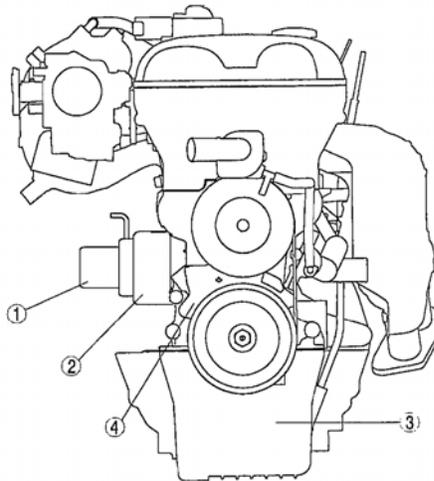


2005 ENGINE

Lubrication - MX-5 Miata

LUBRICATION SYSTEM LOCATION INDEX



1	Oil filter (See OIL FILTER REPLACEMENT.)
2	Oil cooler (See OIL COOLER REMOVAL/ INSTALLATION.)
3	Oil pan (See OIL PAN REMOVAL/INSTALLATION [BP].) (See OIL PAN REMOVAL/INSTALLATION [BP WITH TC].)

4	Oil pump (See OIL PUMP REMOVAL/ INSTALLATION.) (See OIL PUMP DISASSEMBLY/ ASSEMBLY.) (See OIL PUMP INSPECTION.)
---	--

G03637716

Fig. 1: Locating Lubrication System Components
Courtesy of MAZDA MOTORS CORP.

ENGINE OIL LEVEL INSPECTION

1. Position the vehicle on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for **5 min.**
4. Remove the dipstick and inspect oil level and condition.
5. Verify that the oil level is within the F and L marks on the dipstick.
 - Add or replace oil if necessary.

ENGINE OIL REPLACEMENT

2005 Mazda MX-5 Miata

2005 ENGINE Lubrication - MX-5 Miata

WARNING:

- Hot engines and the engine oil can cause severe burn. Do not burn yourself with either.
- A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.
- Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.

1. Position the vehicle on level ground.
2. Remove the oil filler cap and the oil pan drain plug.
3. Drain the oil into a container.
4. Install the drain plug with new washer.

Tightening torque

30-41 N.m {3.0-4.2 kgf.m, 22-30 ft.lbf}

5. Add the engine with the specified type and amount of engine oil.

NOTE:

- The actual oil level may vary from the specified capacity in some cases.

Oil capacity	L {US qt.Imp qt}
Item	Specification
Oil replacement	3.6 {3.8, 3.2}
Oil and oil filter replacement	3.8 {4.0, 3.3}
Total (dry engine)	4.0 {4.2, 3.5}

Engine oil specification

2005 Mazda MX-5 Miata

2005 ENGINE Lubrication - MX-5 Miata

Item	U.S.A. and CANADA	Except U.S.A. and CANADA
Engine oil grade	 (ILSAC)	  API SL or ILSAC
Engine oil viscosity	5W-20	

G03637717

Fig. 2: Engine Oil Specification Chart
Courtesy of MAZDA MOTORS CORP.

6. Install the oil filler cap.
7. Run the engine and inspect for oil leakage.
8. Inspect the oil level.
 - Add oil if necessary. (See **ENGINE OIL LEVEL INSPECTION**.)

OIL FILTER REPLACEMENT

WARNING:

- Remove and install all parts when the engine is cold, otherwise they can cause severe burns or serious injury.
- A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.
- Continuous exposure to used engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.

CAUTION:

- In case you spill engine oil on the exhaust system, wipe it off completely. If you fail to wipe the spilled engine oil, it will produce fumes because of the heat.

1. Remove the oil filter using the SST.

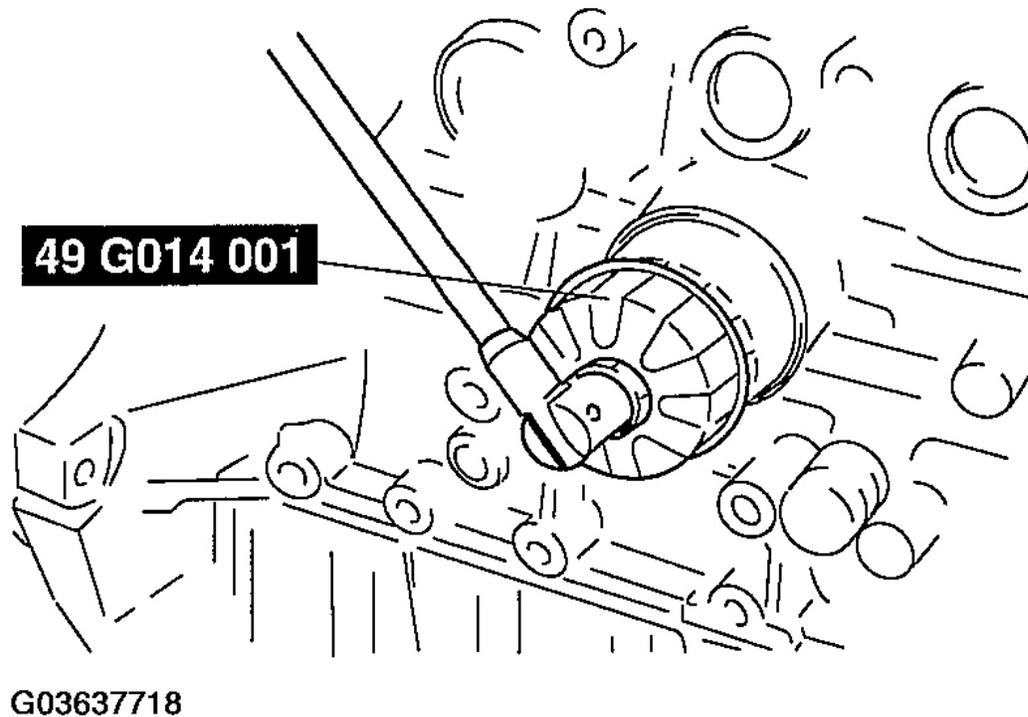


Fig. 3: Removing Oil Filter Using SST
Courtesy of MAZDA MOTORS CORP.

2. Use a clean rag to wipe off the mounting surface on the oil filter body.
3. Apply clean engine oil to the O-ring of the oil filter.
4. Tighten the oil filter 1 and 1/6 turns using the SST.

Tightening torque:

11.7-15.7 N.m {1.2-1.6 kgf.m, 8.7-11.5 ft.lbf}

5. Start the engine and inspect for oil leakage.
6. Inspect the oil level.
 - Add oil if necessary. (See **ENGINE OIL LEVEL INSPECTION**.)

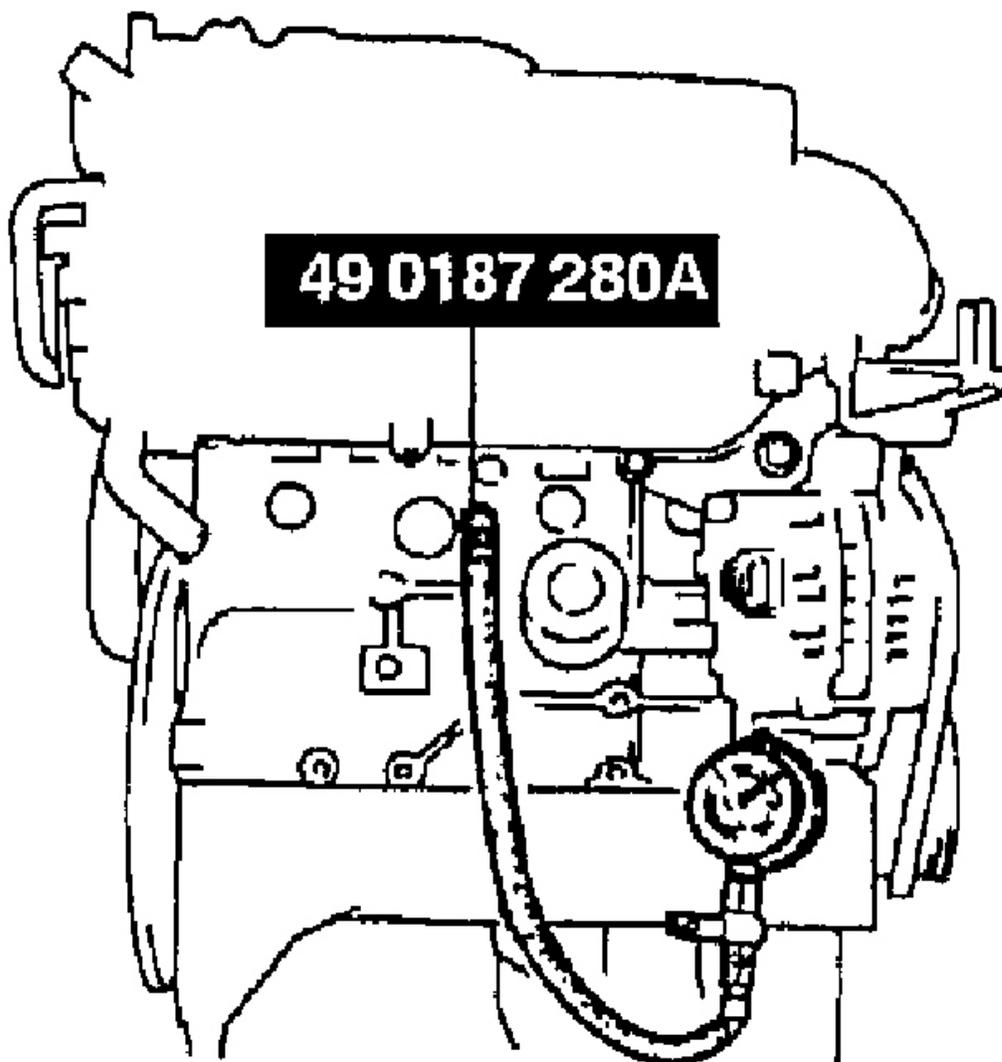
OIL PRESSURE INSPECTION

WARNING:

- Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.

- Hot engines and engine oil are hot, they can cause burns. Turn off the engine and wait until it and engine oil have cooled.

1. Remove the oil pressure switch.
2. Screw the **SST** into the oil pressure switch installation hole.



G03637719

Fig. 4: Screwing SST Into Oil Pressure Switch Installation Hole
Courtesy of MAZDA MOTORS CORP.

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2005 ENGINE Lubrication - MX-5 Miata

3. Warm up the engine to normal operating temperature.
4. Run the engine at the specified speed, and note the gauge readings.
 - If the pressure is not within the specification, inspect amount of engine oil, and inspect for oil leakage or any wear parts inside of engine and so on. Repair or replace if necessary.

NOTE: • **The oil pressure can vary with oil viscosity and temperature.**

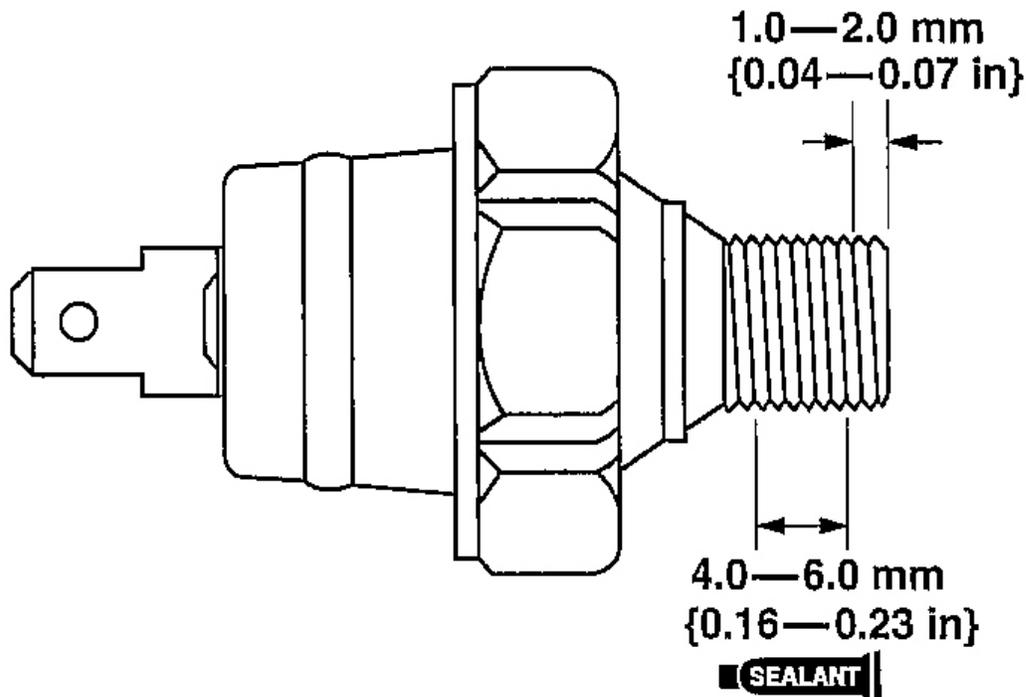
Oil pressure (approx. quantity)

295-392 kPa {3.0-4.0 kgf/cm², 43-56 psi} [3,000 RPM]

5. Stop the engine and wait until it is cool.
6. Remove the SST.

CAUTION: • **Do not apply liquid gasket to the tip of the oil pressure switch by 1.0-2.0 mm {0.4-0.7 in}.**

7. Apply silicone sealant to the oil pressure switch threads as shown in the figure.



G03637720

Fig. 5: Applying Silicone Sealant To Oil Pressure Switch Threads & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

8. Install the oil pressure switch.

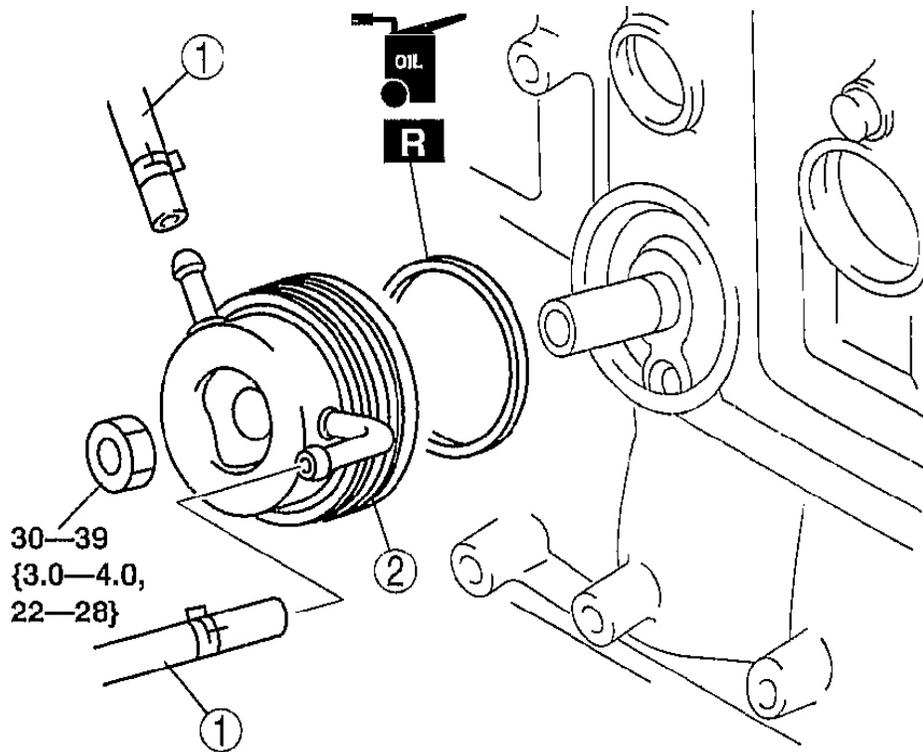
Tightening torque

12-17 N.m {1.2-1.8 kgf.m, 9-13 ft.lbf}

9. Start the engine and inspect for oil leakage.

OIL COOLER REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See **ENGINE COOLANT REPLACEMENT** .)
3. Remove the intake manifold bracket.
4. Remove the oil filter. (See **OIL FILTER REPLACEMENT**.)
5. Remove in the order indicated in the table.



30—39
{3.0—4.0,
22—28}

N·m {kgf·m, ft·lbf}

1	Water hose
2	Oil cooler

G03637721

Fig. 6: Removing Oil Cooler & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

6. Install in the reverse order of removal.
7. Inspect the engine oil level. (See **ENGINE OIL LEVEL INSPECTION.**)
8. Start the engine and inspect for engine oil leakage.

OIL PAN REMOVAL/INSTALLATION [BP]

1. Disconnect the negative battery cable.

2005 Mazda MX-5 Miata

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2. Remove the air cleaner component. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP] .)

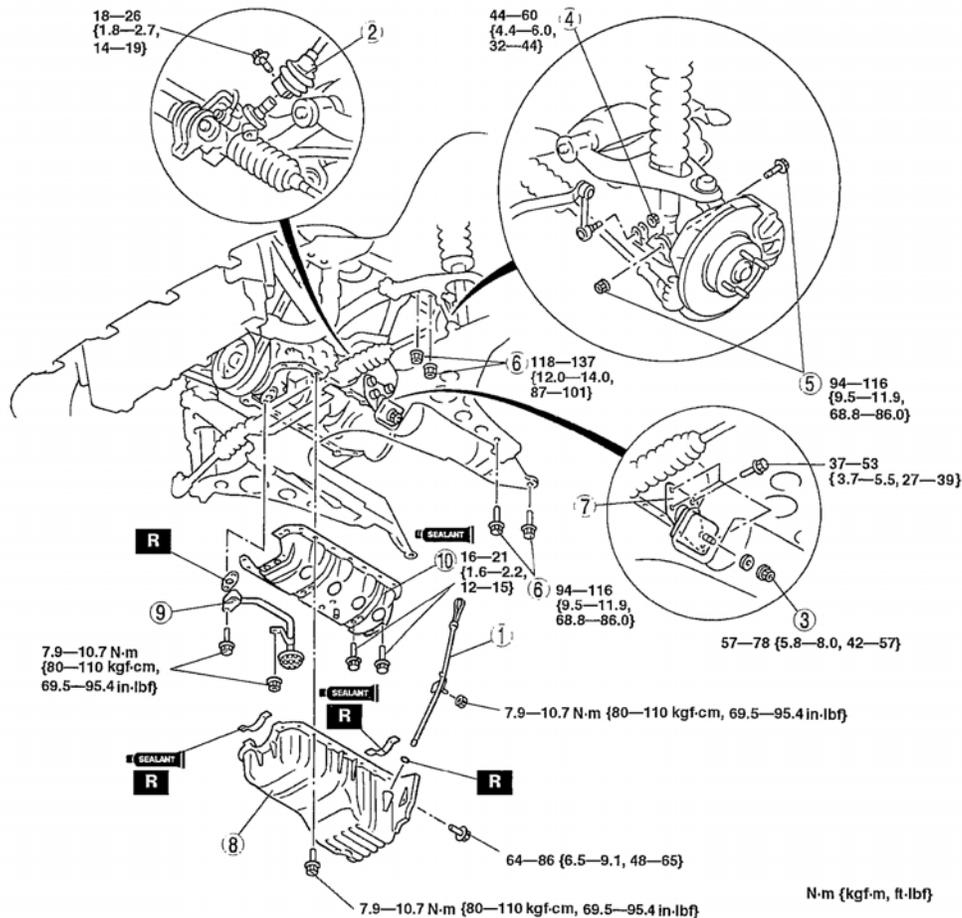
CAUTION:

- Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.

3. Remove the ABS wheel-speed sensor.
4. Drain the engine oil. (See ENGINE OIL REPLACEMENT.)
5. Remove in the order indicated in the table.

2005 Mazda MX-5 Miata

2005 ENGINE Lubrication - MX-5 Miata



1	Dipstick and pipe
2	Intermediate shaft
3	Engine mount nut (See Engine Mount Nut Removal Note.)
4	Stabilizer control link nut
5	Shock absorber bolt and nut
6	Crossmember bolt and nut (See Crossmember Bolt and Nut Removal Note.)

7	Engine mount (See Engine Mount Removal Note.)
8	Oil pan (See Oil Pan Removal Note.) (See Oil Pan Installation Note.)
9	Oil strainer
10	Main bearing support plate (See Main Bearing Support Plate Removal Note.) (See Main Bearing Support Plate Installation Note.)

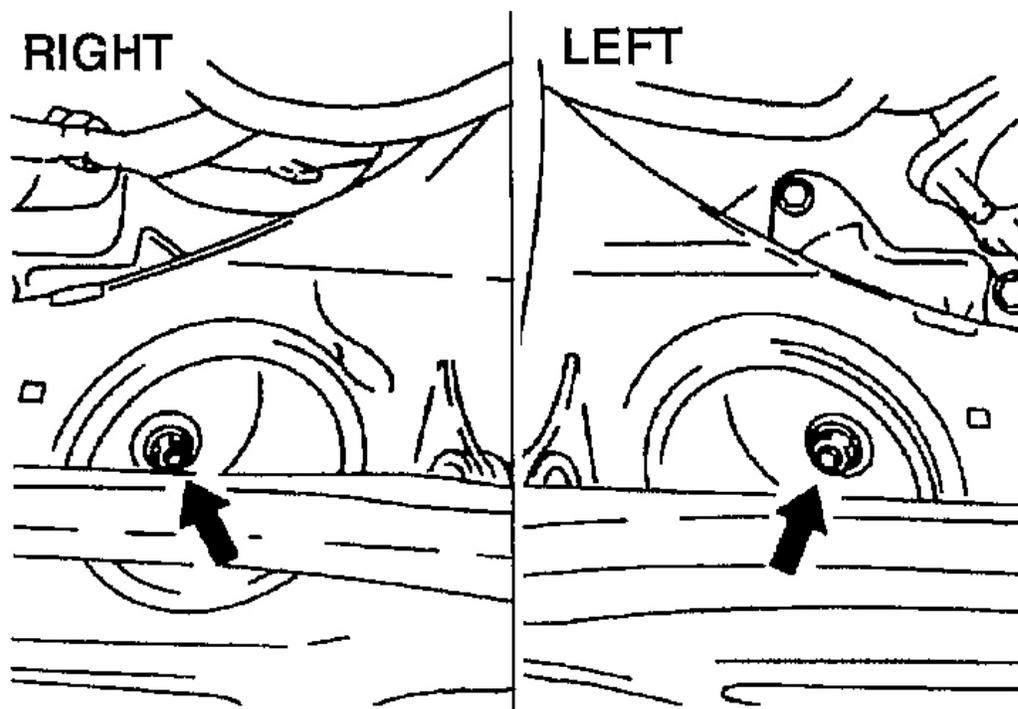
G03637722

Fig. 7: Exploded View Of Oil Pan & Torque Specifications
 Courtesy of MAZDA MOTORS CORP.

6. Install in the reverse order of removal.

ENGINE MOUNT NUT REMOVAL NOTE

1. Loosen the oil pan mounting bolts.
2. Remove the engine mounting nuts.



G03637723

Fig. 8: Removing Engine Mounting Nuts
Courtesy of MAZDA MOTORS CORP.

3. Lift the engine slightly using a hoist.

CROSSMEMBER BOLT AND NUT REMOVAL NOTE

1. Support the crossmember using a transmission jack.
2. Remove the crossmember bolts and nuts.

CAUTION:

- Do not damage the brake hoses, A/C pipes and P/S pipes when lowering the crossmember.

NOTE:

- Lower the crossmember after separating the steering intermediate shaft from the pinion shaft.

3. Lower the crossmember until the clearance between the oil pan and the steering gear housing exceeds approx.130 mm {5.12 in}.

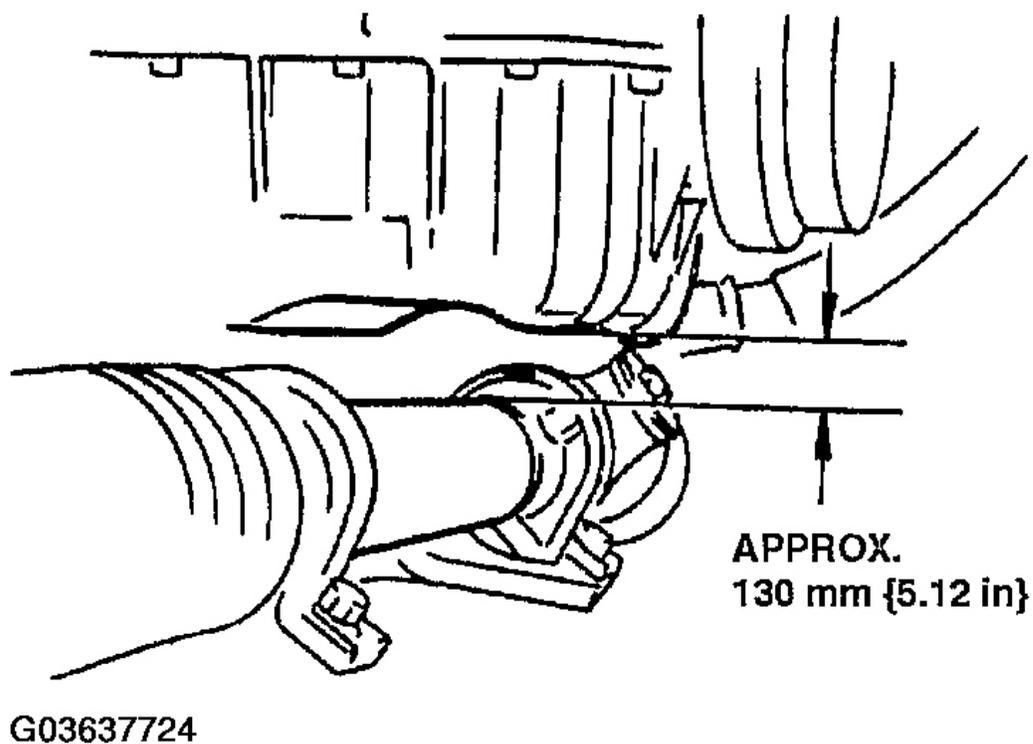


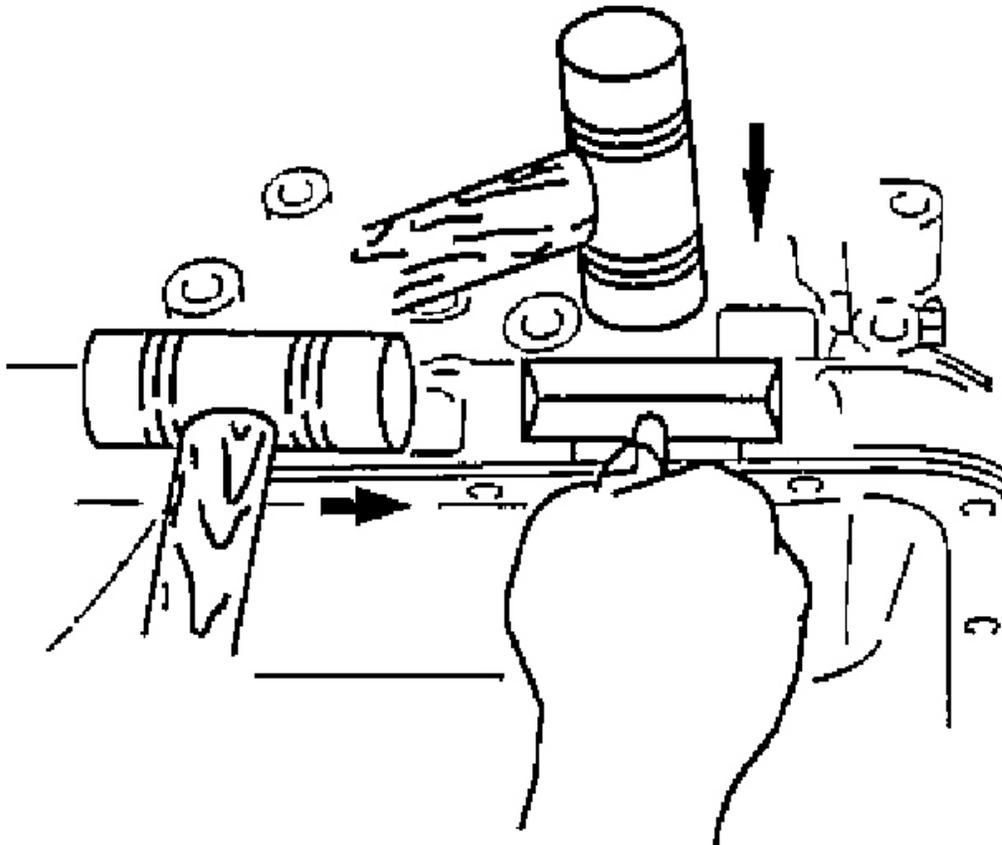
Fig. 9: Measuring Clearance Between Oil Pan And Steering Gear Housing
Courtesy of MAZDA MOTORS CORP.

ENGINE MOUNT REMOVAL NOTE

1. Hang the engine with chain block or the like to lift up.
2. Remove the engine mount.

OIL PAN REMOVAL NOTE

1. Remove the oil pan mounting bolts.
2. Disconnect the cylinder block and oil pan using an oil pan seal cutter.



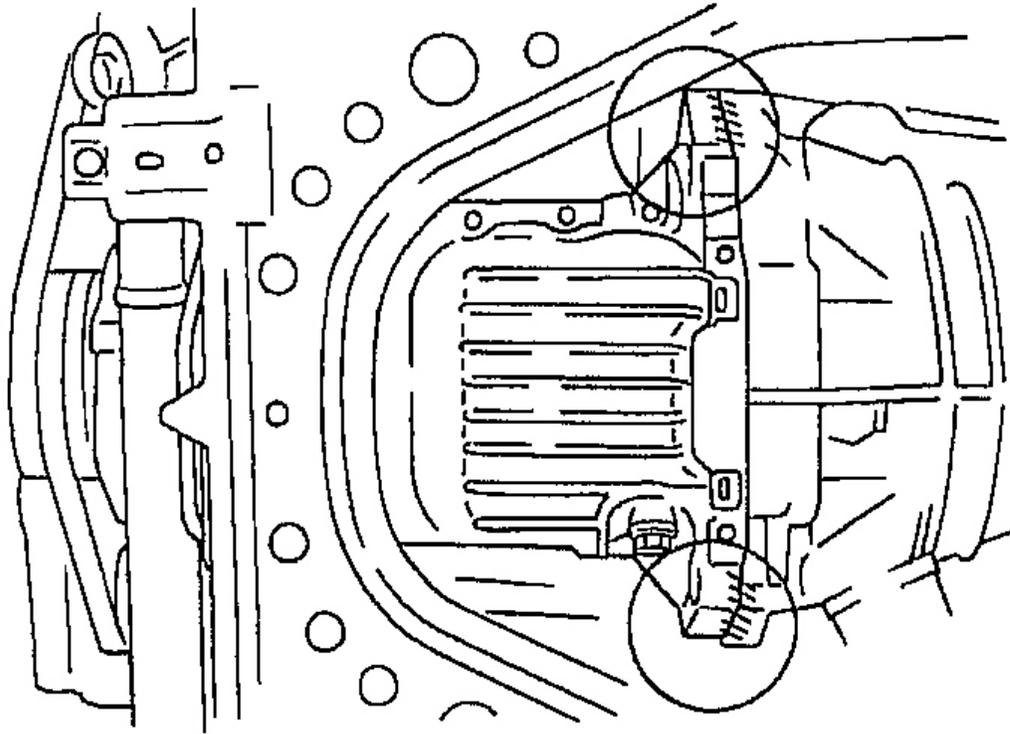
G03637725

Fig. 10: Disconnecting Cylinder Block And Oil Pan Using Oil Pan Seal Cutter
Courtesy of MAZDA MOTORS CORP.

CAUTION:

- Do not insert the flathead screwdriver or the like into the mating surface between the cylinder block and oil pan.

3. Remove the oil pan by inserting the flathead screwdriver into the part shown in the figure.

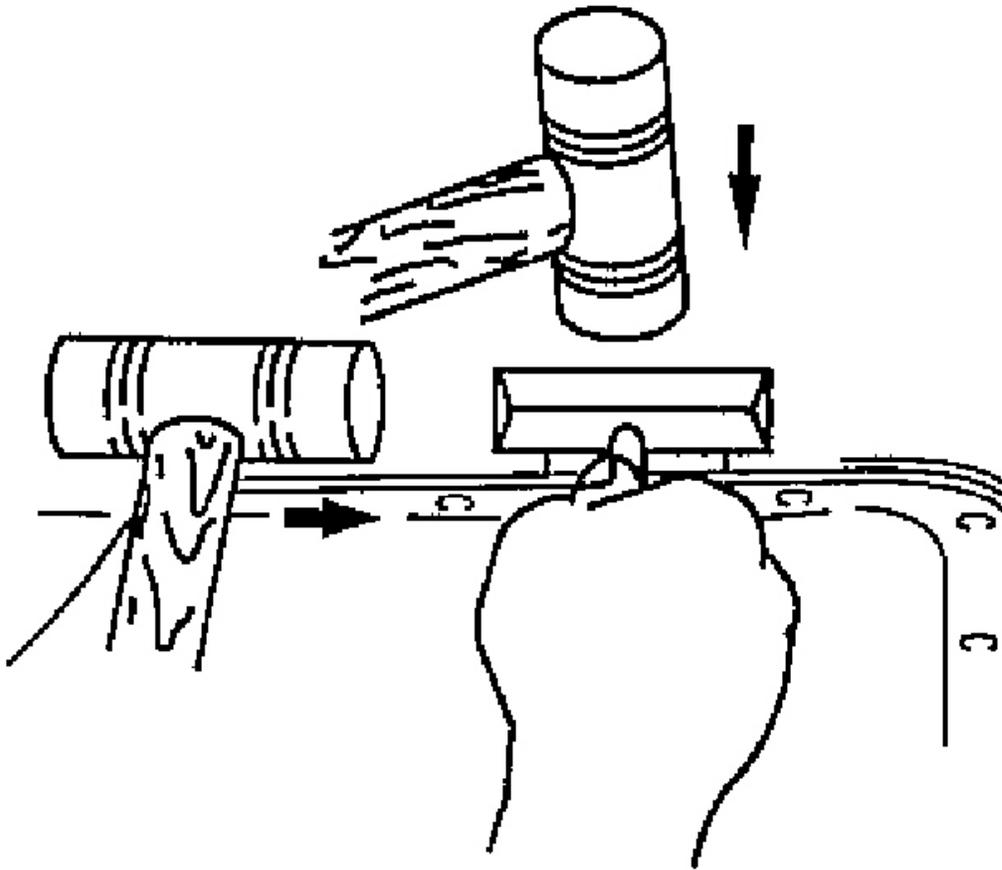


G03637726

Fig. 11: Removing Oil Pan By Inserting Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

MAIN BEARING SUPPORT PLATE REMOVAL NOTE

1. Remove the main bearing support plate using an oil pan seal cutter.

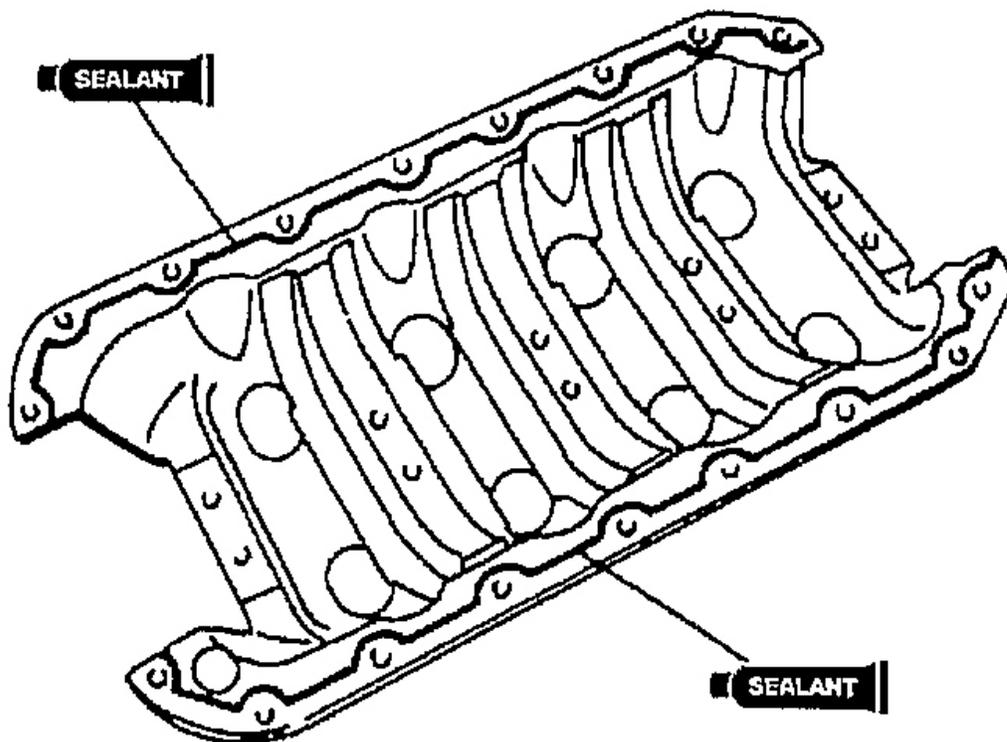


G03637727

Fig. 12: Removing Main Bearing Support Plate Using Oil Pan Seal Cutter
Courtesy of MAZDA MOTORS CORP.

MAIN BEARING SUPPORT PLATE INSTALLATION NOTE

1. Apply liquid gasket of SH780 or TB1207B to main bearing support plate ceaselessly as shown in the figure.



G03637728

Fig. 13: Applying Liquid Gasket To Main Bearing Support Plate
Courtesy of MAZDA MOTORS CORP.

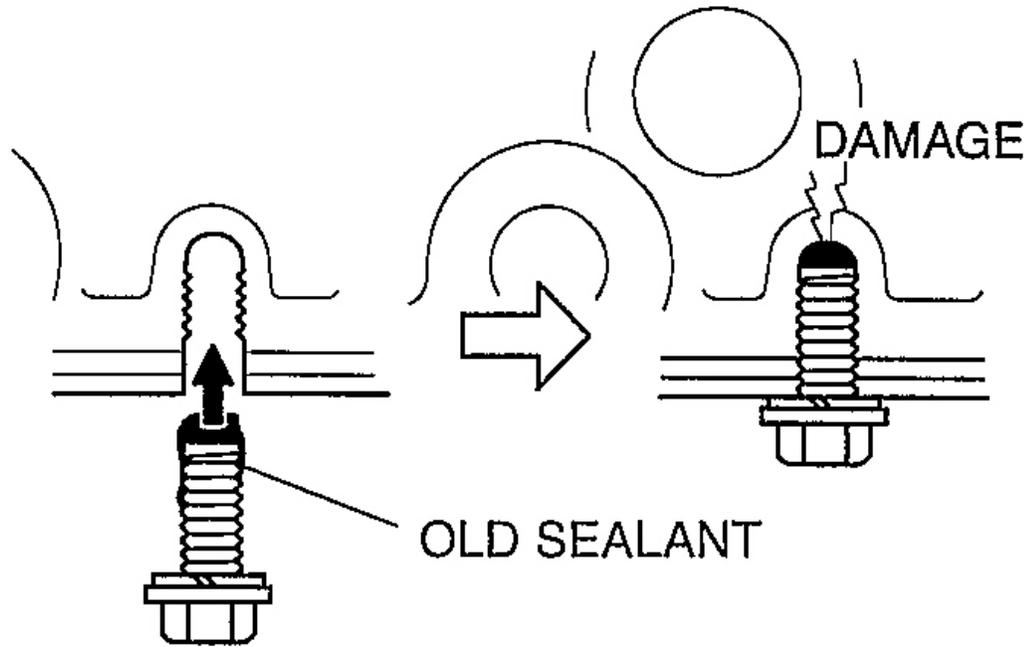
Thickness

THETA 2.5-3.5 mm {0.099-0.137 in}

OIL PAN INSTALLATION NOTE

CAUTION:

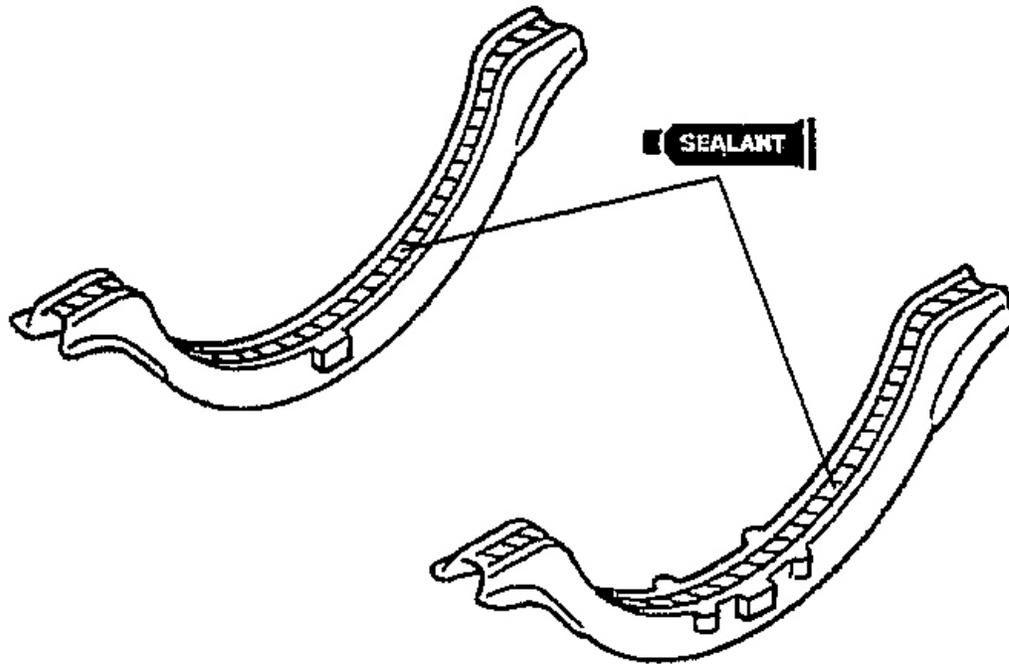
- If the bolts are reused, remove the old sealant from the bolt threads. Tightening a bolt that has old sealant on it can cause thread damage.



G03637729

Fig. 14: Removing Old Sealant From Bolt Threads
Courtesy of MAZDA MOTORS CORP.

1. Apply silicone sealant to the contact surfaces of new oil pan gaskets as shown in the figure.



G03637730

Fig. 15: Applying Silicone Sealant To Contact Surfaces Of Oil Pan Gaskets
Courtesy of MAZDA MOTORS CORP.

2. Install new gaskets onto the oil pump body and the rear cover facing the notches as shown in the figure.

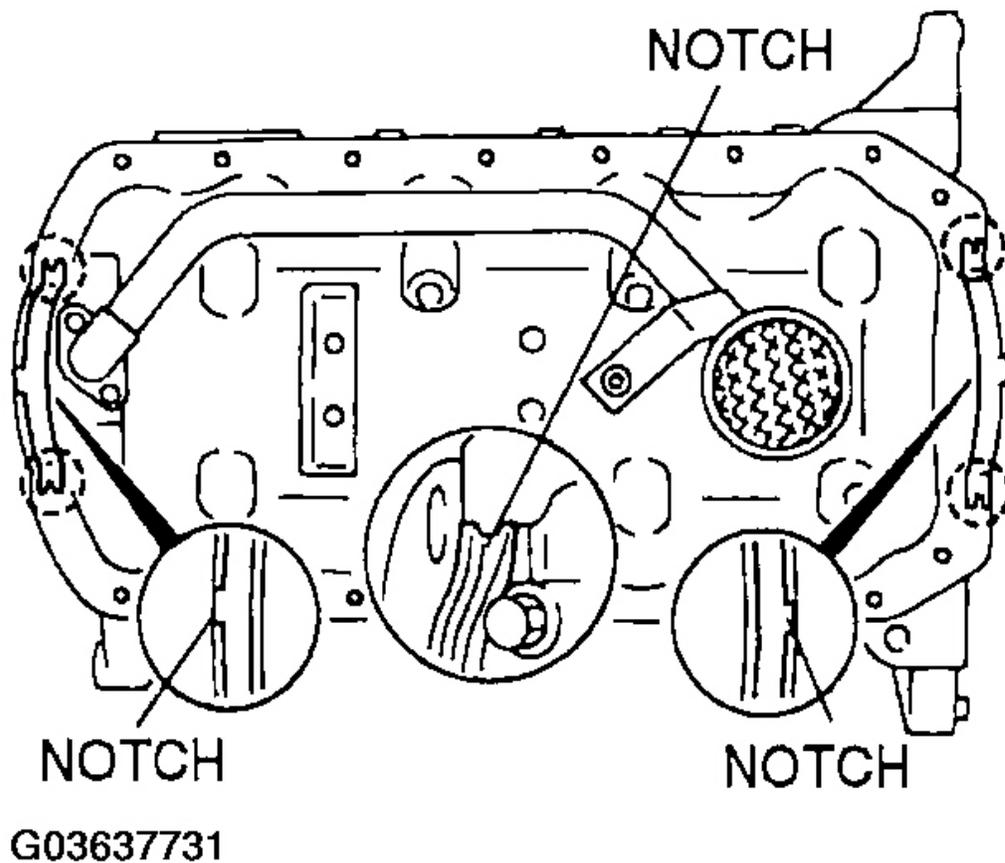
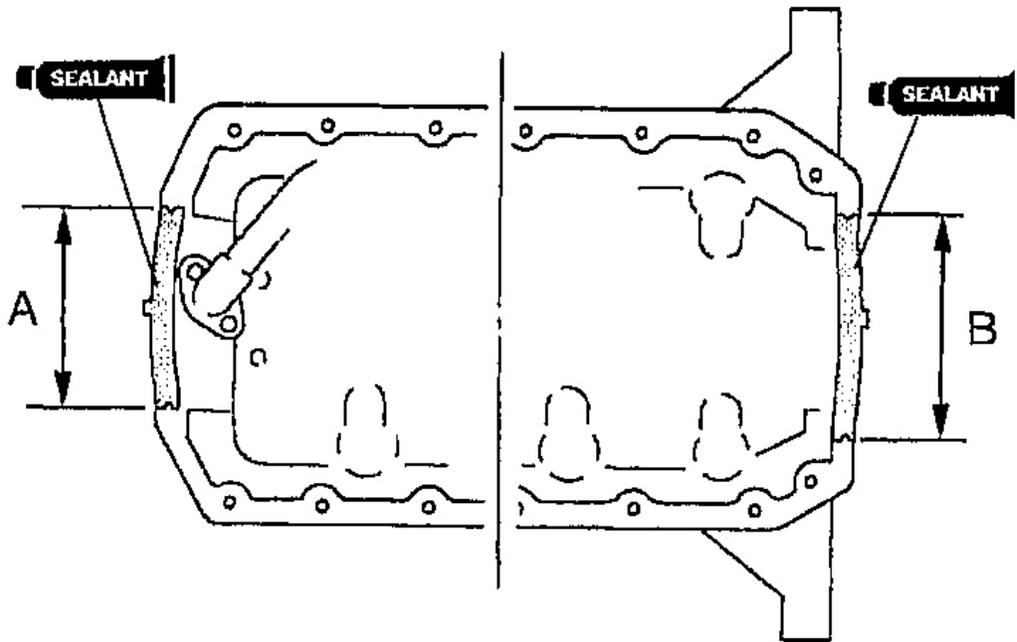


Fig. 16: Installing Gaskets Onto Oil Pump Body
Courtesy of MAZDA MOTORS CORP.

3. Apply silicone sealant onto the area of oil pan gasket indicated by A and B.



G03637732

Fig. 17: Applying Silicone Sealant Onto Area Of Oil Pan Gasket
Courtesy of MAZDA MOTORS CORP.

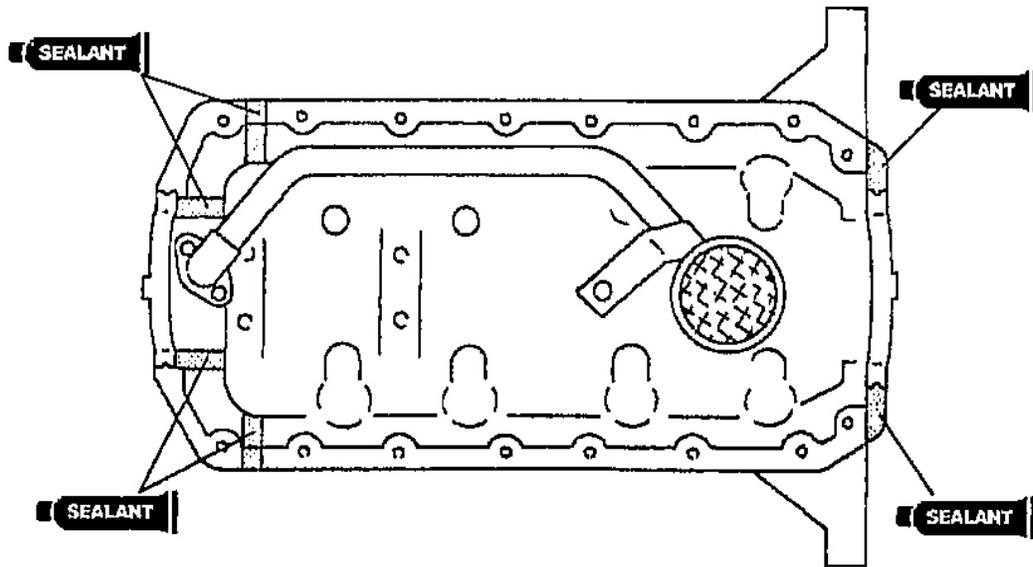
Thickness

THETA 2.0 mm {0.079 in}

4. Apply silicone sealant to the shaded areas as shown in the figure.

2005 Mazda MX-5 Miata

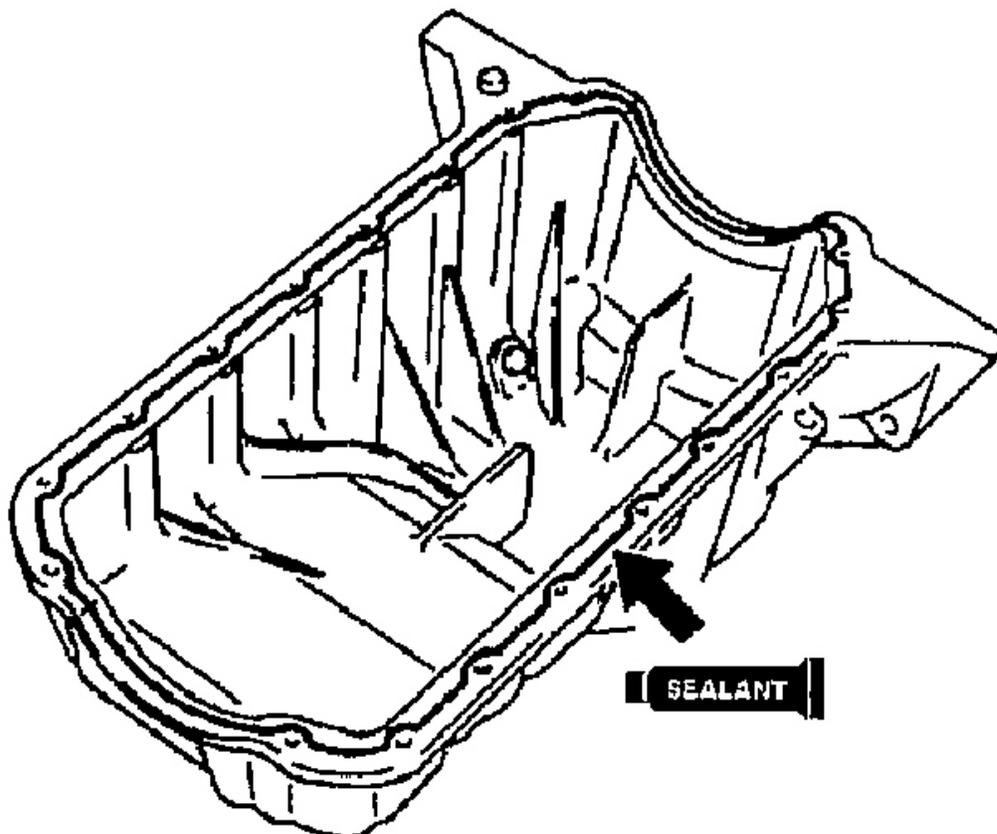
2005 ENGINE Lubrication - MX-5 Miata



G03637733

Fig. 18: Applying Silicone Sealant To Shaded Areas
Courtesy of MAZDA MOTORS CORP.

5. Apply silicone sealant to the oil pan along the inside of the bolt holes and overlap the ends.



G03637734

Fig. 19: Applying Silicone Sealant To Oil Pan Bolt Holes
Courtesy of MAZDA MOTORS CORP.

Thickness

THETA 2.5-3.5 mm {0.099-0.137 in}

OIL PAN REMOVAL/INSTALLATION [BP WITH TC]

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP WITH TC] .)

CAUTION: • Performing the following procedures without first removing the

2005 Mazda MX-5 Miata

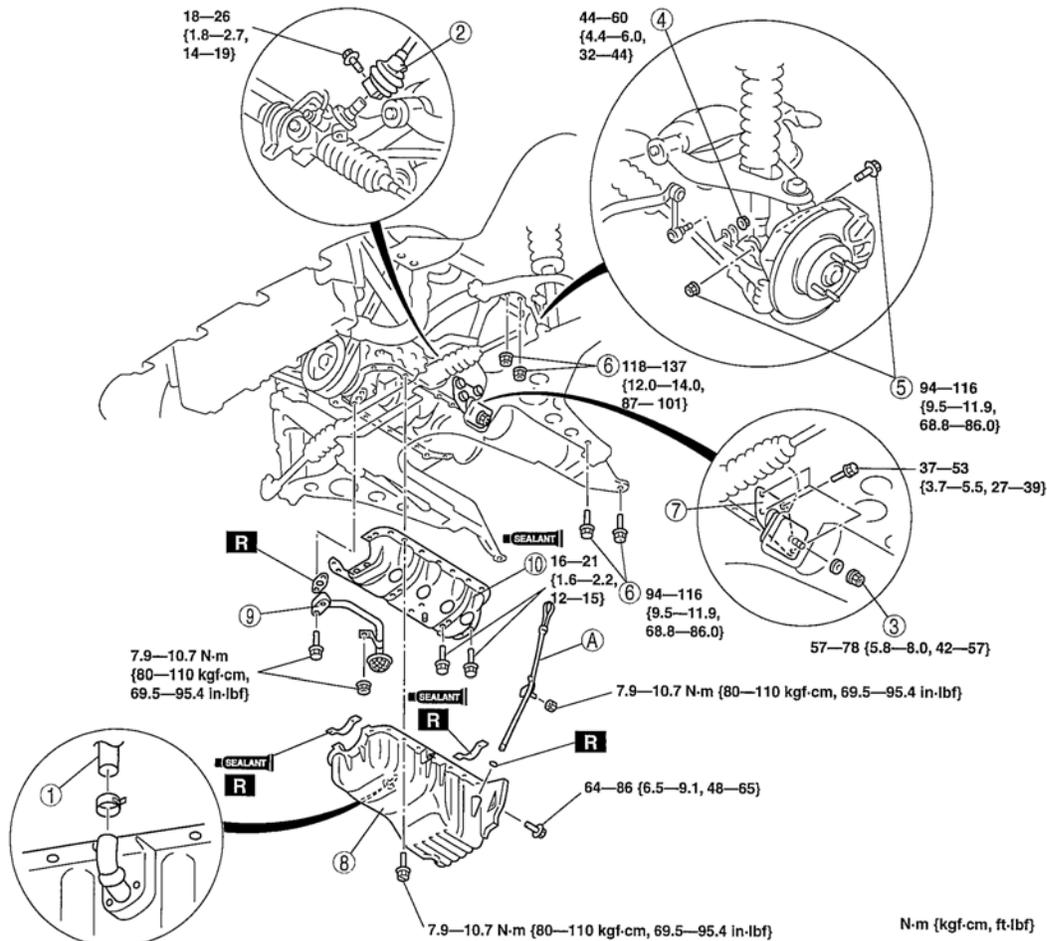
2005 ENGINE Lubrication - MX-5 Miata

ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.

3. Remove the dipstick and pipe A.
4. Remove the exhaust manifold component. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [BP WITH TC]** .)
5. Remove the ABS wheel-speed sensor.
6. Drain the engine oil. (See **ENGINE OIL REPLACEMENT.**)
7. Remove in the order indicated in the table.

2005 Mazda MX-5 Miata

2005 ENGINE Lubrication - MX-5 Miata



1	Joint hose
2	Intermediate shaft
3	Engine mount nut (See Engine Mount Nut Removal Note.)
4	Stabilizer control link nut
5	Shock absorber bolt and nut
6	Crossmember bolt and nut (See Crossmember Bolt and Nut Removal Note.)

7	Engine mount (See Engine Removal Note.) (See Engine Mount Removal Note.)
8	Oil pan (See Oil Pan Removal Note.) (See Oil Pan Installation Note.)
9	Oil strainer
10	Main bearing support plate (See Main Bearing Support Plate Removal Note.) (See Main Bearing Support Plate Installation Note.)

G03637735

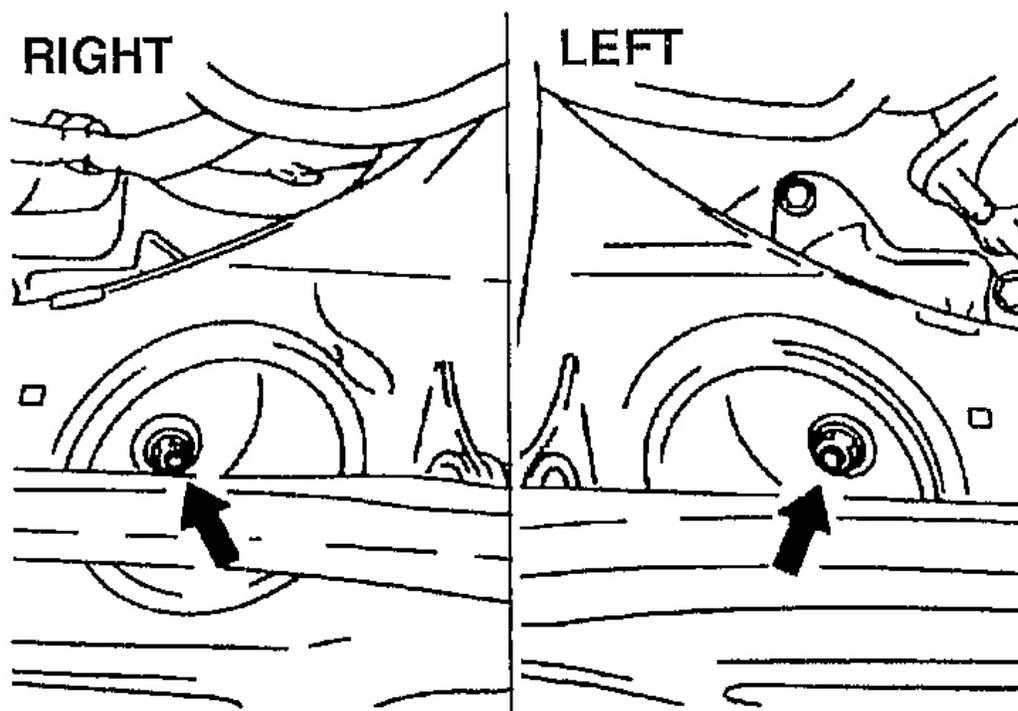
Fig. 20: Exploded View Of Oil Pan [BP With TC] & Torque Specifications
 Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.

ENGINE MOUNT NUT REMOVAL NOTE

1. Loosen the oil pan mounting bolts.

2. Remove the engine mounting nuts.



G03637736

Fig. 21: Removing Engine Mounting Nuts
Courtesy of MAZDA MOTORS CORP.

3. Lift the engine slightly using a hoist.

CROSSMEMBER BOLT AND NUT REMOVAL NOTE

1. Support the crossmember using a transmission jack.
2. Remove the crossmember bolts and nuts.

CAUTION:

- Do not damage the brake hoses, A/C pipes and P/S pipes when lowering the crossmember.

NOTE:

- Lower the crossmember after separating the steering intermediate shaft from the pinion shaft.

3. Lower the crossmember until the clearance between the oil pan and the steering gear housing exceeds **approx.130 mm {5.12 in}**.

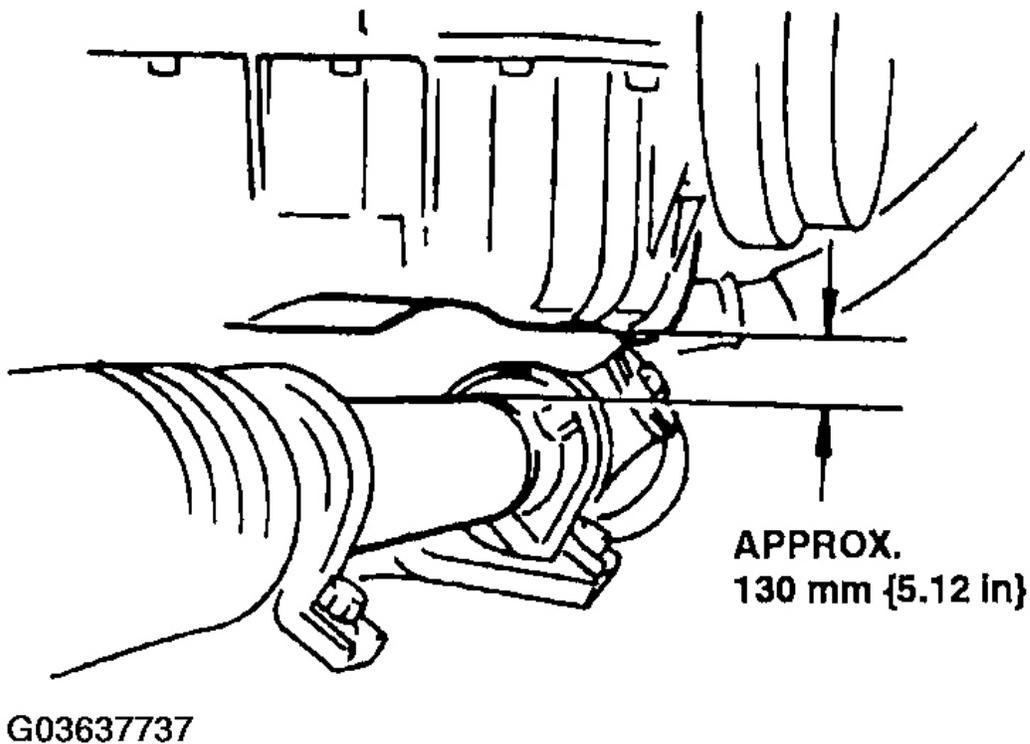


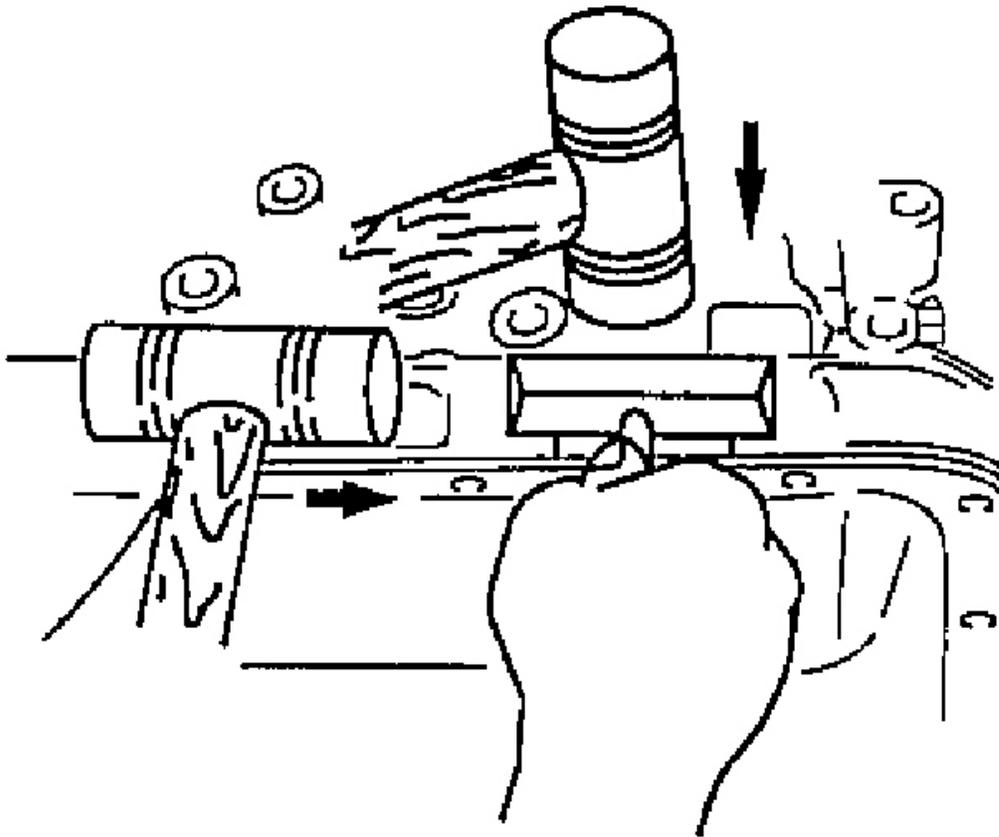
Fig. 22: Measuring Clearance Between Oil Pan And Steering Gear Housing
Courtesy of MAZDA MOTORS CORP.

ENGINE MOUNT REMOVAL NOTE

1. Hang the engine with chain block or the like to lift up.
2. Remove the engine mount.

OIL PAN REMOVAL NOTE

1. Remove the oil pan mounting bolts.
2. Disconnect the cylinder block and oil pan using an oil pan seal cutter.



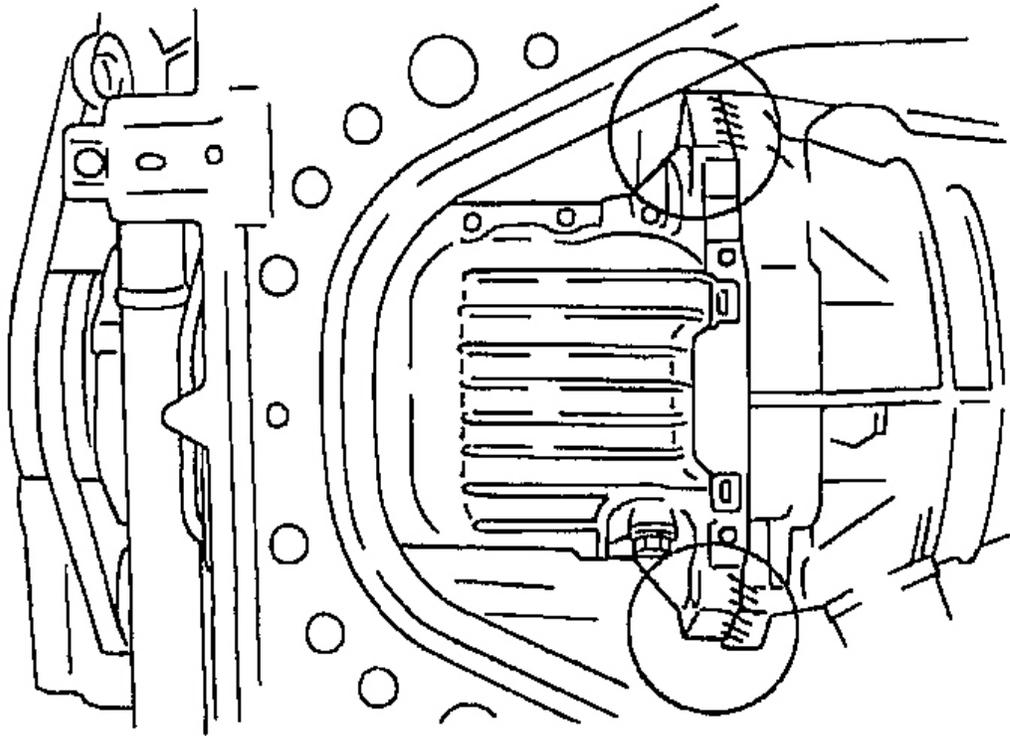
G03637738

Fig. 23: Disconnecting Cylinder Block And Oil Pan Using Oil Pan Seal Cutter
Courtesy of MAZDA MOTORS CORP.

CAUTION:

- Do not insert the flathead screwdriver or the like into the mating surface between the cylinder block and oil pan.

3. Remove the oil pan by inserting the flathead screwdriver into the part shown in the figure.

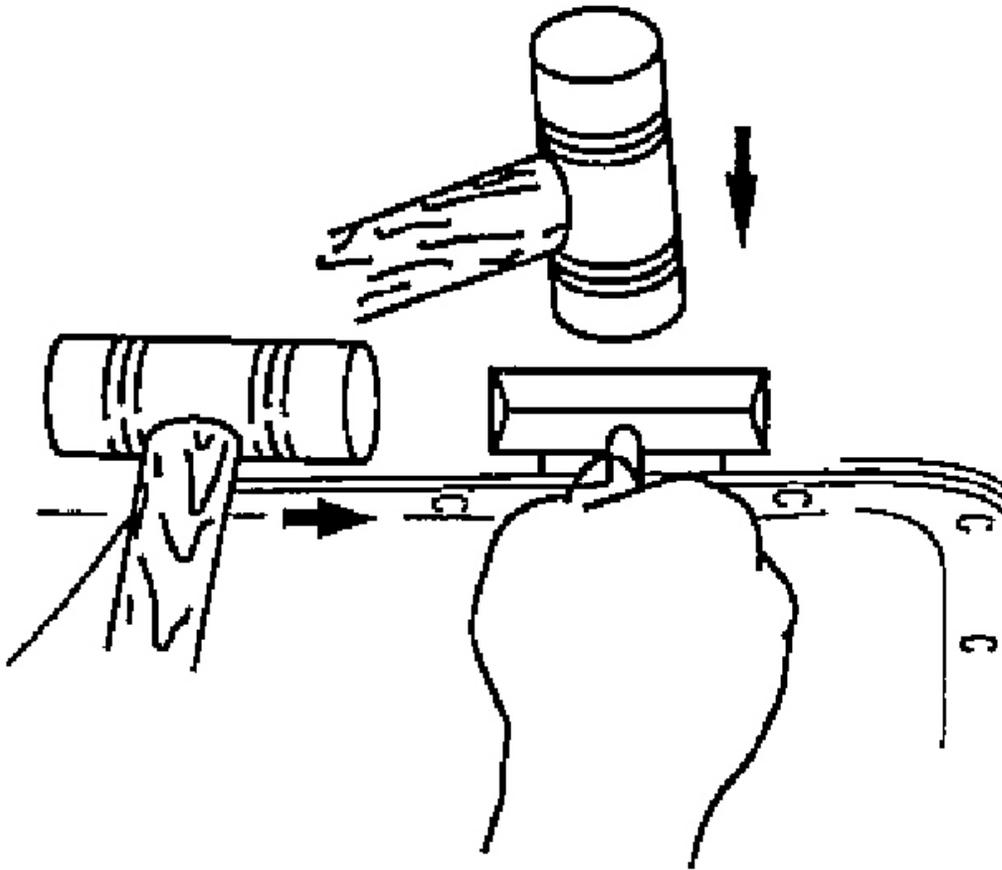


G03637739

Fig. 24: Removing Oil Pan By Inserting Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

MAIN BEARING SUPPORT PLATE REMOVAL NOTE

1. Remove the main bearing support plate using an oil pan seal cutter.

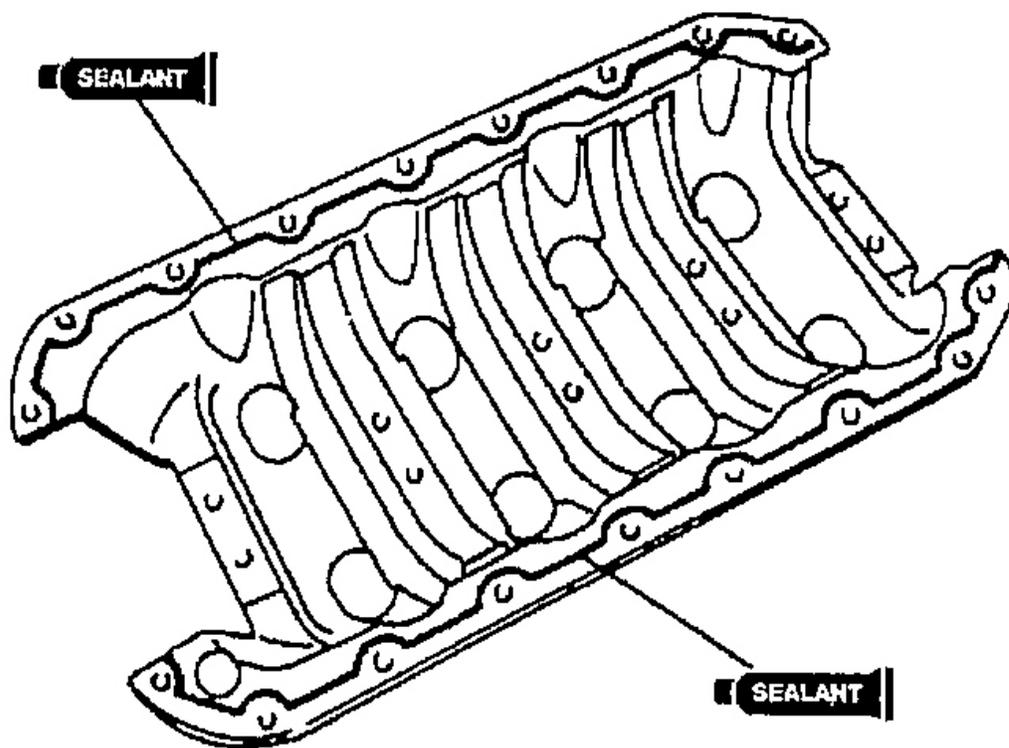


G03637740

Fig. 25: Removing Main Bearing Support Plate Using An Oil Pan Seal Cutter
Courtesy of MAZDA MOTORS CORP.

MAIN BEARING SUPPORT PLATE INSTALLATION NOTE

1. Apply liquid gasket of SH780 or TB1207B to main bearing support plate ceaselessly as shown in the figure.



G03637741

Fig. 26: Applying Liquid Gasket To Main Bearing Support Plate
Courtesy of MAZDA MOTORS CORP.

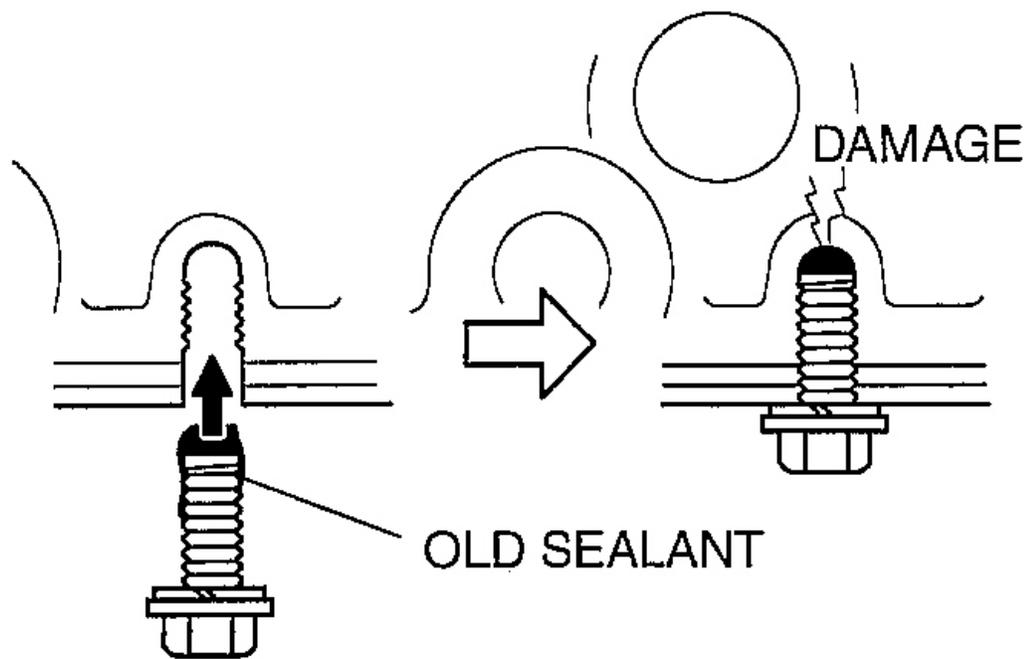
Thickness

THETA 2.5-3.5 mm {0.099-0.137 in}

OIL PAN INSTALLATION NOTE

CAUTION:

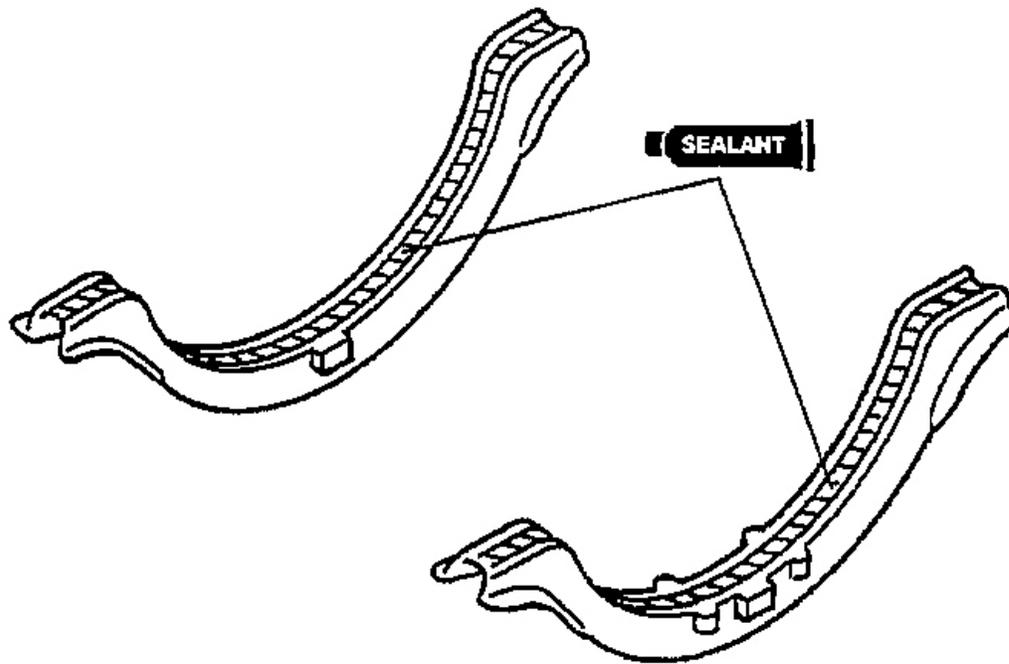
- If the bolts are reused, remove the old sealant from the bolt threads. Tightening a bolt that has old sealant on it can cause thread damage.



G03637742

Fig. 27: Removing Old Sealant From Bolt Threads
Courtesy of MAZDA MOTORS CORP.

1. Apply silicone sealant to the contact surfaces of new oil pan gaskets as shown in the figure.



G03637743

Fig. 28: Applying Silicone Sealant To Contact Surfaces Of New Oil Pan Gaskets
Courtesy of MAZDA MOTORS CORP.

2. Install new gaskets onto the oil pump body and the rear cover facing the notches as shown in the figure.

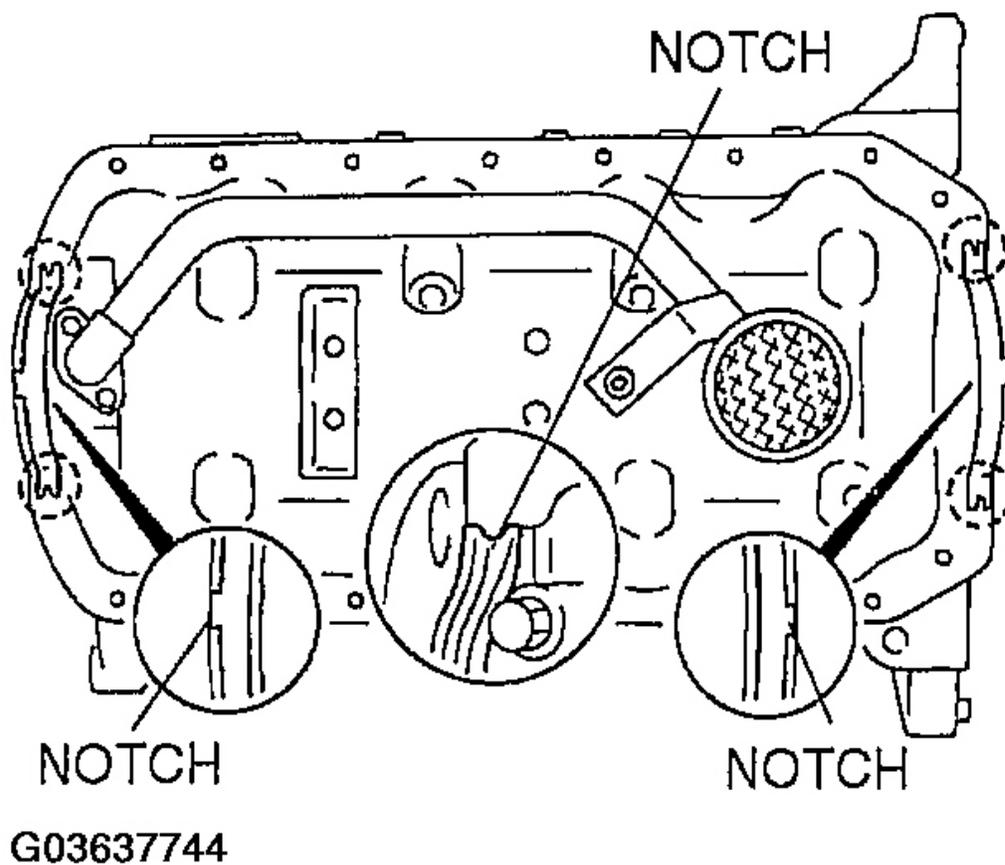
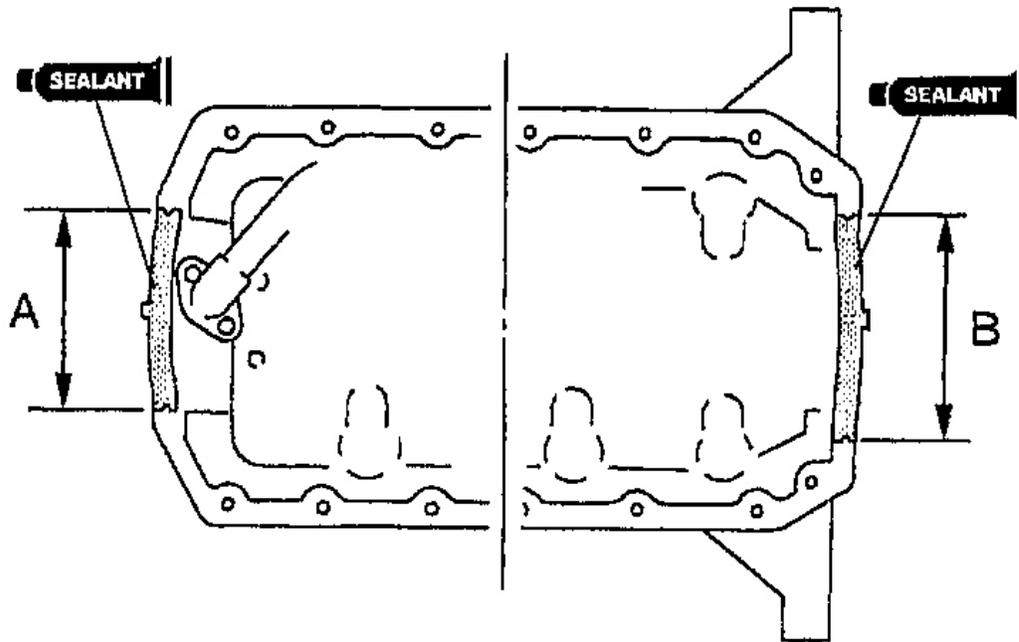


Fig. 29: Installing Gaskets Onto Oil Pump Body
Courtesy of MAZDA MOTORS CORP.

3. Apply silicone sealant onto the area of oil pan gasket indicated by A and B.



G03637745

Fig. 30: Applying Silicone Sealant Onto Area Of Oil Pan Gasket
Courtesy of MAZDA MOTORS CORP.

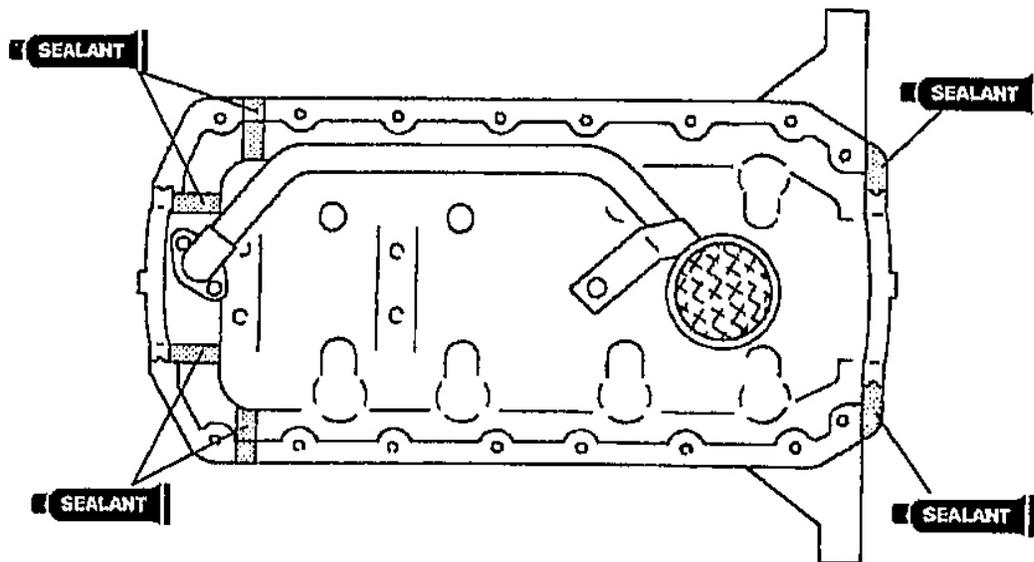
Thickness

THETA 2.0 mm {0.079 in}

4. Apply silicone sealant to the shaded areas as shown in the figure.

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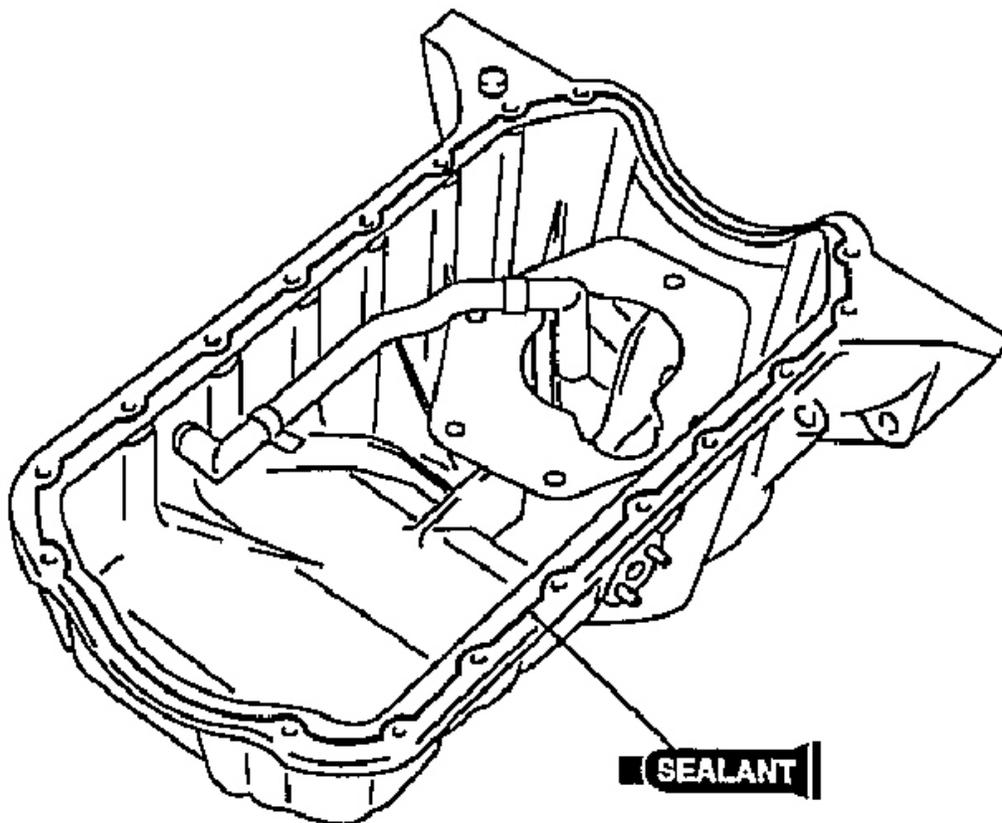
2005 ENGINE Lubrication - MX-5 Miata



G03637746

Fig. 31: Applying Silicone Sealant To Shaded Areas
Courtesy of MAZDA MOTORS CORP.

5. Apply silicone sealant to the oil pan along the inside of the bolt holes and overlap the ends.



G03637747

Fig. 32: Applying Silicone Sealant To Oil Pan Along Inside Of Bolt
Courtesy of MAZDA MOTORS CORP.

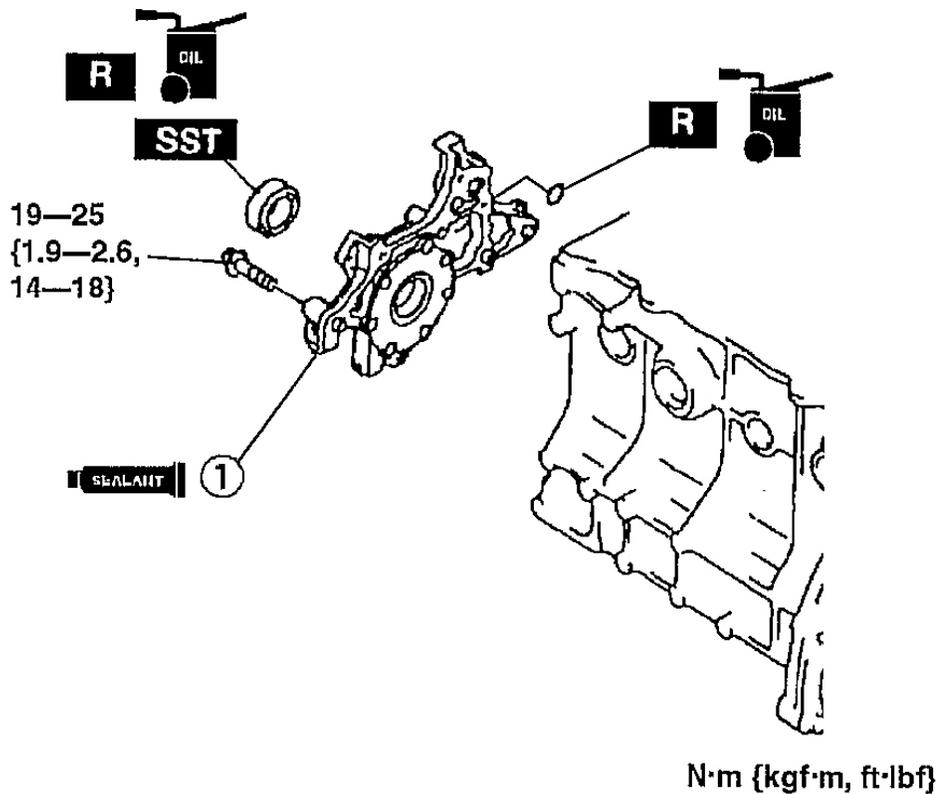
Thickness

THETA 2.5-3.5 mm {0.099-0.137 in}

OIL PUMP REMOVAL/INSTALLATION

1. Remove the timing belt. (See **TIMING BELT REMOVAL/INSTALLATION** .)
2. Remove the timing belt pulley.
3. Remove the oil pan. (See **OIL PAN REMOVAL/INSTALLATION [BP]**.) (See **OIL PAN REMOVAL/INSTALLATION [BP WITH TC]**.)
4. Remove the A/C compressor with the pipe still connected.

5. Remove the A/C compressor bracket.
6. Remove the generator. (See **GENERATOR REMOVAL/INSTALLATION** .)
7. Remove in the order indicated in the table.



1	Oil pump (See Oil Pump Removal Note.) (See Oil Pump Installation Note.)
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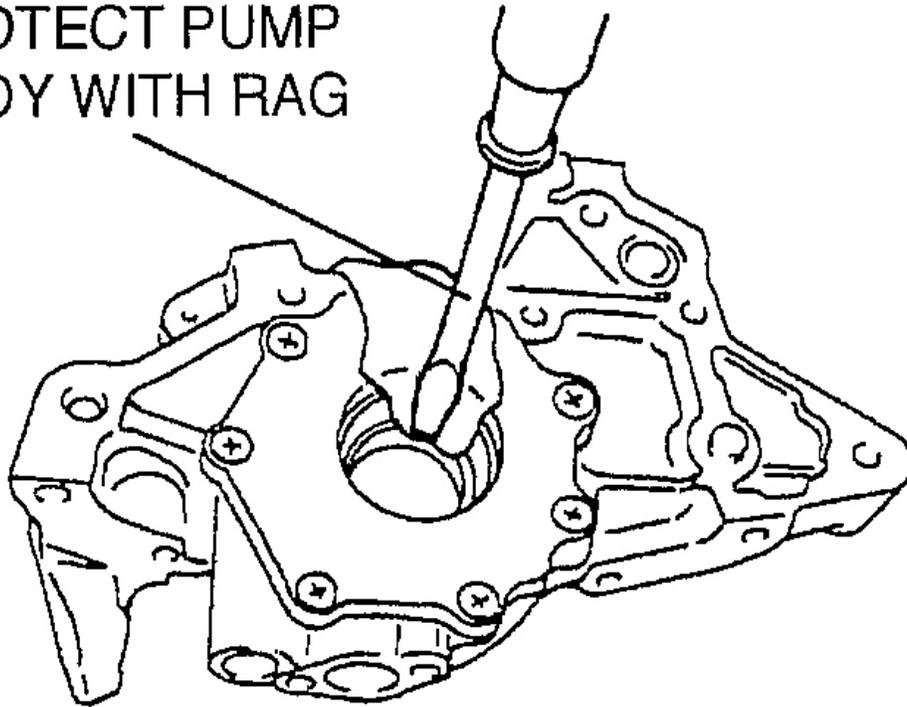
Fig. 33: Installing Oil Pump & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.

OIL PUMP REMOVAL NOTE

1. Remove the oil seal using a flathead screwdriver protected with a rag.

PROTECT PUMP
BODY WITH RAG



G03637749

Fig. 34: Removing Oil Seal Using Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

OIL PUMP INSTALLATION NOTE

1. Apply clean engine oil to the new oil seal.
2. Push the oil seal slightly in by hand.
3. Press the oil seal in evenly using the SST.

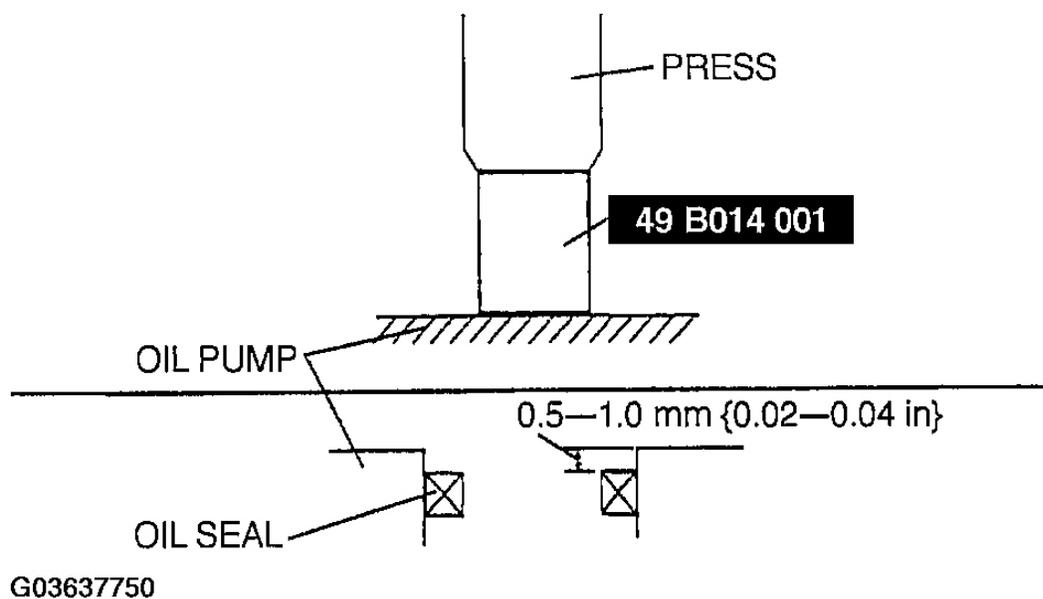
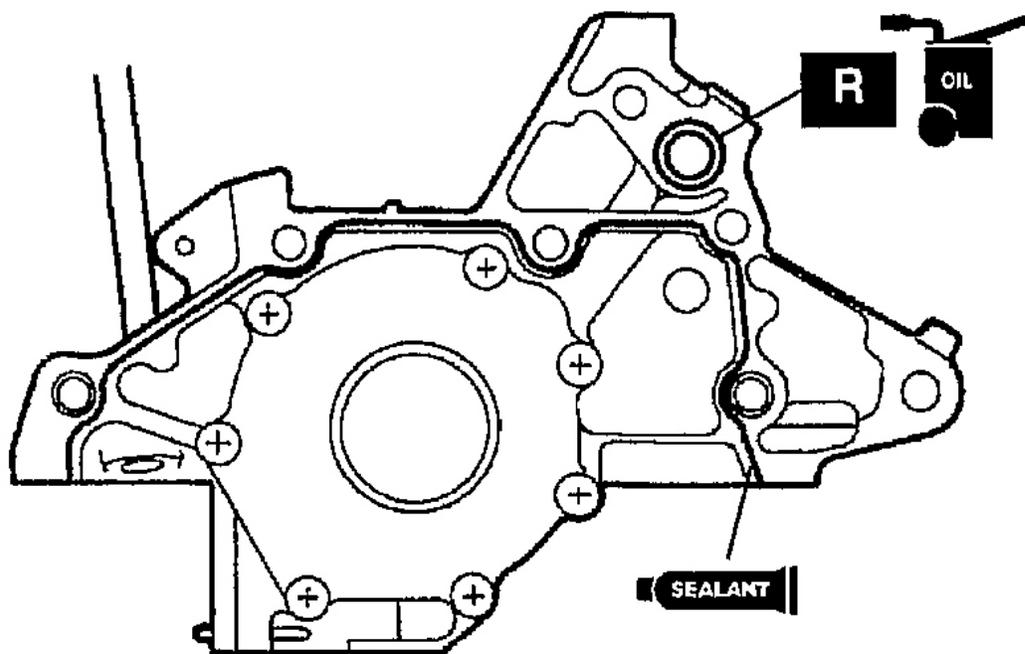


Fig. 35: Pressing Oil Seal

Courtesy of MAZDA MOTORS CORP.

4. Install a new O-ring.
5. Apply silicone sealant to the oil pump as shown in the figure.



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Fig. 36: Apply Silicone Sealant To Oil Pump
Courtesy of MAZDA MOTORS CORP.

Thickness

THETA 1-2 mm {0.040-0.078 in}

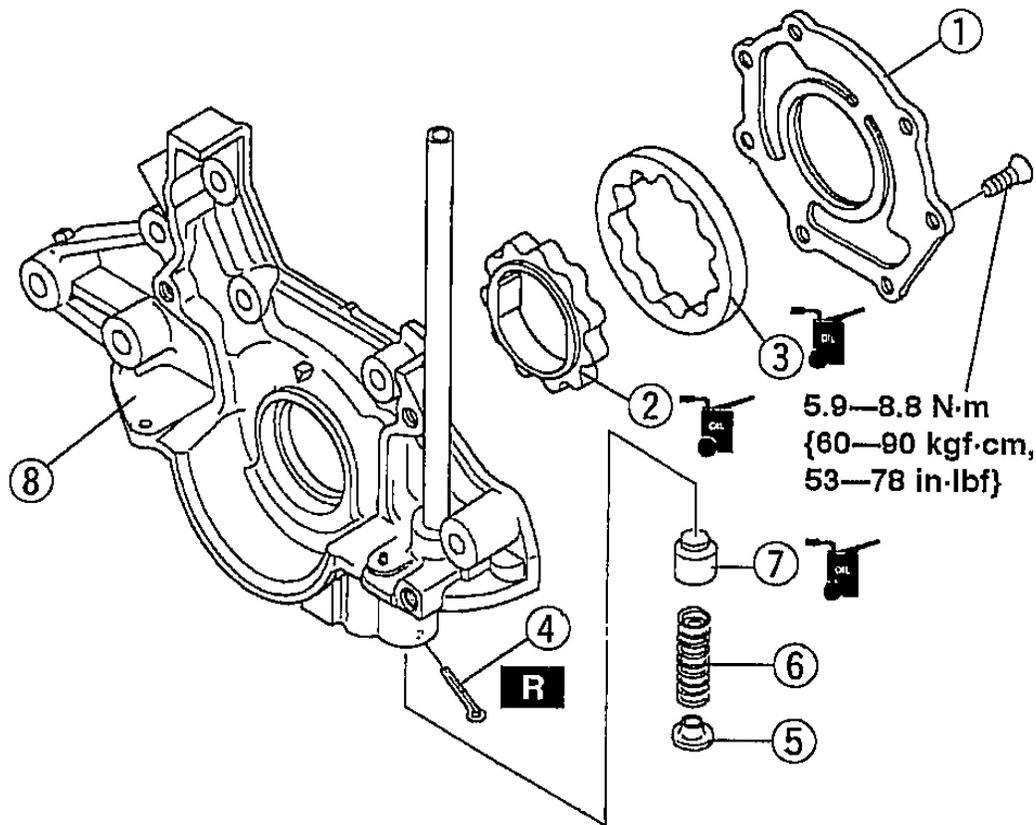
6. Install the oil pump.
7. Cut away the portion of the silicone sealant that projects from the body toward the oil pan side.

OIL PUMP DISASSEMBLY/ASSEMBLY

1. Remove the oil pump. (See **OIL PUMP REMOVAL/INSTALLATION**.)
2. Disassemble in the order indicated in the table.

2005 Mazda MX-5 Miata

2005 ENGINE Lubrication - MX-5 Miata



1	Oil pump cover
2	Inner rotor
3	Outer rotor
4	Cotter pin (See Cotter Pin Assembly Note.)
5	Spring seat
6	Pressure spring
7	Control plunger
8	Oil pump body

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Fig. 37: Removing Oil Pump & Torque Specifications
 Courtesy of MAZDA MOTORS CORP.

3. Assemble in the reverse order of disassembly.

COTTER PIN ASSEMBLY NOTE

1. Bend the cotter pin so that its tip does not project from the oil pump cover mounting surface.

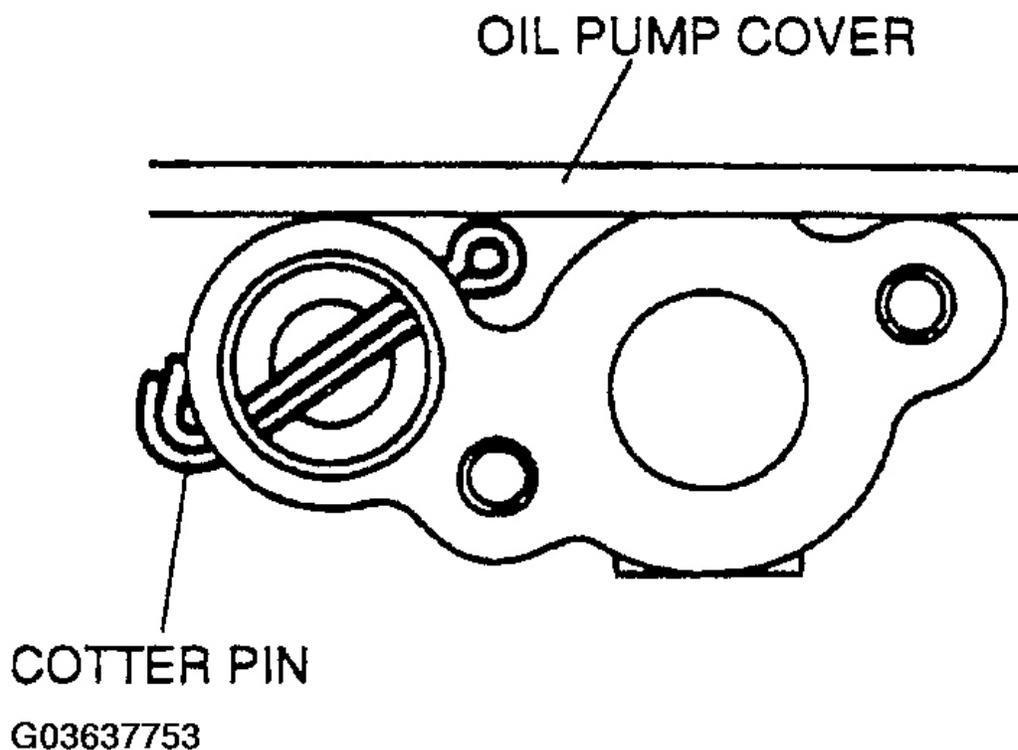


Fig. 38: Identifying Cotter Pin
Courtesy of MAZDA MOTORS CORP.

OIL PUMP INSPECTION

ROTOR CLEARANCE INSPECTION

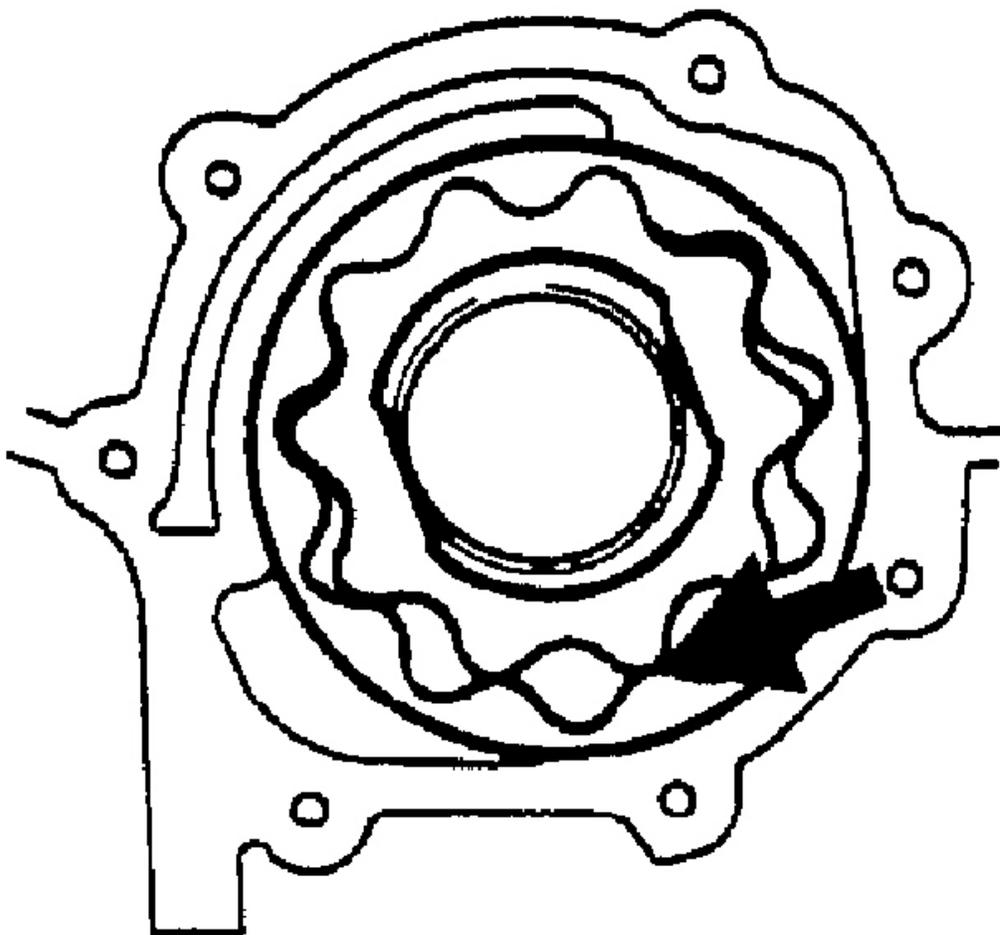
1. Measure the following clearances.
 - If it exceeds the specification, replace the rotor or oil pump body.

Standard tip clearance

0.02-0.18 mm {0.0008-0.0070 in}

Maximum tip clearance

0.20 mm {0.0079 in}



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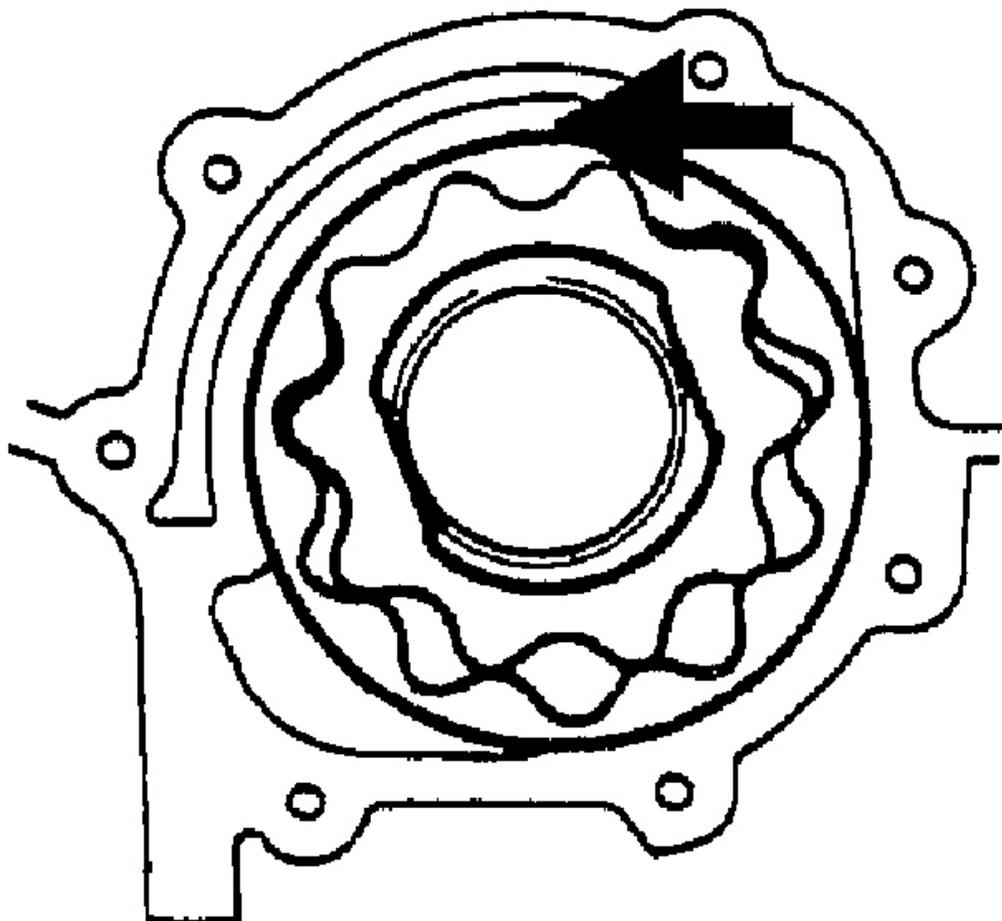
Fig. 39: Locating Maximum Tip Clearance
Courtesy of MAZDA MOTORS CORP.

Standard body clearance

0.09-0.17 mm {0.0036-0.0066 in}

Maximum body clearance

0.22 mm {0.0087 in}



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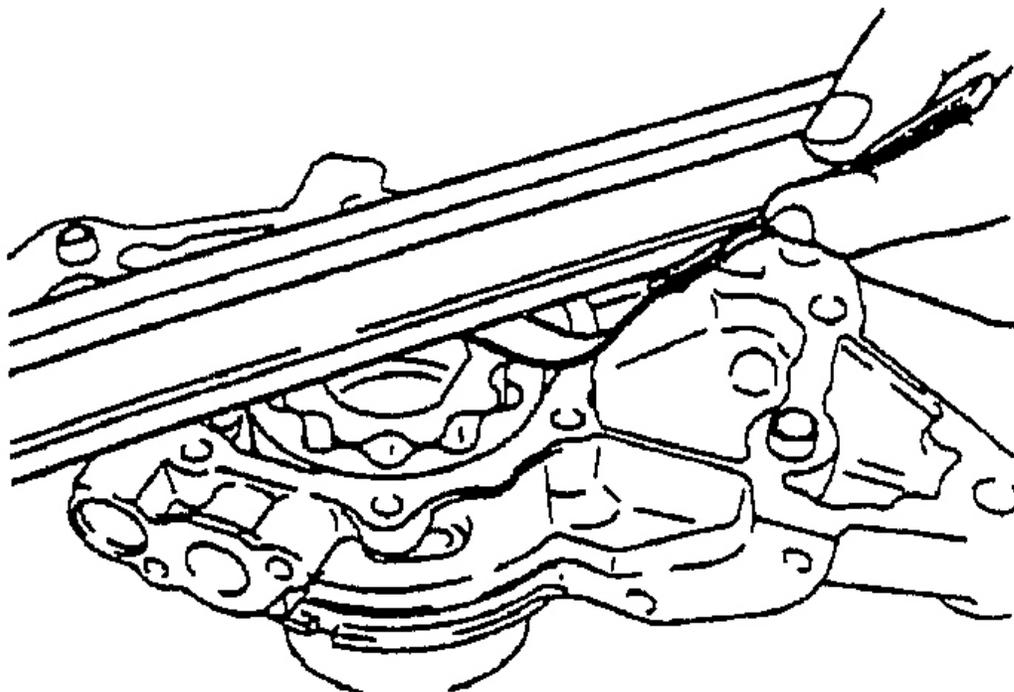
Fig. 40: Locating Maximum Body Clearance
Courtesy of MAZDA MOTORS CORP.

Standard side clearance

0.03-0.11 mm {0.0012-0.0043 in}

Maximum side clearance

0.14 mm {0.0055 in}



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Fig. 41: Locating Maximum Side Clearance
Courtesy of MAZDA MOTORS CORP.

PRESSURE SPRING INSPECTION

1. Apply pressing force to the pressure spring and measure the spring height.
 - If not as specified, replace the pressure spring.

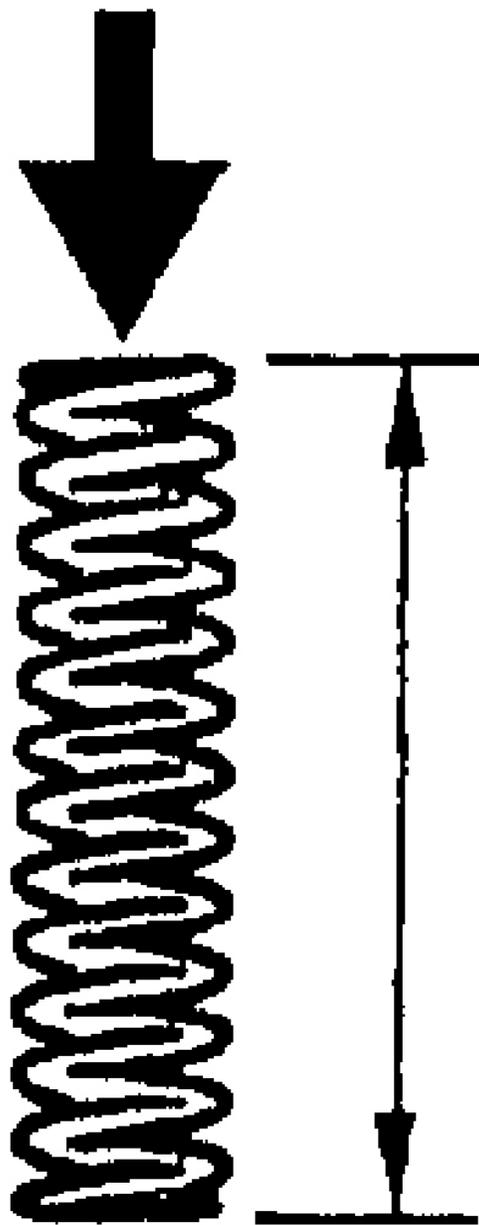
Standard height

35.37 mm {1.393 in} [Pressing force:88.1 N {8.98 kgf, 19.8 lbf}]

Free length (Reference)

46.79 mm {1.842 in}

PRESSING FORCE



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Fig. 42: Measuring Spring Height
Courtesy of MAZDA MOTORS CORP.