

Hawker Beechcraft Corporation

MANUFACTURED COMPONENT MAINTENANCE MANUAL LANDING GEAR ACTUATORS P/N 99-810057, 115-810021, 115-820046 AND 50-820208

INTRODUCTION

This manual provides maintenance instructions and an illustrated parts breakdown for the 115-810021, 99-810057, 115-820046 and 50-820208 series landing gear actuators used on the King Air F90, 99 Airliner series, King Air 100 series and Super King Air 200 series airplanes.

Overhauls of Hawker Beechcraft Corporation (HBC) Landing Gear Actuators (P/N's 115-810021, 99-810057, 115-820046, and 50-820208) shall be performed by HBC approved and authorized overhaul facilities or by an FAA Repair Station or Facility that is approved and authorized to perform this type of procedure. The information and instructions contained in this manual are intended for the use of these approved facilities ONLY.

Several modifications are detailed in these procedures. If modifications are incorporated, the actuator assembly should be reidentified to the part number or dash number to which it conforms. An assembly should be reidentified to a different part number ONLY after ALL the hardware upgrades listed for that configuration have been incorporated. Hawker Beechcraft Corporation REQUIRES that ALL of the modifications listed herein be accomplished.

DESCRIPTION AND OPERATION

The landing gear actuator is attached to the landing gear motor drive through the actuator pinion. As the actuator pinion turns, it drives the actuator screw housing which in turn drives the actuator screw. An actuator nut is threaded to accept the actuator screw. As the actuator screw rotates within the nut it forces the nut in or out of the actuator assembly, depending upon the direction of rotation of the actuator screw. A clevis is attached to the actuator nut and to the drag leg assembly. As the nut and clevis move in or out of the actuator assembly, it causes retraction or extension of the landing gear, as selected by the operator of the landing gear control in the pilot's compartment.

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MANUFACTURED COMPONENT MAINTENANCE MANUAL
LANDING GEAR ACTUATORS P/N 99-810057 AND 115-810021

MAIN LANDING GEAR ACTUATORS (F90, 99 SERIES, 100 SERIES AND 200 SERIES)

TESTING AND TROUBLESHOOTING

Each actuator must be functional tested to assure proper operation. If the actuator nut and screw have been reused as a matched set, it is not necessary to perform a functional test to test the actuator assembly. It is necessary to run all operations on a new actuator nut and screw in order to properly seat the mating thread surfaces and ensure proper operation of the actuator.

A test fixture is needed during maintenance and functional testing of the main landing gear actuator. This fixture will provide the support and the means of operating the actuator. Limit switches must be provided to limit the travel of the actuator. The test fixture should also provide the means of applying the required tension and compression loads to the actuator assembly. A properly designed fixture may be utilized during the disassembly and assembly of the actuator assembly for checking end play and for performing proof tests of components during the inspection.

The Landing Gear Actuator Test Fixture, P/N 115-810021/934, used by Hawker Beechcraft Corporation during the manufacture and overhaul of the main landing gear actuator assemblies, meets these requirements. A test fixture, which will meet the requirements, may be designed and built for this purpose.

- a. Operate the actuator by hand to determine that the pinion does not bind. Secure the actuator in a manner to resist tension and compression loads applied to the clevis (51) at the same points and in much the same manner as if the actuator were mounted in the airplane (Refer to Figure 2). Connect a power unit to the pinion shaft. Provide limit switches for limiting the travel in either direction to prevent bottoming out of the actuator. Operate the actuator at a speed to obtain a full extension or retraction in 8 to 9 seconds. The function test loads of the main landing gear actuator are all tension loads. Compression loads are used only in the measurement of the end play of the actuator screw and nut.
- b. Apply a tension load of 675 to 725 pounds to the clevis (51). Rotate the pinion in both directions to determine that there is a minimum of 0.002 inch backlash between the pinion (27) and the screw housing (13). The pinion must not bind.
- c. Run a minimum of 6 cycles with the load of 675 to 725 pounds tension applied. Allow the actuator to cool for at least 5 minutes after each 3 cycles of extension and retraction.
- d. Remove the tension load. Measure the end play of the actuator assembly. Attach a dial indicator to record the relative motion of the actuator nut (32) and the housing bottom (30). Apply a tension load of 100 to 180 pounds. Record the indication of the dial indicator. Remove the tension load and apply a compression load of 100 to 180 pounds. Record the end play, as indicated by the dial indicator. End play tolerances shall not exceed those listed in step g.
- e. Apply a tension load of 2150 to 2250 pounds. Operate through a minimum of 3 cycles at a speed of between 10 to 18 seconds per cycle. Allow the actuator to cool at least 5 minutes between each three cycles. The actuator must not squeal, bind or bottom out.
- f. Increase the tension load to 3650 to 3750 pounds. Operate the actuator one cycle. It must not bind, squeal or bottom out.
- g. Remove the tension load. Check the end play of the actuator assembly in the manner described earlier in Step d. The end play must not have increased during functional test. Assembly end play, measured between the nut and the housing, may be a maximum of 0.005 inch greater than screw to nut end play. However, total end play shall not exceed 0.010 inch.

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DISASSEMBLY

The following instructions are for the disassembly of the main landing gear actuator.

- a. Remove the actuator brake assembly by removing the nut (22), washer (21), spring (20), spacer (19), washer (5), and bolt (6) (Refer to Figure 2). Remove nut (7), washer (8), bolt (43), spacer (16), washer (17) and washer (18). Do not remove washer (15) or nut (14) from the bolt (43). Tag and identify the brake halves (4) for reuse as a matched set.
- b. Install a spare bolt (31) in the housing in place of the bolt (43) removed with the brake assembly. Secure the bolt (31) and tighten to a torque of 50 to 70 inch-pounds.
- c. Perform an actuator screw and nut end play inspection as follows:
 1. Remove the boot (1). Remove the cover (2) by removing or loosening the bolt (12), washers (11 and 25) and nut (26). After removal of the cover (2), replace the bolt (12), washers (11 and 25) and nut (26).
 2. Secure the actuator, supporting the actuator and resisting the compression and tension forces at the same points and in much the same manner as if the actuator were mounted in the airplane.
 3. Mount a dial indicator to measure the movement of the actuator nut (32) relative to that of the actuator screw (3). This may be accomplished by clamping a dial indicator fixture to the actuator nut assembly and placing the dial indicator sensing device against the head of the actuator screw (3).

NOTE: An erroneous reading will be obtained if the dial indicator is attached to the clevis (51) or the actuator housing (35).

4. Apply a force of 100 to 180 pounds tension and compression to the clevis (51). Record the end play between the nut and the screw.

NOTE: The end play is to be checked at each of three positions: The actuator screw full in then backed off one turn; the actuator screw extended one half its travel; and the actuator extended 7 inches.

If the end play is 0.009 inch or less, the actuator nut (32) and the actuator screw (3) may be reused as a matched set after reconditioning. If the end play exceeds 0.009 inch, visually inspect the screw (3) in accordance with the CHECK AND REPAIR section. If no defects are found, replace the actuator nut (32) and repeat Step c.

NOTE: The replacement of both the actuator screw (3) and the actuator nut (32) may be required to achieve an acceptable end play.

- d. If the end play is acceptable, run the actuator nut fully into the actuator to the fully retracted position. Make alignment marks on the side of the actuator nut (32) and on the head of the actuator screw (3) in order that the thread relationship of the nut and screw may be maintained upon reassembly. (The screw has a double lead thread.)
- e. Secure the actuator and apply pressure to compress the spring (50) and permit the removal of the bolt (34). Remove the clevis (51) and the spring (50).
- f. Rotate the nut (32) to partially extend the nut. Remove the bolt (12). Push the actuator nut (32) toward the retracted position, thus forcing the actuator screw (3) from the screw housing (13). Remove the screw by unscrewing it from the nut. Pull the nut from the actuator. Tag the nut and the screw for reuse as a matched set.
- g. Remove the seal ring (48) from the nut. Remove and discard the packing (49).

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- h. Remove the bolts (31) and the spare bolt (31) installed in step b. from the actuator housing (35). Remove the housing bottom (30) and shims (41). Remove and discard the packing (44) from the housing bottom (30). Remove the cover (9), upper bearing (24) and the screw housing (13) by pressing the screw housing (13) from the lower bearing (39).
- i. Remove the lower bearing (39) from the housing (35).
- j. Remove the upper bearing (24) from the screw housing (13).
- k. Remove and discard the seal (10) from the cover (9).
- l. Remove the snap ring (38) from the shaft of the pinion (27). Remove the pinion from the housing (35). Remove the shims (37), the inner bearing (28) and the outer bearing (36). Tag and identify the screw housing (13) and the pinion (27) for reuse as a matched set. If it is necessary to scrap either the screw housing or the pinion, both must be replaced with a new or serviceable matched set.

The following are parts Hawker Beechcraft Corporation **recommends** be replaced at each repair event.

INDEX	PART NUMBER	NOMENCLATURE
12	NAS1106-23	Bolt
44	AN6227B21	Packing
49	AN6227B15	Packing
34	AN6-20A/M	Bolt
24	115-380102	Bearing
39	7107KRD	Bearing
28	115-380103	Bearing
36	201SZZ	Bearing
38	MS16624-1046	Snap Ring
20	100943YC112N	Spring
1	102A832-3/42	Boot
10	14857	Seal

CLEANING

After disassembly, all parts are to be cleaned with PD680 solvent or equivalent and dried prior to reassembly.

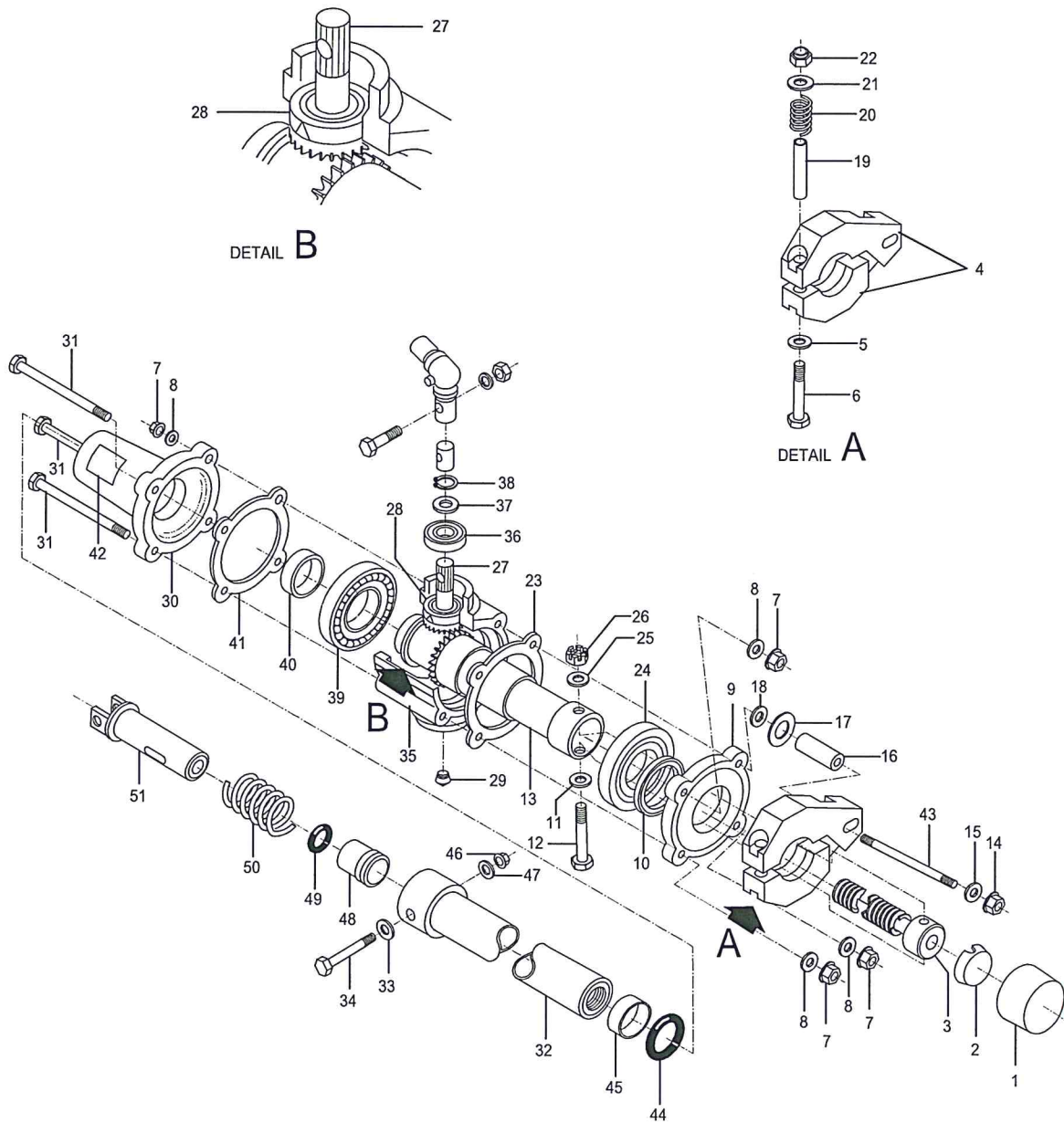
CHECK AND REPAIR

During the check and repair procedures, shafts that have been slightly scored may be lapped with a flat oil stone, and minor nicks, scratches and burrs may be smoothed. Any part that has wear or damage beyond the allowable limits is to be rejected and replaced with a serviceable part.

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Illustrated Parts Breakdown - Main Gear Actuator
P/N 99-810057-()
Figure 2