CONTINENTAL MOTORS® AIRCRAFT ENGINE

SERVICE BULLETIN

Contains Useful Information Pertaining To Your Aircraft Engine

CATEGORY 3

SB16-6

TECHNICAL PORTIONS
FAA APPROVED

SUBJECT: Engine Damage Due to Kickback

PURPOSE: To identify kickback causes and issue post kickback procedures.

COMPLIANCE: Anytime a kickback incident occurs perform the inspections set forth in this Service Document prior to further engine operation.

MODELS AFFECTED: Continental Motors (CM), IO-520-B, BA, BB, C, CB, M, MB; 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; TSIO-550-B, C, E, G, K, N, and TSIOL-550-A, B, C aviation gasoline (AvGas) engines.

I. GENERAL INFORMATION

Recent testing at Continental Motors (CM) has shown that "engine kickback" during engine start can result in high instantaneous torque loading of engine components and cause damage to the starter, adapter assembly or related components, up to and including damage to the crankshaft gears and crankshaft gear's retaining screws. There have been occurrences where all six retaining screws holding the crankshaft gear have fractured.

Kickback is defined as an interruption or reversal of engine rotation during the cranking sequence while starting the engine. Kickback can be detected by the propeller blades abruptly stopping or rotating backwards **while the starter switch is still activated,** either silently or accompanied by the sound of metal hitting metal.

Apart from the "Potential Causes" listed below, engine installations combining lower-inertia (light weight) propellers with slow or sluggish starting RPM have been shown to have an increased opportunity for kickback and, when kickback occurs, a possibility for greater damage to the mechanical components of the starting system.

II. POTENTIAL CAUSES

Kickback can be caused by:

- Improper magneto to engine timing or improper internal magneto timing.
- A magneto switch improperly set for starting.
- "Shower of Sparks" - Improper connection of, or disconnection of, starting systems on magnetos that are so equipped (including retard points, vibrator, and connections). Ungrounded right magneto (an ignition/start switch that is faulty or a broken or loose P-Lead to the right magneto; allowing it to fire while cranking, causing a kickback).
- Improperly functioning impulse couplings on magnetos.
- Improper priming or throttle control.
- Low battery voltage resulting in slow or sluggish starting RPM.

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- Exceeding the published duty cycle/overheating a permanent magnet starter, which can result in lower cranking RPM.
- High resistance in the starting circuit (including power, ground, contactors and battery connections).

III. ACTION REQUIRED

After a kickback occurrence, ensure the root cause of the kickback has been properly identified and corrected. Perform the additional following inspections:

1. Refer to the airframe manufacturer's instructions to gain access to the starter and starter adapter. Remove engine cowling and any airframe supplied parts or components as necessary to facilitate starter and starter adapter assembly removal from the engine.
2. Disconnect all spark plug leads and remove the lower spark plugs.
3. Remove the starter motor and starter adapter in accordance with the instructions in the Overhaul and Maintenance Manual applicable to the affected engine.
4. Visually inspect the journal portion of the starter shaft gear that engages the accessory case roller/needle bearing in the crankcase (see Figures 1 & 2) for condition and dimensional fit in accordance with the applicable Overhaul and Maintenance Manual.

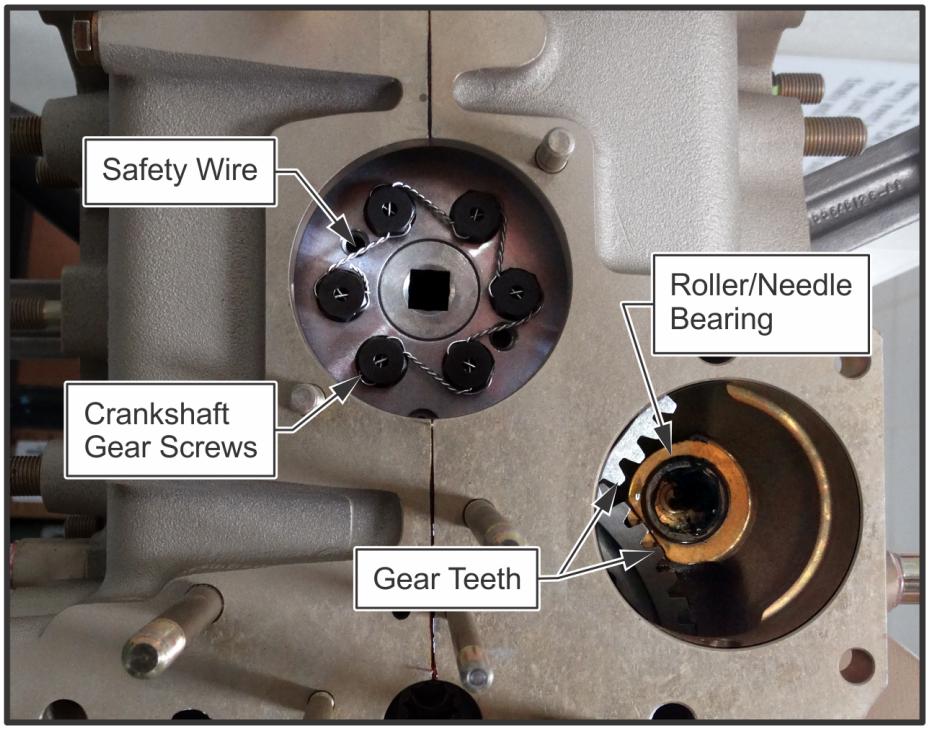


Figure 1. Crankshaft Inspection Area, typical

5. Use a clean, lint free cloth and wipe the oil from crankshaft gear and starter adapter gear teeth to allow inspection. Visually inspect the starter adapter shaft gear and crankshaft gear teeth according to instructions in latest revision of M-0, "Standard Practice Maintenance Manual, Chapter-11."

6. Rotate the starter adapter in clockwise direction by hand (starter shaft gear, see Figure 2):
   a. Ensure that the clutch spring is not binding on the shaft.
   b. Observe smooth operation in the shaft bearing interface.
   c. If rotational travel is uninterrupted, continue to Step 7.

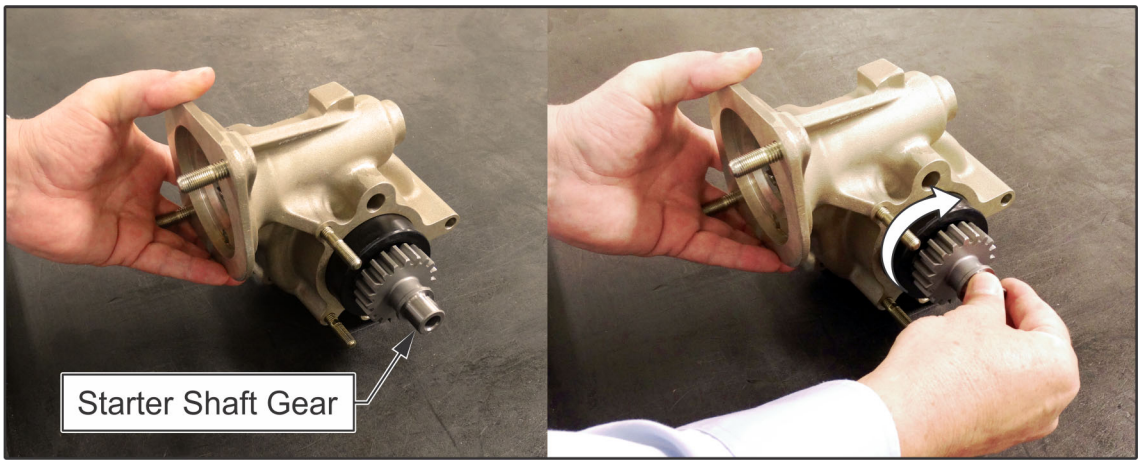


Figure 2. Rotate Starter Shaft Gear (in clockwise direction as shown)

   d. If any rotational travel is interrupted by a ratcheting effect or intermittent binding in the shaft bearing interface:

      1) replace the starter adapter, and

         CAUTION: Never remove and replace more than one crankshaft gear screw at a time when screw replacement is performed without splitting the crankcase.

      2) remove and replace the crankshaft gear screws (see Figure 1), ***one screw at a time,*** in accordance with the instructions in the applicable Overhaul and Maintenance Manual.

         NOTE: Access to remove and replace crankshaft gear screws may require removal and replacement of the engine driven fuel pump or sump (where applicable) according to the instructions in the applicable Overhaul and Maintenance Manual.

         a) Lubricate the threads of the replacement screw with clean 50 weight aviation engine oil.

         b) Torque crankshaft gear screws according to the latest revision of M-0, “Standard Practice Maintenance Manual, Appendix B.” Repeat this process to replace all screws.

         c) Using 0.032" safety wire, safety wire all crankshaft gear screws according to the latest revision of M-0, “Standard Practice Maintenance Manual, Appendix C.”

7. Reinstall any engine components that were removed in accordance with the applicable Overhaul and Maintenance Manual.
8. Reinstall the lower spark plugs and reconnect all spark plug leads.
9. Reinstall any removed airframe supplied parts or components.

10. Reinstall removed engine cowling.
11. Create a logbook entry detailing the compliance actions taken in accordance with this Service Bulletin (SB16-6).
12. Return aircraft to service.

IV. CUSTOMER SERVICE

Visit the Continental Motors web site at www.continentalmotors.aero to obtain copies of Continental Motors Warranty Policies.

Contact Continental Motors Technical Services at one of the numbers listed below if you have any questions concerning the technical content of this Service Document.

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