AIRCRAFT WHEEL & BRAKE DIVISION
PARKER HANNIFIN CORPORATION
AVON, OHIO

PARTS LIST

199-65 CONVERSION KIT

GRUMMAN GOOSE MODELS

G-21 AND G-21A

PART NUMBER	DRAWING REVISION	DESCRIPTION	QUANTITY
30-91	Rev. N dated 03-13-1990	Brake Assembly	2
40-127	Rev. F dated 10-04-2006	Wheel Assembly, 32 x 8.8 Type VII	2

Publication Package (P/N PP199-06500)

199-65 P/L	Rev E dated 05-14-2007	Parts List for 199-65 Kit (This Document)
50-67	Rev. A dated 04-08-1988	Installation Drawing
CM 40-127/30-91	Rev. B dated 03-06-1990	Maintenance Manual
SA99GL	Last amend date 4-8-88	Supplemental Type Certificate
PRM13A	----------	Non Asbestos Organic Brake Lining Conditioning Procedure
PRM69	----------	General Maintenance Information
-------		Product Registration Card

NOTES:

1. This kit will convert one aircraft to Cleveland Wheels and Brakes.
2. For use with Automotive Brake Fluid.

199-65

NC	04-04-1975
REV. A	12-17-1975
REV. B	03-18-1981 (267-15)
REV. C	04-08-1988 (289-26)
REV. D	06-13-1990 (300-62)
REV. E	05-14-2007 (0374-76)

DO NOT SCALE

NOTES:

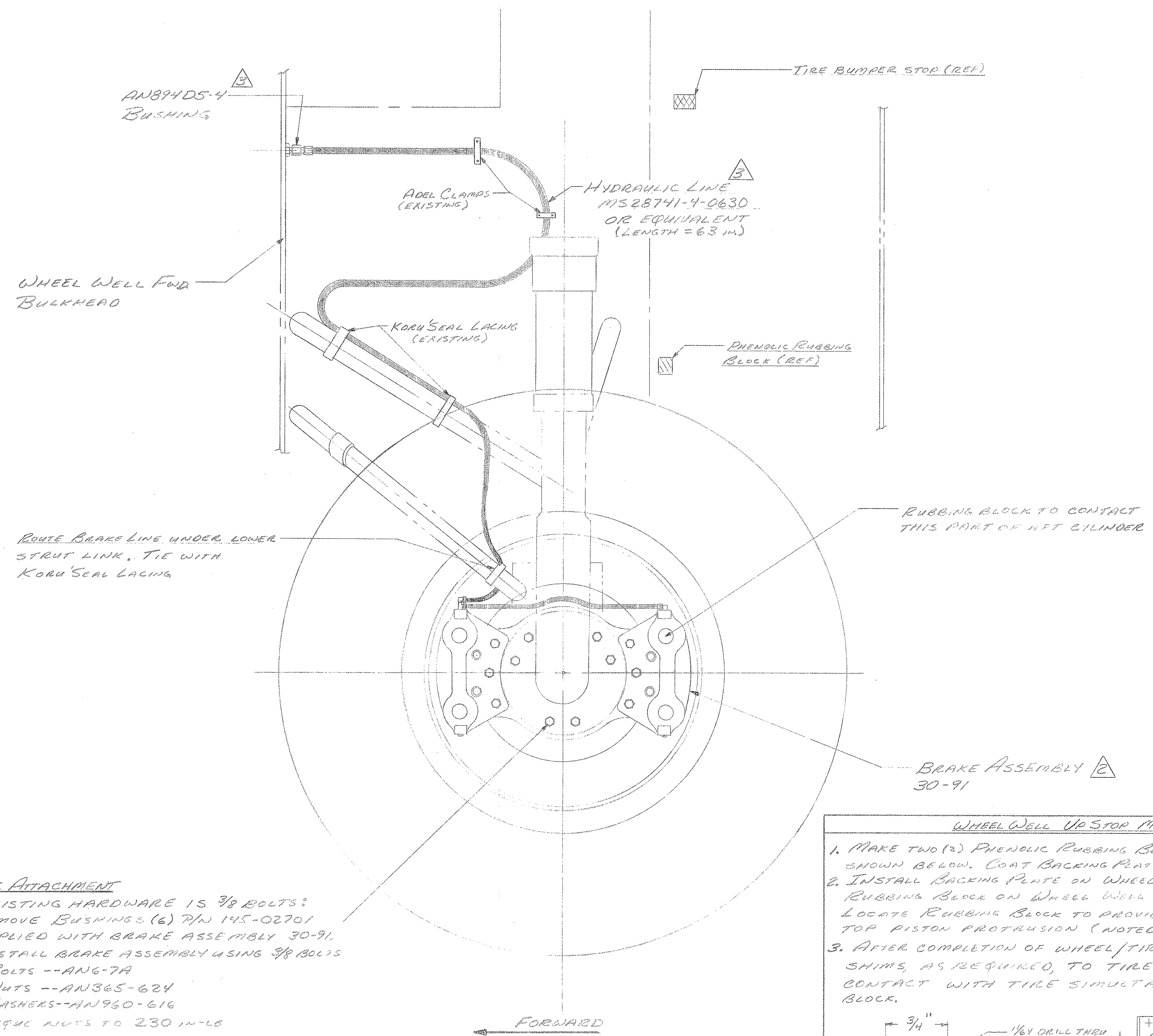
1. THIS INSTALLATION APPLIES TO GRUMMAN GOOSE MODELS G21 AND G21A.
2. △ COMPONENTS SUPPLIED BY CLEVELAND WHEELS & BRAKES
3. △ COMPONENTS NOT SUPPLIED WITH CLEVELAND CONVERSION KIT.

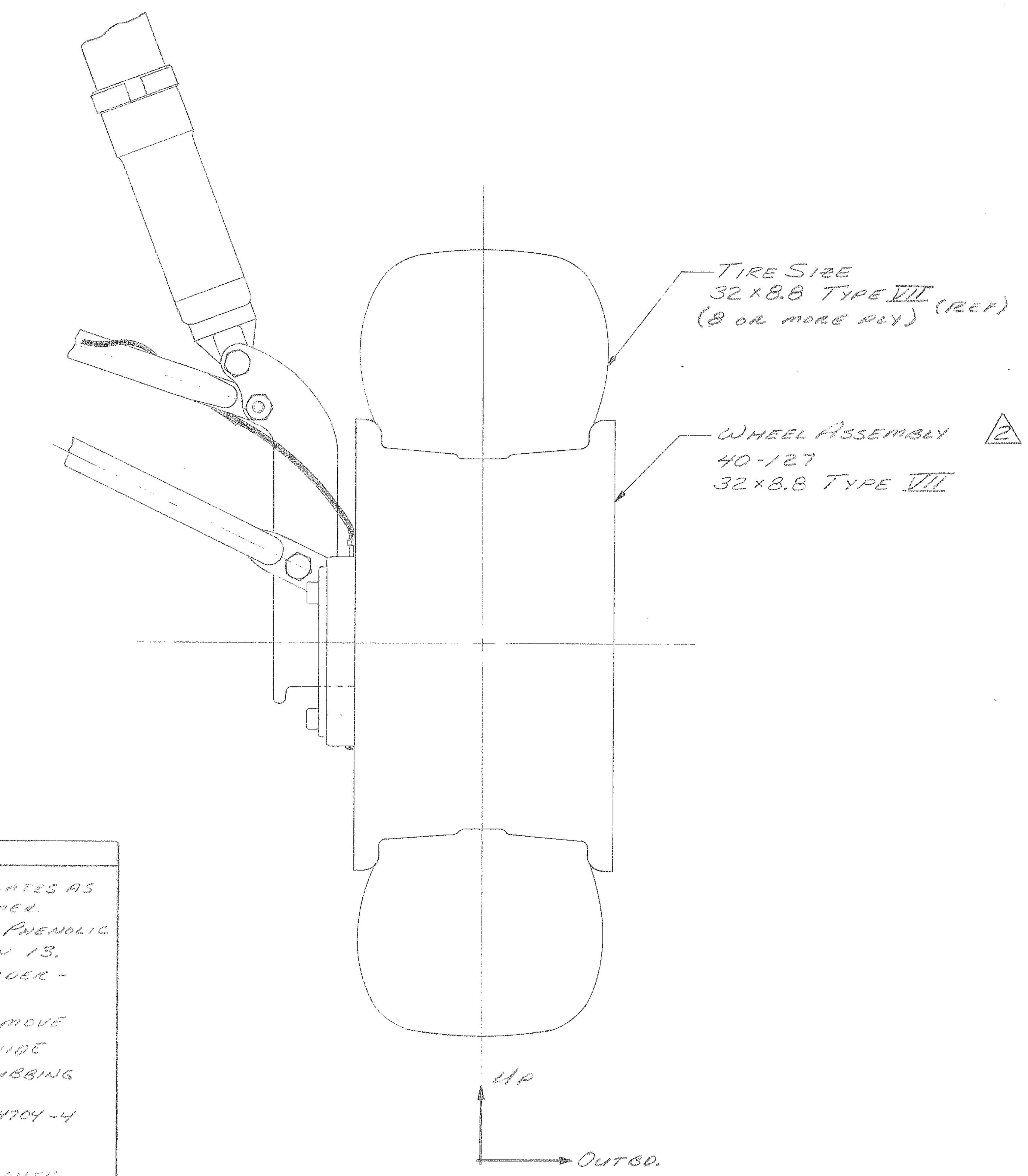
INSTALLATION PROCEDURE

1. REMOVE EXISTING MLG WHEELS & BRAKES AND EXISTING BRAKE LINE (SIZE -5) BETWEEN WHEEL WELL BULKHEAD FITTING AND BRAKE.
2. INSTALL CLEVELAND BRAKE 30-91 ON AXLE, USING EXISTING HARDWARE. REFER TO HARDWARE DESCRIPTION (LOWER LEFT OF DRAWING).
3. INSTALL AN AN894DS-4 BUSHING ON WHEEL WELL BULKHEAD FITTING AND INSTALL BRAKE LINE (MS 28741-4-0630 OR EQUIVALENT).
4. FILL BRAKE SYSTEM WITH BRAKE FLUID (LOCKHEED #5 OR EQUIVALENT). BLEED BRAKES USING A PRESSURE BLEEDING UNIT (RECOMMENDED)
5. UPON COMPLETION OF BRAKE INSTALLATION, INSTALL WHEEL WELL BRAKE RUBBING BLOCK AS DETAILED BELOW (WHEEL WELL UP STOCK MODIFICATION).
6. INSTALL WHEEL SPACER (067-03300) IN INBOARD BEARING AND INSTALL WHEEL ASSEMBLY ON AXLE. INSTALL OUTBOARD BEARING, TANG WASHER AND AXLE NUT TO ALIGN WHEEL. ALIGN DRIVE KEYS ON WHEEL WITH BRAKE DISC SLOTS AND SLIDE WHEEL ASSEMBLY INTO POSITION.
7. TORQUE AXLE NUT TO AIRCRAFT MANUFACTURER'S SPECIFICATIONS AND INSTALL COTTER PIN.
8. INSTALL HUB CAP AND GASKET.
9. CHECK FOR AND ELIMINATE POSSIBLE INTERFERENCE PECULIAR TO INDIVIDUAL AIRCRAFT.
10. CHECK FOR AND ELIMINATE ANY BRAKE FLUID WHICH MAY HAVE SPILLED ON BRAKE LINING.
11. ROTATE WHEEL AND CHECK FOR PROPER ROTATION (NO BRAKE DRAG)

50-67 | A

CHANGE NOTICE	LETTER	DESCRIPTION OF CHANGE	CHG. BY	DATE	CHK'D. BY
267/15	INT.	50-67 WAS 50-25, REVISION A	BB	3/17/81	
289/26	A	ESNA P/N 22NA17A-82 WAS P/N 22NA17A-822	BB	4-8-83	BB





BRAKE ATTACHMENT

IF EXISTING HARDWARE IS 3/8 BOLTS:

1) REMOVE BUSHINGS (6) P/N 145-02701 SUPPLIED WITH BRAKE ASSEMBLY 30-91.
2) INSTALL BRAKE ASSEMBLY USING 3/8 BOLTS
   - BOLTS -- AN6-7A
   - NUTS -- AN365-624
   - WASHERS -- AN960-616

TORQUE NUTS TO 230 IN-LB

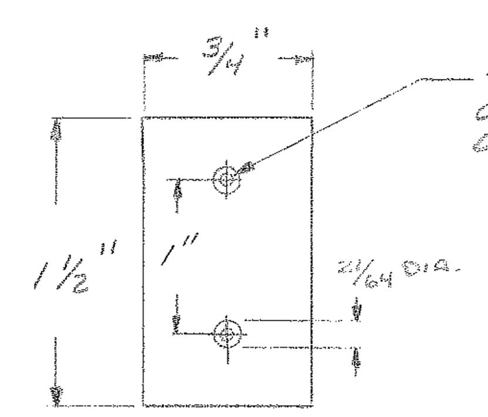
IF EXISTING HARDWARE IS 5/16 BOLTS:

1) USE BUSHING (6) P/N 145-02701 SUPPLIED WITH BRAKE ASSEMBLY 30-91.
2) INSTALL BRAKE ASSEMBLY USING 5/16 BOLTS AND BUSHING 145-02701
   - BOLTS -- AN5-7A
   - NUTS -- AN365-524
   - WASHERS -- AN960-516

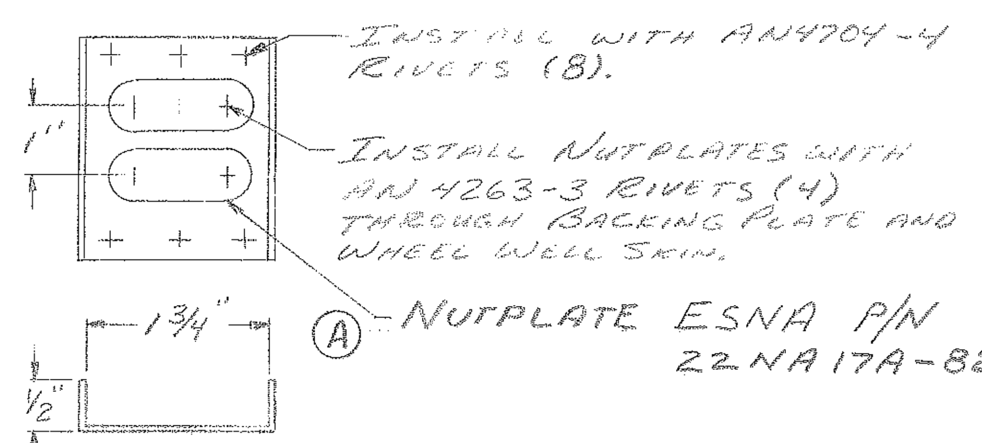
TORQUE NUTS TO 150 IN-LB

WHEEL WELL UP STOP MODIFICATION

1. MAKE TWO (2) PHENOLIC RUBBING BLOCKS AND TWO (2) BACKING PLATES AS SHOWN BELOW. COAT BACKING PLATES WITH ZINC CHROMATE PRIMER.
2. INSTALL BACKING PLATE ON WHEEL WELL SKIN INTERIOR AND PHENOLIC RUBBING BLOCK ON WHEEL WELL SKIN EXTERIOR AT STATION 13. LOCATE RUBBING BLOCK TO PROVIDE CONTACT WITH AFT CYLINDER - TOP PISTON PROTRUSION (NOTED ABOVE).
3. AFTER COMPLETION OF WHEEL/TIRE INSTALLATION - ADD/REMOVE SHIMS, AS REQUIRED, TO TIRE BUMPER STOP TO PROVIDE CONTACT WITH TIRE SIMULTANEOUSLY WITH BRAKE RUBBING BLOCK.



RUBBING BLOCK
MAT'L: PHENOLIC - 3/32 THICK



BACKING PLATE
MAT'L: AL. SHEET - .025 THICK

QTY	QTY	ITEM	PART NO.	DESCRIPTION	MATERIAL & SPEC.	HEAT TREAT & SPEC.	FINISH & SPEC.	WGT.

NEXT ASSEMBLY	QTY	FINAL ASSEMBLY	QTY	PATTERN, CASTING OR BLANK NO.	DRAWN BY JB 6/20/75
THIS DESIGN IS THE PROPERTY OF CLEVELAND WHEELS & BRAKES AND IS NOT TO BE COPIED, DUPLICATED, OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF EQUIPMENT WITHOUT WRITTEN PERMISSION.		ZYGLO PER MIL-I-6866 STAMP M ON PART; MAGNAFLUX PER MIL-I-6868 STAMP P ON PART; √ MACHINED SURFACES PER MIL STD 10 UNLESS OTHERWISE NOTED; UNLESS NOTED ALL THREADS PER MIL-S-7742		WORK TO DIMENSIONS — DO NOT SCALE; TOLERANCE FOR .XXX ± .010; TOLERANCE FOR .XX ± .030; TOLERANCE FOR ANGULAR DIMS. ± 1/2°; TOLERANCE FOR FRACTIONAL DIMS. ± .030; BREAK SHARP EDGES .010 UNLESS NOTED. REMOVE ALL BURRS BEFORE PLATING. DRILL PER INSP. PROCEDURE NO. 114.	CHECKED BY; SCALE 1/4

Cleveland Wheels & Brakes
1160 Avon Center Road, Avon, Ohio 44011
a division of VanSickle Industries, Inc.
"the brake people"

NAME: CLEVELAND WHEEL & BRAKE INSTALLATION — 50-67

050-06700

CLEVELAND WHEELS AND BRAKES
DIVISION OF VAN SICKLE INDUSTRIES, INC.

Maintenance Manual
for
Main Wheel 40-127
Brake Assembly 30-91

Used On

THE GRUMMAN GOOSE

Revision A - 12/15/75

Revision B - 03/06/90

MAIN WHEEL ASSEMBLY

I. Cleaning and Inspection of Main Wheel Assembly

1. Degrease all parts and dry thoroughly. A soft bristle brush may be used to remove hardened grease, dust or dirt.

WARNING

DRY-CLEANING SOLUTIONS ARE TOXIC AND VOLATILE. USE IN A WELL-VENTILATED AREA. AVOID CONTACT WITH SKIN OR CLOTHING. DO NOT INHALE VAPORS.

2. Visually inspect bearing cones for nicks, scratches, water staining, spalling, heat discoloration, roller wear, cage damage, cracks or distortion. Replace if defective or worn.
3. Inspect wheel bearing grease for contamination and solidification at each periodic maintenance inspection. Do not exceed 500 wheel miles between repacking intervals.
4. Inspect wheel halves for cracks, corrosion, and other damage. Cracked or badly corroded castings should be replaced. Small nicks, scratches, or pits can be blended out using fine (400 grit) sandpaper.
5. Inspect snap rings and grease seals for distortion or wear. Replace if damaged or deformed.
6. Inspect bearing cups for looseness, scratches, pitting, corrosion, or evidence of overheating. If evidence of any defect exists, replace cup as explained in Replacement of Bearing Cup Procedures. Coat cups with clean bearing grease.

(Cont'd)

7. Inspect wheel bolts for cracks, corrosion or other damage. Replace cracked bolts. Torque bolts to 300 in-lb.
8. Inspect self-locking nuts for self-locking feature. Replace if self-locking feature is damaged or destroyed.

II Replacement of Bearing Cup.

1. Heat wheel half in boiling water for one hour, or in an oven not exceeding 250° F for 30 minutes.
2. Remove wheel half from source of heat. Bearing cup should be loose enough to fall out of bearing bore when inverted. If cup does not drop out, tap evenly from bore with a fiber drift pin.
3. After cup has been removed, repeat Step #1. Chill bearing cup in dry ice.
4. Remove wheel half from source of heat and bearing cup from dry ice.
5. Dry chilled bearing cup and coat contacting surfaces with zinc chromate primer.
6. Install chilled bearing cup in heated wheel half. Tap gently and evenly into place, using a fiber drift pin or suitable arbor press.

III Recoating of Main Wheel Repaired Surfaces

1. Thoroughly clean repaired surfaces and areas of the wheel from which anodize has been removed.
2. Brush alodine exposed areas as follows:
    1. Warm parts and alodine solution to 100° - 125° F.
    2. Brush alodine solution on exposed areas and allow to dry.

CAUTION

NEVER ALODINE WORKING SURFACES OF BEARING CUPS

BRAKE ASSEMBLY

I. Cleaning and Inspection of Brake Assembly

1. Clean all metal parts and O-rings with denatured alcohol (gasoline and dry cleaning fluids will damage O-rings). If O-rings are damaged or worn excessively, they should be replaced.
2. Inspect brake cylinder for cracks, nicks, corrosion, damaged threads, etc. Inspect inlet and outlet hydraulic ports for foreign contaminates. Examine cylinder walls for scoring or excessive wear. Blend and polish light scratches in piston cavities with fine emery cloth (600 grit). Castings that are cracked or have damaged threads should be replaced.
3. Inspect anchor pins for cracks, corrosion, permanent set, and excessive wear. Replace pins that are bent, cracked or severely corroded.
4. Inspect pistons for cracks, nicks, burrs, or excessive wear. Remove burrs and blend out nicks, using fine emery cloth (600 grit), and clean thoroughly.
5. Inspect pressure plate assembly for cracks, damaged rivets and excessive warpage. Replace if cracked or severely deformed. Replace cracked or deformed rivets.
6. Inspect brake cylinder bolts for cracks, thread damaged, and self-locking feature. Replace bolts that are cracked, bent or have damaged threads. Torque cylinder bolts to 150 in-lb.
7. Inspect brake linings for radial cracks around rivets and surface deterioration. Linings should be replaced when worn to a thickness of .100 inch. Worn linings may be easily removed by drilling out rivets, using a 5/32 drill. Install new linings in place, using 105-00200 rivets.

(Cont'd)

8. Inspect brake disc for cracks, excessive wear or scoring, rust and corrosion. Remove rust and blend out small nicks using fine (400 grit) sandpaper. Brake disc should be replaced when worn to a thickness of .320 inch.

9. Inspect torque plate for cracks, nicks, burrs, rust, excessive wear and brinelling in bolt holes. Replace if cracked or severely deformed.

NOTE

SOME AIRCRAFT MAY HAVE 5/16 INCH DIAMETER BOLTS TO ATTACH BRAKE TO STRUT. WITH 5/16 BOLTS, USE BUSHING (145-02701) SUPPLIED WITH 30-91 BRAKE ASSEMBLY WHEN INSTALLING ON AIRCRAFT.

II Recoating of Brake Assembly

1. Thoroughly clean repaired surfaces and areas of the brake assembly from which anodize has been removed.

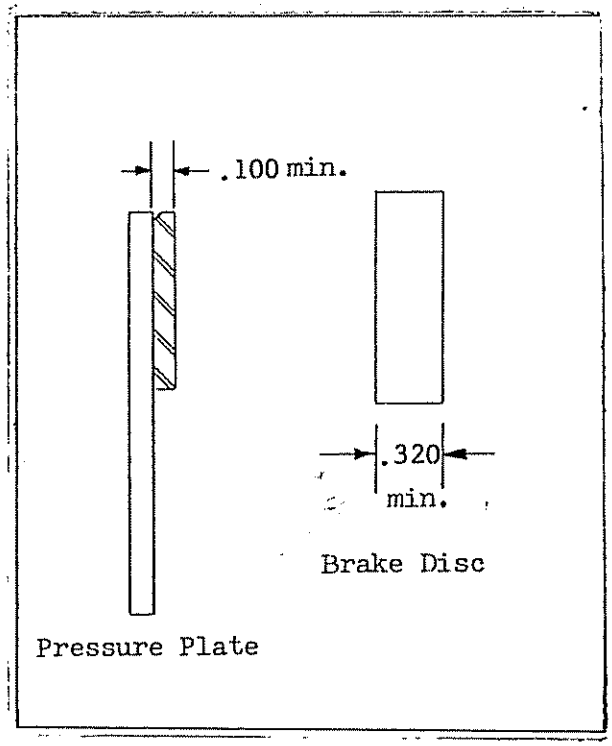
2. Brush alodine exposed areas as follows:

    1. Warm parts and alodine solution to 100° - 125° F.
    2. Brush alodine solution on exposed areas and allow to dry.

CAUTION

DO NOT PAINT PISTONS OR THE PISTON BORES IN THE BRAKE CYLINDER.

III Recommended Wear Limits for Disc and Linings.



IV Brake Lining (Pressure Plate) Removal

The brake linings may be removed without wheel removal, or disconnection of brake line.

1. Jack up aircraft to permit wheel rotation.
2. Remove snap rings (4) (against brake cylinder) from anchor pins (4).
3. Tap anchor pins toward wheel, but do not remove completely from brake.
4. Slide inboard (cylinder side) pressure plate assemblies (2) out.
5. Position wheel to allow access to anchor pins through lightening holes, and remove anchor pins.
6. Position wheel to allow outboard (wheel side) pressure plate assemblies (2) to be slid out between wheel drive keys.
7. Slide pressure plate assemblies (2) out and rotate wheel to remove pressure plate assemblies.

V Brake Lining (Pressure Plate) Installation

Reverse procedure for removal to install pressure plate assemblies in brake.

NOTE:

1. Refer to I.7. (pg. 3) for lining replacement.
2. When installing anchor pins insure that the pins go through holes in pressure plate.

I. MAIN WHEEL ASSEMBLY - TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Cracked or disoriented wheel or wheel half.	1. Hitting rocks or other hard objects during landing or take-off. 2. Landing with flat tire. 3. Landing in crabbing position in cross wind causing exessive side force.	Replace wheel or wheel half. Cracked wheels cannot be repaired satisfactoily.
Damaged bearing cone	1. Misalignment of bearings.	1. Check bearing cup Replace if damaged. Replace bearing cone being sure it is properly seated.
	2. Axle nut improperly torqued.	2. Torque axle nut t aircraft manufacture specifications.
	3. Foreign matter in bearing grease.	3. Be sure bearing grease is free from foreign matter.
	4. Lack of bearing grease.	4. Re-pack bearing grease.
Worn or damaged grease seal rings.	1. Normal wear or improper installation.	1. Replace grease seal rings.

(Cont'd)

II. BRAKE ASSEMBLY - TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Unable to obtain sufficient pressure.	1. Air in hydraulic system.	1. Bleed brake system.
	2. Leak in system.	2. Bleed brake system
Brakes drag.	1. Piston cocked in cylinder.	1. Remove and correct or replace piston.
	2. Foreign matter wedged in brakes.	2. Remove
Brakes do not hold.	1. Lining worn out.	1. Replace Lining.
	2. Lack of pressure due to air in system.	2. Bleed brake system.
	3. Oil or grease on lining.	3. Wipe linings dry. (All saturated lining must be replaced.
	4. New brake linings.	4. Wear in or condition linings with a few light stops.

Cleveland
Wheels & Brakes

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

PRODUCT REFERENCE MEMO

CONDITIONING PROCEDURE FOR NON ASBESTOS ORGANIC BRAKE LINING

The brake lining material used in this brake assembly is a non asbestos organic composition. This material must be properly conditioned in order to provide maximum performance and service life.

Conditioning may be accomplished as follows:

1. Taxi aircraft for 1500 feet with engine at 1700 rpm applying brake pedal force as needed to develop a 5 - 10 mph taxi speed.

2. Allow brakes to cool for 10 - 15 minutes.

3. Apply brakes and check to see if a high throttle static run up may be held with normal pedal force. If so, conditioning is completed.

4. If static run up cannot be held, repeat steps 1 through 3 as needed to successfully hold.

This conditioning procedure will generate sufficient heat to create a thin layer of glazed material at the lining friction surface. Normal brake usage should generate enough heat to maintain the glaze throughout the life of the lining.

Light brake usage can cause the glaze to wear off, resulting in reduced brake performance. In such cases, the lining may be conditioned again following the instructions set forth in this PRM.

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PRODUCT REFERENCE MEMO

AVAILABILITY OF GENERAL MAINTENANCE INFORMATION AND TORQUING PROCEDURES

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

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

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

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

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

COMPLIANCE: Highly Recommended.

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

WEIGHT & BALANCE: Not applicable.

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

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

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

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 SA99GL

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 Aeronautics Bulletin 7A.

thereto as specified hereon meets the airworthiness requirements of ~~Regulations~~ See Type Certificate No. 654-Aero. Bul. 7A; for complete certification basis.

Original Product — Type Certificate Number 654

Make Grumman American Aviation Corp.

Model G-21 and G-21A

Description of Type Design Change

Installation of Cleveland Main Wheels and Brakes in accordance with Parker Hannifin Conversion Kit P/N 199-65, Revision C, dated April 8, 1988, and Cleveland Installation Drawing 50-67, Revision A, dated April 8, 1988, or later FAA Approved revisions.

Limitations and Conditions Maximum static load rating per wheel = 4500 lbs.
Maximum kinetic energy rating per brake = 1,100,000 ft. lbs.
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 those other previously approved modifications will introduce no adverse effect upon the airworthiness of that aircraft.

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

Date of application September 30, 1975 *Date reissued* October 28, 1980

Date of issuance December 3, 1975 *Date amended* April 1, 1981; April 8, 1988

By direction of the Administrator

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

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

This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

Cleveland
Wheels & Brakes

WEIGHT AND BALANCE

FOR

199-06500 KIT

Major components of this kit may differ in weight from existing equipment. Removed components as listed should be weighed. Subtract old installation weight from new installation weight to determine weight change created by installation of this kit. Multiply weight change by moment (applicable to aircraft) and revise weight and balance information in aircraft log book.

DATA

OLD INSTALLATION

Unit	Weight / Unit		# of Units		Weight	
Brake	_____	X	2	=	_____	LBS.
Wheel	_____	X	2	=	_____	LBS.
			TOTAL	=	_____	LBS.

NEW INSTALLATION

Unit	Weight / Unit		# of Units		Weight	
Brake	24.00	X	2	=	48.00	LBS.
Wheel	38.00	X	2	=	76.00	LBS.
			TOTAL	=	124.00	LBS.

Parker
General Aviation