

Operator's Manual

Lycoming

O-540, IO-540 Series

Approved by FAA

4th Edition

Part No. 60297-10

LYCOMING

652 Oliver Street
Williamsport, PA. 17701 U.S.A.
570/323-6181

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LYCOMING OPERATOR'S MANUAL

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.

SERVICE BULLETINS, INSTRUCTIONS, AND LETTERS

Although the information contained in this manual is up-to-date at time of publication, users are urged to keep abreast of later information through Lycoming Service Bulletins, Instructions and Service Letters which are available from all Lycoming distributors or from the factory by subscription. Consult the latest revision of Service Letter No. L114 for subscription information.

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.

SECTION 3

OPERATING INSTRUCTIONS

1. *GENERAL.* Close adherence to these instructions will greatly contribute to long life, economy and satisfactory operation of the engine.

NOTE

YOUR ATTENTION IS DIRECTED TO THE WARRANTIES THAT APPEAR IN THE FRONT OF THIS MANUAL REGARDING ENGINE SPEED, THE USE OF SPECIFIED FUELS AND LUBRICANTS, REPAIR AND ALTERATIONS. PERHAPS NO OTHER ITEM OF ENGINE OPERATION AND MAINTENANCE CONTRIBUTES QUITE SO MUCH TO SATISFACTORY PERFORMANCE AND LONG LIFE AS THE CONSTANT USE OF CORRECT GRADES OF FUEL AND OIL, CORRECT ENGINE TIMING, AND FLYING THE AIRCRAFT AT ALL TIMES WITHIN THE SPEED AND POWER RANGE SPECIFIED FOR THE ENGINE. DO NOT FORGET THAT VIOLATION OF THE OPERATION AND MAINTENANCE SPECIFICATIONS FOR YOUR ENGINE WILL NOT ONLY VOID YOUR WARRANTY BUT WILL SHORTEN THE LIFE OF YOUR ENGINE AFTER ITS WARRANTY PERIOD HAS PASSED.

New engines have been carefully run-in by Lycoming and therefore, no further break-in is necessary insofar as operation is concerned; however, new or newly overhauled engines should be operated using only the lubricating oils recommended in the latest revision of Service Instruction No. 1014.

NOTE

Cruising should be done at 65% to 75% power until a total of 50 hours has been accumulated or the oil consumption has stabilized. This is to insure the proper seating of the rings and is applicable to new engines and engines in service following cylinder replacement or top overhaul of one or more cylinders.

The minimum fuel octane rating is listed in the flight chart, Part 9 of this section. Under no circumstances should fuel of a lower octane rating or automotive fuel (regardless of octane rating) be used.

2. *PRESTARTING ITEMS OF MAINTENANCE.* Before starting the aircraft engines for the first flight of the day; there are several items of maintenance inspection that should be performed. These are described in Section 4 under Daily Pre-Flight Inspection. They must be observed before the engine is started.

3. *STARTING PROCEDURES.*

The following starting procedures are recommended; however, the starting characteristics of various installations will necessitate some variation from these procedures.

NOTE

Cranking periods should be limited from ten (10) to twelve (12) seconds with 5 minutes rest between cranking periods.

Manual leaning may be monitored by exhaust gas temperature indication, fuel flow indication, and by observation of engine speed and/or airspeed. However, whatever instruments are used in leaning the mixture, the following general rules should be observed by the operator of Lycoming aircraft engines.

GENERAL RULES

Never exceed the maximum red line cylinder head temperature limit.

For maximum service life, cylinder head temperatures should be maintained below 435°F (224°C) during high performance cruise operation and below 400°F (205°C) for economy cruise powers.

On engines with manual mixture control, maintain mixture control in "Full Rich" position for rated take-off, climb and maximum cruise powers (above approximately 75%). However, during take-off from high elevation airport or during climb, roughness or loss of power may result from over-richness. In such a case adjust mixture control only enough to obtain smooth operation – not for economy. Observe instruments for temperature rise. Rough operation due to over-rich fuel/air mixture is most likely to be encountered at altitudes above 5,000 feet.

Always return the mixture to full rich before increasing power settings.

Operate the engine at maximum power mixture for performance cruise powers and at best economy mixture for economy cruise power; unless otherwise specified in the airplane owners manual.

During let-down flight operations it may be necessary to manually lean carbureted or fuel injected engines to obtain smooth operation.

A. LEANING TO EXHAUST GAS TEMPERATURE GAGE.

1. Normally aspirated engines with fuel injectors or carburetors.

(a) Maximum Power Cruise (approximately 75% power) – Never lean beyond 150°F on rich side of peak EGT unless aircraft operator's manual shows otherwise. Monitor cylinder head temperatures.

(b) Best Economy Cruise (approximately 75% power and below) – Operate at peak EGT.

B. LEANING TO FLOWMETER.

Lean to applicable fuel-flow tables or lean to indicator marked for correct fuel-flow for each power setting.

C. LEANING WITH MANUAL MIXTURE CONTROL (Without flowmeter or EGT gage).

1. Carbureted Engines.

(a) Slowly move mixture control from "Full Rich" position toward lean position.

(b) Continue leaning until engine roughness is noted.

(c) Enrich until engine runs smoothly and power is regained.

**SECTION 3
OPERATING INSTRUCTIONS**

**LYCOMING OPERATOR'S MANUAL
O-540, IO-540 SERIES**

OPERATING CONDITIONS (CONT.)

Operation	RPM	HP	Fuel Cons. Gal./Hr.	Max. Oil Cons. Qts./Hr.	*Max. Cyl. Head Temp.
<u>IO-540-A, -B, -E, -G, -P Series</u>					
Normal Rated	2575	290	-----	0.97	500°F (260°C)
Performance Cruise (75% Rated)	2350	220	16.5	0.73	500°F (260°C)
Economy Cruise (60% Rated)	2200	175	12.0	0.5	500°F (260°C)
<u>IO-540-C, -J Series**</u>					
Normal Rated	2575	250	-----	0.83	500°F (260°C)
Performance Cruise (75% Rated)	2350	190	16.5	0.63	500°F (260°C)
Economy Cruise (60% Rated)	2200	150	12.5	0.50	500°F (260°C)
<u>IO-540-D, -N, -R, -T, -V Series</u>					
Normal Rated	2700	260	-----	0.87	500°F (260°C)
Performance Cruise (75% Rated)	2450	195	15.0	0.65	500°F (260°C)
Economy Cruise (60% Rated)	2350	155	12.0	0.52	500°F (260°C)
<u>IO-540-K, -L, -M, -S Series</u>					
Normal Rated	2700	300	-----	1.0	500°F (260°C)
Performance Cruise (75% Rated)	2450	225	18.0	0.75	500°F (260°C)
Economy Cruise (60% Rated)	2350	180	12.8	0.60	500°F (260°C)
<u>IO-540-W Series</u>					
Normal Rated	2400	235	-----	0.78	500°F (260°C)
Performance Cruise (75% Rated)	2200	175	12.5	0.58	500°F (260°C)
Economy Cruise (60% Rated)	2000	140	10.1	0.47	500°F (260°C)

* - At Bayonet Location – For maximum service life of the engine maintain cylinder head temperatures between 150°F and 435°F during continuous operation.

** - Limiting manifold pressure for continuous operation of IO-540-C4B5, -C4C5, -J4A5 with Hartzell propeller HCE2Y type hub and 8465-7R blades. Do not exceed 27 inches manifold pressure below 2300 RPM.