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Service Bulletin – Propeller Gearbox Alignment Procedure

Description

The alignment of your engine, engine mounting plate, and propeller gearbox is critical for a smooth running and long lasting gearbox. A misalignment of these three components as small as 0.020" can create undesirable input shaft side loads. This can lead to rear seal failure and premature rear bearing wear. This procedure utilizes a precision alignment tool and four dowel pins to align and then secure the positions of each component.

Applicability

Whether you need to perform this procedure depends on the type of engine mounting plate your powerplant uses and what previous service may have been performed on your powerplant after leaving the factory.

There are three types of engine mounting plates, easily identified by their color.

- Gold Anodized (2007+) – Alignment is permanent. **Ignore this Service Bulletin**.
- Black Anodized, or Bare Aluminum – **Alignment is required whenever the engine bell-housing bolts have been loosened**, unless the alignment procedure was previously accomplished, as indicated by the presence of all four dowel pins and two oval index plates. If you have never loosened these bolts, then it is unlikely that your alignment would have changed since it left the factory.

Procedure Overview

Using a precision alignment tool, the current alignment is checked. If alignment is good, a pair of dowel pins and index plates are installed to permanently secure the alignment.

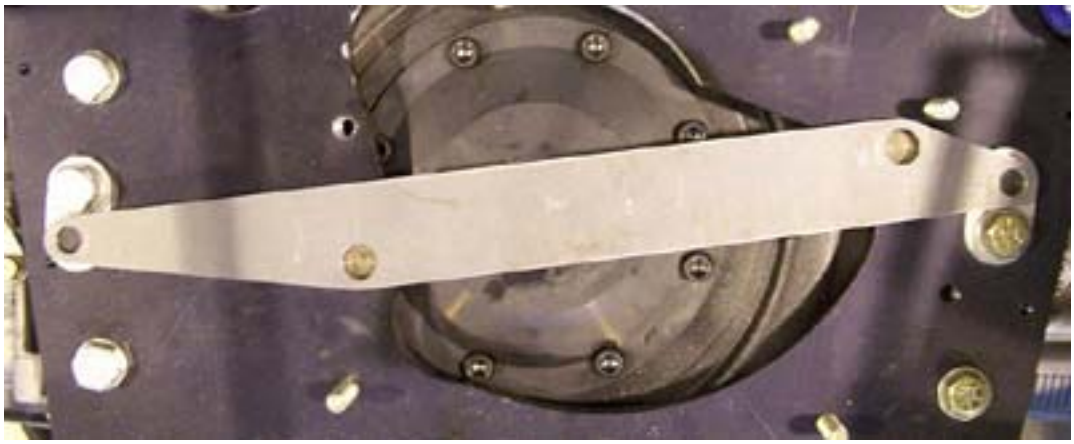
If the alignment is not good, the engine bell-housing bolts are loosened and the bell-housing is shifted slightly to obtain proper alignment, then a pair of dowel pins and index plates are installed to permanently secure the alignment.

This procedure is performed with the propeller and propeller gearbox removed.

DO NOT MODIFY OR DRILL THROUGH THE ALIGNMENT TOOL.

PROVIDED PARTS:

1) (1) Alignment Tool (loaned)
2) (2) Long Dowel Pins
3) (2) Short Dowel Pins
4) (2) Oval Index Plates



Alignment Tool in position over four dowel pins.

Index Plate over long dowel pin.

ALIGNMENT PROCEDURE:

1) Remove the propeller gearbox, exposing the flywheel and engine mounting plate.
2) If you identify FOUR dowel pins, the alignment has previously been secured and no further alignment is needed. Go to step 19.

3) If the two short dowel pins between the engine mounting plate and gearbox are “solid” type pins, skip ahead to step 4. If they are "split" type pins, remove and discard them. This can usually be done with a small pair of vise-grip pliers. Then gently tap the new SHORT dowel pins (provided) into the holes in the engine mounting plate with the tapered ends showing, but only insert them far enough to hold them in place temporarily and still be able to remove them.
4) **CHECK THE EXISTING ALIGNMENT:** Place the alignment tool over the two short dowel pins. Wiggle the tool gently to get it to settle onto the two short dowel pins.
5) Observe what is under the outer two alignment tool holes. There will be an empty hole, a bolt, or two additional dowel pins.
6) If two additional dowel pins are found, continue to gently wiggle the alignment tool and see if it fits over ALL FOUR of the dowel pins. If it does, go to step 19, you are done. If the tool doesn’t fit, go to step 10.
7) If bolts are present, remove the alignment tool and remove and discard these bolts. These bolts, if present, are typically smaller than the rest of the bell-housing bolts and usually have a nut on the back side. These bolts will no longer be used.
8) If you removed bolts or found only an empty hole, insert the two LONG dowel pins into these holes and tap them gently into the bell-housing with a hammer, being careful not to distort the end of the dowel pins. When fully inserted, the dowel pins will protrude approximately 1/4” above the engine mounting plate.
9) Reinstall the alignment tool over ALL FOUR dowel pins. If the tool fits over ALL FOUR of the dowel pins without undue force, go to step 15.
10) **REALIGNMENT:** Your engine mounting plate is out of alignment. To realign it, suspend the engine from an overhead sling and hoist holding it as level as possible.
11) Loosen ALL engine bell-housing to engine mounting plate bolts and any support brace bolts attached to the engine mounting plate.
12) Carefully shift the engine as needed until ALL FOUR dowel pins slip into the alignment tool.
13) One at a time, remove each bell-housing bolt. Watch out for falling spacers behind the mounting plate and pay attention to how many washers are on each bolt position. The spacers and correct number of washers must be in place before reinserting each bolt. Apply a drop of BLUE LocTite, reinsert the bolt and torque to 350 in/lbs (inch pounds). Repeat for all bell-housing bolts.
14) Remove the alignment tool.
15) **SECURING THE ALIGNMENT:** Locate the dowel pin index plates (provided). These are the two oval aluminum plates with two holes in them. The holes surrounding the two long dowel pins in the engine mounting plate are larger in diameter than the dowel pins. These index plates secure the relationship between engine, mounting plate, and gearbox permanently.
16) The bell-housing bolts nearest each index plate are used to secure the index plates. Remove these two bolts. NOTE: Some engine mounting plates do not have bolts at the locations indicated by the index plates. If the use of index plates is desired on these mounting plates, you may drill and tap for short 5/16 bolts to secure the index plates. If you choose not to use the index plates, just make sure the alignment tool is in place while you torque the bell-housing bolts, then do not loosen these bolts again or you will have to realign again.
17) Lightly sand the sides of the index plates. Spread a thin layer of “Right Stuff” or “JB Weld” on the back of each index plate and position the index plates over the LONG dowel pins. The index plate with the flat side goes over the long dowel pin on the pilot’s side. You may need to grind away some of the side of the index plate if it interferes with

the gearbox. The flat edge faces the flywheel center. The index plates allow for future engine removal without altering the dowel pin positions.

18) Place a drop of BLUE LocTite on the bell-housing bolts, reinsert them through each index plate and torque them to 350 in/lbs (inch pounds).
19) Reinstall the propeller gearbox and finish reassembling the aircraft. It is wise to insert the two SHORT dowel pins into the GEARBOX during reassembly with their beveled edges exposed. This prevents the possibility of these dowel pins being pushed all the way through the engine mounting plate. Refer to the document titled "**GEN-III Gearbox Upgrade**" for more details regarding gearbox installation.
20) You may need to rebalance your propeller after installing your gearbox.
21) Make appropriate logbook entries for both propeller and engine.

PLEASE RETURN THE ALIGNMENT TOOL TO THE FACTORY FOR THE BENEFIT OF OTHER CUSTOMERS. ONCE YOUR ALIGNMENT HAS BEEN SECURED, YOU WILL HAVE NO FURTHER USE FOR THE TOOL.

Thank you!