

Last Modified: 9-7-2011	6.4 G	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PKS00EX
Title: 2AR-FE LUBRICATION: LUBRICATION SYSTEM: ON-VEHICLE INSPECTION (2011 RAV4)		

ON-VEHICLE INSPECTION

1. INSPECT ENGINE OIL LEVEL

- (a) Warm up the engine, stop the engine and wait 5 minutes.
- (b) Check that the oil level is between the dipstick low level mark and full level mark.
- If the level is low, check for leakage and add oil up to the full level mark.

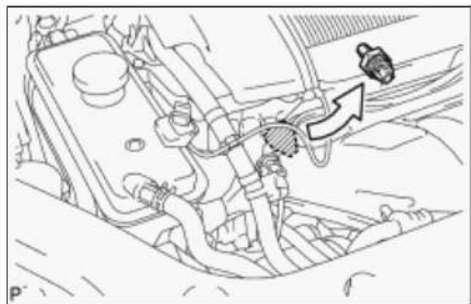
NOTICE:

Do not fill engine oil above the full level mark.

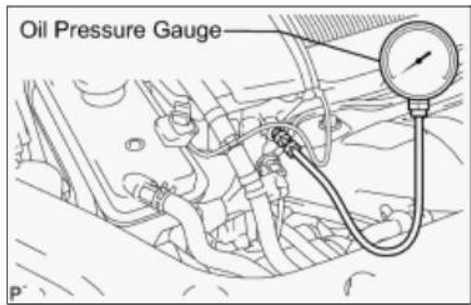
2. INSPECT ENGINE OIL QUALITY

- (a) Check the oil for deterioration, water contamination, discoloration or thinning. If the quality is visibly poor, replace the oil and filter.

3. INSPECT OIL PRESSURE



- (a) Remove the oil pressure switch assembly INFO.



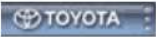
- (b) Install an oil pressure gauge.

- (c) Warm up the engine.
- (d) Measure the oil pressure.
- Standard Oil Pressure:

CONDITION	SPECIFIED CONDITION
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CONDITION	SPECIFIED CONDITION
Idle	30 kPa (0.3 kgf/cm ² , 4.4 psi) or more
4000 rpm	260 kPa (2.7 kgf/cm ² , 38 psi) or more

- (e) Remove the oil pressure gauge.
- (f) Install the oil pressure switch assembly  .

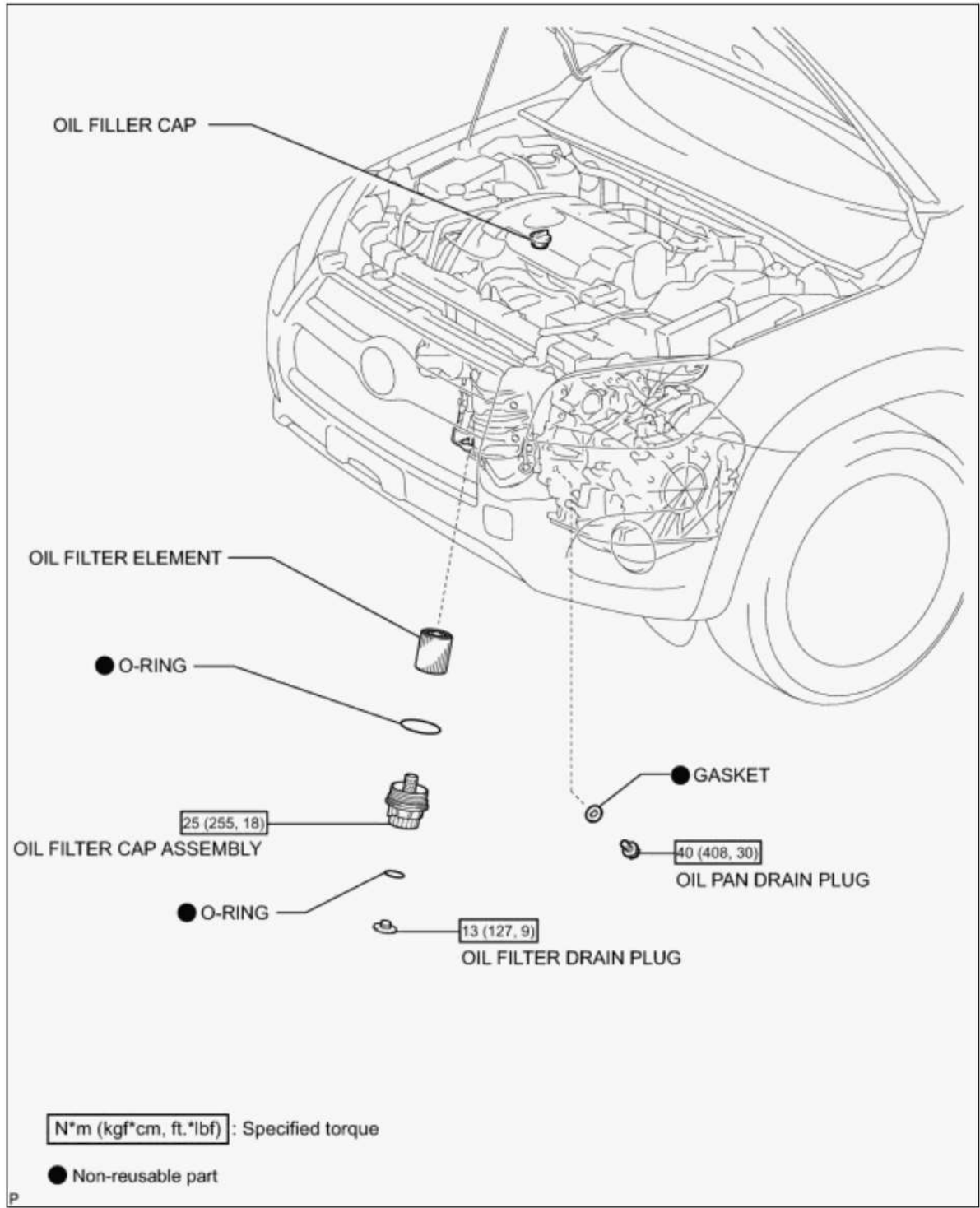


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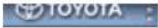
Last Modified: 9-7-2011	6.4 K	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PJX00CX
Title: 2AR-FE LUBRICATION: OIL AND OIL FILTER: COMPONENTS (2011 RAV4)		

COMPONENTS

ILLUSTRATION



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Last Modified: 9-7-2011	6.4 A	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PJW00CX
Title: 2AR-FE LUBRICATION: OIL AND OIL FILTER: REPLACEMENT (2011 RAV4)		

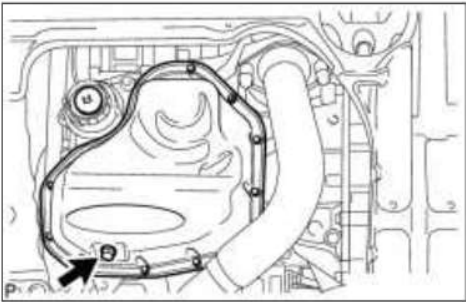
REPLACEMENT

CAUTION:

- Prolonged and repeated contact with engine oil will result in the removal 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. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be washed with soap and water, or use waterless hand cleaner, to remove any used engine oil thoroughly. Do not use gasoline, thinners, or solvents.
- In order to protect the environment, used oil and used oil filters must be disposed of at designated disposal sites.

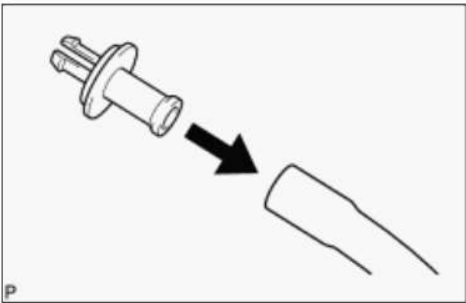
1. DRAIN ENGINE OIL

(a) Remove the oil filler cap.



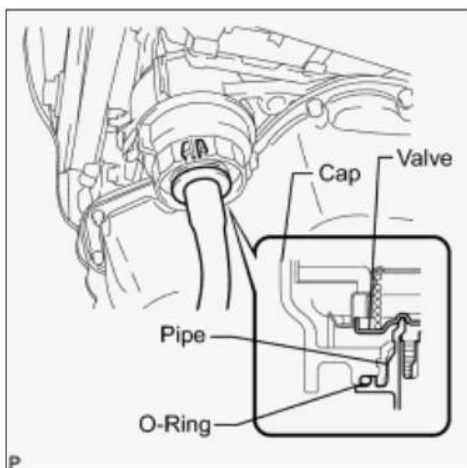
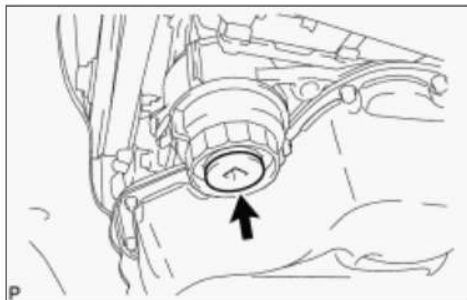
(b) Remove the oil pan drain plug and gasket, and drain the engine oil into a container.

2. REMOVE OIL FILTER CAP ASSEMBLY



(a) Connect a hose with an inside diameter of 15 mm (0.591 in.) to the pipe.

(b) Remove the oil filter drain plug.



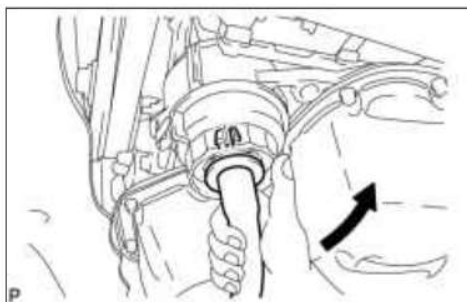
(c) Install the pipe to the oil filter cap.

NOTICE:

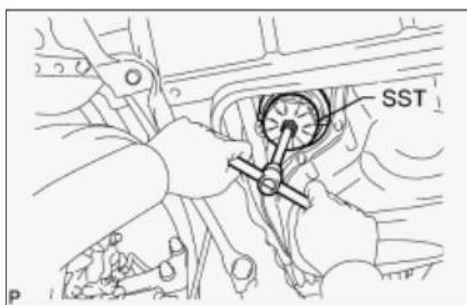
If the O-ring is removed with the drain plug, install the O-ring together with the pipe.

HINT:

Use a container to catch the draining oil.



(d) Check that the oil is drained from the oil filter. Then disconnect the pipe as shown in the illustration and remove the O-ring.

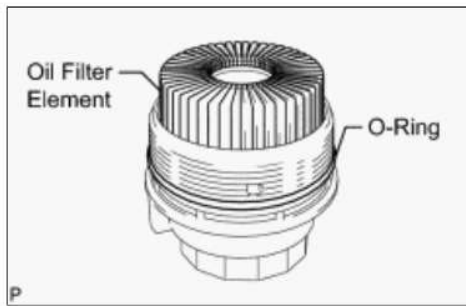


(e) Using SST, remove the oil filter cap.

SST: 09228-06501

NOTICE:

Do not remove the oil filter bracket clip.



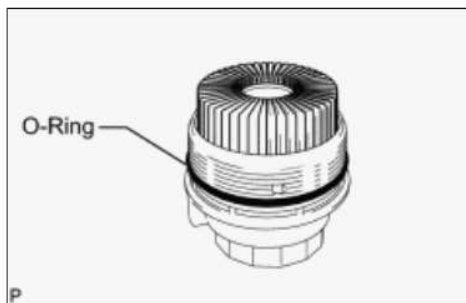
(f) Remove the oil filter element and O-ring from the oil filter cap.

NOTICE:

Be sure to remove the cap O-ring by hand, without using any tools, to prevent damage to the cap O-ring groove.

3. INSTALL OIL FILTER CAP ASSEMBLY

(a) Clean the inside of the oil filter cap, its threads and its O-ring groove.



(b) Apply a small amount of engine oil to a new O-ring and install it to the oil filter cap.

(c) Set a new oil filter element into the oil filter cap.

(d) Remove any dirt or foreign matter from the installation surface of the engine.

(e) Apply a small amount of engine oil to the O-ring again and temporarily install the oil filter cap.

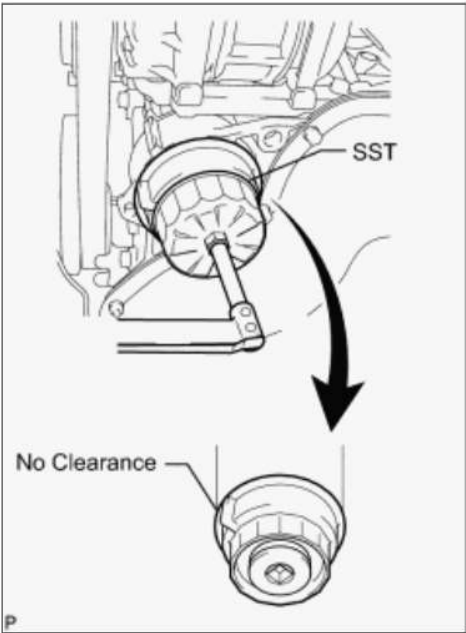
(f) Using SST, tighten the oil filter cap.

SST: 09228-06501

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

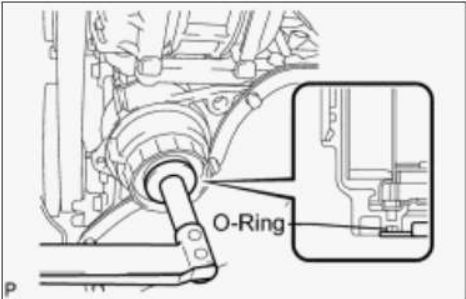
NOTICE:

- Make sure that the oil filter is installed securely as shown in the illustration.
- Be careful that the O-ring does not get caught between any surrounding parts.



(g) Apply a small amount of engine oil to a new drain plug O-ring, and install it to the oil filter cap.

NOTICE:
Before installing the O-ring, remove any dirt or foreign matter from the installation surface of the oil filter cap.



(h) Install the oil filter drain plug.
Torque: 13 N·m (127 kgf·cm, 9ft·lbf)

NOTICE:
Be careful that the O-ring does not get caught between any surrounding parts.

4. ADD ENGINE OIL

(a) Clean and install a new gasket and the oil pan drain plug.

Torque: 40 N·m (408 kgf·cm, 30ft·lbf)

(b) Add new oil.

Standard Oil Grade:

OIL GRADE	OIL VISCOSITY
ILSAC multigrade engine oil	ILSAC multigrade engine oil
	0W-20
	5W-20
	(0W-20 is the best choice for fuel economy and good starting in cold weather.)

Standard Capacity:

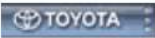
ITEM	SPECIFIED CONDITION
Drain and refill without oil filter change	4.0 liters (4.2 US qts, 3.5 Imp. qts)
Drain and refill with oil filter change	4.4 liters (4.7 US qts, 3.9 Imp. qts)
Dry fill	5.7 liters (6.0 US qts, 5.0 Imp. qts)

(c) Install the oil filler cap.

5. INSPECT FOR OIL LEAK

(a) Start the engine. Make sure that there are no oil leaks from the areas that were worked on.

6. INSPECT ENGINE OIL LEVEL INFO

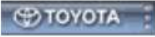
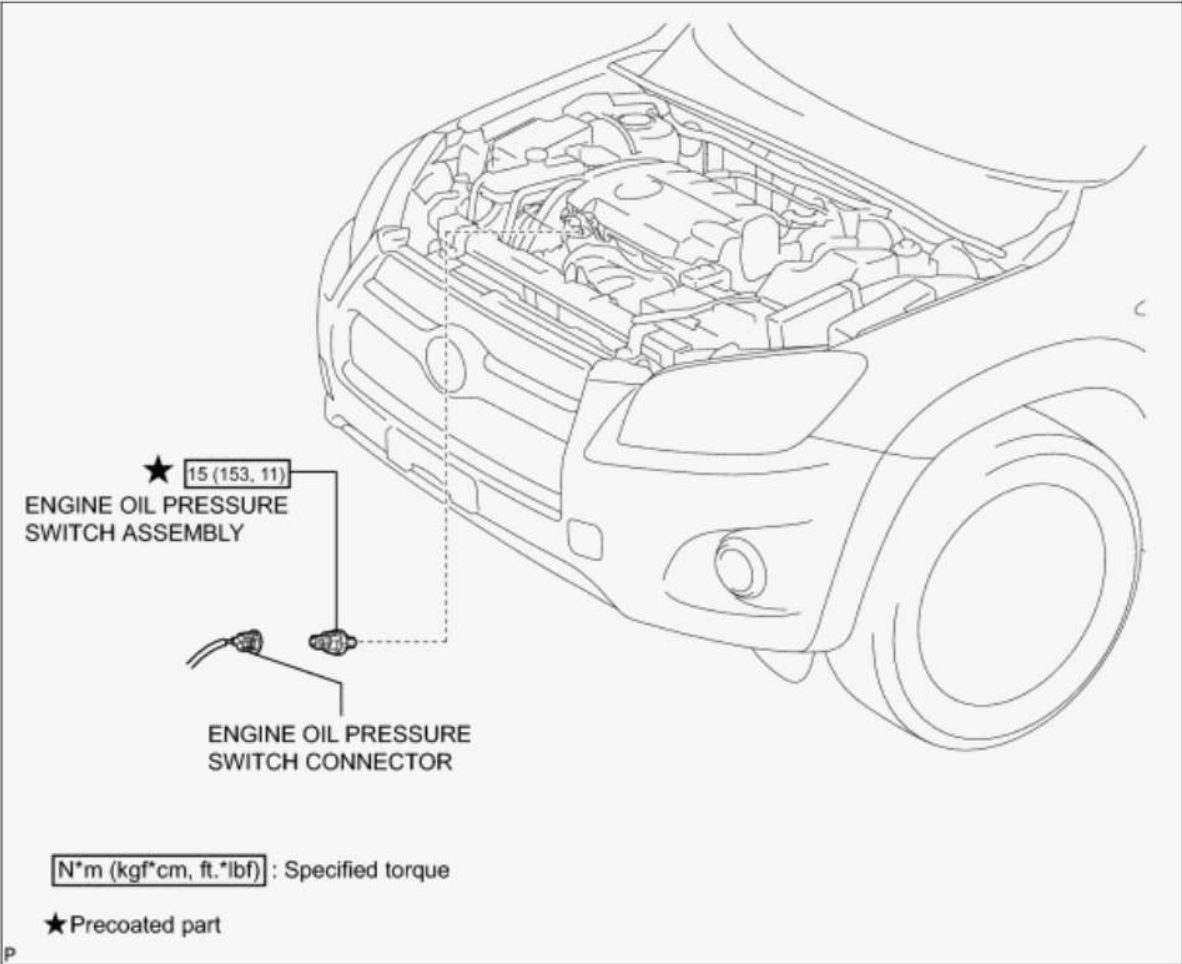


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Last Modified: 9-7-2011	6.4 K	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PJO00EX
Title: 2AR-FE LUBRICATION: OIL PRESSURE SWITCH: COMPONENTS (2011 RAV4)		

COMPONENTS

ILLUSTRATION



Last Modified: 9-7-2011	6.4 G	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PJN00EX
Title: 2AR-FE LUBRICATION: OIL PRESSURE SWITCH: INSPECTION (2011 RAV4)		

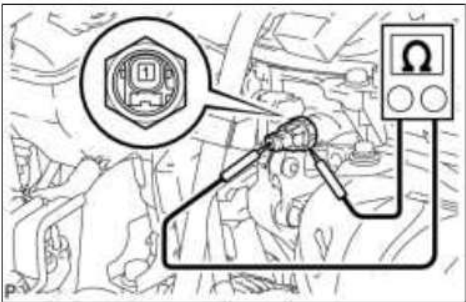
INSPECTION

1. INSPECT ENGINE OIL PRESSURE SWITCH ASSEMBLY

- (a) Disconnect the oil pressure switch connector.
- (b) Start the engine.

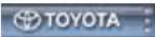
(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - Body ground	Engine stopped	Below 1 Ω
	Engine idling	10 k Ω or higher

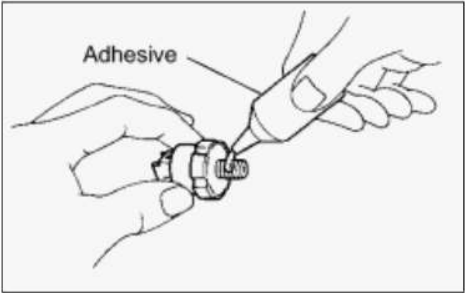
If the result is not as specified, replace the oil pressure switch assembly.



Last Modified: 9-7-2011	6.4 A	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PJM00EX
Title: 2AR-FE LUBRICATION: OIL PRESSURE SWITCH: INSTALLATION (2011 RAV4)		

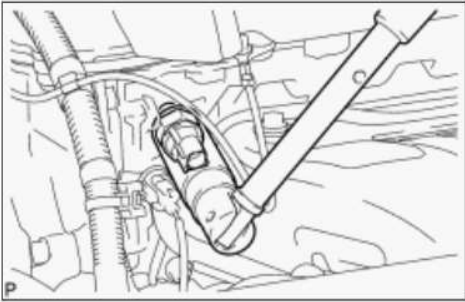
INSTALLATION

1. INSTALL ENGINE OIL PRESSURE SWITCH ASSEMBLY



- (a) Apply adhesive to 2 or 3 threads of the oil pressure switch.
- Adhesive:
TOYOTA Genuine Adhesive 1344, Three Bond 1344 or equivalent.

NOTICE:
Do not let adhesive adhere to the oil hole.

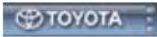


- (b) Using a 24 mm deep socket wrench, install the oil pressure switch.
- Torque: 15 N·m (153 kgf·cm, 11ft·lbf)**

NOTICE:
Do not start the engine within 1 hour of installation.

- (c) Connect the oil pressure switch connector.

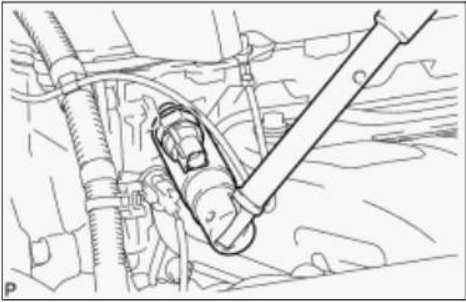
2. INSPECT FOR OIL LEAK



Last Modified: 9-7-2011	6.4 A	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PJP00EX
Title: 2AR-FE LUBRICATION: OIL PRESSURE SWITCH: REMOVAL (2011 RAV4)		

REMOVAL

1. REMOVE ENGINE OIL PRESSURE SWITCH ASSEMBLY



(a) Disconnect the oil pressure switch connector.

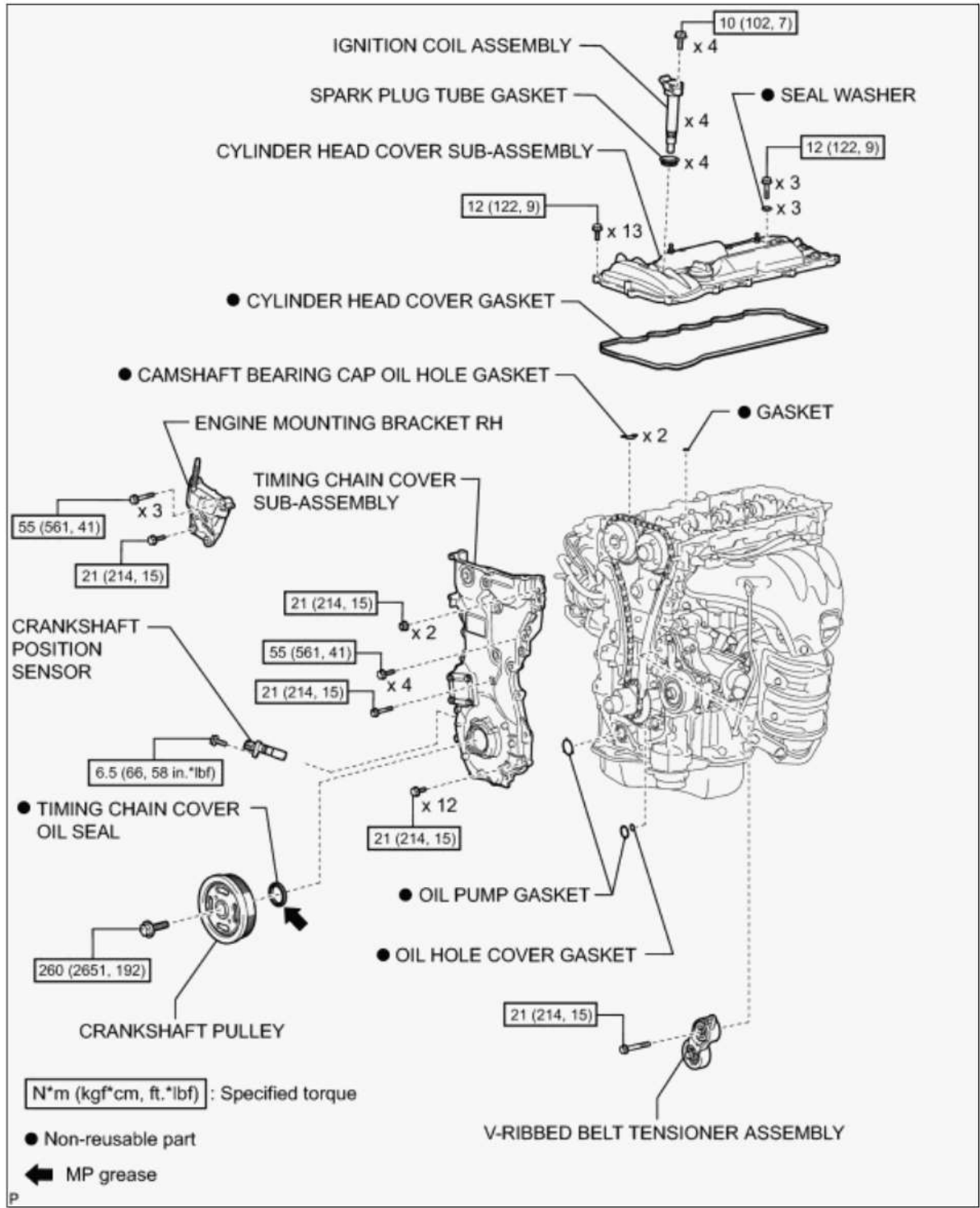
(b) Using a 24 mm deep socket wrench, remove the oil pressure switch.



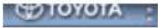
Last Modified: 9-7-2011	6.4 K	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PY600CX
Title: 2AR-FE LUBRICATION: OIL PUMP: COMPONENTS (2011 RAV4)		

COMPONENTS

ILLUSTRATION



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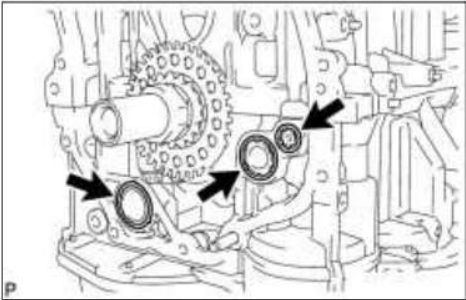


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Last Modified: 9-7-2011	6.4 A	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PY400CX
Title: 2AR-FE LUBRICATION: OIL PUMP: INSTALLATION (2011 RAV4)		

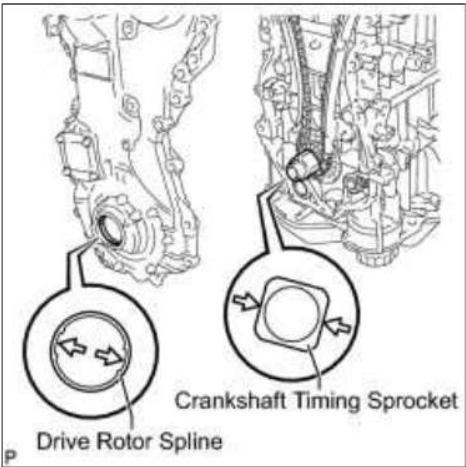
INSTALLATION

1. INSTALL TIMING CHAIN COVER SUB-ASSEMBLY



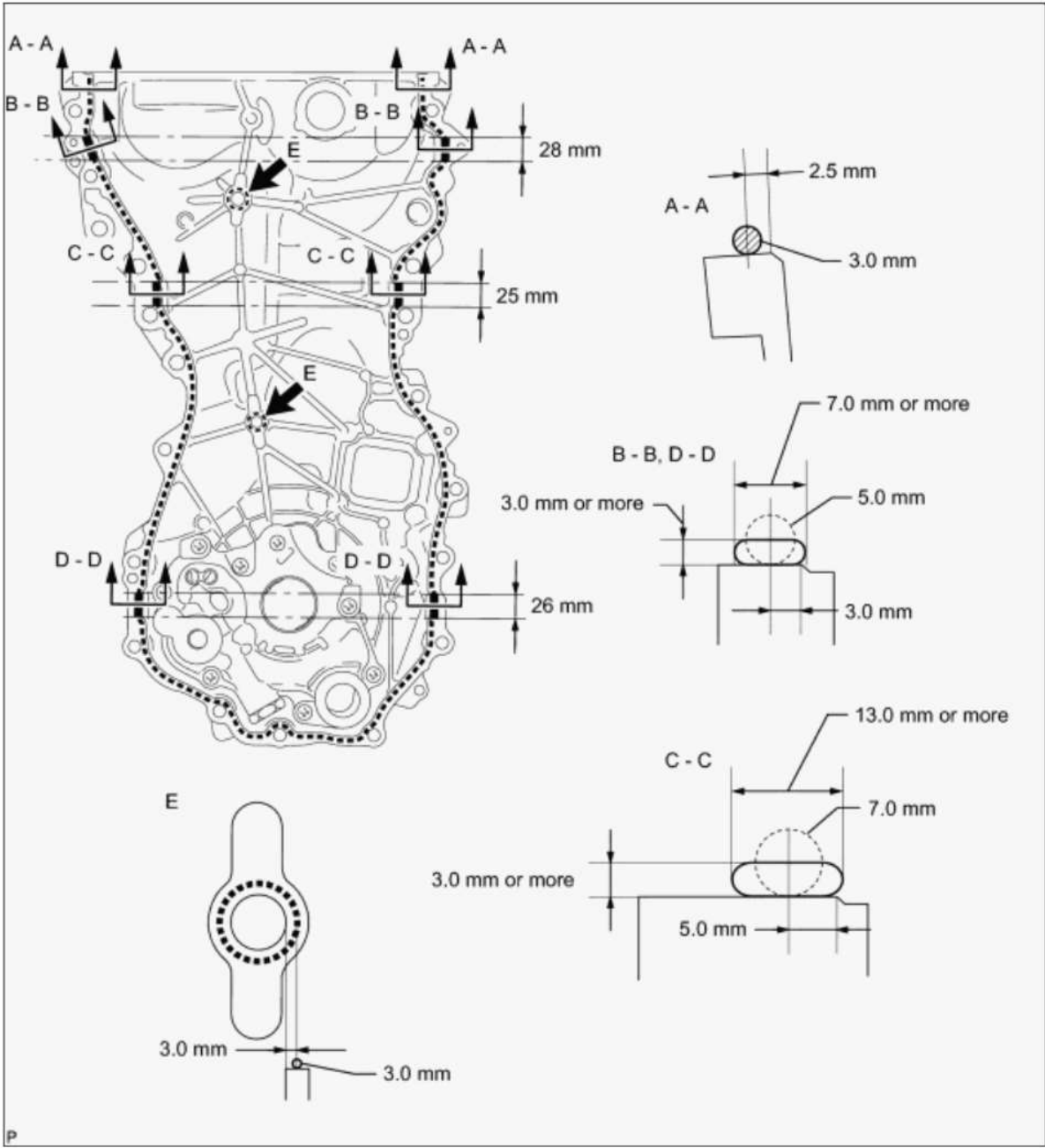
(a) Apply a light coat of engine oil to 3 new gaskets.

(b) Install the 3 gaskets to the stiffening crankcase.



(c) Align the drive rotor spline and the crankshaft timing sprocket as shown in the illustration.

(d) Apply seal packing in a continuous line to the timing chain cover as shown in the following illustration.



Seal packing:
Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent.
Apply Seal Packing as Follows:

AREA	SEAL PACKING DIAMETER (ROUND)	DISTANCE FROM EDGE OF COVER TO CENTER OF SEAL PACKING	SEAL PACKING APPLICATION LENGTH
	SEAL PACKING DIMENSION (FLAT)		
Dashed Line	3.0 mm (0.118 in.)	2.5 mm (0.984 in.)	-
	-		
A - A	3.0 mm (0.118 in.)	2.5 mm (0.984 in.)	-
	-		
B - B	5.0 mm (0.197 in.)	3.0 mm (0.118 in.)	28 mm (1.10 in.)

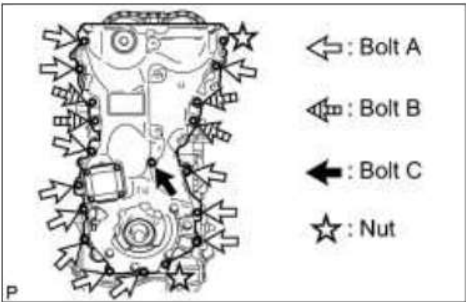
AREA	SEAL PACKING DIAMETER (ROUND)	DISTANCE FROM EDGE OF COVER TO CENTER OF SEAL PACKING	SEAL PACKING APPLICATION LENGTH
	SEAL PACKING DIMENSION (FLAT)		
	7.0 mm (0.276 in.) or more wide and 3.0 mm (0.118 in.) or more thick		
C - C	7.0 mm (0.276 in.)	5.0 mm (0.197 in.)	25mm (0.984 in.)
	13.0 mm (0.512 in.) or more wide and 3.0 mm (0.118 in.) or more thick		
D - D	5.0 mm (0.197 in.)	3.0 mm (0.118 in.)	26 mm (1.02 in.)
	7.0 mm (0.276 in.) or more wide and 3.0 mm (0.118 in.) or more thick		
E	3.0 mm (0.118 in.)	3.0 mm (0.118 in.)	-
	-		

NOTICE:

- When the contact surfaces are wet, clean the surfaces with non-residue solvent before applying seal packing.
- Install the timing chain cover within 3 minutes and tighten the bolts within 10 minutes after applying seal packing.
- After applying seal packing to the timing chain cover, install the engine mounting bracket within 10 minutes.
- Do not apply oil for at least 4 hours after the installation.
- Do not start the engine for at least 4 hours after the installation.

(e) Temporarily install the timing chain cover with the 17 bolts and 2 nuts.

Bolt Length:



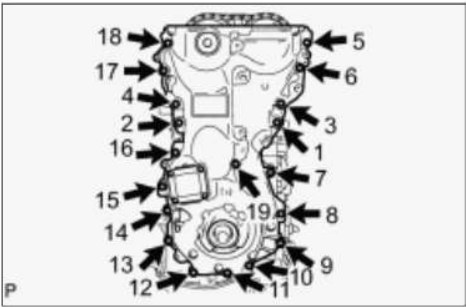
ITEM	LENGTH	THREAD DIAMETER
Bolt A	30 mm (0.118 in.)	8 mm (0.315 in.)
Bolt B	35 mm (1.38 in.)	10 mm (0.394 in.)
Bolt C	45 mm (1.77 in.)	8 mm (0.315 in.)

NOTICE:

Make sure there is no oil on the bolts. If there is oil on the bolts, clean them before installing them.

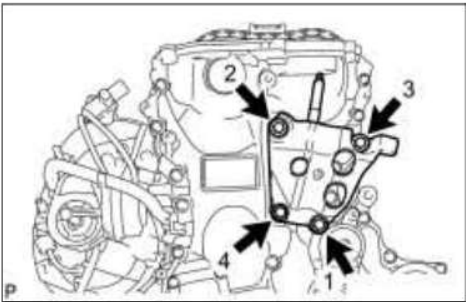
(f) Tighten the 17 bolts and 2 nuts in several steps, in the sequence shown in the illustration.

for bolt 1, 2, 3 and 4 - Torque: 55 N·m (561 kgf·cm, 41ft·lbf)
except bolt 1, 2, 3 and 4 - Torque: 21 N·m (214 kgf·cm,



15ft·lbf)

2. INSTALL ENGINE MOUNTING BRACKET RH



- (a) Install the engine mounting bracket, and install the 4 bolts in the order shown in the illustration.
- for bolt 1, 2 and 3 - Torque: 55 N·m (561 kgf·cm, 41ft·lbf)
for bolt 4 - Torque: 21 N·m (214 kgf·cm, 15ft·lbf)

NOTICE:
After applying seal packing to the timing chain cover, install the engine mounting bracket within 10 minutes.

3. INSTALL TIMING CHAIN COVER OIL SEAL INFO

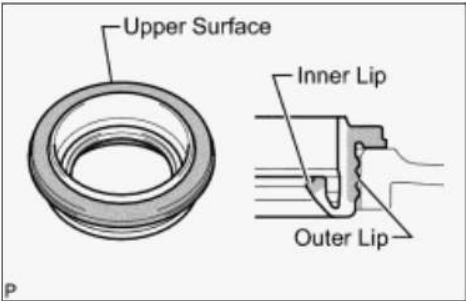
4. INSTALL CRANKSHAFT PULLEY INFO

5. INSTALL CRANKSHAFT POSITION SENSOR INFO

6. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY INFO

7. INSTALL SPARK PLUG TUBE GASKET

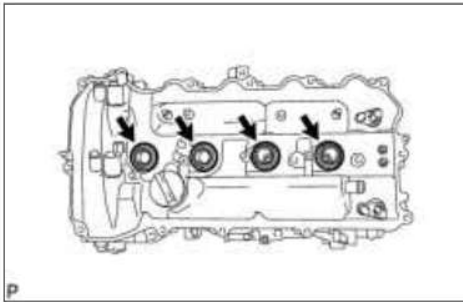
- (a) Visually check the spark plug tube gasket.
- OK:



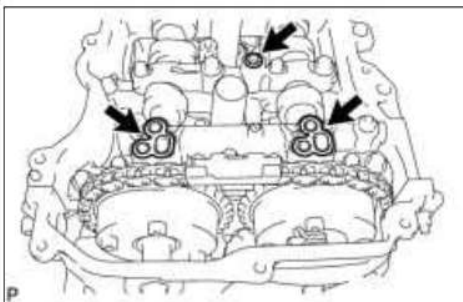
AREA	SPECIFIED CONDITION
Upper surface	No scratches or deformation
Outer lip	No scratches or deformation
Inner lip	No scratches

If the result is not as specified, replace the spark plug tube gasket.

- (b) Install the 4 plug tube gaskets to the cylinder head cover.

**NOTICE:**

After pressing in the spark plug tube gasket, make sure the gasket protrudes 1.0 mm (0.0394 in.) or less from the cylinder head cover.

8. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY

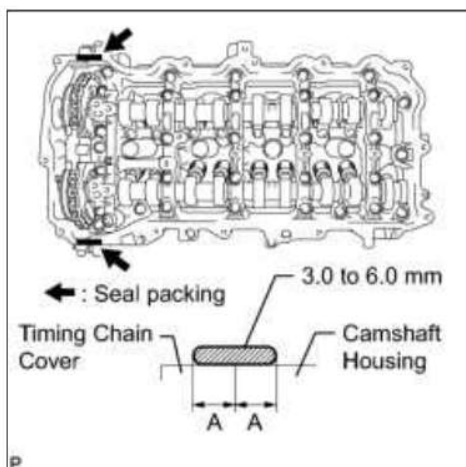
(a) Apply a light coat of engine oil to 3 new gaskets.

(b) Install the 3 gaskets to the camshaft bearing caps.

(c) Install a new gasket to the cylinder head cover.

NOTICE:

Remove any oil from the contact surface.



(d) Apply seal packing as shown in the illustration.

Seal packing:

Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

Standard seal diameter:

3.0 to 6.0 mm (0.118 to 0.236 in.)

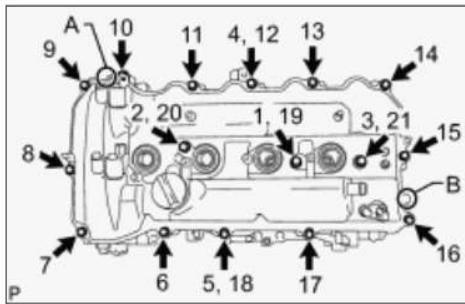
Application width A:

5.0 mm (0.197 in.)

NOTICE:

- Remove any oil from the contact surface.
- Install the cylinder head cover within 3 minutes and tighten the bolts within 15 minutes after applying seal packing.

(e) Align the cylinder head cover with pin A. Then align the cylinder head cover with pin B and install the cylinder head cover.



- (f) Install 3 new seal washers and the 16 bolts, and then tighten the bolts in the order shown in the illustration.

Torque: 12 N·m (122 kgf·cm, 9ft·lbf)

NOTICE:

- Do not apply oil for at least 4 hours after the installation.
- Do not start the engine for at least 4 hours after the installation.

9. INSTALL IGNITION COIL ASSEMBLY INFO

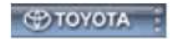
10. CONNECT ENGINE WIRE

- (a) Connect the connectors and clamps, and connect the engine wire to the engine with the bracket bolts.

11. INSTALL ENGINE AND TRANSAXLE

- (a) Install the engine and transaxle INFO.

12. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL



Last Modified: 9-7-2011	6.4 A	From: 201008
Model Year: 2011	Model: RAV4	Doc ID: RM000003PY700CX
Title: 2AR-FE LUBRICATION: OIL PUMP: REMOVAL (2011 RAV4)		

REMOVAL

NOTICE:
Do not remove the oil pump or oil pump relief valve from the timing chain cover sub-assembly.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

2. REMOVE ENGINE AND TRANSAXLE

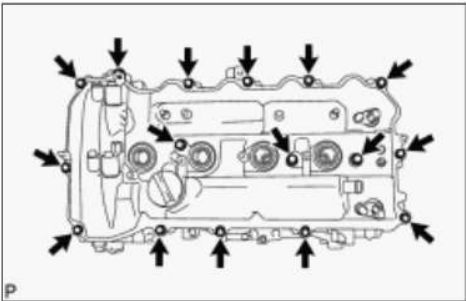
(a) Remove the engine and transaxle INFO.

3. DISCONNECT ENGINE WIRE

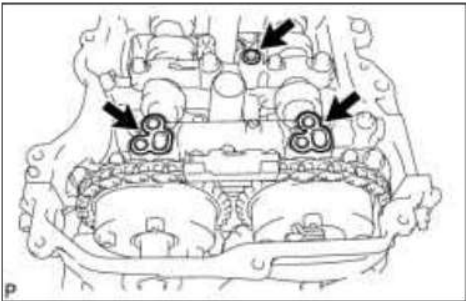
(a) Disconnect the connectors and clamps securing the engine wire to the engine, remove the bracket bolts and disconnect the engine wire from the engine.

4. REMOVE IGNITION COIL ASSEMBLY INFO

5. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY

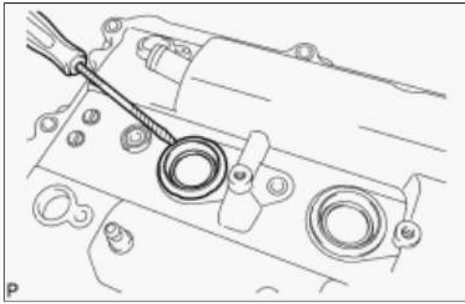


(a) Remove the 16 bolts, 3 seal washers, cylinder head cover and gasket.



(b) Remove the 3 gaskets from the camshaft bearing caps.

6. REMOVE SPARK PLUG TUBE GASKET



(a) Using a screwdriver, pry out the 4 plug tube gaskets.

NOTICE:

Be careful not to damage the cylinder head cover.

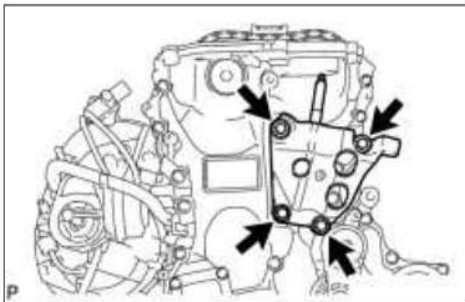
HINT:

Tape the screwdriver tip before use.

7. REMOVE CRANKSHAFT POSITION SENSOR INFO

8. REMOVE CRANKSHAFT PULLEY INFO

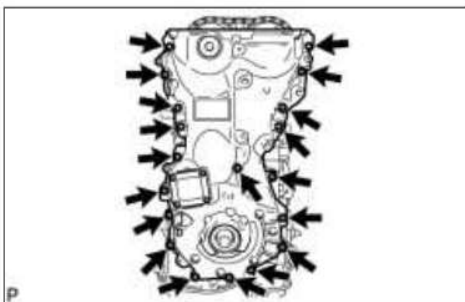
9. REMOVE ENGINE MOUNTING BRACKET RH



(a) Remove the 4 bolts and engine mounting bracket RH.

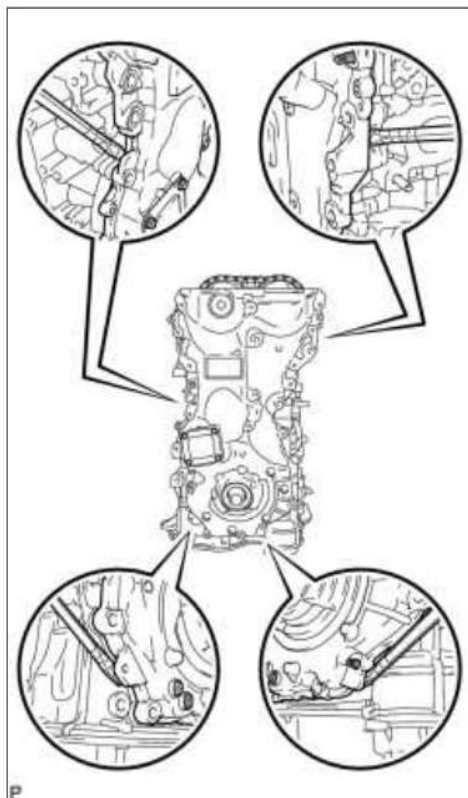
10. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY INFO

11. REMOVE TIMING CHAIN COVER SUB-ASSEMBLY



(a) Remove the 17 bolts and 2 nuts.

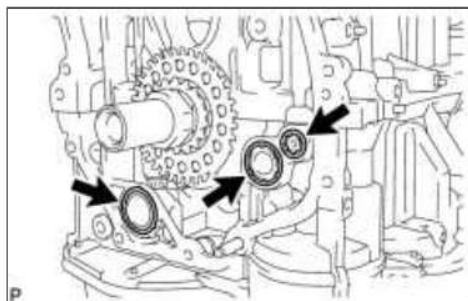
(b) Remove the timing chain cover by prying between the timing chain cover and cylinder head, camshaft housing, cylinder block and stiffening crankcase with a screwdriver as shown in the illustration.

**NOTICE:**

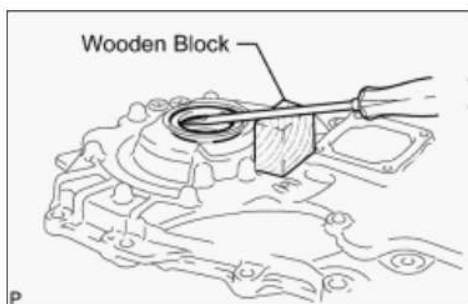
Be careful not to damage the contact surfaces of the cylinder head, camshaft housing, cylinder block, stiffening crankcase and chain cover.

HINT:

Tape the screwdriver tip before use.



(c) Remove the 3 gaskets from the stiffening crankcase.

12. REMOVE TIMING CHAIN COVER OIL SEAL

(a) Using a screwdriver and wooden block, pry out the oil seal.

NOTICE:

Do not damage the surface of the oil seal press fit hole.

HINT:

Tape the screwdriver tip before use.

