

LUBRICATION SYSTEM

ON-VEHICLE INSPECTION

1. CHECK ENGINE OIL LEVEL

- Warm up the engine, stop the engine and wait for 5 minutes.
- Check that the engine oil level is between the L and F marks of the oil dipstick.
If low, check for leakage and add oil up to the F mark.

NOTICE:

Do not add engine oil above the F mark.

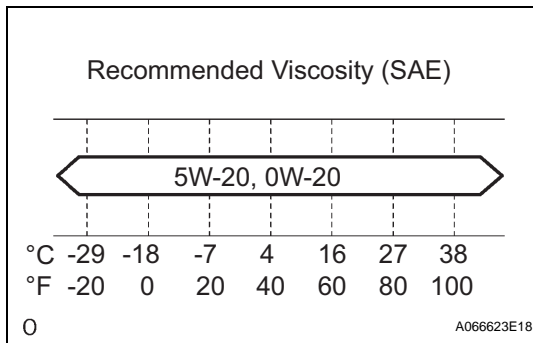
2. CHECK ENGINE OIL QUALITY

- Check the oil for deterioration, water intrusion, discoloration or thinning.
If the quality is visibly poor, replace the oil.

Oil grade:

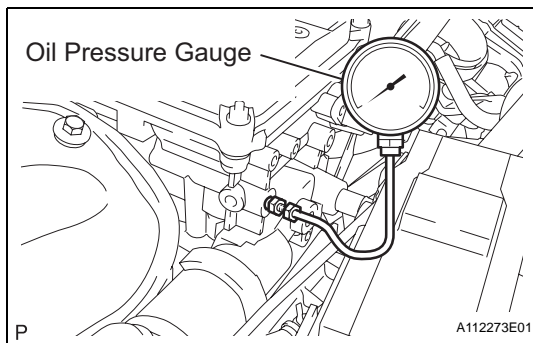
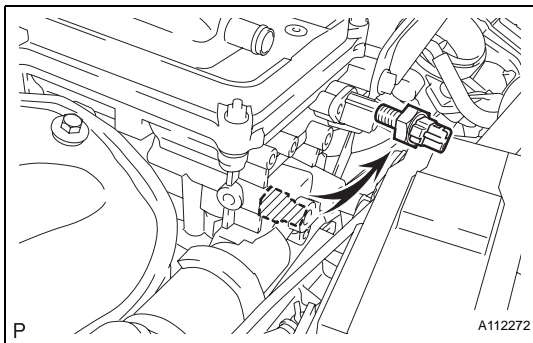
Use ILSAC multigrade engine oil. SAE 5W-20 and SAE 0W-20 engine oil may be used.

However, SAE 0W-20 is the best choice for good fuel economy and good starting in cold weather.



3. CHECK OIL PRESSURE

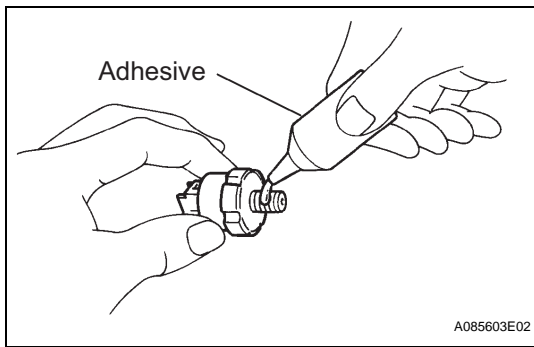
- Disconnect the oil pressure switch connector.
- Using a 24 mm deep socket wrench, remove the oil pressure switch.



- Install the oil pressure gauge.
- Warm up the engine.
- Measure the oil pressure.

Standard oil pressure

Condition	Specified Condition
Idle	29 kPa (0.3 kgf/cm ² , 4.3 psi) or more
3,000 rpm	170 to 300 kPa (1.7 to 3.1 kgf/cm ² , 24 to 44 psi)



- (f) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or Equivalent

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

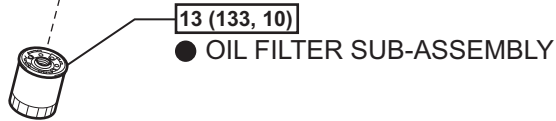
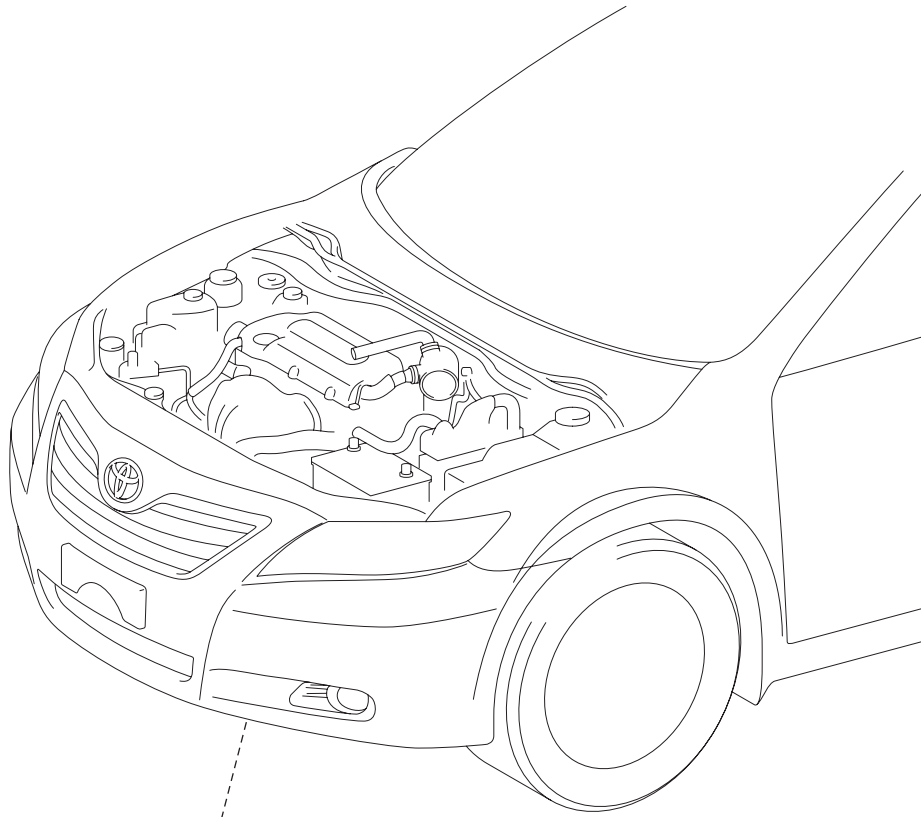
Torque: 15 N*m (153 kgf*cm, 11 ft.*lbf)

NOTICE:

Do not start the engine within 1 hour of installation.

- (h) Connect the oil pressure switch connector.
(i) Check for engine oil leaks.

OIL FILTER COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque ● Non-reusable part

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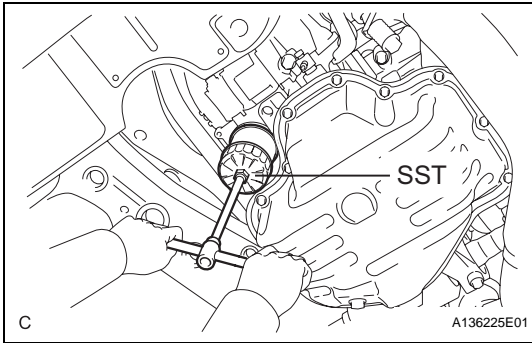
REPLACEMENT

CAUTION:

- Prolonged and repeated contact with engine oil will cause the loss of natural oils from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- Precautions should be taken when replacing engine oil to minimize the risk of your skin making contact with used engine oil. Wear protective clothing and gloves. Wash your skin thoroughly with soap and water, or use a waterless hand cleaner to remove any used engine oil. Do not use gasoline, thinners or solvents.
- For environmental protection, used oil and used oil filters must be disposed of at designated disposal sites.

1. DRAIN ENGINE OIL

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

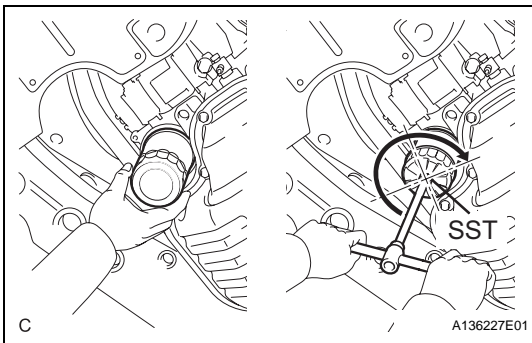


2. REMOVE OIL FILTER SUB-ASSEMBLY

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

3. INSTALL OIL FILTER SUB-ASSEMBLY

- 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.

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

- If enough space is available, use a torque wrench to tighten the oil filter.

Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)

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

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)

- Add new oil.

Standard capacity

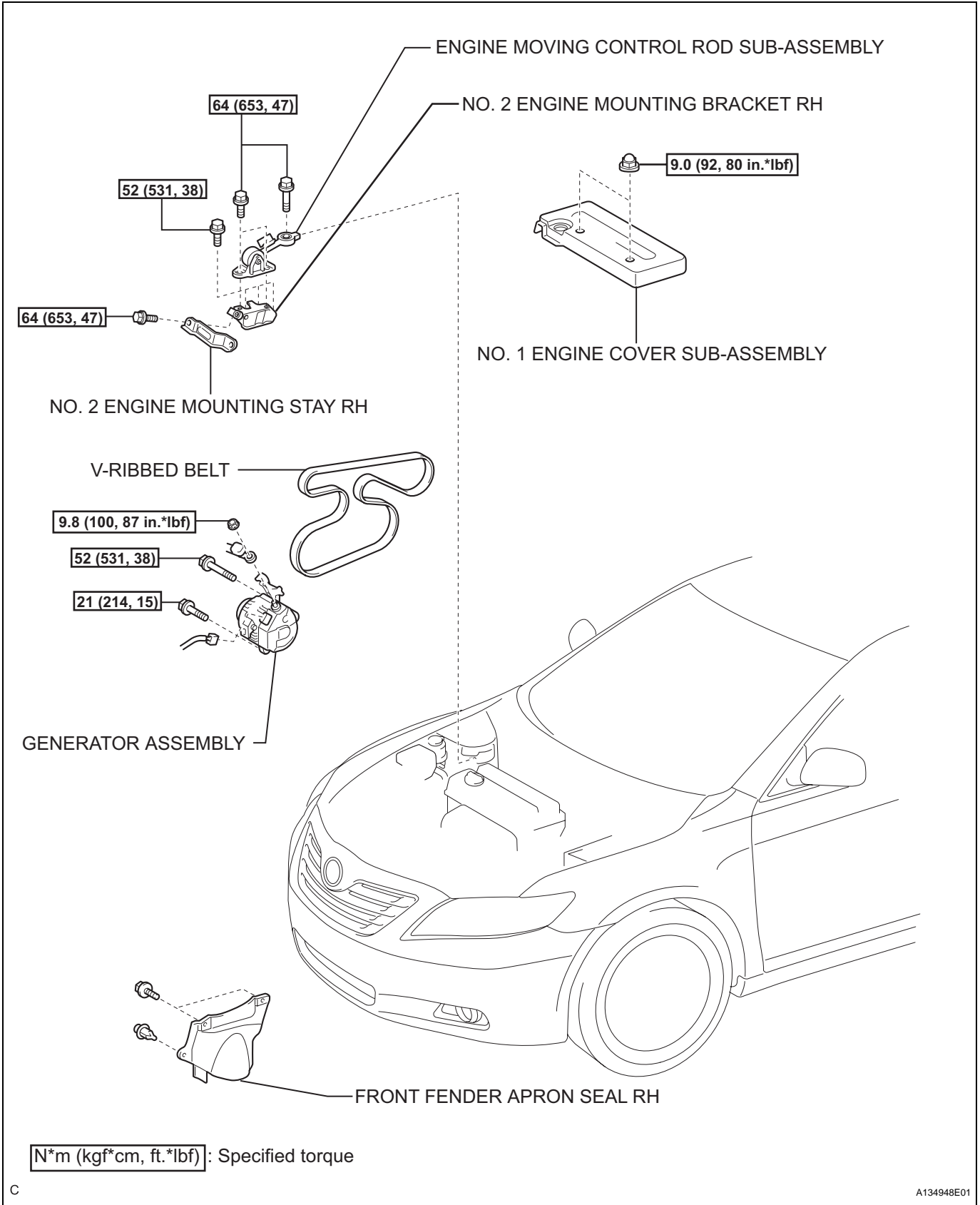
Item	Standard Condition
Drain and refill with oil filter change	4.3 liters (4.5 US qts, 3.8 Imp. qts)

Item	Standard Condition
Drain and refill without oil filter change	4.1 liters (4.3 US qts, 3.6 Imp. qts)
Dry fill	5.0 liters (5.3 US qts, 4.4 Imp. qts)

(c) Install the oil filler cap.

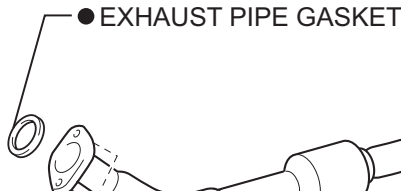
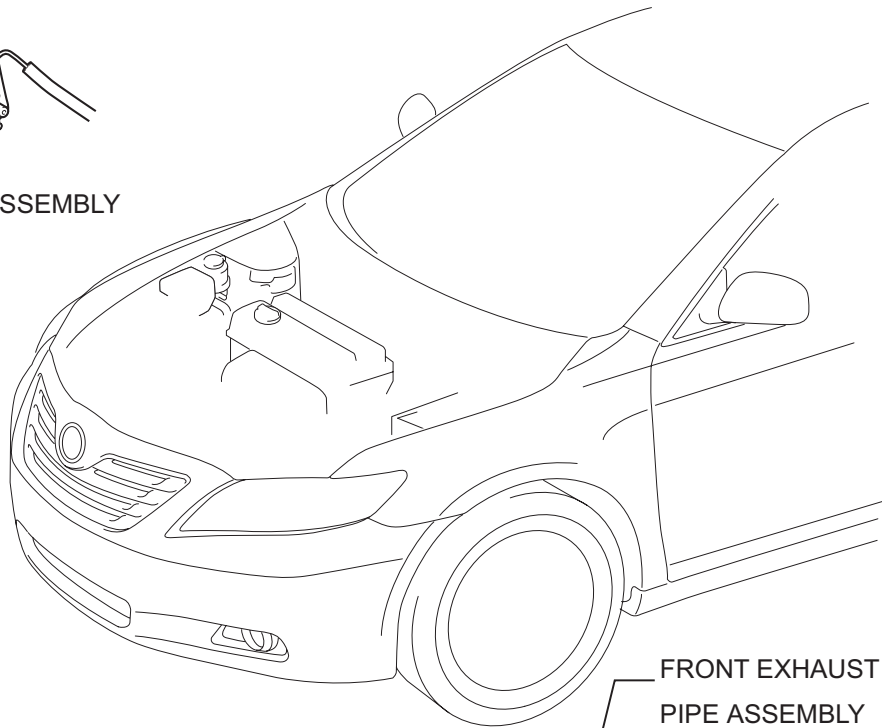
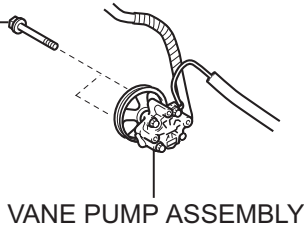
5. CHECK FOR ENGINE OIL LEAKS

OIL PUMP COMPONENTS



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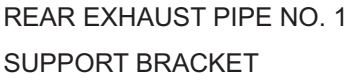
43 (439, 32)



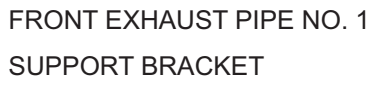
56 (571, 41)



62 (633, 46)

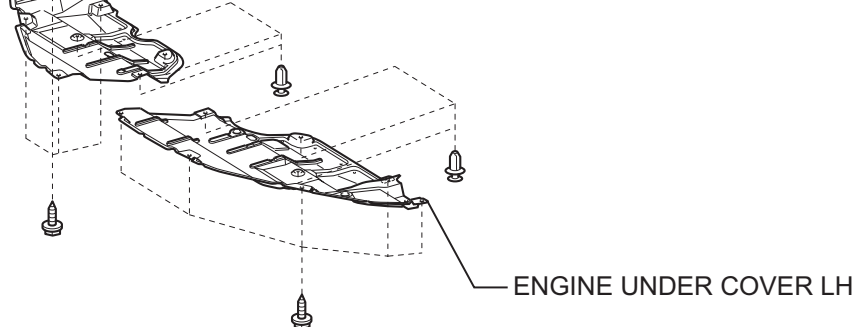


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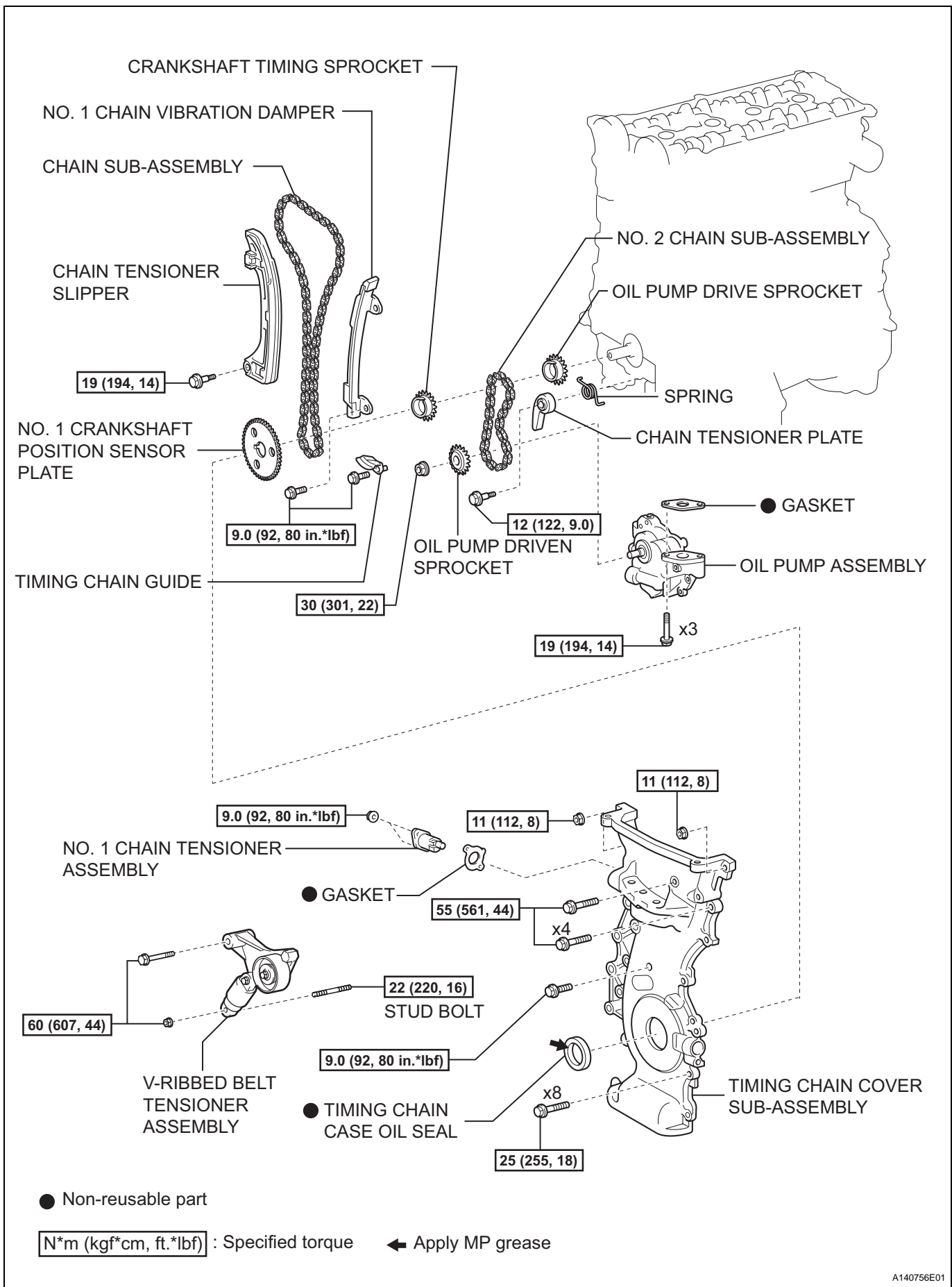


● 33 (337, 24)

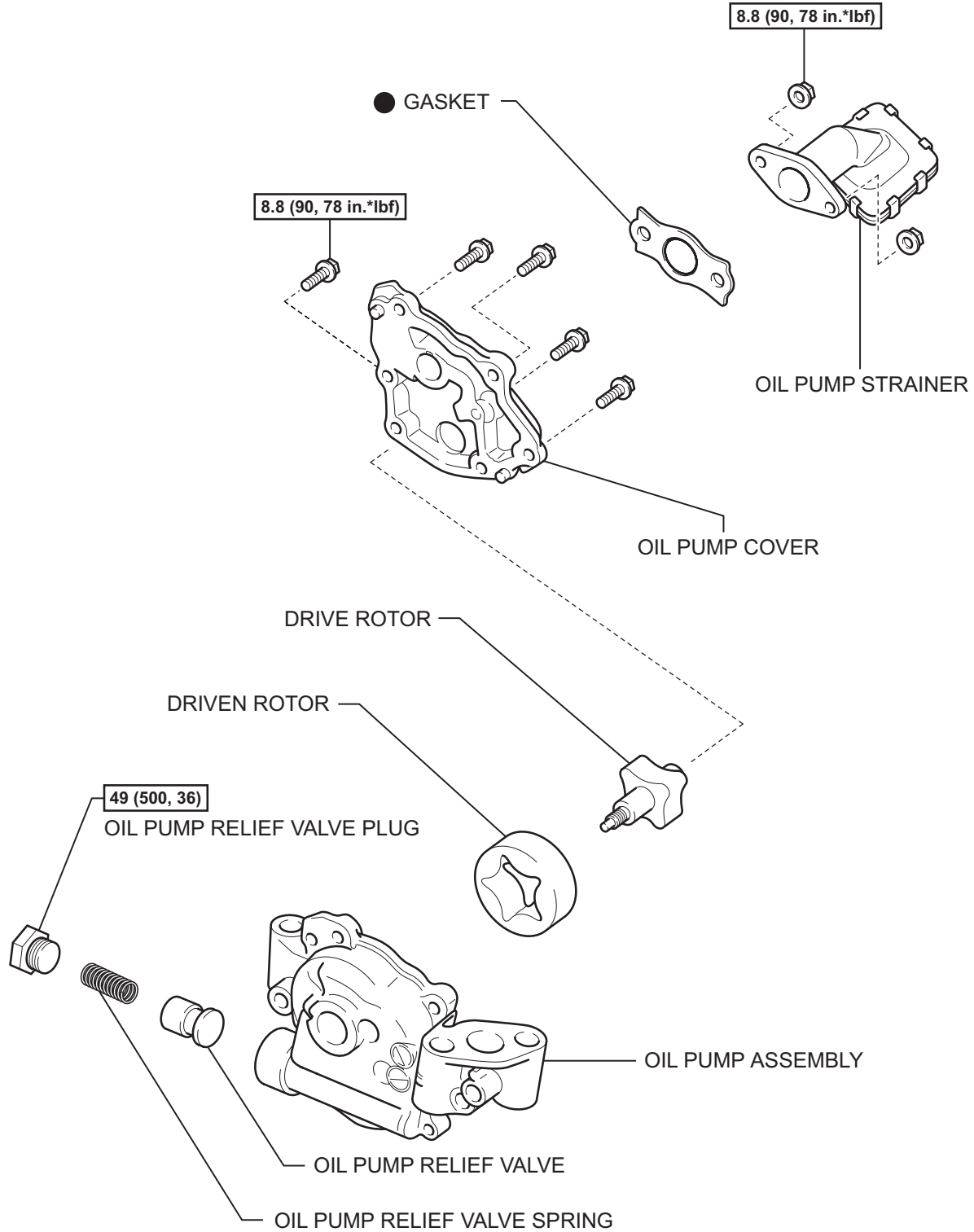
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N*m (kgf*cm, ft.*lbf): Specified torque ● Non-reusable part



LU



● Non-reusable part

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

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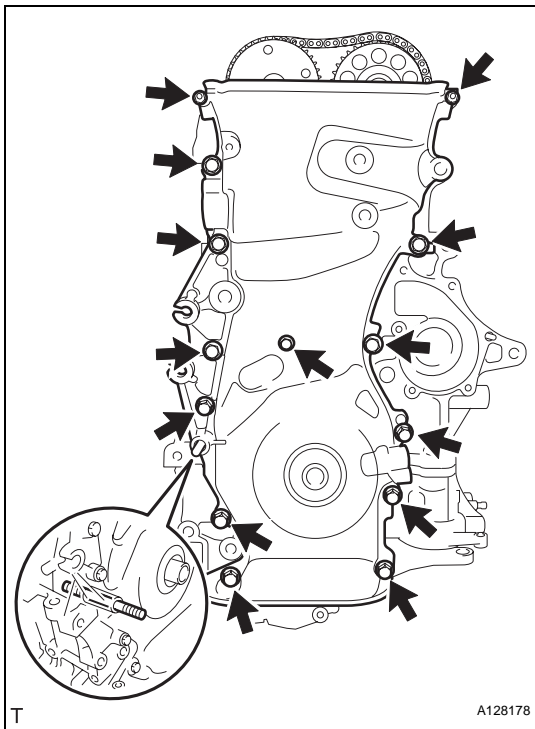
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
2. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY (See page [EM-94](#))
3. REMOVE FRONT WHEEL RH
4. REMOVE ENGINE UNDER COVER LH
5. REMOVE ENGINE UNDER COVER RH
6. REMOVE FRONT FENDER APRON SEAL RH
7. DRAIN ENGINE OIL (See page [LU-4](#))
8. REMOVE FRONT EXHAUST PIPE ASSEMBLY (See page [EX-2](#))
9. REMOVE NO. 2 ENGINE MOUNTING STAY RH (See page [EM-95](#))
10. REMOVE ENGINE MOVING CONTROL ROD SUB-ASSEMBLY (See page [EM-95](#))
11. REMOVE NO. 2 ENGINE MOUNTING BRACKET RH (See page [EM-96](#))
12. REMOVE V-RIBBED BELT (See page [EM-6](#))
13. REMOVE GENERATOR ASSEMBLY (See page [CH-11](#))
14. REMOVE VANE PUMP ASSEMBLY (See page [EM-101](#))
15. REMOVE IGNITION COIL ASSEMBLY (See page [EM-106](#))
16. DISCONNECT VENTILATION HOSE
17. DISCONNECT NO. 2 VENTILATION HOSE
18. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY (See page [EM-21](#))
19. SET SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page [EM-8](#))
20. REMOVE CRANKSHAFT PULLEY (See page [EM-75](#))
21. REMOVE CRANK POSITION SENSOR (See page [ES-411](#))
22. REMOVE OIL PAN SUB-ASSEMBLY (See page [EM-22](#))
23. REMOVE NO. 1 CHAIN TENSIONER ASSEMBLY (See page [EM-22](#))
24. INSTALL ENGINE HANGERS (See page [EM-22](#))
25. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY (See page [EM-23](#))
26. REMOVE ENGINE MOUNTING INSULATOR (See page [EM-23](#))

27. REMOVE ENGINE MOUNTING BRACKET RH (See page EM-24)

28. REMOVE TIMING CHAIN COVER SUB-ASSEMBLY

- (a) Using a E10 "torx" socket, remove the stud bolt for the drive belt tensioner from the cylinder block.
- (b) Remove the 12 bolts and 2 nuts.



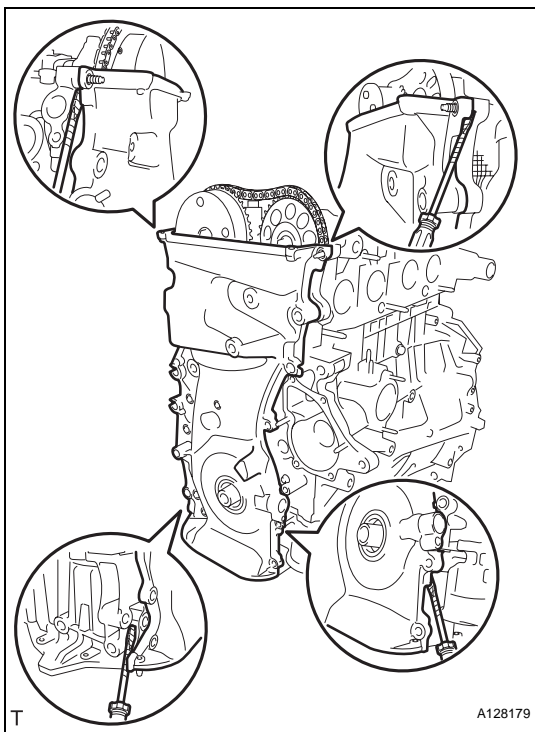
- (c) Remove the timing chain cover by prying between the timing chain cover and cylinder head or cylinder block with a screwdriver.

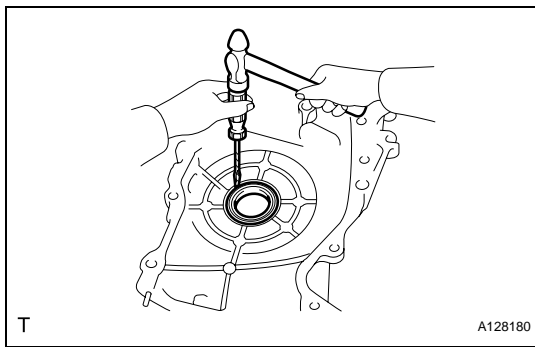
NOTICE:

Be careful not to damage the contact surfaces of the timing chain cover, cylinder block and cylinder head.

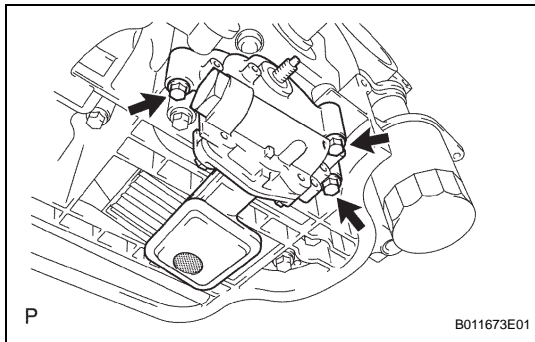
HINT:

Tape the screwdriver tip before use.





29. REMOVE TIMING GEAR CASE OR TIMING CHAIN CASE OIL SEAL
 - (a) Using a screwdriver and a hammer, tap out the oil seal.
 - HINT:
Tape the screwdriver tip before use.
30. REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE (See page EM-24)
31. REMOVE CHAIN TENSIONER SLIPPER (See page EM-24)
32. REMOVE NO. 1 CHAIN VIBRATION DAMPER (See page EM-24)
33. REMOVE TIMING CHAIN GUIDE (See page EM-25)
34. REMOVE CHAIN SUB-ASSEMBLY (See page EM-25)
35. REMOVE CRANKSHAFT TIMING SPROCKET (See page EM-25)
36. REMOVE NO. 2 CHAIN SUB-ASSEMBLY (See page EM-25)
37. REMOVE OIL PUMP ASSEMBLY
 - (a) Remove the 3 bolts, oil pump and gasket.



DISASSEMBLY

1. REMOVE OIL PUMP STRAINER
 - (a) Remove the 2 nuts, oil pump strainer and gasket.
2. REMOVE OIL PUMP RELIEF VALVE
 - (a) Using a 27 mm socket wrench, remove the plug.
 - (b) Remove the valve spring and relief valve.

