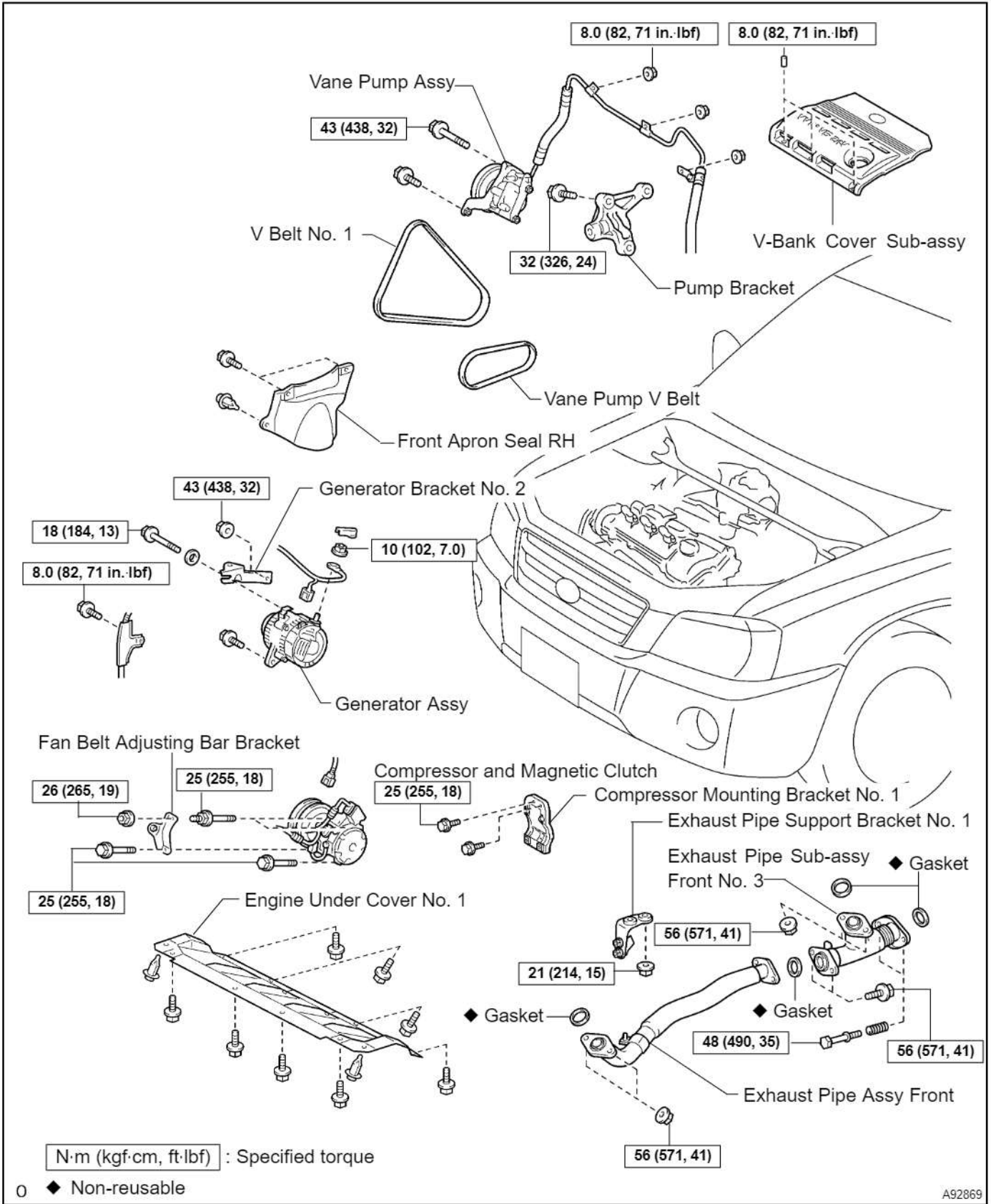
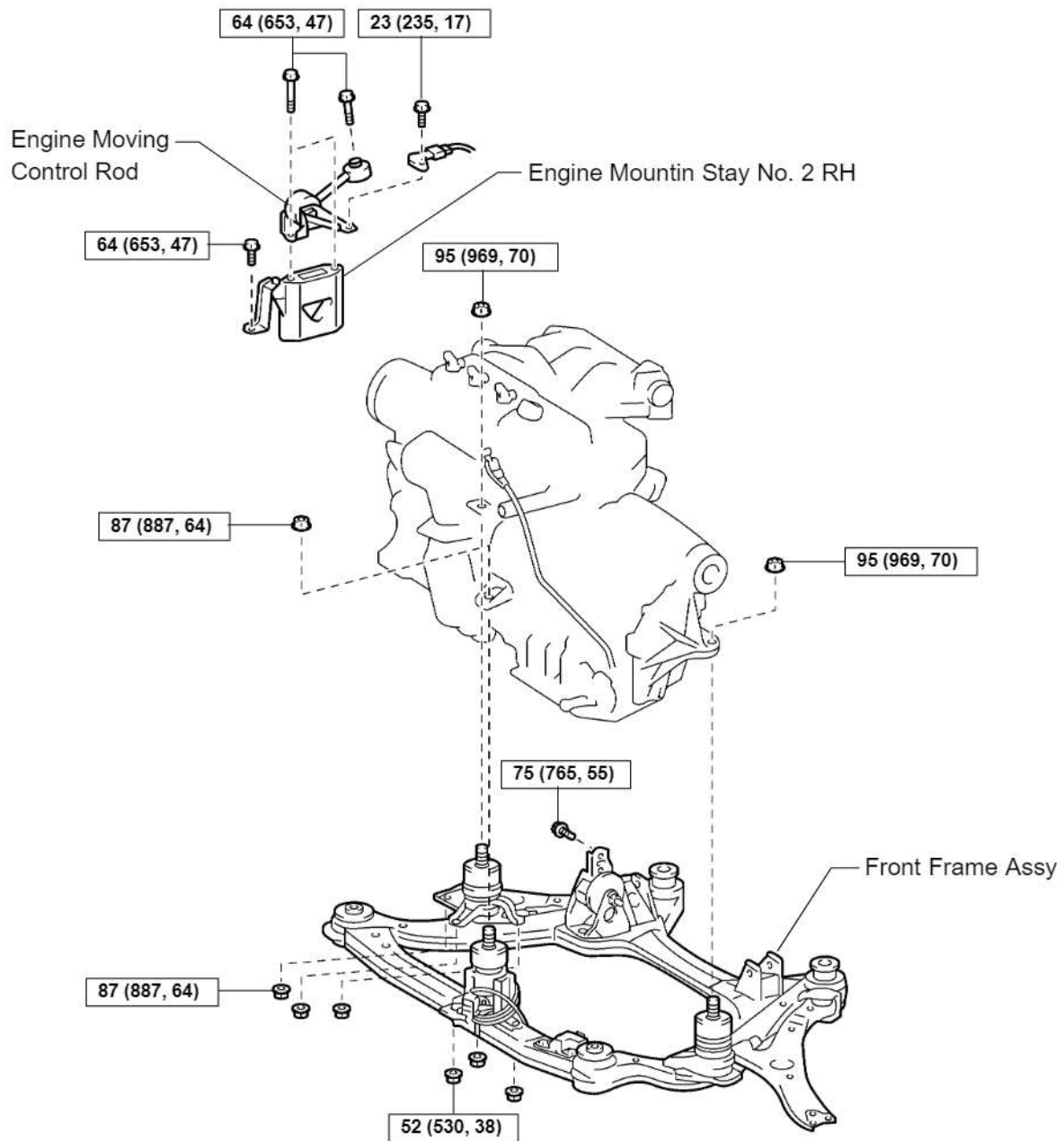


OIL PUMP ASSY (3MZ-FE) COMPONENTS

170HG-04



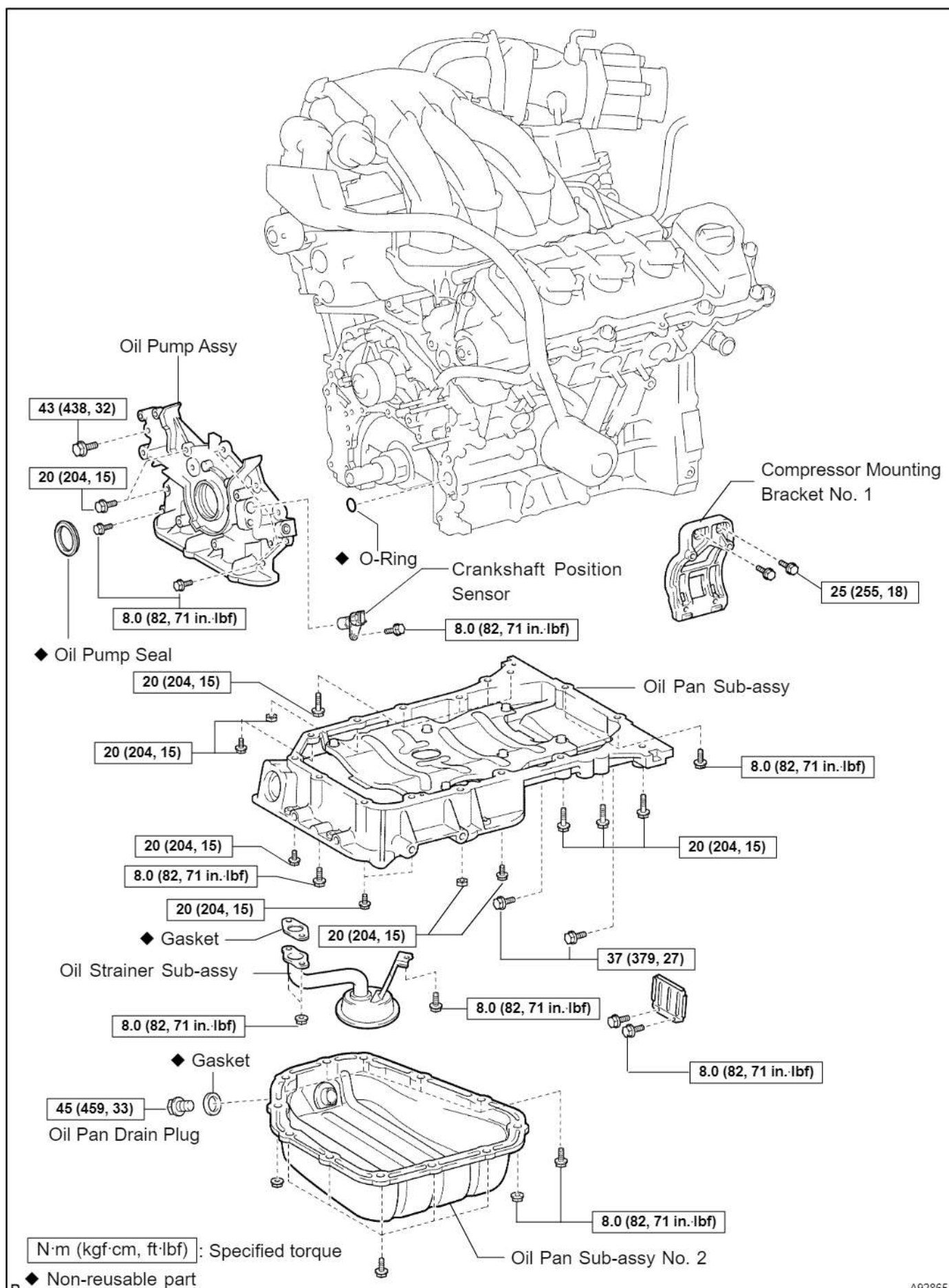
A92869



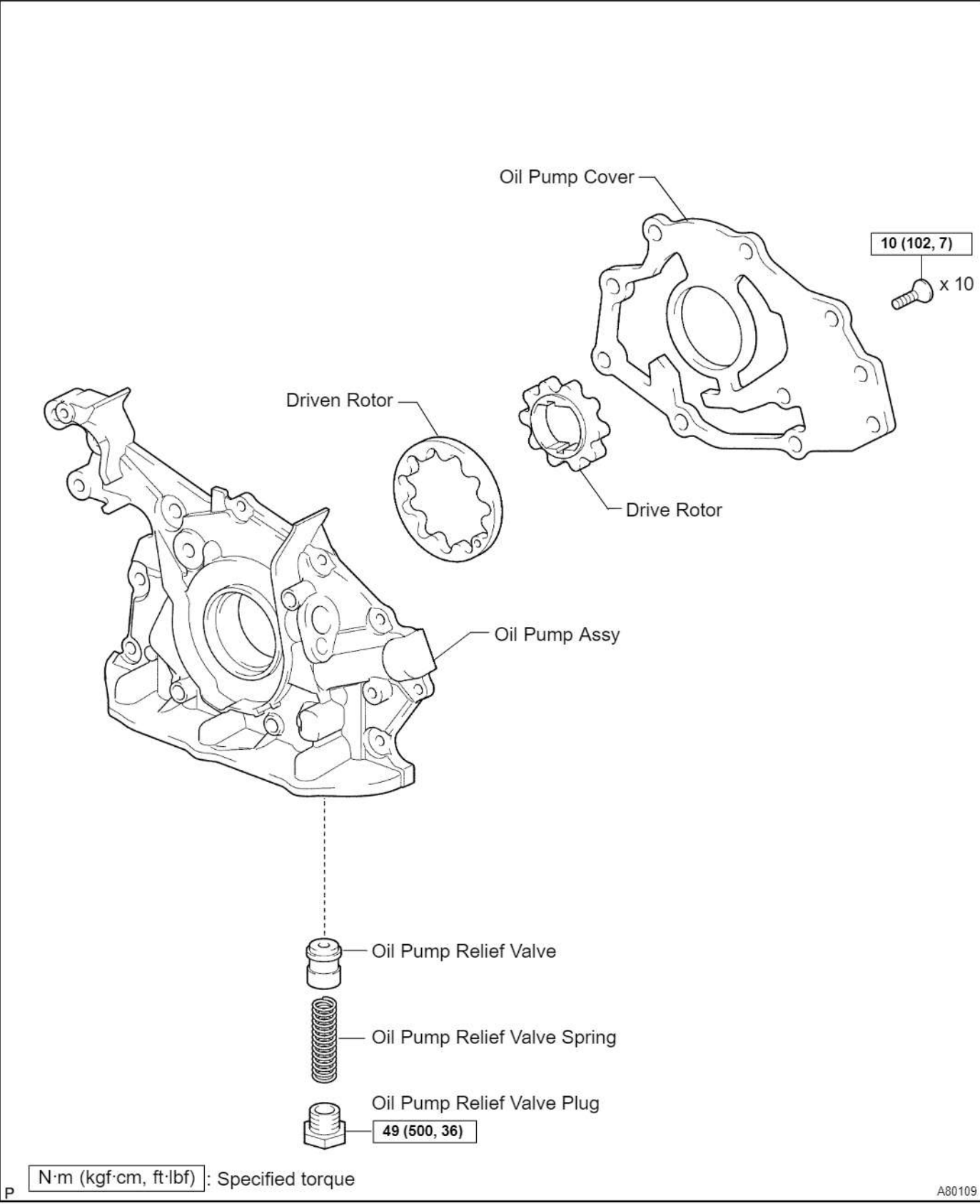
N·m (kgf·cm, ft·lbf) : Specified torque

A90976



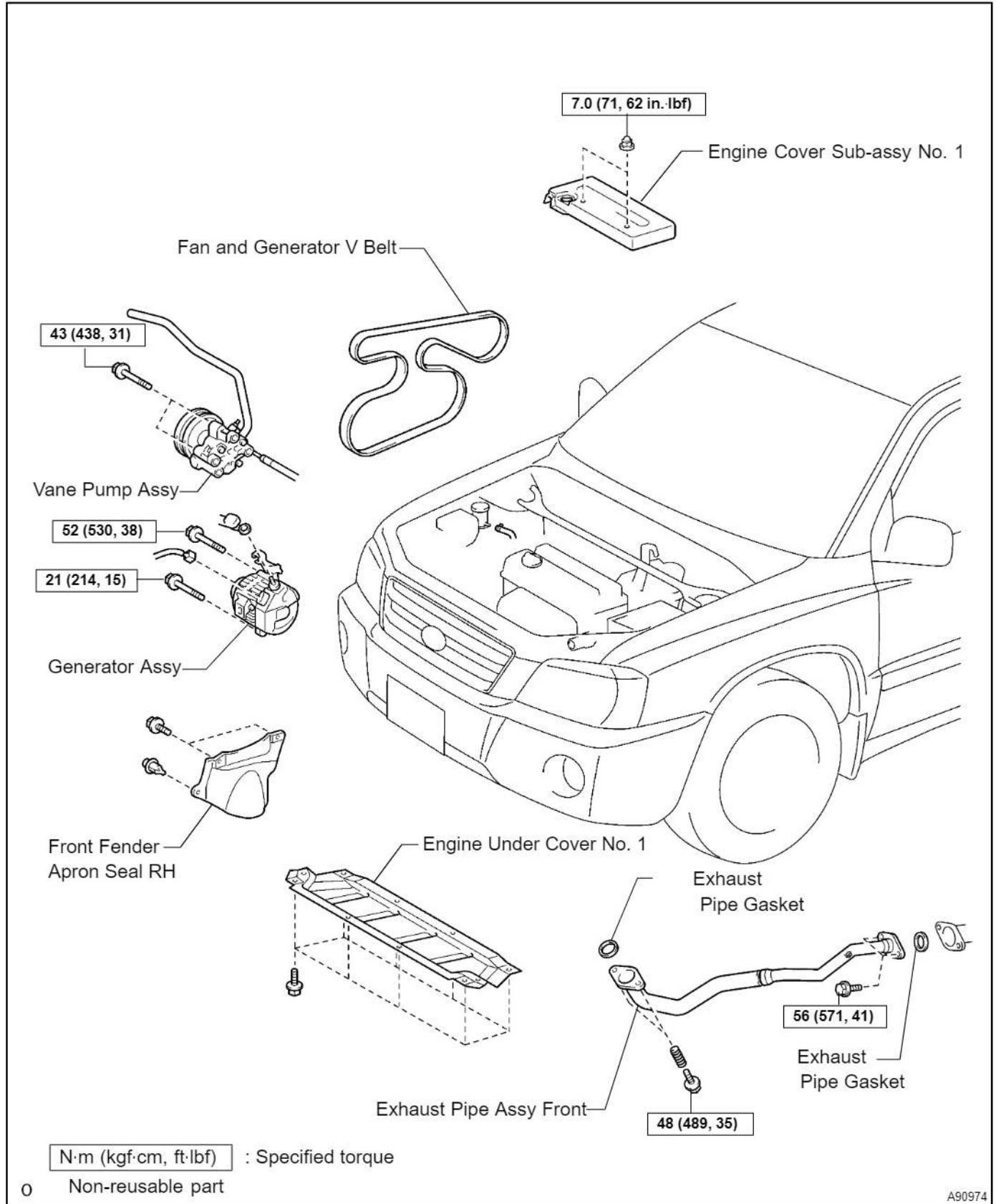


A92865

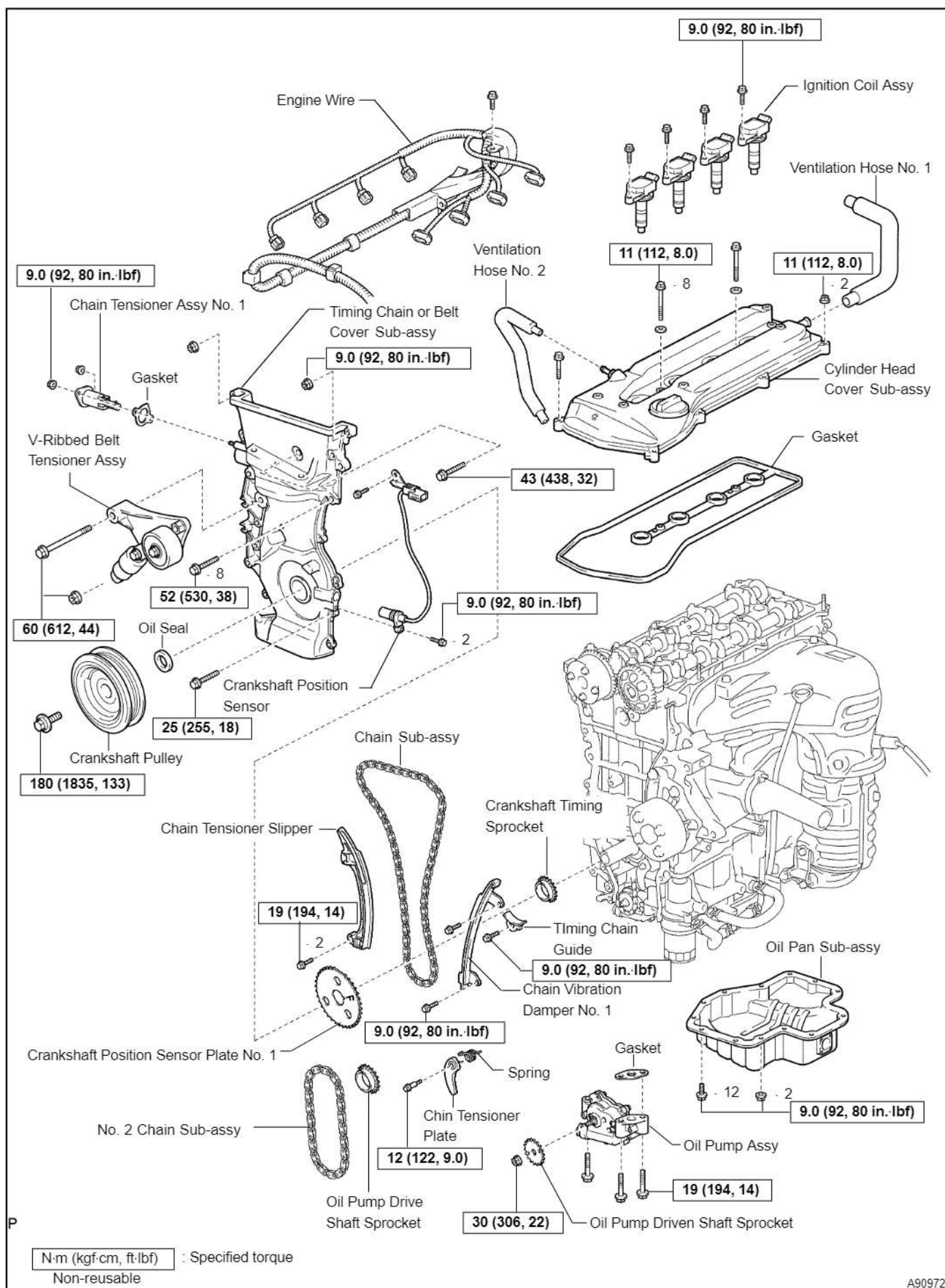


OIL PUMP ASSY (2AZ-FE) COMPONENTS

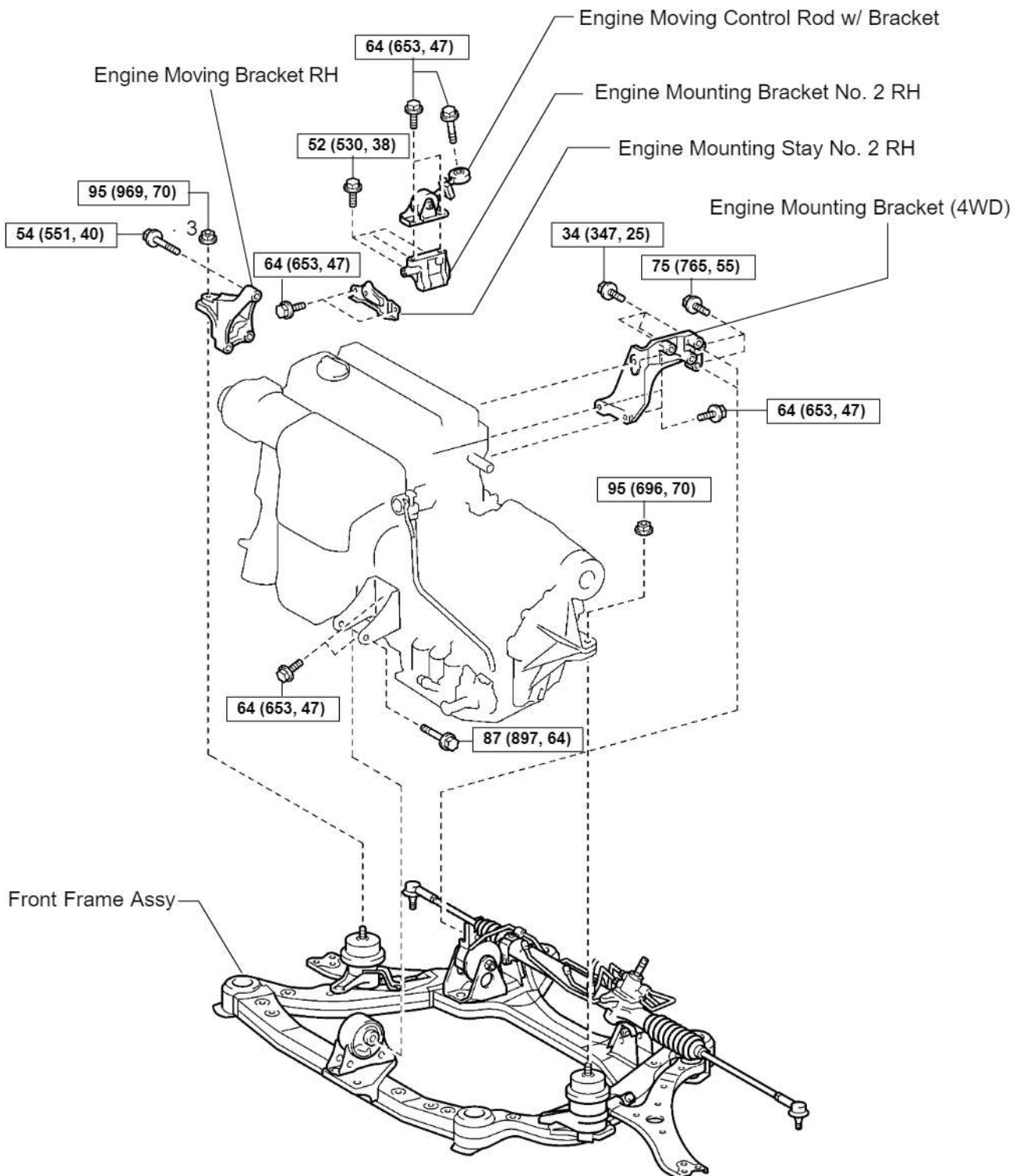
170JG-02



A90974



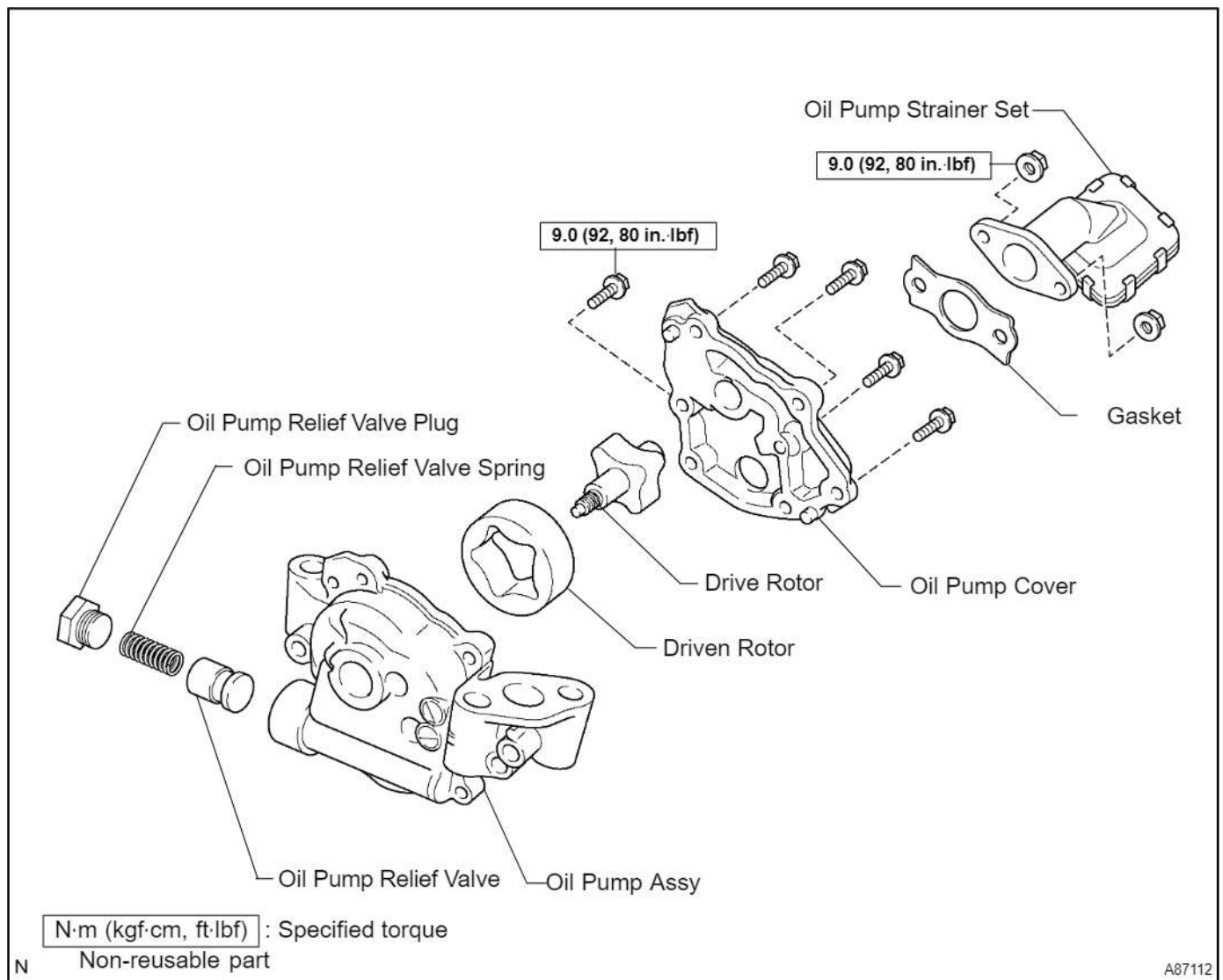
A90972



0

N·m (kgf·cm, ft·lbf) : Specified torque

A90973



LUBRICATION SYSTEM (2AZ-FE)

1701Z-09

ON-VEHICLE INSPECTION

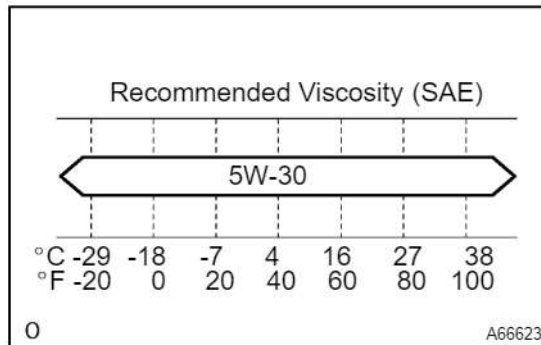
1. CHECK ENGINE OIL LEVEL

- (a) Warm up the engine, stop the engine and wait 5 minutes. The oil level should be between the dipstick's low level mark and full level mark.

If the oil level is low, check for leakage and add oil up to the full level mark.

NOTICE:

Do not fill with engine oil above the full level mark.



2. CHECK ENGINE OIL QUALITY

- (a) Check the oil for deterioration, entry of water, discoloring or thinning.

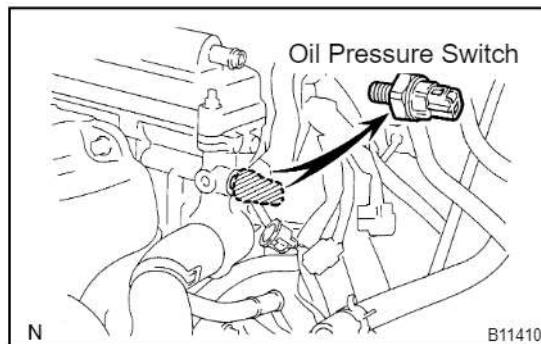
If the quality is visibly poor, replace the oil.

Oil grade:

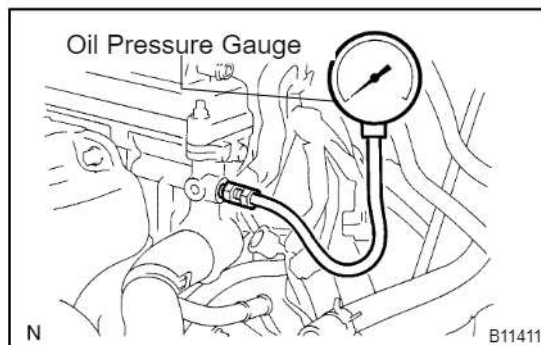
API grade SL, Energy-Conserving or ILSAC, multi-grade engine oil is recommended. SAE 5W-30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.

3. REMOVE OIL PRESSURE SWITCH ASSY

- (a) Disconnect the oil pressure switch connector.



- (b) Remove the oil pressure switch.



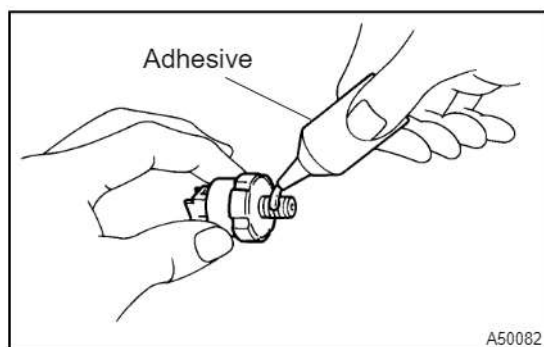
4. INSTALL OIL PRESSURE GAUGE

- (a) Install the oil pressure gauge.

5. WARM UP ENGINE

6. CHECK OIL PRESSURE**Specification:**

Item	Oil Pressure
Idle	29 kPa (0.3 kgf/cm ² , 4.3 psi) or more
3,000 rpm	245 to 539 kPa (2.5 to 5.5 kgf/cm ² , 36 to 78 psi) or more

**7. INSTALL OIL PRESSURE SWITCH**

- (a) Remove the oil pressure gauge.
- (b) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (c) Install the oil pressure switch.

Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

NOTICE:

Do not start the engine for at least 1 hour after installation of the switch.

- (d) Connect the oil pressure switch connector.

8. START ENGINE AND CHECK FOR ENGINE OIL LEAKS

LUBRICATION SYSTEM (3MZ-FE)

17020-12

ON-VEHICLE INSPECTION

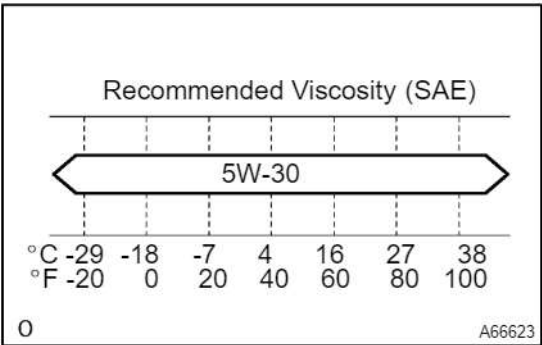
1. CHECK ENGINE OIL LEVEL

- (a) Warm up the engine, stop the engine and wait for 5 minutes. The oil level should be between the dipstick's low level mark and full level mark.

If the oil level is low, check for leakage and add oil up to the full level mark.

NOTICE:

Do not fill with engine oil above the full level mark.



2. CHECK ENGINE OIL QUALITY

- (a) Check the oil for deterioration, entry of water, discoloring or thinning.

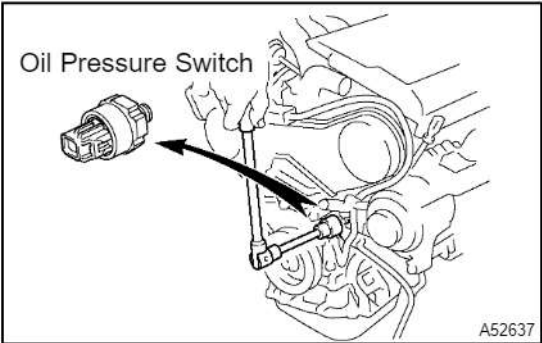
If the quality is visibly poor, replace the oil.

Oil grade:

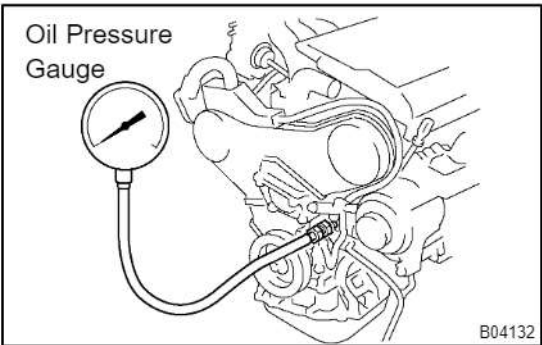
API grade SL, Energy-Conserving or ILSAC, multi-grade engine oil is recommended. SAE 5W-30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.

3. REMOVE OIL PRESSURE SWITCH ASSY

- (a) Disconnect the oil pressure switch connector.



- (b) Using a 24 mm deep socket wrench, remove the oil pressure switch.



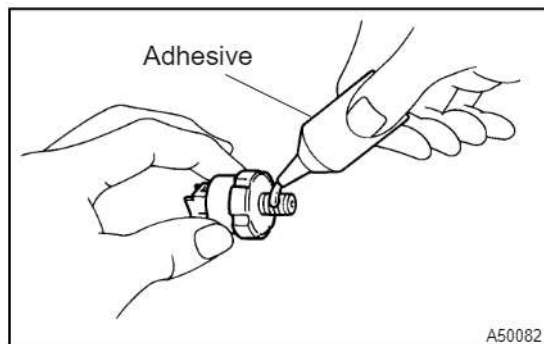
4. INSTALL OIL PRESSURE GAUGE

- (a) Install the oil pressure gauge.

5. WARM UP ENGINE

6. CHECK OIL PRESSURE**Specification:**

Item	Oil Pressure
Idle	29 kPa (0.3 kgf/cm ² , 4.3 psi) or more
3,000 rpm	245 to 539 kPa (2.5 to 5.5 kgf/cm ² , 36 to 78 psi) or more

**7. INSTALL OIL PRESSURE SWITCH**

- (a) Remove the oil pressure gauge.
- (b) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (c) Using a 24 mm deep socket wrench, install the oil pressure switch.

Torque: 15 N·m (152 kgf·cm, 11 ft·lbf)

NOTICE:

Do not start the engine for at least 1 hour after installation of the switch.

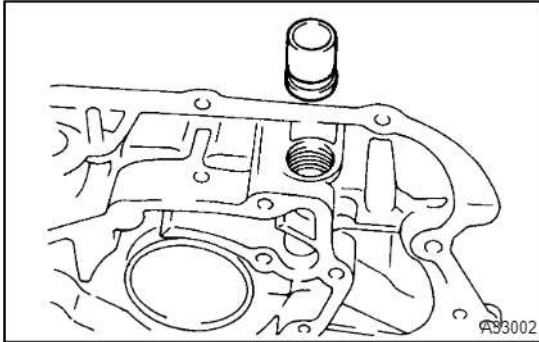
- (d) Connect the oil pressure switch connector.

8. START ENGINE AND CHECK FOR ENGINE OIL LEAKS

OVERHAUL

1. REMOVE OIL PUMP RELIEF VALVE

- (a) Remove the plug, spring and relief valve.



2. INSPECT OIL PUMP RELIEF VALVE

- (a) Apply a light coat of engine oil to the oil pump relief valve.
 (b) Check that the valve falls smoothly into the valve hole by its own weight.

If it does not, replace the relief valve. If necessary, replace the oil pump assy.

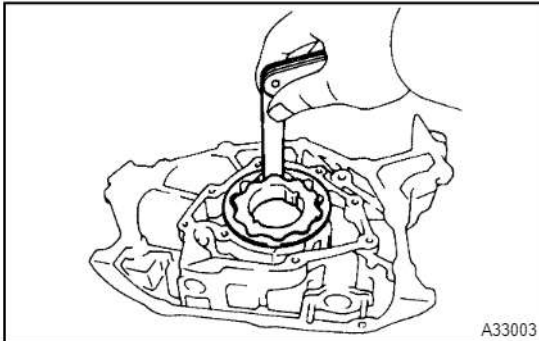
3. INSPECT OIL PUMP COVER

- (a) Remove the 10 screws and the oil pump cover.

4. INSPECT OIL PUMP ROTOR

- (a) Apply a light coat of engine oil to the oil pump rotor set and place them into the oil pump body. Check that the rotors revolve smoothly.

If the result is not as specified, replace the oil pump assy.



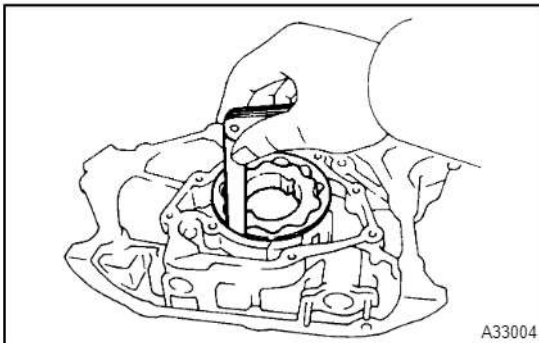
- (b) Check the tip clearance.

- (1) Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

Standard: 0.060 to 0.180 mm (0.0024 to 0.0071 in.)

Maximum: 0.30 mm (0.0118 in.)

If the tip clearance is greater than the maximum, replace the oil pump assy.



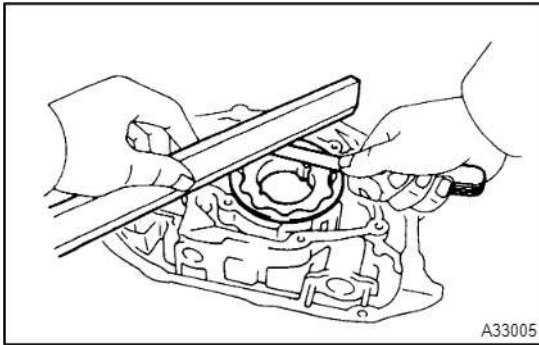
- (c) Check the body clearance between the driven rotor and pump body.

- (1) Using a feeler gauge, measure the clearance between the driven rotor and body.

Standard: 0.250 to 0.325 mm (0.0098 to 0.0128 in.)

Maximum: 0.50 mm (0.0197 in.)

If the body clearance is greater than the maximum, replace the oil pump assy.



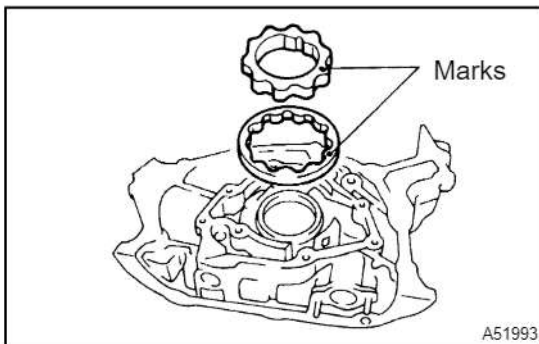
- (d) Check the side clearance.
- (1) Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard: 0.030 to 0.090 mm (0.0012 to 0.0035 in.)

Maximum: 0.15 mm (0.0059 in.)

If the side clearance is greater than the maximum, replace the oil pump assy.

5. REMOVE OIL PUMP ROTOR



6. INSTALL OIL PUMP ROTOR

- (a) Apply a light coat of engine oil to the oil pump gear set and place it into the pump body with the marks facing the pump body cover side.

7. INSTALL OIL PUMP COVER

- (a) Install the oil pump cover with the 10 screws.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

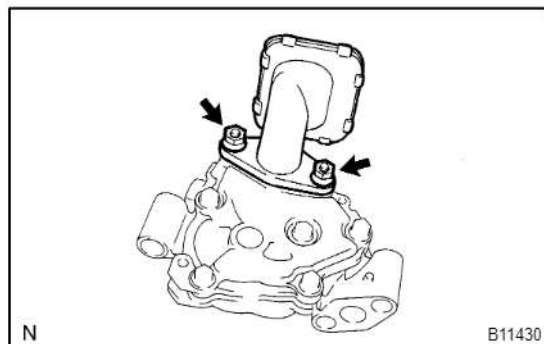
8. INSTALL OIL PUMP RELIEF VALVE

- (a) Apply a light coat of engine oil to the relief valve, and insert the relief valve and spring into the pump body hole.

- (b) Install the plug.

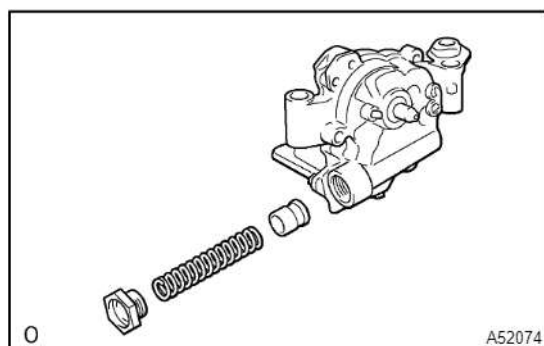
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

OVERHAUL



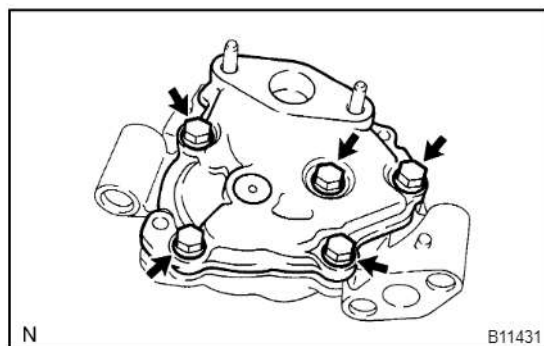
1. REMOVE OIL PUMP STRAINER SET

- (a) Remove the 2 nuts and oil pump strainer.



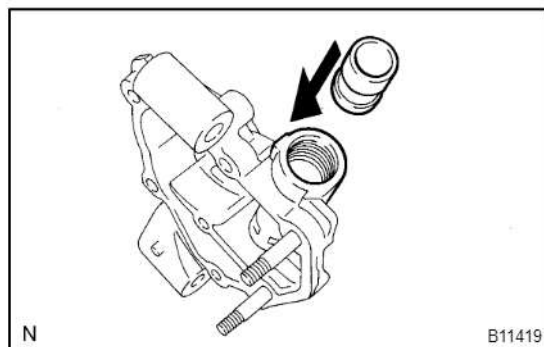
2. REMOVE OIL PUMP RELIEF VALVE

- (a) Using a socket wrench (27 mm), remove the plug.
 (b) Remove the valve spring and relief valve.



3. REMOVE OIL PUMP COVER

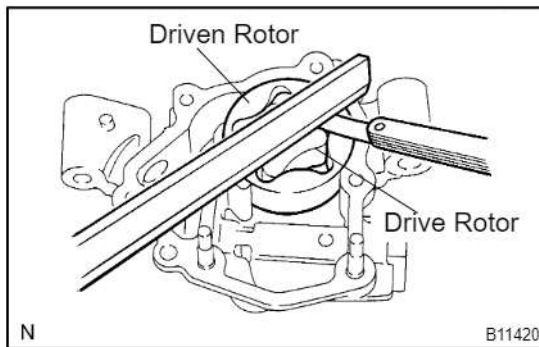
- (a) Remove the 5 bolts and oil pump cover.



4. INSPECT OIL PUMP RELIEF VALVE

- (a) Check the relief valve.
 (1) Coat the valve with engine oil and check that the valve falls smoothly into the valve hole by its own weight.

If it does not, replace the relief valve. If necessary, replace the oil pump assy.



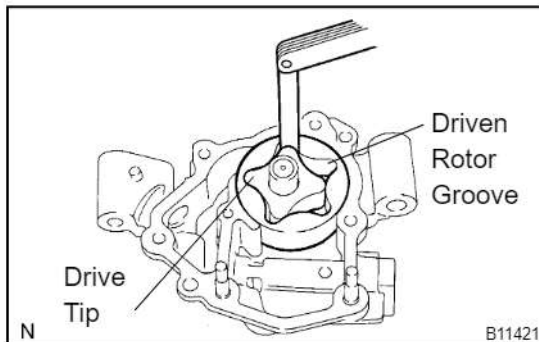
5. INSPECT OIL PUMP ROTOR

- (a) Check the side clearance.
 (1) Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard: 0.030 to 0.085 mm (0.0012 to 0.0033 in.)

Maximum: 0.16 mm (0.0063 in.)

If the side clearance is greater than the maximum, replace the oil pump assy.

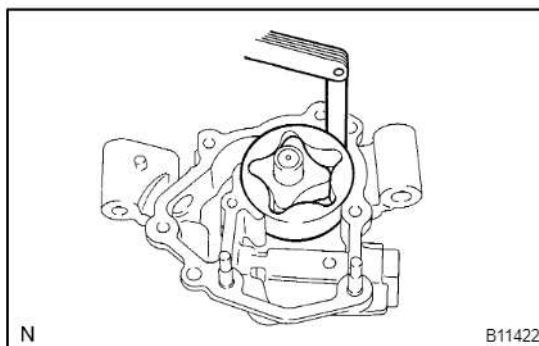


- (b) Check the tip clearance.
 (1) Using a feeler gauge, measure the clearance between the driven rotor tips.

Standard: 0.080 to 0.160 mm (0.0031 to 0.0063 in.)

Maximum: 0.35 mm (0.0138 in.)

If the tip clearance is greater than the maximum, replace the oil pump assy.



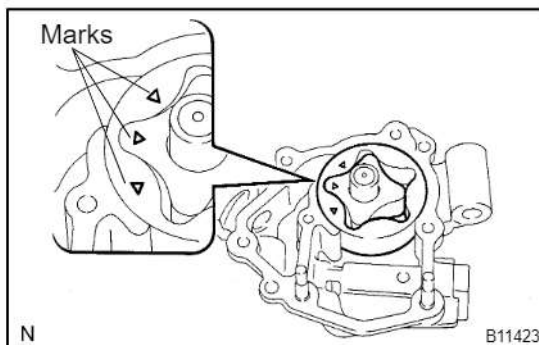
- (c) Check the body clearance.
 (1) Using a feeler gauge, measure the clearance between the driven rotor and pump body.

Standard: 0.100 to 0.170 mm (0.0039 to 0.0067 in.)

Maximum: 0.325 mm (0.01280 in.)

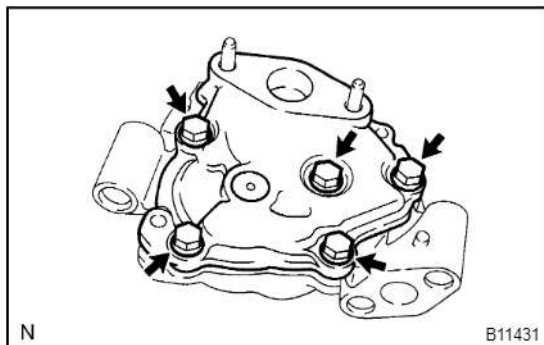
- (d) Remove the oil pump rotors.
 If the body clearance is greater than the maximum, replace the oil pump assy.

6. REMOVE OIL PUMP ROTOR

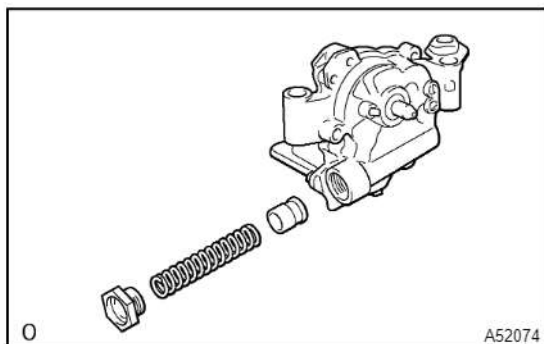


7. INSTALL OIL PUMP ROTOR

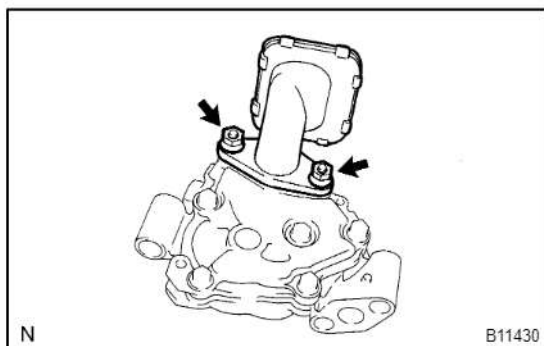
- (a) Coat the drive rotor and driven rotor with engine oil.
 (b) Place the drive and driven rotors into the pump body with the marks facing the pump body cover side.

**8. INSTALL OIL PUMP COVER**

- (a) Install the pump body cover with the 5 bolts.
Torque: 8.8 N·m (90 kgf·cm, 79 in·lbf)

**9. INSTALL OIL PUMP RELIEF VALVE**

- (a) Coat the relief valve with engine oil.
 (b) Insert the relief valve and spring into the pump body hole.
 (c) Using a socket wrench (27 mm), install the plug.

**10. INSTALL OIL PUMP STRAINER SET**

- (a) Place a new gasket on the oil pump.
 (b) Install the oil strainer with the 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

OIL FILTER SUB-ASSY (2AZ-FE)

REPLACEMENT

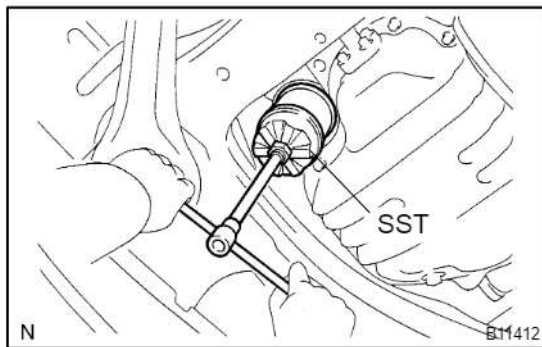
1701X-10

CAUTION:

- Prolonged and repeated contact of mineral oil with the skin will deplete the skin's natural fats, leading to dryness, irritation and dermatitis. In addition, used engine oil contains harmful contaminants which may cause skin cancer.
- Wear protective clothing and gloves to minimize the length and frequency of contact between the skin and used oil. If contact does occur, wash your skin thoroughly with soap and water or waterless hand cleaner. Do not use gasoline, thinners or solvents to wash the skin.
- In order to preserve the environment, dispose of used oil and used oil filters only at designated disposal site.

1. DRAIN ENGINE OIL

- Remove the oil filler cap.
- Remove the oil drain plug and drain the oil into a container.

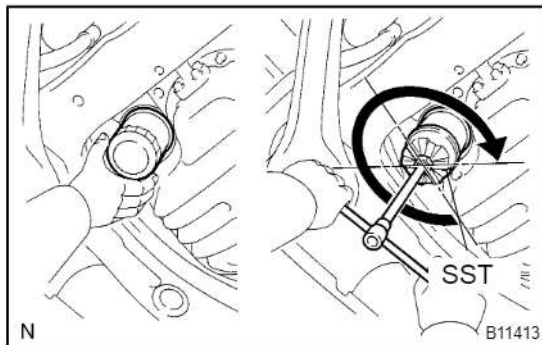


2. REMOVE OIL FILTER SUB-ASSY

- Using SST, remove the oil filter.
SST 09228-06501

3. INSTALL OIL FILTER SUB-ASSY

- Check and clean the oil filter installation surface.
- Apply clean engine oil to the gasket of a new oil filter.



- Lightly screw the oil filter into place by hand, Tighten it until the gasket contacts the seat.
- Using SST, tighten the oil filter.
SST 09228-06501

- Depending on the work space available, choose from the following.
 - If enough space is available, use SST to tighten the oil filter.

Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)

- If not enough space is available to use SST, tighten the oil filter a 3/4 turn by hand.

4. ADD ENGINE OIL

- Clean and install the oil drain plug with a new gasket.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

- (b) Fill with fresh engine oil.

Specification:

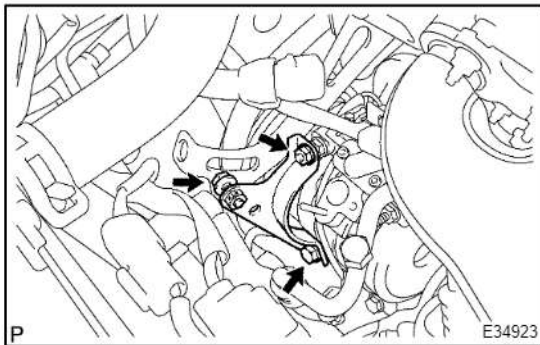
Item		Capacity
Drain and refill	w/ oil filter change	3.8 liters (4.0 US qts, 3.3 Imp. qts)
Drain and refill	w/o oil filter change	3.6 liters (3.8 US qts, 3.2 Imp. qts)
Dry fill		4.5 liters (4.8 US qts, 4.0 Imp. qts)

- (c) Install the oil filler cap.

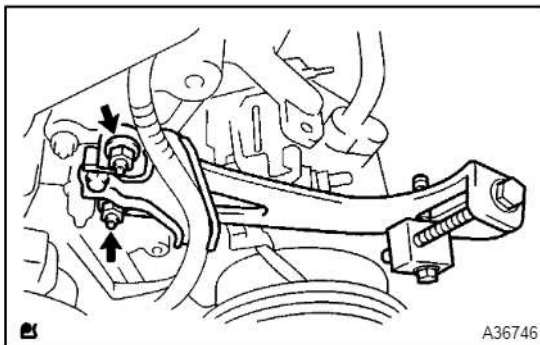
5. CHECK FOR ENGINE OIL LEAKS

REPLACEMENT

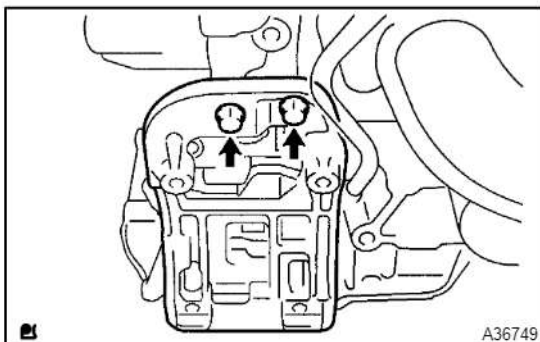
1. REMOVE FRONT WHEEL
2. REMOVE ENGINE UNDER COVER NO.1
3. REMOVE FRONT FENDER APRON SEAL RH
4. DRAIN ENGINE OIL
 - (a) Install a new gasket after draining engine oil.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)
5. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1
(See page 14-125)
6. REMOVE VANE PUMP V BELT (See page 14-125)
7. REMOVE ENGINE MOVING CONTROL ROD (See page 14-149)
8. REMOVE ENGINE MOUNTING STAY NO.2 RH
9. REMOVE GENERATOR BRACKET NO.2
10. REMOVE EXHAUST PIPE SUPPORT BRACKET NO.1
11. REMOVE EXHAUST PIPE ASSY FRONT (See page 15-5)



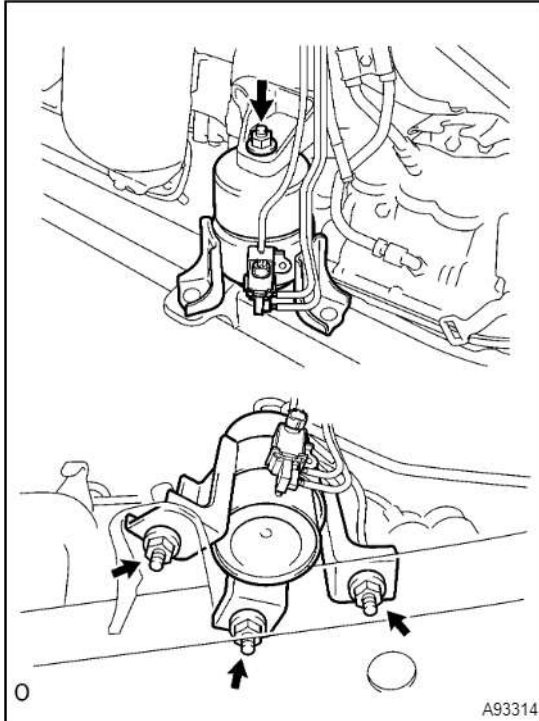
12. SEPARATE COMPRESSOR AND MAGNETIC CLUTCH
 - (a) Remove the 2 bolts, nut and drive belt adjusting bar bracket.



- (b) Remove the 2 nuts and the generator bracket adjusting bar together with the wire harness clamp bracket.
 - (c) Disconnect the compressor, magnetic clutch connector and wire harness clamp.



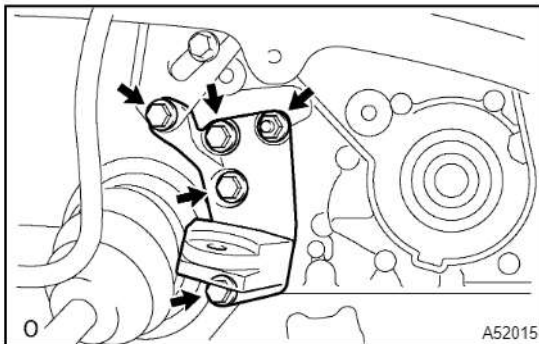
13. REMOVE COMPRESSOR MOUNTING BRACKET NO.1
 - (a) Remove the 2 bolts and mounting bracket.

14. REMOVE OIL LEVEL GAGE SUB-ASSY**15. REMOVE OIL LEVEL GAGE GUIDE****16. REMOVE ENGINE MOUNTING**

- (a) Remove the 4 nuts and bolt, and disconnect the engine mounting insulator FR.

NOTICE:

Do not remove the engine mounting insulator.



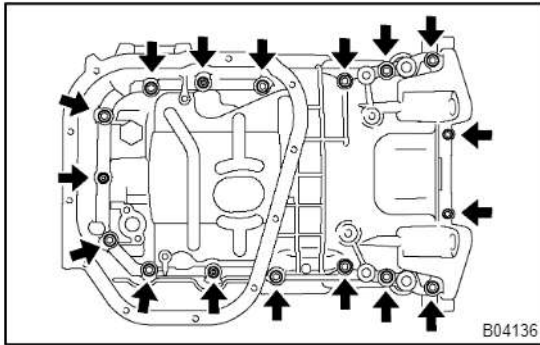
- (b) Remove the 4 bolts, nut and engine mounting bracket RH.

17. REMOVE CRANKSHAFT PULLEY (See page 14-173)**18. REMOVE TIMING BELT NO.1 COVER (See page 14-173)****19. REMOVE TIMING BELT NO.2 COVER (See page 14-173)****20. REMOVE TIMING BELT GUIDE NO.2****21. REMOVE TIMING BELT (See page 14-173)****22. REMOVE TIMING BELT IDLER SUB-ASSY NO.1**

- (a) Using a socket hexagon wrench 10, remove the pivot bolt, timing belt idler No. 1 and plate washer.

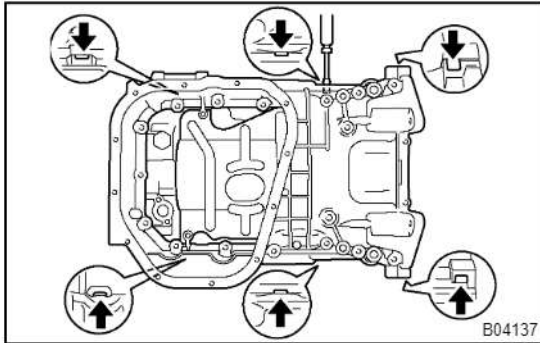
23. REMOVE TIMING BELT IDLER SUB-ASSY NO.2**24. REMOVE CAMSHAFT TIMING PULLEY (See page 14-173)****25. REMOVE TIMING BELT NO.3 COVER (See page 14-173)****26. REMOVE CRANKSHAFT TIMING PULLEY (See page 14-173)****27. REMOVE OIL PAN SUB-ASSY NO.2 (See page 14-173)****28. REMOVE OIL STRAINER SUB-ASSY**

- (a) Remove the bolt and 2 nuts, then remove the oil strainer and the gasket.



29. REMOVE OIL PAN SUB-ASSY

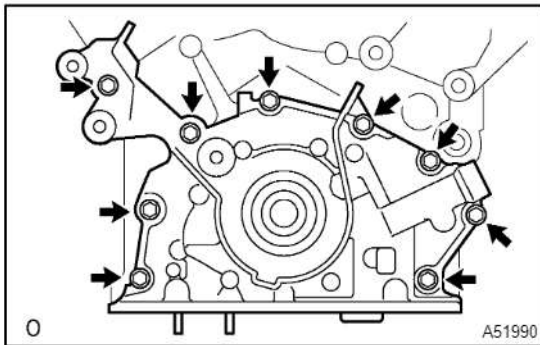
- (a) Uniformly loosen and remove the 15 bolts and 2 nuts, as shown in the illustration.



- (b) Using a screwdriver, remove the oil pan by prying between the cylinder block and the oil pan.

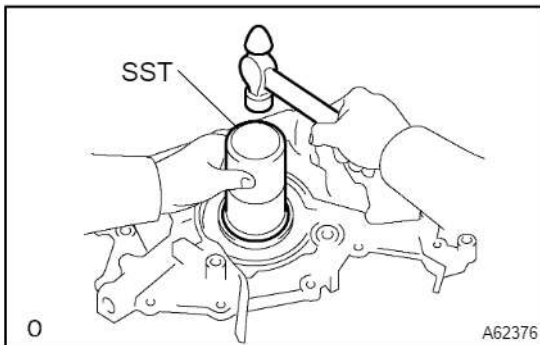
NOTICE:

Be careful not to damage the contact surfaces of the oil pan and cylinder block.



30. REMOVE OIL PUMP ASSY

- (a) Remove the 9 bolts.
 (b) Using a screwdriver, remove the oil pump by prying between the oil pump and the main bearing cap.
 (c) Remove the O-ring.



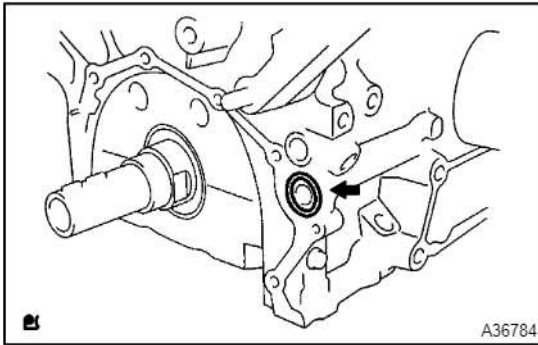
31. INSTALL OIL PUMP ASSY

- (a) Using SST and a hammer, install a new oil seal. Tap the surface of the SST with the hammer until the oil seal's surface is flush with the oil pump body edge.

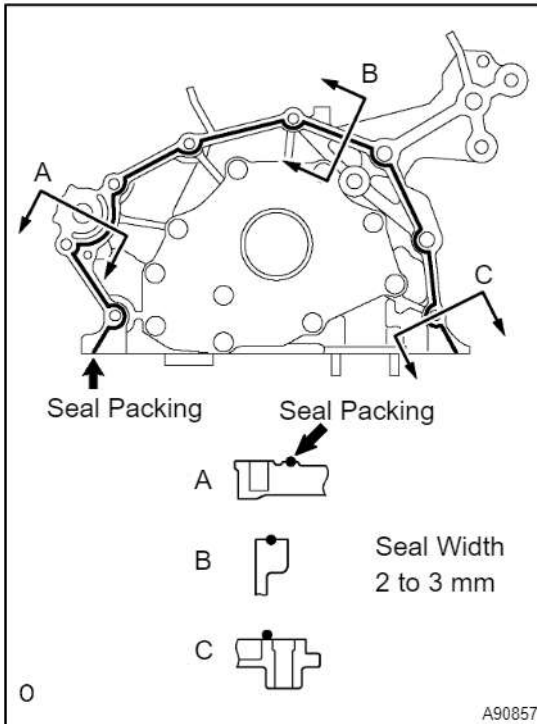
SST 09223-00010

NOTICE:

- **Be careful not to tap the oil seal at an angle.**
 - **Keep the gap between the oil pump body edge and the oil seal free from contamination.**
- (b) Apply a small amount of MP grease to the oil seal lip.
 (c) Remove any old seal packing material from the contact surface.



- (d) Apply a light coat of engine oil to a new O-ring and place it on the cylinder block.

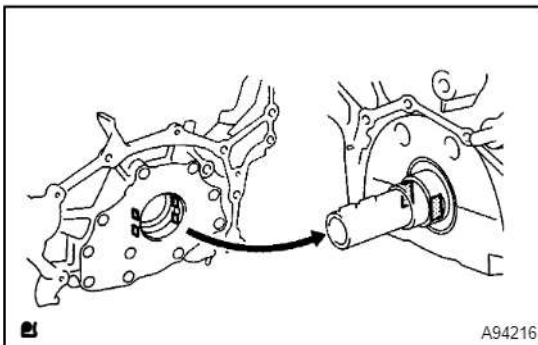


- (e) Apply a continuous bead of seal packing (seal width: 2 to 3 mm (0.08 to 0.12 in.)) as shown in the illustration.

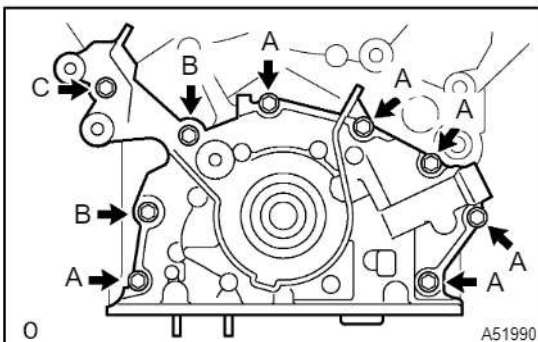
Seal packing: Part No. 08226-00080 or equivalent

NOTICE:

- Remove any oil from contact surface.
- Apply seal packing to the inner side of the bolt holes.
- Install the oil pump within 3 minutes after applying seal packing.
- Do not expose the seal to engine oil for at least 2 hours after installing the oil pump.



- (f) Align the key of the oil pump drive gear with the key way located on the crankshaft, and slide the oil pump into place.



- (g) Install the oil pump by tightening the 9 bolts uniformly.

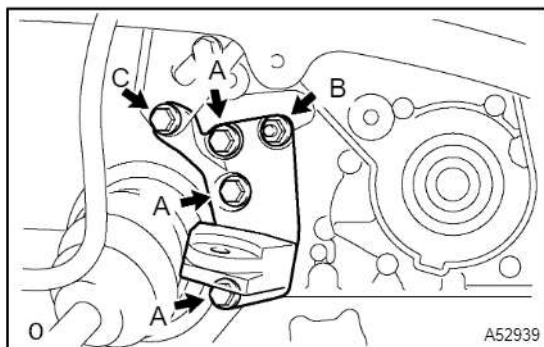
Torque:

8.0 N·m (82 kgf·cm, 71 in·lbf) for bolt A

20 N·m (204 kgf·cm, 15 ft·lbf) for bolt B

43 N·m (438 kgf·cm, 32 ft·lbf) for bolt C

32. **INSTALL OIL PAN SUB-ASSY** (See page 14-173)
33. **INSTALL OIL STRAINER SUB-ASSY**
 - (a) Install a new gasket and the oil strainer with the bolt and 2 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)
34. **INSTALL OIL PAN SUB-ASSY NO.2** (See page 14-173)
35. **INSTALL CRANKSHAFT POSITION SENSOR**
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)
36. **INSTALL COMPRESSOR AND MAGNETIC CLUTCH** (See page 14-149)
37. **INSTALL OIL LEVEL GAGE GUIDE**
38. **INSTALL OIL LEVEL GAGE SUB-ASSY**
39. **INSTALL TIMING BELT IDLER SUB-ASSY NO.1**
 - (a) Using a socket hexagon wrench 10, install the plate washer and timing belt idler No. 1 with the pivot bolt.
Torque: 34 N·m (347 kgf·cm, 25 ft·lbf)
40. **INSTALL TIMING BELT IDLER SUB-ASSY NO.2**
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)
41. **INSTALL TIMING BELT NO.3 COVER** (See page 14-173)
42. **INSTALL CAMSHAFT TIMING PULLEY** (See page 14-173)
43. **INSTALL TIMING BELT** (See page 14-173)
44. **INSTALL CHAIN TENSIONER ASSY NO.1** (See page 14-173)
45. **INSTALL TIMING BELT GUIDE NO.2** (See page 14-41)
46. **INSTALL TIMING BELT NO.2 COVER**
 - (a) Visually check for cracks and breaks on the gasket of the timing belt cover.
If there is a trace that water is entering at the visual check, replace the timing belt cover.
 - (b) Install the timing belt cover.
Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)
47. **INSTALL TIMING BELT NO.1 COVER** (See page 14-173)



48. **INSTALL ENGINE MOUNTING**

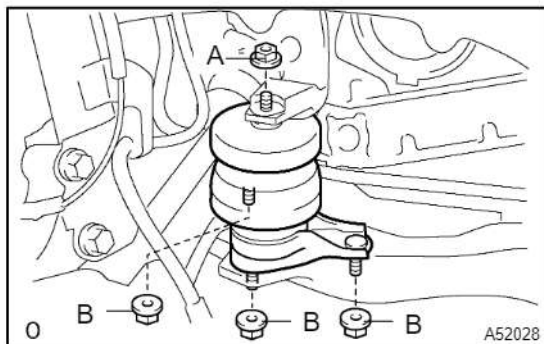
- (a) Install the engine mounting bracket RH with the 4 bolts and nut.

Torque:

54 N·m (551 kgf·cm, 40 ft·lbf) for bolt A

54 N·m (551 kgf·cm, 40 ft·lbf) for nut B

43 N·m (438 kgf·cm, 32 ft·lbf) for bolt C



- (b) Install the engine mounting insulator RH with the 4 nuts.

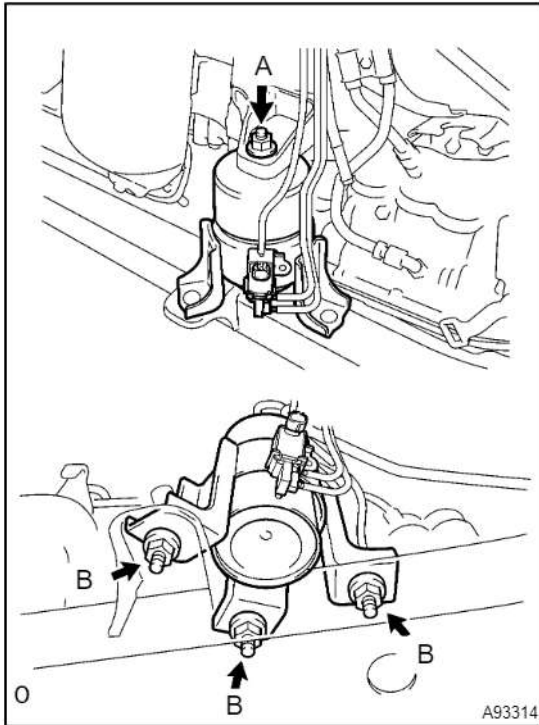
Torque:

95 N·m (969 kgf·cm, 70 ft·lbf) for nut A

87 N·m (887 kgf·cm, 64 ft·lbf) for nut B

HINT:

First, loosely install the nut labeled (A) with your hand. Then use a wrench to install the 3 nuts labeled (B). Finally, use a wrench to tighten nut (A).



- (c) Install the engine mounting insulator FR with the nut.

Torque:

87 N·m (887 kgf·cm, 64 ft·lbf) for nut A

52 N·m (530 kgf·cm, 38 ft·lbf) for nut B

49. INSTALL CRANKSHAFT PULLEY (See page 14-173)

50. INSTALL GENERATOR BRACKET NO.1

- (a) Visually check for cracks and breaks on the gasket of the timing belt cover.
If there is a trace that water is entering at the visual check, replace the timing belt cover.
(b) Install the timing belt cover.

Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

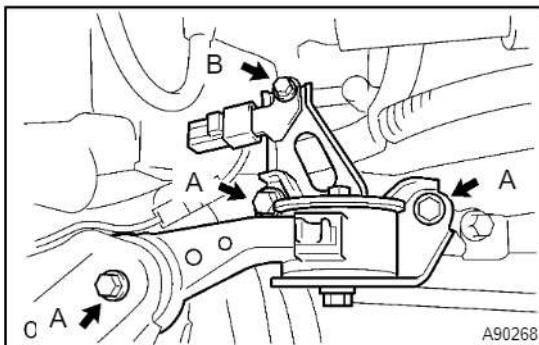
51. INSTALL COMPRESSOR AND MAGNETIC CLUTCH

- (a) Install the compressor with the 3 bolts.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
(b) Install the adjusting bar bracket with the bolt and nut.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf) for bolt

52. INSTALL ENGINE MOUNTING STAY NO.2 RH

Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)



53. INSTALL ENGINE MOVING CONTROL ROD

- (a) Install the control rod and bracket with the 4 bolts.

Torque:

64 N·m (653 kgf·cm, 47 ft·lbf) for bolt A

23 N·m (235 kgf·cm, 17 ft·lbf) for bolt B

54. INSTALL VANE PUMP V BELT (See page 14-125)

55. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

(See page 14-125)

56. ADD ENGINE OIL

57. CHECK FOR ENGINE OIL LEAKS

OIL FILTER SUB-ASSY (3MZ-FE)

REPLACEMENT

1701H-10

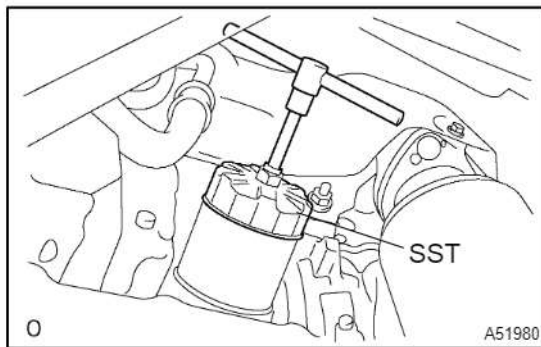
CAUTION:

- Prolonged and repeated contact of mineral oil with the skin will deplete the skin's natural fats, leading to dryness, irritation and dermatitis. In addition, used engine oil contains harmful contaminants which may cause skin cancer.
- Wear protective clothing and gloves to minimize the length and frequency of contact between the skin and used oil. If contact does occur, wash your skin thoroughly with soap and water or waterless hand cleaner. Do not use gasoline, thinners or solvents to wash the skin.
- In order to preserve the environment, dispose of used oil and used oil filters only at designated disposal site.

1. REMOVE ENGINE UNDER COVER NO.1

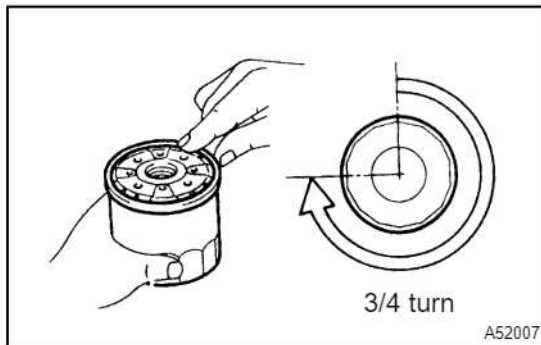
2. DRAIN ENGINE OIL

- Remove the oil filler cap.
- Remove the oil drain plug and drain the oil into a container.



3. REMOVE OIL FILTER SUB-ASSY

- Using SST, remove the oil filter.
SST 09228-07501



4. INSTALL OIL FILTER SUB-ASSY

- Check and clean the oil filter installation surface.
- Apply clean engine oil to the gasket of a new oil filter.
- Lightly screw the oil filter into place by hand, Tighten it until the gasket contacts the seat.
- Using SST, tighten the oil filter.
SST 09228-06501

- Depending on the work space available, choose from the following.

- If enough space is available, use SST to tighten the oil filter.

Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)

- If not enough space is available to use SST, tighten the oil filter a 3/4 turn by hand.

5. ADD ENGINE OIL

- Clean and install the oil drain plug with a new gasket.

Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

- (b) Fill with fresh engine oil.

Specification:

Item		Capacity
Drain and refill	w/ oil filter change	4.7 liters (5.0 US qts, 4.1 Imp. qts)
Drain and refill	w/o oil filter change	4.5 liters (4.8 US qts, 4.0 Imp. qts)
Dry fill		5.5 liters (5.8 US qts, 4.8 Imp. qts)

- (c) Install the oil filler cap.

6. CHECK FOR ENGINE OIL LEAKS

7. INSTALL ENGINE UNDER COVER NO.1

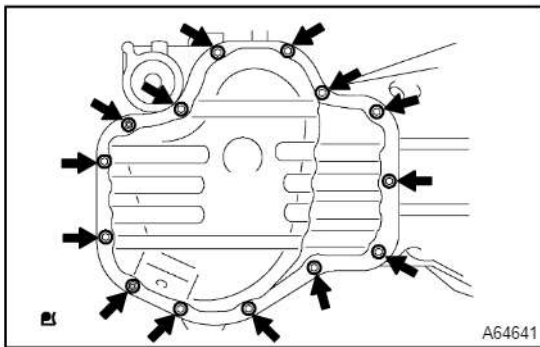
REPLACEMENT

1. REMOVE FRONT WHEEL RH
2. REMOVE ENGINE UNDER COVER NO.1
3. REMOVE FRONT FENDER APRON SEAL RH
4. DRAIN ENGINE OIL
 - (a) Install a new gasket and the drain plug after draining engine oil.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
5. REMOVE EXHAUST PIPE ASSY FRONT
6. REMOVE ENGINE MOVING CONTROL ROD W/BRACKET (See page 14-24)
7. REMOVE ENGINE MOUNTING STAY NO.2 RH (See page 14-24)
8. REMOVE ENGINE MOUNTING BRACKET NO.2 RH (See page 14-24)
9. REMOVE FAN AND GENERATOR V BELT (See page 14-5)
10. REMOVE ENGINE COVER SUB-ASSY NO.1
11. DISCONNECT ENGINE WIRE
12. REMOVE GENERATOR ASSY
13. REMOVE VANE PUMP ASSY (See page 51-8)

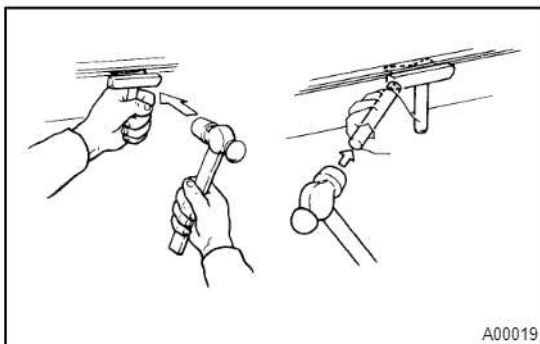
NOTICE:

Do not disconnect the hose.

14. REMOVE IGNITION COIL ASSY
15. DISCONNECT VENTILATION HOSE
16. DISCONNECT VENTILATION HOSE NO.2
17. REMOVE CYLINDER HEAD COVER SUB-ASSY (See page 14-41)
18. SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page 14-6)
19. REMOVE CRANKSHAFT PULLEY (See page 14-41)
20. REMOVE CRANKSHAFT POSITION SENSOR (See page 14-41)



21. REMOVE OIL PAN SUB-ASSY
 - (a) Remove the 12 bolts and 2 nuts.



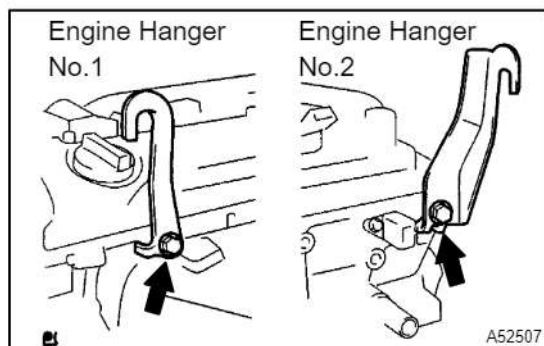
- (b) Insert the blade of SST between the crankcase and oil pan. Cut through the sealer and remove the oil pan.
SST 09032-00100

NOTICE:

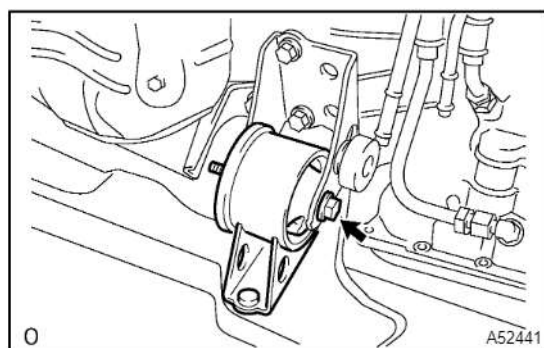
Be careful not to damage the contact surface of the cylinder block and oil pan.

22. REMOVE CHAIN TENSIONER ASSY NO.1 (See page 14-41)

23. REMOVE V-RIBBED BELT TENSIONER ASSY (See page 14-24)



24. INSTALL ENGINE HANGER NO.1



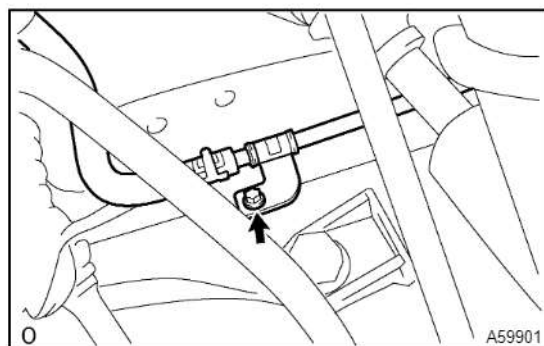
25. REMOVE ENGINE MOUNTING INSULATOR

(a) Attach the engine chain hoist to the engine hangers.

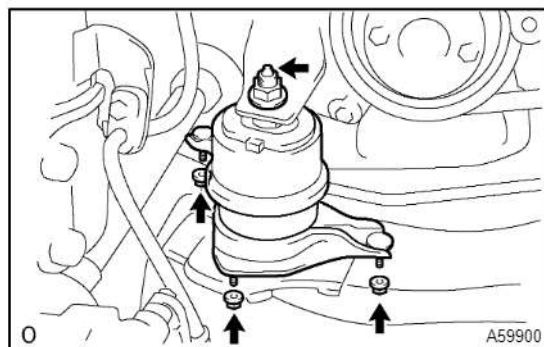
CAUTION:

Do not attempt to hang the engine by hooking the chain to any other part.

(b) Remove the bolt and disconnect the engine mounting insulator FR.

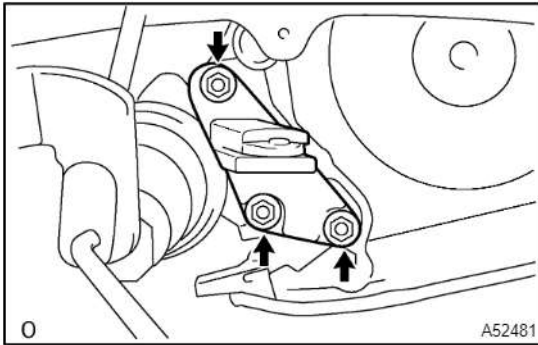


(c) Remove the bolt and disconnect the steering gear return hose clamp from the frame.



(d) Remove the 4 nuts from the engine mounting insulator RH.

(e) Raise the engine and remove the engine mounting insulator RH.



26. REMOVE ENGINE MOUNTING BRACKET RH

- (a) Remove the 3 bolts and engine mounting bracket.

27. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSY (See page 14-41)

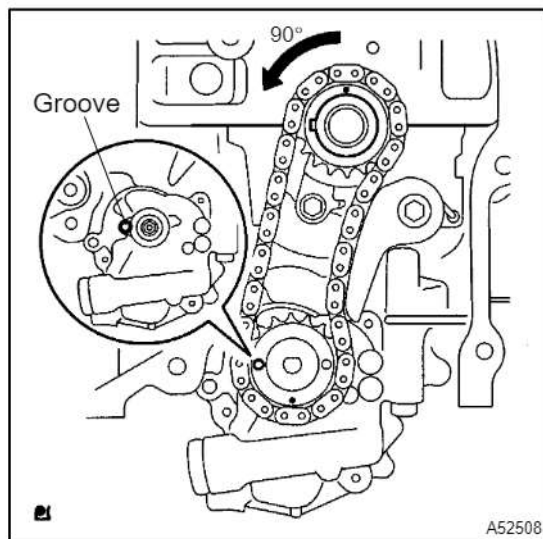
28. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1

29. REMOVE CHAIN TENSIONER SLIPPER (See page 14-68)

30. REMOVE CHAIN VIBRATION DAMPER NO.1 (See page 14-68)

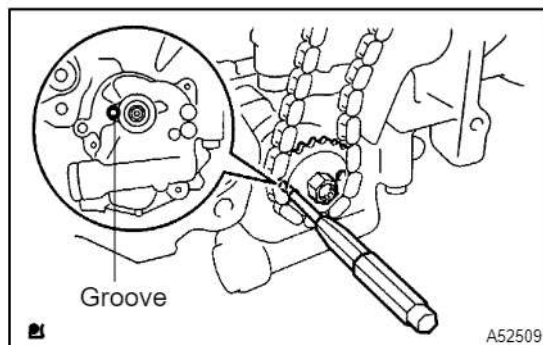
31. REMOVE CHAIN SUB-ASSY (See page 14-68)

32. REMOVE CRANKSHAFT TIMING GEAR OR SPROCKET

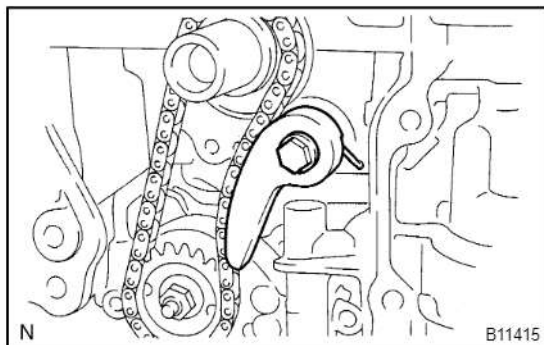


33. REMOVE NO.2 CHAIN SUB-ASSY

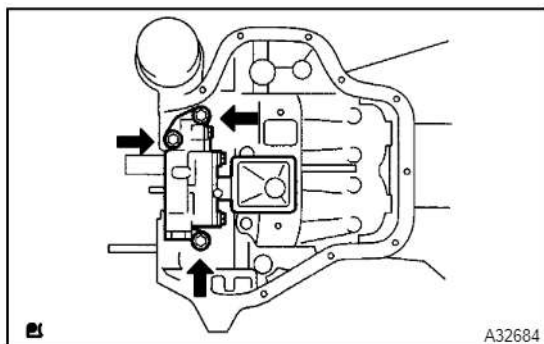
- (a) Turn the crankshaft counterclockwise 90°, and align the adjusting hole of the oil pump drive sprocket gear with the groove of the oil pump.



- (b) Insert a bar ($\phi 4.0$ mm (0.16 in.)) into the adjusting hole of the oil pump drive sprocket to temporarily lock the sprocket in position. Remove the nut.



- (c) Remove the bolt, chain tensioner plate and spring.
- (d) Remove the chain tensioner, oil pump drive sprocket and chain.



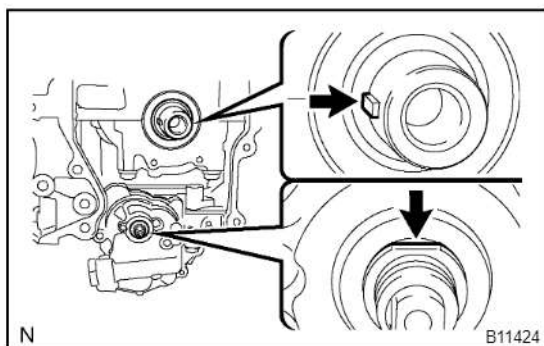
34. REMOVE OIL PUMP ASSY

- (a) Remove the 3 bolts, oil pump and gasket.

35. INSTALL OIL PUMP ASSY

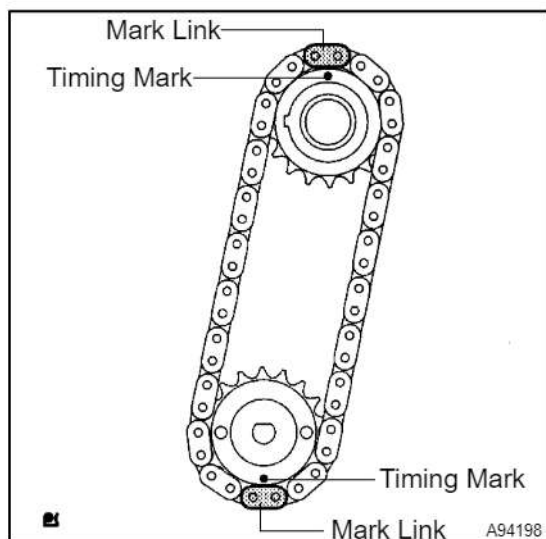
- (a) Install a new gasket and oil pump with the 3 bolts.

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

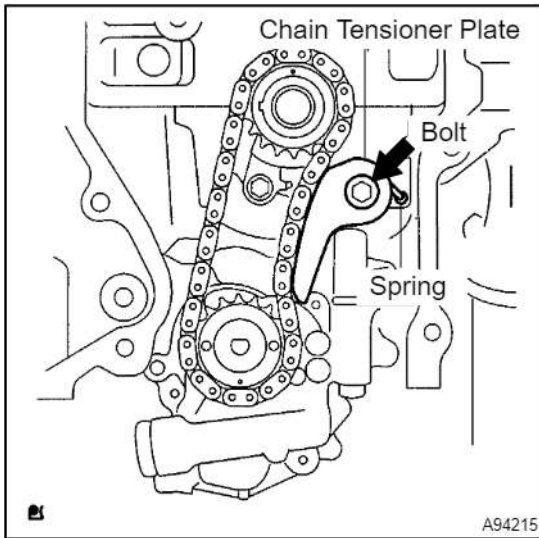


36. INSTALL NO.2 CHAIN SUB-ASSY

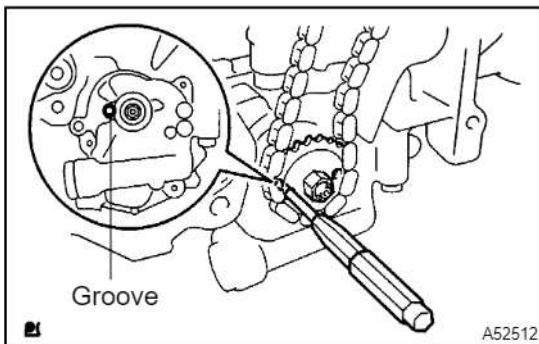
- (a) Set the crankshaft key in the horizontal left position.
- (b) Turn the cutout of the drive shaft to the top.



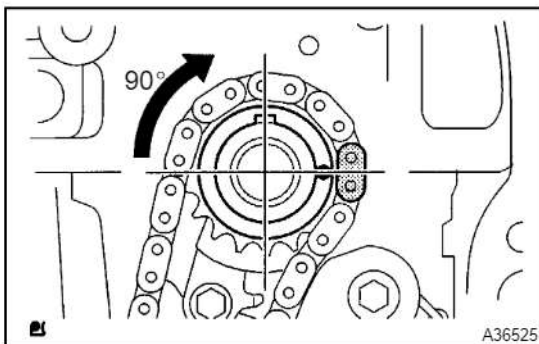
- (c) Align the mark links (yellow colored links) of the chain with the timing marks of the gear as shown in the illustration.
- (d) Insert the gear together with chain into the crankshaft and oil pump shaft.
- (e) Temporarily tighten the oil pump drive shaft gear with the nut.



- (f) Insert the damper spring into the adjusting hole, and install the chain tensioner plate with the bolt.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)



- (g) Align the adjusting hole of the sprocket with the groove of the oil pump.
 (h) Insert a bar (ϕ 4 mm (0.16 in.)) into the adjusting hole of the sprocket to temporarily lock the gear in position. Install the nut.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)



- (i) Rotate the crankshaft 90° clockwise and align the crankshaft key with the top.

37. INSTALL CRANKSHAFT TIMING GEAR OR SPROCKET

38. INSTALL CHAIN VIBRATION DAMPER NO.1

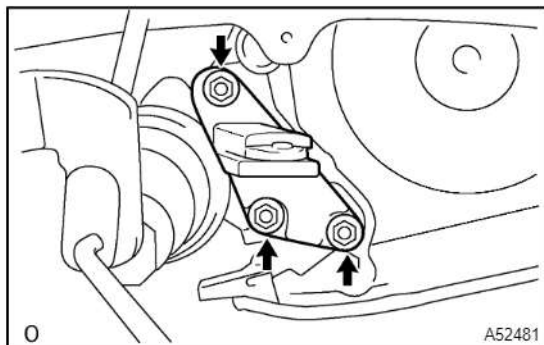
- (a) Install the chain vibration damper with the 2 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

39. INSTALL CHAIN SUB-ASSY (See page 14-68)

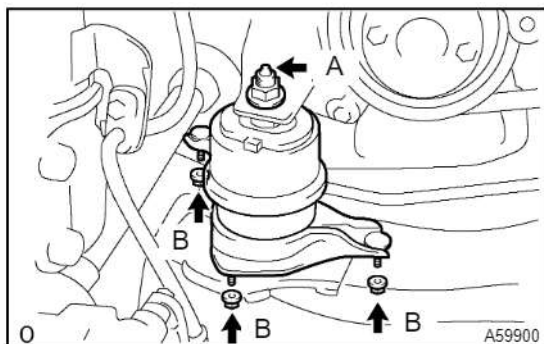
40. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1 (See page 14-41)

41. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSY (See page 14-41)

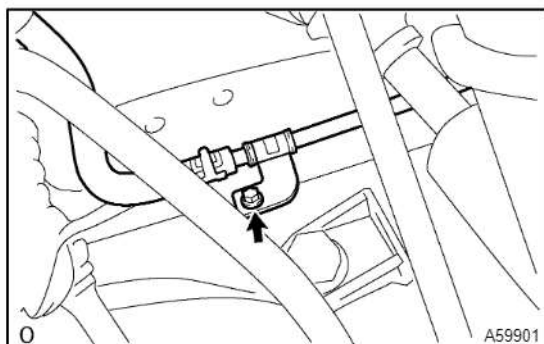
42. INSTALL V-RIBBED BELT TENSIONER ASSY (See page 14-24)

**43. INSTALL ENGINE MOUNTING BRACKET RH**

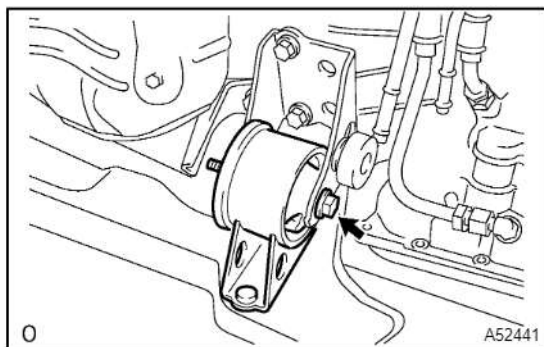
- (a) Install the engine mounting bracket with the 3 bolts.
Torque: 54 N·m (551 kgf·cm, 40 ft·lbf)

**44. INSTALL ENGINE MOUNTING INSULATOR**

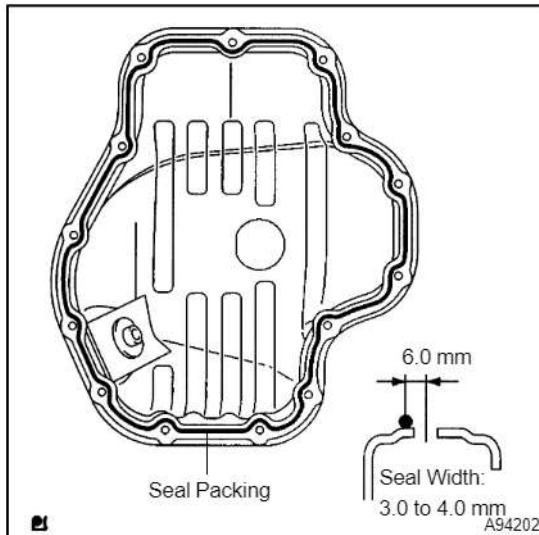
- (a) Raise the engine and install the engine mounting insulator RH.
 (b) Install the engine mounting insulator RH with the 4 nuts.
Torque:
95 N·m (969 kgf·cm, 70 ft·lbf) for nut A
87 N·m (887 kgf·cm, 64 ft·lbf) for nut B



- (c) Install the steering gear return hose clamp to the frame with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)



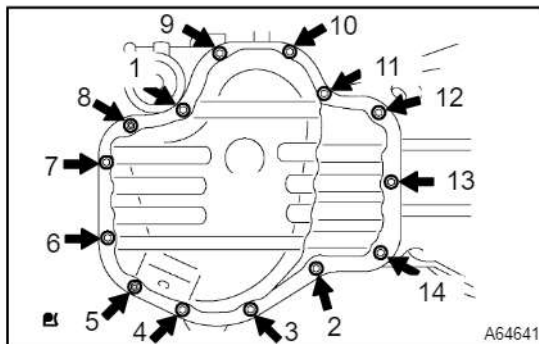
- (d) Install the engine mounting insulator FR with the bolt.
Torque: 87 N·m (887 kgf·cm, 64 ft·lbf)

**45. INSTALL OIL PAN SUB-ASSY****NOTICE:**

- Remove any oil from the contact surface.
- Install the oil pan within 3 minutes after applying seal packing.
- Do not start the engine for at least 2 hours after installing.

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the cylinder block and oil pan.
- (b) Apply seal packing in a continuous bead (Seal Width: 3.0 to 4.0 mm (0.12 to 0.16 in.)) as shown in the illustration, and install the oil pan.

Seal packing: Part No. 08826-00080 or equivalent



- (c) Uniformly tighten the 12 bolts and 2 nuts in the sequence shown in the illustration.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

46. INSTALL CRANKSHAFT POSITION SENSOR (See page 14-41)
47. INSTALL CRANKSHAFT PULLEY (See page 14-41)
48. INSTALL CHAIN TENSIONER ASSY NO.1 (See page 14-68)
49. INSTALL CYLINDER HEAD COVER SUB-ASSY
50. INSTALL IGNITION COIL ASSY
51. INSTALL VANE PUMP ASSY
52. INSTALL GENERATOR ASSY
53. INSTALL ENGINE WIRE
54. INSTALL FAN AND GENERATOR V BELT (See page 14-5)
55. INSTALL ENGINE MOUNTING BRACKET NO.2 RH
56. INSTALL ENGINE MOUNTING STAY NO.2 RH
57. INSTALL ENGINE MOVING CONTROL ROD W/BRACKET (See page 14-24)
58. INSTALL EXHAUST PIPE ASSY FRONT (See page 15-2)
59. INSTALL FRONT WHEEL RH
60. ADD ENGINE OIL
61. CHECK FOR ENGINE OIL LEAKS