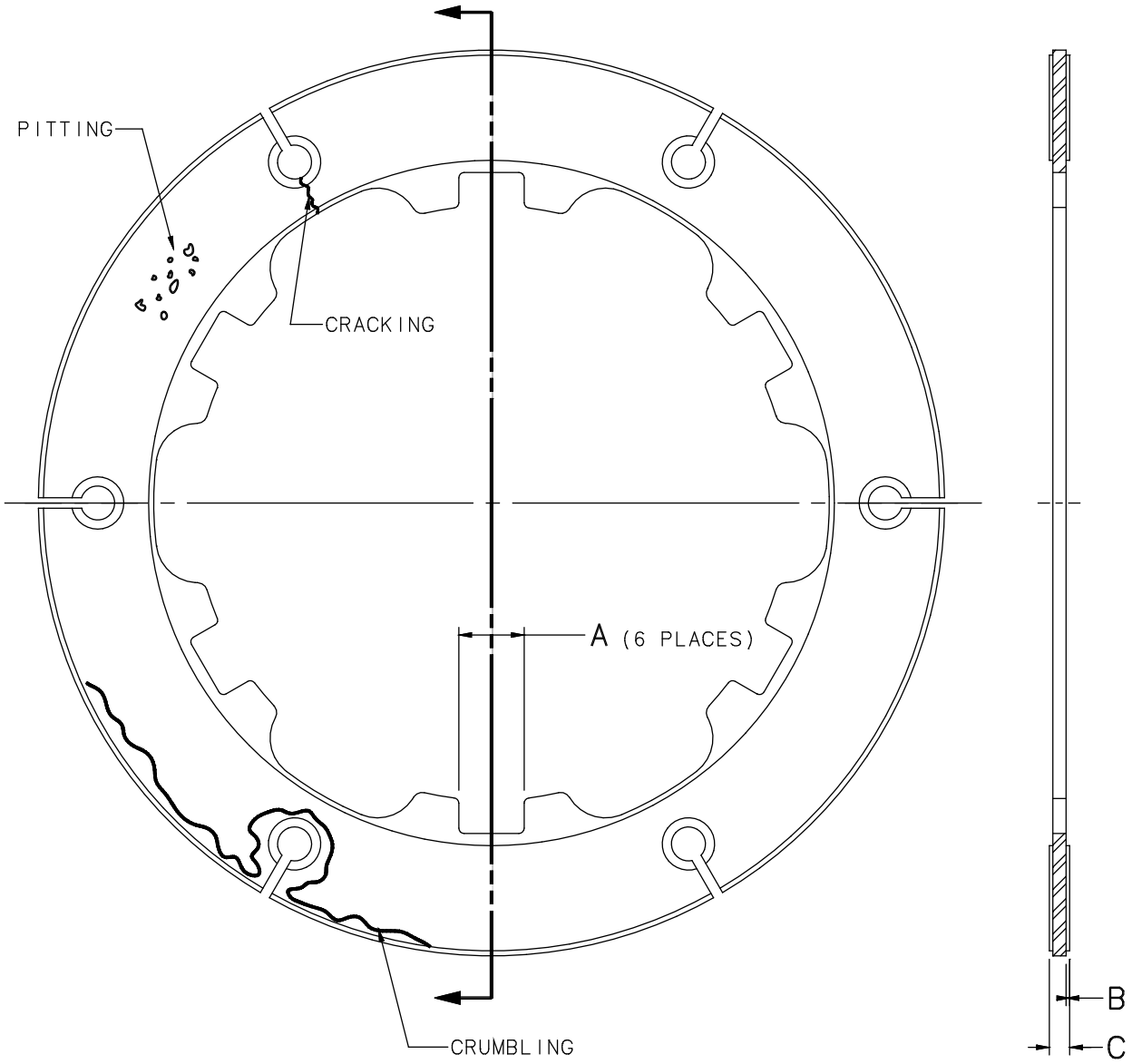
(4) Examine for distortion and out-of-flatness. Replace the center stator if out-of-flatness more than .010 inch (0.25 mm).

INSPECTION / CHECK



Rotating Disc Inspection Limits
Figure 5004

INSPECTION / CHECK



Center Stator Inspection Limits
Figure 5005

INSPECTION / CHECK

G. Inspect Pistons (IPL, 1-95)
Repair per paragraph 2.D. of REPAIR, or replace.

(1) Visually inspect the pistons per paragraph 1.B.

(2) Use a 10-power magnifier to visually examine the outside diameter and O-ring sealing surfaces of the piston for nicks, scratches, burrs, wear, or other damage. Any nicks or scratches on the outsdie diameter or the O-ring sealing surfaces of the piston deeper than .003 inch necessitates replacement of the piston.

H. Inspect Pistons Insulators (IPL, 1-105)

(1) Visually inspect the pistons per paragraph 1.B. Replace damaged insulators.

REPAIR

1. General

Certify that a component is serviceable per INSPECTION/CHECK section prior to attempting repair. Disassemble the brake assembly only to the level necessary to do the repairs or replace components. Repairs are limited to the replacement of parts and to the repairs specified in this section. No attempt should be made to repair cracked, severely corroded or badly damaged parts.

A. Repair Equipment and Materials. Refer to Table 6001.

NOTE: Equivalent substitutes may be used for items listed.

Table 6001 (Sheet 1 of 2)
Repair Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
Model 305	Milford Rivet Machine	N/A	Orbitform
824-1K-7	Roll Set (see Figure 9001, 824-1K-7-A)	N/A	
63-J-919A	Jaws	N/A	
563-DS-7	Driver	N/A	
N/A	Vise Jaws	Soft Brass or Hard Rubber	Commercial Source
N/A	Drill Bit	∅0.187 in. (∅5 mm)	Commercial Source
N/A	Drift Punch	∅0.187 in. (∅5 mm)	Commercial Source
N/A	Hand File	Flat	Commercial Source
N/A	Inside Micrometers	0 to 2.00 in. (0 to 50 mm)	Commercial Source
N/A	Aluminum Oxide Cloth	400 Grit or Finer Wet or Dry	Commercial Source
N/A	Plastic Media Type V (Acrylic)	MIL-P-85891	U.S. Technology Corp.
N/A	Plastic Media Stripping Equipment	N/A	Commercial Source
N/A	Paint Application Equipment	N/A	Commercial Source

REPAIR

Table 6001 (Sheet 2 of 2)
Repair Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Corrosion Preventative Surface Pretreatment	AMS-M-3171, Type VI or Oxsilan®	Commercial source Chemetall Oakite (Oxsilan®)
N/A	Corrosion Preventative Alodine 1200 or Equiv.	MIL-C-5541, Class 1A	Commercial Source
Various for Application Type	Galvanizing Compound	[1] MIL-P-26915 Type I, Class A -or- [2] MIL-P-26915 Type II, Class A	ZRC Products Company
P60G2 or P60G10	Primer Coating	N/A	Sherwin Williams
F63W13	Finish Coating	N/A	Sherwin Williams

[1] MIL-P-26915, Type I is a low VOC, solvent reducible primer

[2] MIL-P-26915, Type II is a low VOC, water reducible primer. Corrosion protection will not be optimum with Type II.

B. Items that need only a general repair (in accordance with this paragraph) are not included in this section. This section includes only those items that require special repair procedures. No attempt should be made to repair cracked, severely corroded or badly damaged parts.

(1) Simple repair will be limited to polishing minor burrs, nicks, scoring, and scratches in non-sealing surface areas with 400 grit or finer (wet or dry) aluminum oxide cloth in accordance with the limits specified in paragraph 2. Repair Procedures.

(2) Use 400 grit or finer, wet or dry aluminum oxide cloth to remove all corrosion and surface damage in accordance with the limits specified in paragraph 2. Repair Procedures.

(3) Clean all repaired parts in accordance with instructions given in CLEANING.

(4) Treat all repaired areas in accordance with their respective repair procedures.

REPAIR

2. Repair Procedures

CAUTION: REPAIRS CAN BE MADE ONLY TO THOSE SURFACES SPECIFIED IN PARAGRAPH 1.B AND THOSE SPECIFIED IN PARAGRAPH 2. REPAIR MUST NOT AFFECT SEALING CHARACTERISTICS OF SEALING SURFACES.

CAUTION: DO NOT USE ABRASIVES CONTAINING IRON SUCH AS STEEL WOOL, IRON OXIDE, OR STEEL WIRE. IRON PARTICLES WHICH BECOME EMBEDDED IN THE MAGNESIUM AND ALUMINUM COMPONENTS WILL ACCELERATE CORROSION.

A. Repair Procedure For Brake Cylinder (IPL, 1-30).

(1) Blend out burrs, nicks, and scratches less than .030 inches (.762 mm) deep on the outside of the brake cylinder using hand filing techniques to relieve any sharp corners that may cause stress concentrations. Blend out tool marks.

(2) Polish out small nicks and scratches, .003 inches max. deep (.0762 mm) on machined surfaces.

(3) Polish out small nicks and scratches not exceeding .003 inches max. (.0762 mm) deep in piston bores.

(4) Clean part per CLEANING section and treat repaired areas per AMS-M-3171, Type VI or Oxsilan®.

AMS-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 ½ to 2 minutes in solution at room termperature.

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

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

Oxsilan® (for use on parts with a clear to irridescent surface treatment appearance).

(a) Scrub surface with an abrasive material such as 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 drying process, a mild airflow source can be used).

(5) Mask applicable areas and apply primer and topcoat to the repaired areas on the outside of the brake cylinder per paragraph 2.C.

REPAIR

B. Paint Removal Procedure For Brake Cylinder (IPL, 1-30).

This procedure is necessary when performing the fluorescent penetrant inspection of the brake cylinder subassembly.

WARNING: STRIPPING SOLVENTS CAN BE TOXIC AND VOLATILE. USE ONLY IN WELL-VENTILATED AREAS. AVOID PHYSICAL CONTACT WITH SOLVENTS AND DO NOT INHALE VAPORS. KEEP SOLVENT CONTAINERS COVERED WHEN NOT IN USE. OBSERVE FIRE PRECAUTIONS.

CAUTION: REFER TO THE APPLICABLE MANUFACTURER'S INSTRUCTIONS FOR DISPOSAL OF CHEMICAL STRIPPING SOLUTIONS OR PLASTIC STRIPPING MEDIA.

NOTE: Chemical stripping agents are commercially available and may be used only if plastic media stripping equipment is not available. For best results, always refer to the applicable chemical manufacturer's instructions for application and use.

(1) Degrease brake cylinder per CLEANING section.

(2) Strip paint from the brake cylinder (IPL, 1-30) using plastic media.

NOTE: For best results, always refer to the applicable plastic media manufacturer's instructions for application and use.

(3) Clean part per CLEANING section prior to penetrant inspection.

REPAIR

C. Repaint Procedure For Brake Cylinder (IPL, 1-30)

Refer to Figure 6001 and repaint brake cylinder in accordance to the following procedure.

CAUTION: REFER TO THE APPLICABLE PAINT MANUFACTURER'S INSTRUCTIONS FOR DISPOSAL OF PRIMER AND TOPCOAT MEDIA.

NOTE: To achieve best results, always refer to the applicable paint manufacturer's instructions for application and use.

(1) Mask and apply primer to brake cylinder. The dry film thickness of the primer shall be .0002 to .0005 inches (.0051 to .0127 mm).

(2) Mask and apply topcoat to brake cylinder. The total dry film thickness (including primer and topcoat) shall be .0008 to .0014 inches (.0203 to .0355 mm).

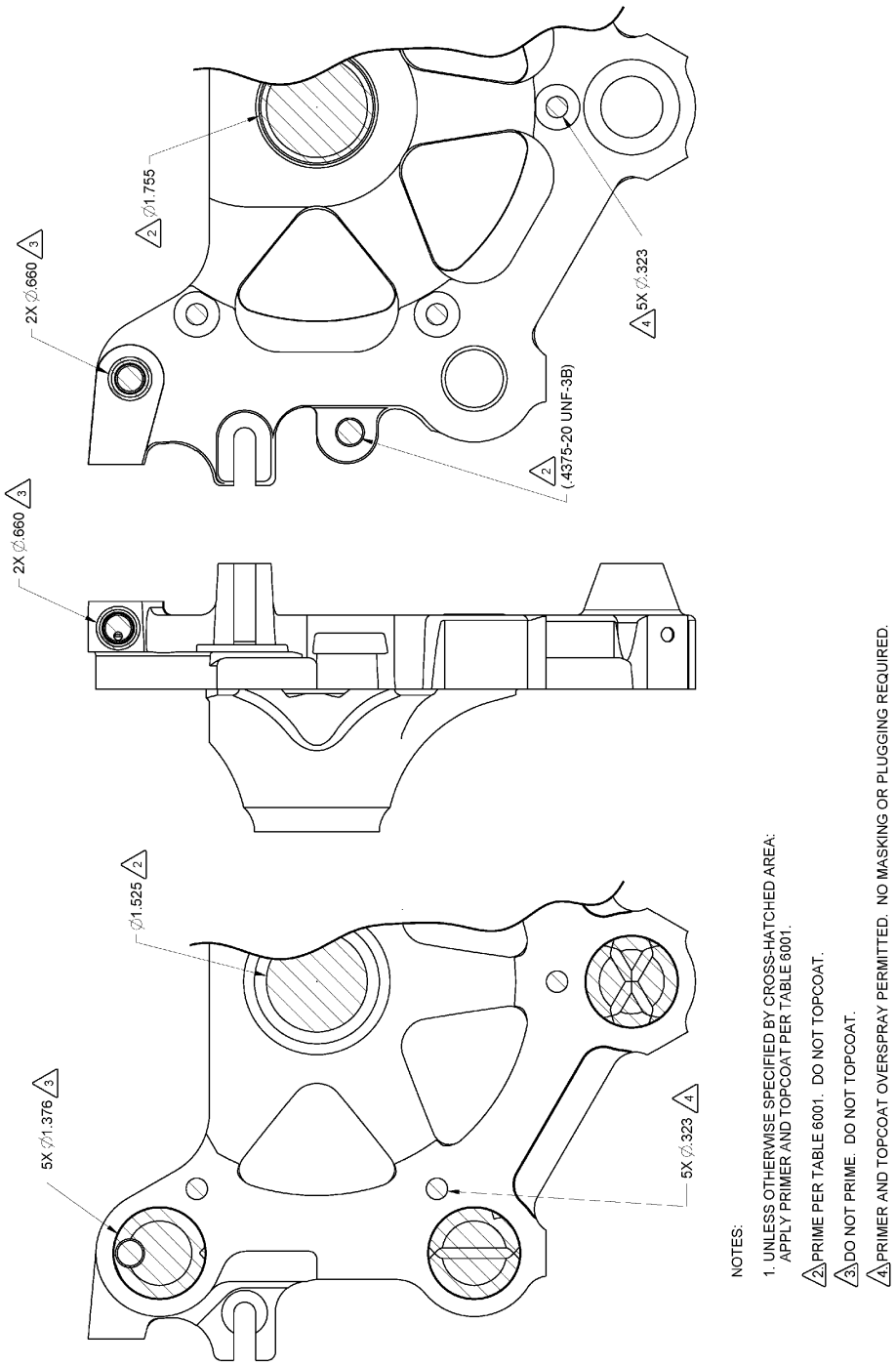
D. Repair Procedure For Pistons (IPL, 1-95)

(1) Polish out small nicks and scratches not exceeding .003 inches max. (.0762 mm) deep on machined surfaces.

(2) Polish out small nicks and scratches not exceeding .003 inches max. (.0762 mm) deep on piston outside diameter.

(3) Clean part per CLEANING section and treat repaired areas with corrosion preventative (Alodine 1200 or equivalent per MIL-C-5541, Class 1A.

REPAIR



Brake Cylinder Masking Instructions
Figure 6001

REPAIR

E. Wear Pad Replacement For Pressure Plate Assembly (IPL, 1-40) and Back Plate Assembly (IPL, 1-85). Refer to IPL, Figure 1.

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

CAUTION: DO NOT ENLARGE THE RIVET HOLES IN THE PRESSURE PLATE AND/OR BACK PLATE. IF THE RIVET HOLE EXCEEDS 5.182 MM (0.204 IN.), THE TORQUE TUBE AND/OR PRESSURE PLATE MUST BE REPLACED.

NOTE: The Milford rollset must be modified prior to using. Refer to Figure 9001 in the SPECIAL TOOLS…section.

(1) Using a 0.187 in. (5mm) dia. drill, drill out the shop head of the rivets (55) and punch the rivets from the respective assembly. Discard rivets.

(2) Remove and discard wear pads (50).

(3) Remove any burrs around rivet hole areas on the pressure plate and back plate.

(4) The pressure plate (45) and back plate (90) should now be checked for continued service per paragraph 2.C and 2.D., respectively, of INSPECTION/CHECK and perform any surface repair for both per paragraph 2.F., of REPAIR.

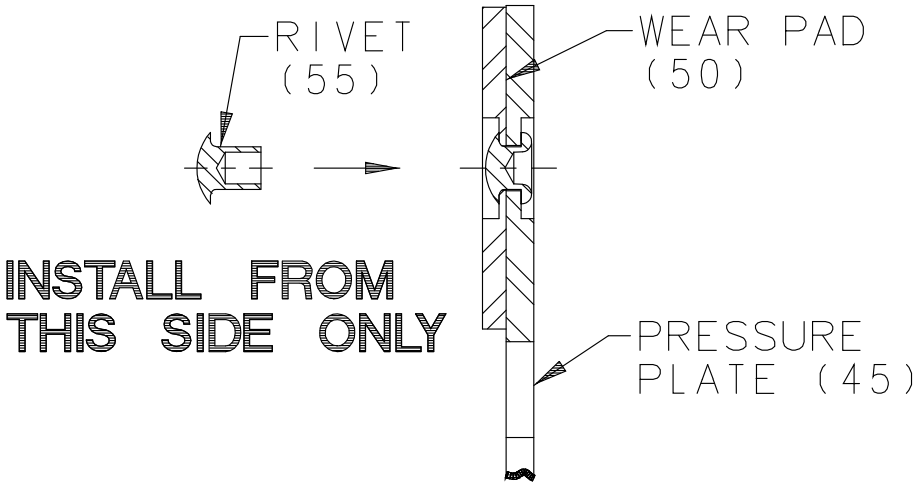
(a) After pressure plate is judged serviceable, refer to Figure 6002 and locate the wear pads over the rivet holes on the pressure plate and insert with rivets.

1 Form the shop head of the rivet using an Milford model 305 or equivalent rivet machine with applicable attachments (driver, jaw, rollset, etc.).

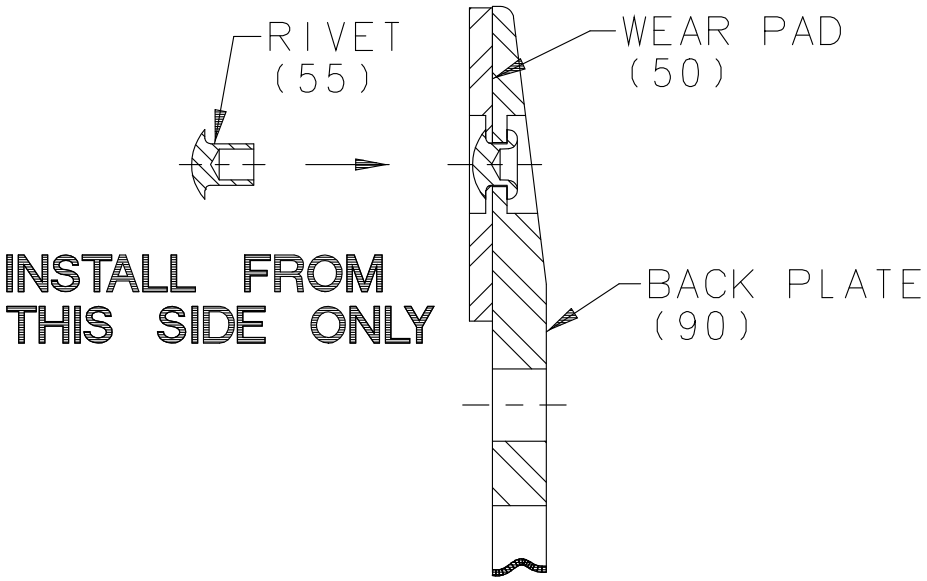
(b) After back plate is judged serviceable, refer to Figure 6003 and locate the wear pads over the rivet holes on the back plate and insert with rivets.

1 Form the shop head of the rivet using an Milford model 305 or equivalent rivet machine with applicable attachments (driver, jaw, rollset, etc.).

REPAIR



Pressure Plate Wear Pad Installation
Figure 6002



Back Plate Wear Pad Installation
Figure 6003

REPAIR

(5) All parts assembled by riveting shall be fitted tightly together, and no perceptible movement shall be allowed between them.

(a) Parts shall not be distorted by splitting, bulging, buckling, or other characteristics which result from poor assembly procedure.

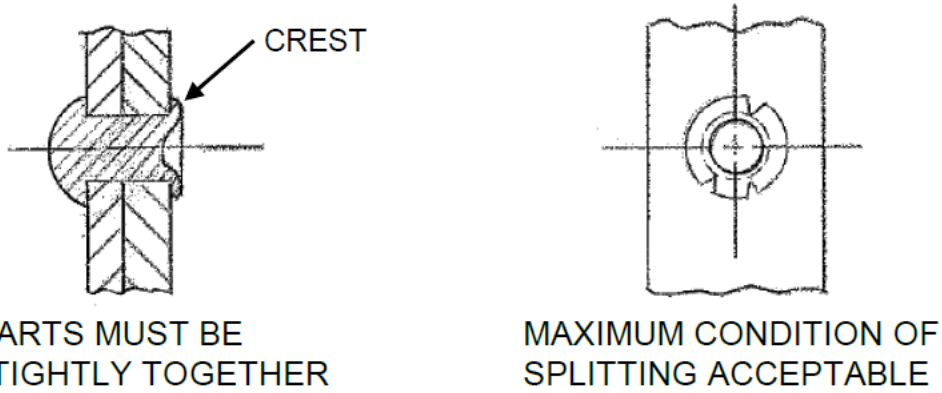
(b) Refer to Figure 6004. Splits in the rolled end (clinched end) resulting from the clinching operation are permitted as follows:

1 The split shall not occur inside the crest of the clenched surface.

2 No more than two [2] splits shall occur in a 90 ° area.

3 A total of no more than three [3] splits shall be allowed.

(6) (Deleted)



Installation Criteria for the Rivets
Figure 6004

REPAIR

F. Repair Procedure For Torque Ring (IPL, 1-35), Pressure Plate (IPL, 1-45), and Back Plate (IPL, 1-90)

(1) Polish out small nicks and scratches, .003 in. max. (.0762 mm) deep on machined surfaces.

(2) Clean part per CLEANING section and treat repaired areas with corrosion preventative (Galvanizing compound per MIL-P-26915, Type I, Class A or Type II, Class A)) in accordance with the following procedure.

CAUTIONS:

- REFER TO THE APPLICABLE PAINT MANUFACTURER'S INSTRUCTIONS FOR DISPOSAL OF COMPOUND MEDIA.
- CORROSION PROTECTION WILL NOT BE OPTIMUM WITH MIL-P-26915, TYPE II, CLASS A.

NOTE: To achieve best results, always refer to the applicable coating manufacturer's instructions for application and use.

(a) Apply galvanizing to all repaired areas of torque tube. The dry film thickness of the coating shall be .0015 inches min. to .0030 inches max. (.0381 to .0762 mm).

ASSEMBLY

1. General

Use these procedures to assemble the brake assembly.

A. Assembly Equipment and Materials. Refer to Table 7001.

NOTE: Equivalent substitutes may be used for items listed.

Table 7001
Assembly Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Fluid, Hydraulic	MIL-H-5606	Commercial Source
N/A	Socket Set	Hex Head, Inch	Commercial Source
N/A	Wrench Set	Hex Head, Open End, Inch	Commercial Source
N/A	Ratchet	1/2 in. Square Drive	Commercial Source
N/A	Torque Wrench	Refer to Table 8002 Assembly Hardware Torque Values for torque range	Commercial Source

2. Assembly Procedures

A. Assemble Main Brake Assembly (Refer to IPL, Figure 1)

(1) Lubricate O-rings (100) with MIL-H-5606 hydraulic fluid, and install on pistons (95).

(2) Place the brake cylinder (30) on a clean, flat work surface with piston bores facing up.

CAUTION: WHEN INSTALLING THE PISTONS (95) INTO THE BRAKE CYLINDER (30), BE CAREFUL NOT TO MISALIGN OR COCK THE PISTON. THIS MAY CAUSE DAMAGE TO INNER SURFACES WHICH IS CAUSE FOR REPAIR OR REPLACEMENT OF THE CYLINDER (30).

(3) With tapped hole in piston (95) facing upward, press each piston into the brake cylinder (30).

(4) Insert piston insulators (105) into the pistons (95).

ASSEMBLY

CAUTION: ENSURE THAT THE COUNTERSUNK SIDE OF WASHER (10) MATES AGAINST THE BOLT HEAD.

(5) Install single countersunk washers (10) onto bolts (5).

(6) Install five [5] bolts (5) with installed washers (10) through cylinder (30) and torque ring (35).

(7) Install and align in the following sequence: pressure plate assembly (40), disc (75), center stator (80), and second disc (40) over torque ring (35).

(8) Install and align back plate assembly (85) onto torque ring (35).

(9) Install flat washers (20) and nuts (15) onto bolts (5). Torque nuts to 200 in-lb (22.60 N-m) dry.

B. Mount brake assembly onto aircraft.

(1) Install the brake assembly onto the axle.

(2) Reconnect hydraulic pressure source.

(3) Bleed brakes per Aircraft Manual.

(4) Install all fittings and plugs and torque to specifications listed in FITS AND CLEARANCES, Table 8002, Assembly Hardware Torque Values.

(5) Test brake assembly per TESTING, paragraph E. Failure of the brake assembly to meet the acceptance parameters of TESTING, paragraph E, will be cause for examination of the assembly. It is permissible to perform this test off-aircraft on an individual brake assembly.

FITS AND CLEARANCES

1. General

A. Assembly Wear Limits (Refer to IPL, Figure 1)

Table 8001 gives the in-service wear limits for the component parts of the brake assembly. You must replace all components that are not within specified limits. Refer to the appropriate paragraphs in INSPECTION / CHECK for more data.

Table 8001
Assembly In-Service Wear Limits

PART NAME (IPL, ITEM NO.)	FIG AND DIMENSION REFERENCE	WORN AREA DESCRIPTION	WORN DIMENSION inches (mm)
Torque Ring (35)	5001, A	Drive Lug Width	.700 inches minimum (17,78 mm)
Wear Pads (50) (pressure plate assembly)	5002, A	Pad Thickness	.070 inches minimum (1.778 mm)
Pressure Plate Assembly (40)	5002, B	Engagement Slot Width	.810 inches maximum (20,574mm)
Wear Pads (50) (back plate assembly)	5003, A	Pad Thickness	.070 inches minimum (1.778 mm)
Rotating Disc (75)	5004, A	Drive Tang Width	.485 inches minimum (12,32 mm)
	5004, B	Lining Material Thickness (single side)	.010 inches minimum (.254 mm)
	5004, C	Lining Material Thickness (overall)	.170 inches minimum (4.318 mm)
Center Stator (80)	5005, A	Key Slot Width	.810 inches maximum (20.574 mm)
	5005, B	Lining Material Thickness (single side)	.010 inches minimum (.254 mm)
	5005, C	Lining Material Thickness (overall)	.180 inches minimum (4.572 mm)
Cylinder (30 or 30A)	N/A	Piston Bore	∅ 1.377 inches maximum (34.976 mm)

FITS AND CLEARANCES

B. Assembly Torque Values (Refer to IPL, Figure 1)

Table 8002 provides the assembly torque values for the component parts of the brake assembly.

NOTE: All torque values listed are considered to be “DRY TORQUE” values.

Table 8002
Assembly Hardware Torque Values

PART NAME (IPL, ITEM NO.)	TORQUE LIMITS in-lb or ft-lb (N-m)
Nuts (15)	200 in-lb dry. (22.60 N-m)
Bleeder Seat (75)	65 to 70 in-lb (7.34 to 7.91 N-m)
Plug Fitting (110)	85 to 90 in-lb (9.60 to 10.17 N-m)
Lining Indicator Seat (70)	50 to 60 in-lb (5.65 to 6.78 N-m)

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES

1. General

This section identifies the special tools, fixtures, equipment and consumables necessary to repair, maintain, and do tests on the main brake assembly. Special tools necessary to perform the requirements of this manual are shown in Table 9001. The materials (consumables list) necessary are shown in Table 9002.

NOTE: Equivalent substitutes may be used for items listed.

A. Special Tools, Fixtures and Equipment

Table 9001 (Sheet 1 of 2)
Special Tools, Fixtures and Equipment

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Powered Hydraulic Test Stand	0 to 1000 psig capacity ± 40 psi gage increment (0 to 68.95 bar) ± 2.76 bar gage increment	Commercial Source
N/A	Tubing	∅0.156 in. (∅3.97 mm) rubber or polymer	Commercial Source
N/A	Fitting, Test	7/16-20 UNF-3B	Commercial Source
N/A	Hydraulic Hose	1000 psig minimum (68.95 bar)	Commercial Source
N/A	Pressure Regulator	0 to 1000 psig (0 to 68.95 bar)	Commercial Source
N/A	Pressure Gage	0 to 1000 psig (0 to 68.95 bar)	Commercial Source
199-18	Preformed Packing Extraction Tool Set	N/A	Parker Hannifin Corp. Aircraft Wheel & Brake
N/A	Socket Set	Hex Head, Inch	Commercial Source
N/A	Wrench Set	Hex Head, Open End, Inch	Commercial Source
N/A	Ratchet	1/2 in. Square Drive	Commercial Source
N/A	Torque Wrench	Refer to Table 8002 Assembly Hardware Torque Values for torque range	Commercial Source

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES

Table 9001 (Sheet 2 of 2)
Special Tools, Fixtures and Equipment

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Inspection Surface Plate	N/A	Commercial Source
N/A	Magnifier	X10 Magnification	Commercial Source
N/A	Vernier Calipers	0 to 6.00 in. (0 to 150 mm)	Commercial Source
N/A	Inside Micrometers	0 to 2.00 in. (0 to 50 mm)	Commercial Source
N/A	Vise Jaws	Soft Brass or Hard Rubber	Commercial Source
Model 305	Milford Rivet Machine	N/A	Orbitform
824-1K-7	Roll Set (see Figure 9001, 824-1K-7-A)	N/A	
63-J-919A	Jaws	N/A	
56S-DS-7	Driver	N/A	
N/A	Drill Bit	∅0.187 in. (∅5 mm)	Commercial Source
N/A	Drift Punch	∅0.187 in. (∅5 mm)	Commercial Source
N/A	Hand File	Flat	Commercial Source
N/A	Plastic Media Stripping Equipment	N/A	Commercial Source
N/A	Paint Application Equipment	N/A	Commercial Source
215-01600	Protective Plug	N/A	Parker Hannifin Corp. Aircraft Wheel & Brake

B. Consumables List

Table 9002 (Sheet 1 of 2)
Consumables List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Fluid, Hydraulic	MIL-H-5606	Commercial Source
N/A	Hydraulic Filter	10 micron	Commercial Source

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES

Table 9002 (Sheet 2 of 2)
Consumables List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Air Supply, Compressed Dry Filtered	30 psig maximum (2.07 bar)	N/A
N/A	Cleaning Cloths	Lint Free	Commercial Source
N/A	Brushes	Soft and Stiff Bristled	Commercial Source
N/A	Solvent, Stoddard Type 1	MIL-PRF-680	Commercial Source
N/A	Cleaner/Degreaser, Water Based	AMS 1526	Commercial Source
N/A	Magnetic Particle Inspection Kit	ASTM E1444	Commercial Source
N/A	Fluorescent Penetrant Inspection Kit	ASTM E1417, Type 1, Method A, Sensitivity Level 2	Commercial Source
N/A	Aluminum Oxide Cloth	400 Grit or Finer Wet or Dry	Commercial Source
N/A	Plastic Media Type V (Acrylic)	MIL-P-85891	U.S. Technology Corp.
N/A	Corrosion Preventative Alodine 1200 or Equiv.	MIL-C-5541, Class 1A	Commercial Source
N/A	Corrosion Preventative Surface Pretreatment	AMS-M-3171, Type VI or Oxsilan®	Commercial Source Chemetall Oakite (Oxsilan®)
Various for Application Type	Galvanizing Compound	[1] MIL-P-26915 Type I, Class A -or- [2] MIL-P-26915 Type II, Class A	ZRC Products Company
P60G2 or P60G10	Primer Coating	N/A	Sherwin Williams
F63W13	Finish Coating	N/A	Sherwin Williams

[1] MIL-P-26915, Type I is a low VOC, solvent reducible primer

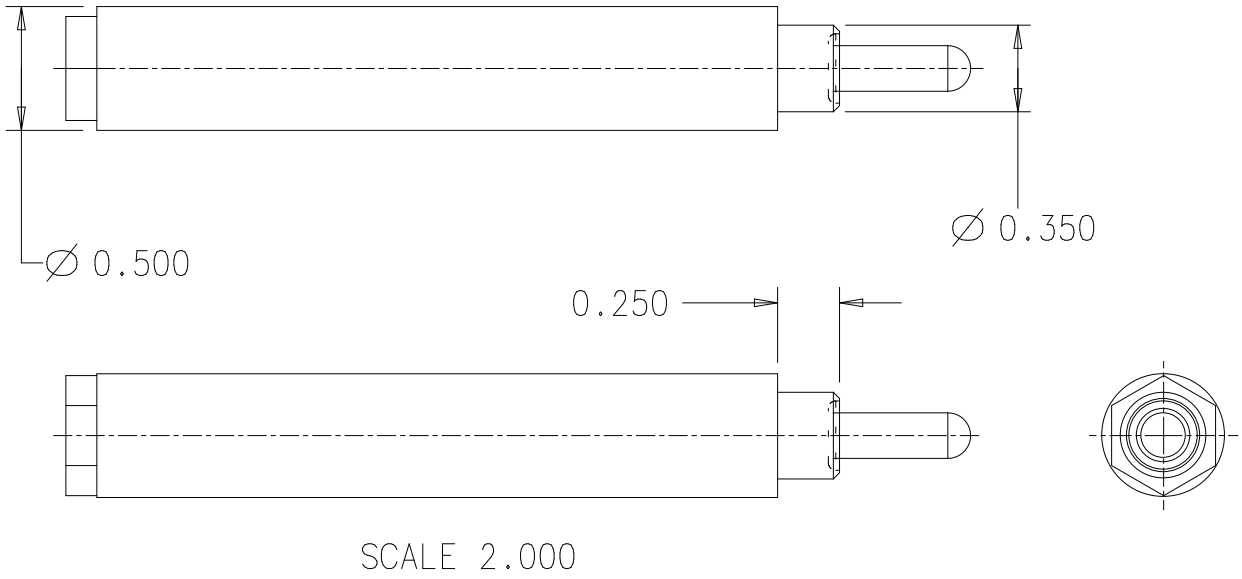
[2] MIL-P-26915, Type II is a low VOC, water reducible primer. Corrosion protection will not be optimum with Type II.

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES

C. List of Manufacturers and Vendors

Name	Address
Parker Hannifin Corporation Aircraft Wheel & Brake	1160 Center Rd. Avon, OH 44011 U.S.A.
Orbitform	1600 Executive Drive Jackson, MI 49203 U.S.A.
U.S. Technology Corporation	220-T 7th Street S.E. Canton, OH 44702 U.S.A.
Sherwin Williams	www.sherwin-williams.com
ZRC Products Company	23-T Newport Ave. Quincy, MA 02171-9975 U.S.A.
Chemetall Oakite	www.chemetall.com

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES



NOTES:

1. 824-1K-7 ROLLSET MODIFICATION. (824-1K-7A, PARKER HANNIFIN REFERENCE NUMBER)

2. UNLESS OTHERWISE SPECIFIED, TOLERANCE IS .XXX ± .010

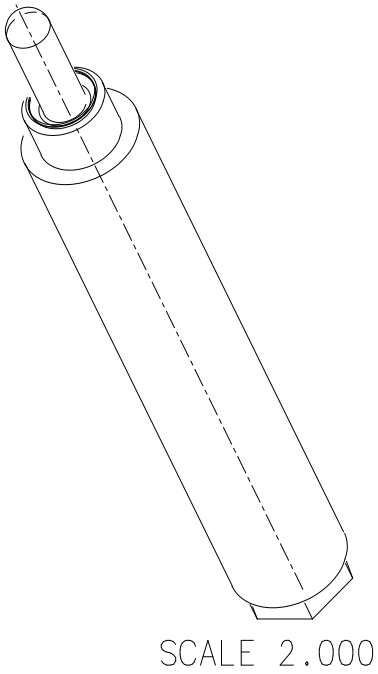


Figure 9001 Rollset Modification

ILLUSTRATED PARTS LIST

1. General

The illustrated parts list describes and illustrates the detail parts of the Main Brake Assembly.

All parts of the equipment are listed, except parts which lose their identities by being permanently fastened to other parts of assemblies and are not subject to disassembly.

A. Explanation of Columns

(1) Figure/Item column: The figure and item numbers key the parts breakdown list to the applicable illustration. The first number represents the figure number of the illustration. The item numbers are arranged in sequence and generally reflect the order of disassembly.

(2) Part Number column: This column contains the assigned Parker Hannifin Aircraft Wheel and Brake part number for the individual item.

(3) Airline Stock Number column: This column contains the Airline Stock Number when applicable.

(4) Nomenclature column: This column identifies the parts being listed by noun name followed by modifiers when applicable. The indenture system used in the parts list shows the relationship of the parts to their subassemblies and to the assembly:

1 2 3 4
Assembly
Attaching Parts for Assembly
Detailed Parts for Assembly
Subassembly
Attaching Parts for Subassembly
Detailed Parts for Subassembly

(5) Effectivity column: An effectivity code shows the difference in parts within various configurations. The effectivity code is used for more than one configuration of the basic part number. Effectivity codes only apply to the figure in which they are used.

(6) Units Per Assembly column: This column indicates the total number required per assembly or per subassembly as applicable. These abbreviations may appear in the Units Per Assembly column:

AR..... As Required (for bulk items)
NP..... Item is Nonprocurable (listed for reference only)
RF..... Reference (item listed for reference only)

ILLUSTRATED PARTS LIST

B. Part Numbering System

Parker Hannifin Aircraft Wheel & Brake has assigned a part number to all purchased and government standard off-the-shelf parts. They are defined and used as follows:

When a purchased part is listed, the assigned Parker Hannifin AWB part number shall be used in the part number column. 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 nomenclature. The federal supply code will be preceded by the letter "V".

Unless otherwise specified by contract, all government standard off-the-shelf parts (such as MS, AN, NAS, etc.) will be identified by the assigned Parker Hannifin AWB part number which will be used in the part number column.

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 in the part number column is replaced by and is not interchangeable with the item number shown in the notation.
Supersedes	SUPSDS	The part in the part number column replaces and is not interchangeable with the item number shown in the notation.
Replaced by	REPLD BY	The part in the part number column is replaced by and interchangeable with the item number shown in the notation.
Replaces	REPLS	The part in the part number column replaces and is interchangeable with the item number shown in the notation.
Vendor	V	Federal Supply Code for vendors.

ILLUSTRATED PARTS LIST

D. Items Not Illustrated

Items not illustrated are indicated by a dash (-) ahead of the item number in the Figure/Item number column.

E. 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.

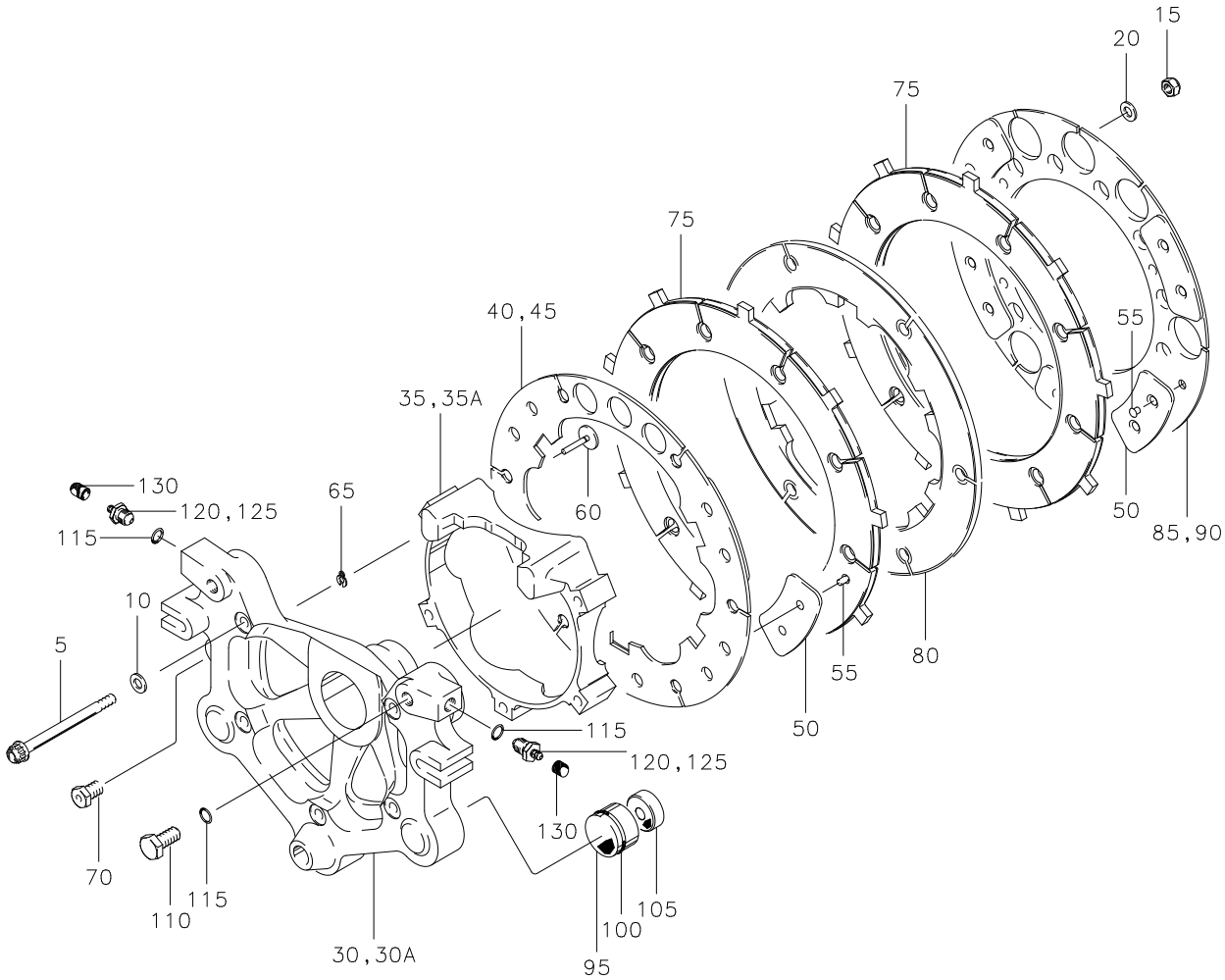
2. Optional Vendor Index

Not applicable

3. Federal Supply Code for Manufacturers

Not applicable.

ILLUSTRATED PARTS LIST



Main Brake Assembly
IPL Figure 1

ILLUSTRATED PARTS LIST

4. Detailed Parts List – Main Brake Assembly (Sheet 1 of 2)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NUMBER	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY.
1 -1	30-162		MAIN BRAKE ASSEMBLY		RF
			ATTACHING PARTS		
5	103-24400		BOLT, EXTERNAL WRENCHING		5
10	095-02800		WASHER, SINGLE COUNTERSUNK		5
15	094-10401		NUT, SELF-LOCKING		5
20	095-10500		WASHER, FLAT		5
			* * *		
– 25	091-15700		. ASSEMBLY, CYLINDER, REPLD BY ITEM 25A		NP
30	061-11600		. . CYLINDER, REPLD BY ITEM 25A		NP
30A	061-11601		. . CYLINDER, REPLD BY ITEM 25A (WAS OPTIONAL FOR ITEM 30)		NP
– 25A	091-23900		. ASSEMBLY, CYLINDER, REPLS ITEMS 25, 30, 30A		1
140	139-07500		. . ASSEMBLY, PIN PLUG		4
95	062-07400		. PISTON		5
100	101-02100		. PACKING, PREFORMED		5
105	088-01500		. INSULATOR		5
35	065-15400		. RING, TORQUE, REPLD BY ITEM 35A		NP
35A	065-15401		. RING, TORQUE, REPLS ITEM 35		1
40	073-07100		. ASSEMBLY, PLATE, PRESSURE		1
45	063-05500		. . PLATE, PRESSURE		1
50	109-00200		. . PAD, WEAR		5
55	105-00901		. . RIVET		10
60	139-11500		. SEAT, INDICATOR, PIN		1
65	155-04800		. RING, RETAINING		1
70	139-11400		. SEAT, INDICATOR, LINING		1
75	159-01200		. DISC, ROTATING		2
80	232-00300		. STATOR, CENTER		1

ILLUSTRATED PARTS LIST

4. Detailed Parts List – Main Brake Assembly (Sheet 2 of 2)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NUMBER	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY.
85	074-05500		. ASSEMBLY, PLATE, BACK		1
90	064-04300		. . PLATE, BACK		1
50	109-00200		. . PAD, WEAR		5
55	105-00901		. . RIVET		10
110	104-05000		. PLUG, FITTING		1
115	101-00700		. PACKING, PREFORMED		3
120	081-00200		. SEAT, BLEEDER		2
125	079-00300		. SCREW, BLEEDER		2
130	183-00100		. CAP, BLEEDER		2
– 135	166-20100		. NAMEPLATE		1

STORAGE

1. General

   A. Storage and Shipment Materials. Refer to Table 15001.

Table 15001
Storage and Shipment Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
215-01600	Protective Plug	N/A	Parker Hannifin Corp. Aircraft Wheel & Brake

2. Procedures

   A. Storage

   Brake assemblies which are not to 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.

   CAUTION: STORAGE LIFE OF RUBBER COMPONENTS ASSEMBLED IN BRAKES OR STORED AS SPARE PARTS IS 4 YEARS FROM CURE DATE. RUBBER COMPONENTS KEPT LONGER THAN 4 YEARS ARE NOT SERVICEABLE AND MUST BE REPLACED DUE TO AGE AND ATMOSPHERIC DETERIORATION. STORAGE LIFE MAY BE SHORTENED BY EXPOSURE TO SUNLIGHT, EXTREME TEMPERATURES, HUMIDITY, OZONE, CONTAMINATION OF FLUIDS, SEVERE OPERATING CONDITIONS, ETC.

   (1) Install a protective plug (215-01600) in brake inlet port to prevent contaminants from entering.

   (2) The brake assembly should be stored in moisture-barrier material and a sealed corrugated cardboard container or equivalent.

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

STORAGE

B. Preparation for Shipment

(1) Install a protective plug (215-01600) in brake inlet port and tighten snug to prevent contaminants from entering.

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

Cleveland Wheels & Brakes

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

MAIN WHEEL ASSEMBLY
PHC Part No. 40-203

CM40-203
Initial Issue Oct 15, 2000

TO: HOLDERS OF CM40-203 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-203.

Attached to this transmittal letter is Revision N/C of CM40-203 (initial issue dated Oct 15, 2000)

Revision N/C, Dated Oct 15, 2000

REVISION N/C 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	Revised to latest standard format (DCN 0327-19)

TO: HOLDERS OF CM40-203 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-203.

Attached to this transmittal letter is Revision A of CM40-203 (initial issue dated Jan 18, 2010)

Revision A, Dated Jan 18, 2010

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

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

REVISION HIGHLIGHTS

Section/Page No.	Description Of Change
As Follows	DCN 0387-78
Record of Rev/pg RR-1	Update page to reflect latest revision
List of Effective Pages pg LEP-1	Update applicable effective dates to reflect latest revision
Description and Operation pg 2	Table 1 Leading Particulars (NOW) Bearing Lubricant: Mobil Aviation Grease SHC100 (WAS) MIL-G-81322
Assembly pg 7001	Table 7001, Assembly Equipment and Materials List (NOW) Mobile Aviation Grease SHC100, Mobil-Exxon (WAS) Aeroshell Grease 22, Shell Oil.
pg 7003	Para. 1.B.(14) (NOW) (refer to Table 7001) (WAS) per MIL-G-81322, grade A.
Special Tools, Fixtures… pg 9002	Table 9002, Consumable List (NOW) Mobile Aviation Grease SHC100, Mobil-Exxon (WAS) Aeroshell Grease 22, Shell Oil.
pg 9003	Para. C (NOW) Mobil-Exxon (WAS) Shell Oil.

TO: HOLDERS OF CM40-203 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-203.

Attached to this transmittal letter is Revision B of CM40-203 (initial issue dated March 10, 2011)

Revision B, Dated March 10, 2011

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

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

REVISION HIGHLIGHTS

Section/Page No.	Description Of Change
As Follows	DCN 0392-63
Record of Rev/pg RR-1	Update page to reflect latest revision
List of Effective Pages pg LEP-1	Update applicable effective dates to reflect latest revision
Inspection and Check pg 5003	Paragraph 2.B. (REMOVE) 'Replace damaged keys liners in accordance with paragraph 1.H. of REPAIR section.'

RECORD OF REVISIONS

Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision letter, date inserted and initial.

REV.	DATE ISSUED	DATE INSERTED	BY	REV.	DATE ISSUED	DATE INSERTED	BY
NC	00-10-15	00-10-15	PHC				
A	10-01-18	10-01-18	PHC				
B	03-10-2011	03-10-2011	PH				

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 Main Wheel Assembly and components.

SERVICE BULLETIN NUMBER	SUBJECT	REV.	DATE INCORPORATED

LIST OF EFFECTIVE PAGES

TABLE OF CONTENTS

INTRODUCTION

1. General

This manual is published for the guidance of personnel responsible for the overhaul and/or maintenance of the Parker Hannifin Main Wheel Assembly covered in this publication.

This manual contains shop instructions for maintaining wheel assembly 40-203, including testing, checking and repair procedures.

The instructions in this manual only apply to assembly part number 40-203. Ensure that the part number on the unit is listed on the cover page before performing any of these instructions.

NOTE: All torque values and specified limits or values set by Parker Hannifin Engineering and contained herein must be strictly observed.

The manufacturer has verified the contents of this manual by actual performance of Disassembly, Assembly and Testing prior to the distribution of printed copies.

While Parker Hannifin Corporation represents that the information contained in this manual was current at the time of publication, it is recommended that the user inquire as to the latest revision level in existence before proceeding with overhaul or maintenance operations. This can be accomplished by contacting the Technical Services Department of the Aircraft Wheel & Brake Division at the following address or numbers:

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
1160 Center Road
Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline
Phone: 1-800-272-5464
Fax: (440) 937-5409

2. Data Rights

The unit charge for this manual covers reproduction and handling costs only and does not constitute purchase of the data or design contained herein, nor does it convey to the purchaser any rights, patent or otherwise, to reproduce or manufacture from said data.

INTRODUCTION

3. TSO Notice

This assembly carries a “TSO C26c”marking for FAR Part 27 and Part 29 usage, which identifies it as having been fully tested in the laboratory and qualified to applicable FAA (Federal Aviation Administration) requirements and specifications. Substitutions of critical parts or changes of processes or materials are not permitted without the written approval of the manufacturer.

4. Manual Use

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

When a section of text makes occasional reference to figure items for identification of components, the item number will be preceded with the associative figure number and enclosed in parentheses ( ) such as:

“ If nut can be turned by hand onto bolt (IPL, 1-5) …..” – read as IPL Figure 1, item 5

When a section of text makes numerous references to a particular figure for identification of components, a note shall precede the applicable text referencing the figure. The item numbers will then be enclosed in parentheses ( ) such as:

“Refer to IPL, Figure 1”

“…install air valve assembly (80) in outer …..” – read as IPL Figure 1, item 80

DESCRIPTION AND OPERATION

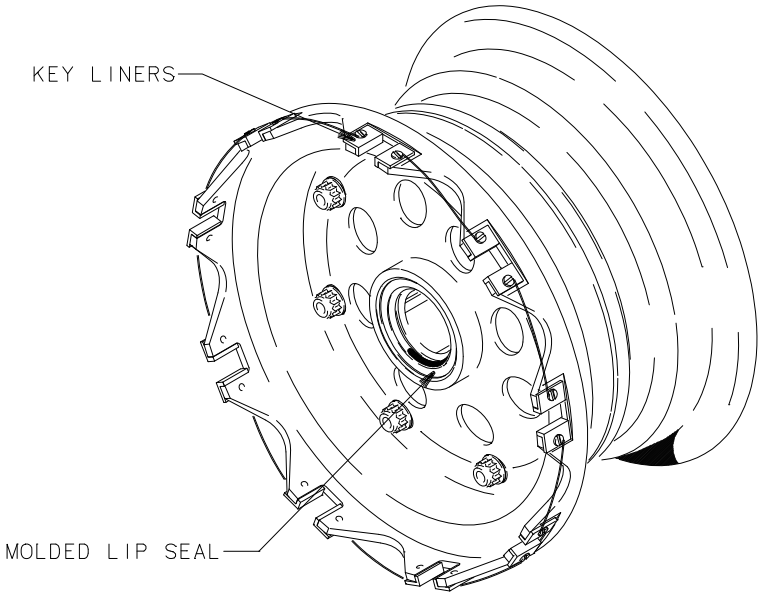
1. Main Wheel Description

The main wheel assembly is a 6.50-10, Type III wheel designed for use with a 22 x 6.75-10, 8 PR tubeless tire and a 6.50-10, 6 PR tube-type tire. The divided type main wheel facilitates tire installation and removal. The two wheel halves are fastened together with high strength bolts, single countersunk washers (under bolt head) and flat washers under self-locking nuts. The wheel halves are machined from forged aluminum alloy.

An O-ring is installed on the inner wheel half to provide an air seal at the juncture of the wheel halves. An inflation valve assembly is installed in the outer wheel half to inflate and deflate a tubeless tire.

The wheel assembly rotates on two tapered roller bearings. The bearing cups are shrink-fit into the hubs of each wheel half. Rubber molded type lip seals provide protection and lubricant retention for the bearing.

The flange of the inner wheel half has nine slots that engage the drive tangs of the rotating brake discs. The inner wheel half flange slots are lined with steel key liners (which are held in place by a single screw and lockwire) to provide a hard wearing surface for the disc tangs and to prevent damage to the softer metal of the wheel.



Main Wheel Assembly
Figure 1

DESCRIPTION AND OPERATION

2. Main Wheel Operation

The main wheel assembly provides partial support of the weight of the aircraft and a means of steering control. When mated with the brake assembly, the wheel assembly provides the braking operation by driving the rotating disc members of the brake assembly.

3. Main Wheel Handling Procedures

Strictly observe the deflation and inflation procedures, and the torque and lubtork values specified in this manual. Do not overtighten any bolt, nut, or fitting. 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 halves properly to protect the paint and surface finishes.

Table 1
Leading Particulars

PARAMETER	SPECIFICATION
Wheel Size and Type	6.50-10, Type III Tubeless or Tubetype
Assembly Weight	11.40 lb (5.17 kg) Maximum Guaranteed
Wheel Bolt Nut Torque	Lubtork 290-300 in-lb with MIL-T-5544
Wheel Material	Aluminum Alloy Casting
Bearing Lubricant	Mobil Aviation Grease SHC100
Wheel Half Coatings	Surface Pretreatment: MIL-A-8625, Type II, Class 1 Primer Coating: Columbia Paint Corporation P/N 11-347Z Finish Coating: Columbia Paint Corporation P/N 11-358A (524 Gloss White)

TESTING

1. General

This section contains test procedures that can be used both as troubleshooting measures and means to test overhauled wheel assemblies

A. Test Equipment and Materials. Refer to Table 1001.

Table 1001
Testing Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Inflation Cage	N/A	Commercial Source
N/A	Tire Pressure Gage	To assure recommended inflation pressure (per airframe mfr.)	Commercial Source
N/A	Socket Set with Assorted Wrenches	12 pt. External Drive and Hex Head, Inch	Commercial Source
N/A	Torque Gage	0 to 400 in-lb capacity (0 to 45.20 N-m)	Commercial Source
N/A	Soap Solution	N/A	Commercial Source

B. Preparation for Testing

Prior to testing, make photocopies of the test data sheet provided at the end of this section. One photocopy of the data sheet is required for each main wheel assembly to be tested.

C. Pretest Check (Refer to IPL, Figure 1)

Perform the following inspections and checks to prepare the main wheel assembly for testing. Do not perform testing on any main wheel assembly that exhibits visible signs of wheel or tire damage.

(1) Visually inspect the wheel for corrosion, cracks, or other visible damage.

(2) Check wheel nuts (15) to be sure they are properly installed and have not worked loose. Bolt threads should be flush to 1-1/2 threads extending beyond the nut.

(3) Check for loose or worn key drives (40).

(4) Visually inspect air valve assembly (80) for damage to hex nut or rubber grommet.

TESTING

(5) Visually inspect tires for cuts, flat spots, and tread or sidewall damage.

NOTE: Refer to tire manufacturer's service and maintenance manuals for recommended servicing procedures.

D. Procedure

Mounted wheel assemblies may be tested in accordance with the following procedure. Refer to IPL, Figure 1.

SAFETY WARNING: INFLATION OF TIRE CAN BE EXTREMELY DANGEROUS AND IT IS RECOMMENDED THAT INFLATION BE PERFORMED IN AN INFLATION CAGE TO PREVENT INJURY TO PERSONNEL FROM POSSIBLE EXPLOSION.

CAUTION: COVER HUB OPENINGS OF WHEEL HALVES TO PREVENT CONTAMINATION OF BEARING AREA.

(1) Place wheel/tire assembly in an inflation cage and inflate to recommended operating pressure.

(2) Coat entire wheel/tire assembly with soap solution. Check carefully for air leaks in the form of soap bubbles.

(a) If air leaks occur around air valve assembly (80), check torque or replace part.

(b) If air leaks occur around tire bead seat, completely deflate tire and remove wheel/tire assembly from inflation cage.

1 Remove tire from wheel and examine wheel bead seat and tire for damage. If wheel bead seat is scratched, nicked or pitting, repair in accordance with paragraph 1.C. of REPAIR section.

NOTE: Refer to DISASSEMBLY section for removal of tire.

(c) If air leaks through wheel, completely deflate tire and remove wheel/tire assembly from inflation cage.

1 Remove tire from wheel and penetrant inspect wheel halves (30 and 55) for cracks in accordance with INSPECTION/CHECK section. Replace cracked wheel halves.

NOTE: Refer to DISASSEMBLY section for removal of tire.

TESTING

(3) Place wheel/tire assembly in an inflation cage and inflate to recommended operating pressure. After the initial 24 hours (growth stabilization), reinflate to recommended operating pressure.

(a) Check pressure after an additional 24 hours. If the reduction in pressure exceeds five percent of inflation pressure, replace wheel O-ring (25) and retest wheel/tire assembly in accordance with step (2).

NOTE: Refer to DISASSEMBLY section for removal of wheel O-ring.

E. Troubleshooting (Refer to IPL, Figure 1)

Table 1001 (Sheet 1 of 2)
Wheel Assembly Troubleshooting

TROUBLE	PROBABLE CAUSE	CORRECTION
Loss of tire pressure	Preformed packing (25) on wheel register worn, damaged or twisted on Wheel register groove	Replace preformed packing (25) and realign on register taking care not to twist packing
	Loss of preload on wheel tie bolts	Inspect and replace self-locking nuts (15) if locking feature is destroyed
	Crack in inboard or outboard wheel half subassemblies (30 & 55)	Penetrant inspect wheel half assemblies (30 & 55) per INSPECTION AND CHECK section and replace with new part if crack is found
Excessive drag on wheel when rotating	Improper preload or torque on axle nut	Loosen and retighten per ASSEMBLY section
	Damage to bearing cones (65) and or bearing cups (50)	Inspect bearing cones (65) and cups (50). Replace if damaged or corroded. Repack new cones with grease

TESTING

Table 1001 (Sheet 2 of 2)
Wheel Assembly Troubleshooting

TROUBLE	PROBABLE CAUSE	CORRECTION
Cracked or distorted wheel or wheel half	Hitting rocks or other hard objects during landing or takeoff	Inspect wheel per INSPECTION/CHECK section to determine condition and replace with new part if crack is found
	Use of sharp objects to break tire bead	Replace wheel or wheel half
	Landing with flat tire or abnormally hard landing	
	Landing in crabbing position in crosswind causing excessive side force	
	Normal fatigue failure when used beyond expected wheel life	
Damaged bearing cone	Misalignment of bearings	Replace bearing cone (65)
	Axle nut improperly torqued	Replace and torque axle nut to aircraft manufacturer's specifications
	Foreign matter in bearing grease	Check bearing cone (65) integrated grease seals for damage. Replace cones and be sure bearing grease is free from foreign matter
	Lack of bearing grease	Replace bearing cones (65) and cups (50) and repack with grease
Worn or damaged bearing cone grease seals	Normal wear or improper installation	Replace bearing cones (65)

TEST DATA SHEET

Work Order No. _____ **Date** _____ **Unit Manufacture Date** _____

A. Pretest Checks

(1) Wheel condition **Accept** _____ **Reject** _____
(2) Wheel assembly hardware condition **Accept** _____ **Reject** _____
(3) Tire condition **Accept** _____ **Reject** _____

Comments: _____

B. Pressure Test **Accept** _____ **Reject** _____

Tire inflation pressure:_____ psig Required: Recommended operating pressure

Leakage around inflation valve: Yes ____ No ____

Leakage around bead seat: Yes ____ No ____

Leakage through wheel: Yes ____ No ____

Comments: _____

C. 24 hour Pressure Test **Accept** _____ **Reject** _____

Tire inflation pressure:_____ psig Required: Recommended operating pressure

Pressure after 24 hrs.:_____ psig Required: Only 5% allowable pressure loss

Pass ____ (less than 5% pressure loss)

Fail ____ (more than 5% pressure loss) – Retest per step B. Pressure Test

Comments: _____

Tester: _____ **Date:** _____

Inspector: _____ **Date:** _____

DISASSEMBLY

1. General

To service the main wheel assembly, it will be necessary to remove it from the aircraft.

NOTE: Refer to TESTING section to establish the condition of the component or most probable cause of detected malfunction(s) to determine extent of disassembly required.

A. Disassembly Equipment and Materials. Refer to Table 3001.

Table 3001
Disassembly Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
199-18	Preformed Packing Extraction Tool Set	N/A	Parker Hannifin Corp. Aircraft Wheel & Brake
N/A	Socket Set with Assorted Wrenches	12 pt. External Drive and Hex Head, Inch	Commercial Source
N/A	Portable Tire Bead Breaker	N/A	Commercial Source
N/A	Soap Solution	N/A	Commercial Source

B. Remove Wheel Assembly

SAFETY WARNING: INSURE AIRCRAFT IS SECURE AND STABLE BEFORE BEGINNING ANY WORK. WORKING UNDER AN IMPROPERLY STABILIZED AIRCRAFT COULD CAUSE INJURY OR DEATH.

(1) Jack aircraft per aircraft maintenance manual until tire is clear of ground. It is **strongly** recommended that the tire be **fully deflated** at this time.

(2) Remove air valve assembly (80) to make sure tire is fully deflated.

(3) Support wheel/tire and remove and retain applicable axle mounting hardware including axle nut, and tang washer and axle spacer, Parker P/N 067-07800.

(4) Remove wheel/tire from axle as a unit and place on a clean flat surface.

DISASSEMBLY

C. Disassemble Wheel Assembly (Refer to IPL, Figure 1)

SAFETY WARNING: DO NOT ATTEMPT TO DISASSEMBLE WHEEL UNTIL TIRE HAS BEEN COMPLETELY DEFLATED. OTHERWISE SERIOUS INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT CAN RESULT.

(1) Confirm that tire is fully deflated.

(2) Remove snap ring (75), grease seal (70) and bearing cone (65) from both wheel half assemblies (30, 55).

CAUTION: DO NOT USE TIRE IRONS OR SCREW DRIVERS TO PRY THE TIRE AWAY FROM THE WHEEL FLANGES AS THEY MAY DAMAGE THE SEALING SURFACE OF THE WHEEL. APPLICATION OF A MILD SOAP SOLUTION AROUND THE TIRE BEAD AND WHEEL FLANGE WILL USUALLY BE ENOUGH TO WORK THE TIRE LOOSE.

(3) Utilizing a portable tire bead breaker, unseat tire beads from both wheel flanges by applying pressure in even increments around entire sidewall as close to tire beads as possible.

CAUTION: DO NOT USE IMPACT OR POWER WRENCHES TO REMOVE WHEEL NUTS AND BOLTS.

(4) Remove bolts (5) and countersunk washers (10), nuts (15), and flat washers (20).

(5) Separate the wheel halves and remove tire.

(6) Remove O-ring (25) from wheel register groove of inner wheel half assembly (30).

NOTE: It is recommended that a new O-ring be installed at each overhaul or tire change.

(7) Drive keys (40) should only be removed if excessively worn, cracked, loose, or for penetrant inspection of the wheel half.

CAUTION: THE BEARING CUPS MUST BE REMOVED IF CHEMICALS ARE USED TO REMOVE PAINT FINISH FROM THE WHEEL HALVES.

(8) Bearing cups (50) **should not** be removed from the wheel halves unless cups are damaged or loose and replacement is required. Refer to REPAIR section for removal and installation procedures.

CLEANING

1. General

   A. Cleaning Equipment and Materials. Refer to Table 4001.

   NOTE: Equivalent substitutes may be used for items listed.

Table 4001
Cleaning Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Air Supply, Compressed Dry Filtered	30 psig maximum (2.07 bar)	N/A
N/A	Cleaning Cloths	Lint Free	Commercial Source
N/A	Brushes	Soft Bristled	Commercial Source
N/A	Solvent, Stoddard Type 1	P-D-680	Commercial Source
N/A	Cleaner/Degreaser, Water Based	AMS 1526	Commercial Source
N/A	Isopropyl Alcohol	N/A	Commercial Source

CLEANING

WARNING: CLEANING SOLVENTS CAN BE TOXIC AND VOLATILE. USE ONLY IN WELL VENTILATED AREAS. AVOID PHYSICAL CONTACT WITH SOLVENT AND DO NOT INHALE VAPORS. KEEP SOLVENT CONTAINERS COVERED WHEN NOT IN USE. OBSERVE FIRE PRECAUTIONS.

B. Cleaning Metallic Components (Refer to IPL, Figure 1)

(1) Clean metallic hardware (bolts, washers, nuts) in Type 1 Stoddard Solvent (per P-D-680). Use a soft bristled cleaning brush to remove stubborn deposits.

CAUTION: CLEAN BEARING CONES (65) CAREFULLY IN A SEPARATE CONTAINER OF CLEAN SOLVENT TO AVOID CONTAMINATION.

(2) In a separate container, clean bearing cones in Type 1 Stoddard Solvent (per P-D-680). Use a soft bristled cleaning brush to remove stubborn deposits.

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

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

(3) Dry all metal parts thoroughly after cleaning, using low-pressure compressed air, 30 psig maximum (2.07 bar). Wipe dried parts with lint free cleaning cloths.

C. Cleaning Aluminum Components (Refer to IPL, Figure 1)

(1) Inner and outer wheel half assemblies (30 and 55) can be washed with Type 1 Stoddard Solvent (per P-D-680). Use a soft bristled cleaning brush to remove stubborn deposits.

(2) Finish cleaning aluminum parts in a water based cleaner/degreaser (per AMS 1526).

(3) Dry parts thoroughly after cleaning, using low pressure compressed air, 30 psig maximum (2.07 bar). Wipe dried parts with lint free cleaning cloths.

D. Cleaning Rubber Components

(1) Clean rubber parts with a mild detergent cleaner or a water based cleaner/degreaser (per AMS 1526) or isopropyl alcohol. Follow up by wiping with a clean, lint free cloth.

INSPECTION / CHECK

1. General

In order to facilitate inspection of components, parts must be cleaned prior to inspection. Refer to CLEANING section for applicable instructions. Refer to the illustrations in this section for important areas and areas of greatest wear. Where indicated, refer to FITS AND CLEARANCES section to find if the part can be used, repaired, or replaced.

A. Inspection/Check Equipment and Materials. Refer to Table 5001.

NOTE: Equivalent substitutes may be used for items listed.

Table 5001
Inspection/Check Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Magnetic Particle Inspection Kit	ASTM E1444	Commercial Source
N/A	Fluorescent Penetrant Inspection Kit	MIL-STD-6866, Type 1, Method A, Sensitivity Level 2	Commercial Source
N/A	Inspection Surface Plate	N/A	Commercial Source
N/A	Magnifier	X10 Magnification	Commercial Source
N/A	Vernier Dial Calipers	0 to 6.00 in. (0 to 150 mm)	Commercial Source

INSPECTION / CHECK

B. Items that need only a general inspection (in accordance with this paragraph) and general repairs (in accordance with paragraph 1.B of REPAIR) are not included in this section. This section includes only those items that require special inspection procedures. Refer to IPL, Figure 1.

(1) Visually examine the following items for damage or looseness: bolts (5) ,washers (10, and 20), nuts (15), air valve assembly (80), and drive key screws (45). Replace all parts with stripped or scored threads or obvious damage. Additionally:

CAUTION: NO REWORKING OF BOLTS IS PERMITTED. ANY STRIPPING OF PLATING FOR INSPECTION PURPOSES IS PROHIBITED.

NOTE: Parker Hannifin recommends Inspection of the bolts after the fifth tire change, and then after the third subsequent tire change, for a total of twenty tire changes, then at each and every tire change thereafter.

(a) Inspect for bent, or cracked or thread damaged bolts (5). Inspect for evidence of cracks especially in the radius under the bolt head and in the threaded area adjacent to the bolt shank using magnetic particle inspection in accordance with ASTM E1444 or equivalent.

NOTE: If **any** of the bolts are damaged, replace **all** of the bolts.

(b) Inspect nuts for damaged threads and for loss of self-locking feature. If nut can be turned by hand onto the bolt (IPL, 1-5) past the top of the nut, then self-locking feature is destroyed.

NOTE: If **any** of the nuts are damaged, replace **all** of the nuts.

(2) Visually examine all components of the wheel assembly for wear, scoring, cracks, chips, nicks, burrs, pitting, corrosion, flaws, and other obvious signs of damage. Replace or repair all parts showing evidence of these defects.

(3) Visually examine all components of the wheel assembly with threaded features. Replace all parts with stripped or scored threads or obvious damage.

(4) Check all parts with sealing surfaces and grooves for distortion, damage, burrs, or corrosion which might damage packings and rings during installation and/or operation or which might permit leakage. Replace part if sealing surfaces and grooves are damaged.

INSPECTION / CHECK

(5) Check individual parts as indicated in paragraph 2. Detailed Inspections. Repair or replace any parts that do not meet INSPECTION / CHECK requirements.

(6) The following items are to be replaced at each overhaul regardless of condition: All preformed packings (25).

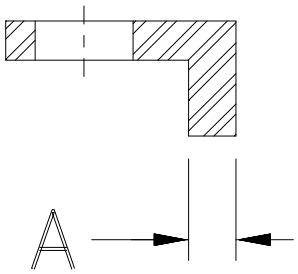
2. Detailed Inspections

A. Inspect Air Valve Assembly (IPL, 1-80)

(1) Visually inspect rubber grommet for cuts, nicks, excessive wear or distortion. If grommet is damaged, replace air valve assembly.

B. Inspect Drive Keys (IPL, 1-40). See Figure 5001

(1) Inspect the drive keys for cracks, battering, or excessive corrosion. Replaced cracked, battered or corroded parts. Thickness must not exceed dimension A per FITS AND CLEARANCES, Table 8001. Replace drive key if constraint exceeds the limit or the area is damaged.



Drive Key Inspection Limits
Figure 5001

C. Inspect Bearing Cups and Cones (IPL, 1-50 and 1-65)
Replace damaged cups and cones in accordance with paragraph 1.F. of REPAIR section.

NOTE: Bearing cups are a designed shrink fit into the wheel halves (IPL, 1-35 and 1-60) and should not be removed unless replacement is necessary due to damage or if chemicals are used to remove paint finish from wheel halves.

INSPECTION / CHECK

(1) Inspect cups in the wheel halves for looseness, wear, corrosion, spalling, brinelling, nicks, scratches, water staining, pitting, and heat discoloration. Replace any damaged bearing cups.

(2) Inspect roller surfaces of bearing cones for wear, corrosion, spalling, pitting and heat discoloration. Replace any damaged bearing cones.

(3) Inspect bearing cage for dents or distortion and for wear of sides, corners and at ends of roller pockets. Replace any damaged bearing cones.

NOTE: [1] See bearing manufacturer's brochure for visual illustrations.

(4) Visually inspect the bearing cone integrated grease seals for cuts, nicks, distortion or other damage. Inspect the integrity of the rubber-to-metal interface. Replace seals that have any tears in the rubber-to-metal interface. If the rubber is cracked or if seal is distorted and unable to fit snug in hub cavity, then sealing characteristics of the seal are damaged and should be replaced.

D. Inspect Inner and Outer Wheel Halves (IPL, 1-35 and 1-60)
Repair damaged areas in accordance with paragraph 1.C. of REPAIR section.

NOTE: Parker Hannifin recommends Inspection of the wheel halves after the fifth tire change, and then after the third subsequent tire change, for a total of twenty tire changes, then at each and every tire change thereafter.

NOTE: Paint must be removed from inner and outer wheel half assemblies (IPL, 1-30 and 1-55) to conduct an accurate method for the flourescent penetrant inspection. Refer to paragraph 1.B. of REPAIR section for paint removal instructions.

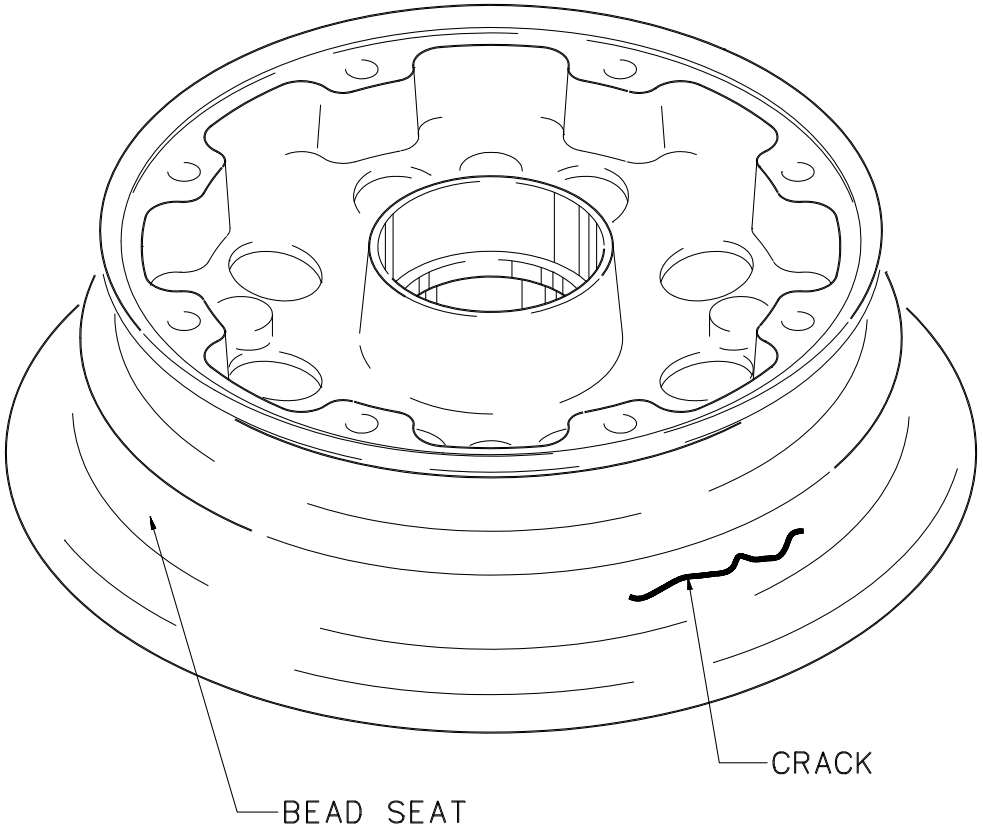
(1) Visually inspect wheel halves for nicks, corrosion or other damage. Replace severely corroded wheels.

(2) Inspect inner and outer wheel half register grooves. Damage to register sections hampering sealing of wheel O-ring (IPL, 1-25) is cause for wheel half replacement.

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

INSPECTION / CHECK

(3) Inspect wheel halves for cracks, or structural damage. Take particular note of bead seat and valve areas. The tire bead seat area of a wheel (see Figure 5002) is typically an area of stress concentration and possibly subjected to trauma from tire beads and tools used to remove tires. This area should receive special attention when inspecting for defects at a tire change to determine airworthiness. Note that these cracks May not be visible without the aid of penetrant inspection. Any cracks are cause for replacement.



Wheel Half Inspection
Figure 5003

REPAIR

1. General

Certify that a component is serviceable per INSPECTION/CHECK section prior to attempting repair. Disassemble the wheel assembly only to the level necessary to do the repairs or replace components. Repairs are limited to the replacement of parts and to the repairs specified in this section. No attempt should be made to repair cracked, severely corroded or badly damaged parts.

A. Repair Equipment and Materials. Refer to Table 6001.

NOTE: Equivalent substitutes May be used for items listed.

Table 6001
Repair Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Aluminum Oxide Cloth	400 Grit or Finer Wet or Dry	Commercial Source
N/A	Plastic Media Type V (Acrylic)	MIL-P-85891	U.S. Technology Corp.
N/A	Plastic Media Stripping Equipment	N/A	Commercial Source
N/A	Dry Ice -or- Sub-Zero Freezer	 -30°F to -60°F (-34.4°C to -51.1°C)	Commercial Source Commercial Source
N/A	Oven	250°F capacity (121°C)	Commercial Source
N/A	Corrosion Preventative Alodine 1200 or Equiv.	MIL-C-5541, Class 1A	Commercial source
N/A	Paint Application Equipment	N/A	Commercial source
11-347Z	Primer Coating	N/A	Columbia Paint Corp.
11-358A	Finish Coating	N/A	Columbia Paint Corp.
N/A	Removal Tool, Bearing Cup	Per Figure 9001 SPECIAL TOOLS…..	N/A
N/A	Installation Tool, Bearing Cup	Per Figure 9002 SPECIAL TOOLS…..	N/A
N/A	Arbor Press	N/A	Commercial Source

REPAIR

B. Paint Removal Procedure For Wheel Halves (IPL, 1-35 and 1-60)

WARNING: STRIPPING SOLVENTS CAN BE TOXIC AND VOLATILE. USE ONLY IN WELL VENTILATED AREAS. AVOID PHYSICAL CONTACT WITH SOLVENTS AND DO NOT INHALE VAPORS. KEEP SOLVENT CONTAINERS COVERED WHEN NOT IN USE. OBSERVE FIRE PRECAUTIONS.

CAUTION: REFER TO THE APPLICABLE MANUFACTURER'S INSTRUCTIONS FOR DISPOSAL OF CHEMICAL STRIPPING SOLUTIONS OR PLASTIC STRIPPING MEDIA.

CAUTION: MAIN WHEEL MUST BE DISASSEMBLED TO THE LEVEL REQUIRED FOR STRIPPING AND REPAINTING.

CAUTION: IF CHEMICAL STRIPPING IS USED, THE BEARING CUP (IPL, 1-45) MUST BE REMOVED FROM THE WHEEL HALF SUBASSEMBLY PRIOR TO PROCEEDING.

(1) Degrease inner and outer wheel halves per CLEANING section.

(2) Strip paint from the inner and outer wheel halves (IPL, 1-35 and 1-60) using plastic media.

NOTE: For best results, always refer to the applicable plastic media manufacturer's instructions for application and use.

NOTE: Chemical stripping agents are commercially available and may be used only if plastic media stripping equipment is not available. Refer to the manufacture of the primer and finish coating for recommended stripping agents. For best results, always refer to the applicable chemical manufacturer's instructions for application and use.

REPAIR

C. Corrosion and Surface Repair Procedure For Wheel Halves (IPL, 1-35 and 1-60)

Refer to Figure 6001 and using 400 grit or finer, wet or dry aluminum oxide cloth, remove all corrosion and surface damage from wheel halves (IPL, 1-35 and 1-60) in accordance with the limits specified in the following procedure.

WARNING: **CLEANING SOLVENTS CAN BE TOXIC AND VOLATILE. USE ONLY IN WELL VENTILATED AREAS. AVOID PHYSICAL CONTACT WITH SOLVENTS AND DO NOT INHALE VAPORS. KEEP SOLVENT CONTAINERS COVERED WHEN NOT IN USE. OBSERVE FIRE PRECAUTIONS.**

CAUTION: REMOVAL OF CORROSION AND SURFACE DAMAGE WILL PREVENT STRESS CONCENTRATIONS AND PREMATURE WHEEL FAILURE, BUT ANY EXCESSIVE REMOVAL OF MATERIAL WILL SHORTEN THE ROLL LIFE OF THE WHEEL; THEREFORE IT IS RECOMMENDED THAT MATERIAL REMOVED BY BLENDING BE LIMITED TO THE MINIMUM REQUIRED FOR REMOVING CORROSION OR SURFACE DAMAGE.

CAUTION: REPAIR MUST NOT AFFECT SEALING CHARACTERISTICS OF SEALING SURFACES.

REPAIR

Dimensional tolerances unless otherwise specified:

.xxx = ±.010
.xx = ±.030
Angular = ±1/2°
Surface Finish = not to exceed 150 microinches RMS

(1) In area 1, polish out corrosion pits, scratches, and tool marks to .015 in. max. deep and .50 in. long. Surface finish should be 20 microinches RMS.

(2) In area 2, blend out and polish imperfections to .020 in. max. deep and 1.00 in. long. Reworked area is not to exceed 1.00 square inch. Do not remove metal if surface directly opposite was previously reworked. Surface finish should be 20 microinches RMS.

(3) In area 3, blend out and polish imperfections to .030 in. max. deep and reworked area not to exceed 1.00 square inch in area.

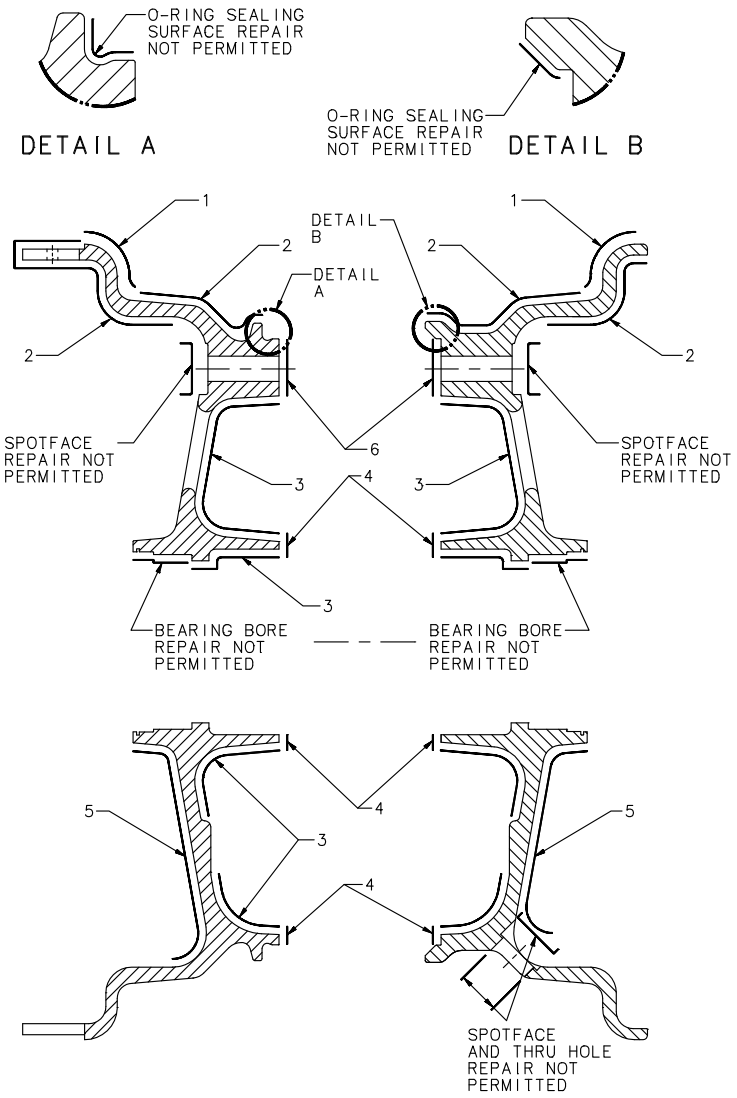
(4) In area 4, polish out imperfections to .010 in. maximum depth in register area.

(5) In area 5, blend out and polish imperfections to .030 inch deep and one square inch in area.

(6) In area 6, the maximum repair is .010 inch deep and .50 square inch in area on each interface boss.

(7) Clean part per CLEANING section.

REPAIR



Wheel Half Repairable Limits
Figure 6001

REPAIR

D. Surface Treatment Procedure For Wheel Halves (IPL, 1-35 and 1-60)

(1) Treat repaired areas with corrosion preventative (Alodine 1200 or equivalent) per MIL-C-5541, Class 1A.

E. Repaint Procedure For Wheel Halves (IPL, 1-30 and 1-55)

Refer to Figures 6002 and 6003 and repaint wheel halves in accordance to the following procedure.

CAUTION: DO NOT GET PAINT ON ROLLER CONTACTING SURFACES OF BEARING CUPS. PAINT ON THESE SURFACES WILL CONTRIBUTE TO BEARING FAILURE.

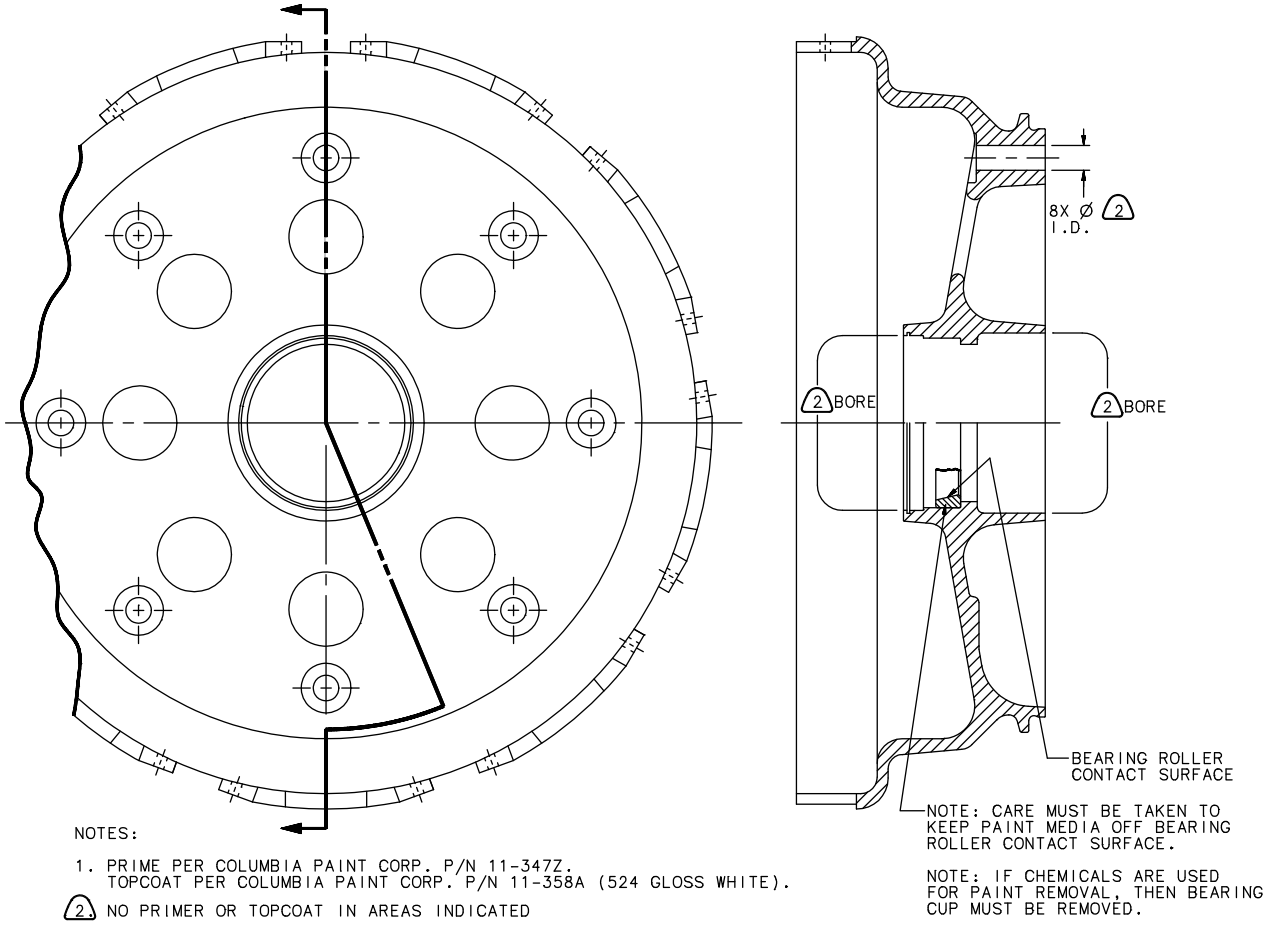
CAUTION: REFER TO THE APPLICABLE PAINT MANUFACTURER'S INSTRUCTIONS FOR DISPOSAL OF PRIMER AND TOPCOAT MEDIA.

NOTE: To achieve best results, always refer to the applicable paint manufacturer's instructions for application and use.

(1) Mask and apply primer to wheel halves. The dry film thickness of the primer shall be .0002 to .0005 inches.

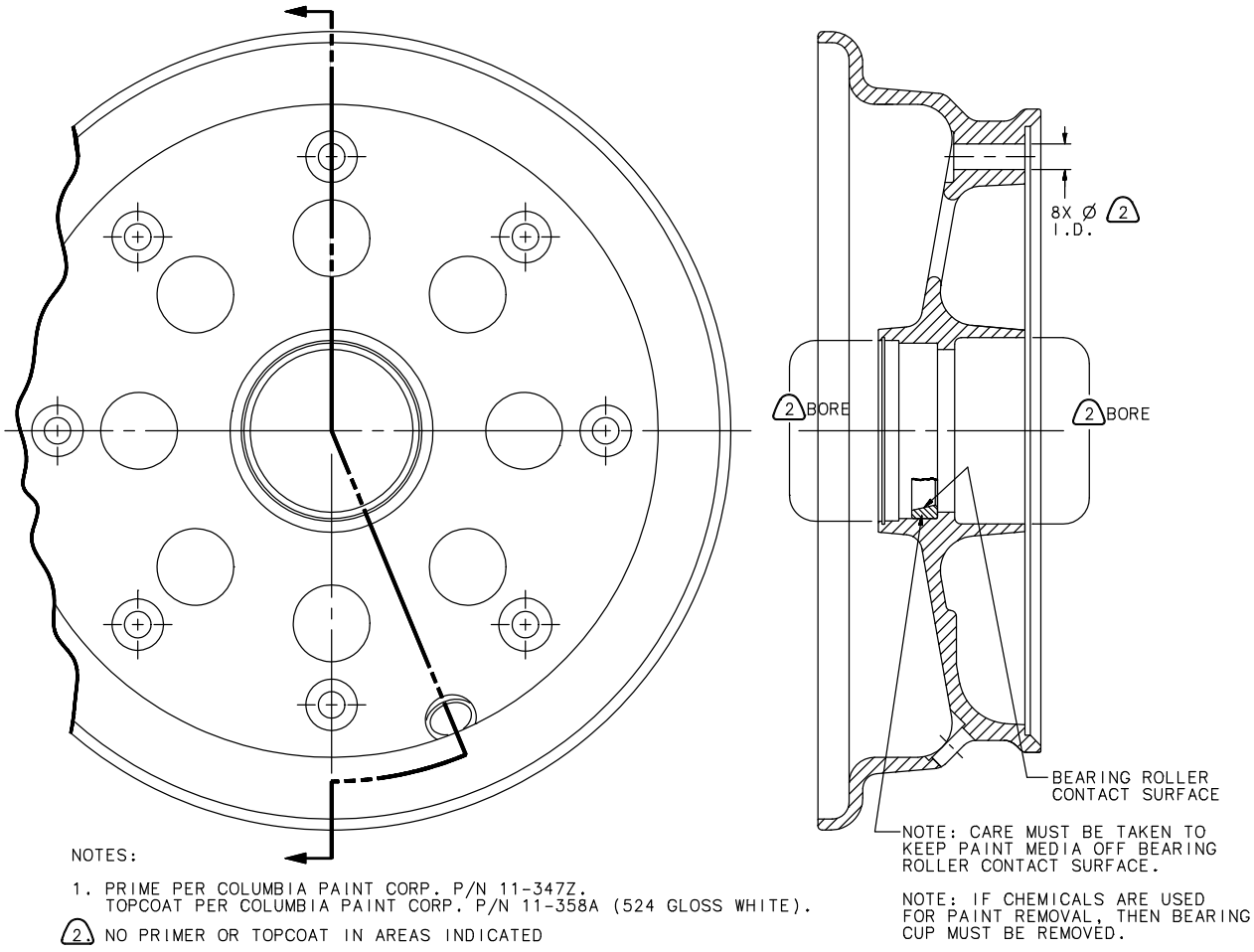
(2) Mask and apply topcoat to wheel halves. The total dry film thickness (including primer and topcoat) shall be .008 to .0014 inches.

REPAIR



Inner Wheel Half Masking Instructions
Figure 6002

REPAIR



Outer Wheel Half Masking Instructions
Figure 6003

REPAIR

F. Remove Bearing Cup (IPL, 1-50)

The bearing cup is a designed shrink fit into the wheel half (IPL, 1-35 and 1-60). Refer to Figure 6004 and remove bearing cup in accordance to the following procedure.

(1) Heat wheel half (IPL, 1-35 or 1-60) to between 145°F to 175°F (62.8°C to 79.4°C) for not longer than 30 minutes.

CAUTION: USE PROTECTIVE GLOVES WHEN HANDLING HEATED PARTS.

CAUTION: DURING BEARING CUP REMOVAL, ALWAYS SUPPORT THE WHEEL HALF ON THE HUB, NOT ON THE FLANGE. FAILURE TO DO SO COULD DAMAGE THE FLANGE.

CAUTION: AVOID RAISING BURRS IN THE HUB BORE WHEN REMOVING BEARING CUP.

(2) Remove wheel half from heat source and place hub face of wheel on a support block. Place fabricated removal tool, see SPECIAL TOOLS….section, on backing face of cup and use an arbor press to apply even pressure to the removal tool. Bearing cup should drop out.

NOTE: An alternate method would be to tap the cup out evenly with a fiber drift pin or phenolic punch after removing from heat source.

(3) Repeat steps (1) and (2) for remaining wheel half.

REPAIR

G. Install Bearing Cup (IPL, 1-50)

Refer to Figure 6005 and install bearing cup in accordance to the following procedure.

CAUTION: WORK SWIFTLY AS THERMAL EXPANSION AND CONTRACTION OF PARTS WILL PRECLUDE EASE OF INSTALLATION.

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

CAUTION: USE PROTECTIVE GLOVES WHEN WORKING WITH DRY ICE.

(2) Prior to installation, chill the new bearing cup to between -30°F to -60°F (-34.4°C to –51.1°C) for a minimum of 30 minutes.

(3) Heat wheel half (IPL, 1-35 or 1-60) to between 145°F to 175°F (62.8°C to 79.4°C) for not longer than 30 minutes.

CAUTION: USE PROTECTIVE GLOVES WHEN HANDLING HEATED PARTS.

(4) Remove the wheel half from the heat source and remove the bearing cup from refrigeration source.

(5) Eliminate condensation by drying bearing cup thoroughly and then apply a wet film of primer coating into the bearing bore.

(6) Place wheel half on a clean flat work surface and align bearing cup over bore. Place fabricated installation tool, see SPECIAL TOOLS…. section, on front face of cup. Press the bearing cup into the bearing bore by applying even pressure to the installlation tool. Make sure the backing surface of the cup rests flush against the shoulder of the bearing bore.

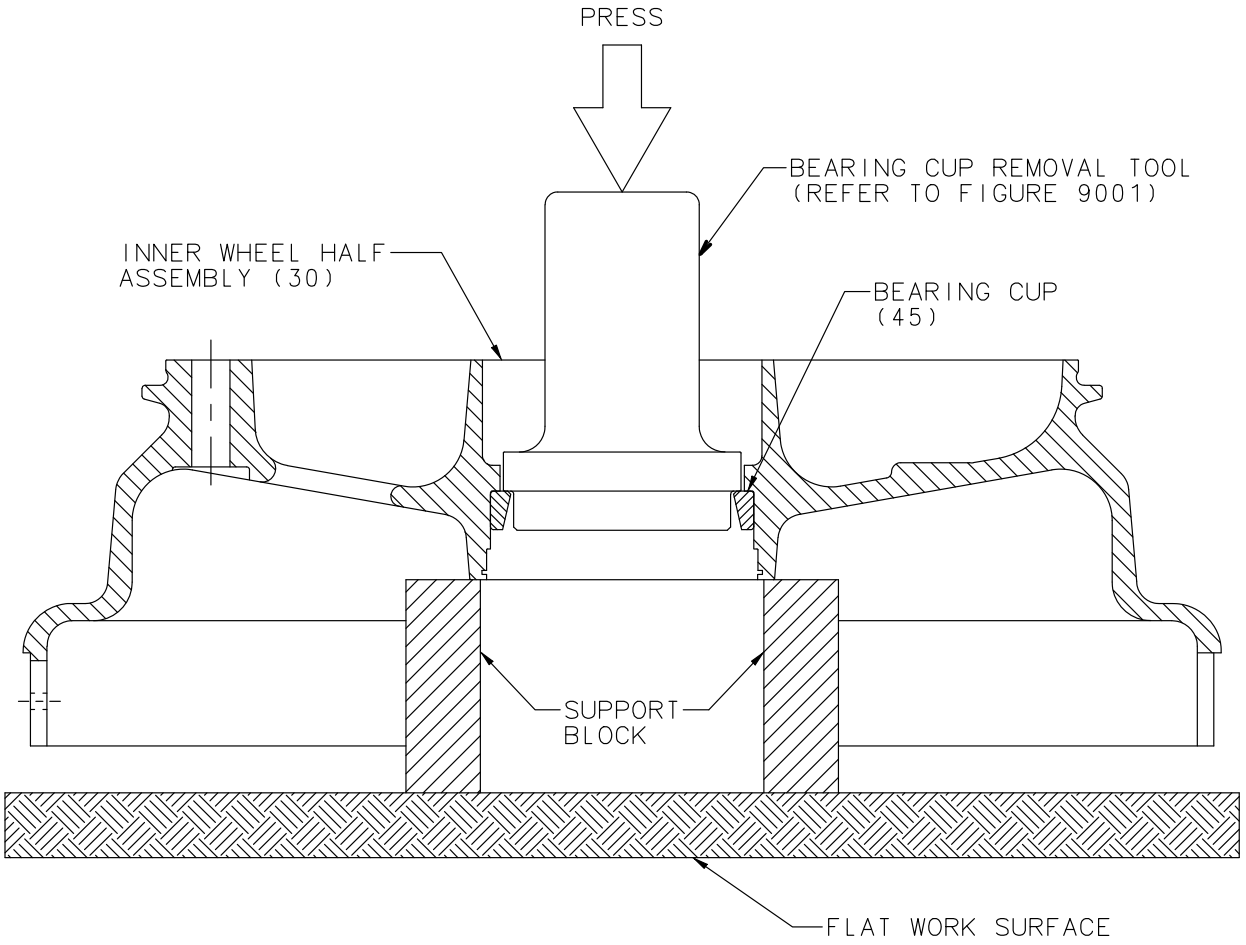
NOTE: An alternate method would be to gently and evenly tap the cup into place with a fiber drift pin or phenolic punch.

NOTE: Avoid cocking the cup during installation. If bearing cup does not seat properly in wheel half, repeat procedure or replace wheel half subassembly.

(7) Remove excess primer so that a film of not more than .08 inches wide extends beyond the cup.

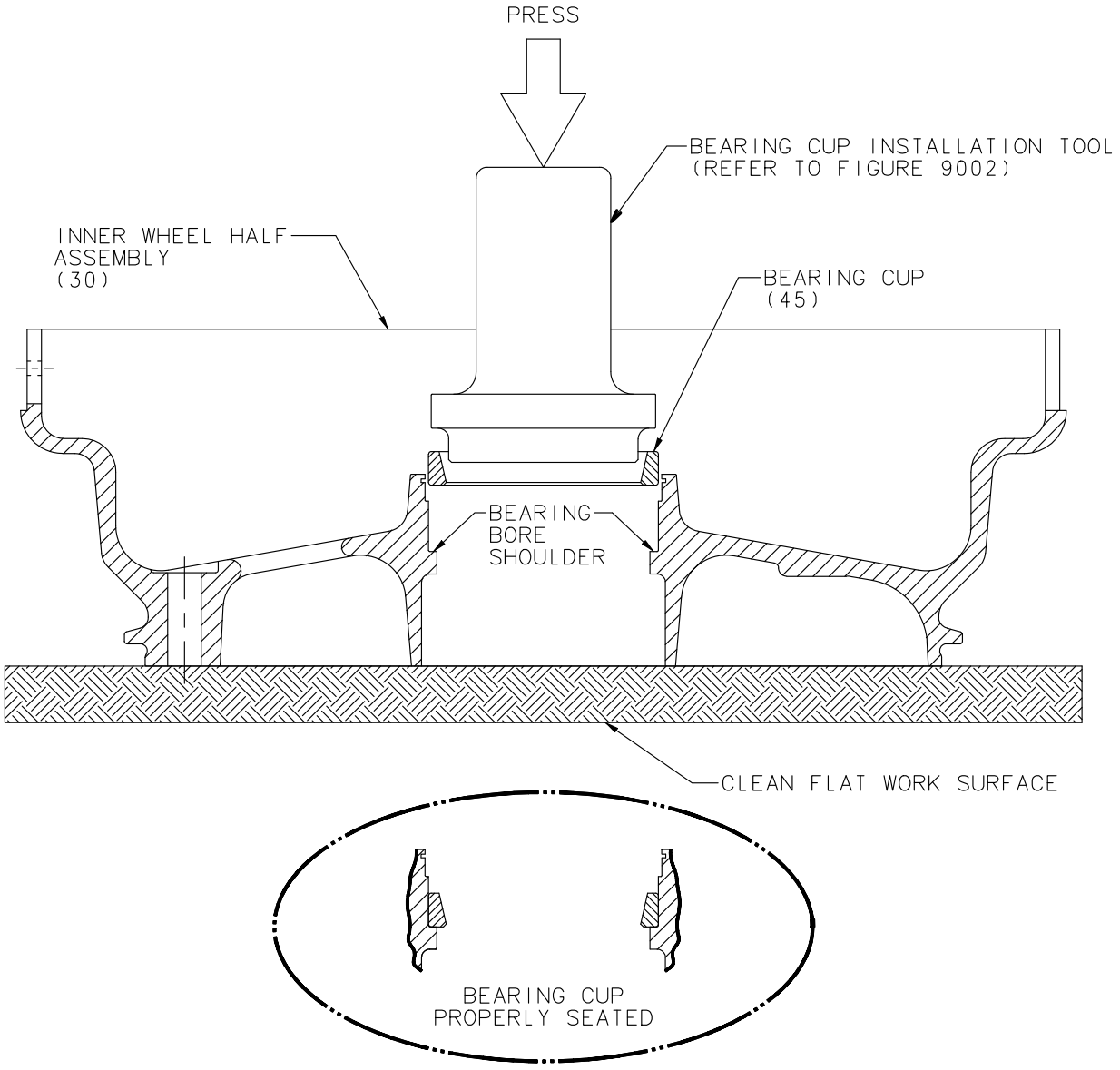
(8) Repeat steps (1) through (7) for remaining wheel half.

REPAIR



Bearing Cup Removal
Figure 6004

REPAIR



Bearing Cup Installation
Figure 6005

ASSEMBLY

1. General

Assembly of the main wheel is essentially the reverse of the disassembly procedures described in this manual.

A. Assembly Equipment and Materials. Refer to Table 7001.

NOTE: Equivalent substitutes may be used for items listed.

Table 7001
Assembly Equipment and Materials List

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
55 O-ring Lubricant	Silicone-Based Lubricant	MIL-G-4343	Dow Corning Corp.
Mobil Aviation Grease SHC100	Lubricating Grease	N/A	Exxon-Mobil Oil Co. Aviation Lubricants
L-P 250	Anti-Seize Compound	MIL-T-5544	Armite Laboratories
N/A	Isopropyl Alcohol	N/A	Commercial Source
N/A	Cleaning Cloths	Lint Free	Commercial Source
N/A	Rubber Cleaner	N/A	Commercial Source
199-18	Preformed Installation Extraction Tool Set	N/A	Parker Hannifin Corp. Aircraft Wheel & Brake
N/A	Socket Set with Assorted Wrenches	12 pt. External Drive and Hex Head, Inch	Commercial Source
N/A	Torque Gage	0 to 400 in-lb capacity (0 to 45.20 N-m)	Commercial Source

ASSEMBLY

B. Assemble Main Wheel Assembly (Refer to IPL, Figure 1)

Assemble the wheel on a clean, flat work surface being careful not to nick, scratch or damage the protective finish or wheel halves.

(1) Apply Dow 55 O-ring lubricant to rubber grommet of air valve assembly (80) and install air valve assembly (80) in outer wheel half (35). Torque hex nut to 35 to 45 in-lb (3.95 to 5.08 N-m).

(2) If removed, install the bearing cups (50) now per paragraph 1.G. of REPAIR section.

(3) New drive keys (40), if required, should be installed now.

(a) Fasten each drive key (40) to the flange of the inner wheel half (35) using one screw (45) for each drive key.

(b) Torque to 30 to 35 in-lb (3.29 to 3.95 N-m) and safety wire with MS20995C32 lockwire. Follow MS33540, general practices for lockwiring.

(4) Inner (30) and outer (55) wheel half assemblies are now assembled.

(5) Place inner wheel half assembly (30) on clean, flat work surface with flange side down. Clean wheel flange, bead seat register and packing groove with a clean cloth dampened with isopropyl alcohol.

CAUTION: THE O-RING (25) MUST SEAT UNIFORMILY WITHOUT STRETCHING OR TWISTING.

(6) Lubricate wheel register O-ring (25) with Dow 55 O-ring lubricant and install in wheel register groove of inner wheel half assembly (30).

NOTE: It is recommended that a new O-ring be installed at each overhaul or tire change.

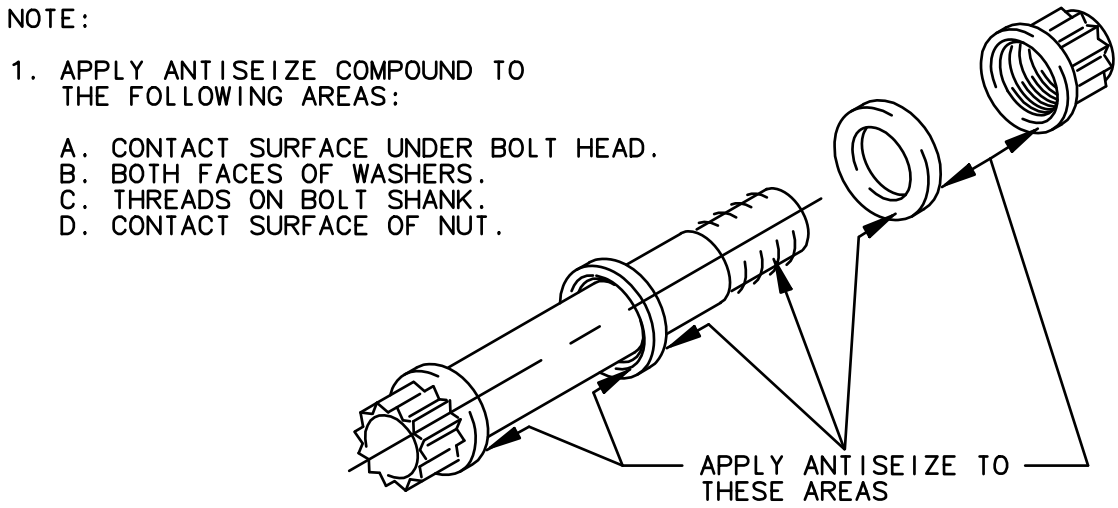
(7) Place serviceable 17.5 x 6.25-6, 10 PR tubeless tire over outer wheel half assembly (55) aligning the Red balancing dot on the tire adjacent to the air valve assembly (80).

NOTE: If tire beads are coated with a talc compound, wipe clean using a commercially available rubber cleaner. Removing talc will minimize tire slippage on wheel.

(8) Position the inner wheel half assembly (30) in the tire so that the bolt holes in both wheel halves are aligned.

ASSEMBLY

(9) Prior to installing mounting hardware, lubricate bolt (5) and nut (15) threads and bearing surfaces of bolt heads, washers (10) and nuts with anti-sieze compound, per MIL-T-5544. Refer to Figure 7001.



Lubricating Mounting Hardware
Figure 7001

(10) Slide a countersunk washer (10) onto each bolt.

NOTE: Ensure that the countersunk side of washer mates against the bolt head.

CAUTION: DO NOT USE IMPACT OR POWER WRENCHES TO INSTALL WHEEL NUTS AND BOLTS.

(11) Insert a bolt (5) [with washer (10)] into the inner wheel half assembly (30). Compress the wheel halves together and install a flat washer (20) and nut (15) onto each of the eight bolts (8), thus fastening the wheel half assemblies together.

NOTE: The nuts (15) should be located on the outer wheel half assembly (55) side.

ASSEMBLY

(12) Final torque nuts (15) to 290 to 300 in-lb (32.77 to 33.90 N-m).

NOTE: Torque nuts in a criss-cross pattern.

NOTE: A stripe of paint or inspector torque seal should be painted on the nuts and bolts (after final torquing) such that any rotation of the nuts relative to the bolts will be indicated by a broken stripe.

SAFETY WARNING:  INFLATION OF THE TIRE CAN BE EXTREMELY DANGEROUS AND IT IS RECOMMENDED THAT INFLATION BE PERFORMED IN AN INFLATION CAGE TO PREVENT INJURY TO PERSONNEL FROM POSSIBLE EXPLOSION.

WARNING: DO NOT INFLATE TIRE TO FULL OPERATING PRESSURE UNTIL THE WHEEL ASSEMBLY HAS BEEN MOUNTED ON AIRCRAFT.

(13) Place the wheel/tire assembly in an inflation cage for initial inflation. Inflate tire to tire manufacturer's specifications to seat the beads on wheel. Reduce tire pressure to recommended storage pressure (10 psig) and remove wheel/tire assembly from inflation cage.

(14) Pack bearing cones (65) with clean bearing grease (refer to Table 7001).

(15) Install inboard bearing cone (65), into the wheel assembly.

(16) Install outboard bearing cone (65), into the wheel assembly.

(17) Install main wheel assembly onto aircraft per airframe manufacturer's instructions.

(18) Inflate tire to airframe manufacturer's recommended inflation pressure.

FITS AND CLEARANCES

1. General

A. Assembly Wear Limits (Refer to IPL, Figure 1)

Table 8001 gives the in-service wear limits for the component parts of the wheel assembly. You must replace all components that are not within specified limits. Refer to the appropriate paragraphs in INSPECTION / CHECK section for more data.

Table 8001
Service Wear Limits

PART NAME (IPL, ITEM NO.)	FIG AND DIMENSION REFERENCE	WORN AREA DESCRIPTION	WORN DIMENSION inches (mm)
Drive Key (40)	5001, A	Drive Key Thickness	.060 in. minimum (1.524 mm)

B. Assembly Torque Values (Refer to IPL, Figure 1)

Table 8002 provides the assembly torque values for the component parts of the wheel assembly.

NOTE: All torque values listed are considered to be “DRY TORQUE” values unless “LUBTORK” is specified. When LUBTORK is specified, apply anti-seize compound per MIL-T-5544 to all friction surfaces as shown in Figure 7001, ASSEMBLY section.

Table 8002
Assembly Hardware Torque Values

PART NAME (IPL, ITEM NO.)	TORQUE LIMITS in-lb or ft-lb (N-m)
Nuts (15)	Lubtork 290 to 300 in-lb (32.77 to 33.90 N-m)
Hex Nut (80) (Air Valve Assembly)	35 to 45 in-lb (3.95 to 5.08 N-m)
Screw (45) (attachment of drive key)	30 to 35 in-lb (3.29 to 3.95 N-m)

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES

1. General

This section identifies the special tools, fixtures, equipment and consumables necessary to repair, maintain, and do tests on the main brake assembly. Special tools necessary to perform the requirements of this manual are shown in Table 9001. The materials (consumables list) necessary are shown in Table 9002.

NOTE: Equivalent substitutes may be used for items listed.

A. Special Tools, Fixtures and Equipment. Refer to Table 9001.

Table 9001
Special Tools, Fixtures and Equipment

PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Inflation Cage	N/A	Commercial Source
N/A	Tire Pressure Gage	N/A	Commercial Source
N/A	Torque Gage	0 to 400 in-lb capacity (0 to 45.20 N-m)	Commercial Source
199-18	Preformed Packing Extraction Tool Set	N/A	Parker Hannifin Corp. Aircraft Wheel & Brake
N/A	Socket Set with Assorted Wrenches	12 pt. External Drive and Hex Head	Commercial Source
N/A	Portable Tire Bead Breaker	N/A	Commercial Source
N/A	Plastic Media Stripping Equipment	N/A	Commercial Source
N/A	Sub-Zero Freezer (Alternate for Dry Ice)	-30°F to -60°F (-34.4°C to -51.1°C)	Commercial Source
N/A	Oven	250°F capacity (121°C)	Commercial Source
N/A	Paint Application Equipment	N/A	Commercial source
N/A	Removal Tool, Bearing Cup	Per Figure 9001 SPECIAL TOOLS…..	N/A
N/A	Installation Tool, Bearing Cup	Per Figure 9002 SPECIAL TOOLS…..	N/A
N/A	Arbor Press	N/A	Commercial Source

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES

B. Consumables List. Refer to Table 9002.

Table 9002
Consumables List

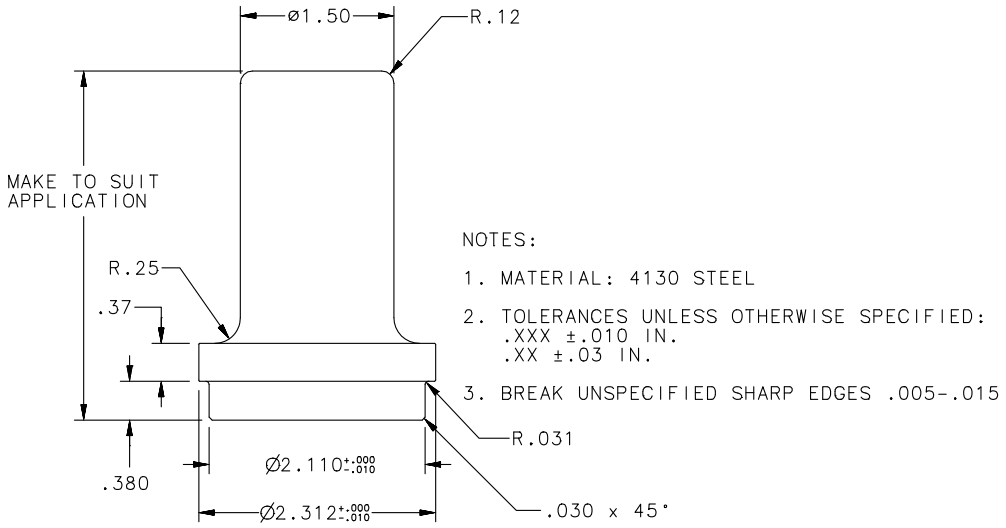
PART NUMBER	NOMENCLATURE	SPECIFICATION	SOURCE OF SUPPLY
N/A	Magnetic Particle Inspection Kit	ASTM E1444	Commercial Source
N/A	Fluorescent Penetrant Inspection Kit	MIL-STD-6866, Type 1, Method A, Sensitivity Level 2	Commercial Source
N/A	Aluminum Oxide Cloth	400 Grit or Finer Wet or Dry	Commercial Source
N/A	Plastic Media, Acrylic	MIL-P-85891, Type V	U.S. Technology Corp.
N/A	Corrosion Preventative Alodine 1200 or Equiv.	MIL-C-5541, Class 1A	Commercial source
11-347Z	Primer Coating	N/A	Columbia Paint Corp.
11-358A	Finish Coating	N/A	Columbia Paint Corp.
55 O-ring Lube	Silicon-Based Lubricant	MIL-G-4343	Dow Corning Corp.
Mobil Aviation Grease SHC100	Lubricating Grease	N/A	Exxon-Mobil Oil Co. Aviation Lubricants
L-P 250	Anti-Seize Compound	MIL-T-5544	Armite Laboratories
N/A	Isopropyl Alcohol	N/A	Commercial Source
N/A	Rubber Cleaner	N/A	Commercial Source
N/A	Soap Solution	N/A	Commercial Source
N/A	Air Supply, Compressed Dry Filtered	30 psig maximum	N/A
N/A	Cleaning Cloths	Lint Free	Commercial Source
N/A	Dry Ice (Alternate for Sub-Zero Freezer)	N/A	Commercial Source
N/A	Brushes	Soft Bristled	Commercial Source
N/A	Solvent, Stoddard Type 1	P-D-680	Commercial Source
N/A	Cleaner/Degreaser	AMS 1526	Commercial Source
N/A	Isopropyl Alcohol	N/A	Commercial Source

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES

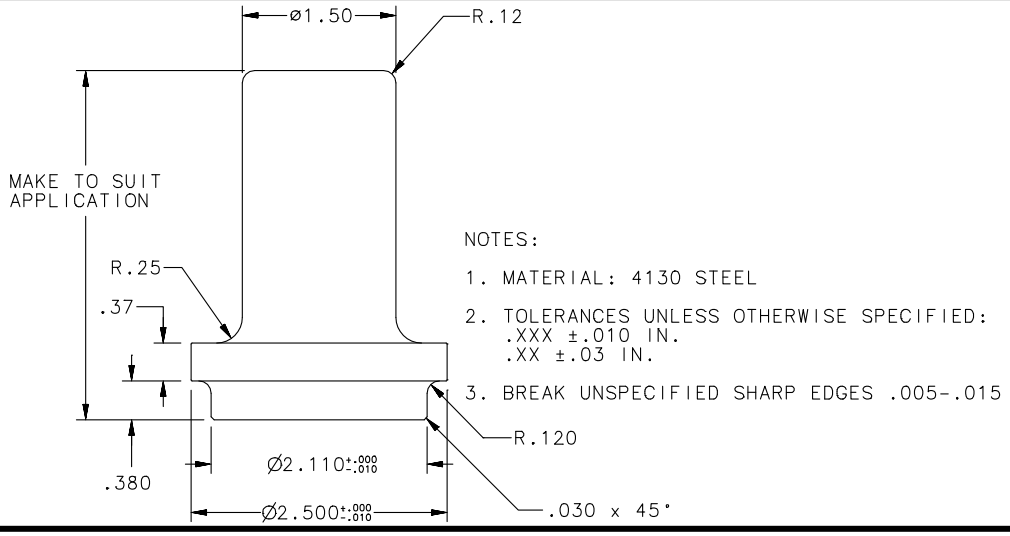
C. List of Manufacturers and Vendors

Name	Address
Parker Hannifin Corporation Aircraft Wheel & Brake	1160 Center Rd. Avon, OH 44011 U.S.A.
U.S. Technology Corporation	220-T 7th Street S.E. Canton, OH 44702 U.S.A.
Columbia Paint Corp.	641 Jackson Avenue Huntington, WV 25728 U.S.A.
Dow Corning Corporation	2030 Dow Center Midland, MI 48674 U.S.A.
Exxon-Mobil Oil Company Aviation Lubricants	3225 Gallows Road Fairfax, VA 22037 U.S.A.
Armite Laboratories	1845 Randolph Street Los Angeles, CA 90001 U.S.A.

SPECIAL TOOLS, FIXTURES, EQUIPMENT AND CONSUMABLES



Bearing Cup Removal Tool
Figure 9001



Bearing Cup Installation Tool
Figure 9002

ILLUSTRATED PARTS LIST

1. General

The illustrated parts list describes and illustrates the detail parts of the Main Wheel Assembly.

All parts of the equipment are listed, except parts which lose their identities by being permanently fastened to other parts of assemblies and are not subject to disassembly.

A. Explanation of Columns

(1) Figure/Item column: The figure and item numbers key the parts breakdown list to the applicable illustration. The first number represents the figure number of the illustration. The item numbers are arranged in sequence and generally reflect the order of disassembly.

(2) Part Number column: This column contains the assigned Parker Hannifin Aircraft Wheel and Brake part number for the individual item.

(3) Airline Stock Number column: This column contains the Airline Stock Number when applicable.

(4) Nomenclature column: This column identifies the parts being listed by noun name followed by modifiers when applicable. The indenture system used in the parts list shows the relationship of the parts to their subassemblies and to the assembly:

1 2 3 4
Assembly
Attaching Parts for Assembly
Detailed Parts for Assembly
Subassembly
Attaching Parts for Subassembly
Detailed Parts for Subassembly

(5) Effectivity column: An effectivity code shows the difference in parts within various configurations. The effectivity code is used for more than one configuration of the basic part number. Effectivity codes only apply to the figure in which they are used.

(6) Units Per Assembly column: This column indicates the total number required per assembly or per subassembly as applicable. These abbreviations may appear in the Units Per Assembly column:

AR..... As Required (for bulk items)
NP..... Item is Nonprocurable (listed for reference only)
RF..... Reference (item listed for reference only)

ILLUSTRATED PARTS LIST

B. Part Numbering System

Parker Hannifin Aircraft Wheel & Brake has assigned a part number to all purchased and government standard off-the-shelf parts. They are defined and used as follows:

When a purchased part is listed, the assigned Parker Hannifin AWB part number shall be used in the part number column. 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 nomenclature. The federal supply code will be preceded by the letter "V".

Unless otherwise specified by contract, all government standard off-the-shelf parts (such as MS, AN, NAS, etc.) will be identified by the assigned Parker Hannifin AWB part number which will be used in the part number column.

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 in the part number column is replaced by and is not interchangeable with the item number shown in the notation.
Supersedes	SUPSDS	The part in the part number column replaces and is not interchangeable with the item number shown in the notation.
Replaced by	REPLD BY	The part in the part number column is replaced by and interchangeable with the item number shown in the notation.
Replaces	REPLS	The part in the part number column replaces and is interchangeable with the item number shown in the notation.
Vendor	V	Federal Supply Code for vendors.

ILLUSTRATED PARTS LIST

D. Items Not Illustrated

Items not illustrated are indicated by a dash (-) ahead of the item number in the Figure/Item number column.

E. 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.

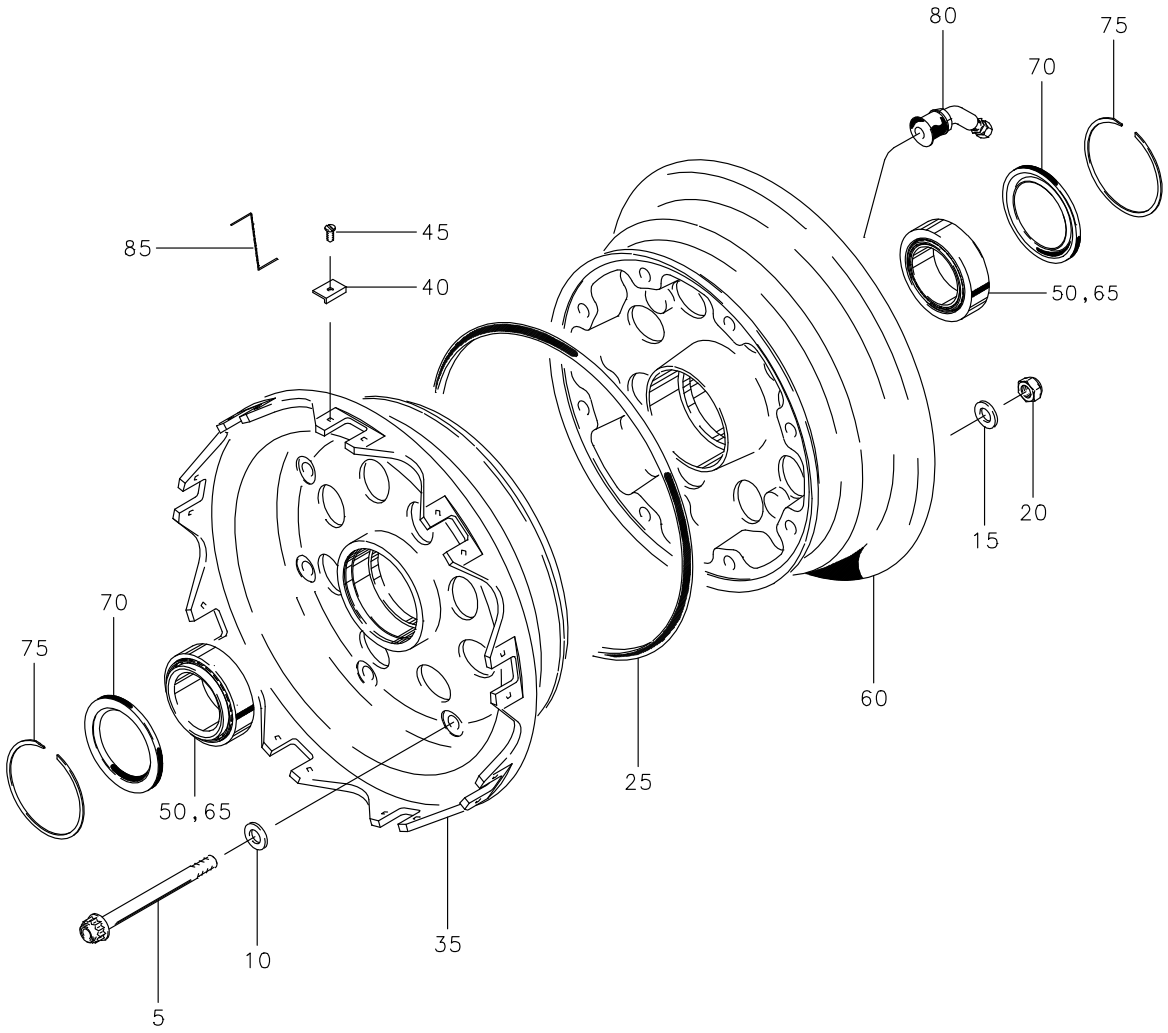
2. Optional Vendor Index

Not applicable.

3. Federal Supply Code for Manufacturers

Not applicable.

ILLUSTRATED PARTS LIST



Main Wheel Assembly
IPL Figure 1

ILLUSTRATED PARTS LIST

4. Detailed Parts List

FIG. ITEM	PART NUMBER	AIRLINE STOCK NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY.
1 - 1	040-20300		MAIN WHEEL ASSEMBLY		RF
			ATTACHING PARTS		
5	103-31200		BOLT, EXTERNAL WRENCHING		8
10	095-03100		WASHER, SINGLE COUNTERSUNK		8
15	095-10600		WASHER, FLAT		8
20	094-91500		NUT, SELF-LOCKING		8
			TTT		
25	101-25800		. O-RING		1
– 30	161-12400		. ASSEMBLY, WHEEL HALF, INBOARD		1
35	151-11900		. . WHEEL HALF, INBOARD		NP
40	205-00700		. . KEY, DRIVE		18
45	102-07700		. . SCREW		18
50	214-00100		. . CUP, BEARING		1
– 55	162-11400		. ASSEMBLY, WHEEL HALF, OUTBOARD		1
60	152-11800		. . WHEEL HALF, OUTBOARD		NP
50	214-00100		. . CUP, BEARING		1
65	214-00200		. CONE, BEARING		2
70	154-03600		. SEAL, GREASE		2
75	155-00100		. RING, SNAP		2
80	160-01200		. VALVE, AIR, ASSEMBLY		1
85	MS20995C32		. LOCKWIRE		AR

– Item Not Illustrated

STORAGE

1. General

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.

A. General

(1) Plug or cover bearing hub area during storage to prevent contamination.

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 rubber components. The usable life may be shortened by exposure to sunlight, extrememe temperatures, and low humidity; contamination by fluids; severe operating conditions, etc.

(2) The wheel assembly should be stored in a clean, dry storeroom. The desirable storeroom temperature range is from 50° to 77°F (10° to 25°C). 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 (68.9 kPa).

B. Wheels Stored Without Tires Installed

(1) Short-term storage of tubeless wheel assemblies may be stored with the wheel O-ring packing installed between the two halves.

(2) Storage of components containing rubber for longer than two years should be assembled without the rubber based components. Those rubber based components, e.g., O-ring packings, molded rubber grease seals, etc., are to be placed in an ultraviolet protective package.

(3) Wheels stored without rubber components installed have an indefinite storage life.

CERTIFICADO SUPLEMENTAR DE TIPO

(Supplemental Type Certificate)

NÚMERO (Number) **2013S02-15**

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

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

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

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

Produto Original - Número do Certificado de Tipo: (Original Product – Type Certificate No:) A24CE (FAA)

Fabricante: (Manufacturer:) Hawker Beechcraft Corporation.

Modelo(s): (Model(s):) 200, 200T, B200, B200T, B200GT and B200CGT.

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

Replace existing Main Wheel and Brakes by installing Parker Hannifin Conversion Kit 199-125, Rev. T, dated 12 Apr. 2011, per Installation Manual, Rev. L, dated 21 Jan. 2010, and installation Drawing 50-90, Rev. K, dated 21 Jan. 2010 or later revisions; and/or replace existing Nose Wheel by installing Parker Hannifin Conversion Kit 199-126, Rev. M, dated 31 July 2011, per Installation Manual, Rev. H, dated 25 July 2011, and installation Drawing 50-91, Rev. J, dated 25 July 2011 or later revisions.

This CST validates in Brazil the STC # SA757GL, issued by FAA (USA).

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

See continuation sheet for applicable data.

DATAS:
(Dates of:)

Do Requerimento: (Application:) 06 Dec. 2012 **Da emissão**: (Issuance:) 26 Feb. 2013 **Da reemissão**: (Reissuance:) **Da emenda**: (Amendment:)

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

DINO ISHIKURA
Superintendente de Aeronavegabilidade
(Airworthiness Superintendent)

ANAC
AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

Folha de Continuação ao
(Continuation Sheet to)

CERTIFICADO SUPLEMENTAR DE TIPO

(Supplemental Type Certificate)

NÚMERO **2013S02-15**
(Number)

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

I. The approval of this type design change should not be extended to other aircraft of this model on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in Type Design, will introduce no adverse effect upon the airworthiness of that aircraft.

II. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

III. These modifications are approved for individual or joint installation on specified models equipped with landing gear that support 10 inches high floatation equipment.

IV. A copy of this Certificate shall be maintained as part of the permanent records of the modified aircraft.

----------END----------

CERTIFICADO SUPLEMENTAR DE TIPO

(Supplemental Type Certificate)

NÚMERO (Number) **2014S04-27**

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

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

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

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

Produto Original - Número do Certificado de Tipo: (Original Product – Type Certificate No:) A31CE (FAA).

Fabricante: (Manufacturer:) Beechcraft Cooporation

Modelo(s): (Model(s):) F90

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

Installation of Cleveland Main Wheels and Brakes in accordance with Parker Hannifin Conversion Kit Parts List No. 199-125, Rev. U, dated 04 Apr. 2013, or later approved revisions.

This CST validates in Brazil the STC No. SA1510GL, issued by FAA (USA).

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

See continuation sheet for applicable data.

DATAS:
(Dates of:)

Do Requerimento: (Application:) 08 Jan. 2014 **Da emissão**: (Issuance:) 30 Apr. 2014 **Da reemissão**: (Reissuance:) **Da emenda**: (Amendment:)

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

DINO ISHIKURA
Superintendente de Aeronavegabilidade
(Airworthiness Superintendent)

ANAC
AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

Folha de Continuação ao
(Continuation Sheet to)

CERTIFICADO SUPLEMENTAR DE TIPO

(Supplemental Type Certificate)

NÚMERO **2014S04-27**
(Number)

LIMITAÇÕES E CONDIÇÕES:
(Limitations and Conditions:)

I. The approval of this type design change should not be extended to other aircraft of these models on which other previously approved modifications are incorporated unless it is determined by the installer that the relationship between this change and any of those other previously approved modifications, including changes in Type Design, will introduce no adverse effect upon the airworthiness of that aircraft.

II. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

III. A copy of this Certificate shall be maintained as part of the permanent records of the modified aircraft.

----------END----------

European Aviation Safety Agency

SUPPLEMENTAL TYPE CERTIFICATE

10048423

This Supplemental Type Certificate is issued by EASA, acting in accordance with Regulation (EC) No. 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation and in accordance with Commission Regulation (EU) No. 748/2012 to

PARKER HANNIFIN CORPORATION
AIRCRAFT WHEEL & BRAKE DIVISION

1160 CENTER ROAD
AVON OH 44011
USA

and certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable Type Certification Basis and environmental protection requirements when operated within the conditions and limitations specified below:

Original Type Certificate Number : 1. FAA A24CE
Original Type Certificate Number : 2. EASA.IM.A.277
Type Certificate Holder : BEECHCRAFT CORPORATION
Type Design - Model : 1. 200, 200C, 200CT, 200T
Type Design - Model : 2. B200, B200C, B200CT,
Type Design - Model : 2. B200T, B200GT, B200CGT.
Original STC Number : FAA SA757GL

Description of Design Change:
Replacement of Main Wheels & Brakes and/or Nose Wheel.

EASA Certification Basis:
The Certification Basis (CB) for the original product remains applicable to this certificate/ approval. The requirements for environmental protection and the associated certified noise and/ or emissions levels of the original product are unchanged and remain applicable to this certificate/ approval.

See Continuation Sheet(s)

For the European Aviation Safety Agency,

Date of issue: 10 March 2014

European Aviation Safety Agency
Michael Düsing
Project Certification Manager

Note:
The following numbers are listed on the certificate:
EASA current Project Number: 0010027435-001

Associated Technical Documentation:
nstallation of Main Wheel and Brakes in accordance with Parker Hannifin Conversion kit 199-125 Rev R, dated September 07, 2010, per Installation Manual, Rev L, dated January 21, 2010, and Installation Drawing 50-90, Rev K, dated January 21, 2010, and/or:-

Installation of Nose Wheel in accordance with Parker Hannifin Conversion kit 199-126 Rev L, dated September 07, 2010, per Installation Manual, Rev G, dated January 21, 2010, and Installation Drawing 50-91, Rev H, dated January 21, 2010.

or later revisions of the above listed documents approved by EASA in accordance with EASA ED Decision 2004/04/CF (or subsequent revisions of this decision) and/ or the Technical Implementation Procedures of EU/ USA Bilateral Agreement.

Limitations/Conditions:
These modifications are approved for individual or joint installation on specified models that are equipped with landing gear that support 10 inch High Floatation equipment.

Prior to installation of this design change it must be determined that the interrelationship between this design change and any other previously installed design change and/ or repair will introduce no adverse effect upon the airworthiness of the product.

- end -

Note:
The following numbers are listed on the certificate:
EASA current Project Number: 0010027435-001

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

Date: _ _/_ _/20_ _

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

To whom it may concern:

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

KIT NUMBER: 199-_____

FAA APPROVAL: 1) STC # _____

NO OTHER APPROVALS NECESSARY

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

A/C MAKE: _____

A/C MODEL_____

TAIL # _____

Regards,

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

United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA1509GL

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

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 23 *of the* Federal Aviation *Regulations.* See Type Certificate Data Sheet No. A14CE for complete certification basis.

Original Product — Type Certificate Number A14CE
Make Beech
Model 99, 99A, A99A, B99, C99, 100, A100, B100

Description of Type Design Change

Installation of Cleveland Main Wheels and Brakes in accordance with Parker Hannifin Conversion Kit Parts List 199-125, Revision C, dated January 28, 1988, or later FAA Approved revision.

Limitations and Conditions

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

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

Date of application December 22, 1988 *Date reissued*

Date of issuance August 16, 1990 *Date amended*

By direction of the Administrator

Donald P. Michal
(Signature)
Donald P. Michal, Manager
Chicago Aircraft Certification Office
(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

FAA Form 8110-2 (10-68)

United States of America

Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

Number SA1510GL

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

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 23 *of the* Federal Aviation *Regulations:* See Type Certificate Data Sheet No. A31CE for complete certification basis.

Original Product—Type Certificate Number A31CE
Make Beech
Model F90

Description of Type Design Change

Installation of Cleveland Main Wheels and Brakes in accordance with Parker Hannifin Conversion Kit Parts List 199-125, Revision C, dated January 28, 1988, or later FAA Approved revision.

Limitations and Conditions

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

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

Date of application December 22, 1988

Date of issuance August 16, 1990

Date reissued

Date amended

By direction of the Administrator

Donald P. Michal
(Signature)
Donald P. Michal, Manager
Chicago Aircraft Certification Office

(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

FAA Form 8110-2 (10-68)

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

Number SA757GL

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.*
See Type Certificate Data Sheet No. A24CE for complete certification basis.

Original Product—Type Certificate Number: A24CE

Make: Hawker Beechcraft Corporation

Model: 200, 200C, 200CT, 200T, B200, B200C, B200CT, B200T, B200GT, B200CGT

Description of Type Design Change:
Replace existing Main Wheel and Brakes by installing Parker Hannifin Conversion Kit 199-125, revision R, dated September 07, 2010 per Installation Manual, revision L, dated January 21, 2010, and Installation Drawing 50-90, revision K, dated January 21, 2010, or later FAA-approved revisions; and/or replace existing Nose Wheel by installing Parker Hannifin Conversion Kit 199-126, revision L, dated September 07, 2010, per Installation Manual, revision G, dated January 21, 2010, and Installation Drawing 50-91, revision H, dated January 21, 2010, or later FAA-approved revisions.

Limitations and Conditions:

1) These modifications are approved for individual or joint installation on specified models equipped with landing gear that support 10 inch high floatation equipment.
2) The installer must determine whether this design change is compatible with previously approved modifications.
3) If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

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: January 19, 1984

Date of issuance: May 1, 1984

Date reissued: February 25, 2011

Date amended: January 27, 2011

By direction of the Administrator

Steven L. Lardinois

(*Signature*)

Steven L. Lardinois
Manager, Systems and Flight Test Branch
Chicago Aircraft Certification Office

(*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.