

AIRCRAFT WHEEL & BRAKE DIVISION  
PARKER HANNIFIN CORPORATION  
AVON, OHIO

PARTS LIST

199-101 CONVERSION KIT

MITSUBISHI AIRCRAFT  
MODELS MU-2 SERIES

<u>PART NUMBER</u>	<u>CODE NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
30-131	030-13100	Brake Assembly	2
40-148	040-14800	Wheel Assembly	2
207-01900	207-01900	Flexible Inlet Hose	2
103-22100	103-22100	Bolt (AN5-10A)	24
095-10700	095-10700	Washer (AN960-516L)	24
094-11000	094-11000	Nut (NAS679A5)	24
095-10500	095-10500	Washer (AN960-516)	72
104-05000	104-05000	Plug (AN814-4)	2
139-09900	139-09900	Cushion Clamp (MS21919WDG10)	2
50-62		Installation Drawing	1
SA648GL		Supplemental Type Certificate, STC	1
SA652GL		Supplemental Type Certificate, STC	1
PRM No. 14A		Metallic Brake Lining Conditioning Procedure	1
		Warranty Registration Card	1

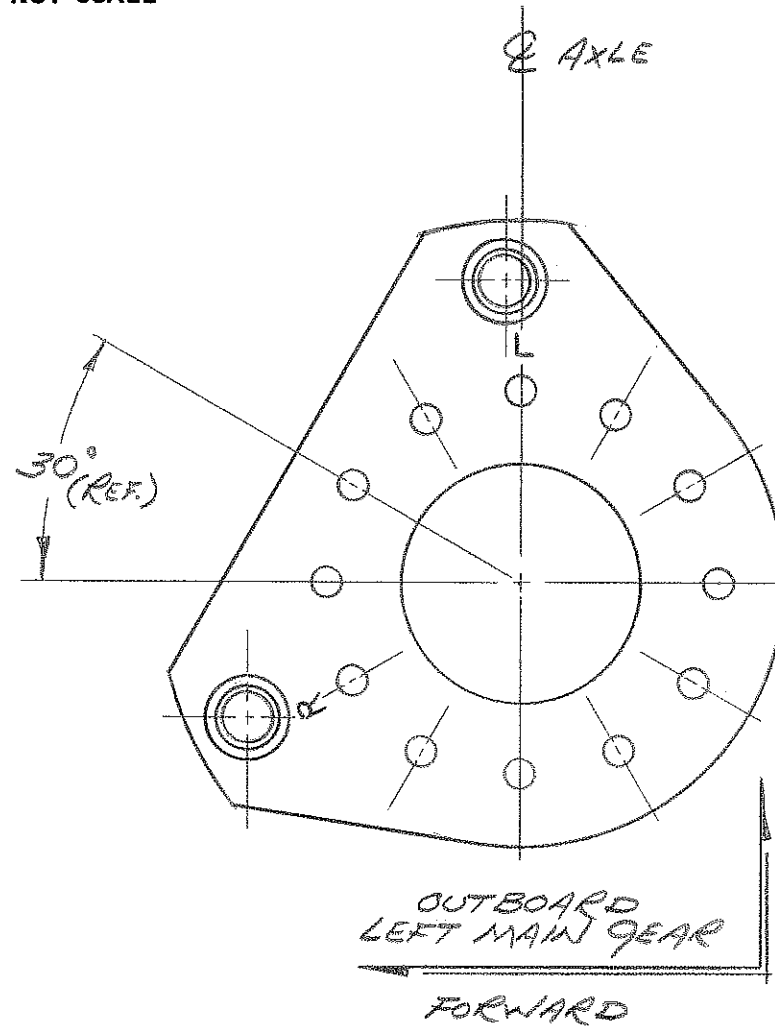
**Notes:**

1. This Kit will convert one aircraft to Cleveland Wheels & Brakes.
2. For use with MIL-H-5606 Brake Fluid

199-101  
 NC  
 REV. A  
 09-28-82  
 02-24-98 (0327-85)

CHANGE NOTICE		LET.	TER.	DESCRIPTION OF CHANGE	CHG. BY	DATE	CHK'D BY
270	1			INITIAL RELEASE	FA	7/22/62	
270	2	A		SEE 941	FA	7/23/62	
270	3	B		SEE 941	FA	7/23/62	

50-62 SAT 1072



**TORQUE PLATE LOCATION:**  
TORQUE PLATE BOLT HOLES ARE TO BE ALIGNED ON AXLE FLANGE AS FOLLOWS:

FOR LEFT MAIN GEAR:  
ALIGN TORQUE PLATE BOLT HOLE (IMPRESSION STAMPED "L") VERTICALLY WITH "L" OF AXLE.

FOR RIGHT MAIN GEAR:  
ALIGN TORQUE PLATE BOLT HOLE (IMPRESSION STAMPED "R") VERTICALLY WITH "R" OF AXLE.

NOTE:

WHEN INSTALLING 65-134 TORQUE PLATE, TIGHTEN ANIS-10A BOLTS TO A TORQUE OF 90-110 IN. LBS. APPLY ANTI-SEIZE COMPOUND MIL-T-5584 ON BOLT THREAD, SURFACE UNDER BOLT HEAD, AND CONTACT SURFACES OF NUT AND WASHER BEFORE INSTALLATION.

MOUNTING HARDWARE:

ANIS-10A BOLTS (24)

ANIS-516L WASHER (24) 1 EA. UNDER BOLT HEAD

N4567945 NUT (24)

ANIS-516 WASHER (72) 3 EA. UNDER NUT

66-90 2 IN. 19

REPLACE WHEN WORN TO .100 THK.

67-18 ANCHOR PIN, APPLY DRY GRAPHITE OR SILICONE GREASE TO ANCHOR BOLT PRIOR TO INSTALLING IN TORQUE PLATE.

30-131 BRAKE ASS'Y

30° (REF.)

SEE DETAIL-A

BRAKE ASSEMBLY ROTATED TO SHOW SECTIONAL VIEW (REF.)

ANIS-24AM BOLTS TORQUE TO 90-110 IN. LBS. (REF.)

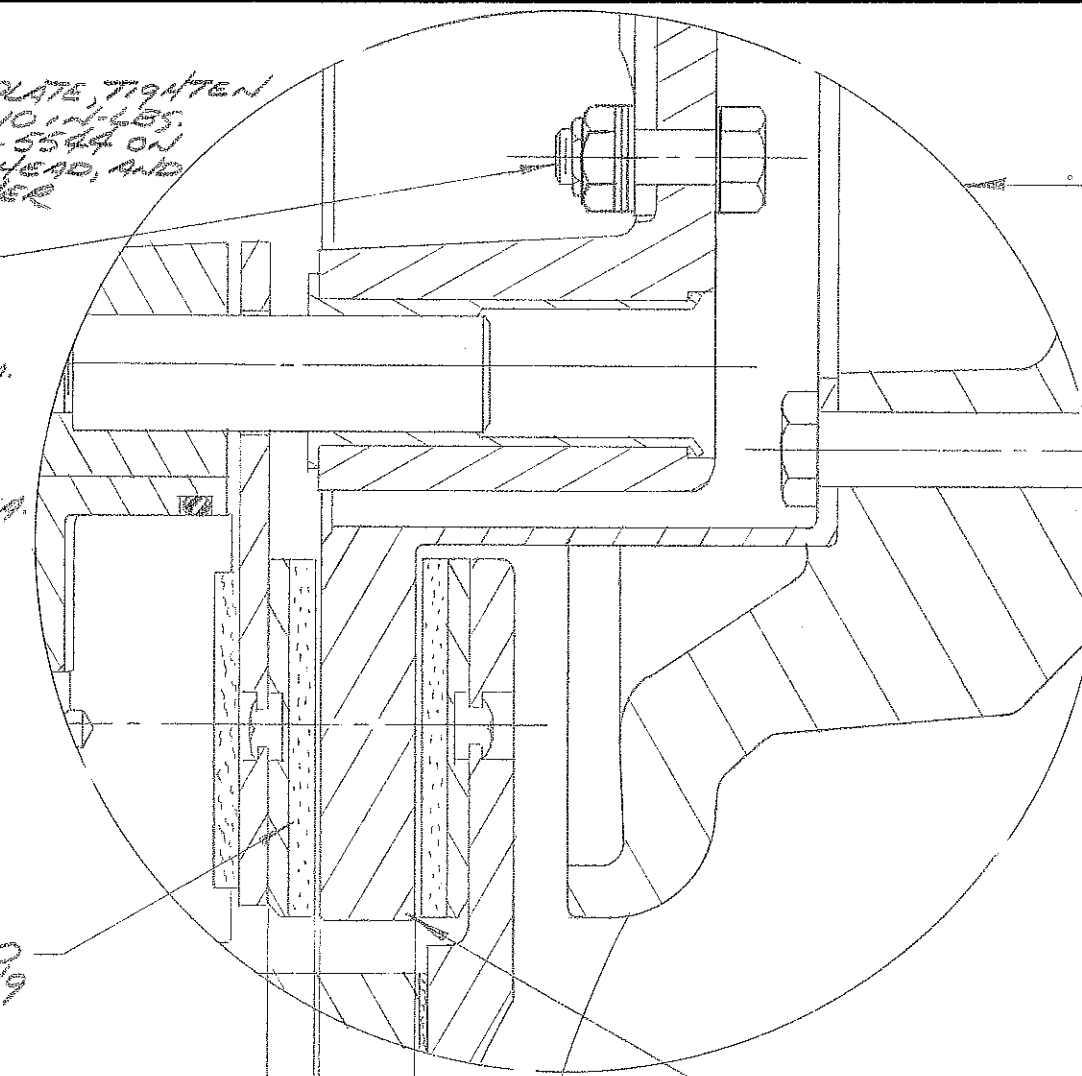
VIEW A

UP

INBOARD LEFT MAIN GEAR

FORWARD

ANIS-10A BOLTS TORQUE TO 90-110 IN. LBS. (REF.)



DETAIL - A - SCALE - FULL

164-72 BRAKE DISC

REPLACE WHEN WORN TO .492 THK.

\* ANIS-4 PLUG

SEE DETAIL-A

BRAKE ASSEMBLY ROTATED TO SHOW SECTIONAL VIEW (REF.)

ANIS-24AM BOLTS TORQUE TO 90-110 IN. LBS. (REF.)

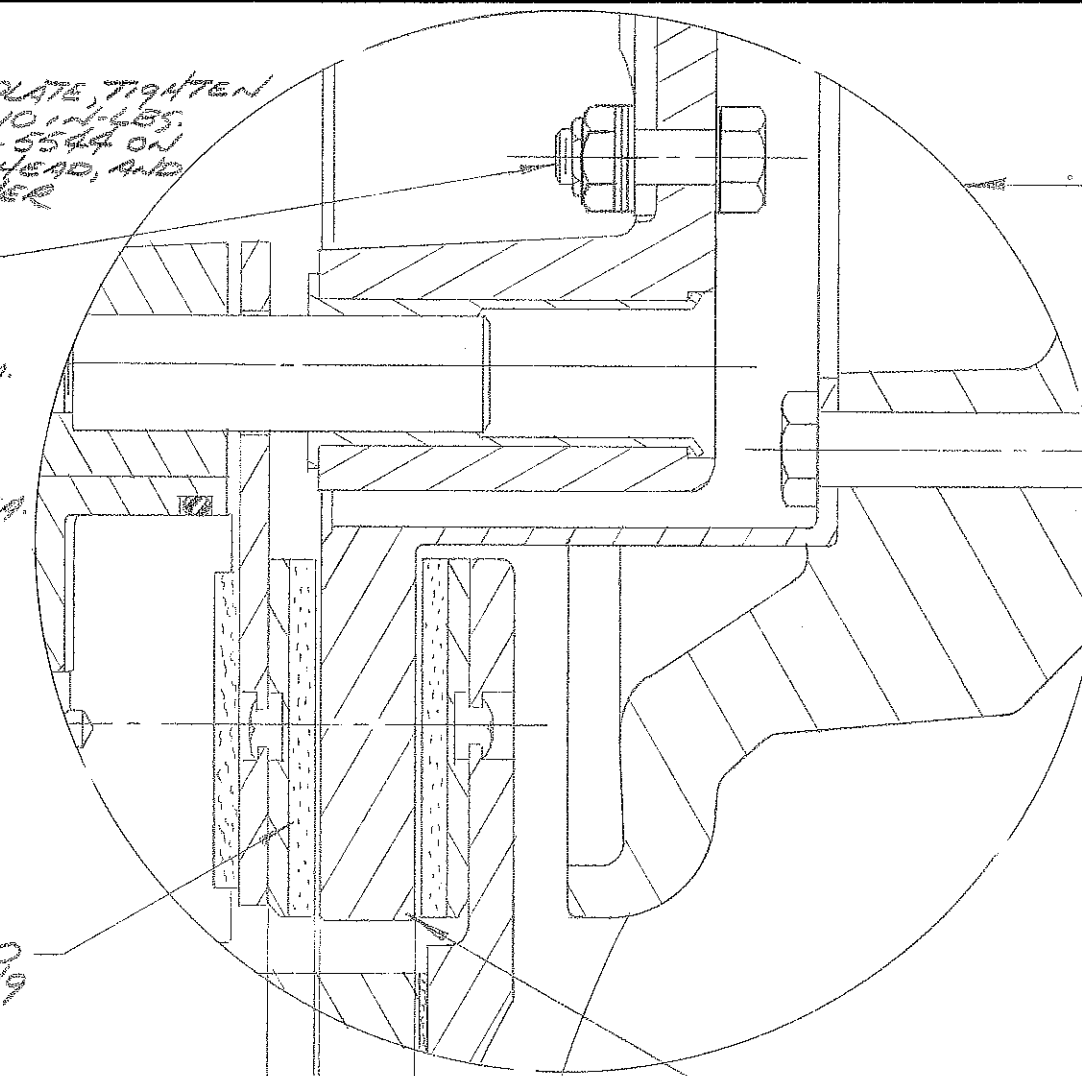
VIEW A

UP

INBOARD LEFT MAIN GEAR

FORWARD

ANIS-10A BOLTS TORQUE TO 90-110 IN. LBS. (REF.)



DETAIL - A - SCALE - FULL

164-72 BRAKE DISC

REPLACE WHEN WORN TO .492 THK.

\* ANIS-4 PLUG

SEE DETAIL-A

BRAKE ASSEMBLY ROTATED TO SHOW SECTIONAL VIEW (REF.)

ANIS-24AM BOLTS TORQUE TO 90-110 IN. LBS. (REF.)

VIEW A

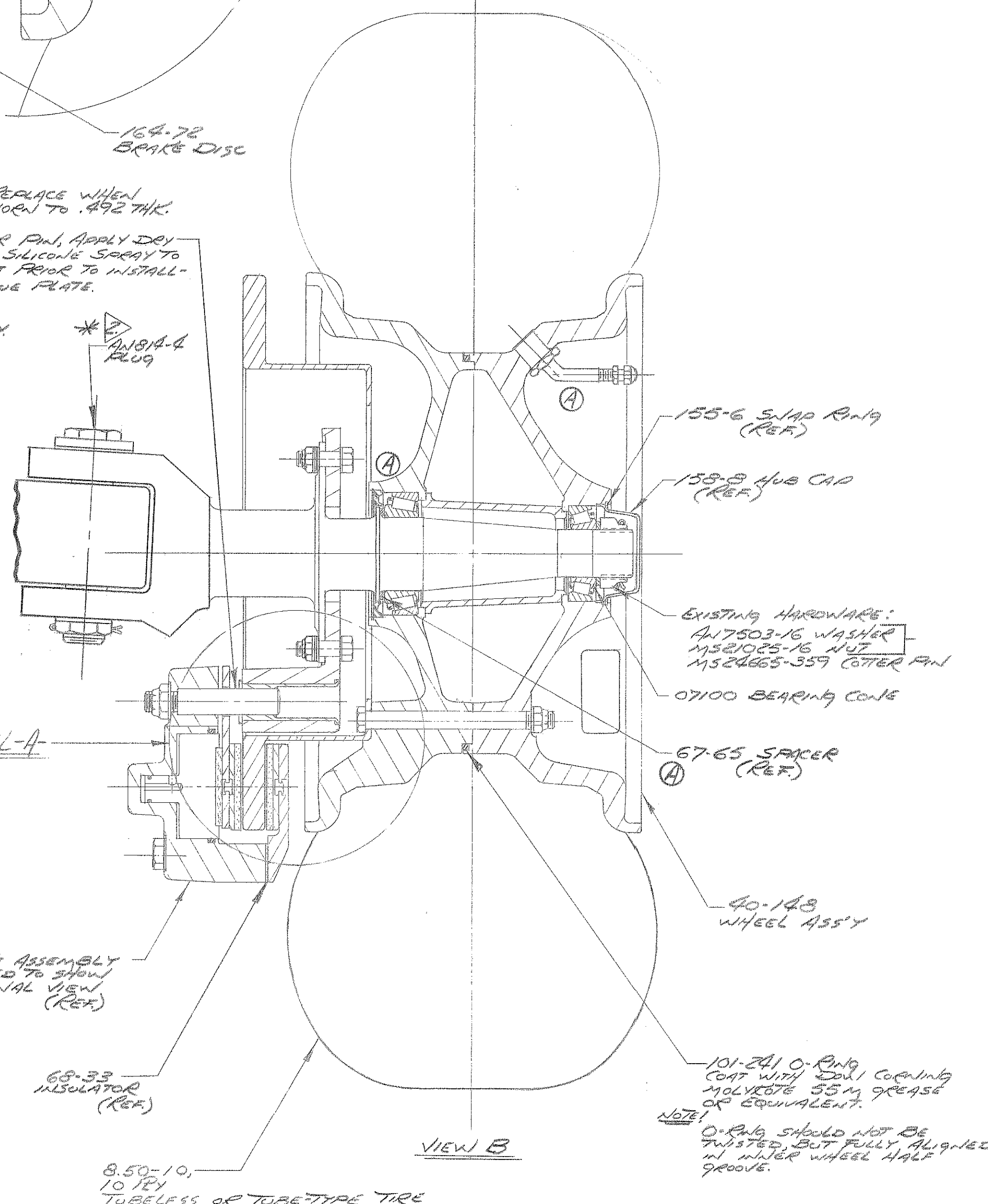
UP

INBOARD LEFT MAIN GEAR

FORWARD

ANIS-10A BOLTS TORQUE TO 90-110 IN. LBS. (REF.)

WHEEL



155-6 SHAD RING (REF.)

158-8 HUB CHD (REF.)

EXISTING HARDWARE:  
ANIS-10A WASHER  
ANIS-10A NUT  
ANIS-10A BOLT

07100 BEARING CONE

67-65 SPACER (REF.)

40-148 WHEEL ASS'Y

101-241 O-RING  
COAT WITH 200/1 CORNING MOLYBDE 35M GREASE OR EQUIVALENT.

NOTE:  
O-RING SHOULD NOT BE TWISTED, BUT FULLY ALIGNED IN INNER WHEEL HALF GROOVE.

8.50-10.10 154  
TUBELESS OR TUBE TYPE TIRE

OUTBOARD

## WEIGHT AND BALANCE DATA

OLD REMOVED GOODYEAR	OLD REMOVED GOODYEAR
WHEEL & BRAKE TOTAL: TO BE COMPUTED	WHEEL & BRAKE TOTAL: 70 LBS. @ AN ARM OF 216.6 IN.
NEW INSTALLED CLEVELAND	
WHEEL ----- 24.70 LBS.	
BRAKE ----- 13.45 LBS.	
TOTAL	38.15 x 2 = 76.30 LBS.

FOR USE WITH MIL-H-5606 BRAKE FLUID

QTY	ITEM	PART NO.	DESCRIPTION	MATERIAL & SPEC.	HEAT TREAT & SPEC.	FINISH & SPEC.	WGT.
1	WHEEL & BRAKE ASSEMBLY	50-62	WHEEL & BRAKE ASSEMBLY	STEEL	150-150	150-150	76.30 LBS.
1	WHEEL & BRAKE ASSEMBLY	50-62	WHEEL & BRAKE ASSEMBLY	STEEL	150-150	150-150	76.30 LBS.

THIS DESIGN IS THE PROPERTY OF PARKER HANNIFIN CORP. AIRCRAFT WHEEL AND BRAKE DIVISION AND IS NOT TO BE COPIED, REPRODUCED, OR USED AS THE BASIS FOR MANUFACTURE OR SALE OF EQUIPMENT WITHOUT OUR WRITTEN PERMISSION.	WORK TO DIMENSIONS - DO NOT SCALE. TOLERANCE FOR ANGULAR DIMS. ± 1/2° UNLESS NOTED. REMOVE ALL BURRS BEFORE PLATING. DRILL PER INSP. PROCEDURE NO. 114.	BREAK SHARP EDGES 0.010 UNLESS NOTED. REMOVE ALL BURRS BEFORE PLATING. DRILL PER INSP. PROCEDURE NO. 114.	NAME	DATE	SCALE	CHECKED BY	APPROVED BY

Cleveland Wheels & Brakes  
Aircraft Wheel and Brake Division  
Parker Hannifin Corporation  
1160 Center Road  
Avon, Ohio 44011

Parker

INSTALLATION DRAWING

50-62

\* NOTES:

- 207-19 HOSE ASS'Y NOT NEEDED WHEN REPLACING GOODYEAR EQUIPMENT
- ANIS-4 PLUG NOT NEEDED WHEN REPLACING GOODYEAR EQUIPMENT

1. Jack aircraft as outlined in accordance with Mitsubishi Service Manual. Remove existing main gear wheels. Retain axle nut.
2. Disconnect lower hydraulic line from existing brake housing fitting and cap tightly.
3. On model aircraft MU-2B: -25, -26, -26A, -30, -35, -36, -36A, -40, -60, disconnect hydraulic swivel fitting at spindle location and solid line on strut to where flexible line is attached. Discard metal line and swivel fitting. Retain large cushion clamp around gear leg. Cap flexible line at bracket. Install plug AN814-4 into spindle where swivel was removed as shown on 50-62 drawing, Sheet 1 of 2.
4. Position new torque plate assembly, part number 75-150 as shown in Detail A, with the letter L or R outboard, for appropriate side, in the vertical plane on center line. Install new mounting hardware, bolts, nuts, and washers and torque hardware to 90-110 in-lbs.
5. Remove snap ring, part number 155-6 and hub cap, part number 158-8 and outer bearing cone, part number 07100 from wheel assembly, part number 40-148.  
NOTE: Store outer bearing ring and cap in a clean environment.
6. Disassemble new wheel assembly, part number 40-148, by removing assembly, bolts, nuts and washers.  
NOTE: Prior to wheel assembling, coat O-ring with Dow Corning Molykote 55M.
7. Install wheel O-ring on inner wheel half.  
CAUTION: Seal should not be twisted, but fully aligned in groove.
8. Install serviceable tire on wheel assembly, part number 40-148 and reassemble wheel halves using assembly bolts and nuts and torque wheel nuts to 300 in-lbs.
9. Check the axle and nut for any burrs or rough threads and remove if they are present. Install new axle spacer, part number 67-65, with radius towards axle flange (radius inboard). Apply grease to the axle thread and all bearing surfaces of washers and nuts. Mount the wheel and tire on the axle and install the outer bearing cone, washer, and axle nut. Tighten mounting nut to a torque of 600 in-lbs. first, then loosen and retorque to 300 in-lbs. To align for cotter pin installation, back nut to the next cotter pin opening and install cotter pin. Install hub cap, part number 158-8, and snap ring, part no. 155-6, in the wheel assembly.
10. Remove 12 tie bolts, part number ABP4-24AM, and 2 insulators, part number 68-33, from brake assembly, part number 30-131, and remove all 4 backplates from assembly.
11. Spray silicone on anchor pins, part number 69-18.
12. Slide brake assembly, part number 30-131 onto torque plate.

13. Reinstall the 12 tie bolts into the brake assembly.
14. Position the 2 insulators, part no. 68-33, over the 12 tie bolts. Then slip back plates between the brake disc and wheel. Position to align holes and tighten the tie bolts. Torque to 80-90 in-lbs.
15. A. Models MU-2B, MU-2B-10, -15, -20  
  
Reconnect existing flexible brake line to brake assembly fitting, part no. 104-31.  
  
NOTE: It may be necessary to shorten existing flexible brake hose approximately 4" to insure proper clearance.  
  
B. Models MU-2B-25, -26, -26A, -30, -35, -36, -36A, -40, -60  
  
Connect flexible brake line hose, part no. 207-19, to brake assembly fitting, part number 104-31, as shown in View A. Route flexible line straight down from fitting to spindle location, then forward to run along side the forward edge of the gear leg up to the existing flexible line which is attached to the center position of the leg and reconnect. Using the existing large cushion clamp on the leg, install new cushion clamp (DG-10) around new hose and secure in location.
16. After reconnecting all existing lines and hoses in the braking system and prior to bleeding the system, check reservoir for adequate fluid level. Pressure bleeding is preferred and recommended for best results. Bleed complete system and remove all trapped air from the hydraulic brake system.
17. After accomplishing the system bleeding, depress and release brake pedals several times, checking for brake drag by rotating the wheel by hand. A slight amount of drag is normal; however, a tightly bound wheel should be investigated and corrected prior to aircraft being released to service.  
  
CAUTION: Excessive drag can be caused by an improperly seated lining.
18. It is very important and necessary that the aircraft landing gear be retracted and the new brake line and caliper assembly be checked for proper clearance in the wheel well. Perform retraction test on aircraft at least twice to insure that the gear is in the jammed up position on one of the tests. Check for clearance. Also, the hydraulic line should be noted, to make sure it has adequate radius.
19. After completion of the retraction tests, remove the aircraft from the jacks and remove all jacking hardware. Complete 337 form and make appropriate Log Book Entries and corrected weight and balance for the installation.
20. Weight and Balance:  
  
Cleveland Wheel Assembly, Part No. 40-148 - 24.7 lbs.  
Cleveland Brake Assembly, Part No. 30-131 - 13.45 lbs.

# Cleveland

Wheels & Brakes

Parker Hannifin Corporation

**Aircraft Wheel & Brake**

1160 Center Road

Avon, Ohio 44011 USA

1-800-BRAKING (272-5464)

216-937-1272 • FAX 216-937-5409

# PRODUCT REFERENCE MEMO

## METALLIC BRAKE LINING CONDITIONING PROCEDURE

The brake lining material used in this brake assembly is an iron based metallic composition. This material must be properly conditioned (glazed) in order to provide optimum service life.

Dynamometer tests have shown that at low braking energies, unglazed linings experience greater wear and the brake discs can become severely scored.

Conditioning may be accomplished as follows:

1. Perform two (2) consecutive full stop braking applications from 30 to 35 kts. Do not allow the brake discs to cool substantially between stops.
2. On aircraft with tail wheels, exercise caution during stopping to prevent tail lifting. Due to the efficiency of these brakes, extremely hard braking could result in lifting the tail from the ground.

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

Visual inspection of the brake disc will indicate the lining condition. A smooth surface, without grooves, indicates the linings are properly glazed. If the disc is rough (grooved), the linings must be reglazed. The conditioning procedure should be performed whenever the rough disc condition is evident.

Light use, such as in taxiing, will cause the glaze to be worn rapidly.

Use caution in performing this procedure, as higher speeds with successive stops could cause the brakes to overheat resulting in warped discs and/or pressure plates.

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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

DEPARTMENT OF TRANSPORT

# Supplemental Type Approval

Number: SA90-118

This approval is issued to:

Issue No.: 1

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

Approval Date: September 26, 1990

Issue Date: September 26, 1990

Responsible Region: Ontario

Aircraft/Engine Type or Model: Mitsubishi MU-2B, MU-2B-10, -15, -20, -25,  
-26, -30, -35, and -36

Canadian Type Approval or Equivalent: A-96

**Description of Type Design Change:**

Installation of Parker Hannifin Wheels and Brakes Conversion Kit,  
199-101 dated 9-28-82, in accordance with FAA Supplemental Type  
Certificate (STC) SA652GL.

**Installation/Operating Data,  
Required Equipment  
and Limitations:**

This installation must be in accordance with  
Parker Hannifin Drawing Number 50-62, Sheet 1  
and 2, Revision B, dated April 20, 1983.

**Conditions:** This approval is only applicable to the type/model of  
aeronautical product specified therein. Prior to incorporating this modifi-  
cation, it shall be established that the interrelationship between this  
change and any other modification(s) incorporated will not adversely  
affect the airworthiness of the modified product.



  
T. Gretton

A/ Regional Airworthiness Engineer  
For Minister of Transport

Canada



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](mailto:Clevelandwbhelp@parker.com)  
Web-site: [www.clevelandwheelandbrake.com](http://www.clevelandwheelandbrake.com)  
Manufacturer of Cleveland Wheels & Brakes

United States of America  
Department of Transportation — Federal Aviation Administration  
**Supplemental Type Certificate**

*Number* SA648GL

*This certificate, issued to* Aircraft Wheel & 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 3 of the Civil Air Regulations.* (For complete certification basis, see TCDS A10SW)

*Original Product — Type Certificate Number* A10SW  
*Make* Mitsubishi  
*Model* MU-2B-25, -26, -26A, -35, -36, -36A, -40,  
and -60

*Description of Type Design Change*

Install Parker Hannifin Wheels and Brakes (199-101 (Conversion Kit dated 9-28-82) according to Installation Drawing and Instructions Number 50-62, Sheet 1 and 2, Revision B, dated April 20, 1983.

*Limitations and Conditions*

The installer must determine the compatibility of this modification with other previously approved modifications.

*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* April 23, 1982

*Date issued*

*Date of issuance* September 10, 1982

*Date amended* October 8, 1982; June 21, 1983



*By direction of the Administrator*

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*



United States of America  
Department of Transportation — Federal Aviation Administration  
**Supplemental Type Certificate**

*Number* SA652GL

*This certificate, issued to* Aircraft Wheel & 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 3 of the Civil Air Regulations.* (See TCDS A2PC for complete certification basis.)

*Original Product — Type Certificate Number* A2PC

*Make* Mitsubishi

*Model* MU-2B, MU-2B-10, -20, -15, -30, -35, -25, -36,  
and -26

*Description of Type Design Change*

Install Parker Hannifin Wheels and Brakes Conversion Kit, 199-101 dated 9-28-82, according to Installation Drawing Number 50-62, Sheet 1 and 2, Revision B, dated April 20, 1983.

*Limitations and Conditions*

The installer must determine the compatibility of this modification with other previously approved modifications.

*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 29, 1982

*Date issued*

*Date of issuance* October 8, 1982

*Date amended* June 21, 1983



*By direction of the Administrator*

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.

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