



652 Oliver Street  
Williamsport, PA. 17701 U.S.A.

Telephone +1 (877) 839-7878 (U.S. and Canada)  
Telephone +1 (570) 327-7222 (International)  
Fax +1 (570) 327-7101  
Email [Technicalsupport@lycoming.com](mailto:Technicalsupport@lycoming.com)  
[www.lycoming.com](http://www.lycoming.com)

# SERVICE INSTRUCTION

DATE: January 25, 2023

Service Instruction No. 1324D  
(Supersedes Service Instruction No. 1324C)  
Engineering Aspects are  
FAA Approved

SUBJECT: Crankshaft Oil Seals

MODELS AFFECTED: All direct drive series engines

TIME OF COMPLIANCE: Any time the front crankshaft oil seal is replaced

REASON FOR REVISION: Clarified cleaning for the crankcase bore, added Permatex<sup>®</sup> Optimum Max Flex Black (P/N 27037) as recommended sealant, with Pliobond<sup>®</sup> #20, Pliobond<sup>®</sup> #25 or Dow Corning<sup>®</sup> 737 Neutral Cure Sealant as an acceptable substitutes, added photos, figures and step by step removal and installation instructions of split and/or solid-ring crankshaft oil seals; added figures and instructions on how to install either seal; added figures and instructions with regards to removing sealant if it gets on either the crankshaft or seal lip.

**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 includes procedures to remove, clean, and install the two types of crankshaft oil seals that can be used in Lycoming direct drive engines: the split crankshaft oil seal and the solid-ring crankshaft oil seal with an internal spring. The split crankshaft oil seal (Figure 1) is open to enable assembly around the crankshaft. The solid-ring crankshaft oil seal (Figure 2) is made from a highly elastic material that allows the seal to be stretched over the crankshaft propeller flange during installation.

**NOTICE:** This procedure can be done with the engine installed in the airframe.



**Figure 1**  
Split Crankshaft Oil Seal



**Figure 2**  
Solid-Ring Crankshaft Oil Seal



ISSUED			REVISED			PAGE NO.	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		
02	27	76	01	25	23	1 of 13	D

**NOTICE:** An oversize crankshaft oil seal could be necessary if the crankcase bore size was increased. Part numbers for oversized parts include a “P” suffix, such as –P50 and are identified on the face of the seal. Except for the revised outside diameter of the seals, the oversize seals are identical in other aspects to the standard size seals. See Oversized Seal Information at the end of this Service Instruction

**Crankshaft Oil Seal Removal**

1. Remove the propeller in accordance with the airframe and propeller manufacturer’s maintenance instructions.
2. Remove the starter ring gear support from the crankshaft propeller flange per instructions in the applicable Lycoming Engines’ maintenance or overhaul manual.

**⚠ CAUTION** During removal of the crankshaft oil seal, use care not to damage the crankshaft or the crankcase with the cotter pin puller. Otherwise, you will need to install an oversize seal per instructions as outlined at the end of this Service Instruction or replace a damaged crankshaft or crankcase.



**Figure 3  
Cotter Pin Puller**

3. Use a cotter pin puller or equivalent tool to remove the crankshaft oil seal. Press the sharp point of the cotter pin puller into the middle of the seal (Figure 3).

4. Use a twisting and pulling motion as necessary, to loosen the oil seal from the crankcase bore.



**Figure 4  
Cutting the Internal Spring**

5. Carefully cut the internal spring in the solid-ring crankshaft oil seals only to release tension on the oil seal (Figure 4).

6. Cut the solid-ring crankshaft oil seal with sharp side cutter pliers. Remove the seal from the crankshaft and discard. If removing a split crankshaft oil seal and it has not come apart, cut it with sharp side cut pliers. (Figure 5).



**Figure 5  
Cutting the Solid-Ring Crankshaft Oil Seal**

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	2 of 13	D	

**⚠ CAUTION** OBEY STANDARD SAFETY PRACTICES AND PRODUCT MANUFACTURER'S RECOMMENDATIONS REGARDING THE USE AND HANDLING OF CLEANING MATERIALS AND ADHESIVES INCLUDING THE USE OF PERSONAL PROTECTIVE EQUIPMENT.

**Required Tasks Before Crankshaft Oil Seal Installation**

**NOTICE:** This preparatory procedure applies to both split-ring and solid-ring crankshaft oil seals.

1. Examine the propeller flange, crankshaft sealing surface and the crankcase seal bore recess for any damage that can cause the seal to leak. If scratches or nicks are found, remove them with fine emery cloth (220 Grit for very light metal sanding) or a small abrasive stone. Remove any sanding residue.
2. Clean the recess of the crankcase bore (which has the groove for the crankshaft oil seal) with a clean disposable lint-free cloth and any of the following cleaning solvents to remove oil, sealant, and debris from the crankcase, especially in the crankcase bore:
  - Acetone
  - Ethyl Alcohol
  - Napasco SC-200
  - Methyl-Ethyl-Ketone (MEK)

**⚠ CAUTION** IF MEK IS USED, ONLY APPLY MEK TO THE CRANKCASE, INCLUDING THE CRANKCASE BORE AND GROOVE FOR THE CRANKSHAFT OIL SEAL. DO NOT APPLY MEK TO THE CRANKSHAFT OIL SEAL, SINCE MEK CAN CAUSE THE SEAL TO DETERIORATE. BE SURE TO REMOVE ALL TRACES OF MEK OR ANY CLEANING SOLVENT, OIL, AND SEALANT PRIOR TO INSTALLATION OF A NEW CRANKSHAFT OIL SEAL.

3. Apply cleaning solvent to the crankcase bore and crankshaft. Use a small spiral brush (Figure 6) to loosen hard deposits and a swab (Figure 7) to wipe away oil deposits inside of the crankcase bore as shown.



**Figure 6**  
**Using Spiral Brush on Hard Deposits**



**Figure 7**  
**Using a Swab to Clean Away Deposits**

**NOTICE:** After cleaning, thoroughly examine the crankshaft and crankcase seal bore for damage. If damaged replace the crankshaft or crankcase.

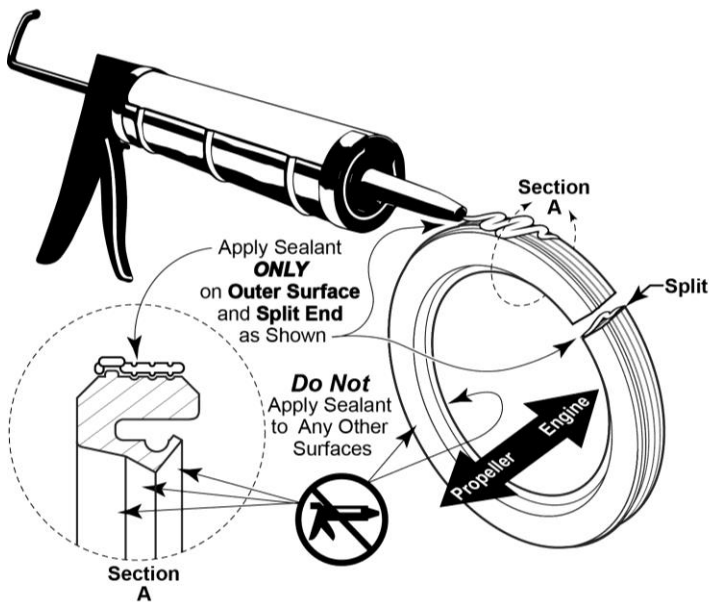
ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR	3 of 13	D	
02	27	76	01	25	23			

## Split Ring Crankshaft Oil Seal Installation

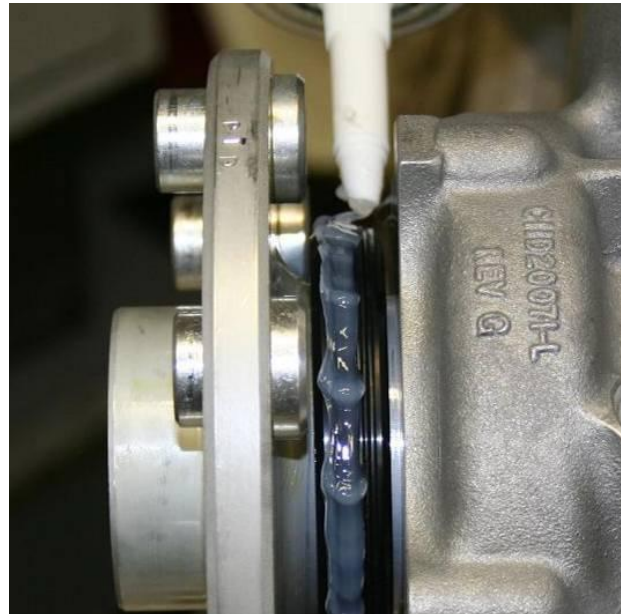
1. Complete the steps in the section “Required Tasks Before Crankshaft Oil Seal Installation” on Page 2 of this Service Instruction.
2. Use ethyl alcohol and disposable wipes to clean the outer surface of the seal, the split end of the seal, and the crankcase seal bore recess. Make sure nothing comes in contact with the cleaned surfaces.
3. Apply a thin film of Lubriko M-6 grease, engine oil or equivalent around the crankshaft at the sealing surface.
4. Face the propeller end of the crankshaft and install the split crankshaft oil seal around the crankshaft.
5. In the following steps, wear butyl rubber gloves and do not get sealant on the crankshaft. If any sealant gets on the crankshaft, use acetone to remove all traces of sealant.

**NOTICE:** Pliobond® #20, Pliobond® #25 or Dow Corning® 737 Neutral Cure Sealant can be used as a substitute for Permatex® Optimum Max Flex Black (P/N 27037). Follow the sealant manufacturer’s instructions to apply Permatex®, Dow Corning® 737 or Pliobond® for application details and cure time.

6. Apply a coat of Permatex® Optimum Max Flex Black (P/N 27037) to the split end of the seal (Figure 8) and press the ends together.
7. Apply a liberal coating of Permatex® Optimum Max Flex Black (P/N 27037) to the outside diameter of the oil seal (Figure 9). Work the sealant into the grooves of the seal. Excess sealant will squeeze out between the crankcase and the oil seal when the split crankshaft oil seal is installed.



**Figure 8**  
**Where to Apply Sealant**



**Figure 9**  
**Applying Permatex® Optimum Max Flex Black (P/N 27037)**

8. When facing the propeller end of the engine with the engine in an upright position, rotate the split crankshaft oil seal until the split is at the 1:00 o'clock position for right-hand rotation engines, (11:00 o'clock position for left-hand rotation engines).

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	4 of 13	D	

9. Work the split crankshaft oil seal into the crankcase bore and press the oil seal firmly against the seat in the crankcase bore.
10. Spread the excess sealant smoothly over the oil seal and crankcase (Figure 10).



**Figure 10**  
**Spread Sealant in Gap Between Case & Seal**

11. Do not allow any sealant to contact the crankshaft or the seal lip. Use acetone and ethyl alcohol to remove any sealant that contacts the crankshaft or seal lip area. (Figure 8).
12. Allow sealant to cure per the manufacturer's instructions.
13. Install the starter ring gear support on the crankshaft propeller flange per instructions in the applicable Lycoming Engines' maintenance or overhaul manual.
14. Install the propeller in accordance with the airframe and propeller manufacturer's maintenance instructions.
15. Complete an engine oil level check and add the required amount to fill the crankcase per the applicable Lycoming Engines' manual.
16. Complete an engine ground run in accordance with the applicable Pilots Operating Handbook (POH) or Airplane Flight Manual (AFM).
17. Examine the split crankshaft oil seal for leaks. If no leaks are found, return the engine to service.

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	5 of 13	D	

## Solid Ring Crankshaft Oil Seal Installation

Tools required for solid ring crankshaft oil seal installation (Figure 11):

- Lubrico M-6 grease, engine oil or equivalent.
- Applicator brush.
- ¼" x 3 ½" Pin (to hold the solid ring crankshaft oil seal to the crankshaft flange during installation).
- Crankshaft propeller flange bushing cover.
- Seal stretching tool ST-383.
- 68293 or LW-11174 Oil Retaining Housing can be used to aid in installing the solid-ring crankshaft oil seal by placing the Oil Retaining Housing over the crankshaft bushings as a guard shown in Figure 20b, if 67384 is not available.



**Figure 11**  
**Tools Required for Solid-Ring Crankshaft Oil Seal Installation**



**Figure 12**  
**Locating the Internal Spring**



**Figure 13**  
**Internal Spring Removed**

**NOTICE:** There are two types of internal springs used in the solid-ring crankshaft oil seal. One type has a hook on each end; the hooks are simply joined together. The other type has threaded ends, one end threads into the other end.

1. Before installing a solid-ring crankshaft oil seal remove the internal spring to prevent damage to the spring, seal and potential injury. (Figures 12 and 13).
  - A. Locate and remove the internal spring from the solid-ring crankshaft oil seal.
  - B. To open the spring find the spring joining ends.
  - C. Hold the spring tight in your left hand so it cannot turn, (Figure 14).
  - D. With your right hand twist the spring and roll with your fingers counterclockwise about 5 turns to unthread and separate the spring ends.

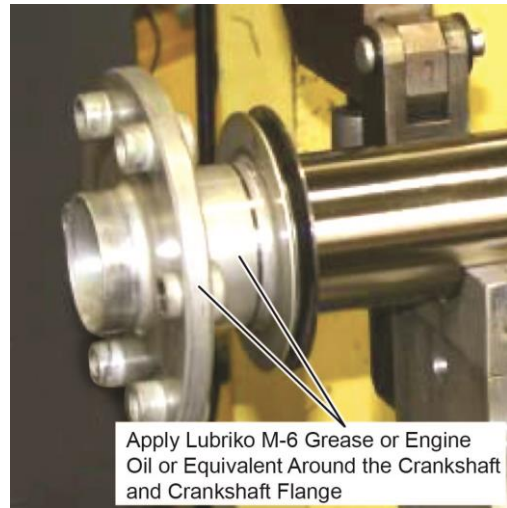


**Figure 14**  
**Separating the Spring Threaded Ends**

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	6 of 13	D	

2. Apply a thin film of Lubriko M-6 grease, engine oil or equivalent on the sealing surface of the crankshaft and on the outer edge of the crankshaft flange (shown in Figure 15).

**NOTICE:** If available, a Pinion Cage Oil Retaining Housing P/N 67394 or 68293 can be installed on the crankshaft propeller flange for easier installation of the solid-ring crankshaft oil seal.



**Figure 15**  
**Apply Lubriko M-6 Grease, Engine Oil or Equivalent around the Crankshaft and Crankshaft Flange**

3. Install the crankshaft propeller flange bushing cover onto the end of the crankshaft if applicable. Use a brush to apply Lubriko M-6 grease, engine oil or equivalent on the crankshaft seal tracking area as well as the outside diameter of the crankshaft flange (Figures 16 and 17).



**Figure 16**  
**Lubriko M-6 Grease, Engine Oil or Equivalent Applied to the Crankshaft**



**Figure 17**  
**Applied Lubriko M-6 Grease, engine oil or equivalent to the Crankshaft Flange**

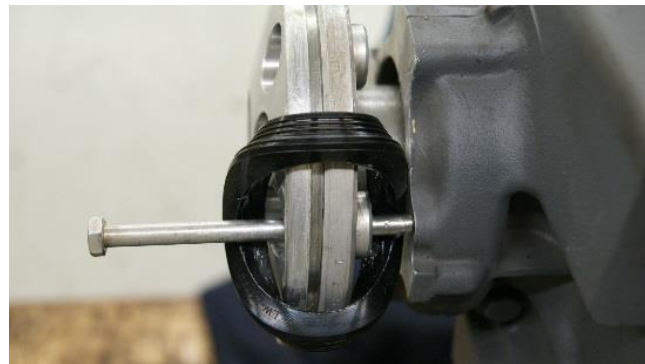
ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	7 of 13	D	

- Use a brush to apply a thin coat of Lubriko M-6 grease, engine oil or equivalent on the inside of the solid-ring crankshaft oil seal to prevent the seal from sticking to the crankshaft, (Figure 18).



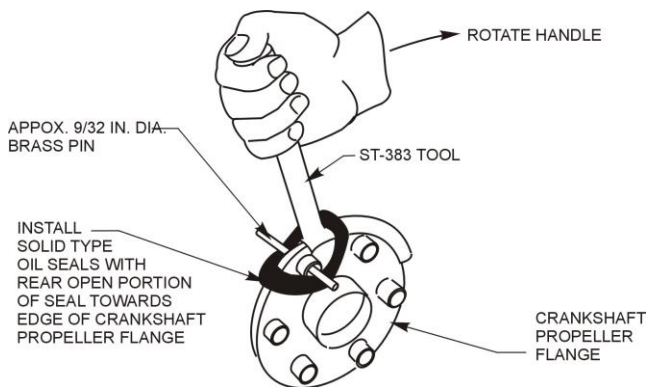
**Figure 18**  
**Lubriko M-6 Grease, engine oil or equivalent Applied to the Inside of the Solid-Ring Crankshaft Oil Seal**

- Install the solid-ring crankshaft oil seal over the edge of the crankshaft propeller flange with the groove (open portion) of the seal towards the crankshaft propeller flange. Secure using a brass pin or equivalent as shown in (Figure 19).



**Figure 19**  
**Install the Pin to Hold the Solid-Ring Crankshaft Oil Seal**

**CAUTION:** USE CARE NOT TO DAMAGE THE SOLID-RING CRANKSHAFT OIL SEAL. INSTALL THE CRANKSHAFT OIL SEAL INSTALLATION TOOL ST-383 UNDER THE SEAL AND OVER THE EDGE OF THE CRANKSHAFT PROPELLER FLANGE AS SHOWN IN FIGURES 20A AND 20B. CAREFULLY TURN THE TOOL TO STRETCH THE OIL SEAL OVER THE CRANKSHAFT PROPELLER FLANGE.



**Figure 20A**  
**Installation of the Solid-Ring Crankshaft Oil Seal on the Crankshaft Propeller Flange**



**Figure 20B**  
**Guard Over the Front of the Flange**

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	8 of 13	D	



6. Pull the solid-ring crankshaft oil seal toward the crankshaft flange. Position the spring between the seal and the crankcase.
7. Firmly hold the spring ends one in each hand, gently stretch the spring around the crankshaft behind the installed solid ring crankshaft oil seal (Figure 21).



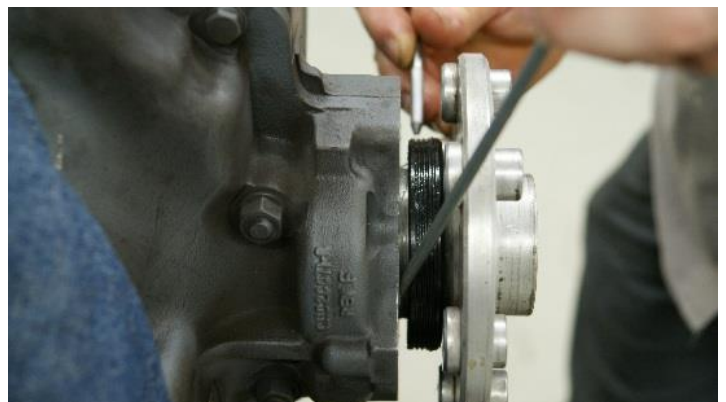
**Figure 21**  
**Installing the Spring**  
**Behind the Solid-Ring Crankshaft Oil Seal**

8. Twist the right side of the spring counter-clockwise three turns and hold. Then twist the left side of the spring clockwise three turns and hold. Join the two spring ends together. Gently release the tension allowing the spring ends to thread into each other locking the spring together. Let the spring relax and rest behind the seal (Figure 22). The spring must be a continuous circle around the crankshaft with no kinks or twists.



**Figure 22**  
**Spring Installed in Relaxed State.**

9. Use a small handled hook to secure the spring, and a long flat blade screwdriver to hold the solid-ring crankshaft oil seal away from the crankcase. Work the spring into the rear of the solid-ring crankshaft oil seal. Ensure the spring is not damaged and is seated completely in the internal groove of the seal (Figure 23).



**Figure 23**  
**Spring Installed in**  
**the Solid Ring Crankshaft Oil Seal**

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	9 of 13	D	

- Use ethyl alcohol and a lint free disposable wipe to clean the outer surface of the solid ring crankshaft oil seal and the crankcase seal bore (Figure 24). Make sure no contaminants touch the cleaned surfaces.



**Figure 24**  
**Cleaning the Solid-Ring Crankshaft Oil Seal**

**NOTICE:** In the next step Pliobond® #20, Pliobond® #25 or Dow Corning® 737 Neutral Cure Sealant can be used as a substitute for Permatex® Optimum Max Flex Black (P/N 27037). Do not get sealant on the crankshaft. If any sealant gets on the crankshaft, use acetone to remove all traces of sealant.

- Wear butyl rubber gloves and apply a liberal amount of the Permatex® Optimum Max Flex Black (P/N 27037) to the solid-ring crankshaft oil seal (Figures 25 & 29). Refer to the manufacturer's instructions for application details and cure time.



**Figure 25**  
**Applying Permatex® Optimum Max Flex Black (P/N 27037)**

- Work the sealant into the grooves of the solid-ring crankshaft oil seal (Figure 26).



**Figure 26**  
**Working the Sealant into the Seal Grooves**

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	10 of 13	D	

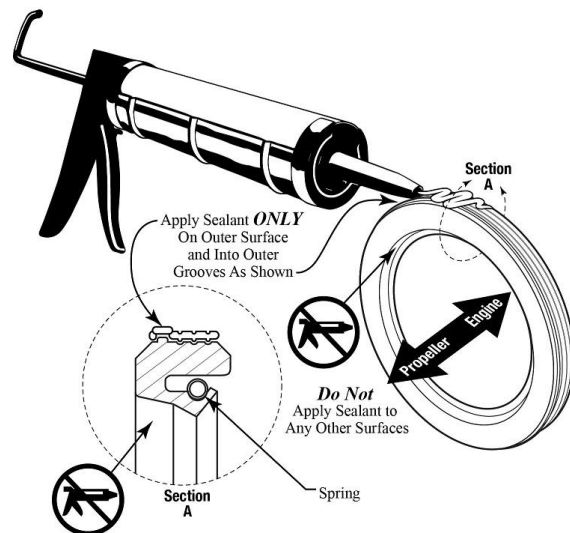
13. Work the solid-ring crankshaft oil seal into the crankcase bore evenly. (Figure 27).
14. Excess sealant will squeeze out spread excess sealant over the front of the crankcase and seal taking care not to get sealant on the crankshaft. (Figure 28)
15. Do not allow any sealant to contact the crankshaft or the seal lip. Use acetone and ethyl alcohol to remove any sealant that contacts the crankshaft or seal lip area. (Figure 29)
16. Allow sealant to cure per the manufacturer's instructions.
17. Install the starter ring gear support on the crankshaft propeller flange per instructions in the applicable Lycoming Engines' manual.
18. Install the propeller in accordance with the airframe and propeller manufacturer's maintenance instructions.
19. Complete an engine oil level check and add the required amount to fill the crankcase per the applicable Lycoming Engines' manual.
20. Complete an engine ground run in accordance with the applicable Pilots Operating Handbook (POH) or Airplane Flight Manual (AFM).
21. Examine the solid-ring crankshaft oil seal for leaks. If no leaks are found, return the engine to service.



**Figure 27**  
**Installing the Solid-Ring Crankshaft Oil Seal into the Crankcase**



**Figure 28**  
**Spread Sealant in Gap Between Case & Seal**



**Figure 29**  
**Where to Apply Sealant**

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	11 of 13	D	

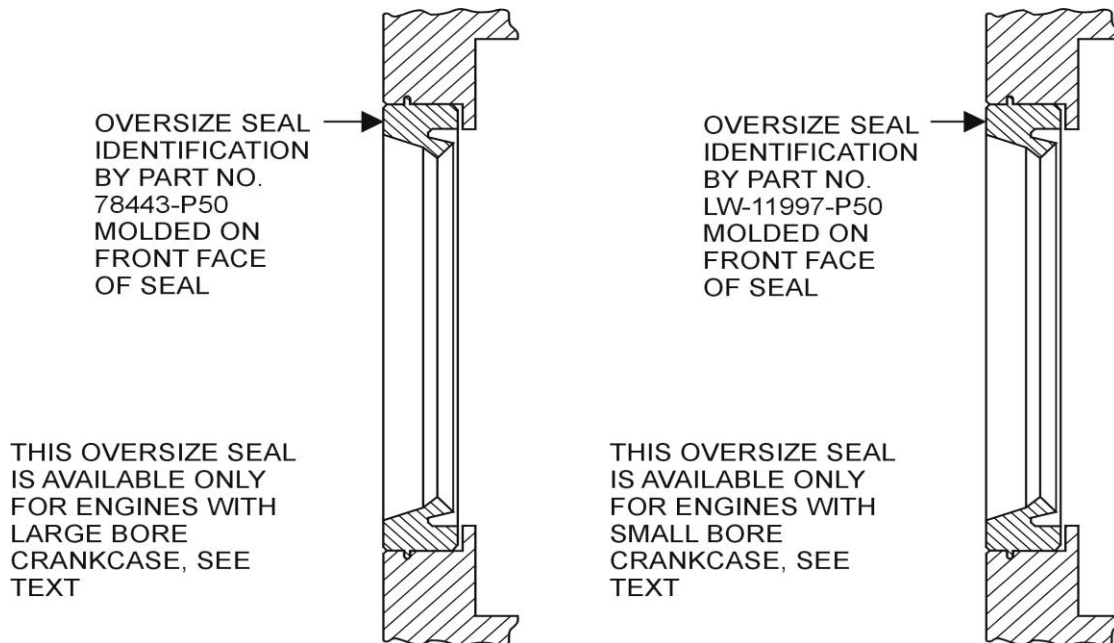
**PARTS DATA:**

- LW-13792 (Small) Crankshaft Oil Seal (molded lip on outside surface – solid type – three grooves for glue retention)
- LW-11997 (Small) Crankshaft Oil Seal (molded lip on outside surface – split type)
- 78443 (Large) Crankshaft Oil Seal (molded lip on outside surface – split type)
- LW-15628 (Large) Crankshaft Oil Seal (molded lip on outside surface – solid type – three grooves for glue retention)
- 76940 (Small) Crankshaft Oil Seal (no molded lip on outside surface – split type)
- 74305 Crankshaft Oil Seal (two grooves for glue retention – split type)
- ST-383 Oil Seal Installation Tool

**Oversize Seal Information:**

If it is necessary to repair the crankcase in which the oil seal bore is worn oversize, complete disassembly of engine is necessary. A .050-inch oversize split seal (P/N 78443-P50) and .050-inch oversize solid seal (P/N LW-15628-P50) have been provided for engines with **large** bore crankcases. A .050-inch oversize split seal (LW-11997-P50) and .050-inch oversize solid seal (LW-13792-P50) have been provided for engines with **small** bore crankcases. Both solid and split seals are available in standard size as well as oversize.

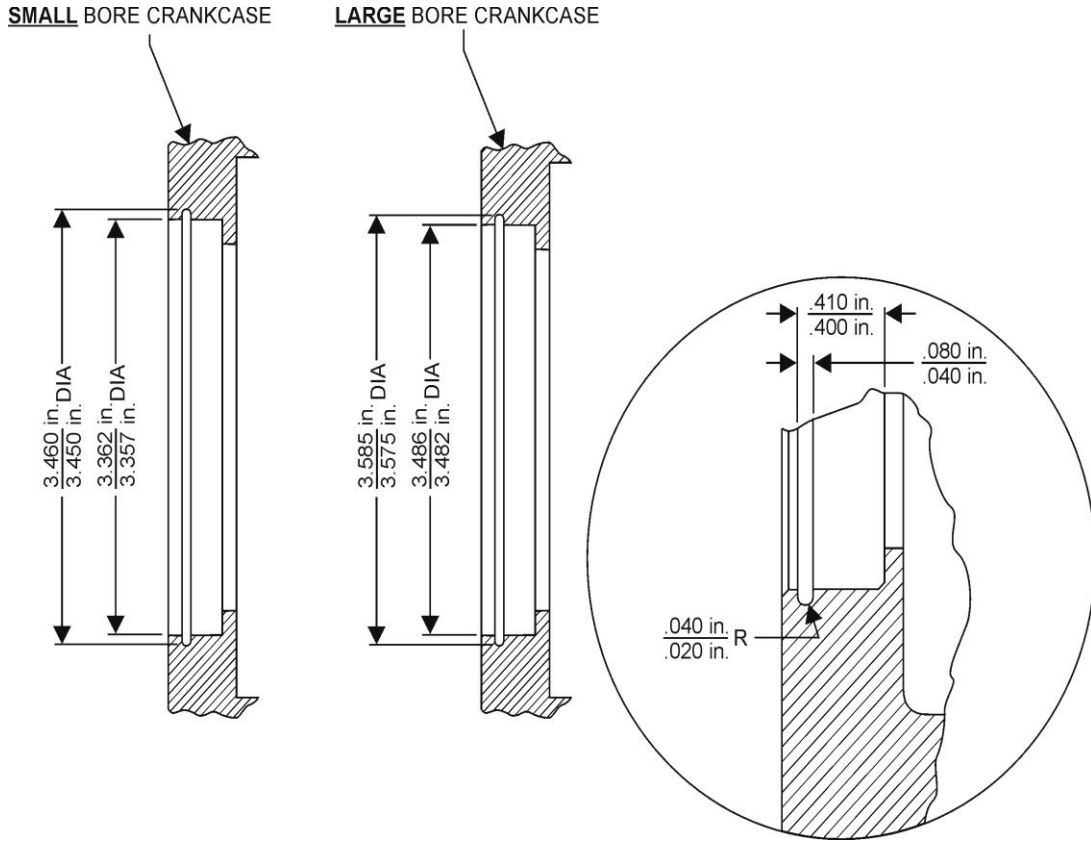
The .050-inch oversize nose seals are identified by the P/N's 78443-P50 or LW-11997-P50 molded on the face of the seals as shown in Figure 30. Except for the revised outside diameter of the seals, they are identical in other aspects to the standard seals



**Figure 30**  
**Identification of Oversize Crankshaft Seal**

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	12 of 13	D	

To accommodate the oversize seal, it is necessary to increase the crankcase nose seal bore on both large and small bore crankcases (Figure 31). Increase the diameter on large bore crankcases to 3.482/3.486 inch, and on small bore crankcases to 3.357/3.362 inch. This can be accomplished on any suitable boring machine. Both the large bore crankcase diameter (3.482/3.486 inch) and the small-bore crankcase diameter (3.357/3.362 inch) must be concentric with the oversize bearing diameter to within 0.005-inch Total Indicator Reading (T.I.R.).



**Figure 31**  
**Crankcase Bore Dimension for Oversize Crankshaft Seal**

If you have any questions, contact Lycoming Technical Support by phone at 570-327-7222 or 877-839-7878 or email to [Technicalsupport@lycoming.com](mailto:Technicalsupport@lycoming.com).

ISSUED			REVISED			PAGE NO.	REVISION	S.I. 1324
MO	DAY	YEAR	MO	DAY	YEAR			
02	27	76	01	25	23	13 of 13	D	