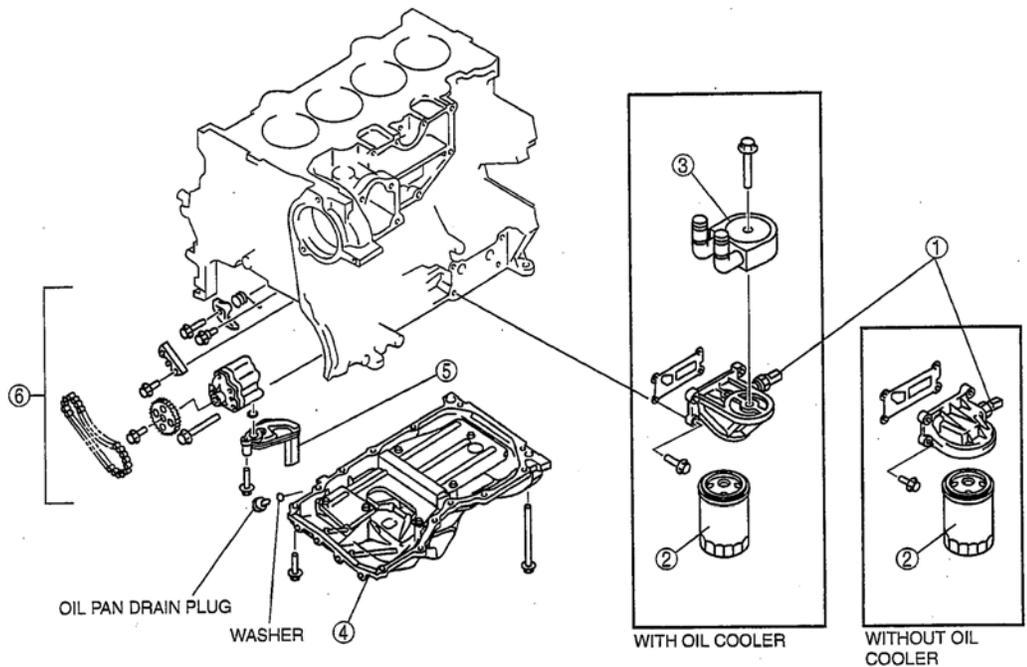


2007 ENGINE

Lubrication [LF] - MX-5 Miata

LUBRICATION SYSTEM LOCATION INDEX [LF]



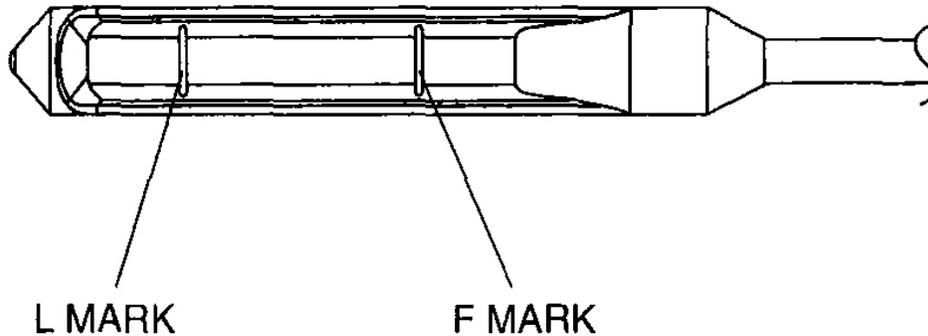
1	Oil pressure switch (See OIL PRESSURE INSPECTION[LF].)
2	Oil filter (See OIL FILTER REPLACEMENT[LF].)
3	Oil cooler (See OIL COOLER REMOVAL/ INSTALLATION [LF].)

4	Oil pan (See OIL PAN REMOVAL/ INSTALLATION[LF].)
5	Oil strainer (See OIL PUMP REMOVAL/ INSTALLATION[LF].)
6	Oil pump component (See OIL PUMP REMOVAL/ INSTALLATION[LF].)

Fig. 1: Identifying Location Of Lubrication System Components
 Courtesy of MAZDA MOTORS CORP.

ENGINE OIL LEVEL INSPECTION [LF]

1. Position the vehicle on level ground.
2. Warm up the engine.
3. Stop the engine and allow **approx. 5 min.** before continuing.
4. Remove the dipstick and verify that the oil level is between the F and L marks on the dipstick.
 - If the oil level is below the L mark, add engine oil.



D6E111AW3001

Fig. 2: Identifying Mark On Dipstick
Courtesy of MAZDA MOTORS CORP.

ENGINE OIL REPLACEMENT [LF]

WARNING:

- Hot engine and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.
- 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. Position the vehicle on level ground.
2. Remove the oil filler cap.
3. Remove the oil pan drain plug.
4. Drain the engine oil into a container.
5. Install the oil pan drain plug with a new washer.

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Oil pan drain plug tightening torque

30-41 N.m {3.1-4.1 kgf.m, 23-30 ft.lbf}

NOTE:

- The amount of residual oil in the engine can vary according to factors such as the replacement method and oil temperature. Verify the oil level after engine oil replacement.

6. Refill the following type and amount of the engine oil.

NOTE:

- The maintenance intervals on scheduled maintenance table (See SCHEDULED MAINTENANCE) can only be supported with the use of the following oils.

ENGINE OIL SPECIFICATION

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

Engine oil capacity (approx. quantity) (AT, 5MT)*¹

Oil replacement: 3.9 L {4.1 US qt, 3.4 Imp qt}

Oil and oil filter replacement: 4.3 L {4.5 US qt, 3.8 Imp qt}

Total (dry engine): 4.6 L {4.9 US qt, 4.0 Imp qt}

Engine oil capacity (approx. quantity) (AT, 5MT)*²

Oil replacement: 4.05 L {4.28 US qt, 3.56 Imp qt}

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Oil and oil filter replacement: 4.45 L {4.70 US qt, 3.92 Imp qt}

Total (dry engine): 4.75 L {5.02 US qt, 4.18 Imp qt}

Engine oil capacity (approx. quantity) (6MT)

Oil replacement: 4.05 L {4.28 US qt, 3.56 Imp qt}

Oil and oil filter replacement: 4.55 L {4.81 US qt, 4.00 Imp qt}

Total (dry engine): 4.85 L {5.12 US qt, 4.27 Imp qt}

*¹ :Applied VIN (Assumed)

JM1 NC15F*7# 100001-130613

JM1 NC16F*7# 100001-130613

JM1 NC25F*7# 100001-130613

JM1 NC26F*7# 100001-130613

*² :Applied VIN (Assumed)

JM1 NC15F*7# 130614-

JM1 NC16F*7# 130614-

JM1 NC25F*7# 130614-

JM1 NC26F*7# 130614-

7. Install the oil filler cap.
8. Start the engine and confirm that there is no oil leakage.
 - If there is oil leakage, repair or replace the applicable part.
9. Inspect the oil level. (See **ENGINE OIL LEVEL INSPECTION [LF]** .)

OIL PRESSURE INSPECTION [LF]

WARNING:

- Hot engine and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.
- 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

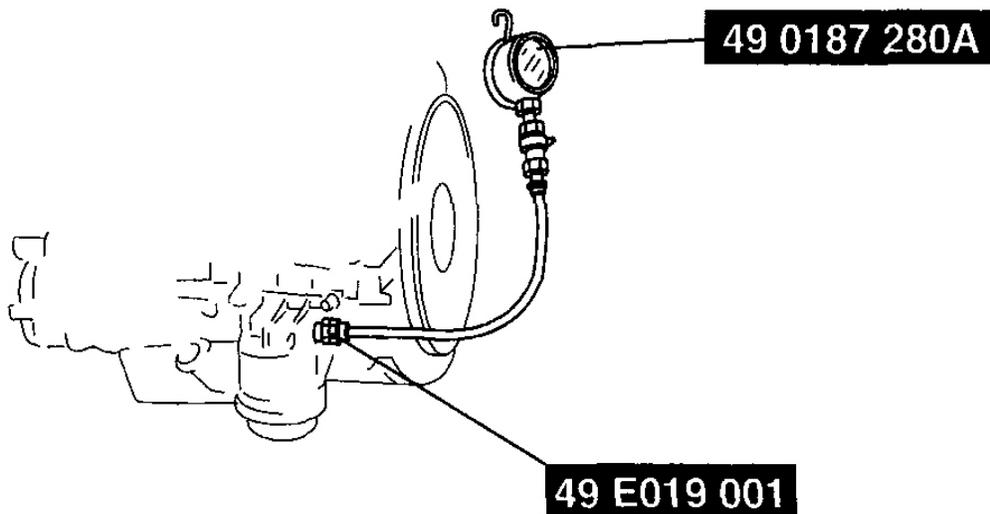
on safety stands.

- **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. Remove the battery cover.
2. Disconnect the negative battery cable.
3. Remove the oil pressure switch.
4. Screw the **SSTs** into the oil pressure switch installation hole.
5. Connect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
6. Warm up the engine to normal operating temperature.
7. Run the engine at the specified speed, and note the gauge readings.
 - If not within the specification, inspect for the cause and repair or replace if necessary.

NOTE:

- **The oil pressure can vary with oil viscosity and temperature.**



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Fig. 3: Screwing SST Into Oil Pressure Switch Installation Hole
Courtesy of MAZDA MOTORS CORP.

Oil pressure (reference value) [oil temperature: 100°C {212°F}]

337-591 kPa {3.44-6.03 kgf/cm², 49.0-85.8 psi} min [3,000 rpm]

8. Stop the engine and wait until it is cool.
9. Disconnect the negative battery cable.
10. Remove the SSTs.

CAUTION:

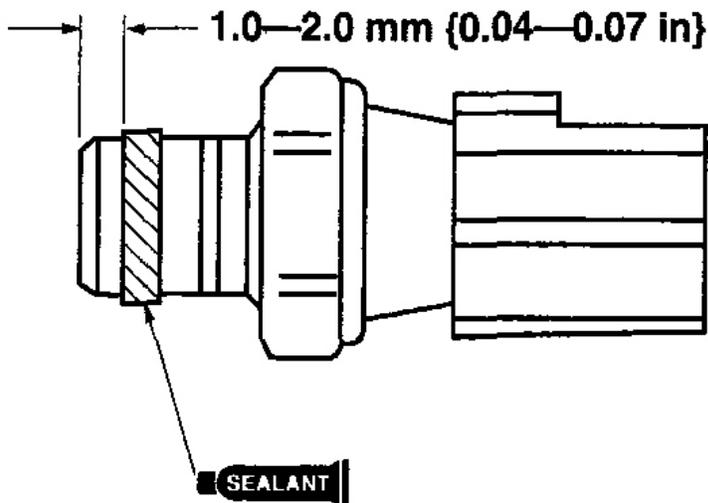
- Make sure that there is no sealant between 1.0-2.0 mm {0.04-0.07 in} from the end of the oil pressure switch to prevent a possible operation malfunction.

11. Apply silicone sealant to the oil pressure switch threads as shown in **Fig. 4**.
12. Install the oil pressure switch.

Tightening torque

12-18 N.m {1.3-1.8 kgf.m, 9-13 ft.lbf}

13. Connect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
14. Install the battery cover.
15. Start the engine and confirm that there is no oil leakage.
 - If there is oil leakage, repair or replace the applicable part.



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Fig. 4: Applying Silicone Sealant To Oil Pressure Switch Threads

Courtesy of MAZDA MOTORS CORP.

OIL FILTER REPLACEMENT [LF]

WARNING:

- Hot engine and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.
- 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.

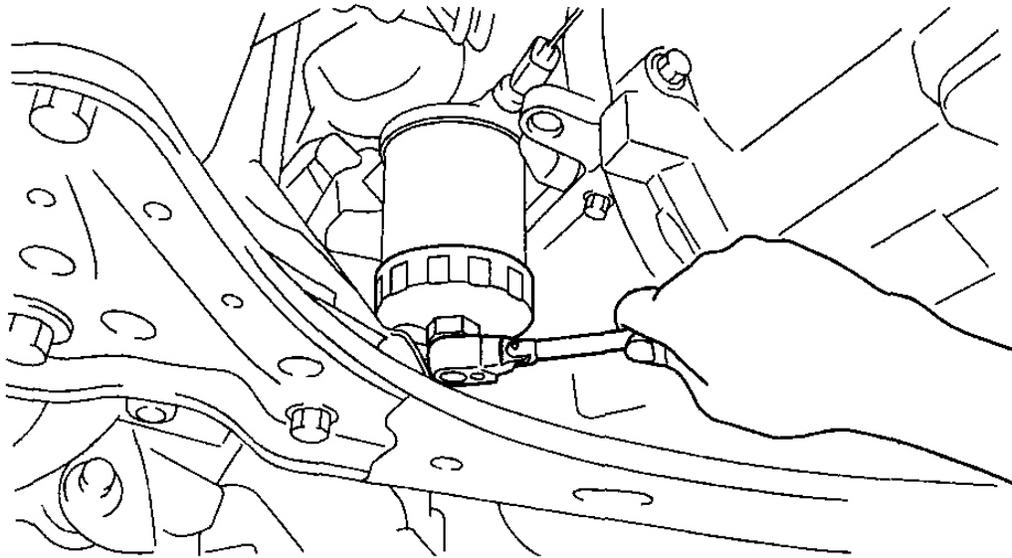
CAUTION:

- 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 a commercially available, cup-type oil filter wrench (**76 mm {3.0 in} diameter, 15 sided**).
2. Use a clean rag to wipe off the mounting surface.
3. Apply clean engine oil to the gasket of a new oil filter.
4. Tighten the oil filter using a cup-type oil filter wrench and according to the instruction on the package or side of the oil filter.

Tightening torque (reference value)

15-20 N.m {1.6-2.0 kgf.m, 11-14 ft.lbf}



E5U111ZW5001

Fig. 5: Removing Oil Filter
Courtesy of MAZDA MOTORS CORP.

5. Start the engine and confirm that there is no oil leakage.
 - If there is oil leakage, repair or replace the applicable part.
6. Inspect the oil level. (See **ENGINE OIL LEVEL INSPECTION [LF]** .)

OIL PAN REMOVAL/INSTALLATION [LF]

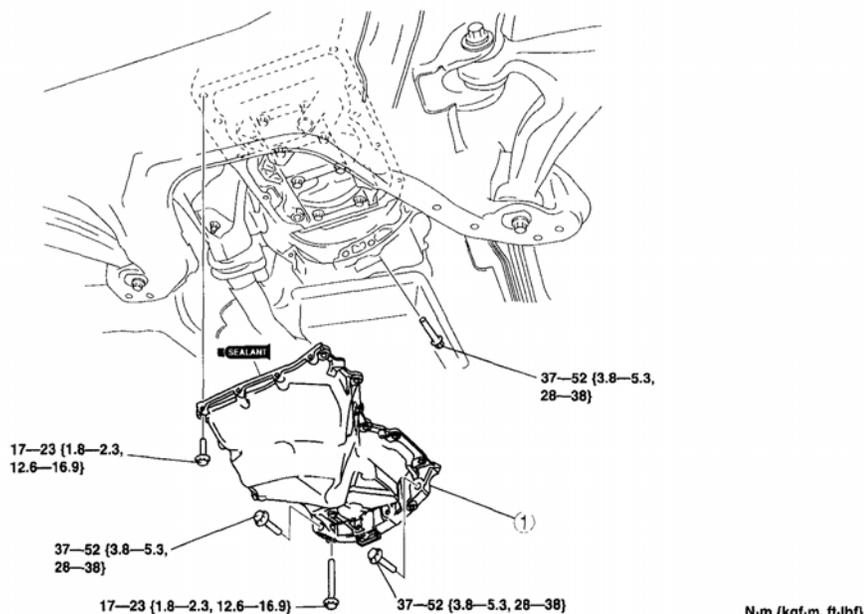
WARNING:

- Hot engine and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.
- 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. Remove the battery and battery tray. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
2. Remove the air cleaner. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
3. Drain the engine oil. (See **ENGINE OIL REPLACEMENT [LF]** .)
4. Loosen the water pump pulley bolt and remove the drive belt. (See **DRIVE BELT REPLACEMENT**

[LF] .)

5. Remove the front suspension tower bar (joint, right side, and left side). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
6. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
7. Remove the ignition coils. (See **IGNITION COIL REMOVAL/INSTALLATION [LF]** .)
8. Remove the P/S oil pump with the hose and pipe sill connected. Position the P/S oil pump out of the way. (See **POWER STEERING OIL PUMP REMOVAL/INSTALLATION** .)
9. Remove the crankshaft position (CKP) sensor. (See **CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [LF]** .)
10. Remove the engine front cover. (See **TIMING CHAIN REMOVAL/INSTALLATION [LF]** .)
11. Remove the transverse member. (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
12. Remove the member bracket. (MT) (See **TRANSMISSION REMOVAL/INSTALLATION [M15M-D]** .) (See **TRANSMISSION REMOVAL/INSTALLATION [P66M-D]** .)
13. Remove in the order indicated in **Fig. 6** .
14. Install in the reverse order of removal.
15. Refill the specified type and amount of the engine oil. (See **ENGINE OIL REPLACEMENT [LF]** .)
16. Start the engine and confirm that there is no oil leakage.
 - If there is oil leakage, repair or replace the applicable part.
17. Inspect the oil level. (See **ENGINE OIL LEVEL INSPECTION [LF]** .)
18. Inspect for the ignition timing and idle speed. (See **ENGINE TUNE-UP [LF]** .)



1 Oil pan

Fig. 6: Identifying Oil Pan Components (With Torque Specifications)

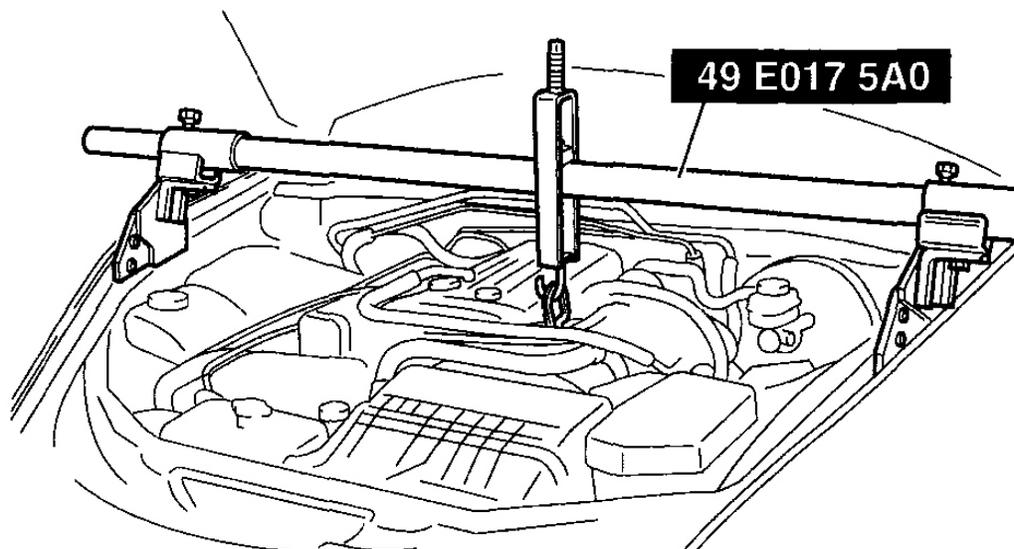
Courtesy of MAZDA MOTORS CORP.

OIL PAN REMOVAL NOTE

NOTE:

- Lift up the engine approx. 25 mm {0.98 in} to assure clearance for the oil pan removal, then remove the oil pan.

1. Remove the windshield wiper arm. (See WIPER ARM AND BLADE REMOVAL/INSTALLATION .)
2. Remove the cowl grille. (See COWL GRILLE REMOVAL/INSTALLATION .)
3. Remove the side cowl grille. (See SIDE COWL GRILLE REMOVAL/INSTALLATION .)
4. Remove the engine compartment service hole cover. (See EGR VALVE REMOVAL/INSTALLATION [LF] .)
5. Remove the front tires.
6. Support the engine using the SST.



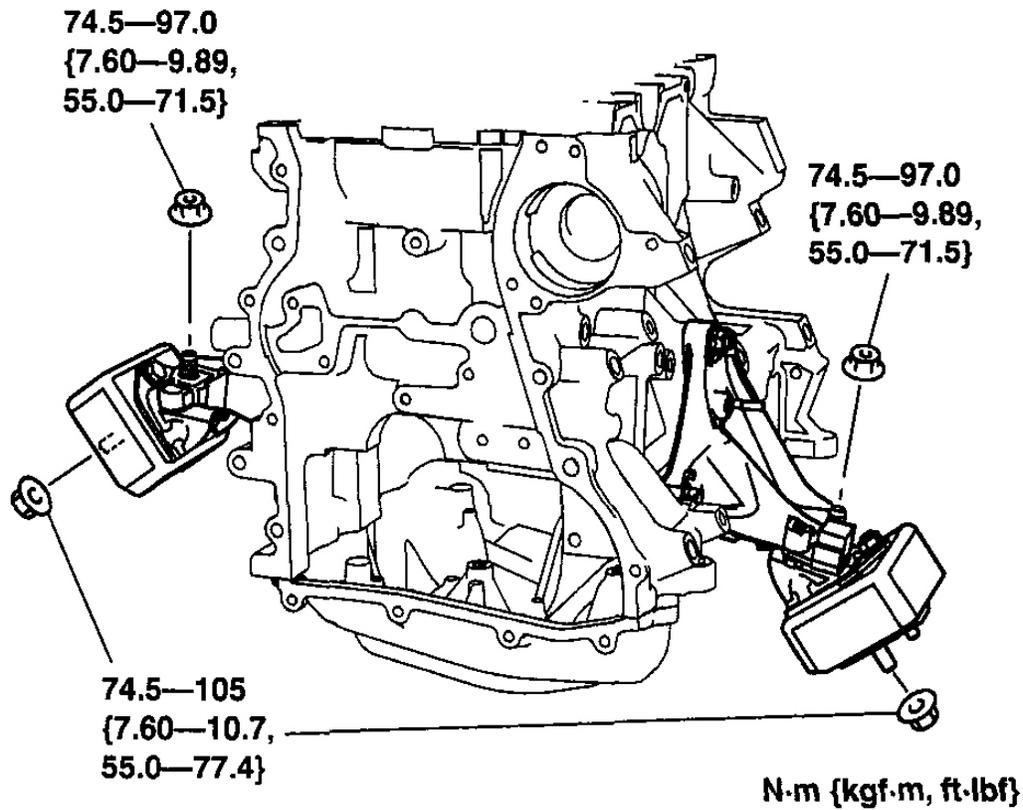
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Fig. 7: Supporting Engine Using SST
Courtesy of MAZDA MOTORS CORP.

7. Remove the engine mount rubber installation nuts.

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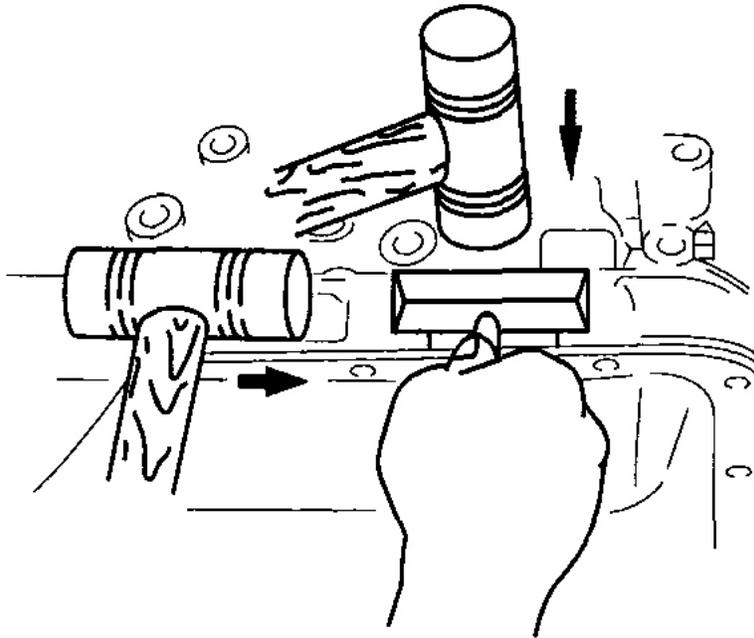
2007 ENGINE Lubrication [LF] - MX-5 Miata



E5U111ZW5009

Fig. 8: Identifying Engine Mount Rubber Installation Nuts (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

8. Lift up the engine **approx. 25 mm {0.98 in}** using the SST.
9. Remove the oil pan installation bolts.
10. Remove the oil pan using the separator tool.



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Fig. 9: Removing Oil Pan Using Separator Tool
Courtesy of MAZDA MOTORS CORP.

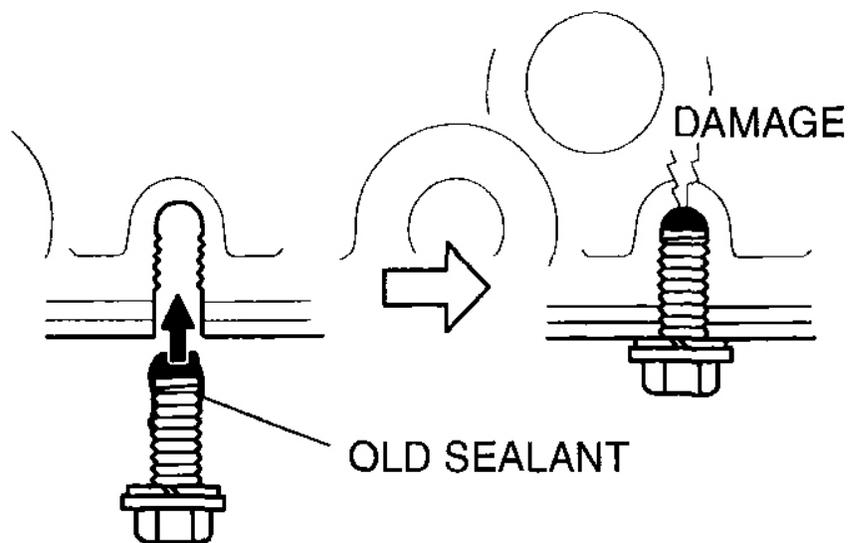
11. Remove the oil pan.

OIL PAN INSTALLATION NOTE

CAUTION:

- Apply the silicon sealant in a single, unbroken line around the whole perimeter.
- Using bolts with the old seal adhering could cause cracks in the housing.

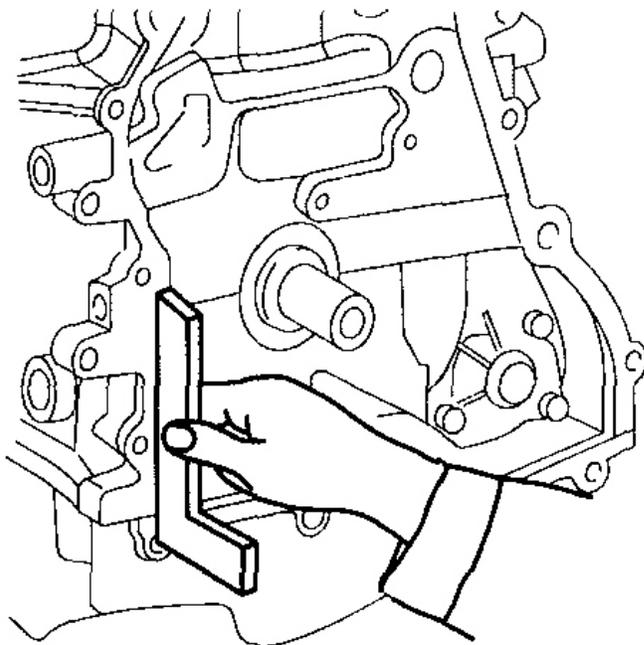
1. Completely clean and remove any oil, dirt, sealant or other foreign material that may be adhering to the housing and oil pan.
2. When reusing the oil pan installation bolts, clean any old sealant from the bolts.



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Fig. 10: Identifying Old Sealant On Oil Pan Bolts
Courtesy of MAZDA MOTORS CORP.

3. Use a square ruler to align the oil pan and the cylinder block junction side on the engine front cover side.



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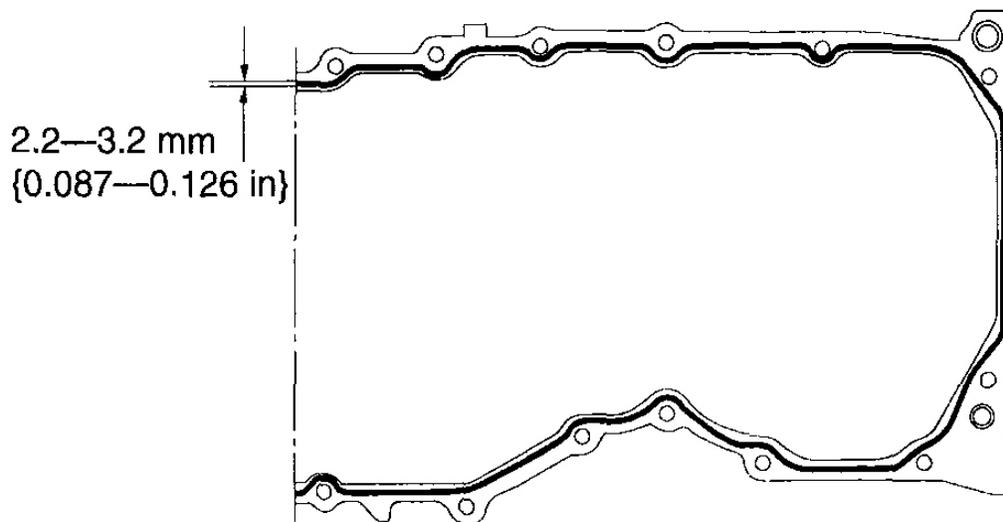
Fig. 11: Aligning Oil Pan & Cylinder Block Junction Side On Engine Front Cover Side Using Square Ruler

Courtesy of MAZDA MOTORS CORP.

4. Apply silicone sealant to the oil pan along the inside of the bolt holes as shown in **Fig. 12** .

Thickness

2.2-3.2 mm {0.087-0.126 in}



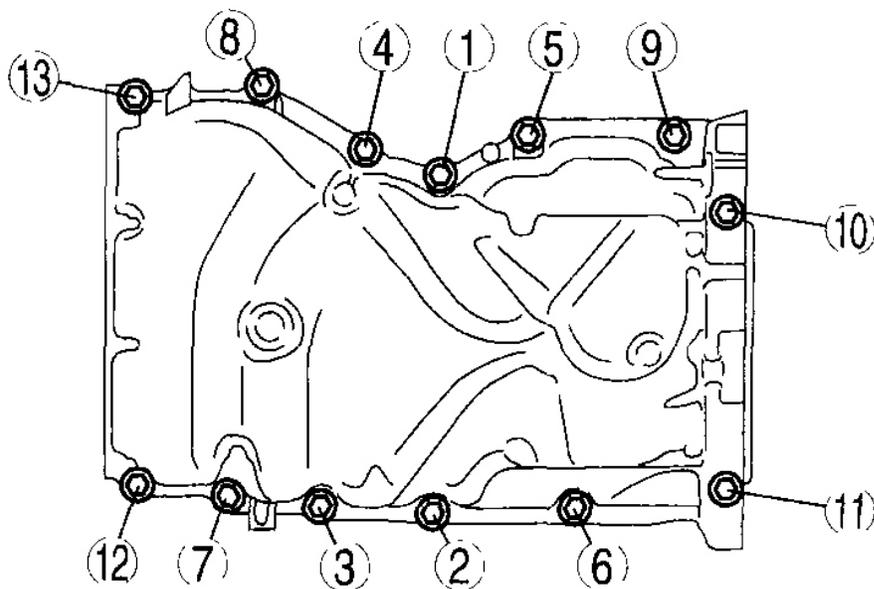
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Fig. 12: Applying Silicone Sealant To Oil Pan
Courtesy of MAZDA MOTORS CORP.

5. Tighten the bolts in the order shown in **Fig. 13** .

Tightening torque

17-23 N.m {1.8-2.3 kgf.m, 12.6-16.9 ft.lbf}



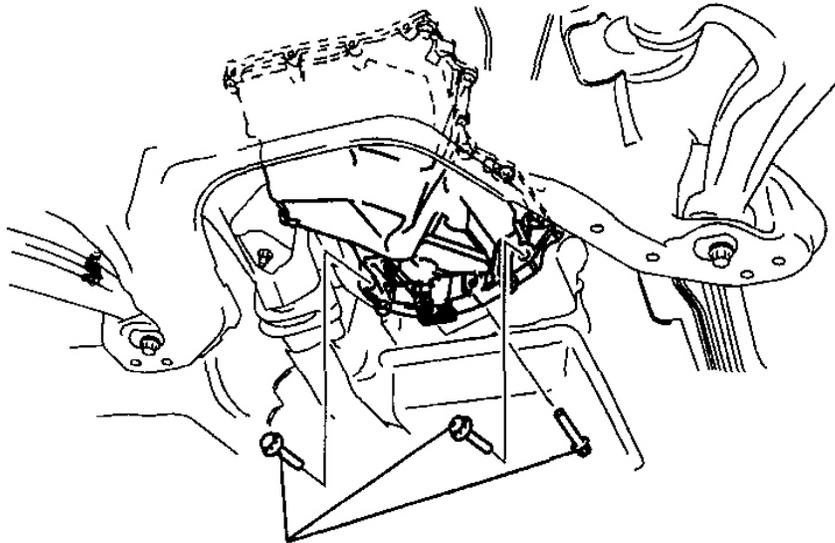
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Fig. 13: Identifying Tightening Sequence Of Oil Pan Bolts
Courtesy of MAZDA MOTORS CORP.

6. Tighten the oil pan-transmission installation bolts.

Tightening torque

37-52 N.m {3.8-5.3 kgf.m, 28-38 ft.lbf}



OIL PAN-TRANSMISSION INSTALLATION BOLTS

E5U111ZW5010

Fig. 14: Tightening Oil Pan-Transmission Installation Bolts
Courtesy of MAZDA MOTORS CORP.

OIL PUMP REMOVAL/INSTALLATION [LF]

WARNING:

- Hot engine and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.
- 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. Remove the battery and battery tray. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
2. Remove the air cleaner. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
3. Drain the engine oil. (See **ENGINE OIL REPLACEMENT [LF]** .)
4. Loosen the water pump pulley bolt and remove the drive belt. (See **DRIVE BELT REPLACEMENT [LF]** .)
5. Remove the front suspension tower bar (joint, right side, and left side). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)

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6. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
7. Remove the ignition coils. (See **IGNITION COIL REMOVAL/INSTALLATION [LF]** .)
8. Remove the P/S oil pump with the hose and pipe sill connected. Position the P/S oil pump out of the way. (See **POWER STEERING OIL PUMP REMOVAL/INSTALLATION** .)
9. Remove the crankshaft position (CKP) sensor. (See **CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [LF]** .)
10. Remove the engine front cover. (See **TIMING CHAIN REMOVAL/INSTALLATION [LF]** .)
11. Remove the transverse member. (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
12. Remove the member bracket. (MT) (See **TRANSMISSION REMOVAL/INSTALLATION [M15M-D]** .) (See **TRANSMISSION REMOVAL/INSTALLATION [P66M-D]** .)
13. Remove the oil pan. (See **OIL PAN REMOVAL/INSTALLATION [LF]** .)
14. Remove in the order indicated in **Fig. 15** .
15. Install in the reverse order of removal.
16. Refill the specified type and amount of the engine oil. (See **ENGINE OIL REPLACEMENT [LF]** .)
17. Start the engine and confirm that there is no oil leakage.
 - If there is oil leakage, repair or replace the applicable part.
18. Inspect the oil level. (See **ENGINE OIL LEVEL INSPECTION [LF]** .)
19. Inspect for the ignition timing and idle speed. (See **ENGINE TUNE-UP [LF]** .)
20. Inspect the oil pressure. (See **OIL PRESSURE INSPECTION [LF]** .)

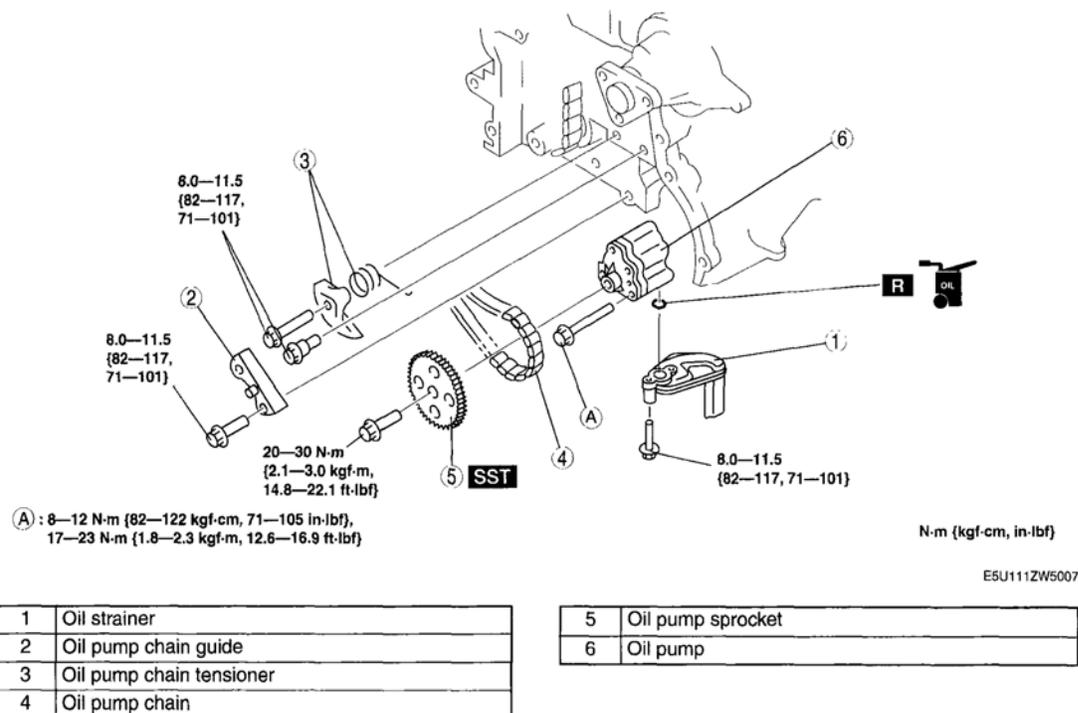


Fig. 15: Identifying Removal Order Of Oil Pump (With Torque Specifications)

Courtesy of MAZDA MOTORS CORP.

OIL PUMP SPROCKET REMOVAL/INSTALLATION NOTE

1. Temporarily install the crankshaft pulley and crankshaft pulley lock bolt to the crankshaft, and lock the oil pump against rotation as shown in figure.

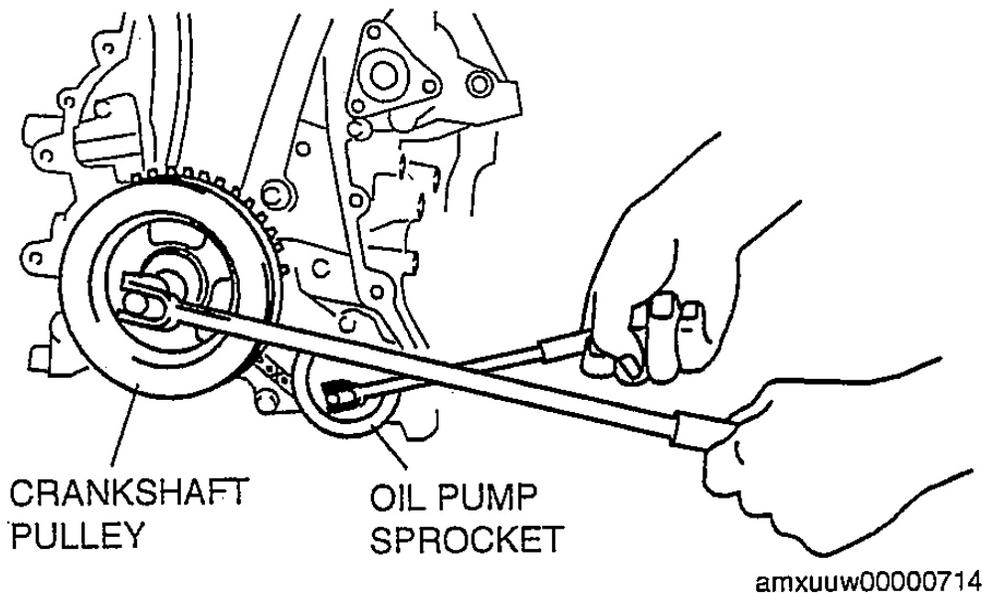


Fig. 16: Installing SST To Oil Pump Sprocket
Courtesy of MAZDA MOTORS CORP.

2. Remove/install the oil pump sprocket, and then remove the crankshaft pulley lock bolt.

Tightening torque

20-30 N.m {2.1-3.0 kgf.m, 14.8-22.1 ft.lbf}

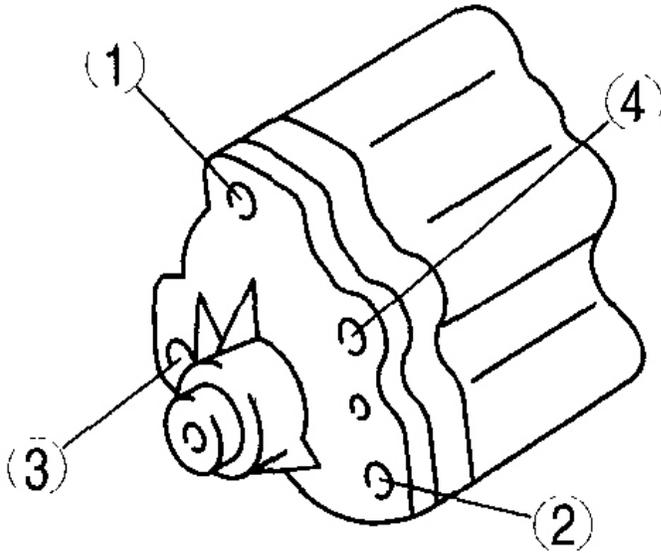
OIL PUMP INSTALLATION NOTE

1. Tighten the oil pump bolts in two steps in the order shown in **Fig. 17** .

Tightening torque

Step 1: 8-12 N.m {82-122 kgf.cm, 71-105 in.lbf}

Step 2: 17-23 N.m {1.8-2.3 kgf.m, 12.6-16.9 ft.lbf}



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Fig. 17: Tightening Oil Pump Bolts
Courtesy of MAZDA MOTORS CORP.

OIL COOLER REMOVAL/INSTALLATION [LF]

WARNING:

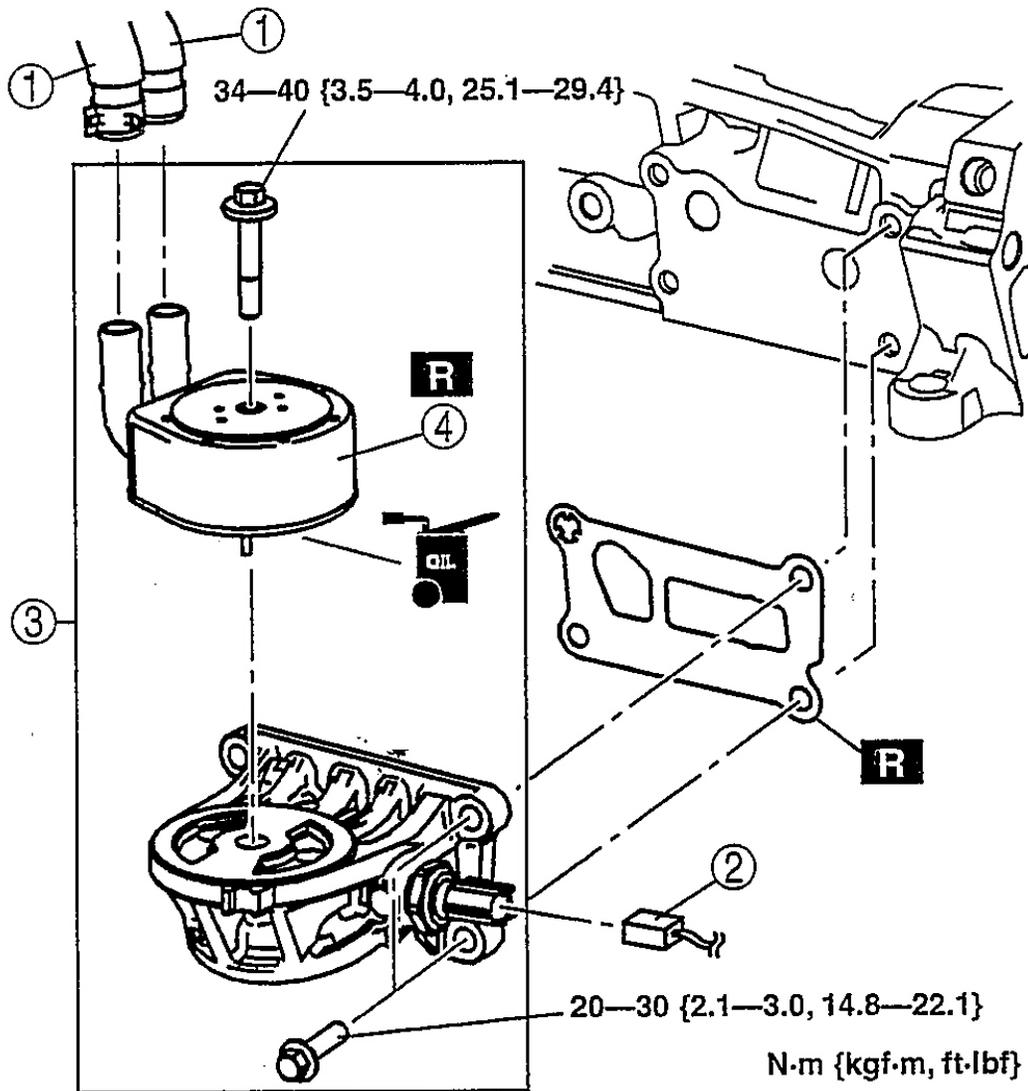
- Hot engine and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.
- A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle 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. Remove the battery cover.
2. Disconnect the negative battery cable.
3. Drain the engine coolant. (See [ENGINE COOLANT REPLACEMENT \[LF\]](#) .)
4. Remove the under cover. (See [TRANSVERSE MEMBER REMOVAL/INSTALLATION](#) .)

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5. Remove the under guard. (LF engine MT models) (See **TRANSMISSION REMOVAL/INSTALLATION [P66M-D]** .) (See **TRANSMISSION REMOVAL/INSTALLATION [M15M-D]** .)
6. Remove the side cover. (LH)
7. Remove oil filter. (See **OIL FILTER REPLACEMENT [LF]**.)
8. Remove in the order indicated in the table.
9. Use a clean rag to wipe off the mounting surface on the oil filter adapter and the oil cooler.
10. Install in the reverse order of the removal.
11. Refill the engine coolant. (See **ENGINE COOLANT REPLACEMENT [LF]** .)
12. Start the engine and confirm that there is no oil leakage.
 - If there is oil leakage, repair or replace the applicable part.
13. Inspect the oil level. (See **ENGINE COOLANT LEVEL INSPECTION [LF]** .)



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Fig. 18: Identifying Oil Cooler Components
 Courtesy of MAZDA MOTORS CORP.

OIL COOLER ITEM DESCRIPTION

1	Water hose
2	Oil pressure switch connector
3	Oil cooler and oil filter adapter component
4	Oil cooler

OIL COOLER REMOVAL NOTE

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1. Secure the oil cooler and oil filter adapter component in a vise.
2. Loosen the oil cooler fitting bolt.
3. Remove the oil cooler.