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# SERVICE INSTRUCTION

DATE: February 1, 2017

Service Instruction No. 1009AZ

(Supersedes Service Instruction No. 1009AY)

Engineering Aspects are

FAA Approved

SUBJECT: Required Time Between Overhaul (TBO) Schedule

MODELS AFFECTED: Lycoming engines that meet defined criteria herein

REASON FOR REVISION: Added IO-360-N and IO-390-C engine models

**NOTICE:** Incomplete review of all the information in this document can cause errors. Read the entire Service Instruction to make sure you have a complete understanding of the requirements.

This Service Instruction identifies the required Time Between Overhaul (TBO) for certified Lycoming engine models maintained and compliant with all applicable Lycoming Service Bulletins and FAA Airworthiness Directives.

The TBOs stated in this Service Instruction do not apply to engines that:

- Do not conform to the original engine model type certificate configuration.
- Have been assembled, repaired or overhauled with FAA-PMA parts, where the FAA-PMA parts have not been approved for use by Lycoming. Consult the applicable FAA-PMA instructions and FAA Airworthiness Directives for the FAA-PMA components.
- Have been maintained or overhauled using methods other than Lycoming approved procedures.

The information in this revision of Service Instruction No. SI-1009 is approved by the FAA as an Alternative Method of Compliance (AMOC) for compliance with AD-2012-19-01, paragraphs (f)(1)(i) and (f)(2)(i).

The TBOs take into account service experience, variations in operating conditions, and frequency of operation. **However, because of variations in the manner in which engines are operated and maintained, Lycoming Engines cannot give assurance that any individual operator will achieve the TBOs identified herein.**

Continuous service assumes that the aircraft will not be out of service for more than 30 consecutive days. If the aircraft is to be out of service for more than 30 consecutive days, refer to the latest revision of Service Letter L180.



General Aviation  
Manufacturers Association

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Engine deterioration in the form of corrosion (rust) and the drying out and hardening of composition materials such as gaskets, seals, flexible hoses and fuel pump diaphragms can occur if an engine is out of service for an extended period of time. Due to the loss of a protective oil film after an extended period of inactivity, abnormal wear on soft metal bearing surfaces can occur during engine start. Therefore, all engines that do not accumulate the hourly period of TBO specified in this publication are recommended to be overhauled in the twelfth year.

Table 1 identifies the TBOs for Lycoming engine models used in fixed wing aircraft. Table 2 contains the TBOs for Lycoming engine models used on rotary wing aircraft.

**NOTICE:** The recommended TBOs identified in Tables 1 and 2 do not apply to engines used for crop dusting or other aircraft used for chemical application. The TBO for engines in these applications is a maximum of 1500 hours, or at recommended TBO, whichever is lower.

Engine accessories and propellers could require overhaul prior to engine overhaul. Complete the overhaul of these components in accordance with the accessory manufacturer's recommendation.

Reliability and average service life cannot be predicted when an engine has undergone any modification not approved by Lycoming Engines. The TBOs shown in Tables 1 and 2 are recommendations for engines as manufactured, without considering any modifications that could alter the life of the engine. Refer to notes shown after Tables 1 and 2 and identified by number in Tables 1 and 2 for additional specific details.

**Table 1**  
**Fixed Wing Aircraft**  
**Recommended Time Between Overhaul Periods**

Engine Models	See Note	Hours
O-235 Series (except -F, -G, -J)	12	2400
O-235-F, -G, -J	13	2000
O-290-D	-----	2000
O-290-D2	-----	1500
O-320 Series (except O-320-H)	1,10,11	2000
O-320-H	11	2000
IO-320-A, -E	1,10,11	2000
IO-320-B, -D, -F	4,6,10,11	2000
IO-320-C	2,4,10,11	1800
AIO-320 (160 HP)	6	1600
AEIO-320 Series	6	1600
O-340 Series	1	2000
O-360 Series (except O-360-E, -J2A)	1,4,10,11	2000
O-360-E	4,11	2000
IO-360-L2A	11	2000
IO-360-A, -C, -D, -J (200 HP)	4,5,6,10,11	2000
IO-360-B, -E, -F, -M, -N (180 HP)	1,4,10,11	2000
TO-360-C, -F; TIO-360-C	3,11	1800
TO-360-E (180 HP)	3,4,11	1800
AIO-360 (200 HP)	6	1400

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**Table 1 (Cont.)**  
**Fixed Wing Aircraft**  
**Recommended Time Between Overhaul Periods**

Engine Models	See Note	Hours
TIO-360-A Series	3,11	1200
AEIO-360 Series (180 HP)	6	1600
AEIO-360 Series (200 HP)	6	1400
IO-390-A	11	2000
AEIO-390-A	6	1400
IO-390-C Series	11	2200
O-435; GO-435	-----	1200
GO, GSO-480; IGSO-480	1	1400
O-540-A, -B, -E4A5	1,10	2000
O-540-E4B5, -E4C5	1,11	2000
O-540-G, -H, -J	10,11	2000
O-540-L3C5D	2,11	2000
IO-540-A, -B (290 HP)	1,10,11	1400
IO-540-AG1A5	-----	1800
IO-540-C	1,10, 11	2000
IO-540-D	1,10	2000
IO-540-E, -G, -P	1,10,11	1600
IO-540-S, -AA	2,10	1800
IO-540-J, -R	2,10	1800
IO-540-J4A5	10	2000
IO-540-AB1A5, -AC1A5, -AF1A5	11	2000
IO-540-K, -L, -M, -N, -T, -V, -W	10,11	2000
AEIO-540 Series	6	1400
IGO & IGSO-540 Series	-----	1200
TIO-540-V, -W, -AE	3,4,11	2000
TIO-540-C, -AA, -AB, -AF, -AG, -AH, -AJ, -AK	3,4,7,11	2000
TIO-540-A, -F, -J, -N, -R, -S, -U	3,4,11,14	1800
TIO-541-A (320 HP)	3	1300
TIO-541-E (380 HP)	3,9	1600
TIGO-541 (425 HP)	3	1200
IO-580-B1A	11	2000
AEIO-580-B1A	6	1400
IO-720 Series	11	1800

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**Table 2**  
**Rotary Wing Aircraft**  
**Recommended Time Between Overhaul Periods**

Engine Models	See Note	Hours
O-320-A2C, -B2C	11	2000
O-320-B2C (Robinson Helicopter only)	15	2200
HO-360-C1A	11	2000
O-360-C2B, -C2D; HO-360 (except -C1A); HIO-360-B	-----	1500
O-360-J2A	11	2000
O-360-J2A (Robinson Helicopter only)	15	2200
HIO-360-A, -C, -D, -E, -F Series	-----	1500
HIO-360-G1A	11	2000
VO-360-A Series	-----	600
VO-360-B; IVO-360	-----	1000
VO-435-A Series	-----	1200
VO-435-B Series	-----	1200
TVO-435 Series	3	1000
O-540-F1B5	11	2000
O-540-F1B5 (Robinson Helicopter only)	11, 15	2200
IO-540-AE1A5	11	2000
IO-540-AE1A5 (Robinson Helicopter only)	15	2200
VO-540 Series	8	1200
IVO-540 Series	-----	600
TVO, TIVO-540 Series	3,8	1200

**NOTES**

1. Only engines built with 1/2 in. (12.7 mm) dia. exhaust valve stems. Engines of this series with 7/16 in. (11.1 mm) dia. exhaust valves must not exceed 1200 hours between overhauls regardless of the type of operation. New and rebuilt engines built with 1/2 in. (12.7 mm) dia. exhaust valve stems are identified, respectively, by serial numbers and date in the latest revision of Service Instruction No. 1136.
2. These engines are designed to incorporate exhaust turbocharging.
3. Turbochargers could require removal, prior to engine overhaul, for carbon removal and repair.
4. Engines with reverse rotation have same overhaul times as corresponding normal rotation engines.
5. 1200 HOURS: Engines that do not have large main bearing dowels must not be operated more than 1200 hours between overhauls.

1400 HOURS: Engines that have large main bearing dowels can be operated to 1400 hours between overhauls. These include engines with serial numbers L-7100-51A and up, and L-101-67A and up; engines which are in compliance with the latest revision of Service Bulletin No. 326; and remanufactured engines shipped after January 26, 1970.

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2000 HOURS: Engines that have large main bearing dowels and redesigned camshafts can be operated to 2000 hours between overhauls. These include engines with serial numbers L-9762-51A and up; IO-360-C1E6 engines with serial numbers L-9723-51A and up; LIO-360-C1E6 engines with serial numbers L-524-67A and up; engines that are in compliance with the latest revision of Service Bulletin No. 326 and Service Instruction No. 1263. Rebuilt engines shipped after October 1, 1972, can be operated to 2000 hours between overhauls except those with serial numbers L-2349-51A and L-7852-51A which do not have the redesigned camshaft and must not exceed 1400 hours of operating time between overhauls.

6. The reliability and service life of engines can be detrimentally affected if they are repeatedly operated at alternating high and low power applications which cause extreme changes in cylinder temperatures. Flight maneuvers which cause engine overspeed also contribute to abnormal wear characteristics that tend to shorten engine life. These factors must be considered to establish TBO of aerobatic engines; therefore it is the responsibility of the operator to determine the percentage of time the engine is used for aerobatics and establish his own TBO. The maximum recommended is the time specified in this instruction.
7. TIO-540-C Series engines with serial numbers L-1754-61 and up, TIO-540-C Series engines that were rebuilt or overhauled at Lycoming Engines, Williamsport, PA after March 1, 1971, and TIO-540-C series engines that have been modified to incorporate large main bearing dowels as described in the latest revision of Service Instruction No. 1225 can be operated to 2000 hours. Engines that do not incorporate this modification must not exceed 1500 hours between overhauls.
8. VO, TVO and TIVO-540 engines built with P/N 77450 connecting rods as described in the latest revision of Service Bulletin No. 371 can be continued in service to 1200 hours. Engines that do not incorporate this new connecting rod are restricted to 1000 hours for VO-540 models and 900 hours for TVO and TIVO-540. See the latest revision of Service Bulletin No. 371 for improved connecting rod assembly.
9. TIO-541-E series engines with serial numbers L-804-59 and up, rebuilt engines shipped after March 1, 1976, and all engines that incorporate the improved crankcases and cylinder assemblies described in the latest revision to Service Bulletin Nos. 334 and 353 can be operated for 1600 hours before overhaul. Engines not in compliance with these requirements are limited to 1200 hours recommended time between overhaul.
10. Some engines in the field have been altered to incorporate an inverted oil system in order to perform aerobatic maneuvers. Whenever this modification is done to an engine, the TBO of the engine must be determined in the same manner listed for AEIO engines of the same model series.
11. If an engine is being used in “frequent” type service and accumulates 40 hours or more per month, and has been so operated consistently since being placed in service, add 200 hours to TBO time. (Engines identified in AD-2012-19-01 are not eligible for this TBO extension.)
12. To qualify for the 2400 hour TBO, high-compression, O-235’s must have the increased strength pistons (P/N LW-18729). See the latest revision of Service Letter No. L213.
13. The high-compression O-235-F, -G and -J series do not have the increased-strength pistons (P/N LW-18729); therefore, they do not qualify for the 2400 hour TBO.
14. TIO-540-A series engines with serial numbers L-1880-61 and up, TIO-540-A series engines that were rebuilt or overhauled at Lycoming Engines, Williamsport, PA after March 1, 1971, and TIO-540-A series engines that have been modified to incorporate large main bearing dowels as described in the latest revision of Service Instruction No. 1225 can be operated to 1800 hours. Engines that do not incorporate this modification must not exceed 1500 hours between overhauls.
15. Only engines built to specifications intended for and installed in Robinson Helicopter applications are approved for 2200 hour TBO.

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# Service Bulletin Fuel Systems

Bulletin No.: MSA-3  
Revision No.: 1  
Date: 11/16/90  
Revised: 11/18/91

**SUBJECT: OVERHAUL PERIODS FOR FLOAT CARBURETORS.**

NOTE: This service bulletin restates overhaul requirements as previously established in Facet Service Bulletin A1-86

REASON FOR REVISION: Revision 1 clarifies overhaul requirements and adds a calendar time requirement for TBO in **ACCOMPLISHMENT INSTRUCTIONS**

**1. PLANNING INFORMATION:**

**A. EFFECTIVITY:**

All Precision Airmotive, Facet Aerospace and Marvel Schebler Aircraft Float Carburetors utilized on general aviation aircraft.

**B. REASON:**

To establish overhaul periods for items in 1.A.

**C. DESCRIPTION:**

**D. COMPLIANCE:**

**E. APPROVAL:**

**F. MANPOWER:**

**G. MATERIAL AVAILABILITY:**

**H. TOOLING:**

**I. REFERENCES:**

**J. WEIGHT AND BALANCE:**

**K. PUBLICATIONS AFFECTED:**

**2. ACCOMPLISHMENT INSTRUCTIONS:**

- A.** The time between overhaul (TBO) for all carburetors designated in 1.A. of this service bulletin is the same as the TBO specified by the engine manufacturer for the engine on which the carburetor is installed or ten (10) years since placed in service or last overhauled, whichever occurs first.

2. ACCOMPLISHMENT INSTRUCTIONS: (cont)

- B. Upon reaching the appropriate carburetor TBO as specified above, the carburetor must be completely overhauled. During the overhaul, it is recommended that the minimum parts to be replaced in the carburetor, regardless of their apparent condition, are those parts comprising the 286-XXX Major Repair Kit as specified in the current Precision Airmotive/Facet Aerospace, Aircraft Carburetor Service Manual #FSM.

Additional parts may also require replacement. This can be determined by careful aircraft quality inspection techniques.

**NOTE:** In those cases where a carburetor requires service prior to TBO, it is recommended that the minimum parts replaced any time a carburetor is opened for service, are those parts comprising a 778-XXX Minor Repair Kit (Refer to Facet Service Information Letter # 8-21-86 for kit contents and effectivity).

- C. A complete overhaul is mandatory regardless of any FAR operational category when the carburetor has been subjected to a severe environment such as but not limited to:

- (1) Engine fire, external or prolonged air intake manifold fire.
- (2) Contaminated fuel such as water, rust, sand, etc.

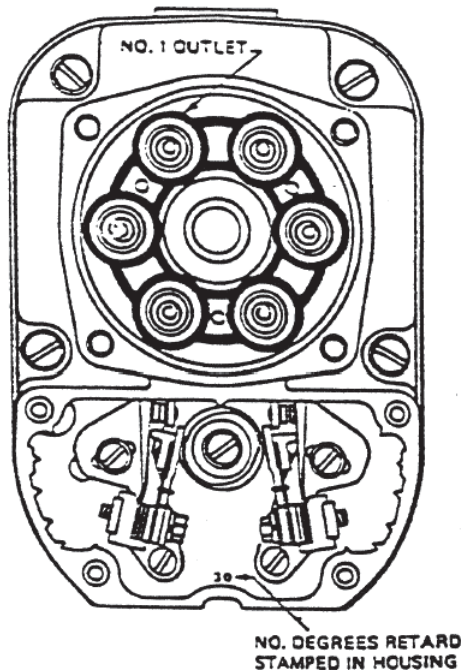
Fuel that does not meet engine manufacturer's requirements may be detrimental to engine operation. If non-specified fuel is inadvertently pumped into the aircraft fuel system, contact Precision Airmotive's Product Support Department to determine if overhaul is necessary.

- (3) If any uncertainty exists regarding the need for overhaul, contact Precision Airmotive's Product Support Department, 3220 100TH ST. S.W. #E, Everett, Washington 98204, (206) 353-8181 for consultation.

**NOTE:** Vertical black bands in the left hand margin denote changes from previous release.

## 2-3. Maintenance and Overhaul Periods

NOTE: Refer to Figure 1 for an exploded view of the Magneto.



**Figure 2-3. Cam End of Dual Contact Assembly Magneto**

Any time the magneto-to-engine timing is found to be outside the engine manufacturer's limits, inspect the contact assemblies (Figure 1) (39) according to the instructions in Section 6-2.1.

Inspect magnetos equipped with snap-ring impulse couplings (Figure 1) (8) at the first 500 hours in service and every 500 hours thereafter according to instructions in Section 6-2.3. Inspect magnetos equipped with riveted impulse couplings (Figure 1) (8) at the first 100 hours in service and every 100 hours thereafter according to instructions in Section 6-2.2.

Inspect all magnetos according to instructions in Section 6-2.3 at the first 500 hours in service and every 500 hours thereafter. If the magneto has more than 500 hours, inspection, as outlined above must take place within the next 100 hours, or at the next scheduled inspection period, whichever occurs first, and at 500-hour intervals thereafter. Upon completion of inspection, make an appropriate logbook entry signifying inspection compliance, referencing the serial numbers of the inspected magnetos.

Magnetos are subject to the same environmental conditions and wear as the engine and must be overhauled when the engine is overhauled. Engine overspeed, sudden stoppage or other unusual circumstances may require engine overhaul prior to engine manufacturer's recommendations. In such circumstances the magneto, regardless of "in service time," must be overhauled with particular attention focused on rotating parts, bearings and electrical components.

In addition, magnetos must be overhauled or replaced five years after the date of manufacture or last overhaul or four years after the date placed in service, which ever occurs first, without regard to accumulated operating hours since new or last overhaul.