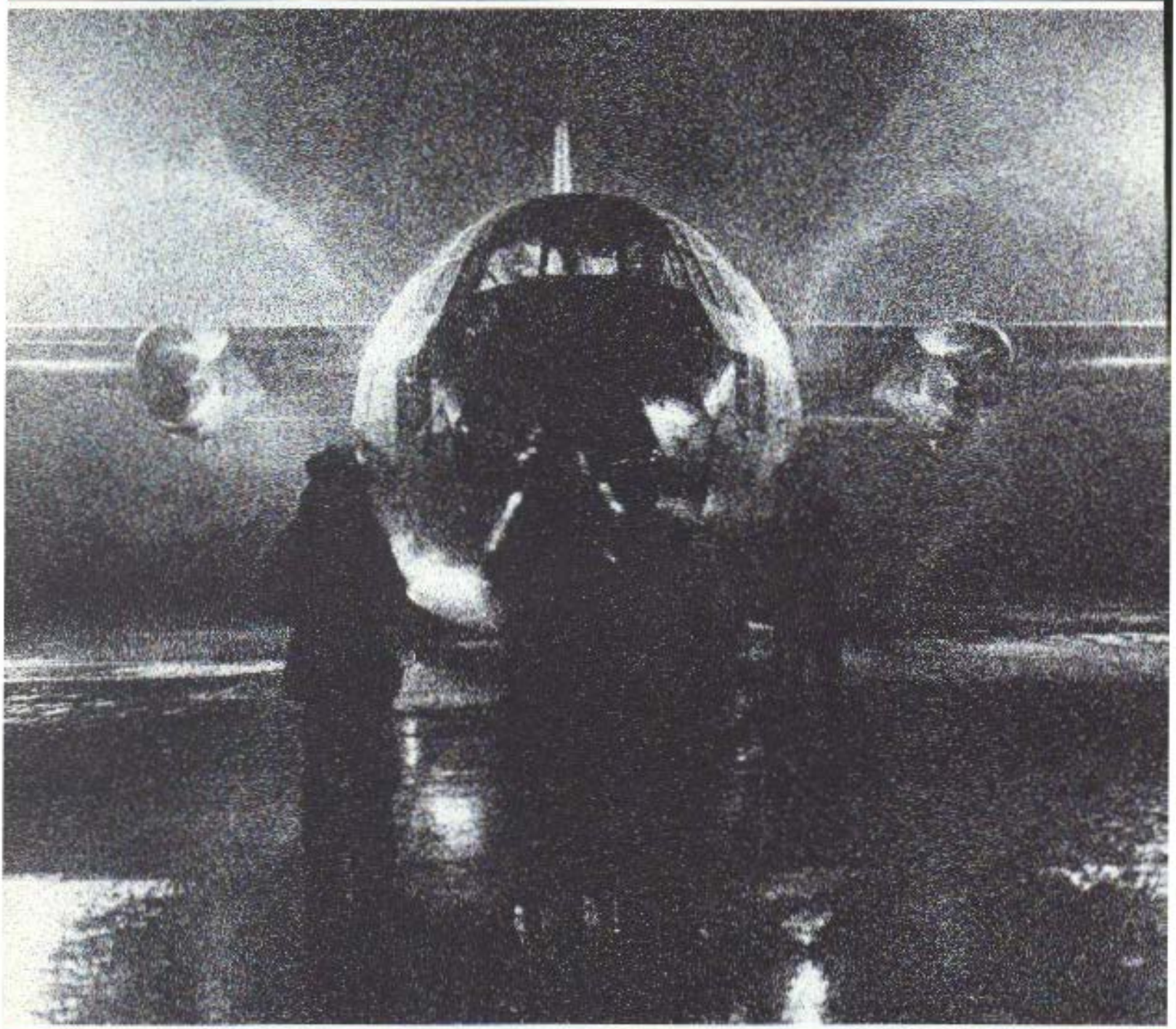
Lockheed

VOL. 13, NO. 1, JANUARY— MARCH 1986

service news

A SERVICE PUBLICATION OF LOCKHEED-GEORGIA COMPANY, A DIVISION OF LOCKHEED CORPORATION



MAIN LANDING GEAR RUB

Previous Page Table of Contents Next Page

Lockheed
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A SERVICE PUBLICATION OF
LOCKHEED-GEORGIA COMPANY
A DIVISION OF
LOCKHEED CORPORATION

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Vol. 13, No. 1, January - March 1986

CONTENTS

Cover: AS winter tightens its grip in the Northern Hemisphere, the all-weather capabilities of the tough, versatile Hercules aircraft become a vitalfactorin keeping schedules in tact and supply lines open.

Editor's note: The cover notes in Vol. 12, No. 4 statethat over 1800 Hercules aircraft have been built. That figure included both the units delivered and those Under contract at the time. As of mid-December 1985. a total of 1765 Hercules aircraft had been delivered.

FocalPoint

Field Service- Dedicated to Serve You

The first operational Hercules aircraft was delivered in December **1956 to** Ardmore. Oklahoma. Almost 1800 Hercules airlifters and over 17 million flying hours later, the Lockheed-Georgia Company continues with a strong commitment to provide the support necessary for every operator to achieve maximum utilization of their aircraft and associated equipment.

Having been associated with Lockheed for averthirty years and in my present posltion, I am keenly aware of the Lockheed **commitment and dedication to** support its products. We have a Field Service organization designed to provide technical assistance to every customer, world-wide, through on-site service representatives, regional service representatives, and at the factory.

The **long** history, outstanding accomplishments, and remarkable record of the Hercules is not only a tribute to the aircraft, hut a tribute to the personnel of the many operators of the aircraft throughout the world.

We **like to think that our** Field Service **Representatives played an importantand** vital role in maklng these achievements possible. We are proud of the unique contribution Lockheed-Georgia Field Service Representatives have made to this record of success. A traditionofservice born with the delivery of that first Hercules lives today through the personal dedication of these specialists to the success of the aircraft and the operators who fly them.

Field Service Representatives are Lockheed career professionals who are willing to serve in support of our products anywhere the aircraft operates and take pride in theoperational effectiveness of the customers they serve. These representatives provide a key and vital link in a vast communication network between operators and the factory. Their reports of customer operations, successes and problems. are read by all Lockheed organizations and top management. Information from these reports is not only used toaddress immediate problems hut serves to enhance future aircraft performance through improved maintenance and inspection procedures and manufacturing techniques.

Lockheed-Georgia Field Service is dedicated to serve you, the Hercules operator, whether on the flight line, in your shops, in the classroom, or back in Georgia at our factory. Below, I have identified the key Hercules service management people for your information and use. **Let us hear from you.**

Sincerely,

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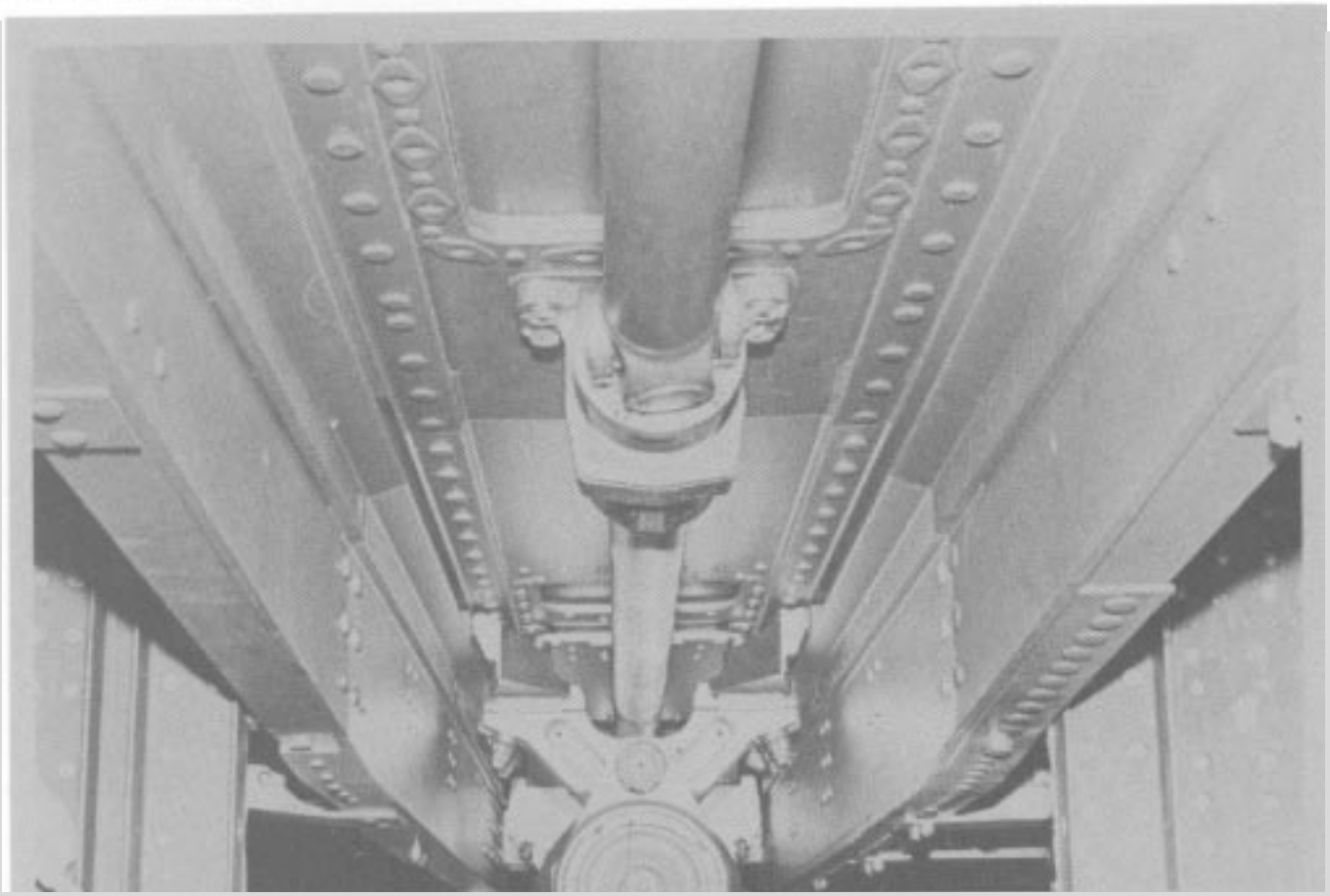

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by Charles W. Callan
Aircraft Design Engineer, Senior

Operators of Hercules aircraft may on some occasions find evidence that there has been contact between the main landing gear torque strut and the vertical beams, or between the main gear piston and shelf bracket. This contact could be the result of any or a combination of the following causes:

- Shoe misadjustment
- Shoe or track wear
- Tire unbalance

The nature of the indications of landing gear rub are helpful in determining the extent of corrective action necessary to deal with the problem. For examplc, an airplane with suspected gear rub where only scratched or chipped paint is observed is considered flyable until adjustments can be made to provide more clearance. Do not, however, continue to operate the airplane for more than 100 flight hours without taking action to relieve the rub. An airplane that shows evidence of rubbing in which metal-to-metal contact is taking place, causing gouging or scratching of the surfaces, is not considered flyable. Immediate corrective action is mandatory.

The following steps can be taken to correct the rubbing condition:

1. Check the lower shoe gap between the inboard face of the shoe and the face of the track. The gap should be 0.002 to 0.007 inch, measured with the airplane on jacks.
2. Check the lower shoe fore and aft clearances to ensure that they are not excessive. Adjust if required (see Figure 1).
3. Check the adjustment of the upper shoes for proper clearance and make sure that the tops of both shoes are within 0.06 inch of being an equal distance above the swivel bracket.
4. Check the upper shoe outboard facings (see Figure

Previous Page Table of Contents Next Page

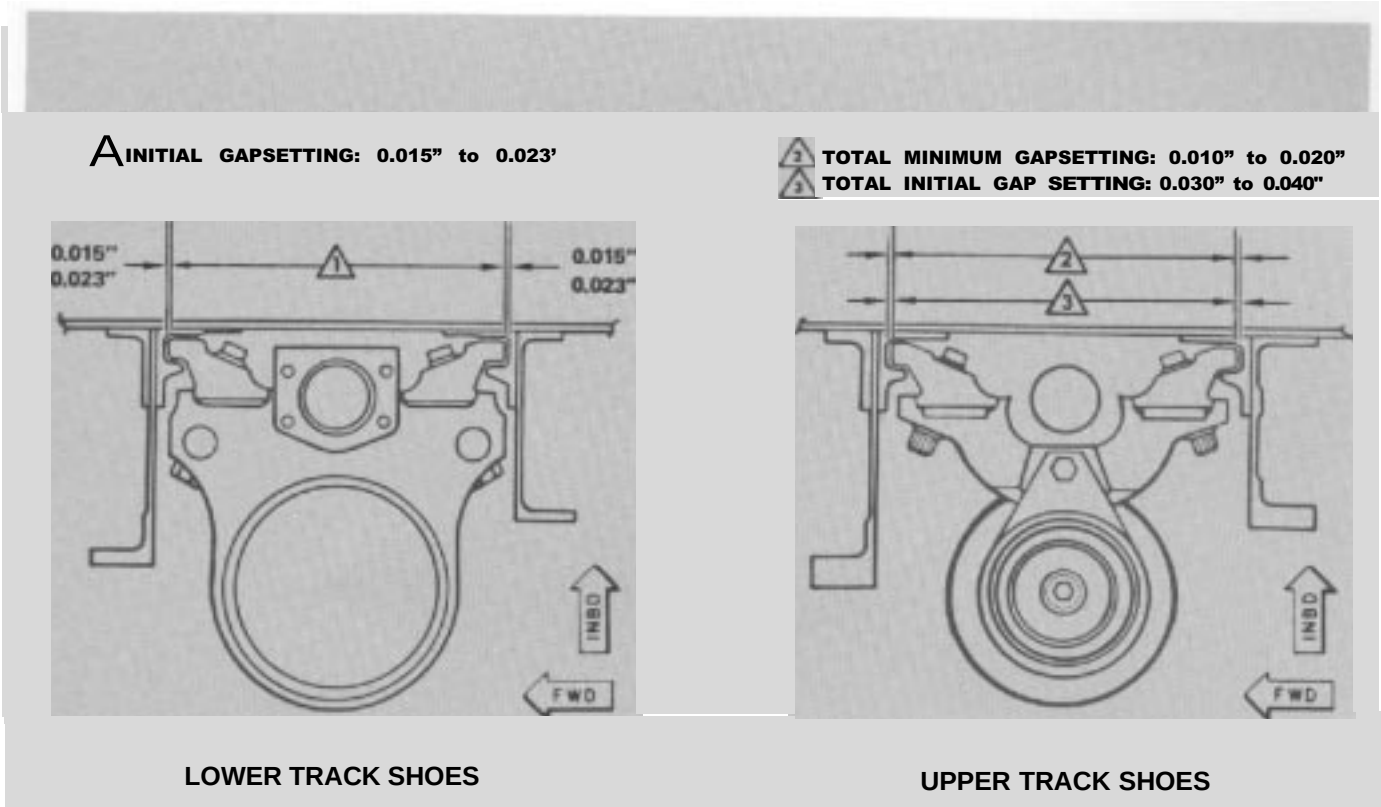


Figure I. **Track shoes – fore and aft clearances.**

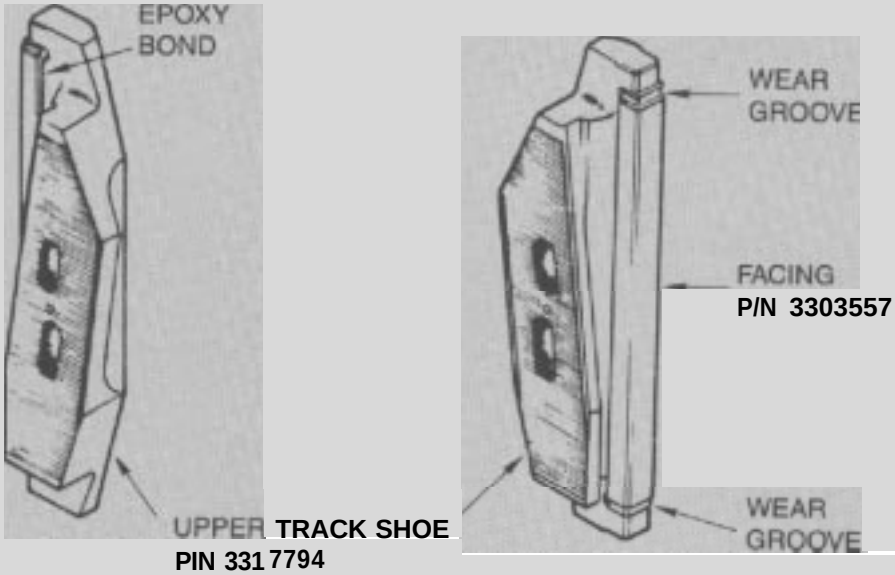


Figure **2. Upper track shoe assemblies.**

Previous Page Table of Contents Next Page

2) for excessive wear according to the instructions in the appropriate maintenance manual, and replace if necessary.

5. Check for unbalanced wheel and tire assemblies and correct if necessary.

If a main landing gear strut has a rubbing condition that cannot be corrected by the above measures, check to see whether the aircraft has the thick (0.130 inch) serrated plates (P/N 372602-11, and -1R) installed between the upper shoes and the swivel bracket (see Figure 3).

If the thick serrated plates are present on the aircraft in question, the rubbing condition can be relieved by substituting the thin (0.065 to 0.070 inch) serrated plates (P/N 372602-3 and -4). The use of the thinner serrated plates shifts the position of the main landing gear piston/axle slightly outboard, thereby increasing the clearance in the contact area.

The thinner plates are interchangeable with the thick plates and may be substituted if increased clearance is desired.

Note that plates should bc replaced in pairs, and that a combination of thick and thin plates on one swivel bracket is not acceptable. If the P/N 372602-3 and -4

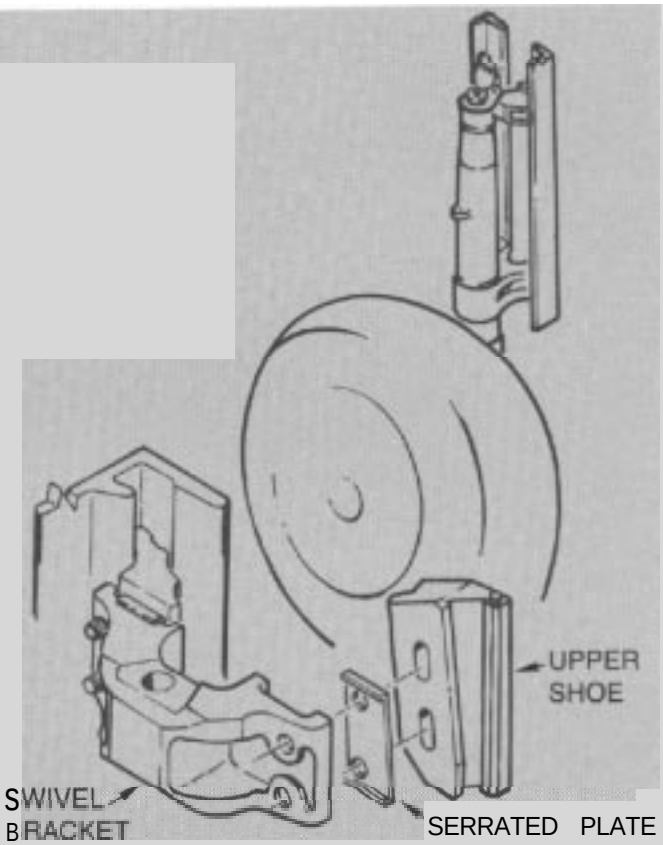


Figure 3. **Upper track shoe installation.**

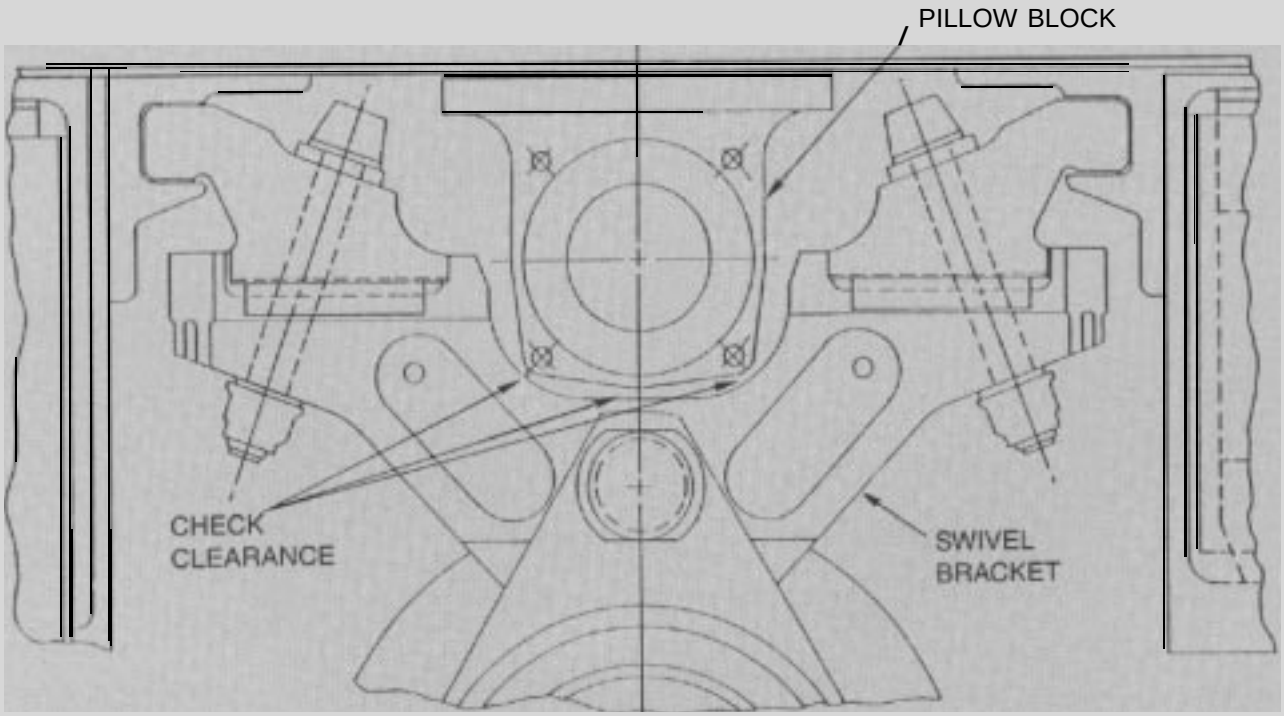


Figure 4. **Clearance check between swivel bracket and pillow block.**

Previous Page Table of Contents Next Page

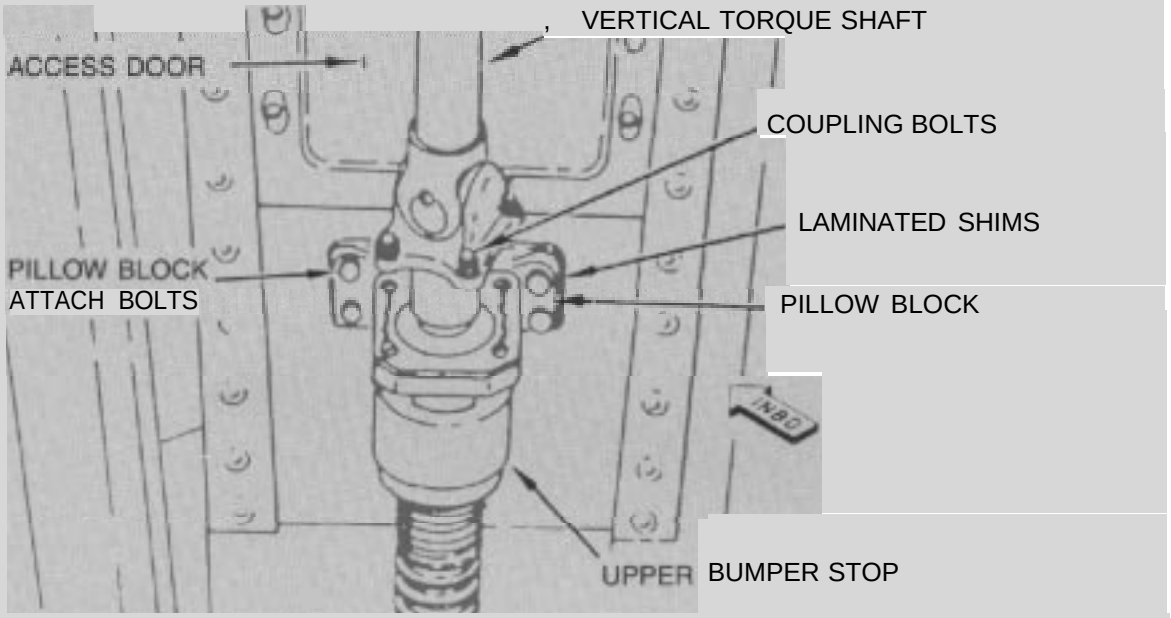


Figure 3. Pillow block installation.

thin serrated plates are not readily available, the -lL and -lR thick plates can be modified to the thinner -3 and -4 configuration by machining the inside of the channel section web to 0.065 to 0.070 inch in thickness. Then replate the reworked area with cadmium.

When thin serrated plates are substituted, care must be taken to ensure that there is adequate **clearance** between the swivel bracket and the ball screw pillow block (see Figure 4). It will be necessary to verify that this clearance exists during functional extension and retraction operations on the ground. The clearance should be no less than 0.015 inch. If the clearance is less than this, the laminated shims (P/N 373556-l) between the pillow block and the side panel may be reduced in thickness until the required clearance is obtained (see Figure 5). If there is only a single point of contact, an additional option may be considered for obtaining the required clearance. That option is to remove up to 0.020 inch of the pillow block edge material at the point where the interference is taking place.

service news

Previous Page Table of Contents Next Page

BRAKE PISTON INSULATOR INSPECTION GUIDELINES

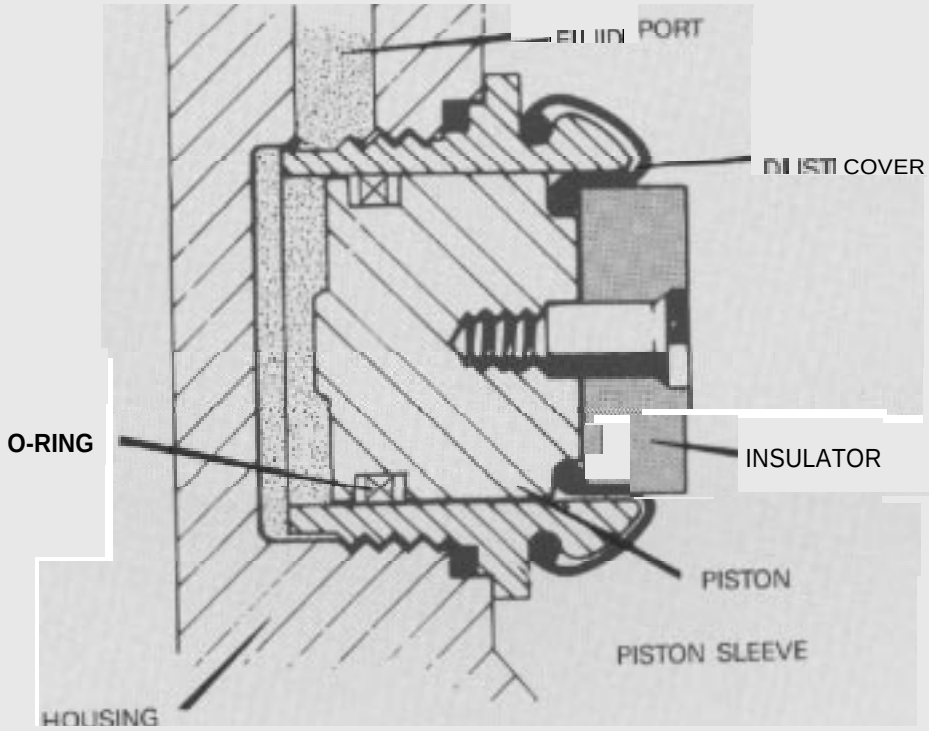
There have been a number of reports of Goodyear multi-disk brakes being removed because of crushed or broken insulators. Here is a little background information on the problem, and some guidelines for inspection and acceptance or rejection of brake piston insulators.

Originally there was no specific requirement for compression strength or load testing of brake piston insulators. After the problem of broken and crushed insulators was reported, the parts were tested by Raymark and Abex, the two vendors concerned. The tests revealed that the Raymark parts crushed at 9,000-13,000 pounds, while the Abex parts failed at 20,000-25,000 pounds.

In December 1983, a minimum acceptable crush load requirement of 18,000 pounds was included in the specification. Goodyear also added a requirement that the vendors stamp a letter H and the supplier identification on same face of the insulator as the part number. Any insulator so marked will be good part.

For inspection of used insulators, parts that are of inadequate strength usually delaminate and are therefore easy to identify. Any insulator that is starting to delaminate should be replaced. Also check visually for blisters, nicks, and cracks. Surface cracks are acceptable; but cracks that extend into the screw hole are cause for rejection. The height of the insulator is also important in determining if a part may be reinstalled for another run. Brake piston insulators less than 0.669 inches high should not be continued in service.

service news



MULTI-DISC ASSEMBLY

CONTROLLING T-56 ENGINE STARTING TEMPERATURE

Occasionally we note excessive turbine inlet temperature (TIT) during engine start, and our usual reaction is to check temperature datum (TD) amplifier calibration. However, improper calibration or malfunction of the TD amplifier is not the cause of excessive TIT during engine start. If the propeller blade angle is properly adjusted and the starter is supplied with an adequate supply of air, then the cause of high TIT is almost invariably excessive fuel flow. In any event, the TD amplifier cannot prevent excessive TIT; it can only reduce fuel flow after the overtemp occurs by driving the TD valve to a "take" position.

Proper operation of the TD system will prevent serious damage to the engine turbine, but repeated overtemps (TIT in excess of 830*C) during start are somewhat life-limiting for the engine. Therefore, in daily operation, the engine hydromechanical system should control fuel flow so that an overtemp will occur only if induced by an abnormal condition such as excessive blade angle, low bleed air pressure, high ambient air temperature, etc.

Proper fuel flow during start and acceleration is a function of the fuel control metering system output that is fine-tuned by manual adjustment of the TD valve null orfice. If the TIT consistently exceeds 82O*C and then is reduced by the TD amplifier start limit function, the TD valve null orifice definitely needs to be adjusted toward the decrease fuel flow direction. Conversely, if TIT during start is less than 78O*C, the null orifice requires an increase adjustment in order for the engine to accelerate properly.

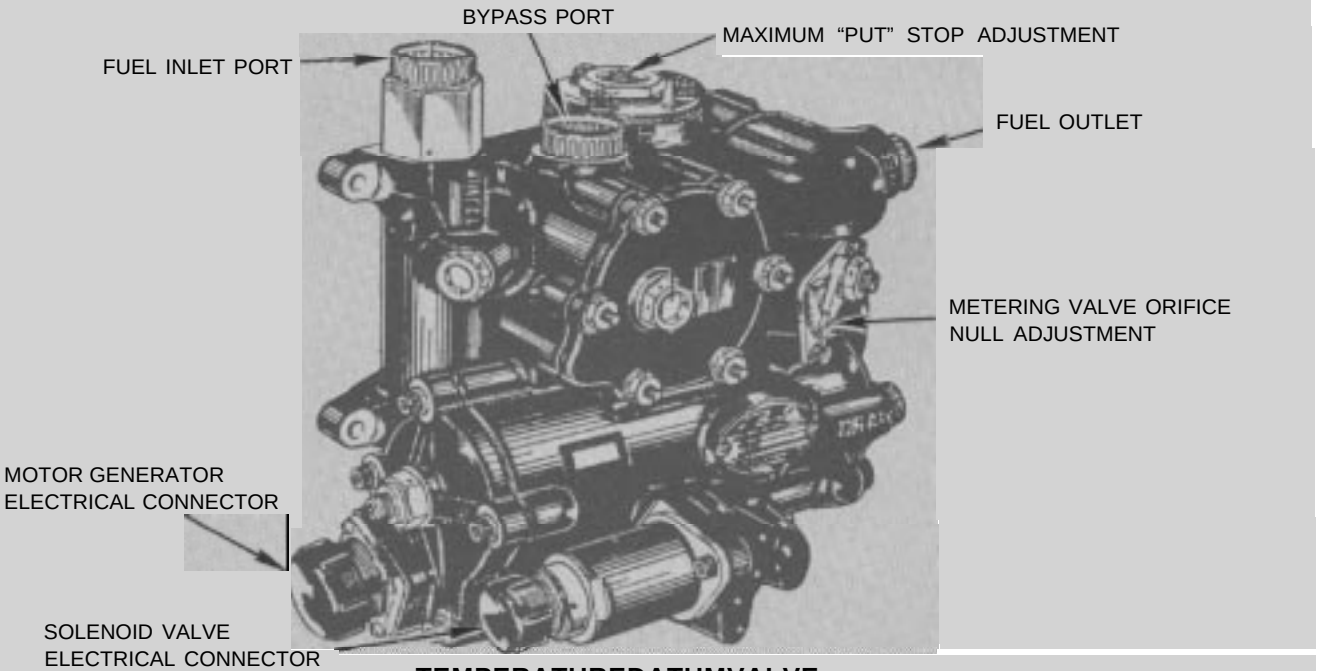
The "Null Engine Start" check will determine if the engine hydromechanical fuel schedule is properly adjusted. This check establishes that a safe engine start could be accomplished in the event of a TD system failure at a remote location where there is no maintenance capability.

Please remember these points when diagnosing and correcting an excessive TIT discrepancy that occurs during engine start and acceleration:

1. The TD valve null orifice adjustment is provided for the sole purpose of matching the hydromechanical fuel system output to the engine fuel requirements during start and acceleration.

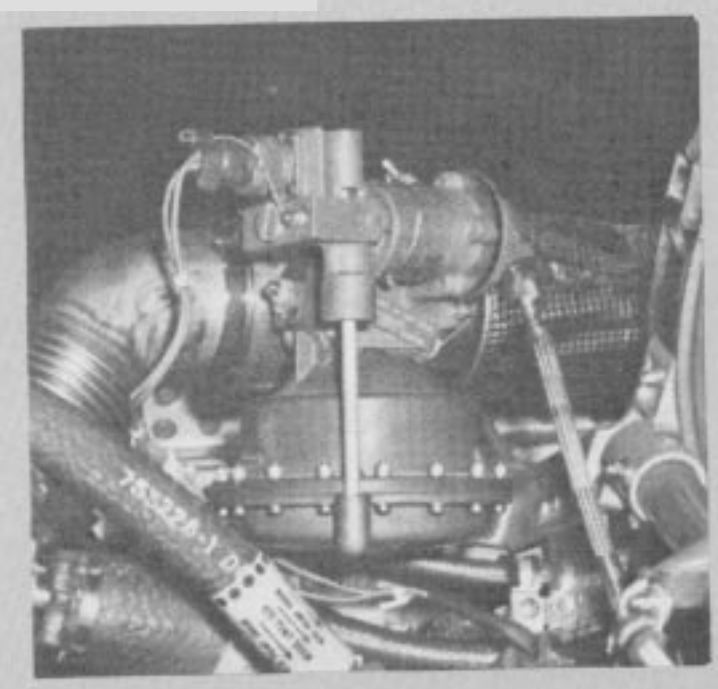
2. The TD valve null orifice adjustment should never be used to compensate for rich or lean conditions during normal operation.

Service news



TEMPERATUREDATUMVALVE

Longer Life for Starter Parts



STARTER CONTROL VALVE ADJUSTMENT

Increasing the Rise Rate Protects Starter Components

Later model Bendix starters (P/N 36E84-18QD or -18QF, for example) are equipped with a stronger clutch return spring. The stronger spring may, under certain circumstances, allow the starter to spool up to a higher RPM before the starter engages. This higher engagement RPM may cause a significant increase in the wear rate on the clutch and coupling teeth, thereby reducing the service life of these components. Bendix Service Bulletin No. 124A has been issued to establish the procedure to elevate the rise rate of the 38E73 starter control valves in order to make them compatible with the stronger return springs. Starter control valves which have been adjusted in compliance with the service bulletin may be identified by the letter "A" following the serial number on their name plate.

Note that the increased rise rate called for in the service bulletin will have no adverse effects on earlier configuration Bendix, AiResearch or Hamilton Standard starters currently being used on C-130 or L-lOO aircraft.

The starter control valves that Bendix Service Bulletin No. 124A applies to are as follows:

Allied/Bendix Fluid Power Division Starter Control Valve models:

38E73 - 4A S/N 1538 and earlier

38373 - 5A S/N 201 and earlier

38E73 - 7A S/N 802 and earlier

Some starter control valves have been previously adjusted at the factory and do not have the "A" stamped after the serial number on the nameplate. If this is the case, the adjustment stem will already be extended 1/2 inch from the face of the rise rate control housing and will not require further adjustment (see Figure 1). For this reason, be sure to check this dimension before any adjustment is made to the unit.

Previous Page Table of Contents Next Page

Adjustment Procedure

1. First, locate the rise rate control valve housing on the starter valve. It is located between the 2-pin solenoid connector and the servo-to-regulator tube (see **Figure 2).** The rise rate control adjusting stem (No. 10-32 thread) is situated above the large regulator backup screw plug. Both the adjusting stem and its locknut are covered with orange torque seal.

2. Scrape off the majority of the torque seal on the adjustment stem and lock nut, while exercising caution not to damage the adjustment screw threads.

3. Use a stiff non-metallic brush and the acetone solvent (or equivalent) to remove the torque seal remaining in the adjustment stem threads. It is important that the adjustment screw threads be properly cleaned without damaging them in the process. Binding may occur between the locknut and adjusting screw if the threads are not properly cleaned or are damaged.

4. Place a suitable blade-type screwdriver into the adjustment screw stem slot to hold it stationary while using a 1/4-inch wrench to unscrew (counterclockwise direction) the locknut only as required to loosen the assembly (about 1/2 turn).

5. Remove the wrench from the locknut and use the screwdriver to unscrew the adjustment stem four (4) complete turns (counterclockwise direction). Be very careful N0T to unscrew the adjustment stem more than four (4) turns since doing so may cause the stem to fall out. With this accomplished, hold the stem stationary with the screwdriver and carefully tighten the locknut (clockwise direction) as required to hold the stem in place.

6. Apply new torque seal to the threads of the stem.

7. Add the letter "A" after the serial number on the name plate on starter control valves which have been adjusted in this manner.

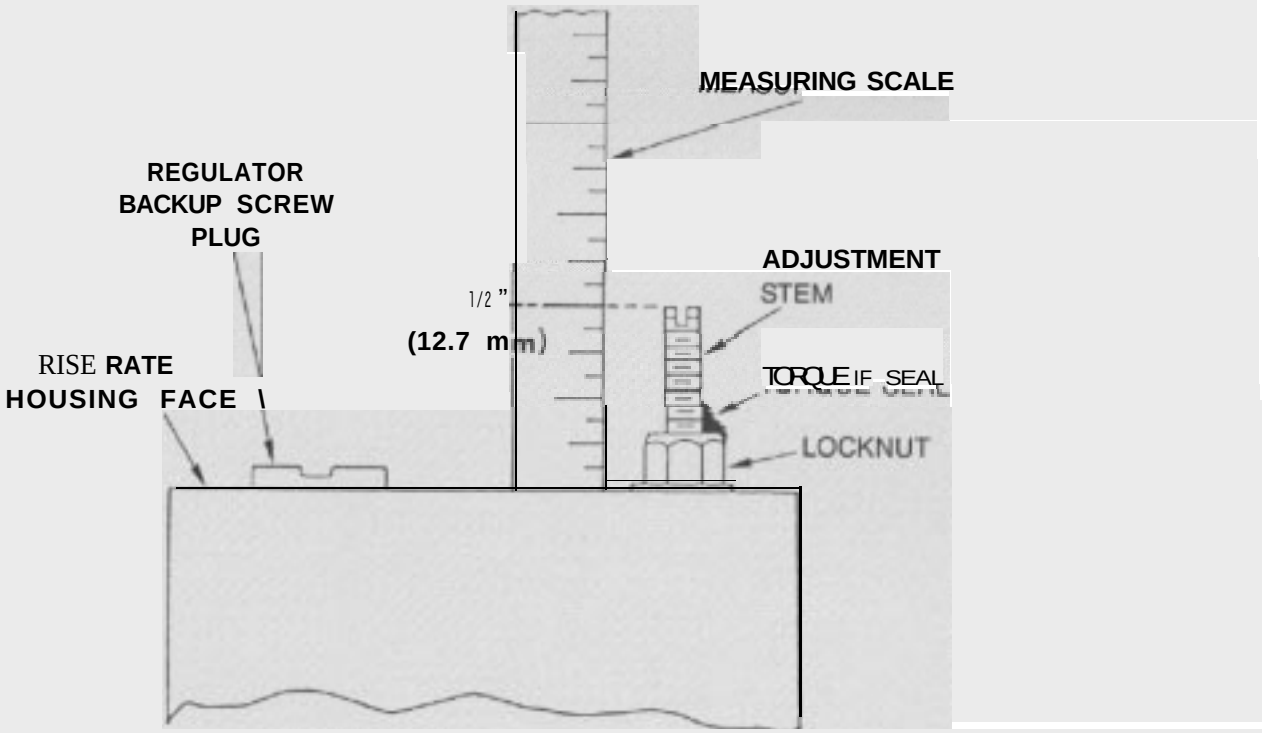


Figure 1. **Adjustment stem measurement.**

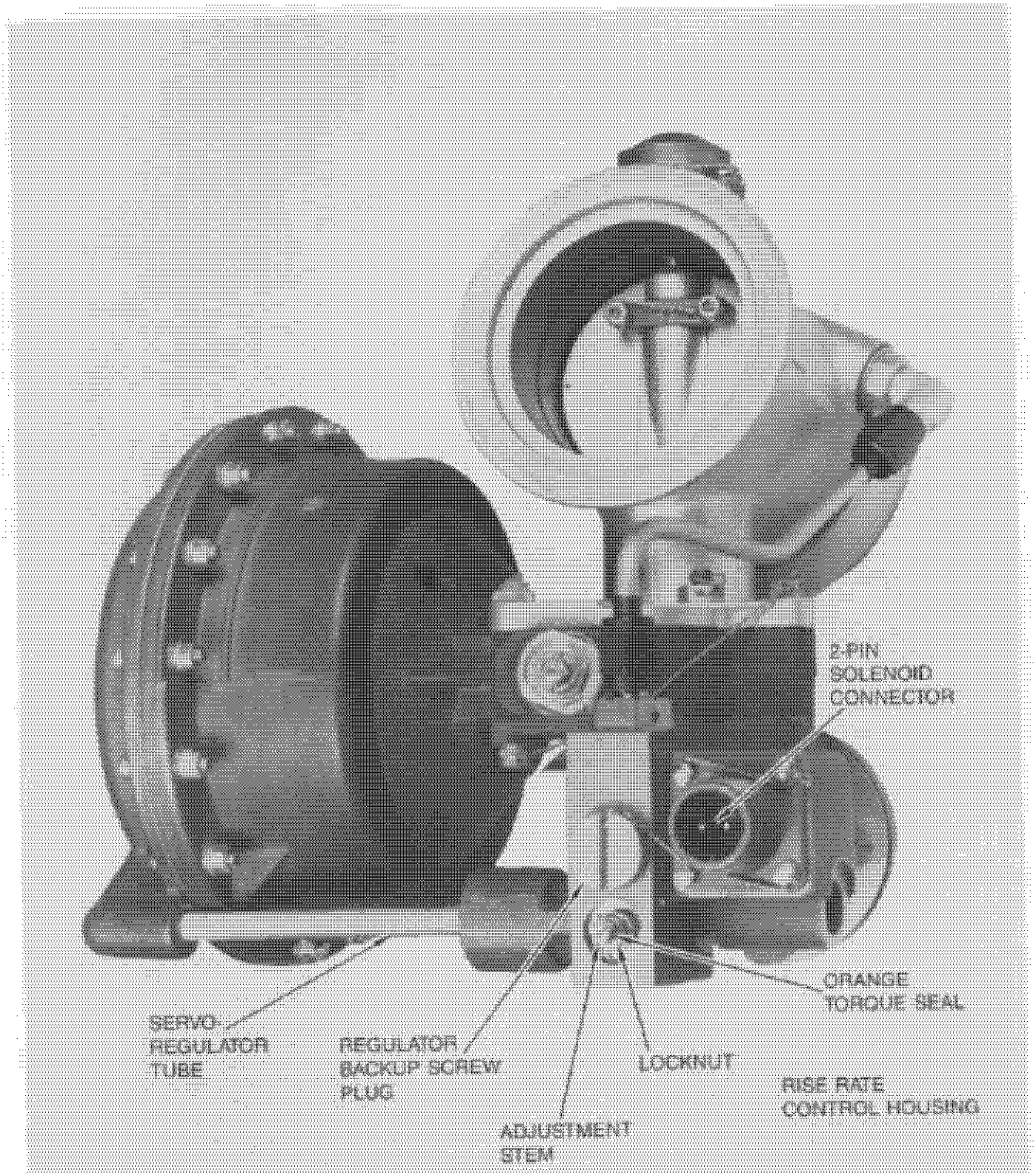
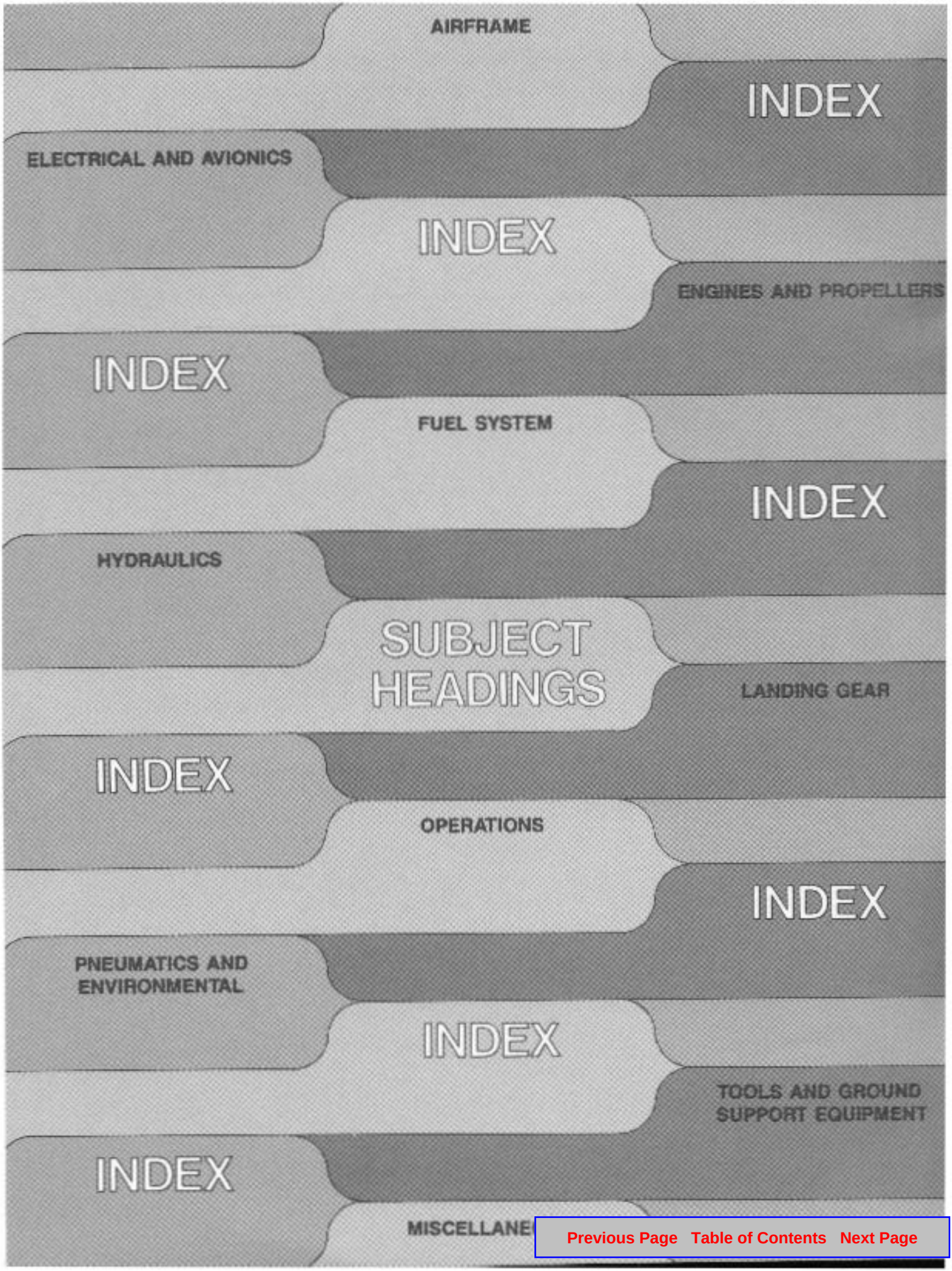


Figure 2. **Rise rate control adjustment.**

SERVICE NEWS


AIRFRAME
INDEX
ELECTRICAL AND AVIONICS
INDEX
ENGINES AND PROPELLERS
INDEX
FUEL SYSTEM
INDEX
HYDRAULICS
SUBJECT HEADINGS
LANDING GEAR
INDEX
OPERATIONS
INDEX
PNEUMATICS AND ENVIRONMENTAL
INDEX
TOOLS AND GROUND SUPPORT EQUIPMENT
INDEX
MISCELLANE

INDEX by SUBJECT
VOL.1, NO.1 through VOL.12, NO.4
1974–1985

AIRFRAME

AIRFRAME (contd)

AIRFRAME (contd)

ELECTRICAL AND AVIONICS

ELECTRICAL AND AVIONICS (contd)

ENGINES AND PROPELLERS

Previous Page Table of Contents Next Page

ENGINES AND PROPELLERS (contd)

ENGINES AND PROPELLERS (cont)

FUELSYSTEM

FUEL SYSTEM (contd)

HYDRAULICS

HYDRAULICS (contd)

LANDING GEAR

Previous Page Table of Contents Next Page

LANDING GEAR (contd)

LANDING GEAR (contd)

OPERATIONS

PNEUMATICS AND ENVIRONMENTAL

PNEUMATICS AND ENVIRONMENTAL (contd)

PNEUMATICS AND ENVIRONMENTAL (contd)

TOOLS AND GROUND SUPPORT EQUIPMENT

Previous Page Table of Contents Next Page

TOOLS AND GROUND SUPPORT EQUIPMENT

MISCELLANEOUS

MISCELLANEOUS (contd)

service news

AIRFRAME

INDEX

ELECTRICAL AND AVIONICS

INDEX

ENGINES AND PROPELLERS

INDEX

FUEL SYSTEM

INDEX

HYDRAULICS

INDEX
1974–1985

LANDING GEAR

INDEX

OPERATIONS

INDEX

PNEUMATICS AND ENVIRONMENTAL

INDEX

TOOLS AND GROUND SUPPORT EQUIPMENT

INDEX

MISCELLANEOUS

Lockheed-Georgia Company
CUSTOMER SERVICE
LOCKHEED-GEORGIA COMPANY