



**HUGHES
SERVICE INFORMATION
LETTER**

TRAINING

LETTER NO. L-31

DATE October 2, 1967

PAGE 1 OF 20

TO—All owners and operators of Hughes Helicopters

SUBJECT: INTERIM REVISION - HANDBOOK OF MAINTENANCE
INSTRUCTIONS (HMI) RE: INSPECTION AND MAINTENANCE
PROCEDURES FOR LANDING GEAR OLEO DAMPERS

MODELS AFFECTED: All 269 Series Helicopters

Reference

269A/A-1 Handbook of Maintenance Instructions, Revised 1 March 67'
269A-2 Handbook of Maintenance Instructions, Addendum, 1 April 67'
269B Handbook of Maintenance Instructions, Revised, 15 August 67'
Owners Manual for 269A, 269A-1, 269A-2, TH-55A and 269B

The information given in this Service Information Letter lists revised procedures and criteria for performing preflight and 100 hour periodic inspection of the landing gear oleo dampers. Instructions for oil filling and air charging of oleos have also been revised and incorporated into a single Service procedure, to ensure a proper air-oil proportion. In addition, the air charging pressure has been increased to 200 PSIG to provide a greater damping margin for cold weather operations.

The data supersedes or amends applicable instructions given in the current Handbook of Maintenance Instructions and Owners Manuals until formal incorporation is accomplished at the next revision cycle.

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269A/A-1 HANDBOOK OF MAINTENANCE INSTRUCTIONS

Page 1-12, Table 1-3. Periodic Inspections, PREFLIGHT INSPECTION

Step f:

DELETE: (3/8 in. min.)

And replace with the following: (1 in. min. or use gage)

Step p:

DELETE: (3/8 in. min. 5/8 in. max.)

And replace with the following: (3/8 in. min. or use gage)

Page 1-16, Table 1-3. Periodic Inspections, 100-HOUR INSPECTION

Following existing step y:

ADD: New step z as follows:

z. Check front (LH and RH) and rear (LH and RH) landing gear oleo dampers for proper operation and condition. 9-22, 9-23

Page 2-16A, Para. 2-31. SHOCK STRUT - LANDING GEAR

DELETE: Existing paragraph 2-31. SHOCK STRUT - LANDING GEAR

And replace with new paragraph 2-31 and 2-31A as follows:

2-31. OLEO DAMPER - LANDING GEAR. Four air-oil type oleo dampers are used in the landing gear assembly to damp landing shock and prevent ground resonance. (See Figure 2-17) The dampers are of aluminum construction, with the exception of the filler valve, and are mounted between the aircraft center-frame section and the landing gear skids (two for each skid, left and right hand sides).

STATIC OLEO DAMPER EXTENSION:

FRONT - 1 inch minimum
REAR - 3/8 inch minimum

2-31A. OPERATIONAL CHECK - OLEO DAMPERS. Perform the following preflight inspection procedure to check for proper extension of oleo dampers and evidence of excessive leakage. Aircraft should be in empty weight (no passengers or cargo aboard) configuration, but with full fuel.

Tools and Equipment

Gage - Measuring

Fabricate from aluminum alloy
or steel, per Figure 2-18A

PROCEDURE

- a. Place aircraft on smooth, hard surface which permits free, lateral movement of skids during inspection.
- b. Visually inspect all four oleo dampers for evidence of leakage.
- c. Lift tail boom at tail rotor gear box to height of five feet and release slowly.
- d. Using special check tool, measure oleo damper extension from top surface of gland nut (through boot material) to center of top oleo attaching bolt. Extension for front oleos is 2.93 in. min.; rear oleo extension is 2.30 in. min. (See Figure 2-18)
- e. Remove oleo damper from aircraft, if extension is out of limits or leakage is noted. (Refer to Section IX for oleo damper maintenance)

CAUTION

Ground resonance can result if aircraft is operated when oleo damper extension, fluid type, and/or fluid-to-air proportions are incorrect.

Page 2-17

DELETE: Existing Figure 2-18. Shock Strut Extension

And replace with new illustration as follows: Figure 2-18. Oleo Damper Extension.

ADD: New illustration as follows: Figure 2-18A. Preflight Check Tool - Oleo Damper Extension.

Page 9-6, Para 9-9. ASSEMBLY - LANDING GEAR.

Following step e.

ADD:

NOTE

Install attaching bolts for front oleos with bolt heads facing aft (or center punch bolt heads if facing forward) to facilitate a more accurate check of oleo damper extension.

Page 9-10, Para. 9-22. ASSEMBLY - SHOCK STRUT

DELETE: Existing Para. 9-22. ASSEMBLY - SHOCK STRUT

Page 9-11, Para. 9-23. SERVICING - SHOCK STRUT

DELETE: Existing Para. 9-23. SERVICING - SHOCK STRUT

ADD: New Paragraphs 9-22 and 9-23 as follows:

9-22. SERVICING - OLEO DAMPER. Perform the following procedures for assembling, oil filling, air charging, and testing oleo dampers. Separate servicing of oil or air is not permitted. Strict adherence to the complete servicing procedure will minimize air entrapment and resultant oleo sponginess, prevent loss of oil, and ensure proper air-oil proportions.

Tools and Equipment

Nitrogen/Air Source- Regulated Compressed	200 PSIG Minimum
Container-Rectangular 6 x 12 x 15 approx.	Commercial

Materials

Oil-Hydraulic	MIL-H-5606 or 6083
Soap	Commercial
Lockwire	MS20995C32

PROCEDURE - ASSEMBLY AND FILLING

- a. Use rectangular container approximately 6" x 12" x 15" high and fill to 3/4" from top with MIL-H-6083 or MIL-H-5606 hydraulic oil.
- b. Install back-up ring (10) and packing "O" ring (11) into gland nut ring groove; install packing ring gasket (9) under flange of gland nut (5).
- c. Install gland nut on piston assy (6); install plug (8) on end of piston and tighten set screw to 7-10 inch lbs. torque to retain plugs.

- d. Place cylinder assy (7) into oil container open end up and allow to fill slowly until completely full. Leave cylinder in container.
- e. Place piston with valve port up into oil container and allow piston to fill from small hole in end of plug.
- f. After piston is completely filled to valve port, place thumb on valve port to prevent draining.
- g. With cylinder completely filled, transfer piston from oil into cylinder with top end of cylinder and bottom of piston submerged in oil and depress piston slowly until piston is approximately 1/2" to 3/4" from bottom of body. Hold in this position in container and tighten gland nut as tight as possible by hand while holding the cylinder.
- h. Remove assembly from container and place suitable block into clevis end of assembly and clamp on vise holding assembly in a vertical position; complete tightening gland nut.

CAUTION

While performing the above procedure piston must remain 1/2" to 3/4" from bottom of cylinder.

- i. Remove assembly from vise and tilt body until valve port is in vertical position (body will be at a 50° angle from vertical plane).
- j. Depress piston slowly until it bottoms in the cylinder, to allow excess oil to drain from assembly.
- k. Oil must be flush with valve port in vertical position and piston bottomed. Add oil if necessary.
- l. While holding assembly in this position install Schrader valve and tighten to seat at port.
- m. Install safety wire (1).

NOTE

While using the above procedure insure that the oil is kept clean and uncontaminated at all times.

PROCEDURE - CHARGING AND TESTING

- a. Connect nitrogen source hose to oleo valve.

NOTE

Dry nitrogen is used to service oleo damper; however dry filtered compressed air is an acceptable substitute if nitrogen is not available.

- b. Regulate nitrogen pressure to 200 pounds.

NOTE

200 lbs. is the initial inflation pressure. After several cycles of operation the hydraulic oil will absorb enough nitrogen to reduce the pressure to 175 PSI.

- c. Open oleo filler valve and allow pressure to stabilize.
- d. Close oleo filler valve.
- e. Reduce regulated nitrogen source pressure to zero.
- f. Disconnect nitrogen source hose from oleo valve.
- g. Check all mating surfaces for leakage of oil and nitrogen.
- h. Check filler valve for leakage with soap solution.
- i. Install valve cap.
- j. Using clean cloth, carefully wipe clean the assembly.
- k. Install boot (4) and safety wire (3).
- l. After servicing and test, install oleo damper as per paragraph 9-9.
- m. Check oleo extension measurement, per paragraph 9-23.

9-23. INSPECTION (100 HOUR) - OLEO DAMPERS. Perform the following procedure to check for proper operation and condition of oleo dampers during 100-hour periodic inspection. Aircraft should be in empty weight configuration (no passengers or cargo aboard), but with full fuel.

Materials

Lubricant Oil or graphite	Commercial
Solvent	Commercial

PROCEDURE

- a. Place aircraft on hard, smooth service which permits free, lateral movement of skids during inspection.
- b. Lubricate skid tube swivels with light oil or graphite.

NOTE

If oil is used, solvent should be used to clean up swivel after inspection is completed to prevent excessive dirt collection.

- c. Raise and lower tail boom approximately 10 times, from upper position with tail rotor gear box five feet above ground to lower position with front of skids lifted off floor.
- d. Lift tail boom to five foot height as in step c., then release slowly.
- e. Using scale, measure and record distance from top of gland nut to bottom of lower ridge on piston barrel of all oleos.
- f. Push down on tail until front skids lift off floor, then release slowly; measure and record as in step e.
- g. Add up and down readings (measurements of step e and f) for each oleo.
 1. If sum of up and down readings is 0.75 to 1.75 inches for each rear oleo, rear oleo, and 4.75 to 5.50 inches for each front oleo, then extension of oleos is within acceptable limits.
 2. If sum of up and down readings is out of limits for one or more oleos, replace oleo furthest out of limits and repeat steps d thru g.

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NOTE

A correction of $1/16$ inch per 12°F variation should be added to the sum of each rear oleo reading for ambient temperatures below 75°F , and subtracted for temperatures above 75°F . Temperature correction for front oleos is $\pm 1/4$ inch per 12°F variation from 75°F .

CAUTION

Ground resonance can result if aircraft is operated when oleo damper extension, type of fluid, and/or fluid-to-air proportion is not correct.

269A-2 HANDBOOK OF MAINTENANCE INSTRUCTIONS ADDENDUM

Page A1-6. Table 1-3, Periodic Inspections, PREFLIGHT INSPECTION

Step f:

DELETE: (3/8 in. min.)

And replace with the following: (1 in. min. or use gage)

Page A1-7. Table 1-3, Periodic Inspections (Cont.), PREFLIGHT INSPECTION

Step p:

DELETE: (3/8 in. min. 5/8 in. max.)

And replace with the following: (3/8 in. min. or use gage)

Page A1-10. Table 1-3, Periodic Inspections, 100-HOUR INSPECTION

Following existing step w:

ADD: New step x as follows:

- x. Check front and rear landing gear oleo dampers (LH and RH sides) 9-22, 9-23
for proper operation and condition.

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269B HANDBOOK OF MAINTENANCE INSTRUCTIONS

Page 1-9, Table 1-3. Periodic Inspections, PREFLIGHT INSPECTION

Step f:

DELETE: (3/8 in. min.)

And replace with the following: (1 in. min. or use gage)

Step n:

DELETE: (3/8 in. min. 5/8 in. max.)

And replace with the following: (3/8 in. min. or use gage)

Page 1-13, Table 1-3. Periodic Inspections, 100-HOUR INSPECTION

Following existing step x:

ADD: New step y:

y. Check front and rear landing gear oleo dampers (LH and RH sides)
for proper operation and condition. 9-25, 9-26

Page 2-17, para. 2-32. SHOCK STRUT - LANDING GEAR

DELETE: Existing paragraph 2-32. SHOCK STRUT - LANDING GEAR

And replace with new paragraphs 2-32 and 2-32A as follows:

2-32. OLEO DAMPER - LANDING GEAR. Four air-oil type oleo dampers are used in the landing gear assembly to damp landing shock and prevent ground resonance. (See Figure 2-17) The dampers are of aluminum construction, with the exception of the filler valve, and are mounted between the aircraft center-frame section and the landing gear skids (two for each skid, left and right hand sides).

STATIC OLEO DAMPER EXTENSION:

FRONT - 1 inch minimum
REAR - 3/8 inch minimum

2-32A. OPERATIONAL CHECK - OLEO DAMPERS. Perform the following pre-flight inspection procedure to check for proper extension of oleo dampers and evidence of excessive leakage. Aircraft should be in empty weight (no passengers or cargo aboard) configuration, but with full fuel.

Tools and Equipment

Gage - Measuring

Fabricate from aluminum alloy
or steel, per Figure 2-18A

PROCEDURE

- a. Place aircraft on smooth, hard surface which permits free, lateral movement of skids during inspection.
- b. Visually inspect all four oleo dampers for evidence of leakage.
- c. Lift tail boom at tail rotor gear box to height of five feet and release slowly.
- d. Using special check tool, measure oleo damper extension from top surface of gland nut (through boot material) to center of top oleo attaching bolt. Extension for front oleos is 2.93 in. min.; rear oleo extension is 2.30 in. min. (See Figure 2-18)
- e. Remove oleo damper from aircraft, if extension is out of limits or leakage is noted. (Refer to Section IX for oleo damper maintenance)

CAUTION

Ground resonance can result if aircraft is operated when oleo damper extension, fluid type, and/or fluid-to-air proportions are incorrect.

Page 2-17

DELETE: Existing Figure 2-18. Shock Strut Extension

And replace with new illustration as follows: Figure 218. Oleo Damper Extension.

ADD: New illustration as follows: Figure 2-18A. Preflight Check Tool-Oleo Damper Extension.

Page 9-5, Para. 9-9. ASSEMBLY - LANDING GEAR

Following step e.

ADD:

NOTE

Install attaching bolts for front oleos with bolt heads facing aft (or center punch bolt heads if facing forward) to facilitate a more accurate check of oleo damper extension.

Page 9-14, Para. 9-25. ASSEMBLY - SHOCK STRUT

DELETE: Existing Paragraph 9-25. ASSEMBLY - SHOCK STRUT

Page 9-14, Para. 9-26. SERVICING - SHOCK STRUT

DELETE: Existing Para. 9-26. SERVICING - SHOCK STRUT

ADD: New Paragraphs 9-25 and 9-26 as follows:

9-25. SERVICING - OLEO DAMPER. Perform the following procedures for assembling, oil filling, air charging, and testing oleo dampers. Separate servicing of oil or air is not permitted. Strict adherence to the complete servicing procedure will minimize air entrapment and resultant oleo sponginess, prevent loss of oil, and ensure proper air-oil proportions.

Tools & Equipment

Nitrogen/Air Source- Regulated Compressed	200 PSIG Minimum
Container-Rectangular 6 x 12 x 15 approx.	Commercial

Materials

Oil-Hydraulic	MIL-H-5606 or 6083
Soap	Commercial
Lockwire	MS20995C32

PROCEDURE - ASSEMBLY & FILLING

- a. Use rectangular container approximately 6" x 12" x 15" high and fill to 3/4" from top with MIL-H-6083 or MIL-H-5606 hydraulic oil.
- b. Install back-up ring (10) and packing "O" ring (11) into gland nut ring groove; install packing ring gasket (9) under flange of gland nut (5).
- c. Install gland nut on piston assy (6); install plug (8) on end of piston and tighten set screw to 7-10 inch lbs. torque to retain plugs.

- d. Place cylinder assy (7) into oil container open end up and allow to fill slowly until completely full. Leave cylinder in container.
- e. Place piston with valve port up into oil container and allow piston to fill from small hole in end of plug.
- f. After piston is completely filled to valve port, place thumb on valve port to prevent draining.
- g. With cylinder completely filled, transfer piston from oil into cylinder with top end of cylinder and bottom of piston submerged in oil and depress piston slowly until piston is approximately 1/2" to 3/4" from bottom of body. Hold in this position in container and tighten gland nut as tight as possible by hand while holding the cylinder.
- h. Remove assembly from container and place suitable block into clevis end of assembly and clamp on vise holding assembly in a vertical position; complete tightening gland nut.

CAUTION

While performing the above procedure piston must remain 1/2" to 3/4" from bottom of cylinder.

- i. Remove assembly from vise and tilt body until valve port is in vertical position (body will be at a 50° angle from vertical plane).
- j. Depress piston slowly until it bottoms in the cylinder, to allow excess oil to drain from assembly.
- k. Oil must be flush with valve port in vertical position and piston bottomed. Add oil if necessary.
- l. While holding assembly in this position install Schrader valve and tighten to seat at port.
- m. Install safety wire (1).

NOTE

While using the above procedure insure that the oil is kept clean and uncontaminated at all times.

PROCEDURE - CHARGING AND TESTING

- a. Connect nitrogen source hose to oleo valve.

NOTE

Dry nitrogen is used to service oleo damper; however dry filtered compressed air is an acceptable substitute if nitrogen is not available.

- b. Regulate nitrogen pressure to 200 pounds.

NOTE

200 lbs. is the initial inflation pressure. After several cycles of operation the hydraulic oil will absorb enough nitrogen to reduce the pressure to 175 PSI.

- c. Open oleo filler valve and allow pressure to stabilize.
- d. Close oleo filler valve.
- e. Reduce regulated nitrogen source pressure to zero.
- f. Disconnect nitrogen source hose from oleo valve.
- g. Check all mating surfaces for leakage of oil and nitrogen.
- h. Check filler valve for leakage with soap solution.
- i. Install valve cap.
- j. Using clean cloth, carefully wipe clean the assembly.
- k. Install boot (4) and safety wire (3).
- l. After servicing and test, install oleo damper as per paragraph 9-9.
- m. Check oleo extension measurement, per Paragraph 9-26.

9-26. INSPECTION (100 HOUR) - OLEO DAMPERS. Perform the following procedure to check for proper operation and condition of oleo dampers during 100-hour periodic inspection. Aircraft should be in empty weight configuration (no passengers or cargo aboard), but with full fuel.

Materials

Lubricant Oil
or graphite

Commercial

Solvent

Commercial

PROCEDURE

- a. Place aircraft on hard, smooth service which permits free, lateral movement of skids during inspection.
- b. Lubricate skid tube swivels with light oil or graphite.

NOTE

If oil is used, solvent should be used to clean up swivel after inspection is completed to prevent excessive dirt collection.

- c. Raise and lower tail boom approximately 10 times, from upper position with tail rotor gear box five feet above ground to lower position with front of skids lifted off floor.
- d. Lift tail boom to five foot height as in step c., then release slowly.
- e. Using scale, measure and record distance from top of gland nut to bottom of lower ridge on piston barrel of all oleos.
- f. Push down on tail boom until front skids left off, then release slowly; measure and record as in step e.
- g. Add up and down readings (measurements of steps e and f) for each oleo.
 1. If sum of up and down readings is 0.75 to 1.75 inches for each rear oleo, and 4.75 to 5.50 inches for each front oleo, then extension of oleos is within acceptable limits.
 2. If sum of up and down readings is out of limits for one or more oleos, replace oleo furthest out of limits and repeat steps d thru g.

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NOTE

A correction of 1/16 inch per 12^oF variation should be added to the sum of each rear oleo reading for ambient temperatures below 75^oF, and subtracted for temperatures above 75^oF. Temperature correction for front oleos is +1/4 inch per 12^oF variation from 75^oF.

CAUTION

Ground resonance can result if aircraft is operated when oleo damper extension, type of fluid, and/or fluid-to-air proportion is not correct.

TH-55A OWNERS MANUAL, SECTION V, INSPECTION

Page 5-1, para. 5-21. PREFLIGHT INSPECTION

Step f:

DELETE: (3/8 in. min. to 5/8 in. max.)

And replace with the following: (1 in. min. or use gage)

Page 5-2, para. 5-21. PRELFIGHT INSPECTION

Step n:

DELETE: (3/8 in. min. to 5/8 in. max.)

And replace with the following: (3/8 in. min. or use gage)

269A/A-1 OWNERS MANUAL, SECTION V, MAINTENANCE, Page 5-21

269A-2 OWNERS MANUAL, SECTION V, MAINTENANCE, Page 5-21

269B OWNERS MANUAL, SECTION V, MAINTENANCE, Page 5-23

Paragraph 5-18. SHOCK STRUT - LANDING GEAR

DELETE: Existing paragraph 5-18. SHOCK STRUT - LANDING GEAR

And replace with new paragraph 5-18 and 5-18A as follows:

5-18. OLEO DAMPER - LANDING GEAR. Four air-oil type oleo dampers are used in the landing gear assembly to damp landing shock and prevent ground resonance. (See Figure 2-17) The dampers are of aluminum construction, with the exception of the filler valve, and are mounted between the aircraft centerframe section and the landing gear skids (two for each skid, left and right hand sides).

STATIC OLEO DAMPER EXTENSION:

FRONT - 1 inch minimum

REAR - 3/8 inch minimum

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5-18A. OPERATIONAL CHECK - OLEO DAMPERS. Perform the following preflight inspection procedure to check for proper extension of oleo dampers and evidence of excessive leakage. Aircraft should be in empty weight (no passengers or cargo aboard) configuration, but with full fuel.

Tool and Equipment

Gage - Measuring

Fabricate from aluminum alloy
or steel, per Figure 2-18A, HMI

PROCEDURE

- a. Place aircraft on smooth, hard surface which permits free, lateral movement of skids during inspection.
- b. Visually inspect all four oleo dampers for evidence of leakage.
- c. Lift tail boom at tail rotor gear box to height of five feet and release slowly.
- d. Using special check tool, measure oleo damper extension from top surface of gland nut (through boot material) to center of top oleo attaching bolt. Extension for front oleos is 2.93 in. min.; rear oleo extension is 2.30 in. min. (See Figure 2-18) HMI.
- e. Remove oleo damper from aircraft, if extension is out of limits or leakage is noted. (Refer to Section IX in HMI for oleo damper maintenance)

CAUTION

Ground resonance can result if aircraft is operated when oleo damper extension, fluid type, and/or fluid-to-air proportions are incorrect.

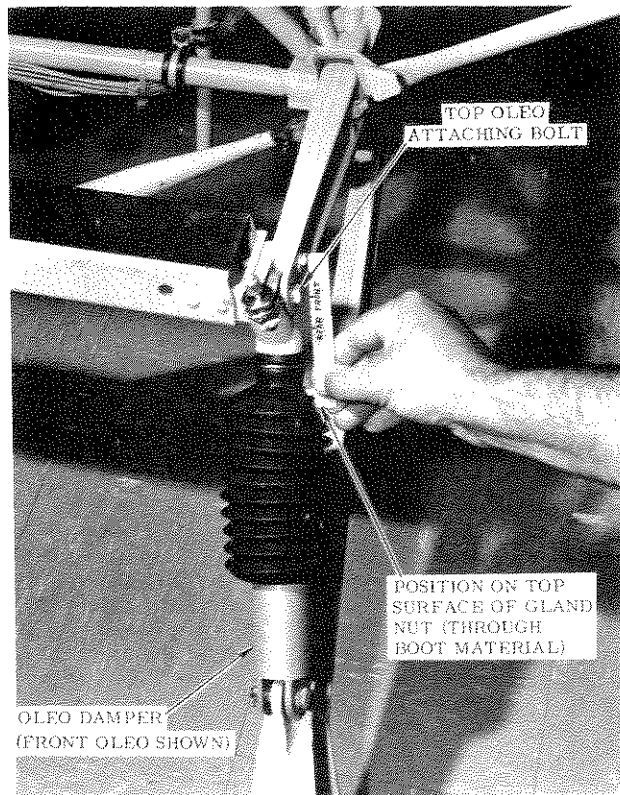
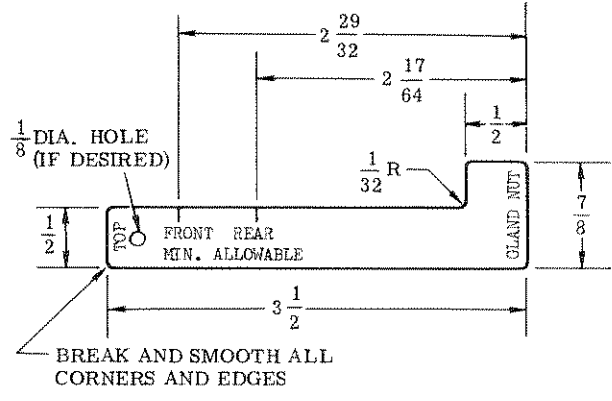


FIGURE 2-16. OLEO DAMPER EXTENSION



MAT'L -.06 - .08 ALUM. ALLOY OR STEEL
NOTE: MARK MIN. FRONT AND REAR
CHECK POSITIONS ON OPPOSITE
SIDE TO SAME EDGE AS SHOWN

FIGURE 2 - 18A. OLEO DAMPER EXTENSION
PRE-FLIGHT CHECK TOOL