

AIRCRAFT WHEEL & BRAKE DIVISION
PARKER HANNIFIN CORPORATION
AVON, OHIO

PARTS LIST

199-175 CONVERSION KIT

LEARJET MODELS 24, 25, 35, 35A, 36, 36A, & 55

<u>PART NUMBER</u>	<u>DRAWING REVISION</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
40-212	Rev. D dated 03-09-2007	Nose Wheel Assembly	1

Publication Package (P/N PP199-17500)

199-175 P/L	-----	Kit Parts List (This document)
50-135	Rev. NC dated 06-06-1989	Installation Drawing
CM40-212	Rev. C dated 02-01-1997	Component Maintenance Manual
SA1459GL	Issue date 03-14-1990	Supplemental Type Certificate
	-----	Warranty Registration Card

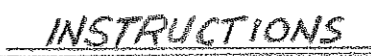
NOTES:

1. This kit will convert one aircraft to Cleveland Nose Wheel.

199-175	06-06-1989 (296-86)
REV. NC	03-27-1990 (299-93)
REV. A	02-01-1997 (0323-90)
REV. B	11-27-2007 (0377-48)
REV. C	

VIEW "A"

SECTION "B"



1. PROPERLY JACK PER MANUAL AS REQUIRED TO REMOVE NOSE WHEEL.
2. COMPLETELY DEFLATE NOSE WHEEL TIRE, THEN REMOVE & RETAIN AXLE NUT, LOCKING WASHER, OUTER SPACER AND O-RING.
3. SLIDE WHEEL FROM AXLE, THEN REMOVE AND RETAIN INNER SPACER & O-RINGS.

NOTE: FOR THIS APPLICATION, 67-88 AXLE SPACERS SUPPLIED WITH 40-212 WHEEL, ARE NOT USED AND MUST BE REMOVED FROM 40-212 WHEEL PRIOR TO INSTALLATION.

- NOTE: AT THIS TIME NOSE WHEEL MAY BE BALANCED IF DESIRED, USING CLEVELAND BALANCE WEIGHT KIT 199-135 PER SECTION 1.5 OF ENCLOSED MAINTENANCE MANUAL

7. TIGHTEN AXLE NUT TO 150-200 IN-LBS OF TORQUE WHILE ROTATING THE WHEEL. BACK OFF AXLE NUT TO ZERO TORQUE, THEN RETORQUE TO 40 IN-LBS WHILE ROTATING THE TIRE. BEND LOCK TAB OF LOCKING WASHER AGAINST CORRESPONDING AXLE NUT HEX FLAT AS REQUIRED TO LOCK AXLE NUT IN PLACE.

9. REMOVE AIRCRAFT FROM JACKS

10. WEIGHT AND BALANCE:
40-212 NOSE WHEEL ASSY. --- 10.90 LBS.
WEIGH ORIGINAL WHEEL AND RECORD ANY SIGNIFICANT CHANGE IN
WEIGHT PER ENTRY TO AIRCRAFT WEIGHT AND BALANCE LOG.

11. MAKE LOG BOOK ENTRY REFLECTING THIS ACTIVITY. FILL OUT ENCLOSED WARRANTY REGISTRATION CARD AND RETURN TO PARKER - HANNIFIN, AWB DIVISION. RETURN AIRCRAFT TO SERVICE.

AIRCRAFT APPLICABILITY
199-175 CONVERSION KIT

⚠ NOTE: NOT APPLICABLE TO CERTAIN MODEL 35 AND 36 EQUIPPED WITH OPTIONAL NOSE WHEEL SPIN-UP SYSTEM.

QTY QXTY ITEM			PART NO.			DESCRIPTION			MATERIAL & SPEC.			HEAT TREAT & SPEC.			FINISH & SPEC.			WGT.											
NEXT ASSEMBLY 199-175						QTY FINAL ASSEMBLY 1						PATTERN, CASTING OR BLANK NO.						DRAWN BY AC 06/14						Cleveland Wheels & Brakes Aircraft Wheel and Brake Division Parker Hannifin Corporation 1150 Center Road Avon, Ohio 44011 Parker					
THIS DESIGN IS THE PROPERTY OF PARKER HANIFFIN CORP. AIRCRAFT WHEEL AND BRAKE DIVISION AND IS NOT TO BE COPIED, DUPLICATED, OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF EQUIPMENT WITHOUT OUR WRITTEN PERMISSION.						ZYGLO PER MIL-L-8686 STAMP P ON PART MAGNAFLUX PER MIL-L-1668B STAMP M ON PART ✓ MACHINED SURFACES PER MIL STD 10 UNLESS OTHERWISE NOTED UNLESS NOTED ALL DIMENSIONS ARE IN INCHES 1742						WORK TO DIMENSIONS - NO SCALE TOLERANCE FOR XXX ± .010 TOLERANCE FOR ANGULAR DIMS ± .125° TOLERANCE FOR ANGLE DIMS ± .000 BREAK SHARP EDGES .010 UNLESS NOTED REMOVE ALL BURRS BEFORE PLATING DRILL TURNING PROCEDURE NO. 114.						CHECKED BY SCALE 1/2" = 1" INSTALLATION DRAWING FOR 199-175 CONVERSION KIT											
																		50135											

**CLEVELAND WHEELS & BRAKES
CM40-212
COMPONENT MAINTENANCE MANUAL
WITH ILLUSTRATED PARTS LIST
FOR
NOSE WHEEL ASSEMBLY
MODEL 40-212**

Cleveland

Wheels & Brakes



Aerospace

PARKER HANNIFIN CORPORATION - AIRCRAFT WHEEL & BRAKE
1160 Center Road - Avon, Ohio 44011 - Customer Service 1-800-Braking

Revision A, dated March 19, 1985

DCN Number N/A

Highlights

Revision A contains only revised pages of the manual. Pages which have been added or revised are outlined below with a description of change.

Please retain all **Highlights** pages, inserting them into the manual for future reference

<u>Page No.</u>	<u>Description of Change</u>
9	Revised Section 1.5; 199-135 was 1\99-111 Changed to allow alternate balancing methods & weights
10	Figure 2...199-135 was 199-111
11	Added note for allowing a single ½ ounce weight on one side of wheel

Revision B, dated June 6, 1989

DCN Number N/A

Highlights

Revision B contains only revised pages of the manual. Pages which have been added or revised are outlined below with a description of change.

Please retain all **Highlights** pages, inserting them into the manual for future reference

<u>Page No.</u>	<u>Description of Change</u>
Title Page	Added LearJet Model Applicability

Revision C, dated February 1, 1997
DCN Number 0319-60

Highlights

Revision C contains all pages of the manual. Pages which have been added or revised are outlined below with a description of change.

Please retain all **Highlights** pages, inserting them into the manual for future reference

<u>Page No.</u>	<u>Description of Change</u>
All	Reformatted all pages, and renamed from "Maintenance Procedure" to "Component Maintenance Manual"
Description & Operation, Page 1	Wheel Coatings (Now): " Dow No. 1 per MIL-M-3171 Paint: Per MIL-C-85285 Color: Untinted White No. 17925 per FED-STD-595 " (Was): " Dow No. 1 per MIL-C-3171 Paint: Per MIL-C-83286 Color: Gloss Grey No. 16440 per Fed. Std. 595 "
402	Retreating and Repainting Wheel Halves (Now): " MIL-M-3171 " (Was): " MIL-C-3171 " (Now): " MIL-C-85285B Type I. Color: Untinted White No. 17925 " (Was): " MIL-C-83286. Color: Gloss Grey No. 16440 "
502	Assembly (Now): "Install air valvetorque to 50 - 60 in-lbs, " (Was): "Install air valvetorque to in-lbs, "
1003	Parts List (Now): " ** 166-19700 " (Was): " 11 166-08800 " (Now): " ** 166-20000 " (Was): " 12 166-04500 " (Now): " 11 067-08800 " (Was): " 13 067-08800 "



CM40-212 COMPONENT MAINTENANCE MANUAL
FOR WHEEL ASSEMBLY 40-212

SERVICE BULLETIN LIST

Note: 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 Wheel Assembly and Components.

SERVICE BULLETIN NO.	REV NO.	DATE INCORPORATED	SERVICE BULLETIN NO	REV NO.	DATE INCORPORATED



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Highlights	and on	Feb 01/97		302	Feb 01/97
Record of	1	Feb 01/97	Check	401	Feb 01/97
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			Illustrated	1001	Feb 01/97
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				1003	Feb 01/97



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CM40-212 COMPONENT MAINTENANCE MANUAL FOR WHEEL ASSEMBLY 40-212

INTRODUCTION

This manual is published for the guidance of personnel responsible for the overhaul and/or maintenance of the Parker Hannifin 40-212 Wheel Assembly covered in this publication. The procedures outlined in this manual may be altered if better and/or more economical methods can be employed by the individual facilities. However, alternative procedures must not reduce the efficiency of operation of the assembly.

NOTE: All torque values and specified limits or values set by Parker Hannifin Engineering and contained herein must be strictly observed and not deviated from.

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 Product Support Department of the Aircraft Wheel & Brake Division at the following address or numbers:

Parker Hannifin Corporation
Aircraft Wheel & Brake Division
Attn: Product Support Dept.
1160 Center Road
Avon, Ohio 44011

Phone: (216) 937-6211
1-800-272-5464

Fax: (216) 937-5409



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TSO NOTICE

This assembly carries a "TSO C26c " marking for commercial transport usage (FAR Part 25), which identifies it as having been fully tested in the laboratory and qualified to applicable FAA (Federal Aviation Administration) requirements and specifications. After final certification, substitutions of critical parts or changes of processes or materials are not permitted without requalification of the assembly and resubmittal of the test data to the FAA for approval.

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

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.

DESCRIPTION AND OPERATION

1. Description and Operation

- A. The Nose wheel assembly is a 18 x 4.4, Type VII wheel designed for use with a 18 x 4.4, 10 ply, 210 MPH dual deflection, tubeless tire.
- B. The divided type main wheel facilitates tire installation and removal.
- C. The two wheel halves are fastened together with 8 ea. 5/16" high strength bolts, washers and self-locking nuts. The wheel halves are machined from AZ81A-T4 cast magnesium.
- D. An O-ring is installed on the outer 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.
- E. The wheel assembly rotates on two Timken duo-face tapered roller bearings. The bearings are protected by a molded type lip seal in each hub. The bearing cups are shrink-fitted into the hubs of each wheel half.
- F. To insure even tire wear, the wheel assembly should be statically balanced to within 2.0 inch-ounces of perfect balance.

2. Handling Procedures

- A. 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.
- B. Handle the wheel bearing cones with extreme care. Many bearing failures can be traced to dropping or mishandling the bearings during maintenance.
- C. Handle and maintain the wheel halves properly to protect the paint and surface finishes.



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3. Leading Particulars

Wheel Size and Type: 18 x 4.4, Type VII Tubeless.

Material: AZ81A-T4 Cast Magnesium.

Wheel Weight : 10.9 Pounds.

Wheel Bolt Nut Torque: 150 Pound-Inches Lubtork.

O-Ring Material: Nitrile, Buna N.

Bearing Lubricant: MIL -G-81322.

Wheel Coatings:

Surface Treatment: Dow No. 1 per MIL-M-3171

Primer: per MIL-P-85582B, Type I, Class C2

Paint: per MIL-C-85285B, Type I

Color: Untinted White No. 17925
per FED-STD-595

4. Maintenance

- A. Wheel maintenance shall be performed "on condition", and is limited to the replacement of parts listed in IPL, Figure 1001, plus procedures as specified in the "CLEANING", "CHECK", and "REPAIR" sections of this manual.

5. Weight & Balance Information

- A. Weight of the 40-212 wheel is 10.90 lbs. When replacing other equipment, weigh the existing nose wheel to derive the weight increase. Compute weight & balance and make appropriate revisions to the aircraft logbook.

6. Aircraft Applicability

- A. Per STC Approvals, the 40-212 nose wheel is eligible for use on the following aircraft:

Cessna Citation Models 500, 501, 550, 551 & S550

Learjet Models 24, 25, 35, 35A, 36, 36A & 55

TESTING

1. General

Test the Wheel assembly in accordance with the following procedure.
(Ref. IPL Fig. 1001)

2. Testing Procedures

- A. Clean bearing cones (4) in dry cleaning solution, specification P-D-680, and visually check roller contacting surfaces for nicks, scratches, rust, corrosion, spalling, flat spots, pitting, heat discoloration and wear. Check bearing cage for dents or distortion and for wear of sides, corners and at ends of roller pockets. Replace bearing cones having any defects.
- B. Wipe bearing cups (2) free of grease and visually check cup face for scratches, pitting, brinelling, spalling, heat discoloration, rust, corrosion and wear. Remove defective cups and install new cups per REPAIR.
- C. Visually check grease seals (Integral to Bearing Cone) for cuts and wear on rubber sealing lip. Replace Bearing Cone (4) if grease seal is damaged .
- D. Cover hub openings of wheel halves to prevent contamination of bearing lubricant.
- E. Place wheel/tire assembly in an inflation cage and inflate to recommended operating pressure.



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- F. Coat juncture around inflation valve (9) and tire beads with soap solution. Check carefully for air leaks in the form of soap bubbles. If air leaks occur around the air valve assembly, check torque on leaking part. If air leaks occur around tire bead seat, completely deflate tire and remove assembly from inflation cage. Remove tire from wheel and examine wheel bead seat and tire for damage. If wheel bead seat is scratched, nicked or pitted, repair in accordance with **REPAIR**.
- G. 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. Check pressure after an additional 24 hours. If the reduction in pressure exceeds five percent of inflation pressure, repeat Step F. All possible sources of air leakage should be rechecked, with particular attention given to all tire surfaces, the wheel bead area, air valve assembly (9), and O-Ring (10).

DISASSEMBLY

1. General

Disassemble the Wheel assembly in accordance with the following instructions after removal from aircraft (Ref. IPL Fig. 1001).

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

2. Disassembly Procedures

- A. Jack aircraft per aircraft maintenance manual until tire is clear of ground and fully deflate tire.
- B. Remove wheel from aircraft per aircraft maintenance manual. Retain all axle nuts, washers, and spacers (11), plus inner and outer wheel bearing cones (4).
- C. Assure that wheel assembly is fully deflated, and place on a clean flat surface.

NOTE: A SOAP SOLUTION AROUND THE BEAD SEAT AREA WILL USUALLY HELP IN BREAKING STUBBORN BEADS.

CAUTION: USE OF TIRE IRONS, SCREWDRIVERS, OR OTHER INSTRUMENTS USED TO PRY THE TIRE LOOSE FROM THE BEAD SEAT AREA OF THE WHEEL MAY RESULT IN PERMANENT DAMAGE TO THE WHEEL AND TIRE.

- D. Using a mallet or a portable bead breaker, break tire beads away 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.

- E. Remove nuts (8), washers (7), bolts (5) and countersunk washers (6).
- F. Separate the wheel halves and remove tire.
- G. Remove O-Ring (10) from wheel register groove of outer wheel half (3).



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NOTE: IT IS RECOMMENDED THAT A NEW O-RING BE INSTALLED AT EACH OVERHAUL.

- H. Bearing cups (2) should not be removed from the wheel halves unless replacement is required. Refer to REPAIR for removal and installation procedures.

NOTE: THE INFLATION VALVE AND THE BEARING CUPS MUST BE REMOVED IF PAINT IS TO BE STRIPPED FROM THE WHEEL HALVES.

CLEANING

1. Cleaning Materials

NOTE: EQUIVALENT SUBSTITUTES MAY BE USED FOR ITEMS LISTED BELOW	
Equipment/Material	Supplier
Dry Cleaning Solution Specification P-D-680 Stoddard Solvent	Commercially Available
Isopropyl Alcohol	Commercially Available
Soft Bristle Brush	Commercially Available
Clean Wiping Cloth	Commercially Available

2. Cleaning Nose Wheel on Aircraft

- A. The wheel can be cleaned while on the aircraft with either steam, hot water, or commercially available solvent. Avoid high pressure contact of liquid to bearing seal and hub area of the wheel.

WARNING: CLEANING SOLUTIONS SHOULD BE USED IN A WELL VENTILATED AREA. AVOID PROLONGED INHALATION OF FUMES.

- B. A soft bristle brush may be used to remove hardened grease, dust or dirt that has accumulated.
- C. Immediately after cleaning, dry wheels thoroughly using a clean wiping cloth, or dry, filtered compressed air.

3. Cleaning Nose Wheel Disassembled for Tire Change

WARNING: CLEANING SOLUTIONS SHOULD BE USED IN A WELL VENTILATED AREA. AVOID PROLONGED INHALATION OF FUMES.

- A. Clean all metal parts by immersing in dry cleaning solution conforming to specification P-D-680. Use a soft bristle brush to remove hardened grease, dust, and dirt.

CAUTION: CLEAN BEARING CONES (4) CAREFULLY IN A SEPARATE CONTAINER OF CLEAN SOLVENT TO AVOID CONTAMINATION.

- B. Dry all metal parts thoroughly after cleaning, using filtered and dried compressed air.
- C. Dry bearing cones thoroughly, using filtered and dried compressed air. Repack bearing cones with clean bearing grease, specification MIL-G-81322, immediately after visually inspecting per CHECK.

CAUTION: DO NOT SPIN BEARING CONES WITH COMPRESSED AIR.

- D. Clean rubber parts in isopropyl alcohol and dry with a clean, soft cloth.

4. Paint Removal Procedures

- A. Remove paint from the wheel halves using chemical paint removal solvents or plastic media stripping in accordance with the following instructions.

WARNING: DUE TO THE TOXICITY OF CHEMICAL PAINT REMOVAL SOLVENTS, IT IS HIGHLY RECOMMENDED THAT PAINT REMOVAL BY THIS METHOD BE ACCOMPLISHED BY A COMMERCIAL FACILITY WITH THE PROPER EQUIPMENT AND CHEMICAL DISPOSAL CAPABILITIES.

CAUTION: REFER TO THE APPLICABLE MANUFACTURERS INSTRUCTIONS WHEN UTILIZING CHEMICAL PAINT REMOVAL SOLVENTS OR PLASTIC MEDIA STRIPPING EQUIPMENT.

- B. Completely disassemble the wheel prior to paint removal. Remove inflation valve (9).

NOTE: REFER TO "REPAIR" FOR RETREATING AND REPAINTING WHEEL.

CHECK

1. Check Materials

NOTE: EQUIVALENT SUBSTITUTES MAY BE USED FOR ITEMS LISTED BELOW:			
Type	Penetrant	Developer	Supplier
Fluorescent	Zyglo ZL-16	Zyglo ZP-13 (wet) optional	Magnaflux Corp. 7300 West Lawrence Ave. Chicago, IL. 60656
	Penetrex ZL-2A with emulsifier ZE-4	Penetrex ZP-4 (dry) or ZP-13 optional	
Red Dye	Spot Check	Spot Check	
	Dy-Chek	Dy-Chek	Turco Products Division of Purex Corp. P.O. Box 6200 Carson, CA 90749
	Met-L-Chek	Met-L-Chek	Met-L-Chek Company 1639 Euclid Street Santa Monica, CA 90404

2. General (Ref. IPL Fig. 1001)

- A. Check all parts for cracks, wear, structural damage, corrosion, and damaged threads. Replace all parts that show evidence of cracks, excessive wear, and structural and thread damage. Repair minor scratches and corrosion. Check specific parts in accordance with the following instructions (Ref. IPL Fig. 1001).

3. Detailed Check (Requires stripping topcoat and primer)

- A. Check wheel halves (1 and 3) for cracks and structural damage. Take particular note of bead seat and valve areas. Check the underside of the wheel tubewell area paying particular attention to the critical area from the tire bead seat radius to the end of the toe of the tire. Check the valve port for stripped threads. Replace wheel half if evidence of cracks or stripped threads exist.

Penetrant inspection of wheel halves is recommended at the following intervals:

- * First inspection after 5th tire change or 2000 cycles, whichever comes first (one cycle is defined as one take-off and one landing).
- * Additional inspections should be performed at every second tire change or 1000 cycles, whichever comes first.

**NOTE: CHECK WHEEL BY ZYGLO OR OTHER DYE-PENETRANT METHODS.
REPLACE ALL CRACKED WHEELS.**

- B. Check carefully for corrosion on the surfaces that contact the tire beads. Remove corrosion and repair surface damage to the limits defined in **REPAIR**.
- C. Check bearing cups (2) in the wheel halves for looseness, wear, corrosion, spalling, brinelling, scratches, pitting, and heat discoloration. Replace defective bearing cups in accordance with **REPAIR**.
- D. Check roller surfaces of bearing cones (4) for wear, corrosion, spalling, scratches, pitting, and heat discoloration. Check bearing cage for nicks, dents, distortion, and wear in the roller pockets. Replace bearing cones having any of the above defects.
- E. Check self-locking nuts (8) for worn, stripped or crossed threads. Replace if any of the above damage exists. Check the nuts self-locking feature. Replace the nut when it can be run down with the fingers after the locking feature engages the bolt.
- F. Magnetic particle inspect or penetrant inspect the wheel tie bolts (5) for cracks, particularly in the areas near the bolt head radius and the threads. If any of the bolts have cracks, replace all of the bolts. See Page 401 for recommended penetrant and developer.
- G. New O-Rings should be installed at each overhaul. Remove burrs or other damage on the adjoining wheel components that could cause O-Ring damage.
- H. Examine grease seals (Integral to bearing cone) for cuts, nicks, distortion, and other damage. Check the integrity of the rubber-to-metal interface. Replace bearing cone (4) if seals have any of these defects.

REPAIR

1. Repair Materials

NOTE: EQUIVALENT SUBSTITUTES MAY BE USED FOR ITEMS LISTED BELOW:	
Equipment/Material	Supplier
Aluminum Oxide Cloth (400 Grit Wet or Dry)	Commercially Available
Dry Cleaning Solvent Specification P-D-680	Commercially Available
Surface Treatment (Dow #1) per Specification MIL-M-3171	Commercially Available
Primer per Specification MIL-P-85582B, Type I, Class C2	Commercially Available
Topcoat per Specification MIL-C-85285B, Type I Untinted White FED-STD-595 Color No. 17925	Commercially Available
O-ring Lubricant Dow Molykote 55M Grease	Dow Corning Corp. Box 1767 Midland, Michigan 48640

2. General Repair Procedures

Repair of the Wheel is limited to the replacement of damaged parts and to the specific repairs listed in this section. (Ref. IPL Fig. 1001)

- A. Repairs to the main wheel 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.

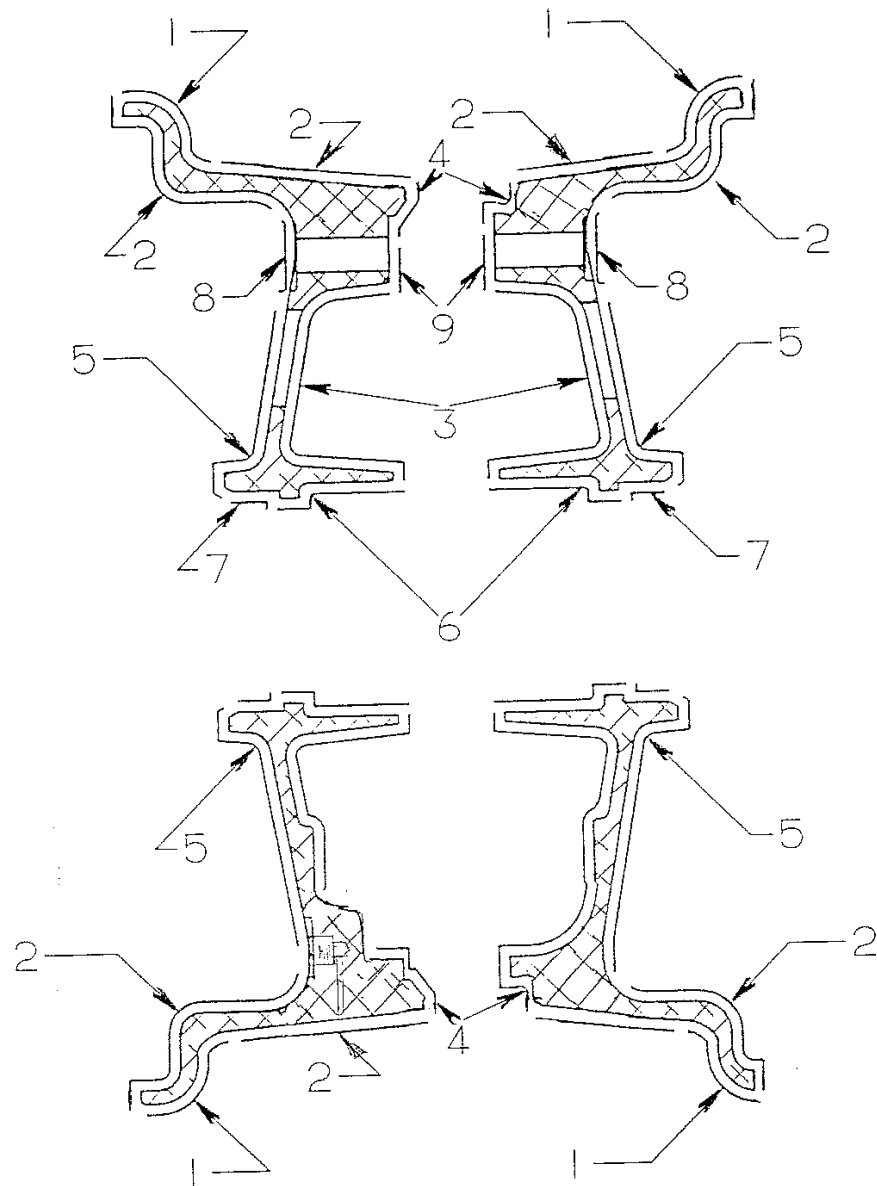
CAUTION: REMOVAL OF CORROSION AND SURFACE DAMAGE WILL PREVENT STRESS CONCENTRATIONS AND PREMATURE WHEEL FAILURE. ANY EXCESSIVE REMOVAL OF MATERIAL WILL SHORTEN THE ROLL LIFE OF THE WHEEL; THEREFORE IT IS RECOMMENDED THAT MATERIAL REMOVED BY BLENDING BE LIMITED TO THE MINIMUM REQUIRED FOR REMOVING CORROSION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

3. Repair of Wheel Halves (1 and 3, Ref. Figure 501)

- A. Remove all corrosion and surface damage from wheel halves according to limits specified in the following paragraphs and defined in Figure 501. Use fine, wet-or-dry, aluminum oxide cloth for polishing. Unless otherwise specified, surface finish of repaired surfaces should not exceed a roughness of 150 rms.

WARNING: DO NOT USE ABRASIVES CONTAINING IRON SUCH AS STEEL WOOL, IRON OXIDE, OR STEEL WIRE; IRON PARTICLES WHICH BECOME EMBEDDED IN THE ALUMINUM WHEEL HALVES WILL ACCELERATE CORROSION.

- B. In area 1, polish out corrosion pits, scratches, and tool marks to .015 inch deep and .5 inch long. Surface finish in bead seat radius should be 20 microinches rms.
- C. In area 2, blend out and polish imperfections to .030 inch deep and 1 inch long. Reworked area is not to exceed 1 square inch. Do not remove metal if surface directly opposite was previously reworked.
- D. In area 3, blend out and polish imperfections to .030 inch deep and one square inch area.
- E. In area 4, polish out imperfections to .010 inch maximum depth in register area, provided sealing qualities are maintained.
- F. In area 5, blend out and polish imperfections to .030 inch deep and one square inch in area.
- G. In area 6, rework is limited to .040 inch deep and .5 square inch in area at a maximum of two places.
- H. In area 7, rework is limited to blending out scratches and corrosion, provided bearing cup retention is not affected.
- I. In area 8, rework is limited to .010 inch maximum depth on face of each bolt boss.
- J. In area 9, the maximum repair is .010 inch deep and one-half square inch on each interface boss.



Outer Wheel Half

Inner Wheel Half

NOTE: NUMBERS REFER TO REWORKED AREAS
DISCUSSED IN REPAIR OF WHEEL HALF

**Wheel Repair Limits
Figure 501**

4. Bearing Cup Removal and Replacement

- A. Heat wheel half in an oven not exceeding 175° F. for 30 minutes.
- B. Remove cup from bore by tapping it out evenly with a fiber or phenolic punch, or fabricate bearing cup removal tool (See Figure 502) and utilize by hand or adapt to arbor press. Exercise extreme care to avoid raising burrs in the hub bore.

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

- C. Make sure that bearing bore and shoulder are clean and free of burrs.
- D. Prior to installation, chill the new bearing cup with dry ice.
- E. Heat wheel half in oven not exceeding 175° F. for 30 minutes.
- F. Remove the wheel half from the heat source and remove the bearing cup from the dry ice. Dry the cup thoroughly.
- G. Brush a wet coat (generous but not dripping) of primer into the bearing bore.
- H. Hand press the bearing cup into the coated housing making sure the backing surface of the cup mates to the shoulder of the bearing bore. Avoid cocking the cup during installation. (Installation tool for cup is pictured in Figure 502)
- I. Remove excess primer compound with a clean shop towel so that a fillet of not more than .08 wide extends beyond the cup.

5. Retreating and Repainting Wheel Halves

- A. Rinse reworked areas with dry-cleaning solution, specification P-D-680 and dry thoroughly with filtered compressed air.

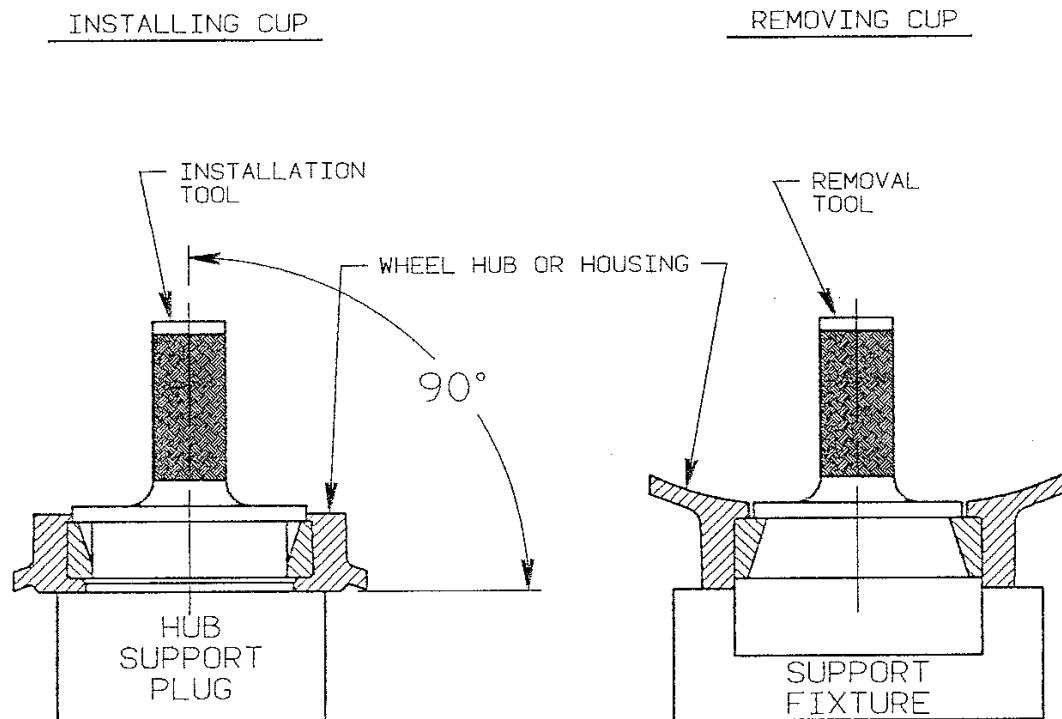
WARNING: CLEANING SOLUTIONS SHOULD BE USED IN A WELL VENTILATED AREA. AVOID PROLONGED INHALATION OF FUMES.

- B. Treat reworked areas per MIL-M-3171, Type III, VI, or VII.

- C. Apply primer to reworked areas. The dry film thickness shall be .0002 to .0005 inch.

CAUTION: DO NOT GET PAINT ON ROLLER CONTACTING SURFACES OF BEARING CUPS. PAINT ON THESE SURFACES WILL CONTRIBUTE TO BEARING FAILURE (SEE FIGURE 502).

- D. Apply topcoat to reworked areas. The dry film thickness shall be .0008 to .0014 inch, including primer.



**Bearing Cup Removal and Installation
Figure 502**

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ASSEMBLY

1. Assembly Materials

NOTE: EQUIVALENT SUBSTITUTES MAY BE USED FOR ITEMS LISTED BELOW.	
Equipment/Material	Supplier
Aeroshell Grease 22 (MIL-G-81322 Grade A)	Shell Oil Company Houston, TX.
Antiseize Compound (Lubtork) Specification MIL-T-5544	W.J. Ruscoe & Company 483 Kenmore Boulevard Akron, Ohio 44301
Isopropyl Alcohol	Commercially Available
Dow Corning 55 O-ring Lubricant Compound	Dow Corning Corp. Box 1767 Midland, Michigan 48640

2. General Assembly Procedures

Assemble the Wheel assembly in accordance with the following procedures
(Ref. IPL Fig. 1001):

CAUTION: IN ORDER TO PROPERLY ASSEMBLE THE WHEEL TO TIRE, SPECIAL TOOLS ARE REQUIRED. TO PREVENT DAMAGE TO WHEEL COMPONENTS, AN AUTHORIZED WHEEL & TIRE SHOP SHOULD ASSEMBLE AND DISASSEMBLE THE WHEEL.

- A. Prior to installing wheel to tire, inspect tire, with special emphasis placed on bead area. Be sure that the tire is free of any foreign material and that the bead areas are clean. Also, be sure that the word "tubeless" appears on the tire sidewall.
- B. Place inner wheel half assembly on a clean flat surface with register side up.

- C. New O-Rings should be installed at each reassembly. Lubricate O-ring (10) with a coat of Dow Corning Molykote 55M grease or MIL-G-81322 grease, and install on register portion of inner wheel half.

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

NOTE: PRIOR TO PLACING TIRE OVER WHEEL HALVES, A TIRE TALC OR SOAP SOLUTION MAY BE USED ON THE BEAD SEAT AREA OF THE TIRE, IF DESIRED, TO AID IN SEATING THE TIRE ON THE WHEEL.

- D. Place tire over inner wheel half assembly with red balance dot on tire side wall up, and aligned with a point midway between any two wheel bolt holes.
- E. Place outer wheel half assembly in tire, making sure to properly align male and female registers. Outer wheel half assembly should be aligned so that the air valve lines up with red dot on tire sidewall.

NOTE: IN ORDER TO ATTAIN WHEEL BALANCE, IT MAY BE NECESSARY TO ROTATE WHEEL HALVES 180°. THIS SHOULD BE ATTEMPTED IF BALANCE IS MORE THAN 1/2 INCH-OUNCES OUT.

- F. Lubricate threads of tie bolts (5) and self-locking nuts (8), surfaces of washers (6 & 7) with antisieze compound. Always clean paint from bolt threads, nuts and washers prior to applying antisieze compound.

CAUTION: INSTALL COUNTERSUNK WASHERS (6) UNDER BOLT HEAD WITH COUNTERSUNK SIDE OF WASHER TOWARD THE BOLT HEAD. FAILURE TO DO SO MAY RESULT IN BOLT FAILURE.

- G. Compress wheel halves together and install bolts (5), countersunk washers (6), plain washers (7), and nuts (8).

CAUTION: DO NOT USE IMPACT OR POWER WRENCHES TO TIGHTEN NUTS OR BOLTS.

- H. Draw nuts up evenly in a criss-cross pattern at equal increments of 35 in-lbs., until wheel halves are seated. Then retighten until a final lubtork value of 150 in-lbs. is obtained. Always torque nuts a second time, because sometimes O-ring compression will give a false initial reading.
- I. Install valve core into valve stem. Install air valve assembly (9) into outer wheel half assembly and dry torque to 50-60 in-lbs.

WARNING: OVERINFLATION OF TIRES FROM HIGH PRESSURE SOURCES MAY RESULT IN WHEEL FAILURE, CAUSING PERSONAL INJURY. ALWAYS USE SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

- J. Place the wheel/tire assembly in an inflation cage for initial inflation. Inflate tire just enough to seat the beads. Reduce tire pressure to recommended storage pressure (40 psi) and remove wheel/tire assembly from inflation cage.

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

- K. Pack bearing cones (4) with clean bearing grease, specification MIL -G-81322.
- L. Install valve cap on valve stem.
- M. Check assembly for balance per following Section 3.

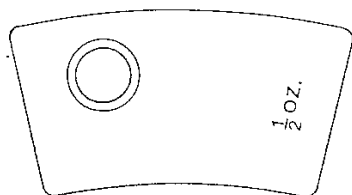
3. Wheel Balancing

Parker Hannifin recommends that all wheel and tire assemblies be balanced.

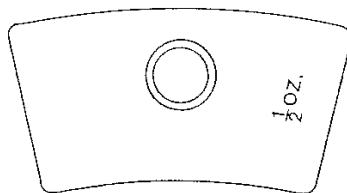
A. Checking Static Balance:

1. Wheel balancing kit 199-135 is available from Parker Hannifin Corp. to statically balance the 40-212 nose wheel assembly. Kit 199-135 uses flush mounted 1/2 ounce weights against the wheel under the heads of the wheel tie bolts (5) in place of the countersunk washers (6), and under the nuts (9) in place of the plain washers (7). See Figures 601 & 602 for weight locations.
2. Alternate methods of balancing can be accomplished by using other approved industry standard methods and weights.
3. Record the amount of weight required to center the bubble, as well as the position and pattern by making a sketch showing the location of the weights relative to the valve stem and bolt pattern.
4. Multiply the amount of weight required to center the bubble by 4.25 inches to obtain the out-of-balance in inch-ounces.

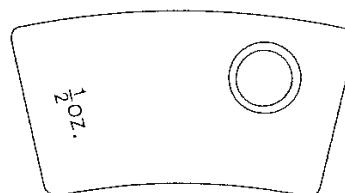
NOTE: IF THE OUT-OF-BALANCE CONDITION IS MORE THAN 2.0 INCH-OUNCES, THEN BALANCE WEIGHTS MUST BE PERMANENTLY INSTALLED ON THE WHEEL AND TIRE ASSEMBLY.



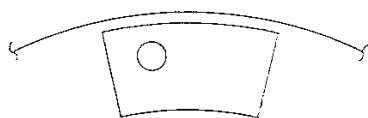
① BALANCE WEIGHT



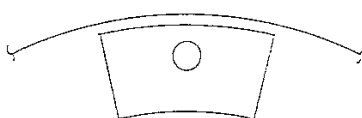
② BALANCE WEIGHT



③ BALANCE WEIGHT



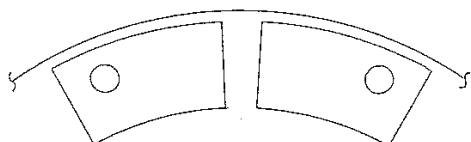
(A) TOTAL WEIGHT: 1 OZ.
WEIGHTS REQ'D: 1-① & 1-③
CORRECTION: 4.25 IN-OZ.



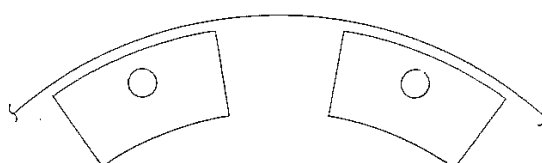
(B) TOTAL WEIGHT: 1 OZ.
WEIGHTS REQ'D: 2-②
CORRECTION: 4.25 IN-OZ.



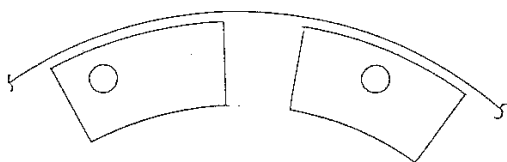
(C) TOTAL WEIGHT: 1 OZ.
WEIGHTS REQ'D: 1-③ & 1-①
CORRECTION: 4.25 IN-OZ.



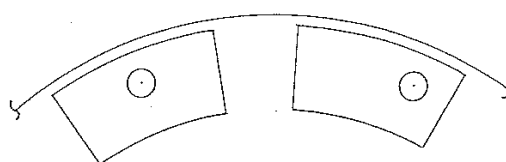
(D) TOTAL WEIGHT: 2 OZ.
WEIGHTS REQ'D: 2-① & 2-③
CORRECTION: 8.5 IN-OZ.



(E) TOTAL WEIGHT: 2 OZ.
WEIGHTS REQ'D: 4-②
CORRECTION: 8.5 IN-OZ.

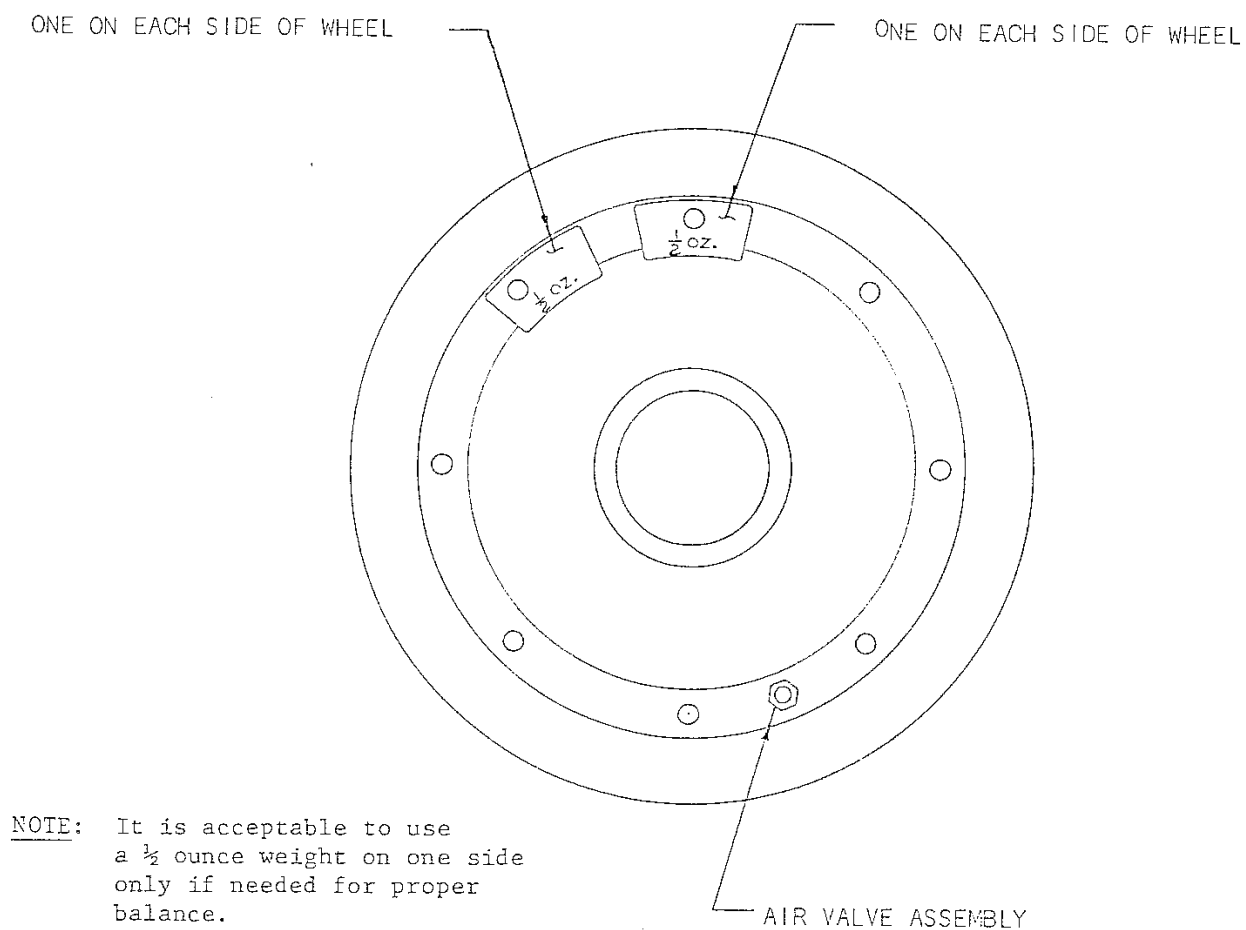


(F) TOTAL WEIGHT: 2 OZ.
WEIGHTS REQ'D: 2-① & 2-②
CORRECTION: 8.5 IN-OZ.



(G) TOTAL WEIGHT: 2 OZ.
WEIGHTS REQ'D: 2-② & 2-③
CORRECTION: 8.5 IN-OZ.

Nose Wheel Balancing Weights
Figure 601



*BALANCE WEIGHTS REPLACE PLAIN AND COUNTERSUNK WASHERS ON WHEEL BOLTS UNDER HEAD AND UNDER NUT WHERE WEIGHT IS REQUIRED TO CENTER BUBBLE IN LEVEL.

Example of Balance Weight Location
Figure 602

B. Installing Balance Weights:

1. Remove the wheel and tire assembly from the wheel balancer and cover the hub openings.
2. Place the wheel and tire assembly on a clean, flat surface and deflate the tire completely by removing the valve core.
3. Before loosening wheel bolts, note the position of the tire relative to the wheel by placing a small strip of tape radially on the wheel in relation to the red balance dot that is vulcanized in the sidewall of the tire.
4. After double checking to make sure that the tire has been fully deflated, loosen the wheel nuts (8) in a criss-cross pattern and remove only the wheel bolt or bolts (5) where the balance weights are to be installed.
5. Discard the plain washers (7) and countersunk washers (6) at these bolt locations.

CAUTION: CARE SHOULD BE TAKEN TO INSURE THAT THE PROTECTIVE FINISH ON THE WHEEL IS NOT NICKED OR SCRATCHED WHILE REMOVING BOLTS. ALSO, IMPACT OR POWER WRENCHES SHOULD NOT BE USED TO REMOVE THE WHEEL BOLT AND NUTS.

6. To install balance weights provided in kit 199-135, discard the plain and countersunk washers (6 & 7), and replace with the pairs of balance weights selected in Paragraph 1. under "Checking Static Balance".
7. Next, lubricate the bolt and nut threads and the bearing surfaces of the bolt head, nut, and balance weights, with antiseize compound.

CAUTION: BE SURE TO ADD BALANCE WEIGHTS OF EQUAL WEIGHT AS SHOWN IN FIGURE 602. THE BALANCE WEIGHTS MUST BE ADDED EQUALLY TO EACH SIDE OF THE WHEEL ASSEMBLY, EXCEPT AS NOTED.

8. Replace the bolts and nuts into the wheel assembly, with balance weights in place.

CAUTION: INSTALL BALANCE WEIGHTS UNDER BOLT HEAD WITH COUNTERSUNK SIDE OF BALANCE WEIGHT TOWARD THE BOLT HEAD. FAILURE TO DO SO MAY RESULT IN BOLT FAILURE.

9. Remove, lubricate, and reinstall the remaining wheel tie bolts one position at a time.

CAUTION: INSTALL COUNTERSUNK WASHERS (6) UNDER BOLT HEAD WITH COUNTERSUNK SIDE OF WASHER TOWARD THE BOLT HEAD. FAILURE TO DO SO MAY RESULT IN BOLT FAILURE.

10. Draw nuts up evenly in a criss-cross pattern at equal increments of 35 in-lbs., until wheel halves are seated. Then retighten until a final lubtork value of 150 in-lbs. is obtained. Always torque nuts a second time, because sometimes O-ring compression will give a false initial reading.
11. Align the tape applied on the wheel per paragraph 3 to the red dot on the tire sidewall..
12. Install valve core into valve stem.

WARNING: OVERINFLATION OF TIRES FROM HIGH PRESSURE SOURCES MAY RESULT IN WHEEL FAILURE, CAUSING PERSONAL INJURY. ALWAYS USE SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

13. Place the wheel/tire assembly in an inflation cage for initial inflation. Inflate tire just enough to seat the beads. Reduce tire pressure to recommended storage pressure (40 psi) and remove wheel/tire assembly from inflation cage.

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

14. Place the wheel and tire assembly back onto the static balancer to verify that the balance is correct.
15. Remove from balancer, and place in storage, or install on aircraft as required.

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STORAGE INSTRUCTIONS

1. Wheels Stored with Tires Installed

- A. The length of time that a wheel assembly can be stored is governed by the storage life of its rubber components.
- B. The wheel/tire assembly should be stored in a clean, cool, dry storeroom out of direct sunlight. The desirable storeroom temperature range is 32° - 75° F. If this temperature range cannot be maintained, temperatures as high as 100° F. or even 125° F. can be tolerated for short periods.
- C. The recommended storage pressure for tires is 40 psi.

2. Wheels Stored Without Tires Installed

- A. Store without the O-Ring (10) installed between the two halves.

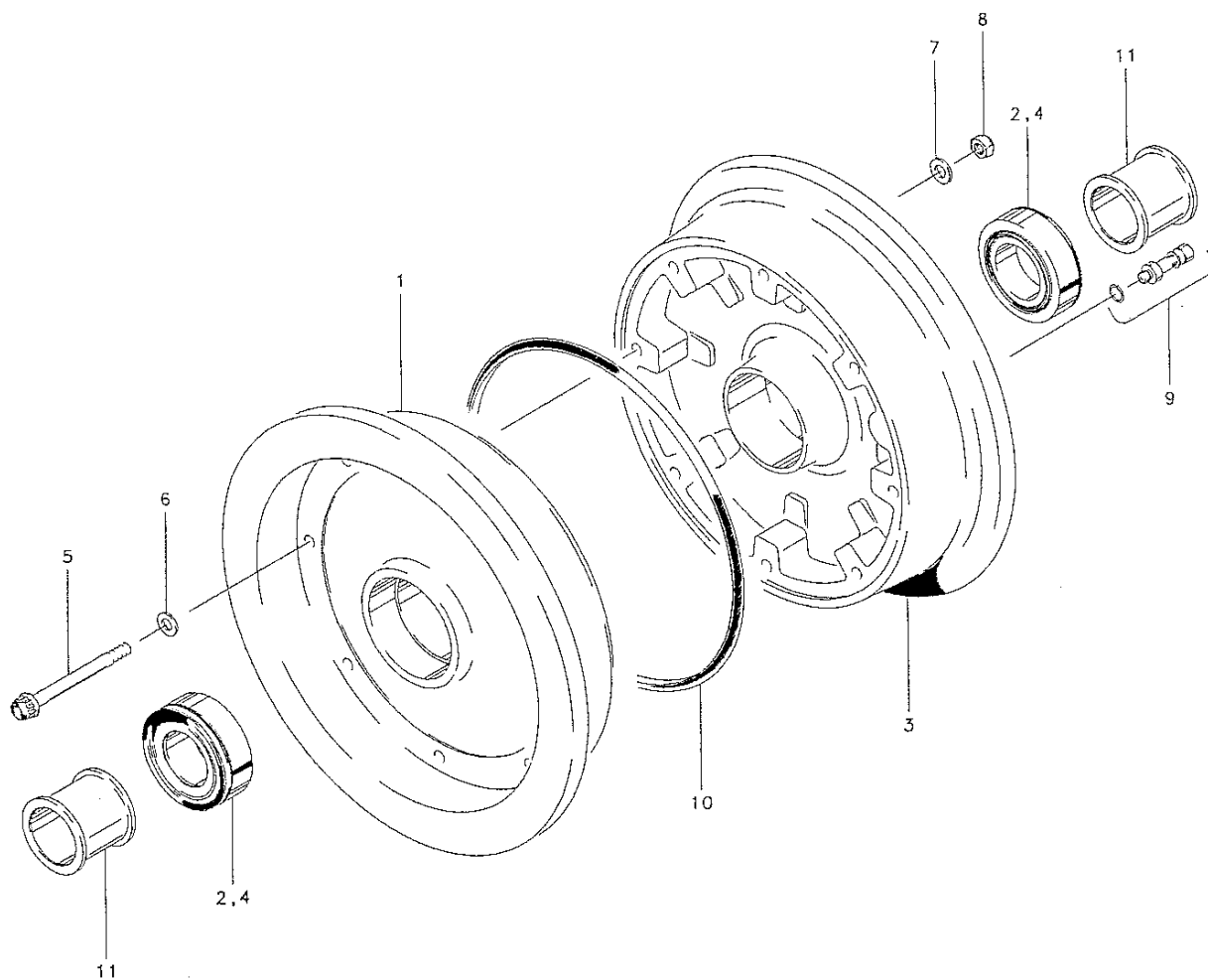
3. Plug Or Cover Bearing Hub Area During Storage To Prevent Contamination.

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ILLUSTRATED PARTS LIST

1. Introduction

- A. The Illustrated Parts List (IPL) section lists and illustrates the procurable parts of the Parker Hannifin assembly covered in this publication. The components are listed in the order of disassembly.
- B. The Figure Item column provides the cross reference between the parts list and IPL Figure 1001.
- C. The Part Number column gives the part number of the item, which is stamped on the part when practical. This number should be used when ordering parts.
- D. The Nomenclature column gives the basic noun name of each part, together with any specifications required to identify the part listed. The descriptions are indented under the column heading to show the relationship of the parts to their subassemblies and to the assembly.
- E. The Units Per Assembly column gives the number of parts required for each assembly or subassembly.



Illustrated Parts List (IPL) for 40-212 Wheel Assembly
Figure 1001

2. Parts List

FIGURE ITEM	PART NUMBER	NOMENCLATURE	UNITS PER ASSY
	40-212	Wheel Assembly	1
	161-13400	Inner Wheel Half Assembly	1
1	*	Wheel Half - Inner	1
2	214-03700	Cup - Bearing	1
	162-12500	Outer Wheel Half Assembly	1
3	*	Wheel Half - Outer	1
2	214-03700	Cup - Bearing	1
4	214-03800	Bearing Cone & Seal	2
5	103-23500	Bolt (MS21250-05030)	8
6	095-02800	Washer, Countersunk (MS20002C5)	8
7	095-13600	Washer (MS20002-5)	8
8	094-10401	Nut (MS21045-5S), (alt. AN365-524C)	8
9	160-00700	Air Valve Assembly (TR762-03)	1
10	101-09700	O-Ring (MS28775-269)	1
**	166-19700	***Nameplate	1
**	166-20000	Warning Decal	1
11	067-08800	Axle Spacer	2

* PART NOT PROCURABLE

** PART NOT ILLUSTRATED IN FIGURE 1001

*** WHEN ORDERING REPLACEMENT NAMEPLATE, FURNISH WHEEL
MODEL NUMBER AND DATE OF MANUFACTURE (IF KNOWN)



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 SA1459GL

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 25 of the Federal Aviation Regulations. See Type Certificate Data Sheet A10CE for complete certification basis.

Original Product — Type Certificate Number A10CE

Make Learjet Corporation

Model 24, 24A, 24B, 24B-A, 24C, 24D, 24D-A, 24E, 24F,
24F-A, 25, 25A, 25B, 25C, 25D, 25F, 35, 35A, 36, 36A, and 55

Description of Type Design Change

Installation of a Cleveland Nose Wheel in accordance with Parker Hannifin Conversion Kit Parts List 199-175, no revision, dated June 6, 1989, 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 June 30, 1989

Date received

Date of issuance March 14, 1990

Date amended



By direction of the Administrator

Donald P. Michal

Donald P. Michal, ^(Signature) 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