Operator's Manual

Lycoming

O-235 and O-290 Series

Approved by FAA

5th Edition

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ATTENTION

OWNERS, OPERATORS, AND MAINTENANCE PERSONNEL

This operator's manual contains a description of the engine, its specifications, and detailed information on how to operate and maintain it. Such maintenance procedures that may be required in conjunction with periodic inspections are also included. This manual is intended for use by owners, pilots and maintenance personnel responsible for care of Lycoming powered aircraft. Modifications and repair procedures are contained in Lycoming overhaul manuals; maintenance personnel should refer to these for such procedures.

SAFETY WARNING

NEGLECTING TO FOLLOW THE OPERATING INSTRUCTIONS AND TO CARRY OUT PERIODIC MAINTENANCE PROCEDURES CAN RESULT IN POOR ENGINE PERFORMANCE AND POWER LOSS. ALSO, IF POWER AND SPEED LIMITATIONS SPECIFIED IN THIS MANUAL ARE EXCEEDED, FOR ANY REASON; DAMAGE TO THE ENGINE AND PERSONAL INJURY CAN HAPPEN. CONSULT YOUR LOCAL FAA APPROVED MAINTENANCE FACILITY.

Although the information contained in this manual is up-to-date at time of publication, Consult the latest revision of Service Letter No. L114 for subscription information.

SPECIAL NOTE

The illustrations, pictures and drawings shown in this publication are typical of the subject matter they portray; in no instance are they to be interpreted as examples of any specific engine, equipment or part thereof.

Drain and refill sump with new oil on installation not employing replaceable external oil filter. See latest revision of Service Instruction No. 1014 for recommended lubricating oils. Seasonal grades are listed in Section 3, Paragraph 8 of this manual.

Remove oil suction and oil pressure screens and clean thoroughly. Note carefully for presence of metal particles that are indicative of internal engine damage.

If engine is equipped with external oil filters, replace at this time. Before disposing of filter, check interior for traces of metal particles that might be evidence of internal engine damage.

d. Exhaust System – Check attaching flanges at exhaust ports on cylinders for evidence of leakage. If they are loose, they must be removed and machined flat before they are reassembled and tightened. Examine exhaust manifolds for general condition.

e. Cooling System – Check cowling for damage and secure anchorage. Any damaged or missing part of the cooling system must be repaired or replaced before the aircraft resumes operation.

f. Cylinders – Check rocker box covers for evidence of oil leaks. If found, replace gasket and tighten screws to specified torque (50 in.-lbs.).

Check cylinders for evidence of excessive heat which is indicated by burned paint on the cylinder. This condition is indicative of internal damage to the cylinder and, if found, its cause must be determined and corrected before the aircraft resumes operation.

Heavy discoloration and appearance of seepage at the cylinder head and barrel attachment area is usually due to emission of thread lubricant used during assembly of the barrel at the factory, or by slight gas leakage which stops after cylinder has been in service for awhile, This condition is neither harmful nor detrimental to the engine performance and operation. If it can be proven that the leakage exceeds these conditions, the cylinder should be replaced.

4. In addition to the items listed for daily pre-flight and 50-hour inspection the following maintenance checks should be made after every one hundred hours of operation.

a. Electrical System – Check all wiring connected to the engine or accessories. Any shielded cables that are damaged should be replaced. Replace faulty clamps or loose wires and check terminals for security and cleanliness.

b. Magnetos – Check condition of breaker points. Check for excessive oil in the breaker compartment, if found, wipe dry with a clean lintless cloth. The felt located at the breaker points should be lubricated in accordance with the magneto manufacturer's instructions. Check magneto to engine timing. Timing procedure is described in Section 5, Paragraph 1.b. of this manual.

c. Engine Accessories – Engine mounted accessories such as pumps, temperature and pressure sensing units should be checked for secure mounting, tight connections and terminals.

d. Cylinders – Check visually for cracked or broken fins.

e. Engine Mounts – Check engine mounting bolts and bushings for security and excessive wear. Replace any bushings that are excessively worn.

f. *Priming Nozzles* – Disconnect primer nozzles from engine and check for equal flow.

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h. *Carburetor* – Check throttle body attaching screws for tightness. The correct torque for these screws is 40 to 50 in.-lbs.

i. *Lubrication System* – Drain and renew lubrication oil. Replace oil filter.

5. 400-HOUR INSPECTION. In addition to the items listed for daily pre-flight, 50-hour and 100-hour inspections, the following maintenance check should be made after every 400 hours of operation.

Valve Inspection – Remove rocker box covers and check for freedom of valve rockers when valves are closed. Look for evidence of abnormal wear or broken parts in the area of the valve tips, valve keeper, springs and spring seat. If any indications are found, the cylinder and all of its components should be removed (including the piston and connecting rod assembly) and inspected for further damage. Replace any parts that do not conform with limits shown in the latest revision of Special Service Publication No. SSP-1776.

6. NON-SCHEDULED INSPECTIONS. Occasionally, service bulletins or service instructions are issued by Lycoming that require inspection procedures that are not listed in this manual. Such publications, usually are limited to specified engine models and become obsolete after corrective modification has been accomplished. All such publications are available from Lycoming distributors, or from the factory by subscription. Consult latest revision of Service Letter No. L114 for subscription information. Maintenance facilities should have an up-to-date file of these publications available at all times.

CAUTION

AFTER ALL CYLINDER BASE NUTS HAVE BEEN TIGHTENED, REMOVE ANY NICKS IN THE CYLINDER FINS BY FILING OR BURRING.

(9) Assemble each push rod in its respective shroud tube, and assemble each rocker in its respective position by placing rocker between bosses and sliding valve rocker shaft in place to retain rocker.

(10) O-290-D2 Series – Be sure that the piston is at top center compression stroke and that both valves are closed. Check clearance between the valve stem tip and the valve rocker. In order to check this clearance, place the thumb of one hand on the valve rocker directly over the end of the push rod and push down so as to compress the hydraulic tappet spring. While holding the spring compressed, check valve clearance, which should be between .028 and .080 inch. If the clearance does not come within these limits, remove the push rod and insert a longer or shorter push rod, as required to correct clearance.

NOTE

Inserting a long rod will cause a decrease in valve clearance.

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(12) All Engines – Install gaskets and rocker box covers, intake pipes, drain tubes and exhaust manifold. Install spark plugs and ignition harness.

5. GENERATOR DRIVE BELT TENSION. Check the tension of a new belt 25 hours after installation. Refer to latest revision of Service Instruction No. 1129 for methods of checking generator drive belt tension.

TROUBLE	PROBABLE CAUSE	REMEDY
	Mixture too rich; indicated by sluggish engine operation, red exhaust flange at night. Extreme cases indicated by black smoke from exhaust.	Check primer shut-off valve for leakage. Readjustment of carburetor by authorized personnel is indicated.
	Mixture too lean; indicated by overheating or backfiring.	Check fuel lines and filters for dirt or other restrictions. Readjustment of carburetor is indicated.
	Leaks in induction system.	Tighten all connections. Replace defective parts.
	Defective spark plugs.	Clean or replace spark plugs.
	Poor fuel.	Fill tank with fuel of recommended grade.
	Magneto breaker points not working properly.	Clean points. Check internal timing of magnetos.
	Defective ignition wire.	Check wire with electric tester. Replace any defective wire.
	Improper ignition timing.	Check magnetos for timing and synchronization.
	Defective spark plug terminal connectors.	Replace connectors on spark plug wire.
Failure of Engine to Develop Full Power	Throttle lever out of adjustment.	Adjust throttle lever.
	Leak in the induction system.	Tighten all connections, and replace defective parts.
	Restriction in carburetor air scoop.	Examine air scoop and remove restrictions. Clean air filter.
	Improper fuel.	Fill tank with recommended fuel.
	Faulty ignition.	Tighten all connections. Check system with tester. Check ignition timing.