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Handbook of Maintenance Instructions
CSP-C1-2

TEMPORARY REVISION NO. 269C1-21

FILING INSTRUCTIONS: Insert in Appendix C, Part 3, Section 5, facing page 5-4, dated 15 May 2001.

SUBJECT: Reassembly, Charging and Leakage Check

This temporary revision revises step b of paragraph 5-5, Leakage Check and adds new paragraph 5-5A, Load/Stroke Inspection to Section 5, Reassembly, Charging and Leakage Check.

MANUAL CHANGES:

1. On page 5-4, delete step b of paragraph 5-5, Leakage Check and replace as follows:
 - b. After testing, hang damper barrel down and let hang for 24 hours. A continuous ring of oil, or any bubbles at all shall be considered leakage and require disassembly, repair and repeat inspection.
2. On page 5-4, insert paragraph 5-5A, Load/Stroke Inspection to Section 5, Reassembly, Charging and Leakage Check as follows:

5-5A. LOAD/STROKE INSPECTION. (Figs. 5-2, 5-3, 5-4, 5-5, 5-6 and 5-7).

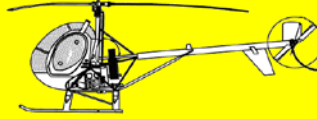
- a. Assemble load/stroke inspection apparatus using a Dake P/N 972210, 10-Ton hydraulic floor utility press, load cell, indicator and addition equipment or equivalent as follows:
 - (1) Locally fabricate parts in accordance with Figure 5-7.
 - (2) Assemble parts as shown in Figure 5-3, threading 5/8 inch -18 all-thread and nuts together.
 - (3) Make sure load cell connectors, top damper attachment fitting, and indicator rest arm are positioned as shown in Figure 5-3.
 - (4) Torque nuts and fittings to 50-70 in.-lbs.
 - (5) Remove hydraulic press cylinder ram cap.
 - (6) Install upper attachment fitting/load cell assembly to hydraulic press (Figure 5-6).
 - (7) Thread 5/8 inch -18 all-thread into bottom damper attachment fitting (Figure 5-4).

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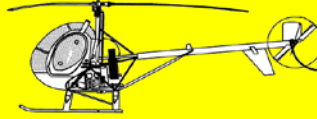
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- (8) Insert bottom damper attachment fitting with 5/8 inch -18 all-thread end of bottom damper attachment fitting into center hole of lower plate.
- (9) Align lower damper fitting. Install hex nut and torque to 50-70 in.-lbs.
- (10) Install lower plate with damper attachment fitting as shown in Figure 5-6.
- (11) Locally fabricate bracket from 2024-T3 aluminum (size to fit Model 9320 indicator is 3.5 inches x 6.0 inches x 1.3 inches, and weighs 0.5 pound) or equivalent. Mount bracket to hydraulic press as shown in Figure 5-5, or equivalent location, using suitable hardware.
- (12) Install Model 9320 indicator to the bracket using self-adhesive Hook and Loop fastening or equivalent.
- (13) Position hydraulic press table and install bottom plate with lower damper fitting with suitable clamps (Figure 5-6).
- (14) Align the upper attachment fitting load cell assembly and lower plate/bottom attachment fitting:
 - (a) Position upper attachment fitting assembly by pumping the hand pump to extend the hydraulic cylinder ram.
 - (b) Continue pumping until landing gear damper can be inserted into the top and bottom fittings and insert PIN-005 or equivalent. Stop pumping the hand pump and check that cross pins can be turned with light hand pressure.
 - (c) Make sure that damper upper and lower fittings align parallel with the slots in the upper and lower fitting slots. If the fittings are not aligned, adjust as follows:
 1. If further alignment of the upper or lower fittings, load cell or indicator rest arm is required, loosen 5/8 inch -18 hex nuts and all-thread shafts to reposition components.
 2. Torque 5/8 inch -18 hex nuts and fittings to 50-70 in.-lbs.
- (15) Mount magnetic base and 4-inch dial indicator.
 - (a) Setup indicator to allow full 4-inch stroke.
 - (b) Verify cross-pins turn with light hand pressure to make sure damper is not under load.
 - (c) Zero dial indicator.
- (16) Secure load indicator to bracket (Figure 5-5).
 - (a) Connect load cell indicator cable connectors.
 - (b) Secure excess wiring.



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- (17) Trial run procedure. When procedure is verified, secure bottom plate to hydraulic press table with suitable 3/8 inch bolts, washers, and self-locking nuts and remove clamps

WARNING

INCORRECT FLUID AND NITROGEN SERVICING LEVELS WILL DETERIORATE THE DAMPING CAPABILITIES OF THE LANDING GEAR DAMPERS. THESE CONDITIONS MAY RESULT IN GROUND RESONANCE AND DESTRUCTION OF THE HELICOPTER. THE LOAD/STROKE CHECK IS A POST OVERHAUL CHECK THAT VERIFIES THE PROPER SERVICING LEVELS. FOLLOW ALL INSTRUCTIONS CAREFULLY TO MAKE SURE SAFE OPERATION.

NOTE

Shop temperature for servicing and load/stroke testing should be stabilized at 60 to 85°F (16 to 29°C).

When stroking the hydraulic hand pump handle, and approaching the load or stroke parameter specified, it is helpful to use short strokes as required so that the pump handle full down position will be reached upon reaching specified load or damper piston position. This will help stabilize dial indicator and digital load indicator readings.

- b. Starting with the hydraulic press cylinder/ram retracted, pump the hand pump to position the serviced 269A3150 damper in upper and lower fittings of test apparatus. Secure damper with upper and lower cross-pins. Cross pins should turn freely with hand pressure, indicating the damper is in position and not yet under load.
- (1) Make sure dial indicator is setup to measure the range from 0.0 inch up to 4.0 inches to accurately measure the full stroke of the damper. With the cross pins able to be turned freely by hand, zero dial the indicator.
- (2) Load readings shall be monitored from the digital indicator. On the 9320-1 digital indicator, apply power to load cell by turning on the indicator by pressing the "VALLEY" button. Press the "GROSS/NET" button on the digital indicator to zero the display.

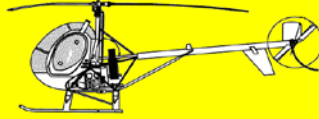
WARNING

A TRANSPARENT FACE SHIELD OR SAFETY EYEGLASSES MUST BE WORN WHILE PERFORMING THE FOLLOWING STEPS.

- c. With the dial indicator indicating 0.0 inch and the digital load cell indicating zero pounds of force (lbf), begin stroking the hand pump slowly to extend hydraulic press cylinder ram to compress the damper.

NOTE

When stroking the hydraulic hand pump handle, and approaching the load or stroke parameter specified, it is helpful to use short strokes, as required, so that the pump handle full down position will be reached upon reaching specified load or damper piston position. This will help stabilize dial indicator and digital load indicator readings.



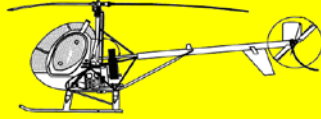
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- (1) For forward dampers (269A3150-019, -023), continue pumping until load applied to damper is 487 lbs.
 - (a) If damper displacement is 1.63 to 2.34 inches, continue to step (4).
 - (b) If damper displacement is outside the range of 1.63 to 2.34 inches, remove damper from inspection apparatus and re-service.
- (2) For aft dampers (269A3150-021), continue pumping until load applied to damper is 814 lbs.
 - (a) If damper displacement is 1.10 to 1.97 inches, continue to step (4).
 - (b) If damper displacement is outside the range of 1.10 to 1.97 inches, remove damper from test apparatus and re-service.
- (3) For aft dampers (269A3150-027), continue pumping until load applied to damper is 814 lbs.
 - (a) If damper displacement is 1.84 to 2.39 inches, continue to step (4).
 - (b) If damper displacement is outside the range of 1.84 to 2.39 inches, remove damper from test apparatus and re-service.

CAUTION

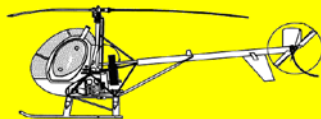
In this next step, the objective is to reach the position where the damper piston is fully retracted (bottomed). Discontinue pumping, finishing the downward stroke the moment the rapid rise in resistance is felt indicating the piston is bottomed. If additional pressure or hand pump strokes were put in after reaching “bottomed” position, release the hand pump pressure and restart the step. Taking a load measurement on a damper that has had additional pressure applied beyond what is required to retract “bottom out” can throw off the accuracy of this test.

- (4) Using pump, continue extending hydraulic cylinder until damper fully retracts to the bottomed position (bottoming should occur at approaching 3.66 to 3.69 inches).
 - (a) For forward dampers (269A3150-019, -023), confirm that load applied by cylinder is equal to or between 2900 to 3600 lbs. If applied load is outside of this range, remove damper from test apparatus and re-service.
 - (b) For aft dampers (269A3150-021), confirm that load applied by cylinder is equal to or between 3200 to 3900 lbs. If applied load is outside of this range, remove damper from test apparatus and re-service.
 - (c) For aft dampers (269A3150-027), confirm that load applied by cylinder is equal to or between 3200 to 3600 lbs. If applied load is outside of this range, remove damper from test apparatus and re-service.
- (5) Repeat steps (1) through (4) two more times.



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- (6) If damper does not pass after repeated servicing, disassemble damper and inspect for discrepancies (section 2 and 3).
- (7) Record results such as pounds of force (lbf) and stroke of the damper (inches), noting part dash number, date, ambient temperature, and serial number of unit.
- (8) After testing, hang the damper barrel down and let hang for 24 hours. A continuous ring of oil, or any bubbles at all shall be considered leakage and require disassembly, repair and repeat inspection.



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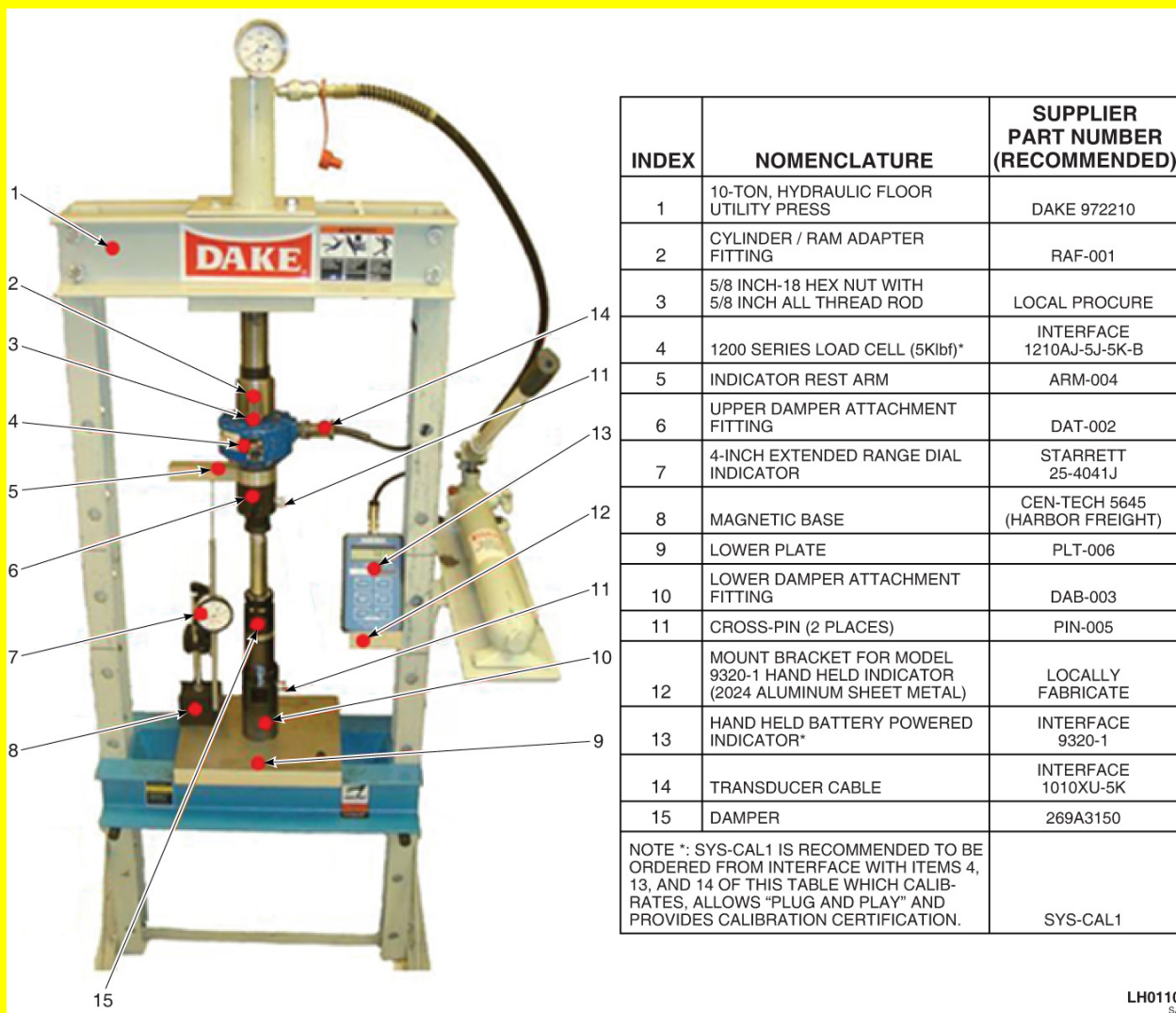
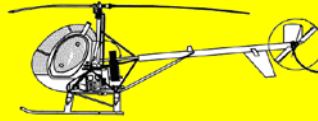


Figure 5-2. Landing Gear Damper Load/Stroke Inspection Apparatus



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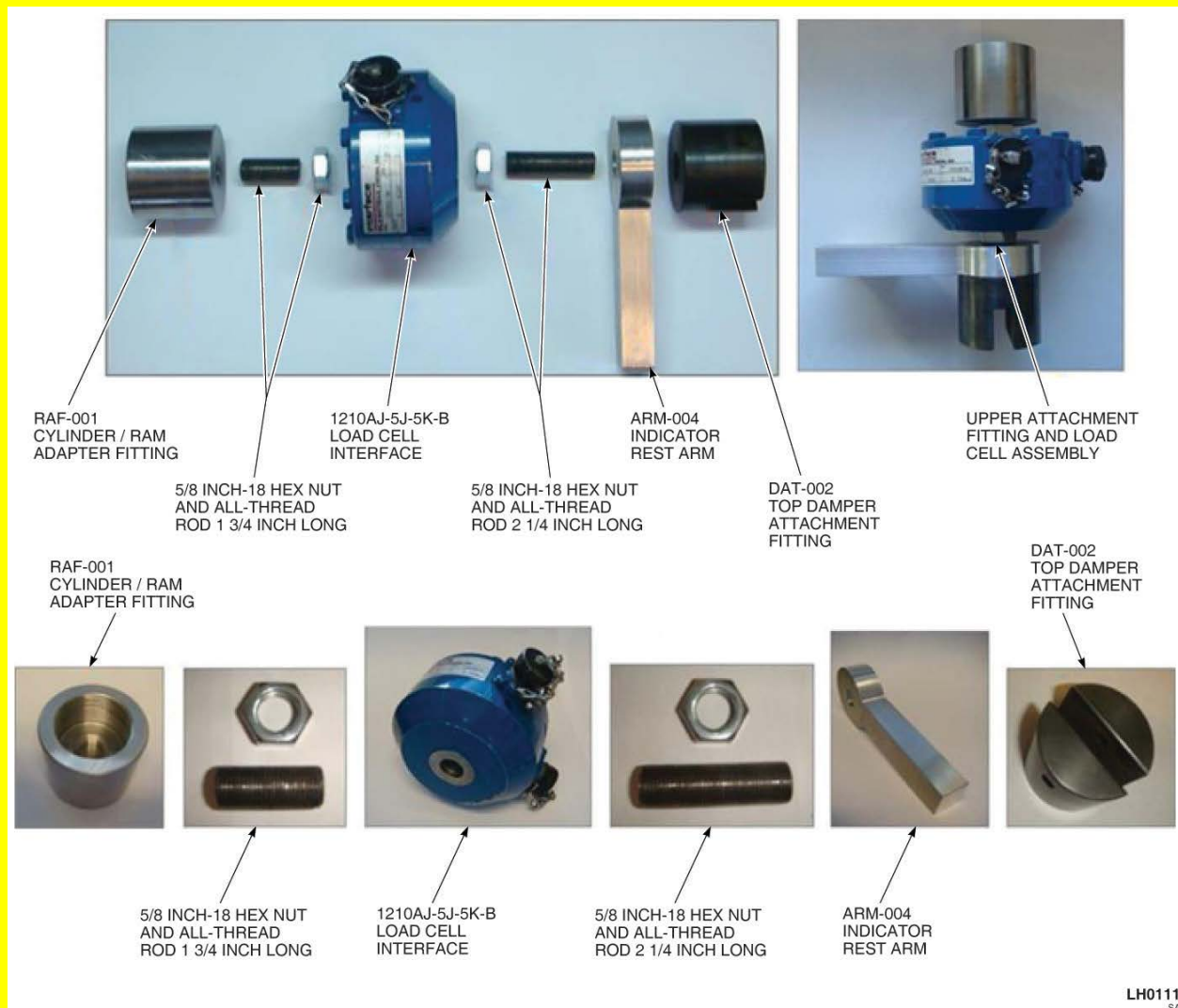
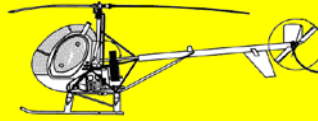


Figure 5-3. Landing Gear Damper Load/Stroke Inspection Apparatus (Upper Attachment Fitting/Load Cell Assembly)



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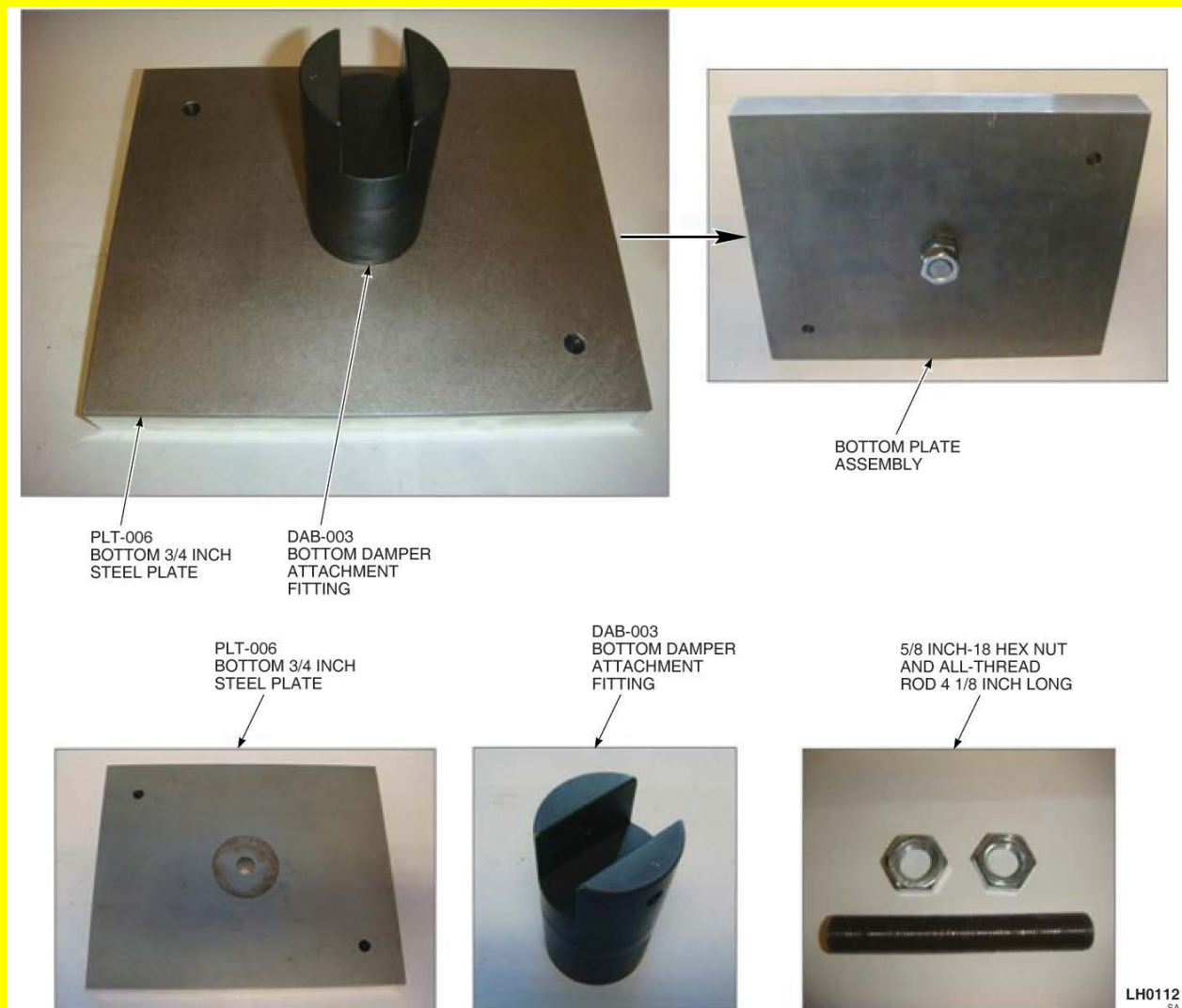
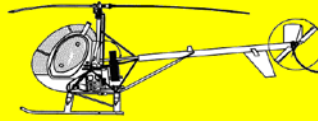


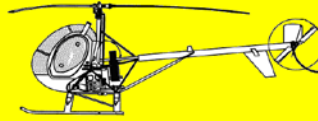
Figure 5-4. Landing Gear Damper Load/Stroke Inspection Apparatus (Lower Plate and Lower Damper Attachment Fitting Assembly)



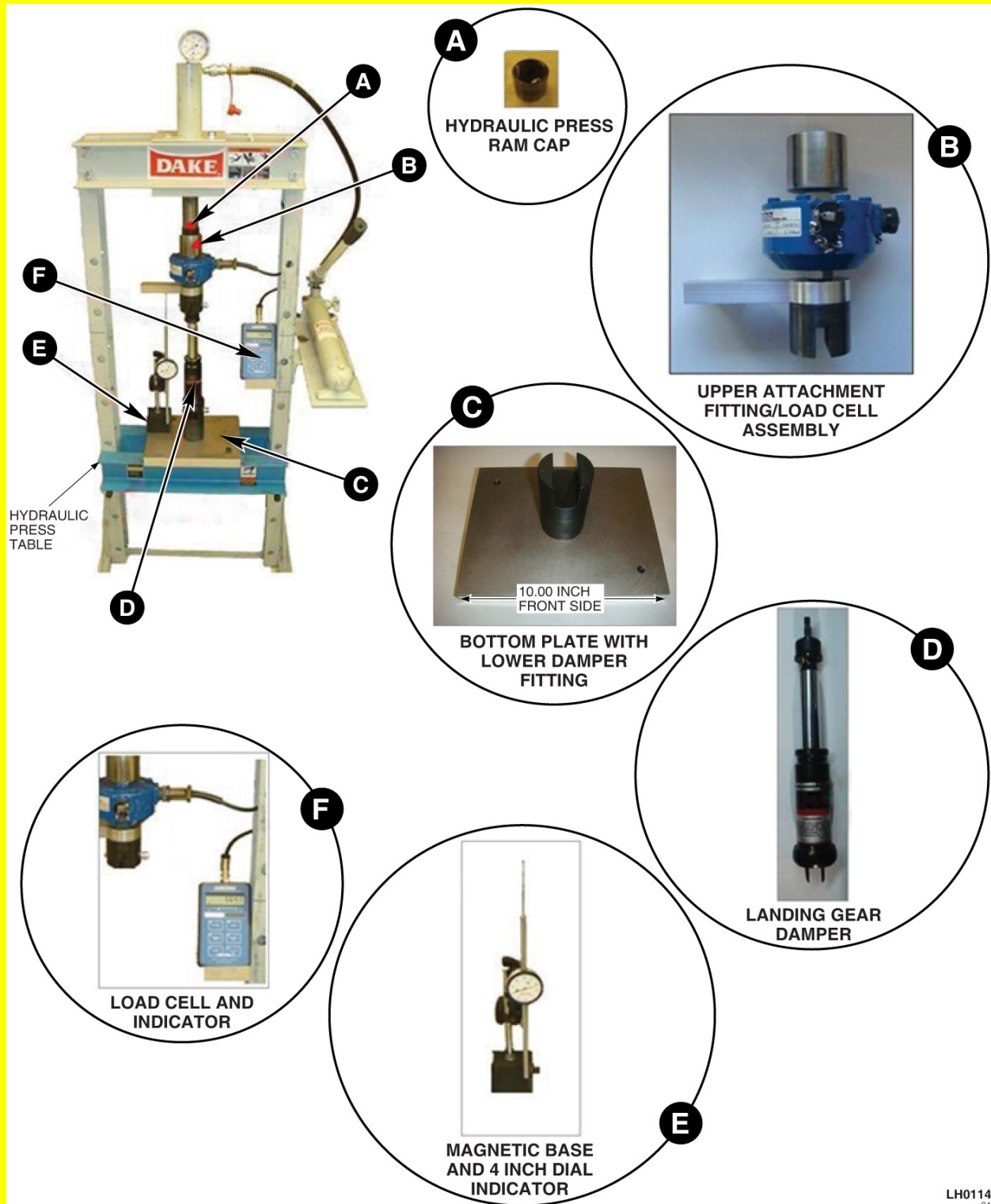
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Figure 5-5. Landing Gear Damper Load/Stroke Inspection Apparatus (Load Indicator Bracket Mount)

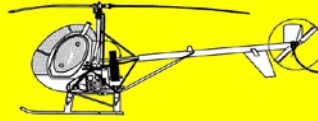


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Figure 5-6. Landing Gear Damper Load/Stroke Inspection Apparatus Final Assembly



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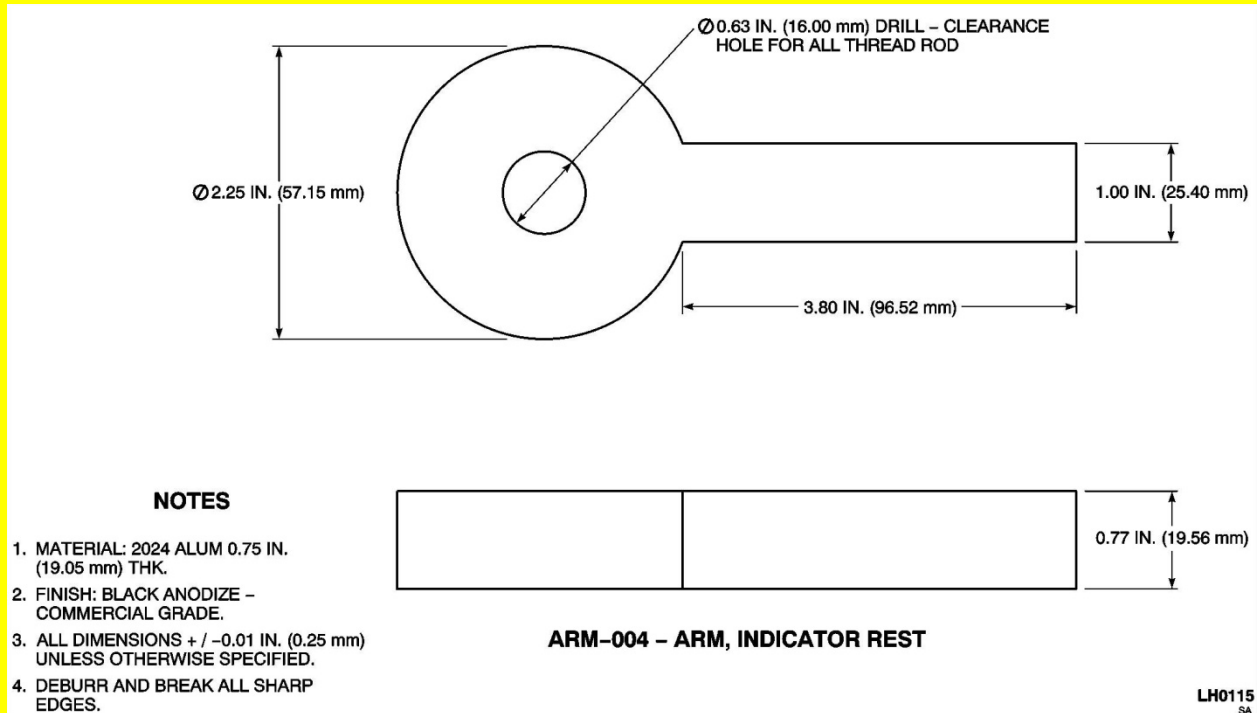
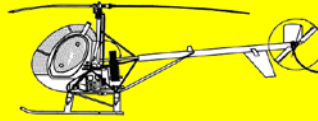
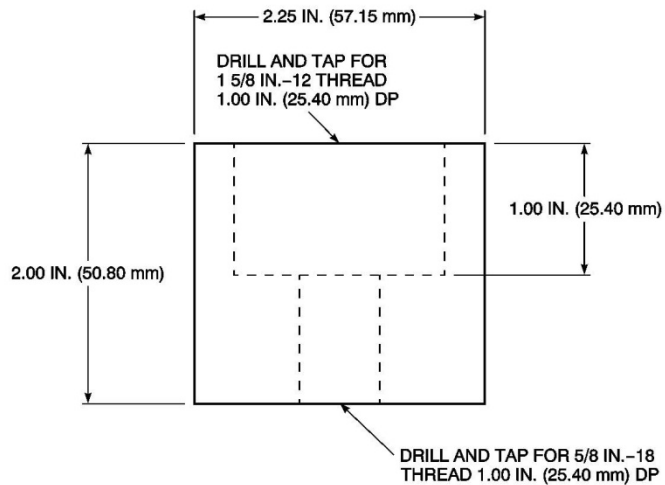


Figure 5-7. Landing Gear Load Stroke Inspection Apparatus Components (Sheet 1 of 6)



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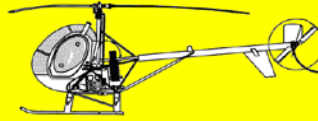
NOTES

1. MATERIAL: 4130 BAR STOCK 2.25 IN. (57.15 mm) DIA X 2.0 IN. (50.80 mm).
2. FINISH: BLACK OXIDE - COMMERCIAL GRADE.
3. ALL DIMENSIONS + / - 0.01 IN. (0.25 mm) UNLESS OTHERWISE SPECIFIED.
4. DEBURR AND BREAK ALL SHARP EDGES.

RAF-001 - CYLINDER ADAPTOR FITTING TO LOAD CELL

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Figure 5-7. Landing Gear Load Stroke Inspection Apparatus Components (Sheet 2 of 6)



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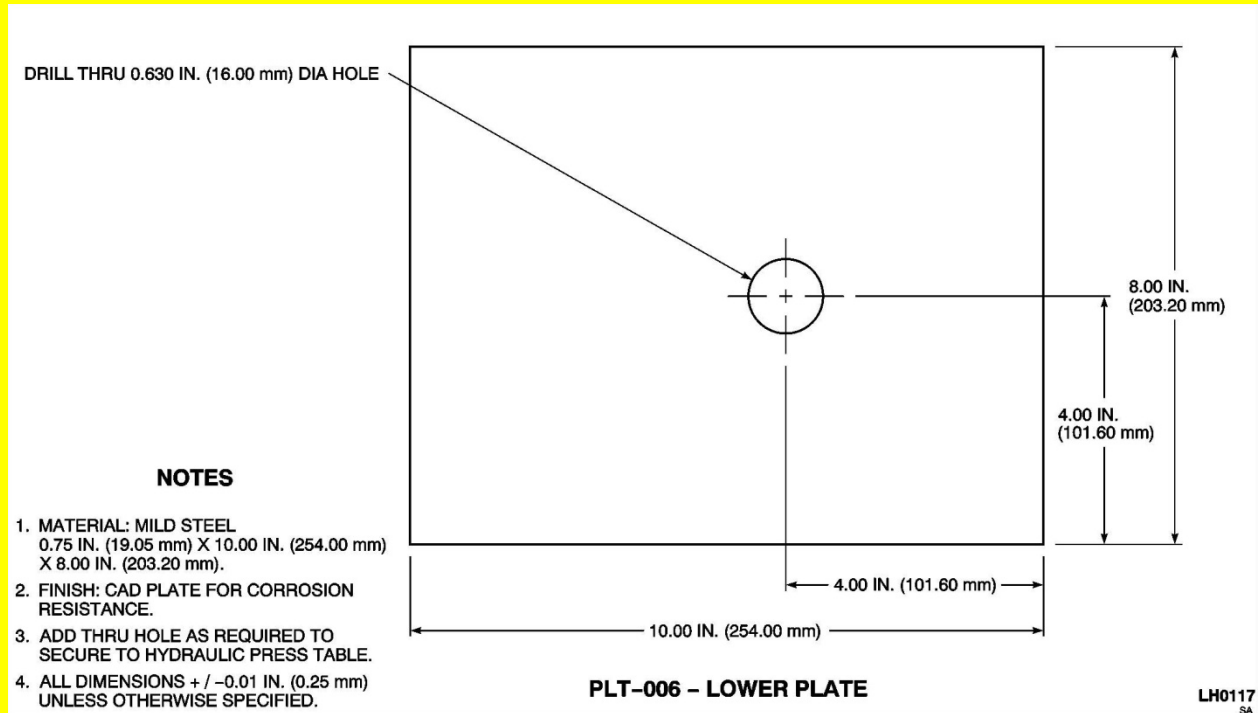
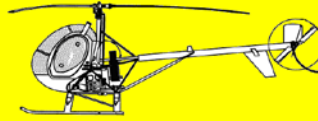
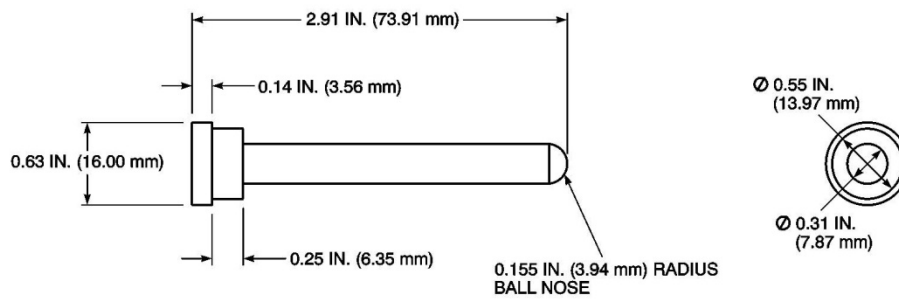


Figure 5-7. Landing Gear Load Stroke Inspection Apparatus Components (Sheet 3 of 6)



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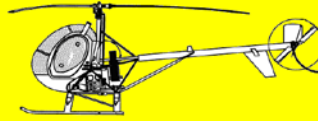
PIN-005 – CROSS-PIN

NOTES

1. MATERIAL: 4130 ROUND BAR STK,
HEAT TREAT TO RC 48-52.
2. FINISH: BLACK OXIDE – COMMERCIAL
GRADE.
3. ALL DIMENSIONS + / -0.01 IN. (0.25 mm)
UNLESS OTHERWISE SPECIFIED.
4. DEBURR AND BREAK ALL SHARP
EDGES.
5. QTY 2 PINS REQUIRED.

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Figure 5-7. Landing Gear Load Stroke Inspection Apparatus Components (Sheet 4 of 6)



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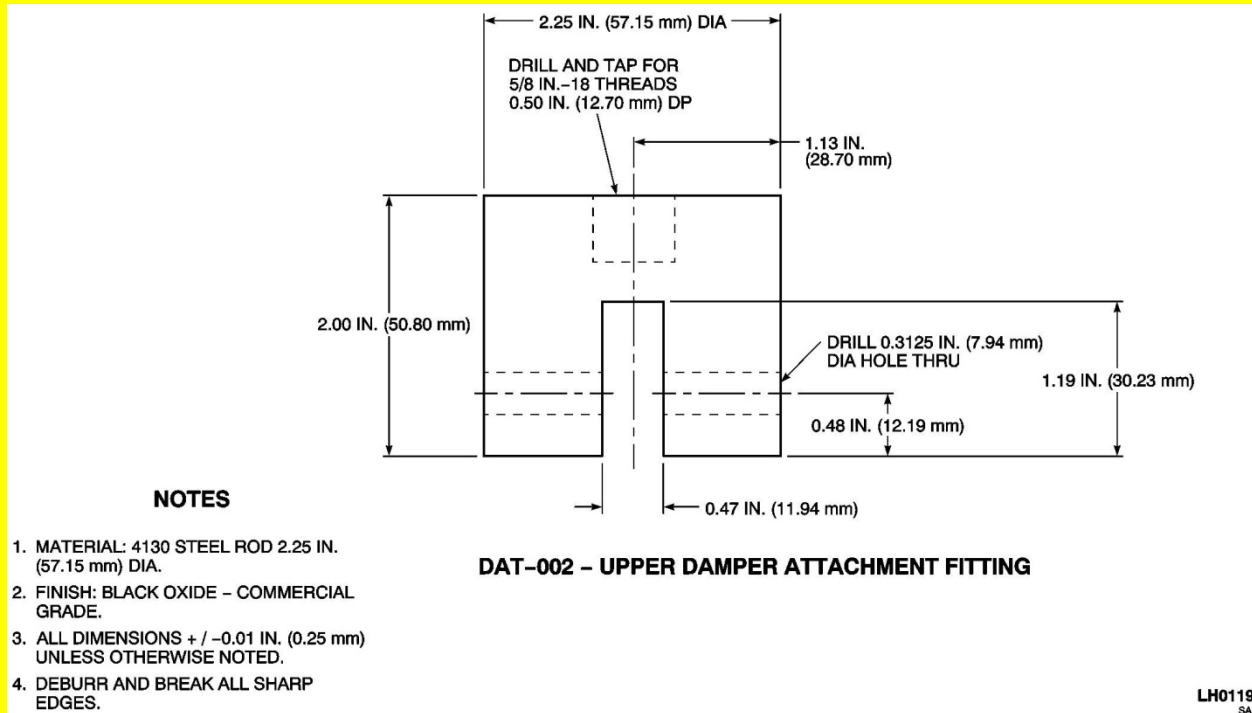
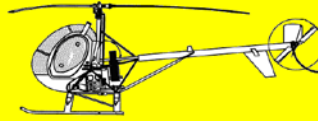
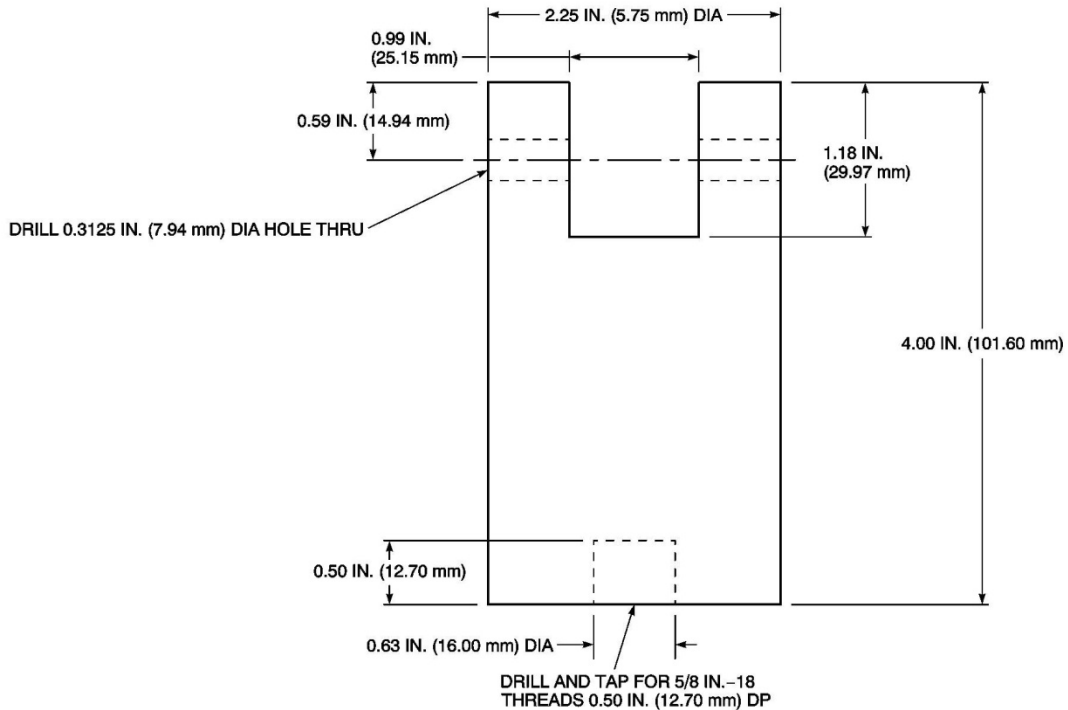


Figure 5-7. Landing Gear Load Stroke Inspection Apparatus Components (Sheet 5 of 6)



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DAB-003 – LOWER DAMPER ATTACHMENT FITTING

NOTES

1. MATERIAL: 4130 STEEL ROD 2.25 IN. (57.15 mm) DIA.
2. FINISH: BLACK OXIDE – COMMERCIAL GRADE.
3. ALL DIMENSIONS + / -0.01 IN. (0.25 mm) UNLESS OTHERWISE SPECIFIED.
4. DEBURR AND BREAK ALL SHARP EDGES.

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Figure 5-7. Landing Gear Load Stroke Inspection Apparatus Components (Sheet 6 of 6)