Table 6-29. 100-Hour Engine Inspection Checklist

Engine Model Number: _____ **Engine Serial Number:** _____

Total Time Engine has been in Service: _____

Time Since Major Overhaul (TSMOH): _____ **Engine in Storage?** _____

Date Inspection Performed: _____ **Inspection Performed by:**_____

Complete the 100-hour inspection according to the instructions referenced in the table, heeding all warnings, cautions and notes. Initial the block beside the procedure upon completion. Note discrepancies in the Inspector Comments or Remarks sections.

Inspection Item	Initials	Inspector Comments
Engine Operational Check(Section 6-4.7)		
Oil Consumption and Trend Monitoring		
Oil Analysis Profile Established? (Section 6-4.8.5)		
Oil Analysis Laboratory used?		
Date of last oil sample analysis:		
Silicone content of last sample:		
Oil consumption quantity noted during oil change:		
Is oil consumption excessive? ❑Yes ❑No		
"Visual Inspection" (Section 6-4.6)		
Accessory Mounting and Security Inspection (Step 18 in Section 6-4.4)		
"Cylinder Inspections"(Section 6-4.11) using the Cylinder Inspection Checklist (Table 6-31 on page 171)		
"Crankcase Inspection"(Section 6-4.12)		
"Engine Mount Inspection" (Section 6-4.13)		
"Induction System Inspection" (Section 6-4.14)		
"Ignition System Inspection" (Section 6-4.15)		
"Engine Gauge Inspection" (Section 6-4.16)		
"Fuel System Inspection" (Section 6-4.17)		
"Engine Control Linkage Inspection" (Section 6-4.19)		
"Induction System Drain Inspection"(Section 6-4.20)		
"Turbocharger and Exhaust System Inspection" (Section 6-4.21)		

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Table 6-29. 100-Hour Engine Inspection Checklist

Engine Model Number: _____ Engine Serial Number: _____ **Total Time Engine has been in Service: _____** **Time Since Major Overhaul (TSMOH): _____ Engine in Storage? _____** **Date Inspection Performed: _____ Inspection Performed by:_____**		
Oil and Filter Change (Section 6-4.8.2)		
Engine Operational Check (Section 6-4.7)		
Remarks:		
Approval Block:		
Checklist Page 2 of 2		

6-4.7. Engine Operational Check

WARNING

Flight is prohibited until the engine successfully completes the operational check and is released for normal operation. If, during an operational check or engine warm-up, abnormal operation is observed or leaks occur, do not take-off. Determine the cause of the problem and take corrective action.

NOTE: The following instructions apply to engines equipped with Continental Motors continuous flow fuel injection systems only. For engines equipped with a carburetor (C-75, C-85, C-90, O-200, O-300, O-470 except GCI model), a servo controlled fuel injection system (GTSIO-520-F or K, L/TSIO-360-RB, TSIO-520-WB), FADEC controlled engines (IOF-240, IOF-550, TSIOF-550), or engines modified by STC, follow the instructions in the primary ICA to verify the engine meets operational specifications.

NOTE: For TIARA engines, reference Service Document M75-3 and the primary ICA (X30144) for fuel system setup instructions.

An engine operational check must be performed after any of the following:

- Engine Installation
- Fuel Injection System parts replacement, maintenance or troubleshooting
- Post-Overhaul
- Return from storage
- After each 100-Hour/Annual

Perform the tasks listed in Table 6-3 on a newly installed, repaired or overhauled engine before the engine can be released for normal flight. Record engine operational check results on a copy of the "Engine Operational Checklist", Table 6-26; substitute forms created by the organization performing the engine operational check may be used.

Table 6-3. Engine Operation Prerequisites

Sequence	Requirement	Section Reference
1	Prepare the engine for operation	Maintenance Preflight Inspection
2	Check Engine Operation	Engine Operational Check
3	Complete the Engine Operational Checklist	"Engine Operational Checklist" (Table 6-26)
4	Perform Flight Check	"Flight Check" in Section 7-2.4[1]

1. and according to the AFM/POH

NOTE: For FADEC engines, perform an "Engine Operational Check" according to instructions in the primary ICA rather than Section 6-4.7.

2. Perform an "Engine Operational Check" according to instructions in Section 6-4.7.
3. Collect an engine oil sample according to the instructions in Section 6-4.8.4, "Oil Sample Collection" and submit it for analysis according to Section 6-4.8.5, "Oil Trend Monitoring and Spectrographic Oil Analysis."
4. Perform the "Cylinder Inspections" according to instructions in Section 6-4.11. The cylinder inspections consist of multiple inspections and checks including Cylinder Power Stroke Area, Differential Pressure, Borescope, Baffle, Cowling, and Cylinder Mounting Deck Inspections.
5. Perform a "Crankcase Inspection" according to Section 6-4.12.
6. Perform an "Engine Mount Inspection" according to Section 6-4.13.
7. Perform an "Induction System Inspection" according to Section 6-4.14.
8. Perform an "Ignition System Inspection" according to Section 6-4.15.
9. **For the IOF-240-B engine only**, perform a "Throttle Position Switch Inspection" according to instructions in the primary ICA.
10. **For FADEC engines only**, perform a "Ground Strap Continuity Test" according to instructions in the primary ICA.
11. **For FADEC engines only**, perform a "FADEC Backup Battery Inspection" according to instructions in the primary ICA.
12. Perform an "Engine Gauge Inspection" according to Section 6-4.16.
13. Perform a "Fuel System Inspection" according to Section 6-4.17.
14. Perform an "Engine Control Linkage Inspection" according to Section 6-4.19.
15. Perform an "Induction System Drain Inspection" according to Section 6-4.20.
16. Inspect the Exhaust system according Section 6-4.21.
17. Change the engine oil and filter according to the Section 6-4.8.2, "Oil Change." Fill the oil sump to the proper capacity for the engine model (**Ref: Section 1-1.1**) with fresh, ashless dispersant aviation engine oil conforming to SAE J1899 (Section 3-1).
18. Inspect installed accessories for mounting security, condition, and proper operation according to the aircraft maintenance manual or accessory manufacturer's instructions. Inspect Hartzell alternator brush holders for soot accumulation. If large amount of soot is present, inspect brushes (Section 6-4.22) according to the alternator manufacturer's ICA.

    NOTE: For FADEC engines, perform an "Engine Operational Check" according to instructions in the primary ICA rather than Section 6-4.7.

19. Perform an "Engine Operational Check" according to instructions in Section 6-4.7.
20. For any other optional engine accessories, refer to the accessory manufacturer's maintenance instructions for inspection criteria.

6-4.6. Visual Inspection

Frequency

- Begin any service interval with a visual inspection

Procedure

1. Verify the engine nacelle is clean and free of fuel leaks, oil leaks, dirt and debris.
2. Inspect all fuel and oil lines for signs of chafing.
3. Inspect the oil cooler and oil filter (or screen) for signs of leaks and physical discrepancies.
4. Check the following on the engine for cracks, dents, pitting or physical damage:
   a. External cylinder barrels
   b. Cylinder barrel fins
   c. Areas between and adjacent to the cylinder barrel fins.
   d. External surfaces of the cylinder head, including areas around
      1) Cylinder head fins
      2) Top and bottom spark plug bosses
      3) Fuel nozzle bosses
      4) Crankcase external surfaces
      5) Accessories
      6) Support structures adjacent to accessories

   NOTE: If cylinder discrepancies are discovered during the visual inspection, perform the "Cylinder Inspections" in Section 6-4.11.
5. Check security of engine and accessory wiring harnesses, including ignition leads. Check for signs of thermal breakdown, chafing, deterioration or improper routing.
6. Replace broken or damaged cushion clamps and stressed or broken wire ties.
7. Check magnetos for external damage, cracks and mounting security. Ensure the ignition plate is securely fastened to the magneto and the harness is properly routed.
8. Inspect external drive belts for nicks, cracks and visible wear; replace belts exhibiting nicks, cracks, or visible wear. Check belt tension and adjust, as required according to instructions in Section 6-4.10.4.
9. Inspect the exposed area of the crankshaft between the crankshaft nose oil seal and the propeller flange for evidence of corrosion. If corrosion is detected, use a Scotch-Brite® pad and a no-corrosive soap solution to remove surface corrosion.
   a. If the cleaning process eliminated the corrosion and no evidence of pitting exists, apply a generous coat of silver or aluminum paint according to the paint manufacturer's instructions to the exposed portion of the crankshaft to prevent further corrosion.

b. If cleaning is unsuccessful (suspected corrosion has advanced to pitting), disassemble the engine and replace the crankshaft.

10. Check electrical connectors for signs of corrosion or contamination; if external corrosion or contamination is discovered, disconnect the connectors and inspect the internal pins for corrosion or contamination.

11. Inspect installed accessories for proper mounting and security. Inspect brush holders for soot accumulation. If large amount of soot is present, inspect brushes (Section 6-4.22).

    NOTE: For items 12 - 16, inspect for obvious signs of physical damage, wear or deterioration, loose or missing hardware, leaks or foreign material that may hinder normal operation. Correct any discrepancies.

12. Inspect the physical security of the fuel system.

13. Inspect the physical integrity of the induction system airbox, ducts, seals and gaskets.

14. Inspect the physical integrity of the lubrication system.

15. Inspect the physical integrity of the turbocharger and exhaust system.

    a. Inspect the stacks, risers, elbows and transitions for burns, cracks or leaks.

    b. Inspect turbocharger and exhaust system hardware and joints for stress.

    c. Inspect slip joints for leaks, bulges, cracks, deformation, or hot spots.

    d. Inspect multi-segment V-band clamp spot welds (or rivets) for cracks or physical damage.

        1) Inspect the corner radii of clamp inner segments for cracks with a flashlight and inspection mirror.

        2) Inspect the V-band clamp outer band for flatness, especially within two inches of spot-weld tabs that retain the T-bolt fastener variance must be less than 0.062 in.

    e. Inspect the heat exchanger, if installed, seams, joints and transition slip joints for evidence of leakage or cracks using a mirror or flexible borescope. Replace any heat exchanger assembly that exhibits cracks or is suspected of leaking.

16. Repair any observable damage or deficiency before the aircraft is returned to service. Refer to Chapter 10, Non-Overhaul Repair and Replacement Procedures.

6-4.11. Cylinder Inspections

A complete cylinder inspection entails the tasks described in the respective sections Table 6-19 below. Performing all of the tasks in Table 6-19 ensures items that can affect cylinder operation have been inspected and verified for proper operation. Use a copy of the "Cylinder Inspection Checklist" on page 6-171 to record inspection progress and findings.

Table 6-19. Cylinder Inspection Tasks and References

Task[1]	Section Reference
Cylinder visual inspection	Section 6-4.11.1
Check cylinder differential pressure	Section 6-4.11.2
Inspect engine cylinders with borescope	Section 6-4.11.3
Inspect cylinder to crankcase mounting deck	Section 6-4.11.4
Inspect baffles	Section 6-4.11.5
Inspect cowling	Section 6-4.11.6

1. All tasks in this table must be performed for a complete cylinder inspection.

In addition to the instructions contained in this section, reference the following Service Documents to determine compliance requirements, based on engine model applicability.

Table 6-20. Additional Cylinder Service Document References

Document Number	Title
M92-8	Application of 4 -1/16 inch Diameter Cylinder Assemblies
M92-6	Rocker Shaft Retention Improvement for Inclined Valve Cylinder
M92-4	IO & L/TSIO-360 Rocker Shaft Stud Inspection
M91-7	Cylinder Barrel Ultrasonic Inspection
M91-6	Cylinder Barrel Inspection
M73-13	Rocker Shaft Bosses
M73-2	Cylinder, Non - H FAA AD #72-20-02

6-4.11.1. Cylinder Visual Inspection

Procedure

1. Remove the engine compartment cowling according to the aircraft manufacturer's instructions and perform steps 2 & 3 without cleaning the engine.
2. Inspect the cylinder barrel power stroke areas (Figure 6-64) with an inspection mirror and light for cracks, sharp indentations, chafing, damage or pitting. Repair discrepancies according to instructions in the primary ICA. The power stroke areas include the:
   - Twelve o'clock area on the first six fins below the head on the 1-3-5 side of the engine as mounted on the crankcase.
   - Six o'clock area on the first six fins below the head on the 2-4-6 side of the engine as mounted on the crankcase.
3. Inspect the external surfaces of the cylinder head including the fins, intake and exhaust ports, top and bottom spark plug bosses and fuel nozzle bosses for cracks, exhaust flange leakage or any signs of oil, fuel, or soot leakage indicating the cylinder or the head-to-barrel junction structural integrity has been breached. ***For liquid cooled cylinder only:*** Inspect cylinder head cooling jackets for coolant leaks.

   NOTE: If discrepancies are noted during the visual inspection, perform a "Differential Pressure Test" according to instructions in Section 6-4.11.2 and a "Cylinder Borescope Inspection" according to instructions in Section 6-4.11.3.

4. Thoroughly clean the exterior of the engine according to instructions in Chapter 12 and repeat steps 2 & 3.

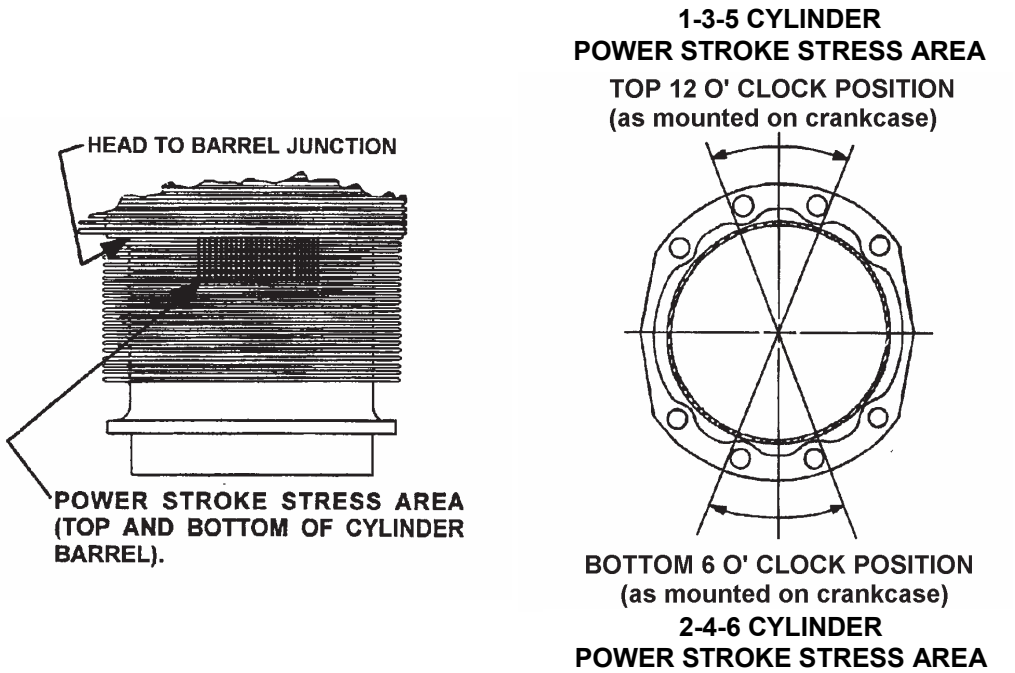


Figure 6-64. Cylinder Power Stroke Areas

6-4.11.2. Differential Pressure Test

Purpose

The Cylinder Differential Pressure Test is a nondestructive method of determining the internal condition of cylinders and cylinder components. As with any test or inspection, the Cylinder Differential Pressure Test has certain limitations that may necessitate its use in conjunction with other non-invasive inspections. The Cylinder Differential Pressure Test identifies leaks and the source of leaks, with the engine under static conditions (not running), using a regulated 80 psi pressure source. The Cylinder Borescope Inspection (Section 6-4.11.3) is used to assess the physical condition of the combustion chamber. Continental Motors requires a borescope inspection to be performed in conjunction with the Differential Pressure Test. Marginal or unsatisfactory results of the Cylinder Differential Pressure Test or Cylinder Borescope inspections may indicate the need to perform additional inspections.

> NOTE: The static leak check does not relate directly to cylinder pressures developed during actual engine operations.

Monitor and record engine oil consumption, the appearance or color of the engine oil and any visual indications of high crankcase pressure (combustion blow-by) such as an oily, wet area on the aircraft belly or lower wing surface.

> NOTE: Prior to performing the cylinder differential pressure test, determine the baseline master orifice calibrated pressure reading according to instructions in Section 6-4.11.2.1.

Excess cylinder wall or piston ring wear, broken piston rings and burned valves exhibit additional symptoms that include, but are not limited to the following:

- Excessive cylinder barrel wear and/or piston ring wear:
  - Elevated crankcase pressure; see “Excess Crankcase Pressure” in Section 8-9.1.
  - Sudden increased oil consumption (based on trend monitoring)
  - Oil discolored within first 10 hours after an oil change
- Broken piston rings:
  - Scored, grooved cylinder wall, evident via a borescope inspection
  - Abnormal debris in oil filter or oil screen
- Burned valves:
  - Extremely low cylinder differential pressure test results
  - Usually evident during borescope inspection.

Many variables affect Differential Pressure Test results, such as:

- Abnormal amounts of oil in the cylinder
- Engine temperature and cylinder temperature uniformity
- Test equipment accuracy
- Capacity and quality of the compressed air source
- Techniques used by the technician when performing the test

Frequency

Perform the differential pressure test:

- During 100-hour or Annual inspections
- If excessive oil consumption or blow-by is suspected
- If the cylinder exhibits signs of accelerated wear

Test Equipment

- Dry, oil-free compressed air source capable of providing a minimum line pressure of 125 P.S.I. with a minimum flow capability of 15 Cubic Feet per Minute (CFM).

  NOTE: Master Orifice Tool (Part No. 646953A) is no longer available. Without the Master Orifice Tool, the Model E2A Differential Pressure Tester is not a valid test equipment option; the Model E2M Differential Pressure Tester must be used. If the facility performing the repairs is in possession of both a Model E2A Differential Pressure Tester and the Master Orifice Tool, the shop may continue to use them as alternatives to the Model E2M Differential Pressure Tester. Instructions in this manual apply only to the Model E2M Differential Pressure Tester.

  The Eastern Technology web site (eastertech.com) indicates a Model E2M-1000, with a 0.060 Master Orifice should be used on cylinders with a bore greater than 5.0 inches however, approved type certificate data pertaining to engines in this manual were approved by the FAA using a Model E2M Differential Pressure Tester with a 0.040 inch Master Orifice.

- Eastern Technology Corporation Model E2M (Figure 6-65) Cylinder Differential Pressure Tester. This Differential Pressure Tester incorporates a 0.040 Master Orifice Tool.

WARNING

Differential Pressure Test equipment must be calibrated annually. Failure to properly maintain and calibrate the Differential Pressure Test equipment may result in misleading or erroneous Differential Pressure Test readings.

Perform the “Differential Pressure Tester Setup” instructions in Section 6-4.11.2.1 to calibrate the test equipment prior to conducting the Cylinder Differential Pressure Test. Perform the Cylinder Differential Pressure Test as soon as possible after the aircraft has returned from flight. If the aircraft cannot be flown prior to performing the Cylinder Differential Pressure Test, operate it on the ground, with the cowling installed until a minimum of 300 to 350°F (149 to 177°C) is observed on the aircraft cylinder head temperature (CHT) gauge.

WARNING

Shut the fuel supply OFF and ground the magnetos prior to performing the Differential Pressure Test to prevent accidental engine starts. Take necessary precautions to prevent accidental rotation of the propeller while performing this test. Differential pressure tests are best performed with two people, one to adjust the pressure regulator and one to hold the aircraft propeller.

The "Master Orifice" is a calibration standard that must be used prior to performing the Cylinder Differential Pressure Test. The Master Orifice establishes the acceptable cylinder pressure leakage limit for the test equipment being used and the atmospheric conditions at the time of the test. Record the acceptable cylinder pressure leakage limit, along with the individual cylinder readings in the engine logbook and on a copy of "Cylinder Inspection Checklist" on page 6-171.

6-4.11.2.1. Differential Pressure Tester E2M Setup

Perform this procedure to prepare the Model E2M Differential Pressure Tester (Figure 6-65) for use and establish the acceptable cylinder pressure leakage limit.

Procedure

1. Turn the Differential Pressure Tester pressure regulator valve OFF.
2. Position the Master Orifice Valve to the OFF position; handle is horizontal and directly over the OFF label.
3. Position the Slow Fill Valve (next to the pressure regulator) to the OFF position; handle is vertical, pointing down.
4. With the Slow Fill Valve in the OFF position, connect the air source to the Differential Pressure Tester male quick disconnect.

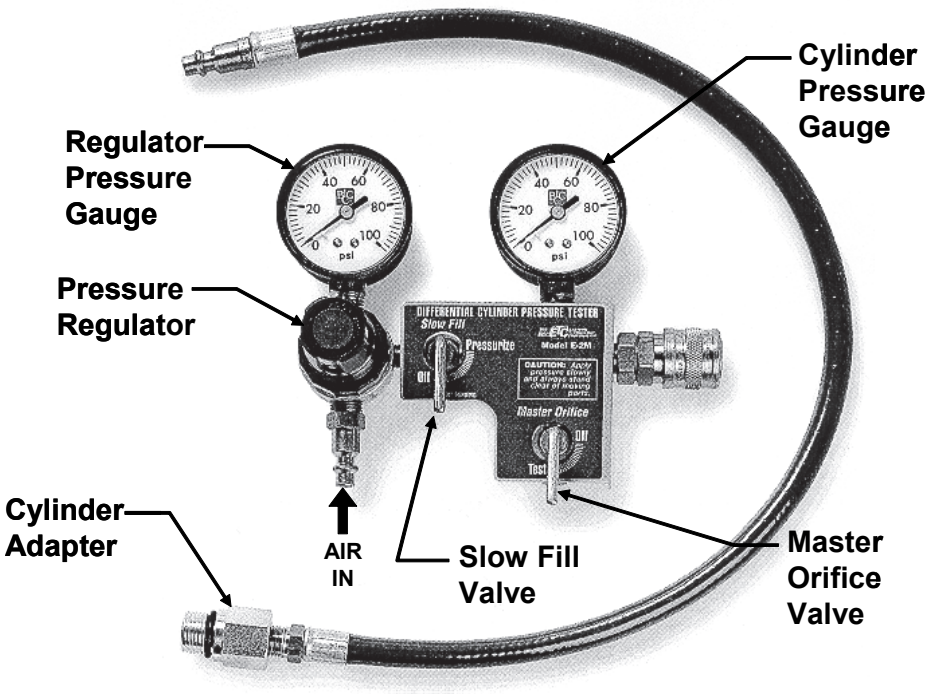


Figure 6-65. Model E2M Differential Pressure Tester

5. Adjust the pressure regulator for indicated 80 psi.
6. Set the Master Orifice Valve to the TEST position; handle is vertical, pointing down.
7. Turn the Slow Fill Valve to the PRESSURIZE position.

8. If necessary, adjust the pressure regulator to maintain an 80 psi indication on the regulator pressure gauge.
9. Record the cylinder pressure gauge indication on a copy of the Cylinder Inspection Checklist. This is the Acceptable Cylinder Pressure Leakage Limit.
10. Turn the Slow Fill Valve to the OFF position; handle is vertical, pointing down.
11. Turn the Master Orifice Valve to the OFF position; handle is horizontal, directly over the OFF label.
12. The Differential Pressure Tester is ready for use; proceed to Section 6-4.11.2.4, "Cylinder Differential Pressure Test."

6-4.11.2.2. Differential Pressure Tester Reliability Check

Keep the Differential Pressure Tester clean and check it periodically for accuracy:

1. Apply a line pressure of 100 to 120 psi; close the Slow Fill Valve.
2. Adjust the pressure regulator to 80 psi. The pressure in both gauges should stabilize with no leakage.

6-4.11.2.3. Leak Check

WARNING

Turn the Ignition Switch OFF and disconnect engine power before commencing maintenance or inspections. Do not stand or place equipment within the arc of the propeller.

Exercise care when opening the cylinder pressure valve, air pressure entering the cylinder may cause the crankshaft to rotate if the piston is not at bottom dead center.

This simple check will identify conditions undetectable by visual inspection that cannot be repaired. If the cylinder barrel to head junction is compromised, replace the cylinder; further inspection is unnecessary if the cylinder fails the leak check.

1. Have an assistant hold the propeller when applying air pressure to the cylinder to prevent propeller rotation.
2. With the compression tester connected, apply 5 psi oil free air to the cylinder.
3. Position the piston as close to bottom dead center on the compression stroke as possible, ensuring the intake valve remains closed to allow the cylinder to hold pressure.
4. Increase the pressure slowly to a maximum value of 80 psi. Saturate the exterior of the cylinder assembly with a mild non-alkaline soap and water solution.
5. Inspect the cylinder for leakage, indicated by an accumulation of air bubbles.
6. After cylinder inspection, relieve cylinder pressure and remove compression tester.
7. Repeat steps 1 through 5 for all cylinders. Rinse the cylinder thoroughly upon completion to remove the soap residue.

6-4.11.2.4. Cylinder Differential Pressure Test

Have an assistant hold the propeller when applying air pressure to the cylinder to prevent propeller rotation.

WARNING

Turn the Ignition Switch OFF and disconnect engine power before commencing maintenance or inspections. Do not stand or place equipment within the arc of the propeller.

Procedure

1. Perform the test as soon as possible after engine shut down to ensure the piston rings, cylinder walls, and other engine parts are well lubricated and at operating clearance.
2. Remove the most accessible spark plug from each cylinder. Identify the cylinder number and position of the removed spark plugs. Examine the spark plugs to aid in diagnosing engine and cylinder conditions. Refer to the spark plug manufacturer's technical data.
3. Turn the crankshaft by hand in the direction of rotation until the piston in the cylinder under test is positioned just before its compression stroke.
4. Install the cylinder adapter in the spark plug hole and connect the Differential Pressure Tester to the cylinder adapter (Figure 6-66).

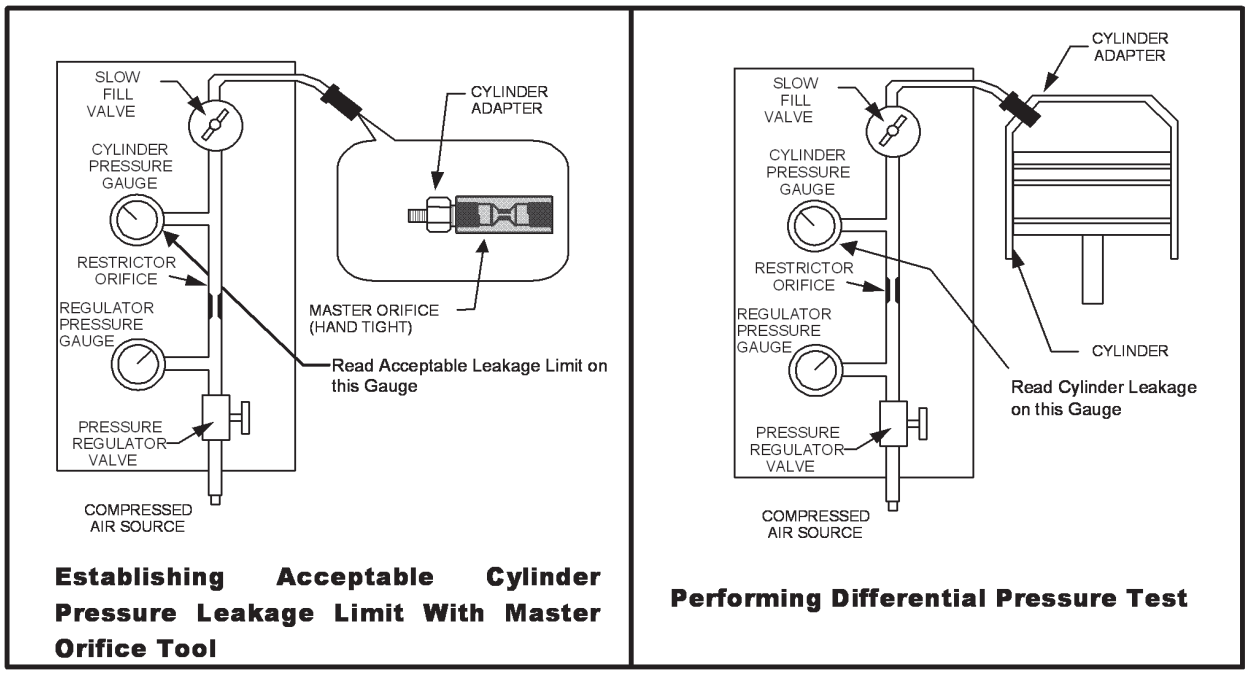


Figure 6-66. Differential Pressure Test Equipment Usage

NOTE: The Slow Fill Valve should be in the CLOSED position.

WARNING

Exercise care when opening the cylinder pressure valve, air pressure entering the cylinder may cause the crankshaft to rotate if the piston is not at bottom dead center.

5. Have an assistant secure the propeller to prevent rotation and slowly turn the Slow Fill Valve in the direction of the PRESSURIZE position to pressurize the cylinder to 20 psi.

   NOTE: Some Continental Motors engines feature a lightweight starter which restricts turning the propeller in the opposite direction of normal rotation. For these engines, remove the starter prior to commencing the test or continue to turn the propeller in the normal direction of rotation to seek the TDC position with the highest pressure indication on the cylinder pressure gauge.

6. Continue turning the propeller in the normal direction of rotation, against the pressure until the piston reaches top dead center (TDC) indicated by a sudden decrease in the force required to turn the crankshaft. If the crankshaft is rotated too far, back up at least one-half revolution and start over again to eliminate the effect of valve train backlash and to keep the piston rings seated.

WARNING

The probability of air pressure in the cylinders turning the propeller during this procedure will be highest when the air pressure in the cylinder is raised to 80 psi in step 7. Stand outside the propeller arc with balanced footing while holding the propeller firmly to avoid injury.

7. With the piston at top dead center, open the Slow Fill Valve completely. Observe the regulator pressure gauge and adjust the pressure regulator, if necessary, for an 80 psi indication.

8. To ensure the piston rings are seated and the piston is square in the cylinder bore, move the propeller slightly back and forth with a rocking motion, while applying the regulated pressure of 80 psi, to obtain the highest indicated pressure reading on the cylinder pressure gauge. Adjust the pressure regulator, as necessary, to maintain a regulated pressure indication of 80 psi.

9. Record cylinder pressure gauge indication. The difference between indicated cylinder pressure and indicated regulator pressure is the amount of cylinder leakage. Record cylinder pressure indication as: $^{(\text{pressure reading})}/_{80\ \text{psi}}$.

   NOTE: Repeat steps 3 through 9 on each engine cylinder. Record Cylinder Differential Pressure Test results for each cylinder on a copy of the Cylinder Inspection Checklist.

10. Compare the recorded test results with Table 6-21 to determine what action, if any, is recommended.

11. Turn the Slow Fill Valve to the OFF position.

12. Disconnect the test equipment from the cylinder and proceed to the "Cylinder Borescope Inspection" in Section 6-4.11.3.

Table 6-21. Differential Pressure Test Results

Air Discharge Source	Pressure Test Value	Symptoms and Observations	Recommended Action
Air discharge at oil filler/ crankcase breather.	Cylinder Differential Pressure Test reading above the acceptable cylinder pressure leakage limit.	Normal borescope indications. Oil consumption stable, no excessive oil discharge out engine breather	Continue engine in service. Repeat Differential Pressure Test at next 100-hour/annual inspection.
	Cylinder Differential Pressure Test reading below the acceptable cylinder pressure leakage limit.	Normal borescope indications. Oil consumption stable, no excessive oil discharge out engine breather.	Fly aircraft at Cruise Power setting[1] and repeat Cylinder Differential Pressure Test.
	Cylinder Differential Pressure Test reading below the acceptable cylinder pressure leakage limit after re-test.	Not applicable	Remove cylinder for repair.
	Cylinder Differential Pressure Test reading above or below the acceptable cylinder pressure leakage limit	Oil consumption abnormal[2], with oil discharge out engine breather. Borescope inspection reveals heavy carbon deposits in combustion chamber and on piston crown with excessive oil puddling in cylinder barrel.	Remove cylinder for repair.
Little to no air discharge at oil filler/crankcase breather.	Cylinder Differential Pressure Test reading abnormally high	Oil consumption abnormal[2], with oil discharge out engine breather. Borescope inspection reveals heavy carbon deposits in combustion chamber and on piston crown with excessive oil puddling in cylinder barrel.	Remove cylinder for repair.

Table 6-21. Differential Pressure Test Results

Air Discharge Source	Pressure Test Value	Symptoms and Observations	Recommended Action
Air discharge into induction system	Cylinder Differential Pressure Test reading above the acceptable cylinder pressure leakage limit.	Normal cylinder borescope inspection results.	Continue engine in service.
	Cylinder Differential Pressure Test reading below the acceptable cylinder pressure leakage limit.	Normal cylinder borescope inspection results.	Fly aircraft at cruise power setting[1] and repeat Cylinder Differential Pressure Test.
	Cylinder Differential Pressure Test reading below the acceptable cylinder pressure leakage limit after re-check.	Not Applicable	Remove cylinder for repair.
Air discharge into exhaust system	Cylinder Differential Pressure Test reading above the acceptable cylinder pressure leakage limit.	Normal cylinder borescope inspection results.	Continue engine in service.
	Cylinder Differential Pressure Test reading below the acceptable cylinder pressure leakage limit.	Normal cylinder borescope inspection results.	Fly aircraft at cruise power setting[1] and repeat Cylinder Differential Pressure Test.
	Cylinder Differential Pressure Test reading below the acceptable cylinder pressure leakage limit after re-check.	Not Applicable	Remove cylinder for repair.
Air escaping at spark plug spot face	Cylinder Differential Pressure Test readings not applicable	Dye check of area reveals cracks.	Remove cylinder for replacement.
Air discharge at cylinder head to barrel juncture or between barrel fins	Cylinder Differential Pressure Test readings above the acceptable cylinder pressure leakage limit.	First cylinder head fin above cylinder barrel wet with oil or baked on oil residue.	Remove cylinder for replacement.

1. Fly the aircraft at cruise power setting between 65 and 75 percent power according to the Aircraft Flight Manual/Pilots Operating Handbook (AFM/POH) for a duration that will allow engine oil and temperatures to stabilize, or at least 45 minutes. Repeat the differential pressure test on the suspect cylinder.
2. A sudden increase in oil consumption from the established, normal trend.

6-4.11.3. Cylinder Borescope Inspection

Regular engine operation provides an oil coating for the cylinder and minimizes rust formation. New cylinders are particularly sensitive to rust formation if the engine is infrequently used or not properly preserved during storage.

NOTE: Ground operation of the engine is an unacceptable substitute for in-flight engine operation. Ground operation does not provide adequate cylinder cooling and introduces water and acids into the lubrication system.

Purpose

The cylinder borescope inspection provides a non-destructive method of visually examining the internal cylinder components and must be used in conjunction with the "Differential Pressure Test" to assess the condition of the valve, piston top, deposits, and the hone pattern on the cylinder barrel and identify abnormal wear patterns which can contribute to low differential pressure readings or increased oil consumption.

The cylinder wall hone pattern consists of engineered surface "scratches" which aid in ring seating by allowing the ring and wall surface to wear uniformly and provides a reservoir of oil for lubrication during ring travel. The cylinder walls and rings are designed to wear over the life of the engine, particularly in the power stroke area. The visible hone pattern in the upper portion of the bore may disappear during normal operation; and is not cause for cylinder replacement.

Required Equipment

- Mechanics tools
- Borescope

Frequency

- During 100-hour/Annual inspection
- If oil consumption is excessive
- After an engine overspeed incident
- Whenever an anomaly is suspected

WARNING

Turn the Ignition Switch OFF and disconnect engine electrical power before commencing maintenance or inspections. Confirm continuity between the magneto capacitor and aircraft ground to prevent accidental engine start during maintenance. Do not stand or place equipment within the arc of the propeller.

Take preventive measures to avoid burns when performing a Cylinder Borescope Inspection on a hot engine.

Procedure

1. Remove the engine cowling as necessary to gain access to the top spark plugs.
2. Remove the top spark plug from each cylinder.

3. Position the piston at bottom dead center on the power stroke. The exhaust valve will be open with the piston in this position.
4. Insert the borescope probe through the upper spark plug hole and inspect the internal surfaces of each cylinder, including the exhaust valve and exhaust valve seat.
5. Position the piston at bottom dead center at the end of the intake stroke.
6. Insert the borescope through the upper spark plug hole and inspect the intake valve and valve seat. Use Table 6-22 and Figure 6-67 through Figure 6-70 to interpret inspection findings.

Table 6-22. Borescope Inspection Objectives and Corrective Actions

Inspection Item	Objective	If Abnormality Noted
Combustion Chamber	Inspect: •Valve seat inserts for erosion, burning •Spark plug heli-coils for protrusion into combustion chamber •Heavy carbon deposits/presence of excessive oil	Remove cylinder for repair
Exhaust Valve Face	Inspect for signs of leakage or damage indicated by: •Localized discoloration on the valve face circumference (Figure 6-68) •Minute cracks •Erosion (missing material)	Repair or replace cylinder
Intake Valve Face	Inspect for signs of leakage or damage indicated by: •Localized discoloration on the valve face circumference •Erosion (missing material)	Repair or replace cylinder
Cylinder Bore	Inspect exposed surface of bore for: •Heavy scoring/piston rub (Figure 6-71) •Piston pin rub (wide band pattern in horizontal plane at 3 o'clock and/or 9 o'clock position)	Repair or replace cylinder
	Corrosion (Figure 6-70)[1] Excessive oil in cylinder/heavy deposits of carbon in combustion chamber	Remove cylinder for repair
	Upper portion of cylinder bore has no visible hone pattern (Figure 6-72) and (Figure 6-73)	Normal indication for in service cylinders
Piston Head	Inspect for: •Piston crown for erosion, missing material •Visible damage from foreign debris	Remove cylinder for repair

1. Remove cylinder for repair or replacement. Perform complete inspection of connecting rod bushing for correct installation and finishing.

Figure 6-67. Normal Combustion Chamber

Exhaust valve has reddish deposit in center with dark outer edge. Intake valve has light brown combustion deposits. Combustion chamber has light brown deposits.

Figure 6-68. Burned Exhaust Valve

Note the edge of valve face has lost all combustion residue with striations moving toward center of valve.

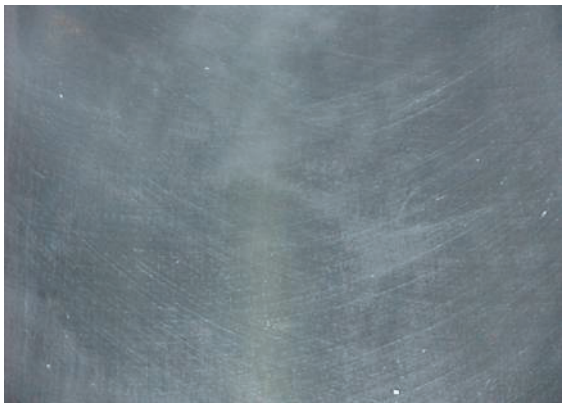


Figure 6-69. Phosphate-Coated Cylinder w/ Revised Hone Pattern

Phosphate coating provides increased corrosion protection during initial hours of engine operation.

Figure 6-70. Phosphated Cylinder Bore

Phosphate coating in valleys of the cylinder bore hone pattern. Light corrosion at top of cylinder bore, above piston ring travel limit in this area is normal.

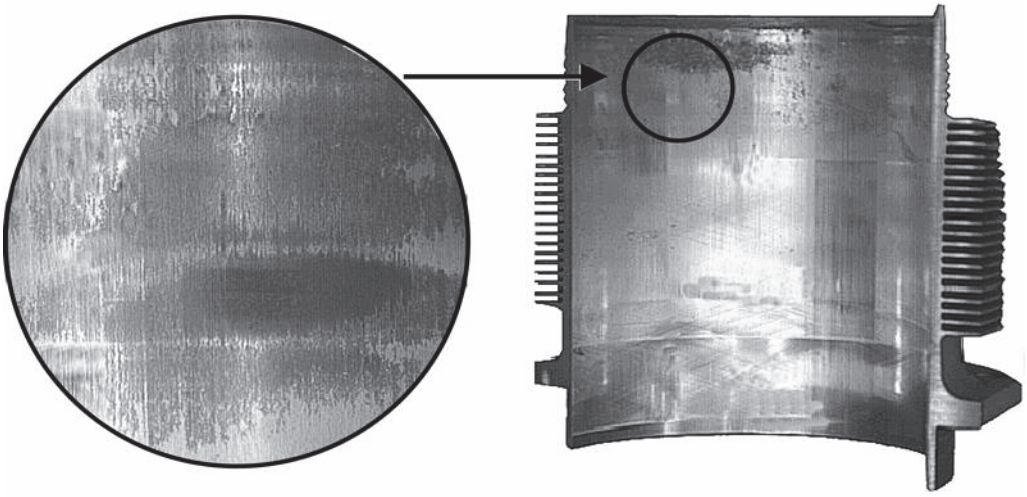


Figure 6-71. Cylinder Barrel Scoring and Piston Rub

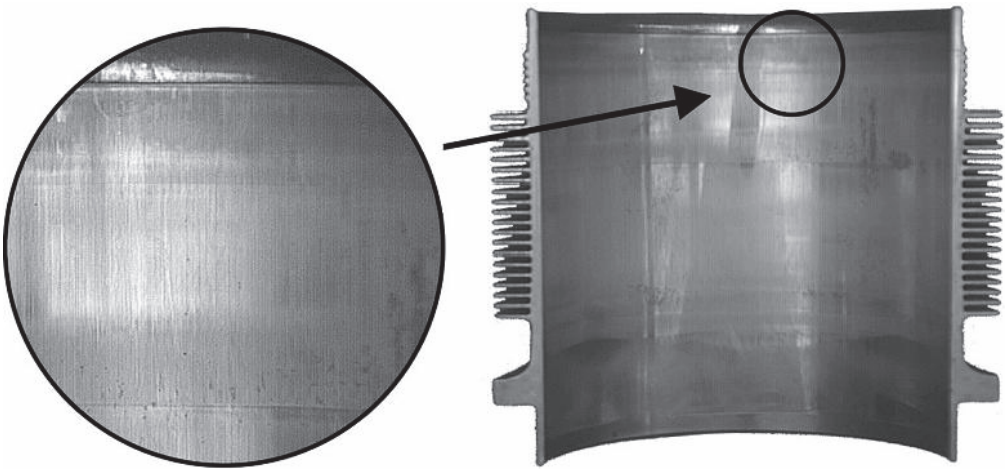


Figure 6-72. Typical Wear in Upper Ring Travel

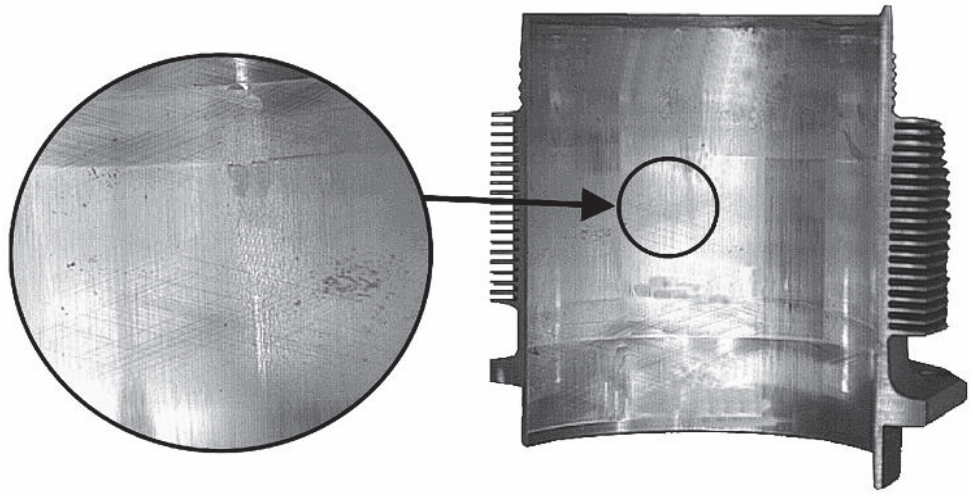


Figure 6-73. Typical Cylinder Wear

6-4.11.4. Cylinder to Crankcase Mounting Deck Inspection

Purpose

Proper cylinder torque requires a solid mounting surface. Foreign materials, such as grease or unauthorized sealants applied to the mounting base or flange will not allow proper fastener preload. Proper torque procedures are critical to engine operation.

Frequency

During 100-hour/Annual inspection

WARNING

Do not apply <u>any</u> form of sealant to the crankcase cylinder deck, chamfer, cylinder mounting flange, cylinder base O-ring, or cylinder fastener threads. The use of RTV, silicone, Gasket Maker or <u>any</u> other sealant on the areas listed above during engine assembly will cause a loss of cylinder deck stud or through-bolt torque. Subsequent loss of cylinder attachment load, loss of main bearing crush and/or fretting of the crankcase parting surfaces will occur. The result will be cylinder separation, main bearing movement, oil starvation and catastrophic engine failure. USE ONLY CLEAN 50 WEIGHT AVIATION ENGINE OIL ON SURFACES LISTED.

Procedure

Inspect the cylinder-to-crankcase mounting deck for evidence of silicone RTV sealant on the cylinder deck flange. If silicone RTV sealant or any other unauthorized sealant or adhesive is discovered, the engine must be completely disassembled, cleaned, inspected and assembled according to the overhaul instructions in the primary ICA.

1. Remove the engine from the aircraft according to instructions in Section 5-1.
2. Disassemble the engine according to the instructions in the primary ICA (**Section 1-1.1**).
3. Clean the engine components according to the instructions in the Chapter 12 of this manual.
4. Inspect the engine components according to the instructions in the primary ICA (**Ref: Section 1-1.1**).
5. Reassemble the engine according to instructions in the primary ICA (**Ref: Section 1-1.1**).
6. Perform the “Post-overhaul Testing” according to instructions in the primary ICA (**Ref: Section 1-1.1**).
7. Install the overhauled engine according to instruction in Section 5-2.

6-4.11.5. Baffle Inspection

Purpose

To prevent cylinder deterioration and verify baffles are properly fitted and installed. This inspection performed in concert with the cylinder inspection.

The heat transfer in piston engines requires efficient and reliable operation of cooling baffles to prevent rapid deterioration of the cylinders and other engine components. Verify the baffles are installed, intact, and positioned properly.

Frequency

During 100-hour/Annual inspection or whenever the cowling is removed

Procedure

1. Check the following for deterioration, wear, correct position, and proper contact with the cowl. Figure 6-74 through Figure 6-77 show improperly positioned baffle seals.
2. Repair or replace worn or distorted baffles in accordance with the aircraft manufacturer or Supplemental Type Certificate (STC) holder's information.
3. Check and adjust inter-cylinder baffles to ensure a tight fit.
4. Inspect for holes and cracks that would allow cooling airflow to be wasted. Seal any cracks or holes by applying a non-corrosive silicone adhesive/sealant. Consult the aircraft manufacturer for application instructions. Baffle conditions shown in Figure 6-78 shows air gaps that lead to inadequate cooling airflow. Figure 6-79 and Figure 6-80 show evidence of cooling air loss at the baffle seals.
5. Check the integrity of all cooling ducts, heater ducts, etc. and repair as necessary.

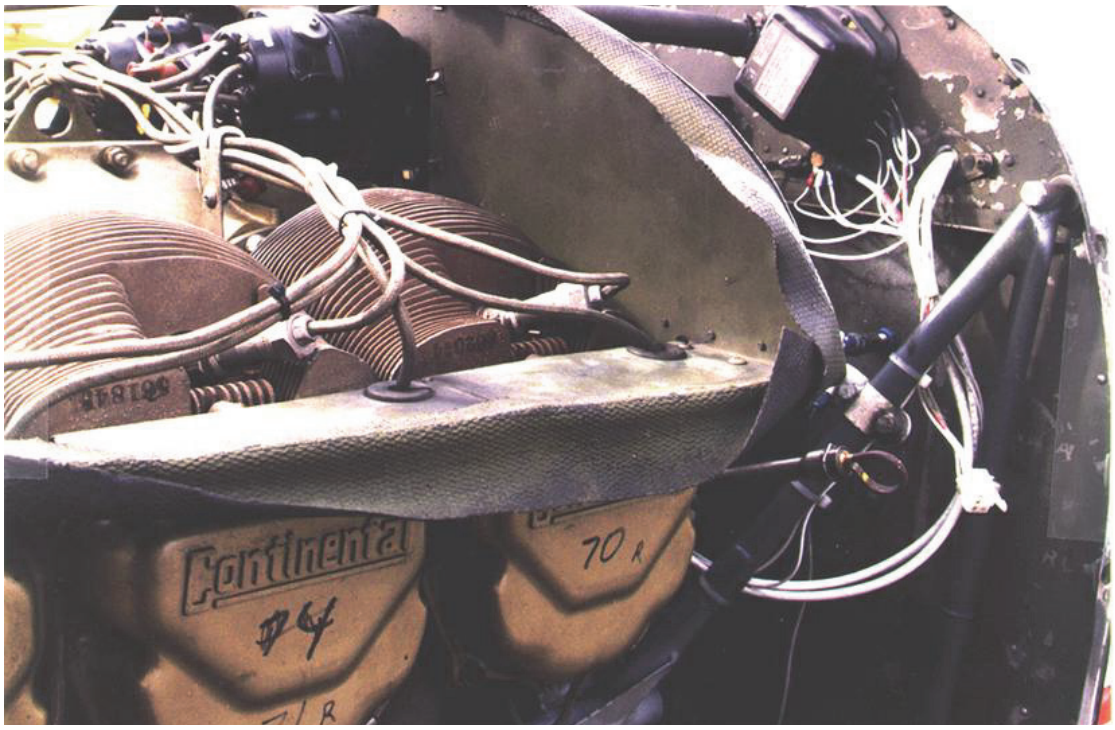


Figure 6-74. Improperly Positioned Baffle Seals

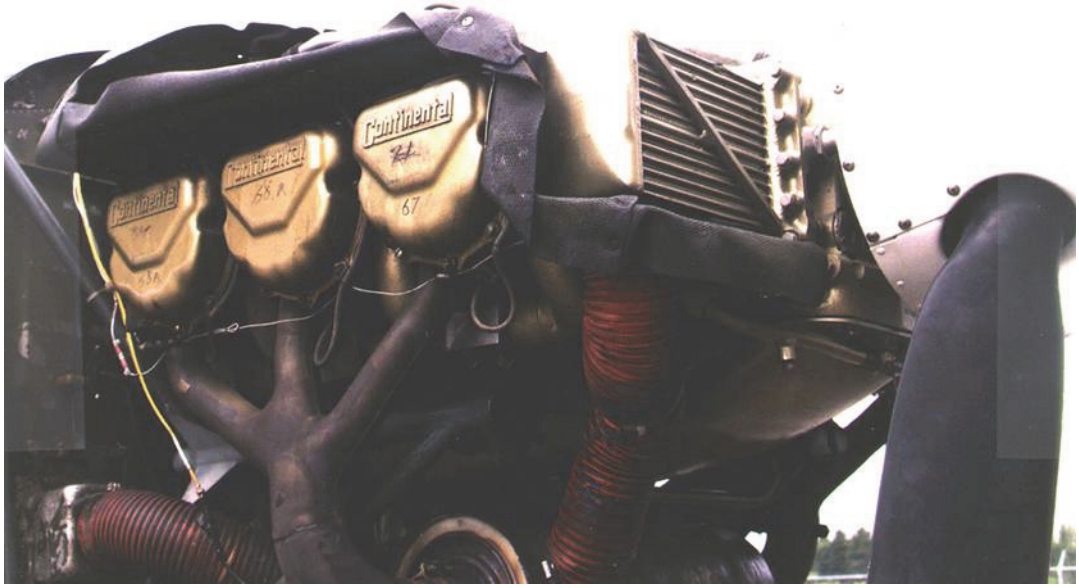


Figure 6-75. Improperly Positioned Baffle Seals

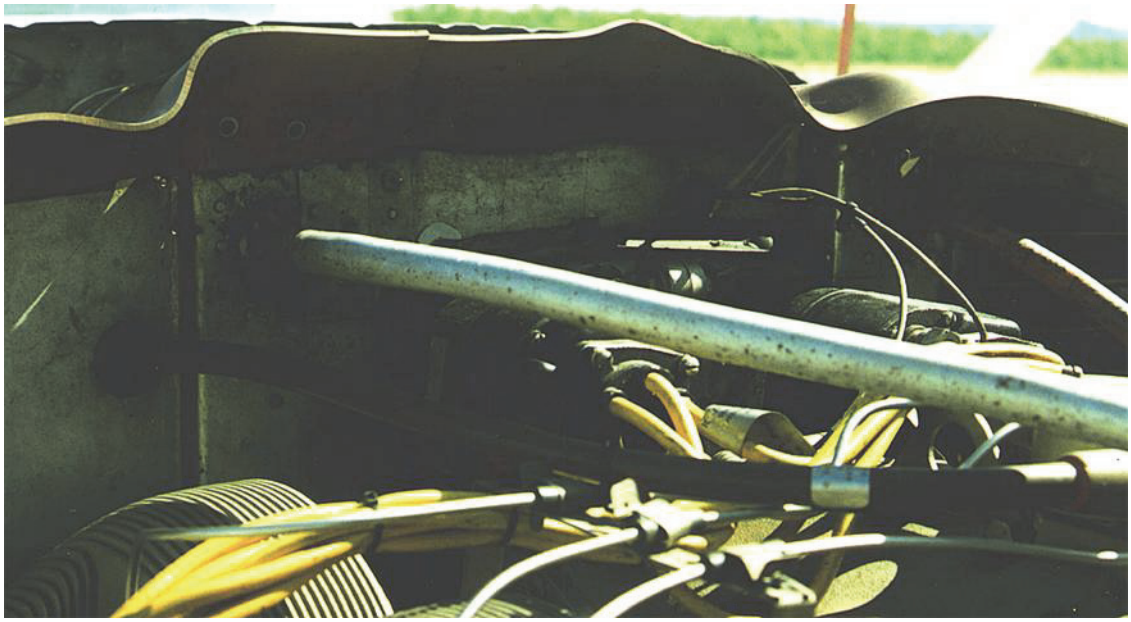


Figure 6-76. Improperly Positioned Aft and Side Peripheral Baffle Seals

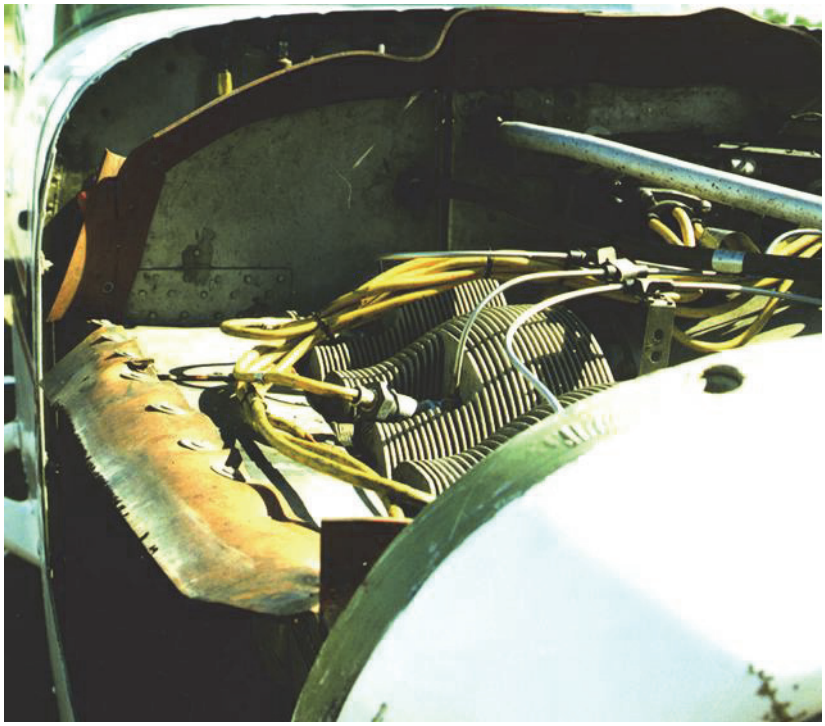


Figure 6-77. Improperly Positioned Aft and Side Peripheral Baffle Seals

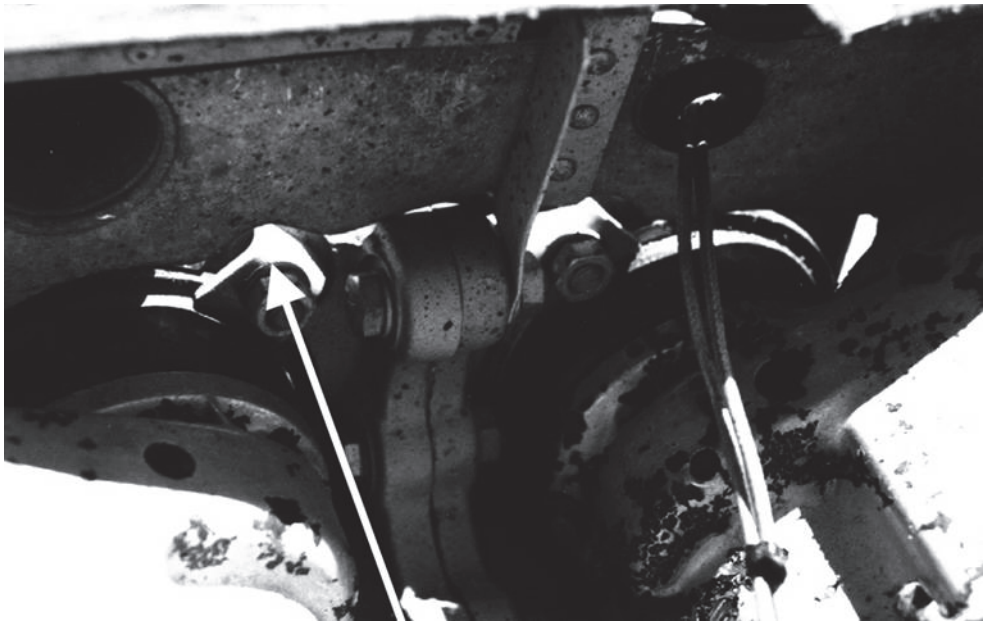


Figure 6-78. Aft and Side Baffles with Air Gaps

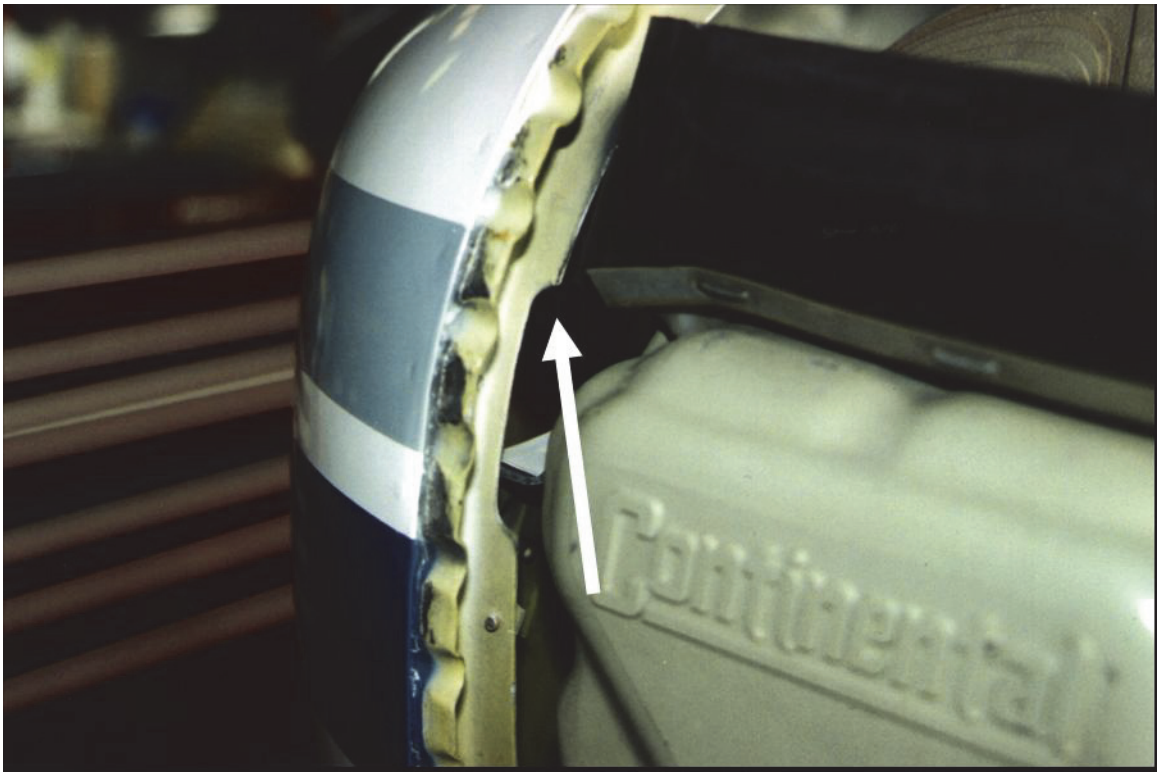


Figure 6-79. Cooling Loss Due to Gaps in Baffle Seals

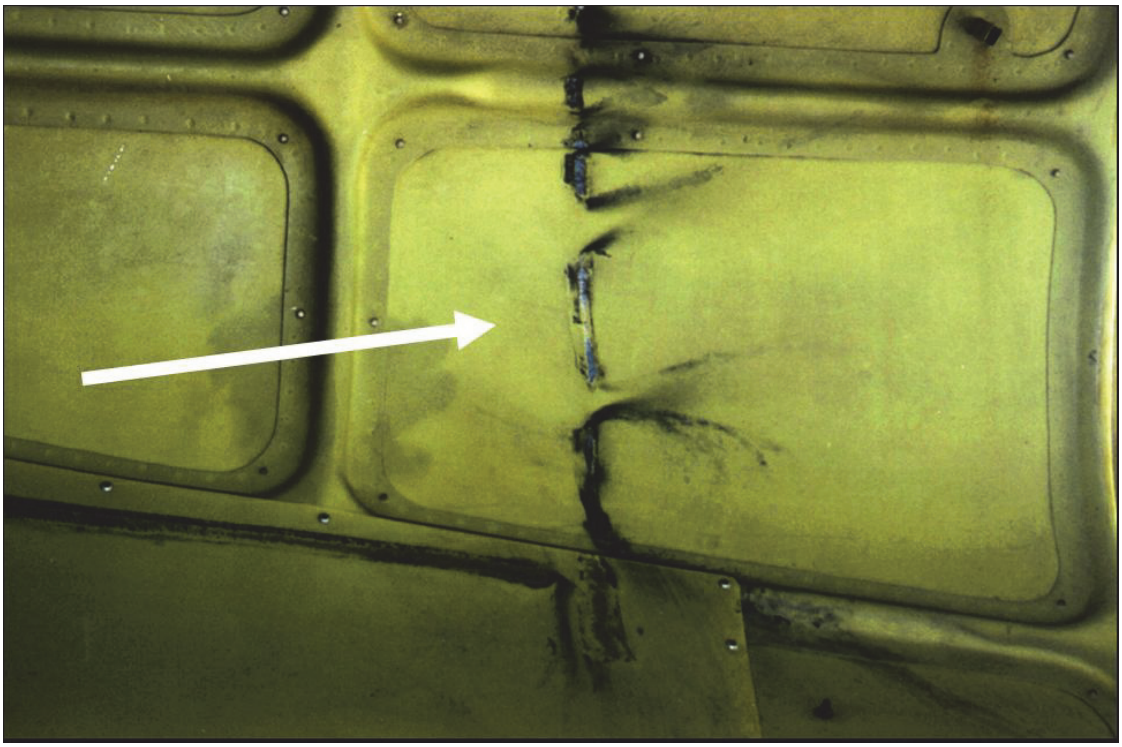


Figure 6-80. Cooling Loss Due to Gaps in Baffle Seals

6-4.11.6. Cowling Inspection

Purpose

Check cowl openings for restrictions and proper operation of the cowl flap. Cowl flap operation is an integral function of engine cooling control.

Frequency

During 100-hour/Annual inspection

Procedure

1. Verify add-on accessories and their associated hardware do not restrict cowl inlet, cowl outlet, and air flow through the cooling fins.
2. Verify the cowl flap rigging and operation meet the appropriate aircraft maintenance manual specifications.
3. Check for cracks and other obvious physical defects.

6-4.12. Crankcase Inspection

Product improvements over time have reduced material porosity and increased thickness in certain areas of our crankcases to improve structural integrity.

The part numbers for the engine model crankcases are minimum acceptable candidates for overhaul. Continental Motors will destroy any preceding crankcase part number when obtained as a core return.

Table 6-23. Crankcase Casting Numbers

Engine Model	Casting Number	Casting Part Number Introduction Year
O-300	530836/530837	1948
IO-360, LTSIO-360, TSIO-360	640432/640433	1973
520 Sandcast	640960/640961	1974
520 Permold	642000/642001	1977
GTSIO-520	642080/642081	1977

Purpose

To verify the crankcase is free of oil leaks, cracks, and physical damage.

Frequency

During 100-hour/Annual inspection

Procedure

WARNING

If neglected, crankcase cracks may progress to the point of causing major oil leakage or engine structural failure.

CAUTION: Dye penetrant inspection must be performed by a properly qualified mechanic in accordance with the dye penetrant manufacturer's instructions.

1. Visually inspect the exterior of the crankcase halves for cracks. Carefully inspect the entire external surface of the crankcase using an inspection light and mirror. If suspected cracks are discovered, perform a dye penetrant inspection according to the penetrant manufacturer's instructions to verify the condition.

   NOTE: All crankcase cracks require attention, regardless of size or location. Do not ignore crankcase cracks.

   Cracks are frequently accompanied by oil seepage; investigate all crankcases for indications of oil leaks.

   a. Cylinder deck (white/non-shaded in Figure 6-82 through Figure 6-88 = critical areas) cracks, regardless of size require **immediate crankcase replacement**.

   b. Repair cracks two inch (5.08 cm) or longer in the shaded (non-critical) locations of Figure 6-82 through Figure 6-88 according to instructions in Section 10-7.

   c. If a crack is found in the *non-critical* (shaded) area less than two inches (5.08 cm) in length **and** there is no oil leakage from the crack, the crankcase may remain in service, if the following conditions are met:

      1) If oil is leaking (visibly dripping) from the crack, repair or replace the crankcase immediately.

      2) Scribe the extremities of cracks smaller than two inches in the non-critical areas to monitor further growth progression.

      3) Inspect cracks previously identified in the non-critical stress areas of Figure 6-82 through Figure 6-88 for progression at 50-hour inspection intervals. If a crack in the non-critical area progresses to two inches or more in length, repair or replace the crankcase.

      4) Inspect the scribed cracks at the next 50 hour engine inspection for progression. If no progression is noted, repeat the progression inspection at each 100-hour inspection interval until the crack is repaired or the crankcase is replaced.

      5) Repair or replace the crankcase if cracks in the non-critical area progress to two inches or beyond in the shaded locations.

   NOTE: Crankcase repairs are not possible with the engine mounted in the aircraft. To accomplish repair, remove the engine from the aircraft, disassemble the engine and send the crankcase to a Part 145 Repair Station certified to perform the crankcase repair.

   d. Replace the crankcase immediately, if:

      1) Any crack is observed in the critical (white/non-shaded) area.

      2) A crack is observed in any of the non-critical (shaded) areas two inches (5.08 cm) or more in length.

      3) Any oil is leaking from the crack in the crankcase.

      4) At overhaul, crankcase casting part number is listed in Table 6-23.

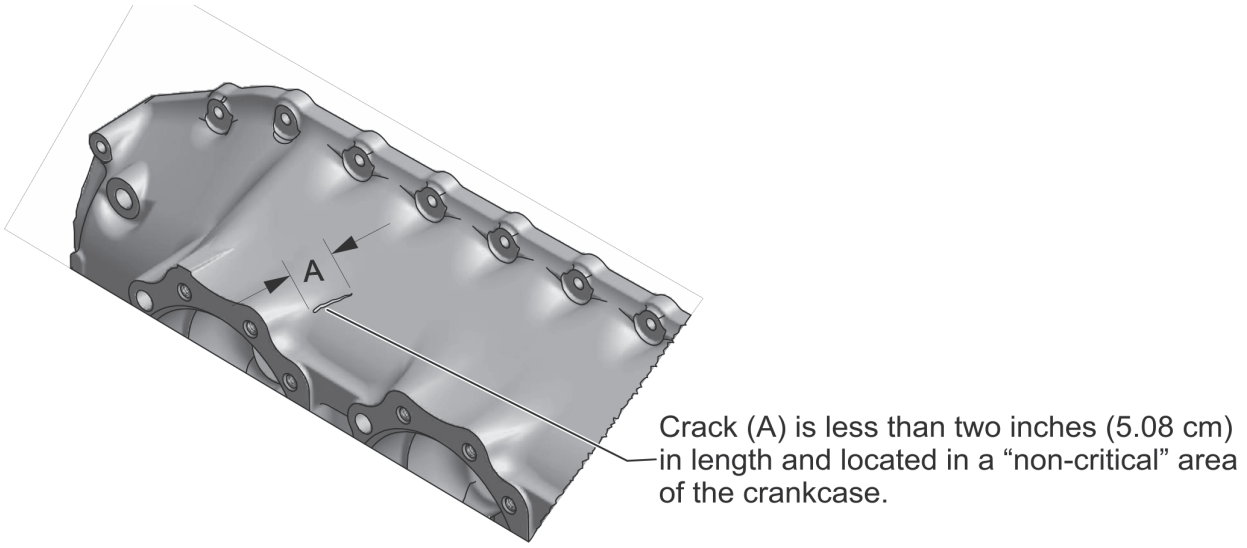


Figure 6-81. Crack in Non-Critical Area of Crankcase, *typical*

2. Investigate oil leaks as possible crack indications. If oil leaks are the result of damaged or improperly sealed gaskets, replace questionable gaskets according to the overhaul instructions.
3. Inspect the crankcase breather for cracks or dents; inspect tube ends for scoring or eccentricity that may prohibit a proper seal. Discard and replace unserviceable components.
4. Inspect engine mount brackets for cracks, dents and wear. Inspect hardware for distorted, stripped threads and damaged wrench flats. Discard and replace unserviceable components.
5. Inspect the crankcase backbone seam for signs of oil leaks. Oil leakage in this area may be caused by improperly torqued through bolts. If through bolt torque is less than the minimum specifications, remove, disassemble, and inspect the engine immediately to determine the cause of through bolt torque loss.

WARNING

The use of sealants or lubricants other than those specified herein on mating threads and between mating surfaces may cause incorrect torque application and subsequent engine damage or failure.

6. Inspect the cylinder deck for signs of RTV Sealant used on the cylinder deck flange. If RTV Sealant is found, refer to Section 6-4.11.4, “Cylinder to Crankcase Mounting Deck Inspection” for corrective action.

6-4.12.1. Crankcase Critical Stress Areas

Illustrations in Figure 6-82 through Figure 6-88 depict critical stress areas on the crankcase as white/non-shaded; non-critical stress areas of the crankcases are shaded in the illustrations.

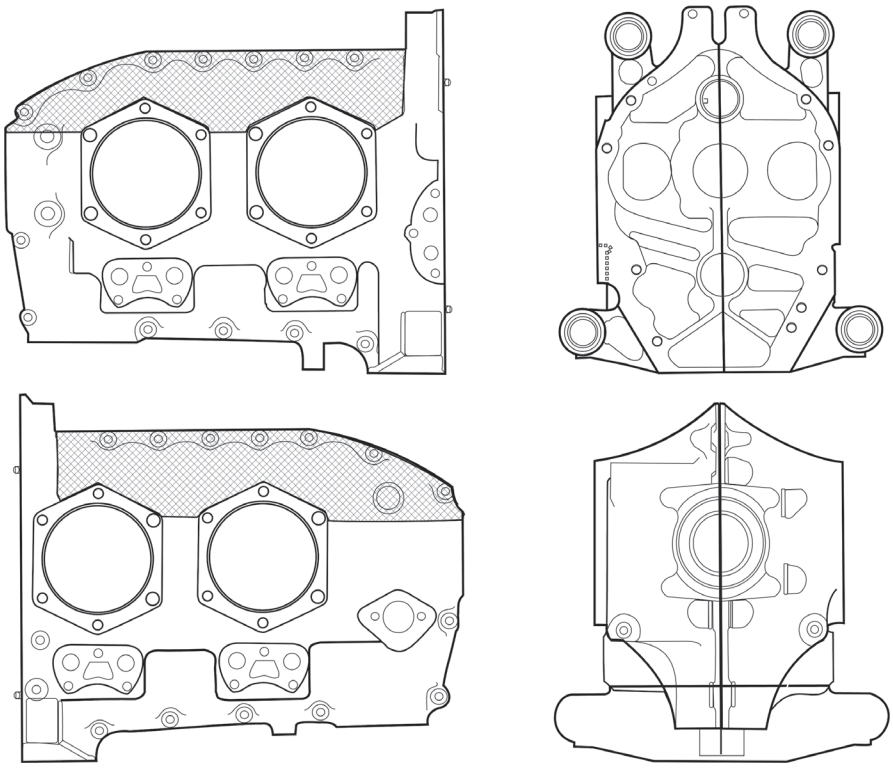


Figure 6-82. O-200 Engine Crankcase

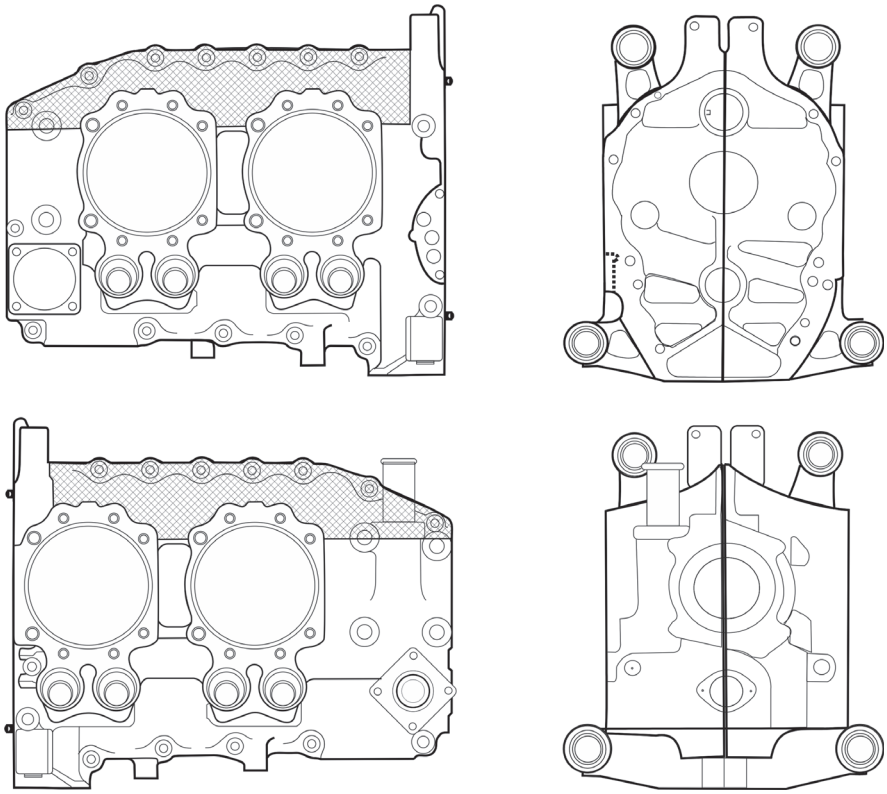


Figure 6-83. IO/IOF-240 Engine Crankcase

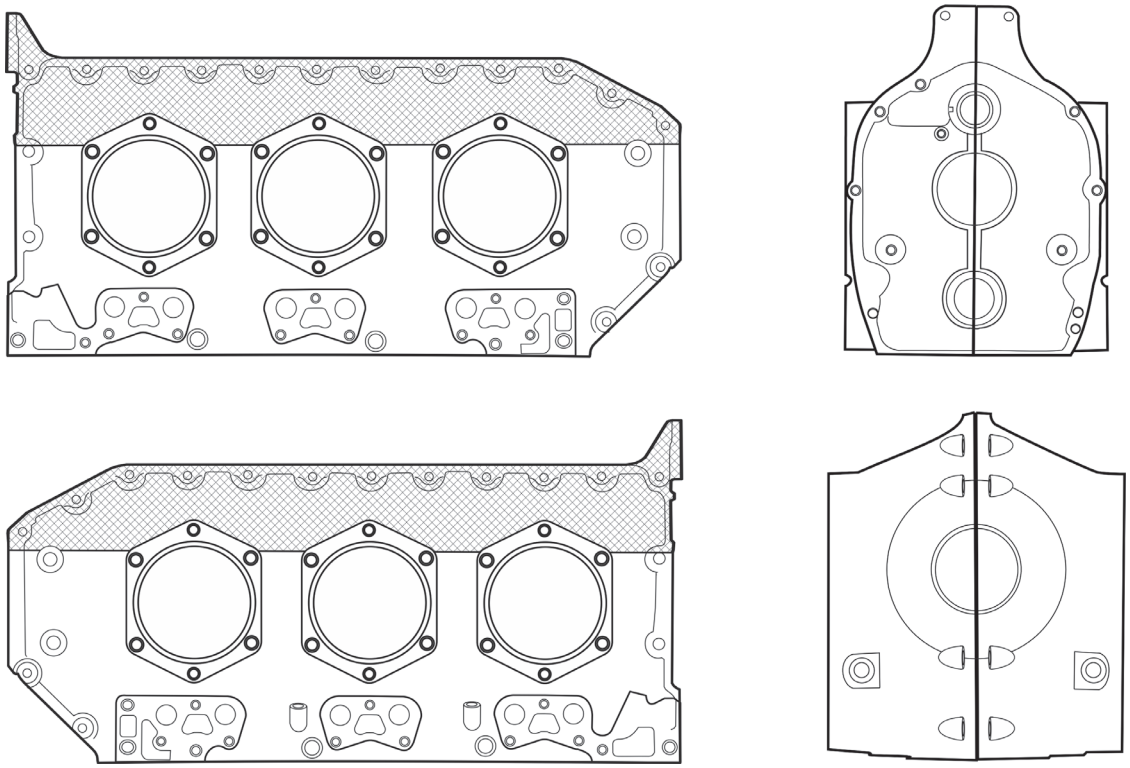


Figure 6-84. O-300 Engine Crankcase

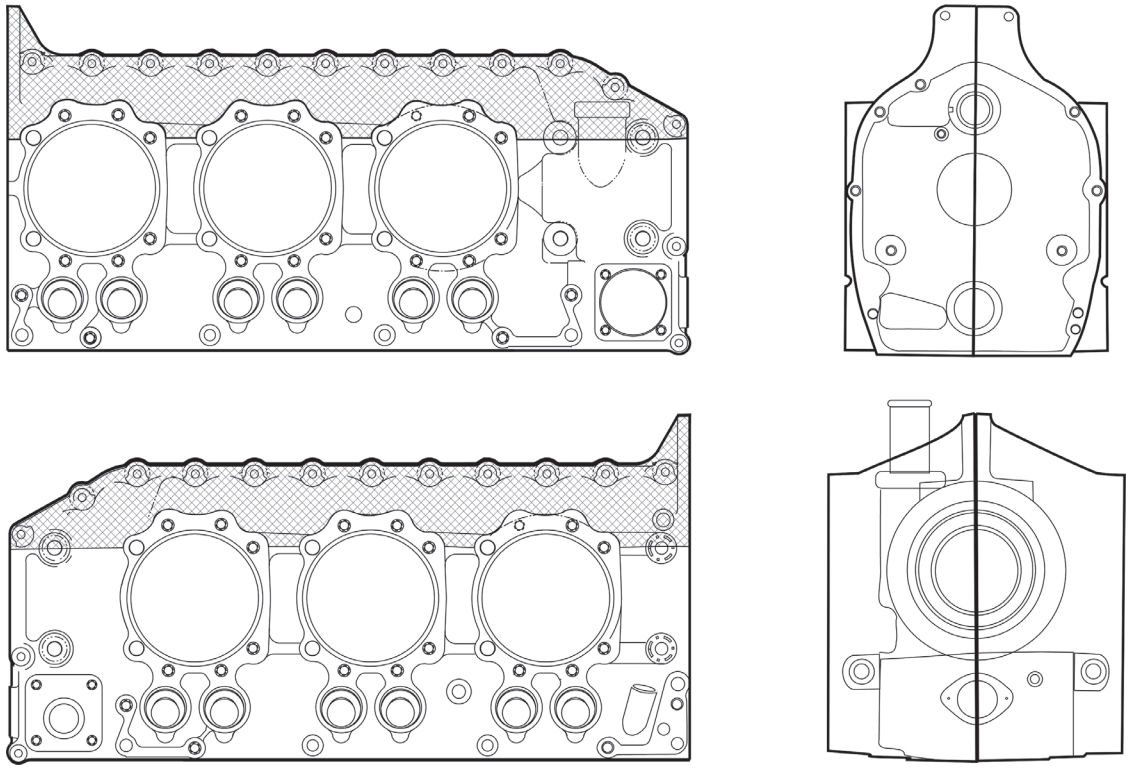


Figure 6-85. IO/LTSIO/TSIO-360 Series Engine Crankcase

6-4.13. Engine Mount Inspection

Frequency

During 100-hour/Annual inspection

Procedure

1. Inspect engine mounts for signs of cracks, deterioration, proper assembly and security. If cracks are suspected, perform a nondestructive inspection using fluorescent penetrant or eddy current methods to determine engine mount condition.
2. Inspect engine mount isolators for signs of deterioration, proper assembly and security. Replace engine mount isolators exhibiting any of these conditions.

WARNING

Do not allow a cracked engine mount to remain in service. Replace upon discovery.

3. Replace damaged or deteriorated engine mounts or engine mount isolators.

6-4.14. Induction System Inspection

Purpose

Check the integrity of the air filter, seals, and airbox to prevent particulates from entering the engine that can abrade cylinder walls and ring faces thereby damaging the engine.

Frequency

During 100-hour/Annual inspection

Procedure

1. Remove and inspect the induction air filter for cleanliness, normal operation and the absence of gaps or leaks in the filtering element. Verify the air filter seal prevents airflow except through the filter. Inspect or replace, as required, according to the aircraft manufacturer/STC holder's instructions.
2. Verify the integrity of the airbox; look for alternate air circuits which can bypass the filtering system. Any holes or bypass circuits found behind the filtering element should be repaired, as required, according to the aircraft manufacturer/STC holder's instructions.
3. Verify operation of the alternate air door and the integrity of the seal in the closed position. Verify the door operating mechanism closes securely. Replace or repair, as required, according to the aircraft manufacturer/STC holder's instructions.
4. If oil analyses are done on engine oil samples, check the silicone content of the most recent oil analysis and the overall silicone trend to further assess the possibility of Induction System leaks or pilot operational issues such as extensive use of carburetor heat or alternate air during ground operation.
5. Inspect the induction tube and hose connections to verify proper installation. Induction tubes incorporate a “bead” (Figure 6-89) which provides an anchor point for the induction tube clamps and enhances the seal between the induction tube and hose. Remove, inspect and install induction system according to instructions in the applicable Maintenance and Overhaul (or Overhaul) Manual if induction tubes,

hoses or clamps are improperly installed or inspection identifies parts as unserviceable.

a. Visually inspect the induction system clamps for proper fit and positioning. Clamps should be positioned squarely over the joint between the induction tubes and hose (Figure 6-89), inboard of the induction tube bead; no part of the end of the induction tube should be visible with the hose and clamp properly installed. Loosen the clamps, reposition, and torque the clamps 25-35 in. lbs. If the clamp will not tighten or remain torqued, the clamp is unserviceable - replace the clamp.

b. Perform a visual inspection on the induction hoses for proper fit and positioning. Hoses should be flexible; splits, tears, or cracks are unserviceable conditions. Replace cracked, split, or torn induction hoses. Hoses should not exhibit “twists” from misalignment, which can cause stress cracks. Hoses must be positioned over the induction tubes to secure the induction tube beads within the clamped portion of the hose.

c. Perform a visual inspection on the induction tubes. Replace tubes exhibiting deep scratches, dents, cracks, or eroded sealing beads.

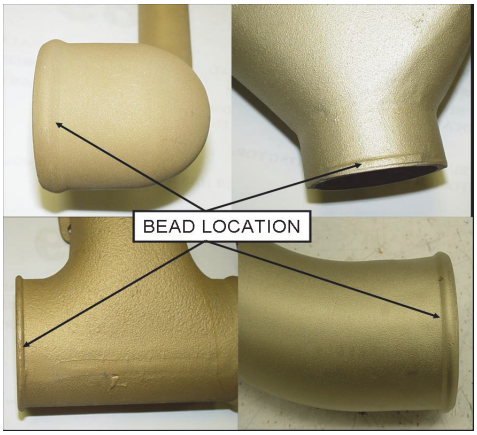
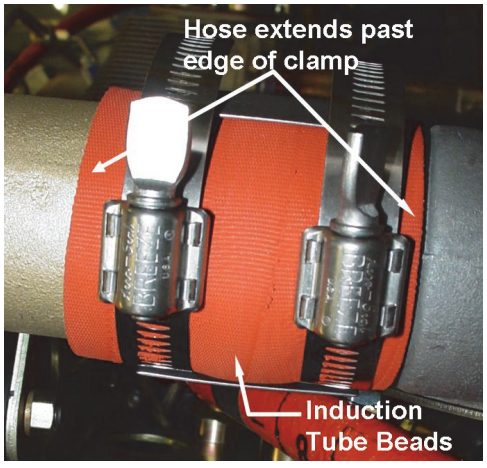


Figure 6-89. Induction Tube Bead Location



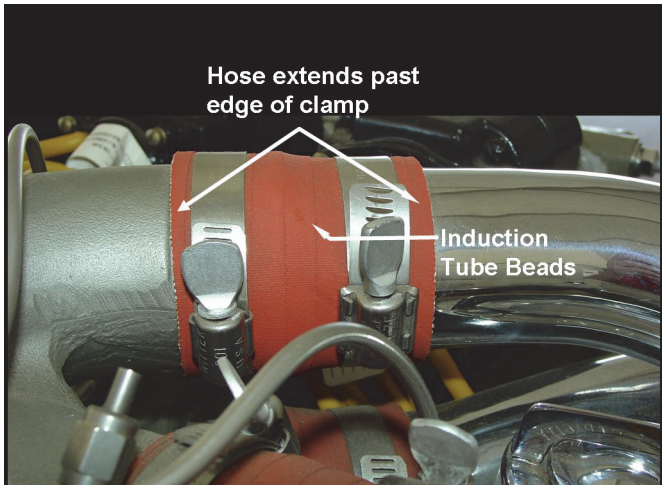


Figure 6-90. Properly Installed Induction Tube, Hose and Clamps

6-4.15. Ignition System Inspection

Purpose

Verify the following:

- Magneto housing and flange is free of damage
- Magneto to engine timing is set properly
- Ignition leads are intact and secure
- Spark plugs are clean, operating properly, and correctly gapped

Frequency

During 100-hour/Annual inspection

Procedure

WARNING

Turn the Ignition Switch OFF and disconnect engine electrical power before commencing maintenance or inspections. Confirm continuity between the magneto capacitor and aircraft ground to prevent an accidental engine start. Do not stand or place equipment within the arc of the propeller.

1. Ignition Switch..... OFF
2. Remove the spark plug leads from the top and bottom spark plugs and ground the leads to the engine.
3. Verify the magnetos are properly grounded.
4. Clean the ignition leads and visually inspect the ignition leads for chafing, deterioration and insulation breakdown. Replace worn, frayed or chafed ignition wires.
5. For engines equipped with impulse coupled magnetos, perform an “Impulse Coupling Functional Check” according to the instructions in Section 6-4.15.1.
6. Remove the spark plugs from each cylinder. Clean, inspect, and rotate spark plugs according to instructions in Section 6-4.9.2.

WARNING

Failure to maintain the magneto, spark plugs and ignition leads can cause engine damage or failure due to misfire.

7. Perform the “Crankshaft Top Dead Center Alignment” in Section 6-4.9.1.1 to position the crankshaft to the proper position from magneto to engine timing.
8. Visually inspect the external surfaces of the magneto for physical security or corrosion. Replace non-Continental Motors magnetos exhibiting damage, unusual wear or corrosion. Correct Continental Motors magneto discrepancies according to the Magneto Service Manual.
9. For pressurized magnetos:

   NOTE: Pressurized magnetos are equipped with a desiccant filter; the filter media is normally white in color and darkens when contaminated.

a. Inspect the magneto filter body, pressurization fittings, and hoses for physical condition and security. Replace missing, cracked or damaged magneto pressurization parts.

b. Inspect the filter media for contamination; the media within the translucent filter body should be uniform in color and shape. If the media appears to be contaminated, discard and replace the filter with a new one (Magneto Filter Replacement in Chapter 10, Non-Overhaul Repair and Replacement).

c. Verify the filter is installed with the drain positioned farthest from the magneto; if properly installed, the arrow on the filter body will point toward the magneto and the drain will be physically lower than the inlet and outlet fittings for proper drainage. Adjust filter installation to ensure the drain is lower than the fittings.

CAUTION: Verify the magneto pressurization vent is open. If the vent is clogged, nitric acid formation in the magneto will cause rapid degradation of the magneto internal components, leading to imminent magneto failure.

d. Verify the reducer is fully seated in the bottom of the filter drain tube and the orifice is clear of debris to allow for drainage. If liquid is accumulated in the bottom of the filter, the drain or magneto vent may be clogged:

1) Replace the desiccant filter.

2) Remove, disassemble and inspect Continental Motors magnetos for corrosion according to the instructions in the Magneto Service Manual. Remove and replace Champion (Slick) Magnetos with new or serviceable units.

10. Perform a 100-Hour inspection on Continental Motors magnetos according to instructions in the Magneto Service Manual.

11. Note the magneto RPM drop test results recorded during the "Engine Operational Check" in Section 6-4.7. If magneto RPM drop or spread during run-up was not within published limits, inspect, troubleshoot, repair and adjust as required to correct discrepancy.

12. Check magneto to engine timing according to the "Magneto to Engine Timing" instructions in Section 6-4.9.1.2. If magneto timing cannot be adjusted:

a. Remove the magneto from the engine according to the instructions in Section 10-5, "Magneto Replacement."

b. Perform a "Magneto Drive Coupling Inspection" according to the instructions in Section 6-4.15.3.

c. Replace Champion (Slick) magnetos with a new, rebuilt, or serviceable magneto. Troubleshoot and repair Continental Motors magnetos according to instructions in the Magneto Service Manual.

13. For engines equipped with a shower of sparks ignition system, perform a "Starting Vibrator Functional Check" according to the instructions in Section 6-4.15.2 after verification of magneto to engine timing.

6-4.15.1. Impulse Coupling Functional Check

This functional check is a simple method to determine if the magneto impulse couplings are functioning properly without disassembly. This functional check is not a suitable substitute for the impulse coupling inspection in the Magneto Service Manual.

WARNING

Do not stand or place equipment within the arc of the propeller.

Procedure

1. Disconnect the ignition harness from all spark plugs and ground the ignition harness leads to the engine.
2. Remove top spark plugs from the engine
3. Mixture Control ..... IDLE CUT-OFF
4. Throttle..... CLOSED
5. Fuel Selector Valve ..... OFF
6. Master Power Switch ..... ON
7. Crank the engine several revolutions using the Start switch (if separate from the Ignition switch) or Ignition switch (if start function is controlled by the Ignition switch).
   RESULT: Impulse coupling operation is audible and can be felt through the magneto housing. The “clicking” sound from the impulse couplings should be consistent while the engine is cranked. If no “clicking” is heard, or the clicking is intermittent, remove the magnetos and service according to the manufacturer's instructions.
8. Disconnect the aircraft battery according to the aircraft manufacturer's instructions.
9. For shower of sparks ignition only: Turn and hold the Ignition Switch in the START position and verify continuity between the right magneto P-lead and ground. If continuity is not present, repair the circuit before proceeding.
10. Ignition Switch..... OFF
11. Disconnect the P-lead from each magneto. Verify continuity between both magneto P-leads and ground with a multimeter. If either circuit is faulty, repair the circuit before proceeding.
12. Reconnect the magneto P-leads and place the Ignition Switch in the OFF position.
13. If ignition system maintenance is complete, install top spark plugs (with new gaskets) according to instructions in Section 6-4.9.2 and reconnect the ignition harness according to the instructions in Section 6-4.9.3.

6-4.15.2. Starting Vibrator Functional Check

WARNING

Do not stand or place equipment within the arc of the propeller.

1. Disconnect aircraft electrical power from the starter according to the aircraft manufacturer's instructions.
2. Perform the "Crankshaft Top Dead Center Alignment" instructions in Section 6-4.9.1.1 to position the No. 1 cylinder at the proper ignition timing position.
3. Remove the lower spark plug lead from the No. 1 cylinder. Position the tip of the spark plug lead 3/16" from engine ground.
4. Master Switch ..... ON

   CAUTION: The starting vibrator duty cycle is 16.6% or 20/120 seconds; do not engage the starting vibrator for longer than 20 seconds in a two minute period. Exceeding the duty cycle will overheat the circuit and may damage the starting vibrator.

5. Ignition Switch.....START (maximum 20 seconds)
   RESULT: A strong blue spark emits from the spark plug lead at a few degrees before top dead center on the No. 1 cylinder compression stroke. If no spark is observed before the maximum advanced position, inspect the left magneto main and retard contact point timing circuit according to the appropriate manufacturer's Magneto Service Manual.
6. Reconnect the spark plug lead to the No. 1 cylinder lower spark plug.
7. Reconnect aircraft electrical power to the starter according to the aircraft manufacturer's instructions.

6-4.15.3. Magneto Drive Coupling Inspection

1. Remove the magnetos from the engine according to the "Magneto Replacement" instructions in Section 10-5.
2. Inspect the drive coupling bushings and retainers for serviceability and proper installation. If the bushings are torn or exhibit missing material, perform a "Foreign Object Contamination Inspection" according to instructions in Section 6-5.7.
3. Perform a "Gear Tooth Inspection" according to instructions in Section 11-1.1 on the magneto drive gear and idler gear assembly. Rotate the crankshaft 360° in order to inspect the circumference of the gear. If the gear teeth are chipped, broken, or otherwise damaged, remove, inspect and make repairs, if necessary, to the magneto drive gear or accessory drive adapter according to instructions in the primary ICA (**Ref: Section 1-1.1**). Perform a "Foreign Object Contamination Inspection" according to instructions in Section 6-5.7.

6-4.16. Engine Gauge Inspection

CAUTION: Inaccurate aircraft engine related gauges can cause operation outside of engine certification and specification limits. Aircraft gauge calibration errors can be particularly harmful for high horsepower engines. Gauges may require re-marking for modified (STC) engines. Significant aircraft engine gauge inaccuracies can lead to engine damage.

Purpose

Verify proper gauge operation and ensure reliable condition feedback to the pilot.

Frequency

During 100-hour/Annual inspection

Procedure

Verify the following indicators are working properly according to instructions in the Aircraft Maintenance Manual. Repair or replace faulty components.

- Tachometer
- Manifold pressure gauge
- Fuel flow gauge
- Oil pressure gauge
- Oil temperature gauge
- Cylinder head temperature gauge
- Exhaust gas temperature gauge
- Turbine inlet temperature gauge (if equipped)

NOTE: Verify the accuracy of the EGT/TIT indicating system. The aircraft manufacturer may require EGT/TIT reporting be operational for all categories of flight. Consult the Aircraft Maintenance Manual for interval and operational requirements. In many cases, EGT/TIT calibration is a 100-hour inspection requirement.

6-4.17. Fuel System Inspection

Engine operation and cooling are directly related to the correct fuel-air ratio. Improper fuel settings can affect engine performance in terms of both power and throttle response. For FADEC engines, refer to the "Fuel System Inspection" in the primary ICA.

Purpose

- Verify fuel injector operation
- Verify fuel lines are clear
- Verify the fuel pump is properly adjusted

Frequency

- During 100-hour/Annual inspection
- Clean fuel injectors at the first 100-hour inspection and every 300 hours (or annually) thereafter, whichever comes first.

Procedure

1. Inspect each fuel line to the connection point at the fuel manifold valve for chafing, wear, or damage. Replace worn, chafed or damaged fuel lines with new fuel lines.
2. Inspect the fuel manifold valve for leaks and security of fittings.
3. Clean the fuel injectors:
   a. Remove the fuel injectors (Section 10-2.2 or Section 10-2.4) from the cylinders. Remove the O-rings from the fuel injectors, if present.
   b. Clean the fuel injectors in an ultrasonic cleaner. If an ultrasonic cleaner is not available, soak the fuel injectors in lacquer thinner. After successful cleaning, use dry, oil-free compressed air (from inlet to outlet) to remove residual cleaner from the nozzles.
   c. Install the fuel injectors (Section 10-2.3 or Section 10-2.5).
4. Inspect the fuel line and fittings from the fuel pump outlet to the fuel manifold valve, including the fuel filter (if installed) for wear or damage. Replace faulty parts.
5. Turn the aircraft boost pump (if equipped) to the ON position.
   a. Visually inspect the fuel pump, fuel lines, fuel manifold valve, fuel hoses and fittings for signs of fuel leaks.
   b. Verify no fuel is leaking from the fuel pump dry bay drain.
   c. Inspect each fuel injector to the fuel line connection point.
6. Turn the aircraft boost pump OFF.
7. Perform the "Fuel System Operational Check" according to instructions in Section 6-4.7.4.

   NOTE: The "Fuel System Operational Check" is part of the "Engine Operational Check" performed at the beginning and conclusion of the 100-hour scheduled inspections.

6-4.19. Engine Control Linkage Inspection

Purpose

To ensure proper operation and avoid accelerated wear, inspect the engine control linkage for excessive play, which may restrict control travel or damage control levers or cables.

Frequency

- During 100-hour/Annual inspection

Procedure

1. Inspect the pivot points of levers and linkages for debris, old grease, and oil.

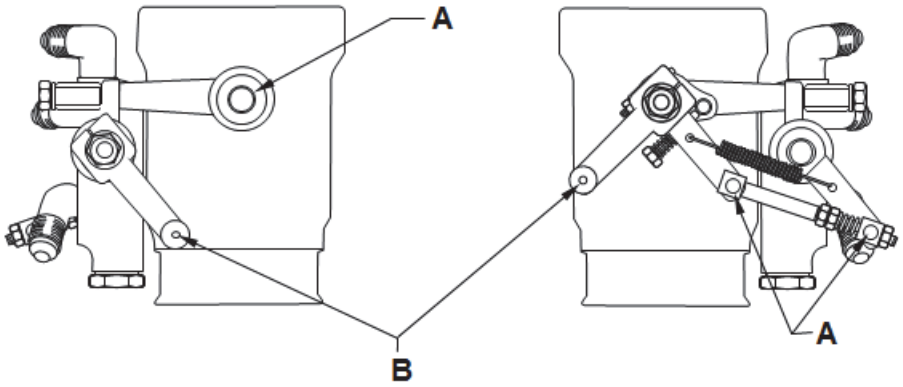
WARNING

If the lock nut securing a bronze throttle or mixture control lever is loosened for any reason, replace the bronze lever with the appropriate stainless steel replacement lever.

2. Inspect throttle and mixture control lever condition and security according to the "Throttle and Mixture Control Lever Inspection" instructions in Section 6-4.18. Grasp the lever firmly and apply lateral force to the end of the lever. No free play is permitted between the shaft and control lever.
3. Replace worn or corroded linkage and attaching hardware according to the aircraft manufacturer's instructions.

CAUTION: When utilizing compressed air, wear OSHA approved protective eye wear. Never exceed 30 psi when using compressed gases for cleaning purposes. (OSHA 1910.242(b))

4. Clean pivot point areas thoroughly with Stoddard solvent. After cleaning, dry each area using compressed air.
5. Unless otherwise specified by the aircraft manufacturer's instructions, apply LPS 2, LOCTITE Maintain™ Lubricant, or equivalent, to each pivot point (Figure 6-93 or Figure 6-94), including the throttle shaft bushings.
6. Consult the aircraft manufacturer's instructions concerning aircraft engine control cable attach point inspection, cleaning, repair, installation, and lubrication.
7. Cycle throttle and mixture controls through the full range of motion.
   a. Verify each control has full range of travel and the required safeties are in place.
   b. Ensure levers and linkages do not bind and control movement is unrestricted by parts or components in close proximity.



A – Clean, inspect, and lubricate according to instructions in this section.

B – Clean, inspect, and lubricate according to aircraft manufacturer's instructions.

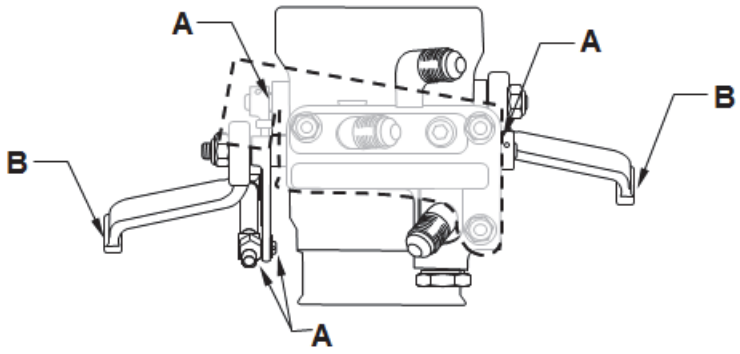
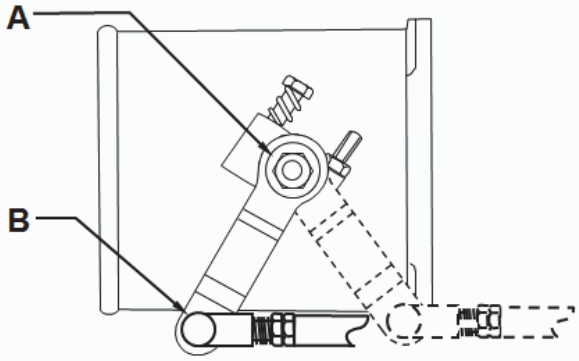


Figure 6-93. Throttle and Control Assembly Lubrication Points



A - Clean, inspect, and lubricate according to instructions in this section.

B - Clean, inspect, and lubricate according to airframe manufacturer's instructions.

Figure 6-94. Throttle and Metering Assembly Lubrication Points

6-4.20. Induction System Drain Inspection

NOTE: This inspection only applies to fuel injected engines. Engines with carburetors do not offer induction system drains.

Induction system drains are incorporated on all engines featuring cross-flow (induction tubes above) cylinders. Engine models with updraft induction (below the cylinder) incorporate drains in the induction tubes to allow excess fuel to drain from the induction system. A check valve is incorporated in the induction drain to isolate the fuel in the induction system when the intake valve opens. Naturally aspirated engines use a two-way check valve. Because the induction system on turbocharged engines can operate in a negative pressure state, a three-way check valve is required for the turbocharged induction. An improved drain connector (Figure 6-95) was introduced in 2000 for improved cold weather starting characteristics. If the cylinder drain terminates at the taper (Part No. 632068), the drain connector is no longer available, replace with Part No. 655742, or later, if unserviceable, or to improve cold weather operation.

Purpose

Induction system drains evacuate excess fuel from the intake ports. Restricted induction system drains can accumulate excessive amounts of fuel and may cause hydraulic lock.

Frequency

During all periodic inspections

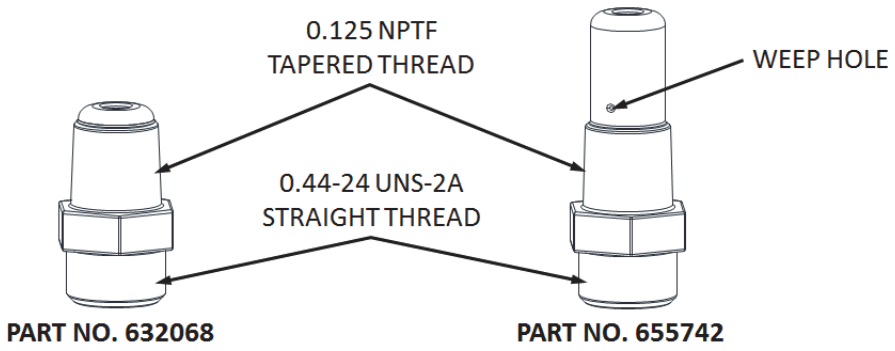


Figure 6-95. Induction Port Drain Connectors

Procedures

6-4.20.1. Induction System Drain Inspection (Naturally aspirated engines)

1. Remove the aircraft cowling according to the aircraft manufacturer's instructions.
2. At each 100-Hour/Annual Inspection, remove the connectors (Figure 6-95) from the cylinder head and clean according to the instructions in Section 10-3.1 and install serviceable, or new connector fittings in each cylinder according to the instructions in Section 10-3.2.
3. Connect a section of clear, fuel rated hose to the aircraft fuel drain outlet.

WARNING

Vacuum pumps are commercially available from a number of sources. Use only a spark-arrested vacuum pump, designed for use with flammable liquids.

4. Apply light vacuum (< -5 psi) from a spark-arrested source rated for flammable liquids to the clear hose connected to the aircraft fuel drain outlet and activate the aircraft engine fuel priming system for five seconds.
   RESULT: Fuel drains from the hose into the container.
5. Apply light positive pressure (< 5 psi) from a spark-arrested source rated for flammable liquids to the clear hose connected to the aircraft fuel drain outlet and activate the aircraft engine fuel priming system for five seconds.
   RESULT: Drain valve is closed - no fuel flows into the clear hose.
6. Remove air pressure source from the fuel drain hose. Allow the fuel in the hose to drain into a fuel rated container.
   RESULT: Fuel drains from the hose into the container.

6-4.20.2. Induction System Drain Inspection (Turbocharged engines)

1. Remove the aircraft cowling according to the aircraft manufacturer's instructions.
2. At each 100-Hour/Annual Inspection, remove the connectors (Figure 6-95) from the cylinder head and clean according to the instructions in Section 10-3.1 and install serviceable, or new connector fittings in each cylinder according to the instructions in Section 10-3.2.
3. Connect a section of clear, fuel rated hose to the cylinder drain hose.

WARNING

Vacuum pumps are commercially available from a number of sources. Use only a spark-arrested vacuum pump, designed for use with flammable liquids.

4. Apply light vacuum (< -5 psi) from a spark-arrested source rated for flammable liquids to the clear hose and activate the aircraft engine fuel primer system for five seconds.
   RESULT: No fuel flows into the clear hose.
5. Remove the vacuum source from the drain and allow the residual fuel to drain in to a fuel rated container.
   RESULT: Fuel drains from the hose into the container.
6. Apply light pressure (< 5 psi) from a spark-arrested source rated for flammable liquids to the clear hose and activate the aircraft engine fuel primer system for five seconds.
   RESULT: No fuel flows into the clear hose.
7. Remove air pressure source from the cylinder drain hose. Allow the fuel in the hose to drain into a fuel rated container.
   RESULT: Fuel drains from the hose into the container.

6-4.21. Turbocharger and Exhaust System Inspection

Purpose

Verify the integrity of the turbocharger and exhaust system, including the heater muff (if installed). Isolate and correct cracks or leaks in the exhaust system.

Frequency

During 100-hour/Annual inspection

CAUTION: Ensure the turbocharger and exhaust system components are cool before inspection to prevent burns.

Procedure

1. Remove airframe items that hinder visual inspection of the exhaust and turbochargers.
2. Clean the exhaust system, removing oil and grease, by spraying the exhaust systems parts with Stoddard solvent. Allow the solvent to drain and wipe the parts with a clean cloth.

   CAUTION: Cracks in the exhaust system can release carbon monoxide in the nacelle or the cabin; correct exhaust leaks before further flight.

3. Inspect the exhaust system components according to the instructions in Table 6-24.

Table 6-24. Exhaust Inspection Criteria

Part	Inspection Action
Stacks Risers Elbows	Check parts for the following: • Burned areas • Cracks • Loose parts/hardware • Pay particular attention to welded areas and seams, checking for cracks. • Replace parts that are cracked, burned, or worn
Slip joints	Check for bulges, cracks, or hot spots (see Figure 6-96)
Multi-segment V-band clamps	Inspect spot-weld (or rivet) areas for cracks or physical damage. Inspect the corner radii of clamp inner segments for cracks with a flashlight and mirror. Inspect the inner segment spacing. Inspect the clamp outer band for flatness using a straight edge, especially within 2 inches of spot-weld tabs that retain the T-bolt fastener - clearance must be less than 0.062 inches. Verify 100% inner and outer band segment contact. To replace a multi-segment V-band clamp, refer to the primary ICA. Ref: Section 1-1.1
Heater muff	Inspect the heat exchanger seams, joints and transitions with a flashlight and mirror or a flexible borescope for physical damage, cracks, corrosion, and burn-through. Inspect connecting flanges for security and proper mating.

4. Connect a high volume, dust-free, air pressure source to the exhaust tailpipe outlet.
5. Apply five (5) psi of air pressure to the exhaust system.

6. Apply soapy water to the exhaust system and check for bubbling in areas of the exhaust other than the slip joints. If bubbling is found, replace the leaking exhaust components according to the instructions in primary ICA (**Ref: Section 1-1.1**) or aircraft maintenance manual.

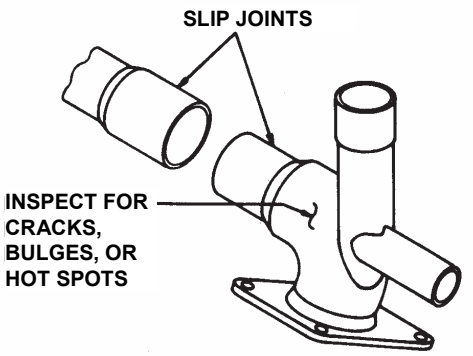


Figure 6-96. Exhaust Slip joint Inspection

WARNING

Exhaust system weld repairs may only be performed by an FAA Part 145 authorized repair station certified to perform the specific repairs.

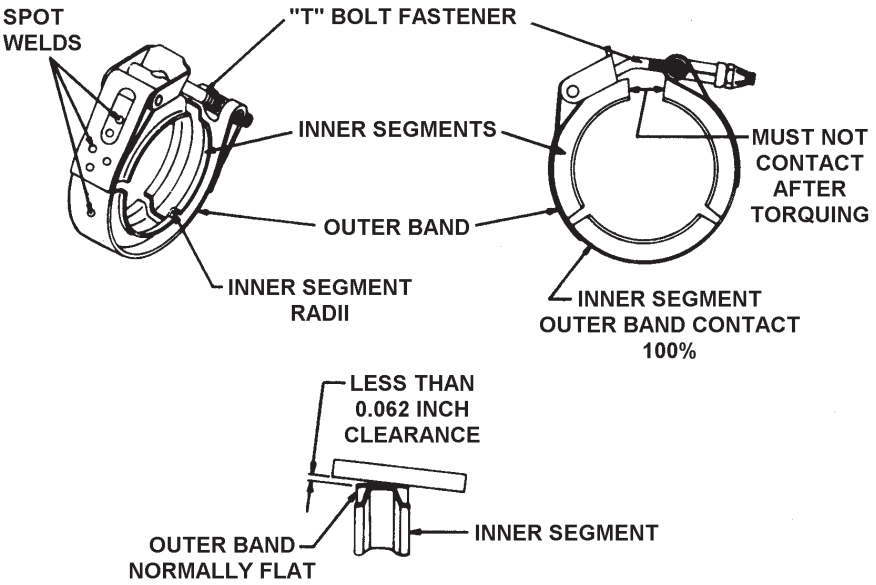


Figure 6-97. V-band Clamp Inspection

7. Visually inspect the exhaust stacks and transition unit for wear, leaks, cracks, or distortion. Replace worn, leaking, cracked, or distorted exhaust parts. Inspect the exhaust manifold connections at the cylinder to verify the physical security of the exhaust flange, gasket and exhaust manifold fasteners. Exhaust system removal and installation procedures may be found in the primary ICA (**Ref: Section 1-1.1**) or the aircraft maintenance manual, if disassembly is required.

8. Remove the multi-segment V-band clamps from the exhaust tailpipes according to instructions in the primary ICA (**Ref: Section 1-1.1**) or the aircraft maintenance manual. Clean the outer band of the multi-segment V-band clamps with crocus cloth. Inspect the V-band clamps according to the instructions in Table 6-24.
9. Inspect the turbocharger oil reservoirs, oil inlet and outlet fittings and surrounding area for signs of leakage. Torque fasteners or fittings to Appendix B specifications or replace leaking parts, as required to remedy leaking reservoirs or fittings.
10. Remove the induction air supply from the turbocharger compressor according to the aircraft manufacturer's instructions. Inspect the induction air supply duct for wear, deformation, cracks or other physical damage; replace, if necessary.
11. Remove the turbocharger compressor discharge duct from the induction system according to instructions in the primary ICA (**Ref: Section 1-1.1**) or the aircraft maintenance manual. Inspect the hardware for wear, deformation, cracks or other physical damage; replace, if necessary.
12. Inspect the turbine and compressor housings for cracks or physical damage, especially at the mounting flanges. If cracks or physical damage is discovered, replace the turbocharger with a new, rebuilt or serviceable unit.
13. Inspect the turbine and compressor wheel blades for damage. If turbine or compressor blades are damaged, replace the turbocharger with a new, rebuilt or serviceable unit.
14. Spin the turbine shaft to check for freedom of movement and end play. If the turbine or compressor blades touch the housing during rotation, if the shaft does not rotate freely, or if the shaft exhibits noticeable "wobble" during rotation, replace the turbocharger with a new, rebuilt or serviceable unit.
15. Inspect the interior of the turbine and compressor housings for oil, indicating oil seal damage or a faulty check valve. If oil is found inside the housing, troubleshoot to isolate cause of oil accumulation.
16. Inspect the wastegate for cracks or physical damage. If the wastegate is cracked or damaged, replace the wastegate with a new, rebuilt or serviceable unit. Inspect the security of the mounting flange fasteners, retorque if fasteners appear loose.
17. Inspect the wastegate actuator fittings for leaks and physical security; retorque loose fittings to Appendix B specifications. If leaks persist, replace O-rings, retorque fittings and repeat leak inspection after a ground engine run. Inspect the wastegate actuator hydraulic hoses for chafing, nicks, cuts or leaks; replace hoses exhibiting these conditions.
18. Inspect the wastegate actuator and butterfly valve for general condition and freedom of movement. Check the link rod pins and levers for wear. If the wastegate actuator, butterfly valve, link rod pins or levers are worn, binding, or damaged, replace the wastegate actuator.

19. Clean and lubricate the butterfly valve and associated linkages:

    a. Inspect fixed wastegate valves according to the instructions in the primary ICA (**Ref: Section 1-1.1**).

    b. For variable wastegate valves resembling the Figure 6-97.1, lubricate the butterfly shaft with Mouse Milk® (see Table 3-5) penetrating lubricant at initial installation and at each 100-hour maintenance interval.

    NOTE: The installed wastegate may be positioned in a manner that differs from the illustration. The fittings used to connect the hydraulic hoses may differ from those depicted in the illustration.

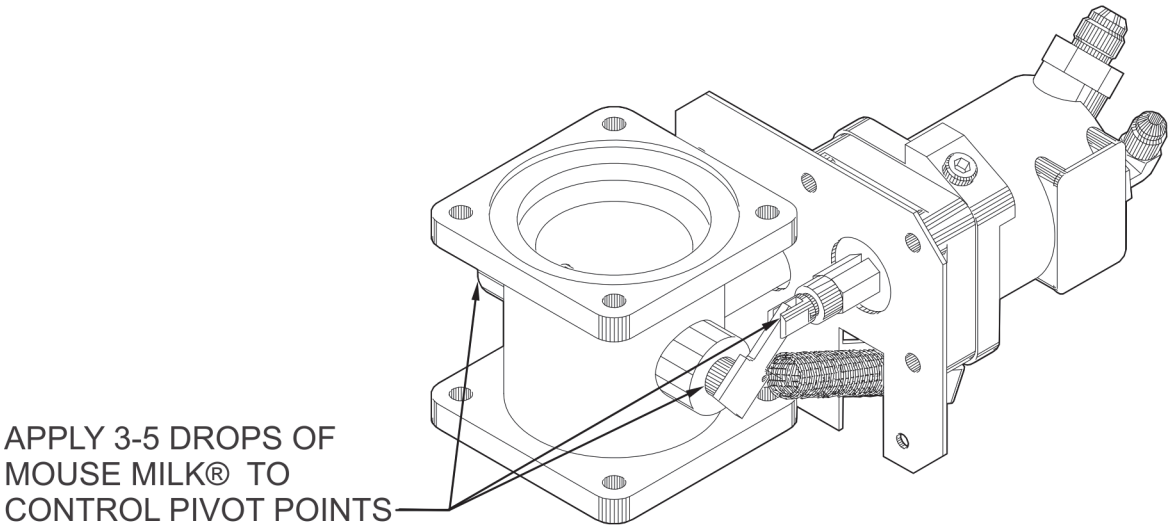


Figure 6-97.1. Typical Wastegate Lubrication Points

20. For applicable engine models: remove, disassemble, and inspect the turbocharger oil supply check valve according to the instructions in Section 6-4.21.1.

procedure continues on next page...

21. Inspect the wastegate controller and fittings for physical condition and security. If the wastegate controller exhibits physical damage, replace the wastegate controller with a new, rebuilt, or serviceable unit. Inspect the wastegate controller hoses, or tubes, for chafing, nicks, cuts or leaks; replace hoses exhibiting these conditions. Inspect the wastegate controller reference hoses or tubes for bends, dents, nicks or leaks; replace reference lines exhibiting these conditions.
22. Inspect the wastegate controller (Figure 6-56) housing for oil leaks around the diaphragm, deck pressure sensing port, oil inlet, oil outlet, or adjustment screw. If oil is leaking from a fitting, remove the fitting and replace O-rings, install and torque the fitting to Appendix B specifications. If oil is leaking from the housing, replace the wastegate controller with a new, rebuilt, or serviceable unit.

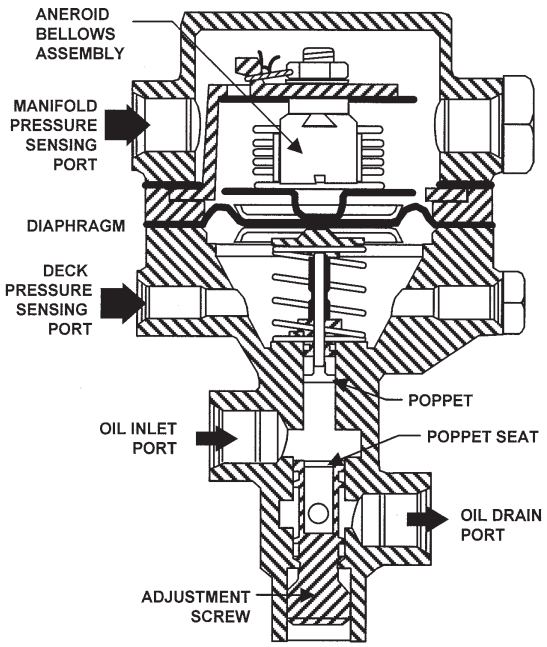


Figure 6-56 repeated for reference (typical sloped controller)

23. Inspect the overboost valve housing for cracks or physical damage; replace cracked or damaged overboost valve assembly with a new, rebuilt or serviceable unit. Remove accumulated debris from the overboost valve exposed bellows assembly shaft (behind the housing flange) and housing according to instructions in the primary ICA (**Ref: Section 1-1.1**). Inspect the mounting flange for fastener security; replace missing fasteners; re-torque loose overboost valve fasteners to Appendix B specifications.
24. Inspect the compressor housing V-band clamp, exhaust housing bolts and lock tabs for security. Torque loose hardware to Appendix B specifications.
25. Reassemble the turbocharger and exhaust system.
    a. Install the induction system air supply according to aircraft manufacturer's instructions.
    b. Install the turbocharger compressor discharge duct and exhaust pipe/heater muff according to the instructions in the primary ICA (**Ref: Section 1-1.1**) or the aircraft maintenance manual.

6-4.21.1. Turbocharger Oil Supply Check Valve Inspection

Applicable Engines: TSIO-520-BE, LB, UB, WB;
TSIO-550-A, B, C, E, G, K, N;
TSIOF-550-D, J, K, P;
TSIOL-550-B, C

The check valve is designed to prevent oil flow from the engine oil cooler to the turbocharger when the engine is shut down. If the check valve does not close properly, or becomes blocked with foreign matter, the check valve may remain open, allowing oil to continuously flow to the turbocharger (usually accompanied by oil puddling below the turbocharger).

Purpose

Inspect, clean and lubricate the check valve.

Procedure

1. Disconnect oil hose from the oil cooler at the check valve.
2. Disconnect check valve (where applicable) from:
   a. hose servicing turbocharger (see Figure 6-97.3), or
   b. tee fitting (Figure 6-97.4).

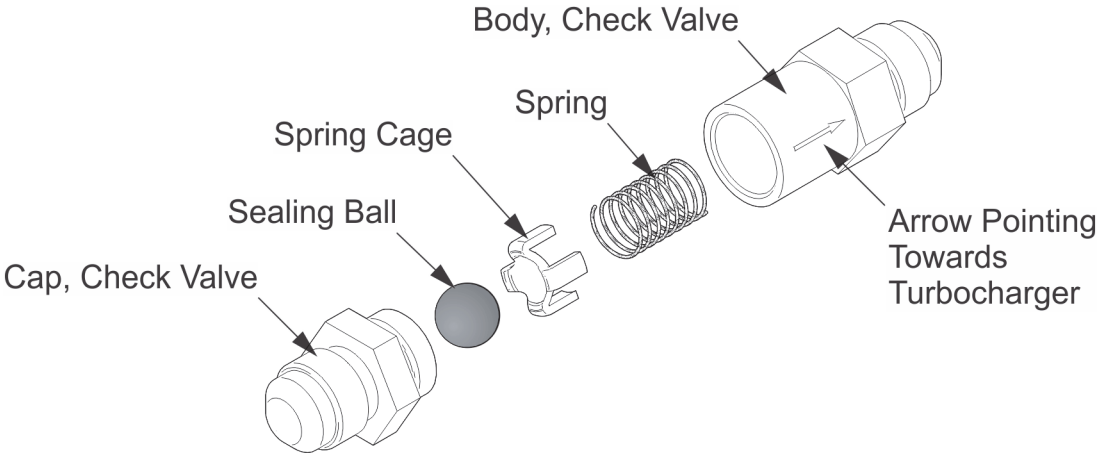


Figure 6-97.2. Check Valve Detail Illustration

3. To disassemble the check valve (see Figure 6-97.2), unscrew the check valve cap from the check valve body. Remove the sealing ball, spring cage, and spring.

   CAUTION: Do not use metal cleaning tools such as brass or wire brushes or steel wool to clean the check valve.

4. In a clean container, clean check valve and all components with mineral spirits.

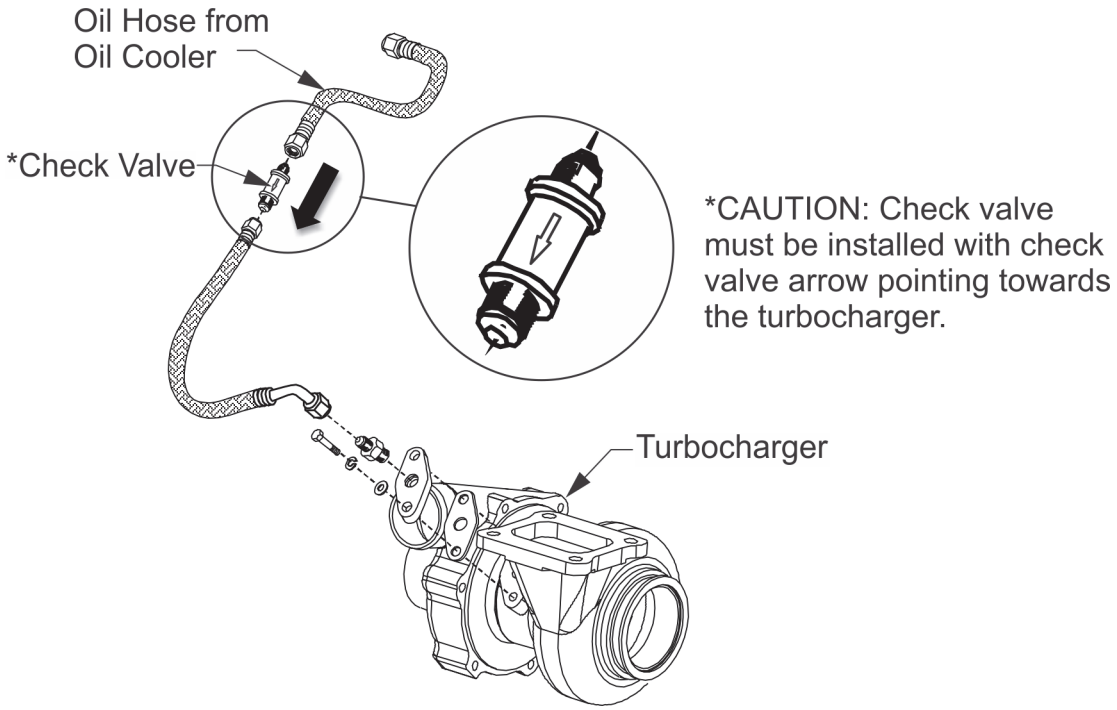


Figure 6-97.3. Single Turbocharger Lubrication (check valve location, typical)

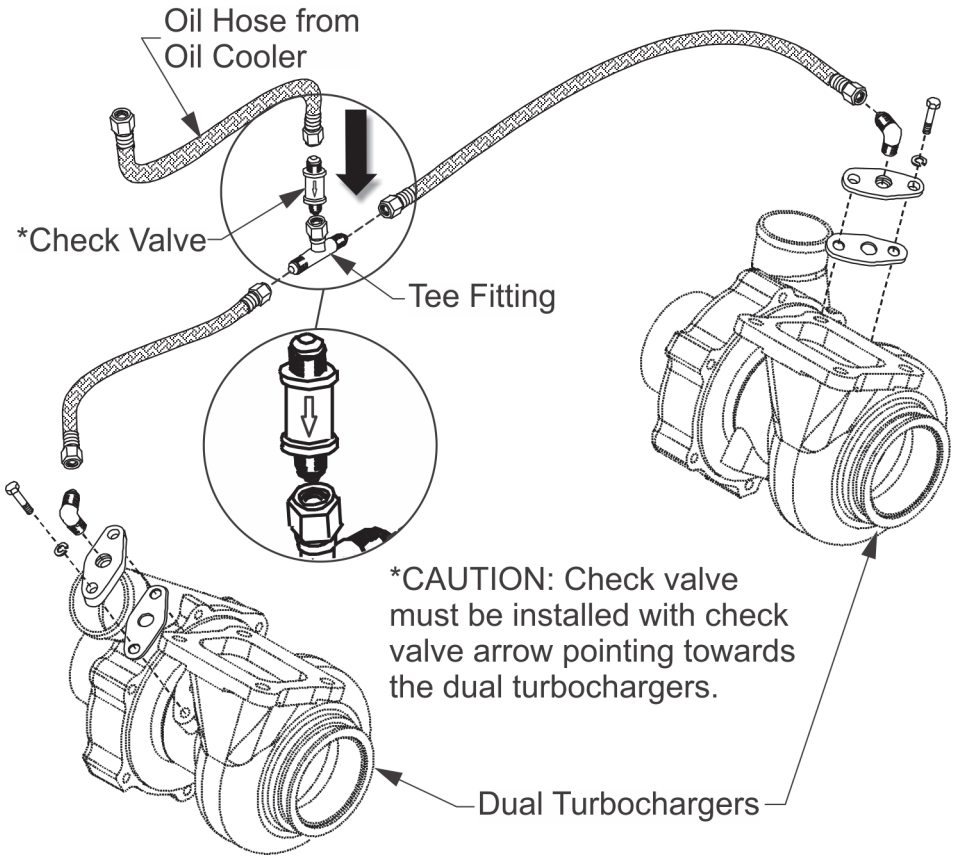


Figure 6-97.4. Dual Turbocharger (check valve location, typical)

5. Completely dry the body of the check valve with compressed air.
6. Inspect the check valve and all components for debris, corrosion, or physical damage. If damage is found, replace the entire check valve according to the Maintenance and Overhaul Manual instructions. If no damage is found, proceed to next step.
7. Apply a light coating of 50-weight aviation oil to all components and threads of check valve body and cap.

   CAUTION: Do not force or cross-thread the check valve cap into the check valve body. Misaligning the internal components could cause the check valve to malfunction and hinder turbocharger lubrication.

8. Assemble the check valve (see Figure 6-97.2, for correct orientation):
   a. Stack the spring, spring cage, and sealing ball and properly seat these internal components in the check valve body.
   b. Insert the check valve cap squarely over the check valve body and tighten until the sealing surfaces make finger tight contact.

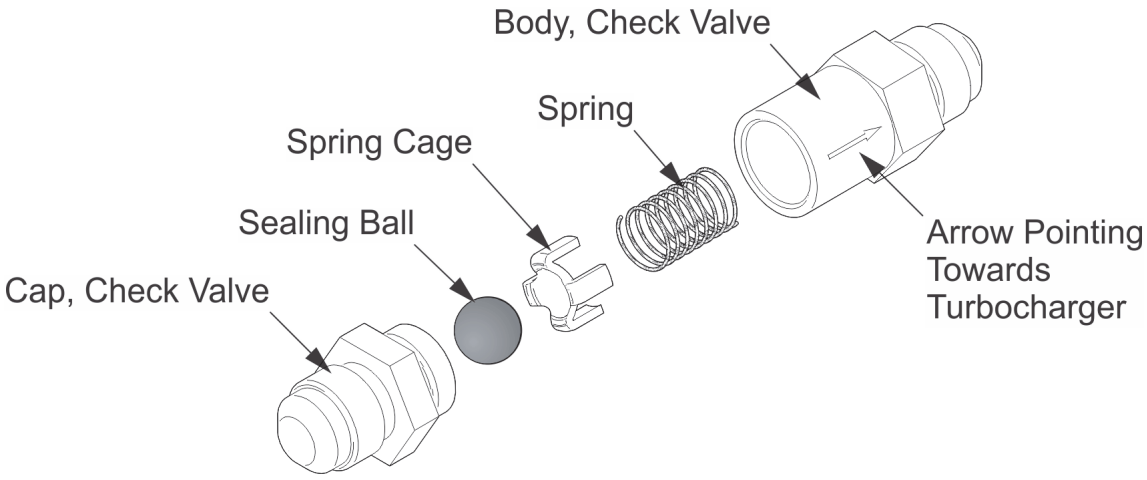
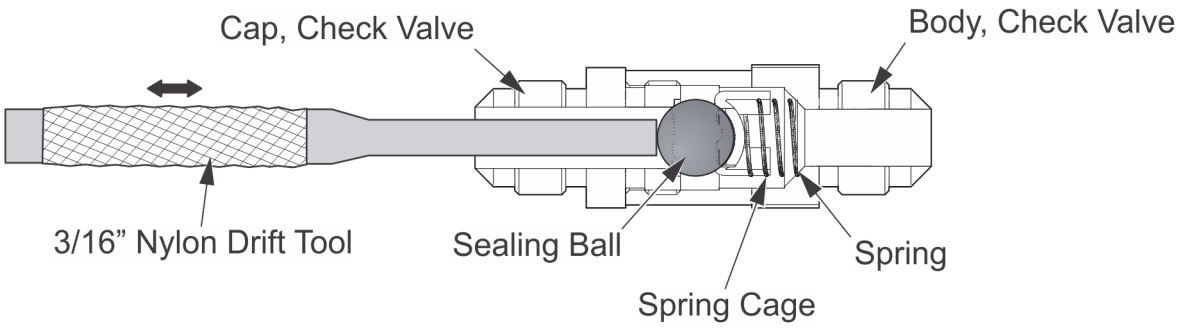


Figure 6-97.2 repeated for reference

CAUTION: Do not use sharp metal tools to verify movement of internal components, as it may damage the check valve's operation.

   c. Carefully insert a clean 3/16" nylon (or equivalent) drift tool into the check valve (as shown in Figure 6-97.5). Use light pressure to verify free, unobstructed movement of the internal components. Normal travel is approximately 0.06 inch.



Note: Gently insert drift tool and verify free movement of internal components

Figure 6-97.5. Check Valve Functional Check

d. Torque the check valve cap and body to 100-150 in.-lbs and repeat step 8, c.

CAUTION: Check valve must be installed with the check valve arrow pointing towards the turbocharger (see Figure 6-97.3 or Figure 6-97.4). If the check valve is installed improperly it will cause the check valve to malfunction and prevent turbocharger lubrication.

9. Connect check valve (with the check valve arrow pointing towards the turbocharger) to:

   a. hose servicing turbocharger and torque to 150-195 in.-lbs. (reference Figure 6-97.3), or

   b. tee fitting and torque to 150-195 in.-lbs. (reference Figure 6-97.4).

10. Connect the oil hose from the oil cooler to the check valve and tighten nut finger tight. Torque hose fittings to 150-195 in.-lbs.

11. Replenish engine oil levels according to the instructions in Section 6-4.8.

12. Perform a “Ground Run-up”; check for oil leaks and correct any discrepancies.

6-4.22. Alternator Inspection

Frequency

During 500-hour inspection

Procedure

1. Remove engine cowling and aircraft components necessary to gain access to the alternator.
2. Remove the alternator according to instructions in Section 10-4.1.1 or Section 10-4.1.1. Perform the "Alternator Drive Hub Inspection" in Section 6-4.22.1 or Section 6-4.22.2 on all gear driven alternators. For belt driven alternator removal, refer to the engine primary ICA (**Ref: Section 1-1.1**).
3. Inspect Continental Motors alternators according to the Alternator Service Manual ("Related Publications" in Section 1-2.5); correct any discrepancies discovered during the inspection. For engines equipped with Hartzell (Kelly) ES10024 consult Hartzell Service Information Letter A-135 for one time inspection requirements. For engines equipped with Hartzell (Kelly) ES-6012 or ES7024 belt driven alternators, consult Hartzell Service Information Letters A-137 and A-138 for one time inspection requirements. For additional instructions regarding Hartzell alternator instructions for continued airworthiness, consult Section 10-4.3. Remove and replace all other alternators with a new, rebuilt or serviceable alternators.
4. Install the serviceable alternator according to "Gear Driven Alternator Replacement, Forward Mount" in Section 10-4.1 or "Gear Driven Alternator Replacement, Aft Mount" in Section 10-4.2 after successfully completing the alternator manufacturer's service and inspection requirements. For belt driven alternator installation, refer to the engine primary ICA (**Ref: Section 1-1.1**).
5. Perform the instructions in the normal "Engine Start" (Section 7-3.2) and "Ground Run-up" (Section 7-3.3) to verify alternator operation.
6. Install airframe components and cowling according to the aircraft manufacturer's instructions.

6-4.22.1. Alternator Drive Hub Inspection FWD

Applicable Engines:

GTSIO-520-C, D, F, H, K, L, M, N, IO-520-B, BA, BB, C, CB, M, MB, NB, TSIO-520-B, BB, BE, D, DB, E, EB, J, JB, K, KB, L, LB, N, NB, UB, VB, WB, IO-550-A, B, C, G, N, P, R, IOF-550-B, C, N, P, R, TSIO-550- B, C,E, G, K, N, TSIOF-550-D, J, K, P, TSIOL-550, A, B, C

> NOTE: This procedure only applies to the direct drive alternator. The alternator drive hub is designed to slip when abnormal torque is required to rotate the alternator shaft.

Procedure

1. Remove the top spark plugs according to instructions in Section 6-4.9.2.
2. Remove the alternator according to the instructions in Section 10-4.2.1.

3. Perform a "Gear Tooth Inspection" according to instructions in Section 11-1.1 on the alternator drive hub gear and the crankshaft gear.

   a. Rotate the crankshaft 360° in order to inspect the circumference of the face gear.

   NOTE: If the alternator drive hub exhibits damage or missing material, perform a "Foreign Object Contamination Inspection" according to the instructions in Section 6-5.7. Remove the foreign material from the crankcase and perform a visual inspection to determine if surrounding components were damaged as a result of the component failure.

   b. Inspect the drive hub gear teeth for damage or missing material. If damage to the drive hub clutch is suspect, or damage is obvious, perform a "Foreign Object Contamination Inspection" according to instructions in Section 6-5.7.

4. Remove the alternator drive hub according to instructions in Section 10-4.1.2, "Gear Driven Alternator Drive Hub Removal."

5. Alternator couplings with a drive spring assembly were superseded in 1996 by the elastomer drive coupling. If the alternator is assembled with a drive spring assembly, remove the drive spring assembly and replace it with an elastomer drive coupling according to the instructions in Section 10-4.1.2 and Section 10-4.1.3.

6. Inspect the alternator drive coupling assembly for shearing or tearing of the elastomeric (rubber) element. Replace worn or damaged parts observed according to instructions in Section 10-4.1.3, "Alternator Drive Hub Installation." Inspect the exterior of the alternator for evidence of oil leakage; consult the alternator service instructions for oil seal replacement instructions. If the oil seal cannot be replaced, replace the alternator according to instructions in Section 10-4.

   CAUTION: Secure only the outer diameter of the drive hub assembly; allow the gear freedom of movement to prevent shearing the elastomer coupling.

7. Perform an "Alternator Drive Hub Slippage Inspection" according to the instructions in Section 10-4.1.4 on the elastomer drive coupling.

8. Install the serviceable drive hub on the alternator according to instructions in Section 10-4.1.3, "Alternator Drive Hub Installation."

9. Install the top spark plugs according to instructions in Section 6-4.9.2.

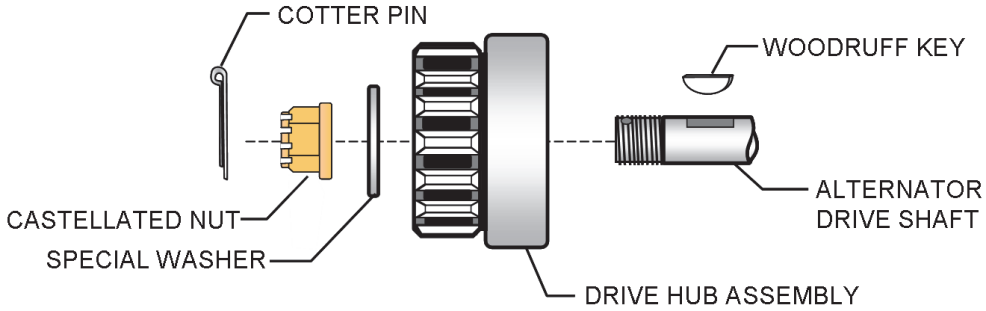


Figure 6-98. Alternator Drive Hub

6-4.22.2. Alternator Drive Hub Inspection AFT

Subject engines may have a single piece elastomer coupling or a multi-part coupling.

Applicable Engines:

C-75, C-85, C-90, C-115, C-125, C-145, E-165, E-185, E-225, O-200, GO-300, GIO-300, O-300, IO-240, IOF-240, IO-360, LTSIO-360, TSIO-360

NOTE: This procedure only applies to the direct drive alternator. The alternator drive hub is designed to slip when abnormal torque is required to rotate the alternator shaft.

Procedure

1. Remove the top spark plugs according to instructions in Section 6-4.9.2.
2. Remove the alternator from the accessory case according to the instructions in Section 10-4.2.1.
3. Perform a "Gear Tooth Inspection" according to instructions in Section 11-1.1 on the alternator drive hub gear and the camshaft gear.
   a. Rotate the crankshaft through two complete revolutions while inspecting the circumference of the camshaft gear.
   b. Inspect the drive hub gear teeth for damage or missing material. If damage to the drive hub is suspect, or damage is obvious, perform a "Foreign Object Contamination Inspection" according to instructions in Section 6-5.7.
4. Remove the alternator drive hub according to instructions in Section 10-4.2.2.

   NOTE: If the alternator drive hub exhibits damage or missing material, perform a "Foreign Object Contamination Inspection" according to the instructions in Section 6-5.7. Remove the foreign material from the crankcase and perform a visual inspection to determine if surrounding components were damaged as a result of the component failure.

5. Identify the type of assembly installed and inspect the drive coupling.
   a. Inspect the one piece alternator drive coupling assembly:
      1) Inspect the assembly for shearing or tearing; pay particular attention to the condition of the elastomeric (rubber) element. Replace the coupling if worn or damaged according to Section 10-4.2.2 and Section 10-4.2.3 instructions.

   CAUTION: Secure only the outer diameter of the drive hub assembly; allow the gear freedom of movement to prevent shearing the elastomer coupling

      2) Secure the alternator drive hub assembly in a vise with protective (padded) covers on the jaws. Do not over-tighten the coupling in the vise.
      3) Install the Alternator Drive Hub Torque Tool (Figure 2-6) over the drive hub and apply 100 inch pounds of torque to the drive hub coupling with a calibrated torque wrench. No slippage is permitted at 100 inch pounds of

torque or less. Replace the drive hub if slippage occurs under 100 inch pounds of torque.

4) Install the serviceable drive hub on the alternator according to instructions in Section 10-4.2.3.

b. Inspect the multi-part drive coupling:

1) Secure the alternator coupling gear (Figure 6-99) (5) in the jaws of a padded vice, leaving the gear section free.

NOTE: At 500 Hours, replace the retainer and bushings regardless of condition, on the multi-piece couplings.

2) Remove the sleeve (6), bushings (8), and retainer (7). Do not remove the drive hub (1) unless damage is suspect. Discard the bushings (8) and retainer (7).

3) Inspect the nut (3), gear (5) and sleeve (6) for wear and replace if necessary.

4) Install a new retainer (7) and two new bushings (8) in the hub (1) on the alternator shaft. Install the sleeve (6) and gear (5) on the shaft and secure with the nut (3).

5) Install the drive hub assembly according to instructions in Section 10-4.2.3.

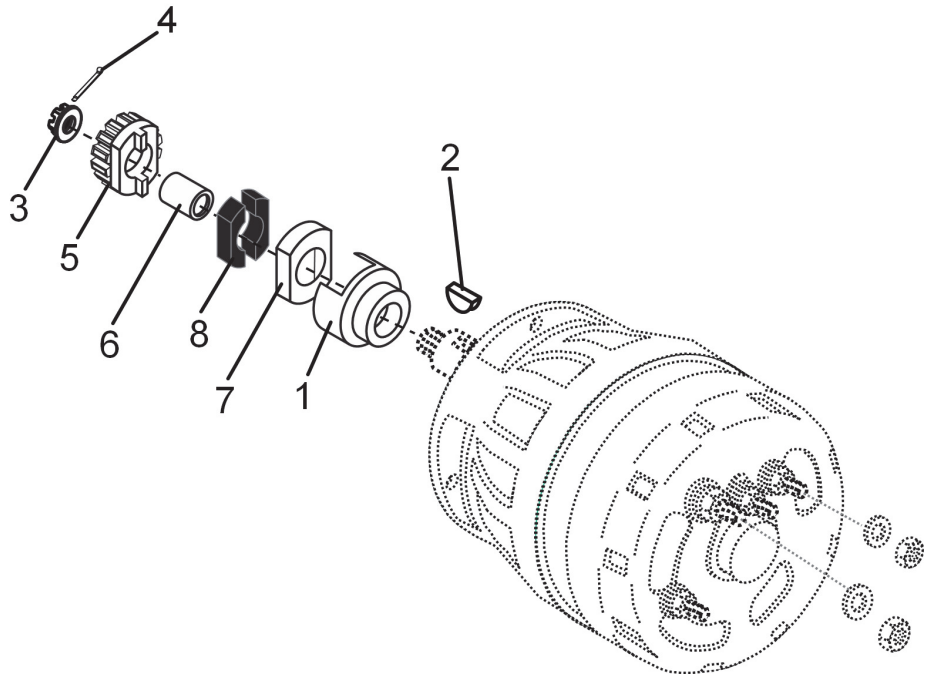


Figure 6-99. Alternator and Coupling Assembly

1	Drive Hub	3	Castellated Nut	5	Gear	7	Retainer
2	Woodruff Key	4	Cotter Pin	6	Sleeve	8	Bushings

6. Install the alternator according to instructions in Section 10-4.2.4.

7. Install the top spark plugs according to instructions in Section 6-4.9.2.

Table 6-31. Cylinder Inspection Checklist

Engine Model Number: _____ **Engine Serial Number:** _____

Total Time Engine has been in Service: _____

Time Since Major Overhaul (TSMOH): _____ **Engine in Storage?** _____

Date Inspection Performed: _____ **Inspection Performed by:**_____

Inspection Item	**Inspector Comments**
Complete the cylinder inspection according to the instructions referenced in the table, heeding all warnings, cautions and notes. Initial the block beside the procedure upon completion. Note discrepancies in the Inspector Comments or Notes sections.	
Complete a visual inspection of the cylinder exterior and power stroke areas for signs of cracks, leaks, rust or pitting (Section 6-4.11.1).	

Cylinders					
1	**2**	**3**	**4**	**5**	**6**
❑	❑	❑	❑	❑	❑

Complete a visual inspection of cylinder head, barrel, fins, ports and bosses for evidence of fuel, oil or soot (Section 6-4.11.1)	

Cylinders					
1	**2**	**3**	**4**	**5**	**6**
❑	❑	❑	❑	❑	❑

Inspect the cylinder to crankcase mounting deck for visible signs of RTV sealant (Section 6-4.11.4).	

Cylinders					
1	**2**	**3**	**4**	**5**	**6**
❑	❑	❑	❑	❑	❑

Differential Pressure Check (Section 6-4.11.2)	
Baseline Master Orifice Calibrated Pressure Reading:	

Cylinder Pressure Reading					
1	**2**	**3**	**4**	**5**	**6**
❑	❑	❑	❑	❑	❑

NOTES:

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