



Improved Oil Seal Conversion Kit

PART# 433-421

Installation Instructions

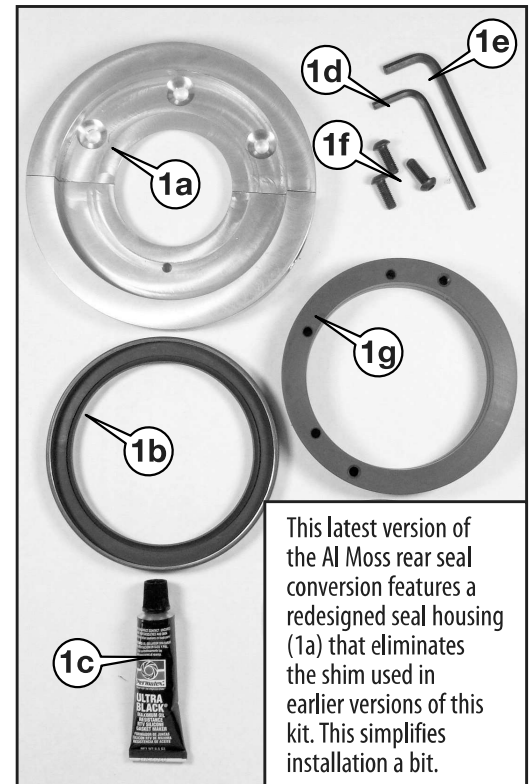
For: MGT Series

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Contents of the Kit:

Ref	Part #	Description	Qty
1a	433-407	Seal Housing, aluminum	1 EACH
1b	433-422	Seal (12K RPM)	1 EACH
1c	433-416	Permatex Ultra-Black Gasket Maker	1 EACH
1d	433-412	Allen Wrench, 4 MM	1 EACH
1e	433-413	Allen Wrench, 3/16"	1 EACH
1f	323-715	Screw, Button Head, Allen Drive	3 EACH
1g	433-406	Seal housing alignment tool	1 EACH
	980-379	Instructions (this document)	1 EACH

IMPORTANT: If you have previously installed one of these kits, please read all of the following instructions thoroughly and carefully, as they describe a much improved approach to the task. For the installation to be successful, it is necessary to read, understand and then follow each and every step. We suggest that each step be reviewed, then checked off or lined out when completed.



It is assumed that your engine is out of your car and is dismantled, at least to the point of having the crankshaft out and the flywheel removed from the crankshaft. Also, the engine must be in an inverted position. There are four separate steps to the task: preparation of (1) the crankshaft, (2) the block, (3) the seal and (4) the flywheel. Dealing with them in the following order will give you the best results.

Installation Instructions

PREPARING THE CRANKSHAFT

If you are installing a brand new crankshaft, only two steps are necessary:

- 1) Make sure the outer surface of the rear flange is perfectly clean and smooth, and
- 2) Size the flywheel taper pins to fit the holes in the flange (see Preparing the Flywheel, below). If your new flange is not perfectly smooth, read the next paragraph.

If you are re-using an original crankshaft:

- 1) Carefully examine the outer surface of the rear flange to ascertain that it is free from nicks or scratches. This is the surface on which the new seal will be riding. If you can make the flange perfectly smooth by carefully sanding with fine emery paper, or have your local auto machine shop polish the flange on their crankshaft grinding machine, well and good. However, it is highly unlikely that the flange will ever be smooth enough to make a perfect seal. To maximize your chances for a leak-free installation, we strongly recommend fitting a Speedi-Sleeve (Moss p/n 433-425). You should also buy a tube of Permatex 64000 High Strength Sleeve Retainer from your local auto parts store, which will prevent the Speedi-Sleeve from working loose.
- 2) Although somewhat unorthodox, we recommend installing the Speedi-Sleeve backwards for two reasons. First, this allows the sleeve to be pushed further onto the flange which increases the surface on which the new seal can ride. This in turn gives you more flexibility when positioning the seal. Second, it is very hard to cut off the curved portion of the Speedi-Sleeve when it is unsupported. Putting it on backwards positions the curved portion on the flange, making it easier to trim it off.
- 3) To install the Speedi-Sleeve, lube the main bearings and set the crankshaft in the block.
- 4) Install and snug up the main bearing cap nuts.
- 5) Apply a thin film of the Permatex 64000 High Strength Sleeve Retainer onto the flange.
- 6) Carefully fit the Speedi-Sleeve over the flange with the curved portion outwards or away from the block. (Figure 1) Note: You do not use the installation “cup” supplied with the sleeve.

- 7) Very gently tap around the curved edge of the Speedi-sleeve with a soft-faced mallet and work it onto the flange. (Figure 7)

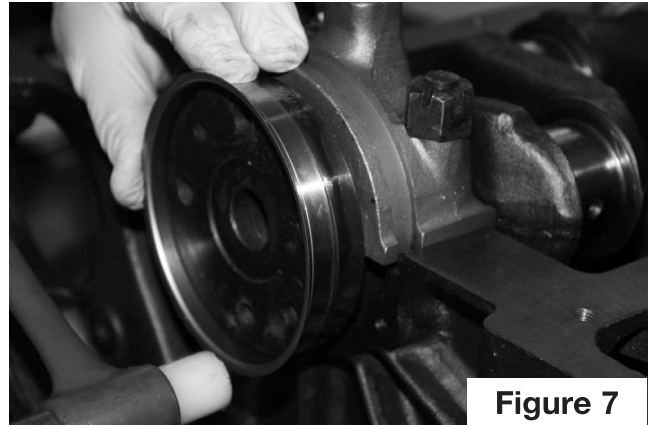


Figure 7

- 8) Select a flat piece of wood that will completely cover the Speedi-Sleeve. Hold the wood (2a) up against the edge of the Speedi-Sleeve and tap the wood gently with the mallet until the wood makes contact with the rear of the crank. Make sure the wood is touching the entire face of the crankshaft flange. This will ensure that the curved portion of the Speedi-Sleeve is parallel with the face of the flange. (Figure 8)

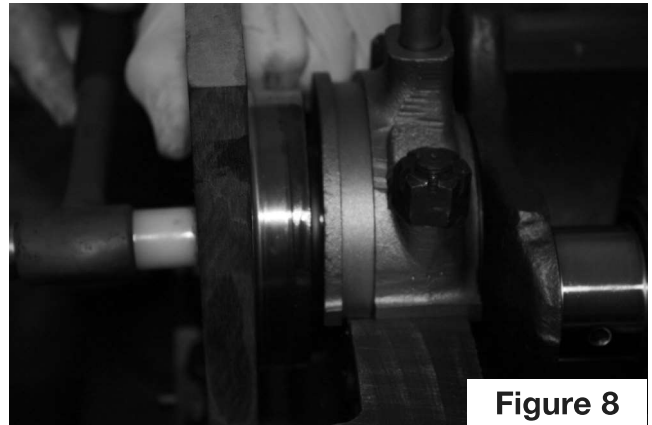


Figure 8

- 9) Locate the groove that separates the curved portion from the flat part of the Speedi-Sleeve. Take a sharp box cutter or utility knife and, while rotating the crankshaft with one hand, press the blade deeply into the groove. (Figure 9)

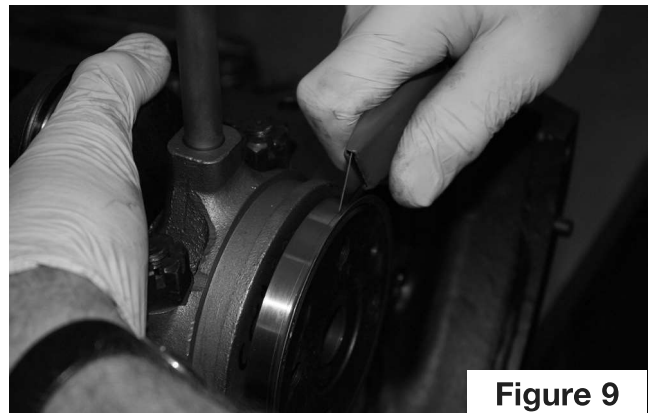
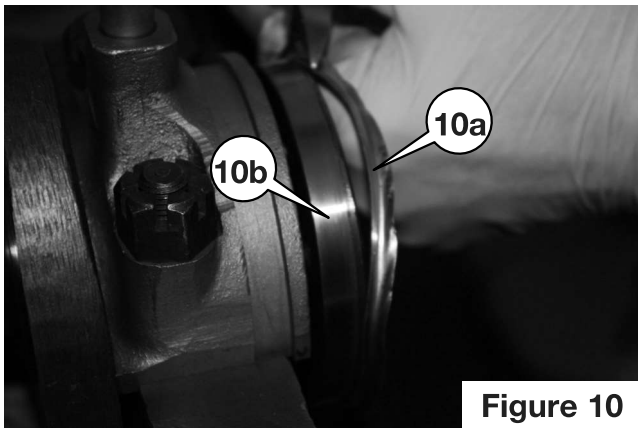


Figure 9

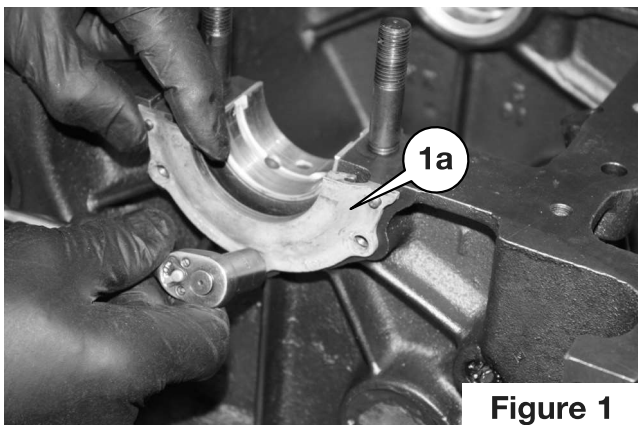
- 10) Continue until you have cut through the groove and can peel off the curved portion (10a) without damaging the surface of the sleeve (10b) on the flange. This is very important because the rubber lip of the new seal will ride on this surface. (Figure 10)



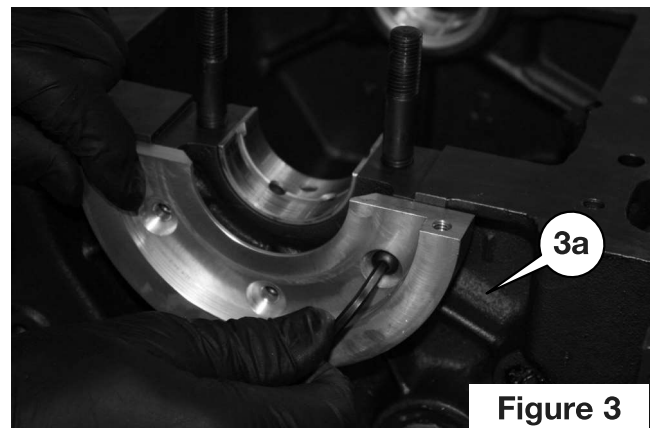
- 11) If any part of the sleeve edge becomes raised up, carefully tap it flat against the flange. If necessary, gently file off any burrs. Any rough or ragged edge would quickly destroy the seal.
- 12) Your crankshaft is now prepared for installation. To obtain full access to the block, the crank needs to come out. Undo the main caps and take it out of the block.

PREPARING THE BLOCK

- 1) Remove the three hex bolts (1a) securing the original pot metal upper oil slinger (1a). Remove the slinger and set it aside. Remove all traces of the original gasket from the block. Keep the slinger handy - you may need it as a template for a gasket later on. Note that the two hardened guide pins do not have to be removed. There are holes in the back of the new seal housing large enough to accommodate the pins. The holes are large enough to allow the new housing to move about as you center the new seal & seal housing on the crankshaft flange.



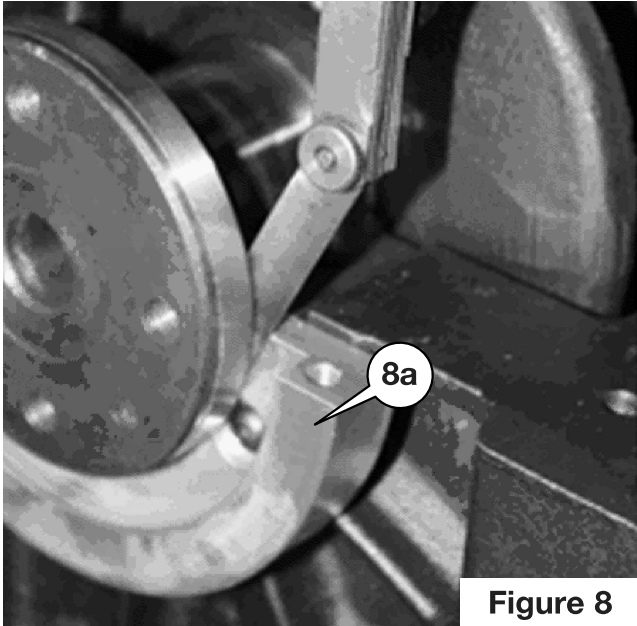
- 2) The three threaded holes that held the original upper slinger will be reused. It helps to run a 6 mm x 1 tap (Moss 385-710) into each threaded hole in the block before trying to insert the new screws.
- 3) Position the thicker half of the new seal housing (6a) against the block and insert the three button-head cap screws (3a). Determine that these screws will not bottom out in the block by tightening them one at a time and checking whether the housing is now held tightly. If the housing is loose with the screw tight, it means the end of the screw has hit the bottom of the tapped hole. Since it is impractical to deepen the holes in the block, cut or grind a bit off the ends of the screws as necessary, so that each one can be fully tightened and the seal housing is held tightly against the block.



- 4) When you are sure all three button-head screws tighten properly, make sure that the housing is not touching any of the five “webs” cast into the block (like 3a). If they appear to be close, pour a little solvent or light oil into the housing and see if it leaks out, or shine a light the other side of the housing and check whether you can see the light. Relieve the webs by grinding if necessary and then tighten the housing half in place.
- 5) Lubricate the main bearing shells again.
- 6) Lower the crankshaft into the block.
- 7) Install the front and center caps, and tighten the nuts.

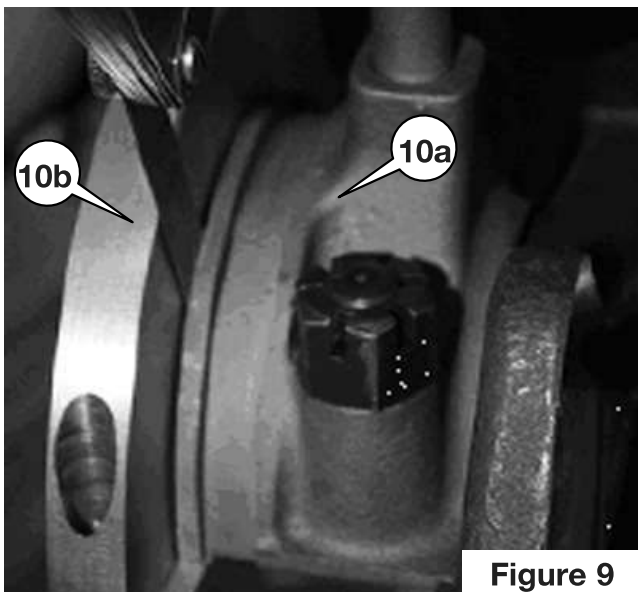
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- 8) Using a feeler gauge, measure the distance from either the front of the crankshaft flange or the leading edge of the Speedi-Sleeve to the face of the seal housing half you just installed (8a). It should be between 0.020" and 0.025" in order for the seal to be properly positioned on the flange. (Figure 8)

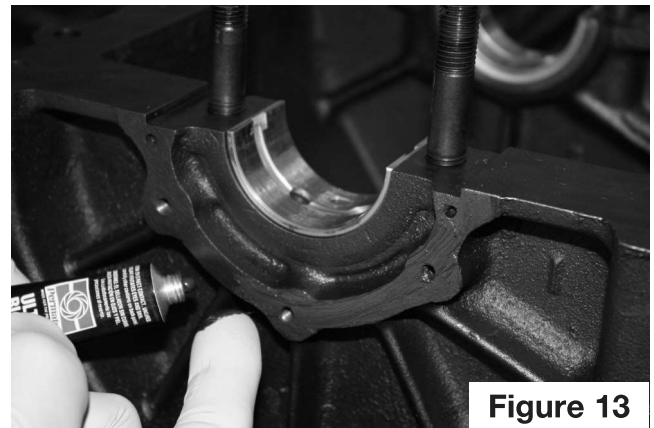


- 9) If the gap is wider than 0.025", lift out the crankshaft, remove the seal housing half (8a) and make a gasket to go between it and the block to achieve the requisite clearance. (Auto parts stores sell gasket paper in a variety of thicknesses.) Use the original slinger you removed as a pattern for the gasket. At this time, do not use any sealer or gasket cement when you attach the seal housing to the block. Tighten the button-head cap screws.

- 10) Join the thin half of the seal housing (10a) to the thick half with the two long Allen screws provided in the kit. The correct Allen wrench is included in the kit.



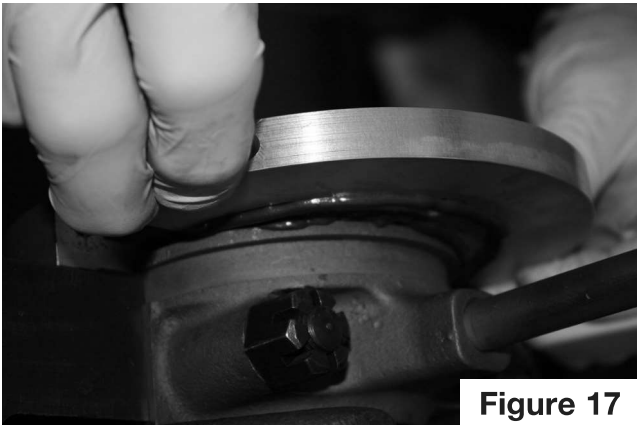
- 11) Try to install the rear main bearing cap (8b) over its studs. The rear face of the rear main cap was never a machined surface and can be quite uneven. Most main caps are very thick in this area and it will most likely be necessary to remove some material from this surface to allow the cap to fit over its studs. This can be done with a grinder, disk or belt sander, etc. You need to take off enough material so that you have between 0.010" to 0.015" between the main cap and the seal housing when the main cap is tightened down. Don't worry if you end up with a surface that is a bit uneven; the sealer which you will use in a later step will take care of this. (Figure 8)
- 12) When you have achieved the requisite gap between the main bearing cap and the seal housing, remove the crankshaft and both halves of the seal housing.
- 13) (Figure 9) Find the small tube of Permatex Ultra Black sealer included in the kit. Apply a thin coating of the sealer on the block (and gaskets if you made some).



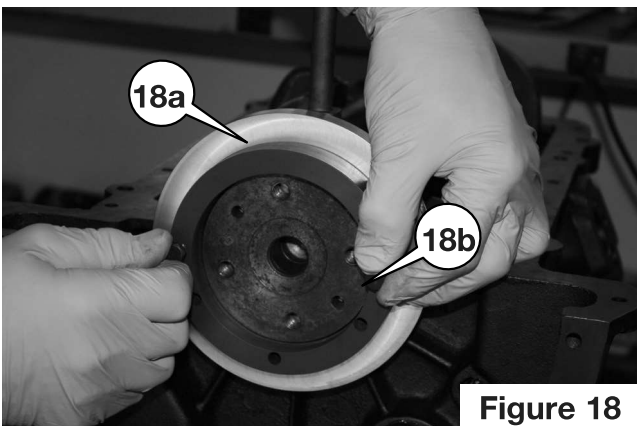
- 14) Attach the thick half of the seal housing to the block using the three button-head cap screws supplied in the kit. Tighten the screws, then loosen them just enough to allow the seal housing to move in any direction. If the housing is not free to move, the alignment tool will not work and the seal will not be centered.
- 15) After making sure there is still some lube on the main bearing surfaces, re-install the crankshaft and firmly tighten the main bearing caps but do not torque them yet.
- 16) Thoroughly clean the two semicircular grooves in the back (forward) surface of the thin half of the housing. These grooves must be clean – no oil or grease. (Figure 16)



- 17) Squeeze a small bead of the Permatex Ultra Black Sealer into the two semicircular grooves in the back (forward facing) surface of the thin half of the housing. These beads should protrude at least $\frac{1}{16}$ " above the surface. You are really making two half "O" rings. (Figure 17)

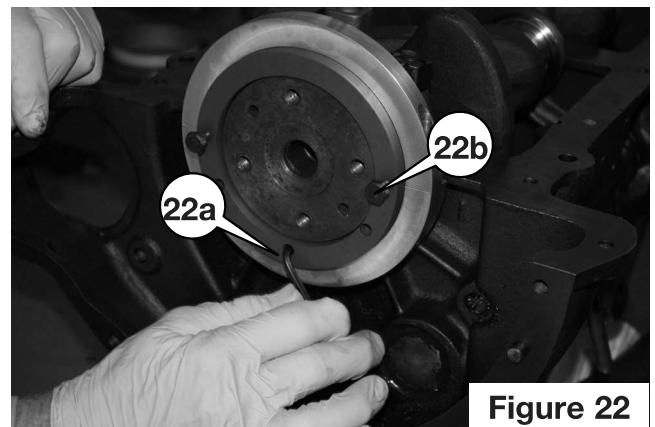


- 18) Now slide this half of the seal housing behind the crankshaft flange and up to the cap, being careful not to disturb the beads of sealer any more than necessary. (Figure 18)



- 19) Install and tighten the two Allen screws which join the two halves of the seal housing.

- 19) Inspect the seal housing alignment tool (18a) provided in the kit. You will see that it has two inside diameters. If you have fitted a Speedi-Sleeve to your crank flange, the larger diameter will go into the seal housing first. Otherwise, the smaller diameter will go into the seal housing first
- 20) To manipulate the alignment tool, you need something to hang onto. There are two threaded holes in the alignment tool that will accept two of the hex bolts which originally held the original pot-metal oil slinger on the block. Thread the bolts (18b, 22b) into the alignment tool from the side that is away from the seal housing. Grasp the bolt heads from the other three holes (13a) in the alignment tool with the heads of the button-head cap screws securing the seal housing.
- 21) Holding the two hex bolt heads (Figure 18b, 22b), carefully push the tool onto the flange and into the seal housing. This action will cause the seal housing to slide into position, perfectly centered on the crankshaft flange.
- 22) Insert the smaller Allen wrench through the three holes (22a) in the alignment tool and fully tighten the button-head cap screws to lock the seal housing in place. With the seal housing centered on the crankshaft flange, the seal will also be centered when it is fitted.



- 23) After allowing the sealer to set up for a minimum of six hours, undo the rear main bearing cap nuts and the two Allen screws securing the two halves of the new seal housing. Remove the alignment tool and carefully remove the main bearing cap with the housing half attached to it.
- 24) At this point it is necessary to drill a $\frac{3}{16}$ " hole through the web of the rear main cap to allow the oil that collects in the cavity around the new seal to drain into the trough in the main cap and back into the sump. Carefully drill directly through the $\frac{3}{16}$ " hole in the housing with a drill press or hand drill. (Figure 24)

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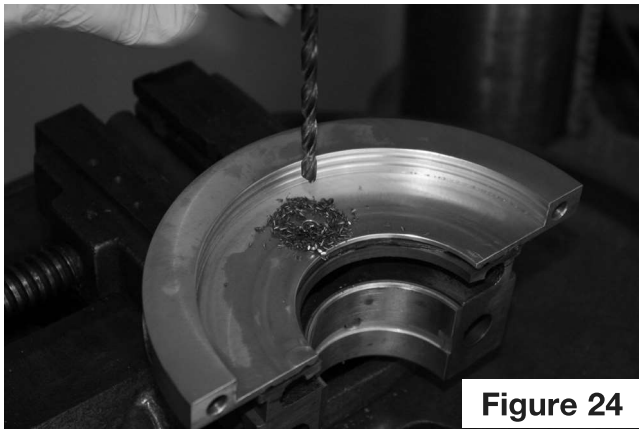


Figure 24

- 25) Make certain that the drilled hole goes through the web of the rear main cap into the trough in the main cap. Be sure to remove all drill chips. (If it is ever decided to no longer use the seal housing, the hole in the main cap can be plugged with JB Weld or a similar product.

PREPARING THE SEAL

- 1) If you fitted a Speedi-Sleeve to your flange, it is very likely that the very thin, very sharp edge of the sleeve will slice into the lip of the seal as you install it. To prevent this, cover only the rearmost edge of the Speedi-Sleeve with one layer of masking tape (Figure 1). Apply a light coating of engine oil onto the tape and crankshaft flange (or Speedi-Sleeve).

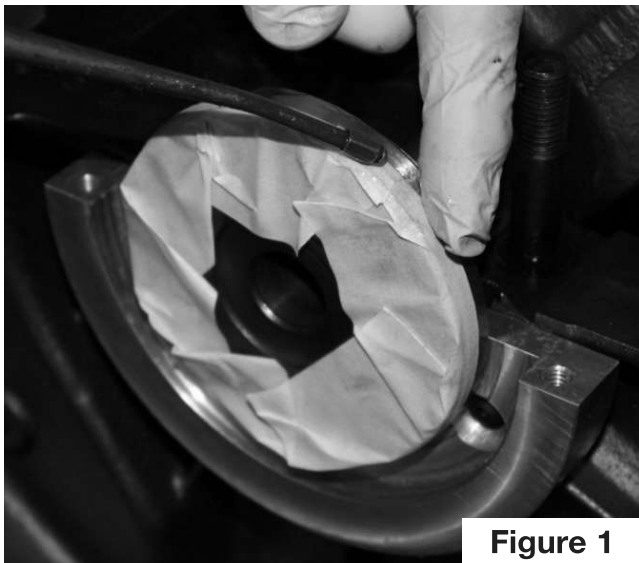


Figure 1

- 2) (Figure 2) Hold the seal with the lip (open part) of the seal facing forward (toward the engine). Carefully work the new oil seal over the Speedi-Sleeve or flange. When the seal is on the flange, make sure the rubber portion has not rolled back onto itself. Remove the masking tape (if used).

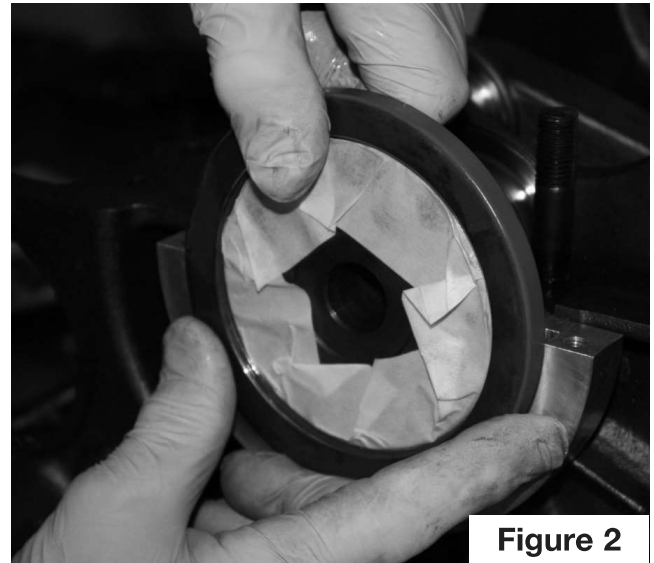


Figure 2

- 3) It is important to make sure the seal will seat properly on the crankshaft flange. There is a “step” machined into the seal housing that the seal must be pressed against. This “step” will position the seal so the lip will ride on the smooth surface of the crankshaft flange, or on the smooth surface of the Speedi-Sleeve
- 4) With a soft hammer tap around the lower half of the seal to make sure it is fully seated into the housing (4a). Inspect the visible portion of the rubber seal on the engine side and make sure it is nicely seated on the crankshaft flange or the Speedi-sleeve.

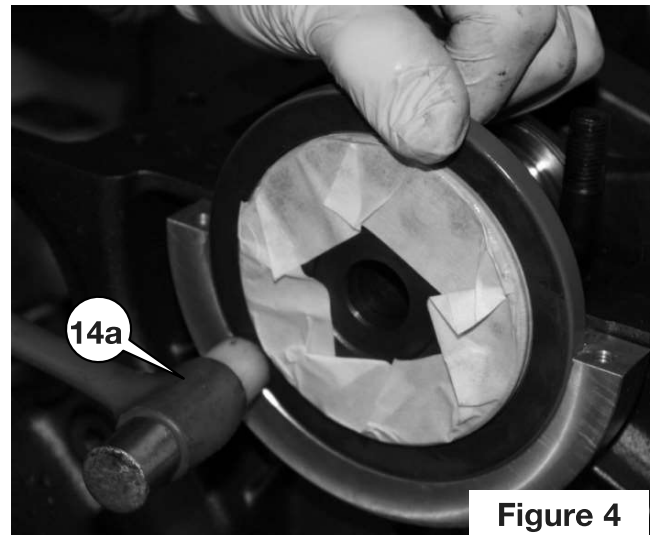


Figure 4

Note: If it has come off the front of the flange, you will need to go back to the Step 3 under “Preparing the Block”, to reposition the seal housing so it sets the seal firmly on the flange.

PREPARING THE FLYWHEEL

- 1) The surface of the flywheel which will mate with the rear surface of the crankshaft flange must be perfectly flat and smooth. There must not be any metal protruding around any of the six holes. This may be checked visually or with a razor blade, or a new blade for a utility knife. Any metal found protruding may be removed with a small grinder. (Figure 1)

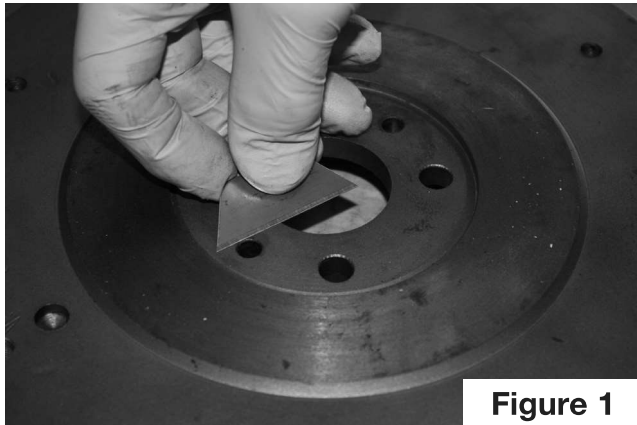


Figure 1

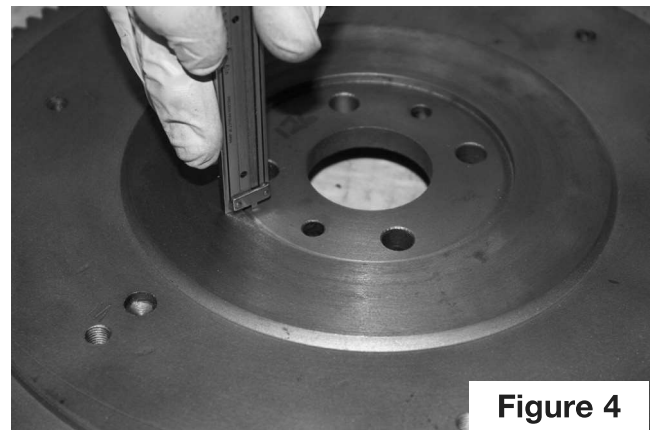


Figure 4

- 2) It is imperative to determine that both tapered pins will fit snugly in both the flywheel and the crankshaft. We now know that when these engines were originally assembled at the MG factory, both holes were reamed with a tapered reamer after the flywheel was installed. If you are using your original crankshaft, your taper pins will likely fit properly. However, replacement crankshafts have always been supplied with straight holes and, as the metal is too hard to be reamed, this presents a problem. One suggested method is to tap both pins into the flywheel and measure how far they protrude. Remove them from the flywheel and, with a file or belt sander, very carefully shape the protruding ends of the pins to the size of the holes in the crankshaft. (New taper pins are available from Moss-order one 325-328, a set of 2 pins)
- 3) The back of the flywheel is recessed so it overhangs the end of the crankshaft flange. On most flywheels, this overhang is 0.125" or more. This overhang brings the back of the flywheel very close to the new rear seal.
- 4) There must be at least a .015" gap between the seal and the back of the flywheel so it is necessary to have the back of the flywheel machined to leave a depth of .080" between the rear face and the surface which fits against the crank flange (Figure 4). Your local automotive machine shop will be able to do this when they re-surface the clutch face of the flywheel.

- 5) When this has been done, mount the flywheel on the crankshaft without using the dowel pins, insert and - one by one - tighten the four bolts. Note carefully whether each bolt protrudes through the crankshaft flange. If they do, they will hit the seal housing and so it is necessary to shorten them by grinding the ends so that they are flush with the back of the flange. Note: Original bolts are often stretched; you will see that the bolt near the head is narrower and the threads are wider apart than the rest. New bolts are essential if yours are at all questionable (Moss 321-108 is a set of 4 flywheel bolts).
- 6) The flywheel is now prepared so remove it for later installation.

FINAL ASSEMBLY

- 1) Remove the front and center main caps and lift out the crankshaft with the seal still in place and lay it on the bench. Be careful not to disturb the seal.
- 2) Apply a thin bead of Permatex Ultra Black sealer in the annular grooves in the seal housing half bolted to the block. (Figure 2) Next, lower the crankshaft and seal into place. Make sure the seal is still seating correctly on the flange. Pushing the seal forward hard against the step in the seal housing will keep the seal at 90 degrees to the axis of the crankshaft. Carefully eyeball the seal to be sure it is not misaligned.

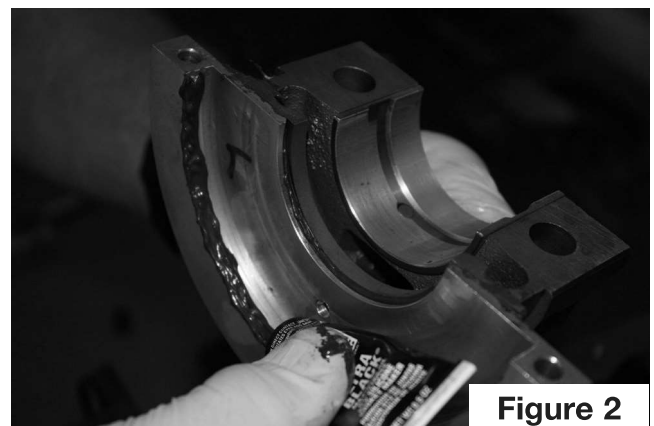


Figure 2

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- 3) Now install the front and center main bearing caps and tighten them firmly.
- 4) Apply a thin bead of Permatex Ultra Black sealer in the annular grooves in the seal housing half on the rear main cap and a very thin smear of sealer on the mating faces where the two halves of the seal housing bolt together. (Figure 4)

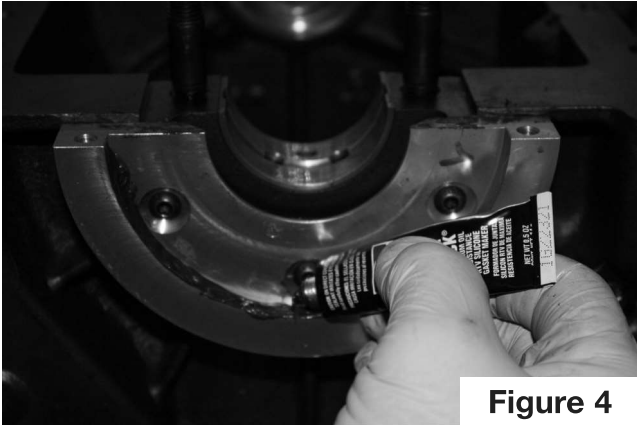


Figure 4

- 5) Install the rear main cap, making sure the seal is still at 90 degrees to the axis of the flange. Tighten the two nuts on the main cap and install the two Allen screws which join the two halves of the housing but do not fully tighten them.
- 6) Using the seal alignment tool and your soft hammer, tap against the seal to make sure it is fully seated against the step in the housing.
- 7) Remove the alignment tool and fully tighten the two Allen screws which join the two halves of the housing.
- 8) Torque the main bearing cap nuts. The Shop Manual says "62.5 ft. lbs or next split pin hole"; we have found that selective fitting of the nuts (swapping them from stud to stud) often enables the pin holes to line up more accurately, so do this before over-tightening the nuts.
- 9) Fit the flywheel to the crank flange. Install and hand-tighten the four flywheel bolts.
- 10) Carefully check the gap between the flywheel and the seal housing- there must be no contact!
- 11) Remove the flywheel bolts one at a time and smear a light coating of the black Permatex on the threads. Reinstall and hand-tighten the four flywheel bolts.
- 12) Put a smear of Permatex on each taper pin, insert them in their holes and drive them home firmly with a hammer.
- 13) Place a block of wood or a large soft hammer head between one of the crankshaft webs and the edge of the block to prevent the crank from rotating while you tighten the flywheel bolts. Now fully tighten the flywheel bolts and safety wire them in place. No torque spec is given for these bolts but they must be really tight.
- 14) This completes the installation of the Improved AL Moss Rear Main Seal Conversion Kit.

Although every effort has been made to ensure the accuracy and clarity of this information, any suggestions that you may have that will improve the information (especially detailed installation notes and photos) are welcome. These instructions were developed and written by Moss Technical Support. If you have any questions or difficulties with your installation of this product, telephone 800-667-7872 between 7:00 a.m. and 4:00 p.m., Pacific Time for assistance.

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