652 Oliver Street
Williamsport, PA 17701 U.S.A.
Telephone +1 (877) 839-7878 (U.S. and Canada)
Telephone +1 (570) 327-7222 (International)
Facsimile +1 (570) 327-7101
Email Technicalsupport@lycoming.com
www.lycoming.com

MANDATORY

SERVICE BULLETIN

DATE: April 8, 2020

Service Bulletin No. 369S
(Supersedes Service Bulletin No. 369R)
Engineering Aspects are
FAA Approved

SUBJECT: Engine Inspection after Overspeed

MODELS AFFECTED: All Lycoming piston engines.

TIME OF COMPLIANCE: As required by the subject bulletin.

REASON FOR REVISION: Added new engine model IO-390-D to Table 1. Added new steps in Table 4 to include EIS Overspeed. Added a new NOTICE before the Magneto Overspeed Inspection section. Added a new section for EIS Overspeed Inspection.

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

Because engine overspeed can occur inadvertently during flight, this Service Bulletin includes the definition of engine overspeed and momentary overspeed, and the necessary determinations, inspection, and corrective action to take after an overspeed incident.

NOTICE: All incidents of engine overspeed must be recorded in the engine logbook, along with the inspection and any corrective action done per this Service Bulletin.

Previous revisions of this Service Bulletin No. 369 included two other sections: "Overboost" and "Engines Equipped with Absolute Pressure Relief Valve." These sections are now in Service Bulletin No. 592.

Definition of Overspeed vs. Momentary Overspeed

In *engine overspeed*, the engine operates above its rated (speed) revolutions per minute (RPM). Operation of an engine above its rated RPM can accelerate wear on already stressed components. The consequences of overspeed vary by engine type and model and depend upon several factors such as duration of overspeed as well as the amount of overspeed. Refer to the section "Identify Amount of Overspeed" in this Service Bulletin.

Momentary overspeed can occur during a landing attempt, when the propeller governor lags as the throttle is suddenly opened for a go-around. In fixed wing aircraft, momentary overspeed is defined as an increase of no more than 10% of rated engine RPM for a period not exceeding 3 seconds. If the duration and amount of overspeed is calculated to fall within the limitations defined as *momentary*, no further maintenance actions are necessary. **However, for rotary wing aircraft (helicopters), no momentary overspeed is allowed** and inspection and maintenance must be done as per this Service Bulletin.

⚠ **CAUTION:** DO NOT OPERATE AN ENGINE CONTINUOUSLY AT AN OVERSPEED RATE BECAUSE IT CAN WEAR OUT ENGINE PARTS AND EVENTUALLY CAUSE ENGINE FAILURE.

©2020 Avco Corporation. All Rights Reserved
Lycoming Engines is a division of Avco Corporation.

Identify Amount of Overspeed

The following steps are required if any engine is subjected to overspeed of more than 10% of rated engine RPM for more than 3 seconds or if a helicopter engine is subjected to momentary overspeed.

1. Refer to Table 1 which shows the rated RPM's for Lycoming engines.
2. Table 2 identifies specific engine models used expressly on helicopters.

NOTICE: In addition to the continuous rated RPM shown in Table 1, a few engine models have a 5-minute take-off rating. On these engines, if overspeed does not exceed the take-off rating for longer than 5 minutes, the overspeed can be disregarded.

Table 1
Fixed Wing Aircraft Specified Rated Engine RPM

ENGINE MODELS	SPECIFIED ENGINE SPEED		
	Continuous Rated RPM	5 Minute Take-Off Rating	RPM for Computing Overspeed
O-235-C1C, -C2C	2600	2800	2800
O-235-C1, -C1B, -C2A, -C2B, -F, -G, -H, -J	2800		2800
O-235-E, -K (Except -K2C) -L, -M -N -P	2800		2800
O-235-K2C	2700	2800	2800
O-290-D, -D2B, -D2C	2600	2800	2800
O-320-A, -B, -C, -D, -E, -H; Series; **O-320-A2B, -A2C, -B2C; IO-320-A, -B, -C, -D, -E, -F; LIO-320-B, -C; *AIO-320-A, -B, -C; *AEIO-320-D, -E	2700		2700
O-340 Series	2700		2700
TO-360-A, -C, -E, -F; LTO-360-A, -E; TIO-360-A, -C	2575		2575
O-360-A, -B, -C (except **-C2D), -D, -E, -F, -G; **O-360-J2A IO-360 -A, -B, -C, -D, -E, -F, -J, -K, -M, -N, P Series IO-360-L2A; LIO-360-B1G6, -C1E6, -M1A; LO-360-A, -C, -E; *AIO-360-A, -B Series; *AEIO-360-A, -B, -H	2700		2700
**O-360-C2D	2700	2900	2900
IO-390-A, -C, -D Series AEIO-390-A Series	2700		2700
O-435-A, -C, -C1 Series	2550		2550
GO-435-C Series	3100	3400	3400
GO-480-B Series;	3000	3400	3400
GO-480-C, -D, -F, -G IGO-480-A1A6, -A1B6	3100	3400	3400
GSO-480-A, -B Series IGSO-480-A Series	3200	3400	3400

Table 1 (Cont.)
Fixed Wing Aircraft Specified Rated Engine RPM

ENGINE MODELS	SPECIFIED ENGINE SPEED		
	Continuous Rated RPM	5 Minute Take-Off Rating	RPM for Computing Overspeed
O-540-J, -L Series; IO-540-AB1A5, -W1A5D, -W3A5D; TIO-540-AK1A, -T2AD;	2400		2400
TIO-540-AE2A, -AH1A, -AJ1A; TIO/LTIO-540-U2A;	2500		2500
O-540-A, -B, -D Series IO-540-A, -B, -C, -E, -G, -J, -P TIO-540-A1A, -A1B, -A1C, -A2A, -A2B, -A2C, -AA, -AB, -AF1A, -AF1B, AG1A, -C1A, -E1A, -F, -G, -H, -J. -N TIO/LTIO-540-R2AD; LTIO-540-F, -J, -N	2575		2575
TIO/LTIO-540-V2AD, TIO/LTIO-540-W	2600		2600
O-540-E, -G, -H Series; IO-540-AA, -AF, -AC, -D, -K, -L, -M, -N, -R, -S, -T, -U, -V TIO/LTIO-540-S1AD; *AEIO-540-D, -L Series	2700		2700
**O-540-F1A5, **O-540-F1B5; **IO-540-AE1A5	2800		2800
IGO-540-A, -B	3000	3400	3400
IGSO-540 Series	3200	3400	3400
TIO-541-A1A	2575		2575
TIO-541-E	2900		2900
TIGO-541-B, -C, -D, -E, -G	3200		3200
IO-580-A1A	2500		2500
IO-580-B1A; *AEIO-580-B1A	2700		2700
IO-720-A, -B, -C, -D	2650		2650
TEO-540-A1A	2500		2500
TEO-540-C1A	2575		2575

* - Aerobatic engines that are engaged in flight maneuvers which cause engine overspeed are subject to unusual wear and possible overstress of rotating parts, which will shorten the service life of the engine. The damage accumulated due to the amount of overspeed, along with the extent of repeated operation at alternating high and low power applications, must be evaluated by the operator to determine the necessary inspection procedures and corrective action required.

** - Also used on rotary wing aircraft (see Table 2).

Table 2
Rotary Wing Aircraft Specified Rated Engine RPM

ENGINE MODEL	SPECIFIED ENGINE SPEED		
	Continuous Rated RPM	5 Minute Take-Off Rating	RPM for Computing Overspeed
O-320-A2B, A2C, B2C	2700		2700
O-360-A2E, -C2B, -C2E, -J2A; HO-360-A, -C; HIO-360-G1A	2700		2700
O-360-C2D	2700	2900	2900
HO-360-B Series; HIO-360-A, -B, -E Series; HIO/LHIO-360-C1A, -C1B Series; VO-360-A, -B; IVO-360-A1A	2900		2900
HIO/LHIO-360-F1AD	3050		3050
HIO-360-D1A	3200		3200
HIO-390-A1A	2700	2800	2800
O-435-A2, C	2550		2550
O-435-4 (O-435-K1)	3000		3000
O-435-25 (TVO-435-B1A); TVO-435-A, -B, -C, -D, -E, -F -G Series; VO-435-B1A	3200		3200
VO-435-A Series	3200	3400	3400
HIO-540-A1A	2575		2575
O-540-F1A5, -F1B5 IO-540-AE1A5	2800		2800
VO-540-A	3200	3300	3300
VO-540-B, -C Series IVO-540-A1A TIVO-540-A2A	3200		3200

3. There are three categories of overspeed. Identify the category of overspeed shown in Table 3:
   - Less than 5% of rated engine speed
   - Between 5 and 10% of rated engine speed
   - More than 10% of rated engine speed

Table 3
Inspection Requirements in Event of Overspeed

CATEGORY	ENGINE RPM													
Engine Overspeed in Excess of Max. Rated RPM	2400	2425	2500	2550	2575	2600	2650	2700	2800	2900	3050	3200	3300	3400
* 5%	2520	2546	2625	2678	2704	2730	2783	2835	2940	3045	3202	3360	3465	3570
*10%	2640	2668	2750	2805	2833	2860	2915	2970	3080	3190	3355	3520	3630	3740
* - Except as defined as “Momentary Overspeed” on page 1 of this Service Bulletin.														

Corrective Action After Engine Overspeed

NOTICE: All incidents of overspeed must be recorded in the engine logbook, including corrective action.

1. When the overspeed occurrence is less than 5% of the rated engine speed, the recommended corrective action for *all* engines is as follows:
   a. Identify and correct the cause of the overspeed.
   b. In the engine logbook, record the overspeed incident, any inspections, and corrective action.

   NOTICE: For helicopter engines with a rated speed between 2800 to 3300 RPM, complete the Cylinder Overspeed Inspection in this Service Bulletin, remove oil screens and filters, and examine all screens and filters in the lubrication system for metal contamination per the latest revision of Service Bulletin No. SB-480. If any unexplained metal accumulation is found, identify and correct the cause before returning the engine to service.

2. Overspeeds between *5% and 10%* depend upon the engine type as shown in Table 4. In this case:
   a. Identify the engine type that applies to your engine model and complete the corrective action shown in Table 4.
   b. In the engine logbook, record the overspeed incident, any inspections, and corrective action.

3. In the case where the overspeed is *10% or more*, the corrective action is to:
   a. Remove the engine from the aircraft.
   b. Disassemble the engine in accordance with the applicable Lycoming Overhaul Manual.
   c. Examine the engine and components in accordance with the applicable Lycoming Overhaul Manual.
   d. Replace any parts that are damaged or not in agreement with the latest revision of the Table of Limits SSP-1776.
   e. In engines with dynamic counterweights, replace the bushings in the counterweight and the crankshaft.
   f. In the engine logbook, record the overspeed incident, any inspections, and corrective action.

Table 4
Corrective Action for Overspeed's between 5% to 10%

Engine Type	Corrective Action
DIRECT DRIVE ENGINES and HELICOPTER ENGINES	1. Identify and correct the cause of the overspeed. 2. Complete the "Cylinder Overspeed Inspection" procedure in this Service Bulletin. 3. Drain the lubricating system. 4. Remove oil screens and filters. 5. Examine all screens and filters* in the lubrication system for metal contamination. If any unexplained metal accumulation is found, identify and correct the cause before returning the engine to service. 6. If the engine has magnetos, complete the "Magneto Overspeed Inspection" procedure in this Service Bulletin. 7. If the engine has Lycoming Electronic Ignition System (EIS), complete the "EIS Overspeed Inspection" procedure in this Service Bulletin. 8. Complete the "Valve Train Overspeed Inspection" procedure in this Service Bulletin.
DIRECT DRIVE TURBOCHARGED ENGINE	1. Identify and correct the cause of the overspeed. 2. Complete the "Cylinder Overspeed Inspection" procedure in this Service Bulletin. 3. Drain the lubricating system. 4. Remove oil screens and filters. 5. Examine all screens and filters* in the lubrication system for metal contamination. If any unexplained metal accumulation is found, identify and correct the cause before returning the engine to service. 6. If the engine has magnetos, complete the "Magneto Overspeed Inspection" procedure in this Service Bulletin. 7. If the engine has Lycoming Electronic Ignition System (EIS), complete the "EIS Overspeed Inspection" procedure in this Service Bulletin. 8. Disconnect both the inlet and outlet attaching hardware from the turbocharger and examine the compressor and turbine wheels for damage. Examine the shaft-wheel assembly for free rotation and for vertical and lateral motion, which are evidence of damaged center housing bearings. Repair damage in these areas before returning the engine to service. 9. Complete the "Valve Train Overspeed Inspection" procedure in this Service Bulletin.
GEARED DRIVE ENGINE	1. Identify and correct the cause of the overspeed. 2. Complete the "Cylinder Overspeed Inspection" procedure in this Service Bulletin. 3. On mechanically supercharged engines: a. Remove the supercharger drain cover. b. Look for engine lubricating oil which, if found, is evidence of a damaged supercharger seal. c. To see the extent of damage, drain the oil from the supercharger for a period of 8 hours. d. If the quantity of oil accumulated is more than a teaspoonful, replace the supercharger seal. 4. Examine all screens and filters* in the lubrication system for metal contamination. If any unexplained metal accumulation is found, identify and correct the cause before returning the engine to service. 5. (Turbocharged) Disconnect both the inlet and outlet attaching hardware from the turbocharger and examine the compressor and turbine wheels for damage. Examine the shaft-wheel assembly for free rotation and for vertical and lateral motion, which are evidence of damaged center housing bearings. Repair damage in these areas before returning the engine to service. 6. Complete the "Valve Train Overspeed Inspection" procedure in this Service Bulletin.
* Per instruction in the latest revision of Service Bulletin No. SB-480	

Cylinder Overspeed Inspection

1. Complete a differential pressure check on all cylinders to identify the sealing quality of the rings and valves. See the latest revision to Service Instruction No. 1191 for the procedure.
2. Use a borescope or equivalent instrument to examine the walls of each cylinder for scoring which could be caused by a stuck or broken piston ring.

NOTICE: Refer to the latest revision of the Service Table of Limits SSP-1776 for tolerances, clearances, and backlash during Magneto Overspeed Inspection and EIS Overspeed Inspection.

Magneto Overspeed Inspection

⚠ **CAUTION:** EARLIER SLICK MAGNETOS ARE NON-REPAIRABLE. REFER TO THE SLICK PUBLICATION.

1. Disassemble the magnetos and examine all components for damage; recondition or replace parts as required.
2. Assemble and test the magnetos in accordance with the applicable magneto overhaul instructions.
3. Examine the magneto drive gears for looseness which is indication that the supporting idler shafts are loose due to failure of safety attachments.
4. If applicable, examine the magneto bearing recess in the crankcase for excessive wear. Repair as necessary in accordance with the latest revision of Service Instruction No. 1140.

EIS Overspeed Inspection

1. Examine the magneto drive gears for looseness which is indication that the supporting idler shafts are loose due to failure of safety attachments.
2. If applicable, examine the magneto bearing recess in the crankcase for excessive wear. Repair as necessary in accordance with the latest revision of Service Instruction No. 1140.
3. If the unit does not function correctly, replace the EIS. Refer to the latest revision of SI-1569 or applicable Installation and Operation Manual for Operational Check of the EIS.

Valve Train Overspeed Inspection

Either repeated moments or short periods of operation in the overspeed region, increase at an accelerated pace the rate of wear in the parts that make up the valve train which decreases engine reliability. In addition to the checks on the engine during a 100-hour maintenance inspection, complete the following steps to examine the valve train before returning the engine to service.

1. Use a borescope or equivalent illuminated magnifying optical device to examine the condition of the intake and exhaust valve faces and seat faces. If there is evidence of excessive wear, pounding, or grooving, replace the valve and seat.
2. Examine the external condition of valve keys, rockers, and exhaust valve guides for damage. Examine valve springs for coil strikes or severe bottoming of the coils. If damage to springs is evident, remove them and complete a check of the compression load as specified in the latest revision of the Service Table of Limits SSP-1776. Replace any valve spring that is not within limits.
3. Rotate the crankshaft by hand to see if the valve lift is uniform or equal for all cylinders. See if valve rockers are free when the valves are closed. Unequal valve lift is an indication of bent push rods. Tight rockers when valves are closed, is an indication of a tuliped valve or a damaged valve lifter. Repair any suspected damage before returning the engine to service.
4. Refer to the latest revision of Service Bulletin No. 388 for the exhaust valve stem-to-valve guide clearance condition.