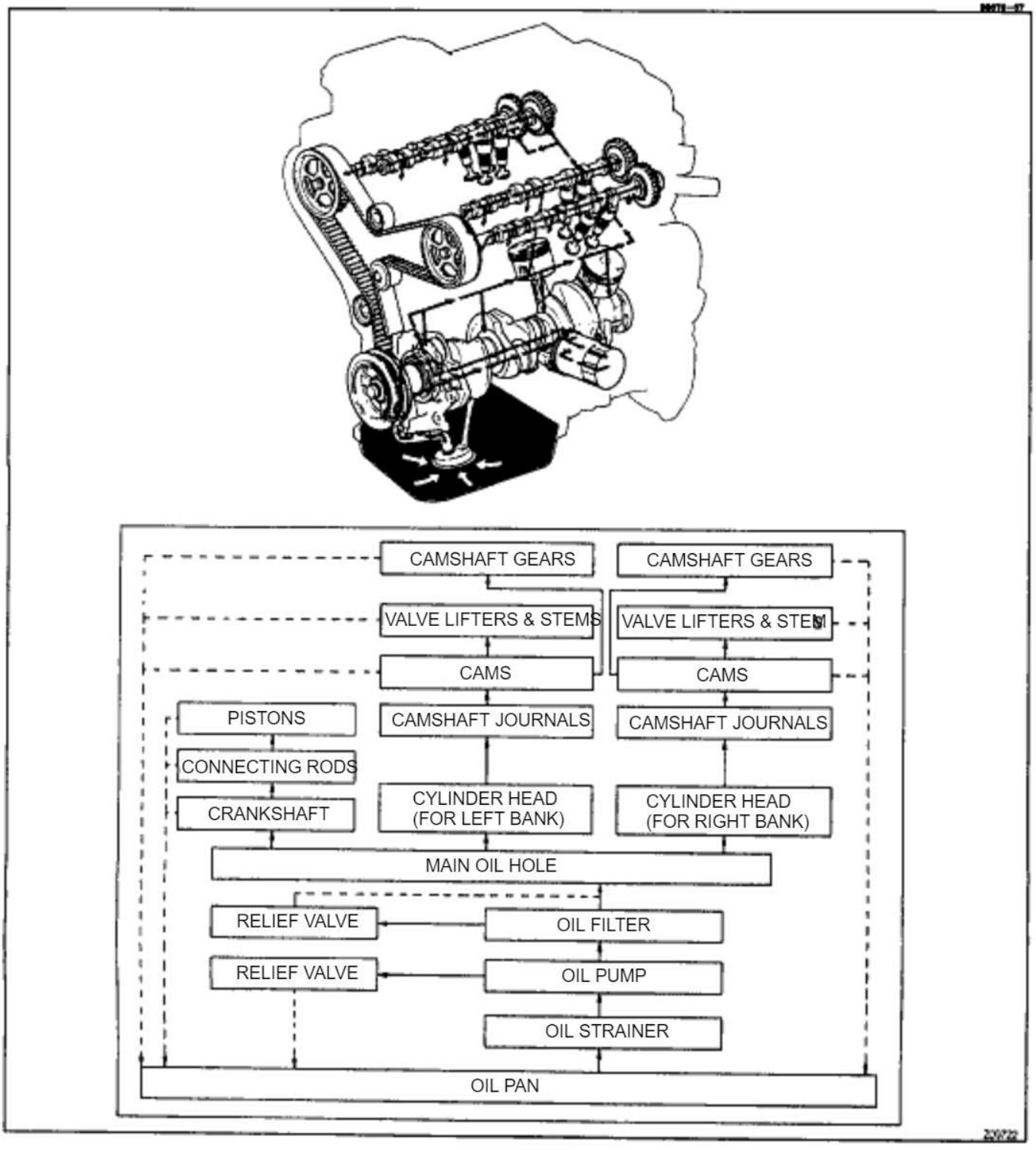
# LUBRICATION SYSTEM

## DESCRIPTION

A fully pressurized, fully filtered lubrication system has been adopted for this engine.

## OPERATION



A pressure feeding lubrication system has been adopted to supply oil to the moving parts of this engine. The lubrication system consists of an oil pan, oil pump, oil filter and other external parts which supply oil to the moving parts in the engine block. The oil circuit is shown in the illustration at the top of the previous page. Oil from the oil pan is pumped up by the oil pump. After it passes through the oil filter, it is fed through the various oil holes in the crankshaft and cylinder block. After passing through the cylinder block and performing its lubricating function, the oil is returned by gravity to the oil pan. A dipstick on the center left side of the cylinder block is provided to check the oil level.

**OIL PUMP**

The oil pump pumps up oil from the oil pan and feeds it under pressure to the various parts of the engine. An oil strainer is mounted in front of the inlet to the oil pump to remove impurities. The oil pump itself is a trochoid type pump, inside of which there is a drive rotor and a driven rotor. When the drive rotor rotates, the driven rotor rotates in the same direction, and since the axis of the drive rotor shaft is different from the center of the driven rotor, the space between the two rotors changes as they rotate. Oil is drawn in when the space is wide and is discharged when the space in narrow.

**OIL PRESSURE REGULATOR (RELIEF VALVE)**

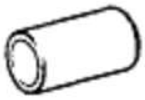
At high engine speeds, the engine oil supplied by the oil pump exceeds the capacity of the engine to utilize it. For that reason, the oil pressure regulator works to prevent an oversupply of oil.
–During normal oil supply, a coil spring and valve keep the bypass closed, but when too much oil is being fed, the pressure become extremely high, overpowering the force of the spring and opening the valves. This allows the excess oil to flow through the relief valve and return to the oil pan.

**OIL FILTER**

The oil filter is a full flow type filter with a built–in paper filter element. Particles of metal from wear, airborne dirt, carbon and other impurities can get into the oil during use and could cause accelerated wear or seizing if allowed to circulate through the engine. The oil filter, integrated into the oil line, removes these impurities as the oil passes through it. The filter is mounted outside the engine to simplify replacement of the filter element. A relief valve is also included ahead of the filter element to relieve the high oil pressure in case the filter element becomes clogged with impurities. The relief valve opens when the oil pressure overpowers the force of the spring. Oil passing through the relief valve bypasses the oil filter and flows directly into the main oil hole in the engine.

# PREPARATION

## SST (SPECIAL SERVICE TOOLS)

| | | |
|---|---|---|
|  | 09032–00100 Oil Pan Seal Cutter | No.2 oil pan |
|  | 09223–00010 Cover & Seal Replacer | Crankshaft front oil seal |
|  | 09226–07500 Oil Filter Wrench | |
|  | 09816–30010 Oil Pressure Switch Socket | |

## RECOMMENDED TOOLS

| | | |
|---|---|---|
|  | 09200–00010 Engine Adjust Kit | |

## EQUIPMENT

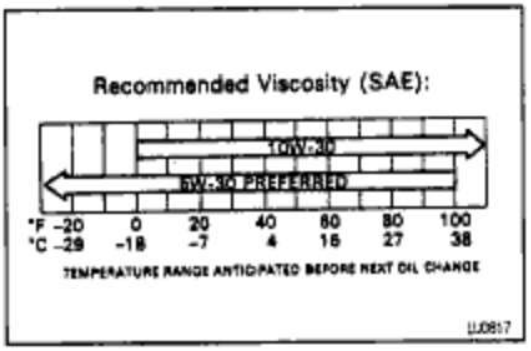
| | |
|---|---|
| Oil pressure gauge | |
| Precision straight edge | Oil pump |
| Torque wrench | |

## LUBRICANT

| Item | Capacity | Classification |
|---|---|---|
| Engine oil<br>Dry fill<br>Drain and refill<br>w/ Oil filter change<br>w/o Oil filter change | 5.5 liters (5.8 US qts, 4.8 Imp. qts)<br><br>4.7 liters (5.0 US qts, 4.1 Imp. qts)<br>4.5 liters (4.8 US qts, 4.0 Imp. qts) | API grade SG or SH, Energy–Conserving II or ILSAC multigrade and recommended viscosity oil with SAE 5W–30 being the preferred engine oil |

## SSM (SPECIAL SERVICE MATERIALS)

| | |
|---|---|
| 08826–00080 Seal packing or equivalent | Oil pump<br>No.1 oil pan<br>No.2 oil pan |
| 08833–00080 Adhesive 1344,<br>THREE BOND 1344,<br>LOCTITE 242 or equivalent | Oil pressure switch |




## OIL PRESSURE CHECK

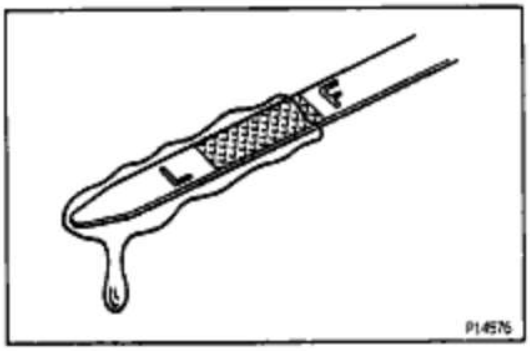
**1. CHECK ENGINE OIL QUALITY**

Check the oil for deterioration, entry of water, dis–coloring or thinning.

If the quality is visibly poor, replace the oil.

**Oil grade:**

**API grade SG or SH, Energy – Conserving II or ILSAC multigrade engine oil. Recommended viscosi–ty is as shown in the illustration with SAE 5W–30 being the preferred engine oil.**



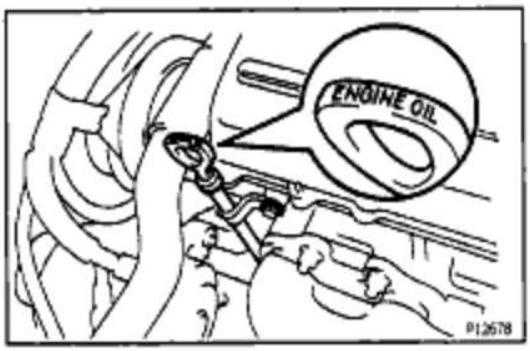

**2. CHECK ENGINE OIL LEVEL**

The oil level should be between the ”L” and ”F” marks on the dipstick.

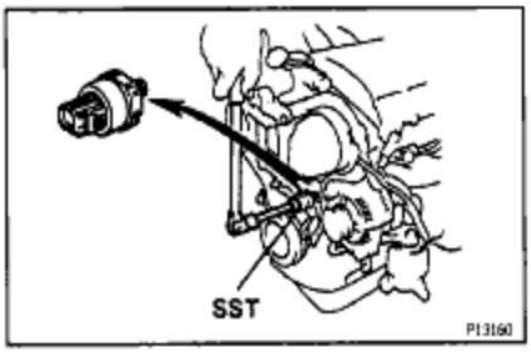
If low, check for leakage and add oil up to the ”F” mark.

**NOTICE:**

- **Do not fill with engine oil above the ”F” mark.**



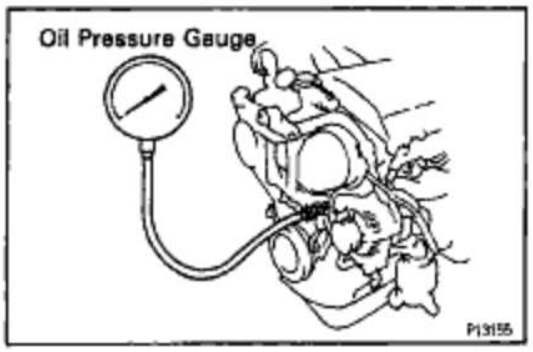

- **Install the oil dipstick facing the direction shown in the illustration.**




**3. REMOVE OIL PRESSURE SWITCH, AND INSTALL OIL PRESSURE GAUGE**

(a) Using SST, remove the oil pressure switch.

SST 09816 – 30010




(b) Install the oil pressure gauge.

**4. WARM UP ENGINE**

Allow the engine to warm up to normal operating temperature.

**5. CHECK OIL PRESSURE**

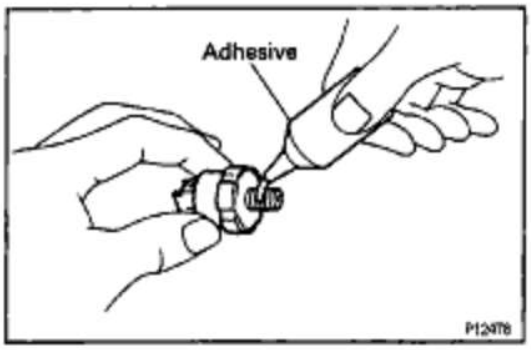
**Oil pressure:**

**At idle speed**

**29 kPa (0.3 kgf/cm$^2$, 4.3 psi) or more**

**At 3,000 rpm**

**294 – 539 kPa (3.0 – 5.5 kgf/cm$^2$, 43 – 78 psi)**



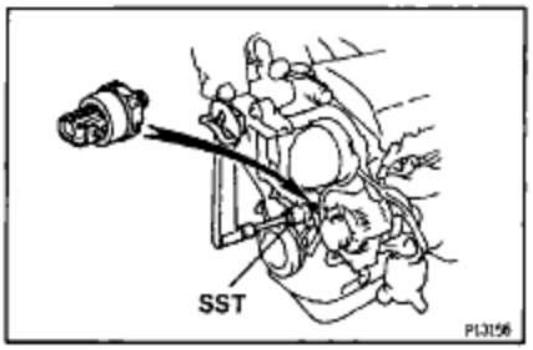

**6. REMOVE OIL PRESSURE GAUGE AND REINSTALL OIL PRESSURE SWITCH**

(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 SST, reinstall the oil pressure switch.

SST 09816–30010

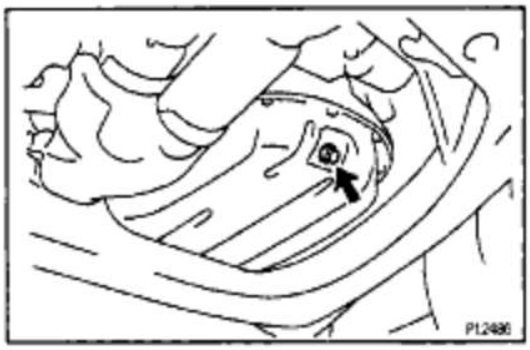
**Torque: 13 N–m (130 kgf–cm, 9 ft–lbf)**

**7. START ENGINE AND CHECK FOR LEAKS**

# OIL AND FILTER REPLACEMENT

**CAUTION:**

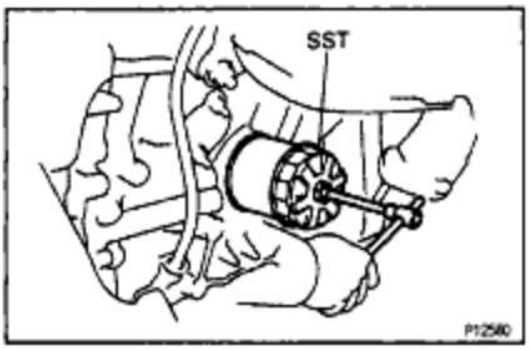
- **Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.**
- **Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing end gloves. Wash your skin thoroughly with soap and water, or use waterless hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.**
- **In order to preserve the environment, used oil and used oil filter must be disposed of only at designated disposal sites.**



**1. DRAIN ENGINE OIL**

(a) Remove the oil filler cap.

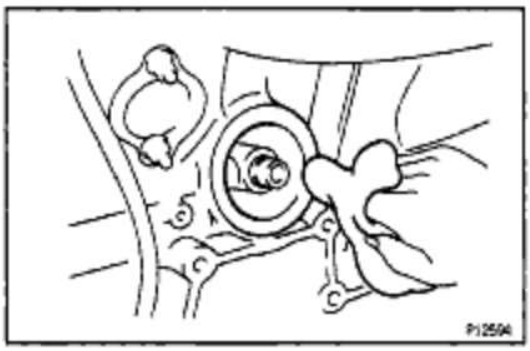
(b) Remove the oil drain plug, and drain the oil into a container.




## 2. REPLACE OIL FILTER

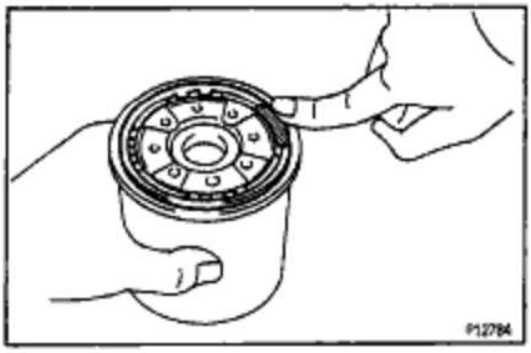
(a) Using SST, remove the oil filter.

SST 09228–07500

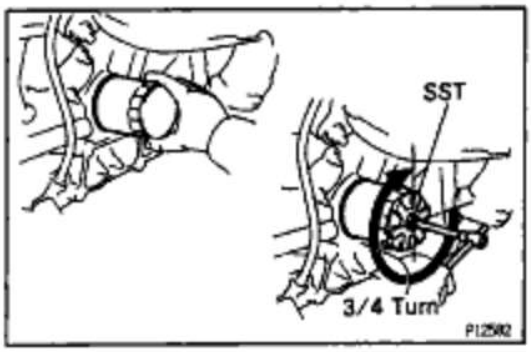


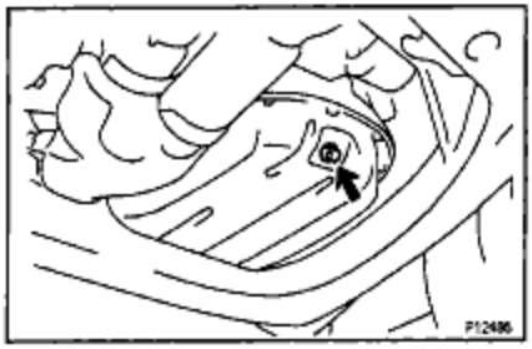
(b) Check and clean the oil filter installation surface.

(c) Apply clean engine oil to the gasket of a new oil filter.




(d) Lightly screw the oil filter into place, and tighten it until the gasket contacts the seat.
(e) Using SST, tighten it an additional 3/4 turn.
SST 09228–07500

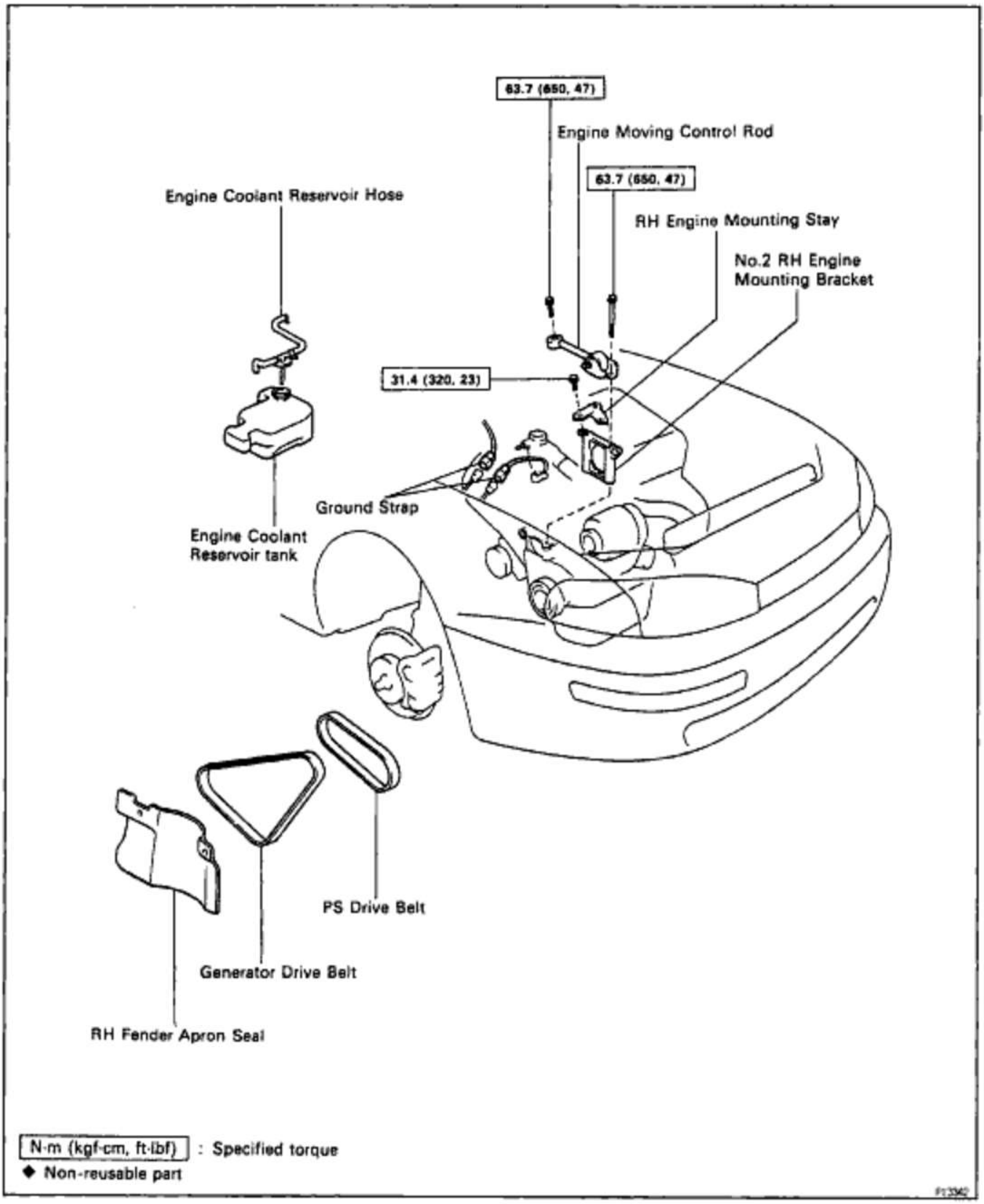


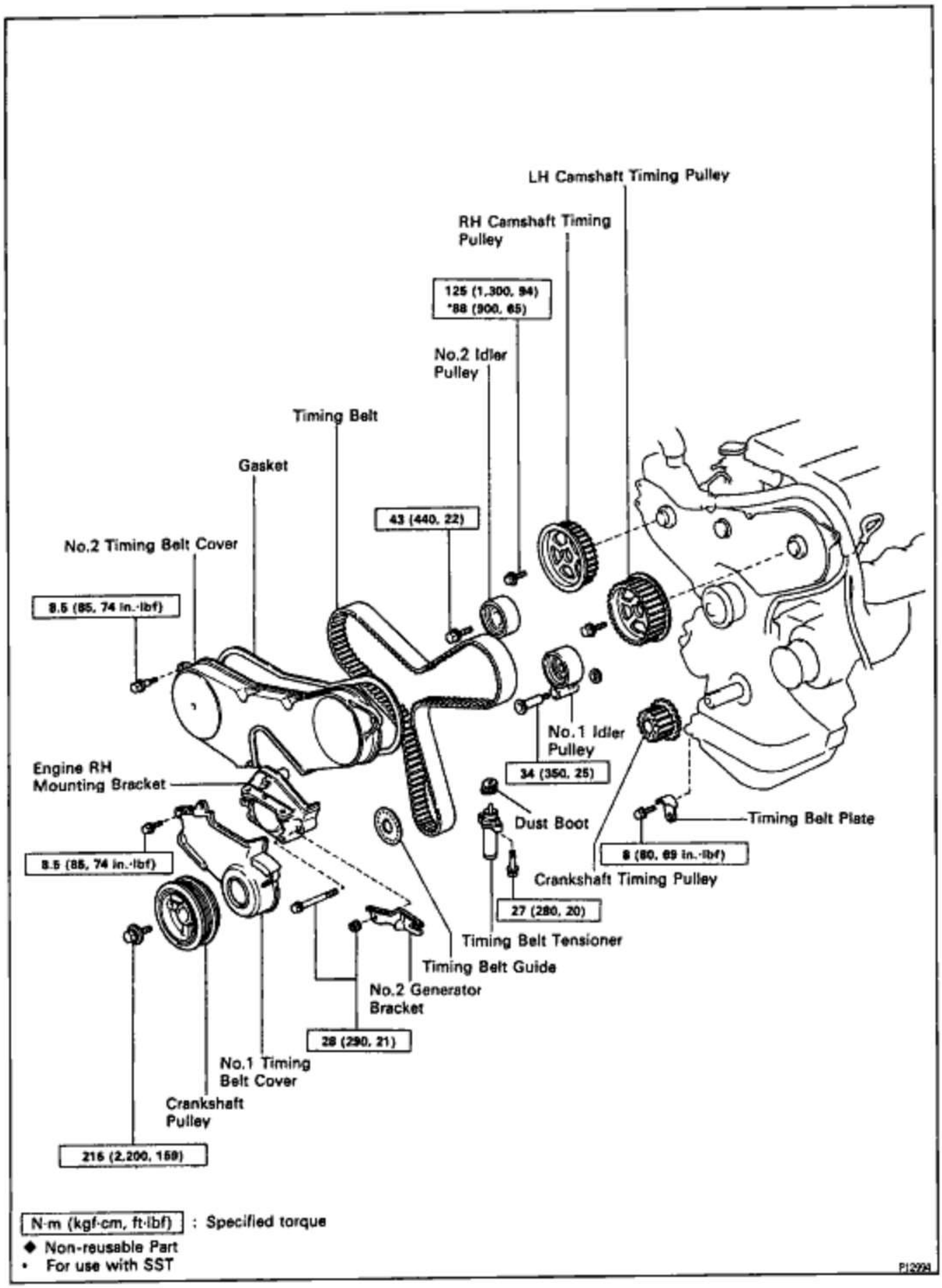



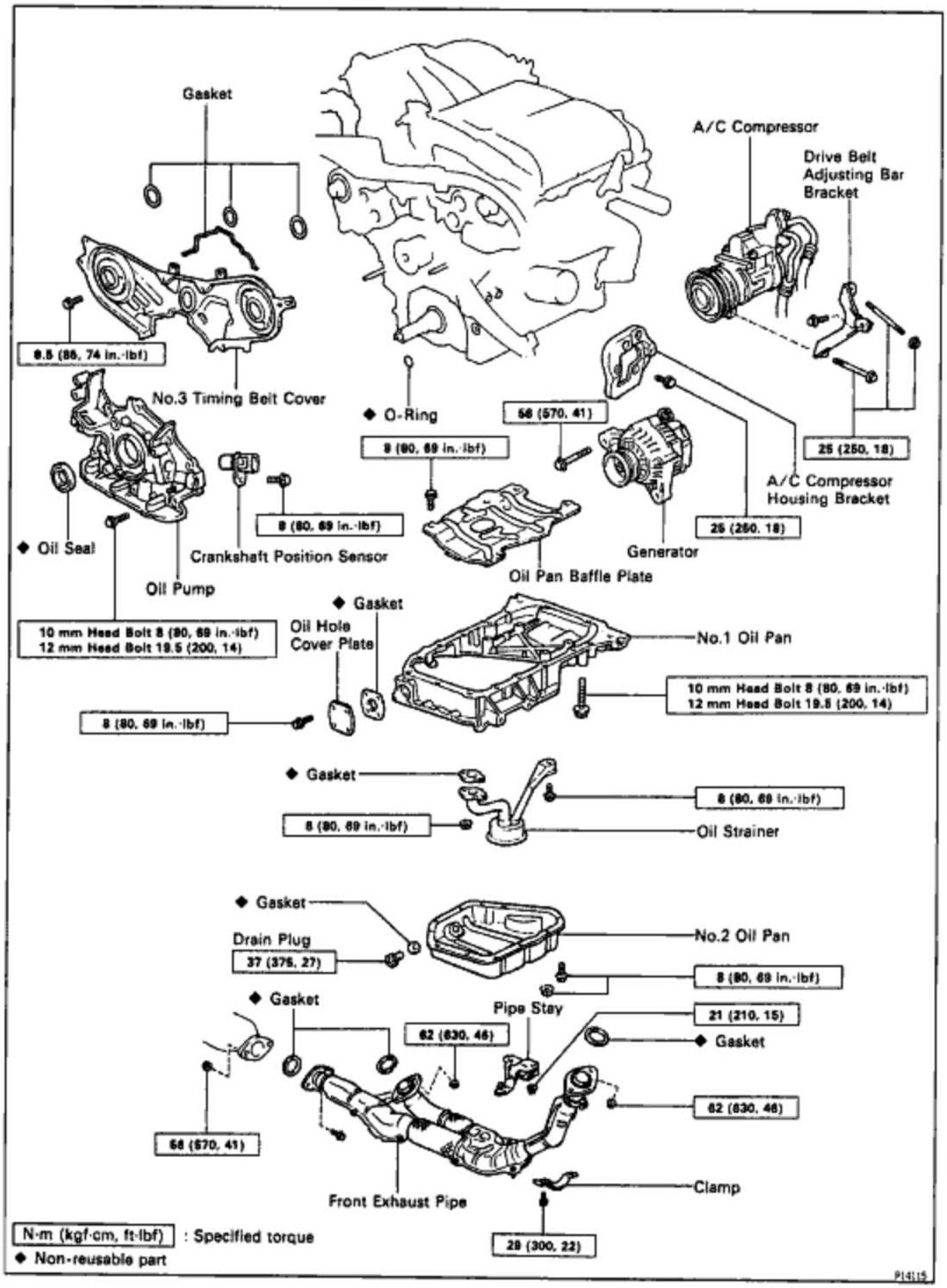

**3. REFILL WITH ENGINE OIL**
(a) Clean and install the oil drain plug with a new gasket.
**Torque: 37 N–m (375 kgf–cm, 27 ft–lbf)**
(b) Fill with fresh engine oil.
**Oil grade:**
**API grade SG or SH, Energy – Conserving II or ILSAC multigrade and recommended viscosity oil, with SAE 5W–30 being the preferred engine oil.**
**Capacity:**
**Drain and refill**
**w/ Oil filter change**
**4.7 liters (5.0 US qts, 4.1 Imp. qts)**
**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) Reinstall the oil filler cap.
**4. START ENGINE AND CHECK FOR OIL LEAKS**
**5. RECHECK ENGINE OIL LEVEL**

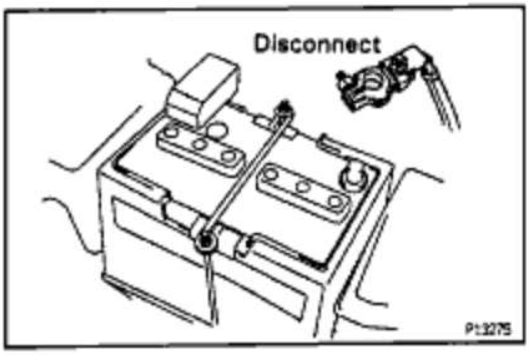
# OIL PUMP

## COMPONENTS FOR REMOVAL AND INSTALLATION




LH Camshaft Timing Pulley
RH Camshaft Timing Pulley
125 (1,300, 94)
*88 (900, 65)
No.2 Idler Pulley
Timing Belt
Gasket
43 (440, 22)
No.2 Timing Belt Cover
8.5 (85, 74 in.·lbf)
No.1 Idler Pulley
34 (350, 25)
Engine RH Mounting Bracket
Dust Boot
Timing Belt Plate
8 (80, 69 in.·lbf)
8.5 (85, 74 in.·lbf)
Crankshaft Timing Pulley
27 (280, 20)
Timing Belt Tensioner
Timing Belt Guide
No.2 Generator Bracket
28 (290, 21)
No.1 Timing Belt Cover
Crankshaft Pulley
216 (2,200, 159)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable Part
• For use with SST
PI229H


Gasket
8.5 (85, 74 in.·lbf)
No.3 Timing Belt Cover
◆ Oil Seal
Oil Pump
Crankshaft Position Sensor
8 (80, 69 in.·lbf)
◆ O-Ring
8 (80, 69 in.·lbf)
Oil Pan Baffle Plate
56 (570, 41)
Generator
25 (250, 18)
A/C Compressor
Drive Belt Adjusting Bar Bracket
25 (250, 18)
A/C Compressor Housing Bracket
10 mm Head Bolt 8 (80, 69 in.·lbf)
12 mm Head Bolt 19.5 (200, 14)
◆ Gasket
Oil Hole Cover Plate
8 (80, 69 in.·lbf)
No.1 Oil Pan
10 mm Head Bolt 8 (80, 69 in.·lbf)
12 mm Head Bolt 19.5 (200, 14)
◆ Gasket
8 (80, 69 in.·lbf)
8 (80, 69 in.·lbf)
Oil Strainer
◆ Gasket
Drain Plug
37 (375, 27)
No.2 Oil Pan
8 (80, 69 in.·lbf)
◆ Gasket
Pipe Stay
62 (630, 46)
21 (210, 15)
◆ Gasket
62 (630, 46)
56 (570, 41)
Front Exhaust Pipe
Clamp
28 (300, 22)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
P14115




# OIL PUMP REMOVAL

**(See Components for Removal and Installation)**

HINT: When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

**1. DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY**

**CAUTION: Work must be started after 90 seconds from the time the Ignition switch is turned to the 'LOCK' position and the negative (–) terminal cable Is discon–nected from the battery.**

**2. DRAIN ENGINE OIL**

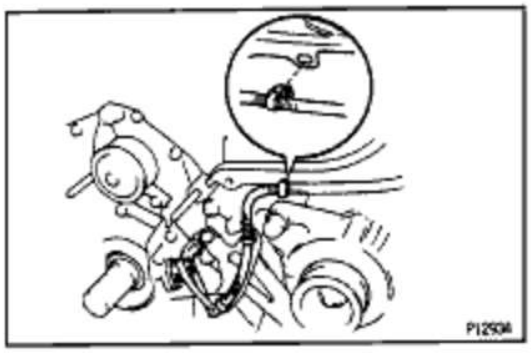
**3. REMOVE OIL DIPSTICK**

**4. REMOVE TIMING BELT**

**(See step 2 to 20 on pages EG2–41 to 45)**

**5. REMOVE TIMING PULLEYS**

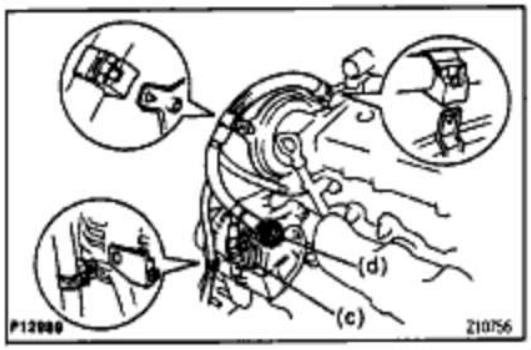
**(See step 21 to 24 on pages EG2–45 to 47)**



**6. DISCONNECT ENGINE WIRE**

(a) Disconnect the crankshaft position sensor connector.

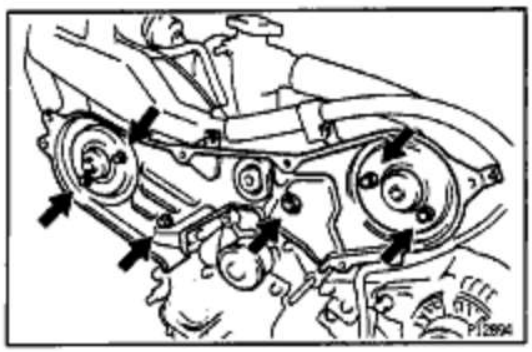
(b) Disconnect the engine wire from the wire clamp.




(c) Disconnect the generator connector.

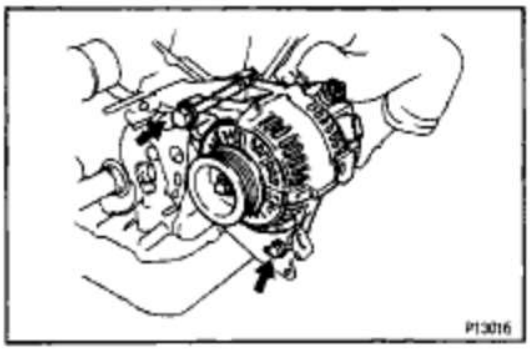
(d) Remove the nut and disconnect the generator wire.

(e) Disconnect the engine wire from the 3 clamps.

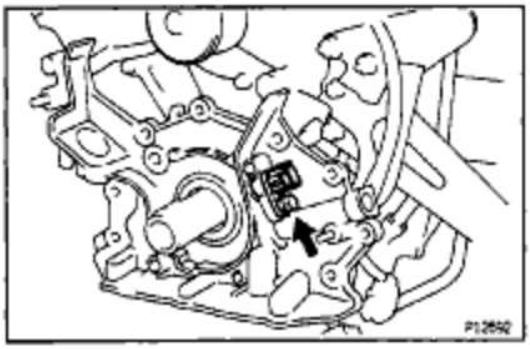


**7. REMOVE No.3 TIMING BELT COVER**

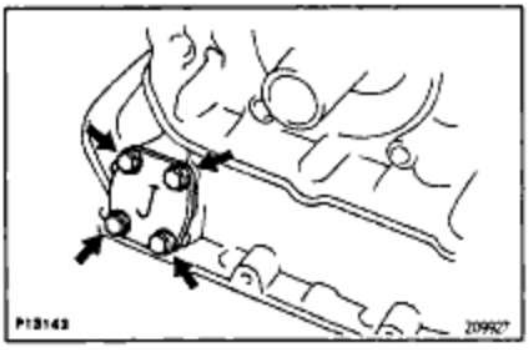
**Remove the 6 bolts and belt cover.**




**8. REMOVE GENERATOR**
Remove the 2 bolts and generator.

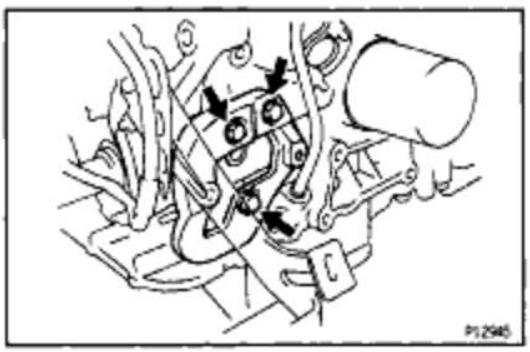



**9. REMOVE CRANKSHAFT POSITION SENSOR**
Remove the bolt and position sensor.

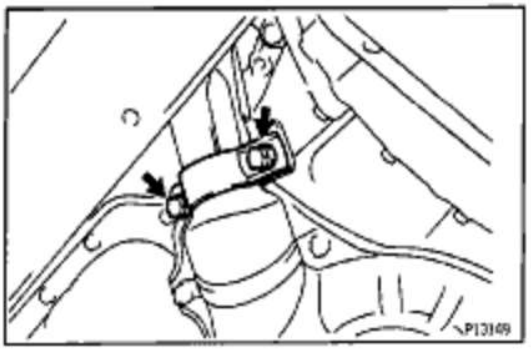



**10. REMOVE OIL HOLE COVER PLATE**
Remove the 4 bolts and cover plate.


**11. REMOVE A/C COMPRESSOR WITHOUT DISCONNECTING HOSES**
(a) Disconnect the A/C compressor connector.
(b) Remove the drive belt.
(c) Remove the 5 bolts, 2 nuts and drive belt adjusting bar bracket, and disconnect the A/C compressor.
(d) Move the compressor aside and suspend it.

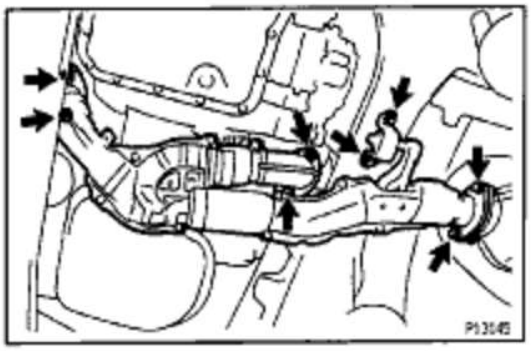



**12. REMOVE A/C COMPRESSOR HOUSING BRACKET**
Remove the 3 bolts and A/C compressor housing bracket.



**13. REMOVE FRONT EXHAUST PIPE**

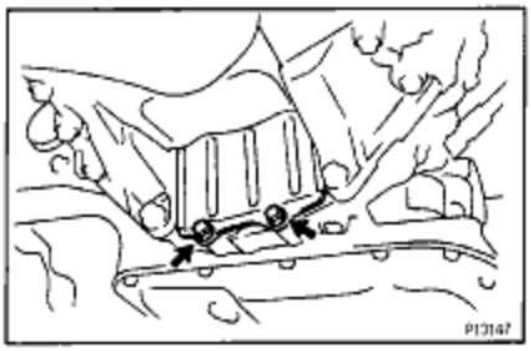
(a) Remove the 2 bolts and exhaust pipe clamp.



(b) Remove the 2 bolts, and disconnect the bracket.
(c) Remove the 2 bolts and 2 nuts holding the front exhaust pipe to the three–way catalytic converter.
(d) Remove the 4 nuts holding the front exhaust pipe to the exhaust manifolds.
(e) Remove the front exhaust pipe and 3 gaskets.

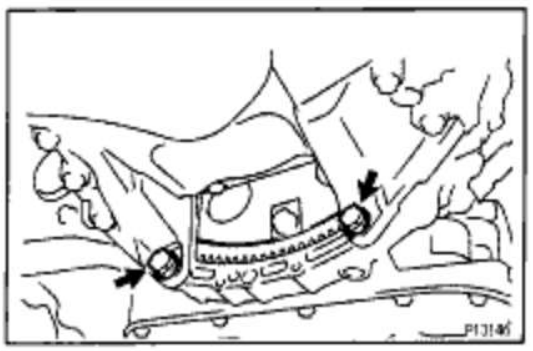
**14. REMOVE FRONT EXHAUST PIPE STAY**

Remove the 2 bolts and pipe stay.



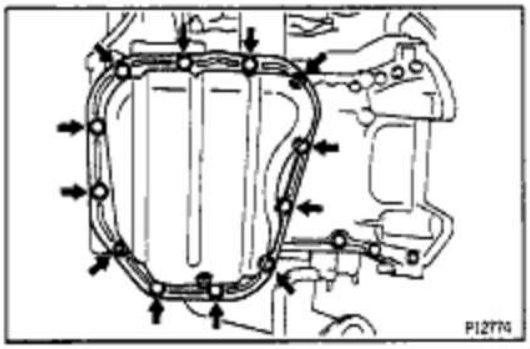
**15. REMOVE FLYWHEEL HOUSING UNDERCOVER**

Remove the 2 bolts and undercover.



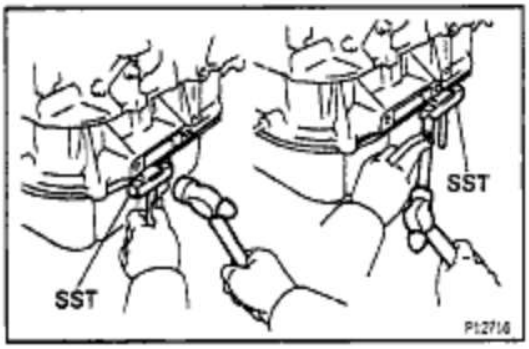
**16. REMOVE BOLTS HOLDING NO.1 OIL PAN TO TRANSAXLE**

Remove the 2 bolts.



**17. REMOVE NO.2 OIL PAN**

(a) Remove the 10 bolts and 2 nuts.

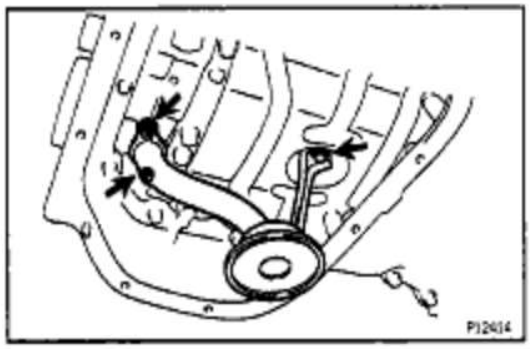



(b) Insert the blade of SST between the No. 1 and No.2 oil pans, and cut off applied sealer and remove the No. 1 oil pan.

SST 09032 – 00100

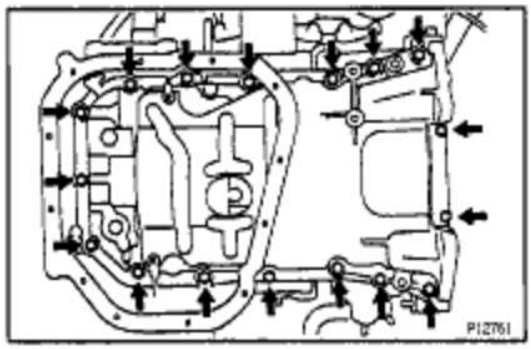
**NOTICE:**

- **Be careful not to the damage the No.2 oil pan con–tact surface of the No.1 oil pan.**
- **Be careful not to damage the No..2 oil pan flange.**



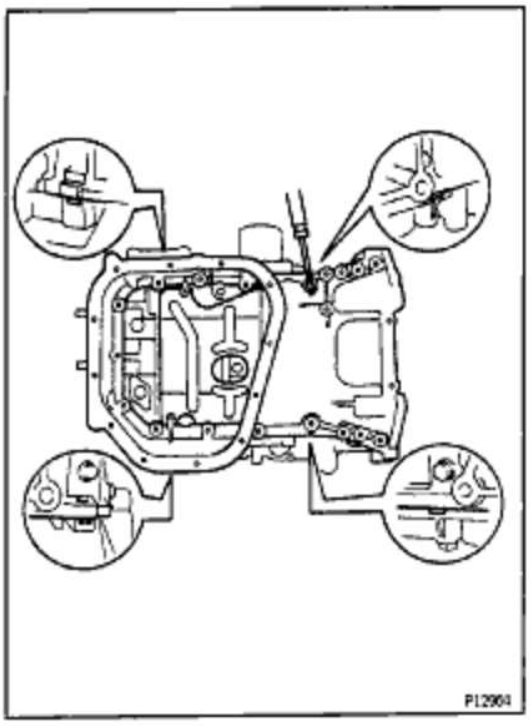
**18. REMOVE OIL STRAINER**

Remove the bolt, 2 nuts, oil strainer and gasket.



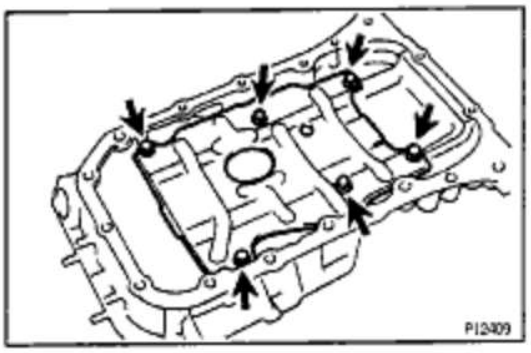
**19. REMOVE NO.1 OIL PAN**

(a) Remove the 17 bolts.



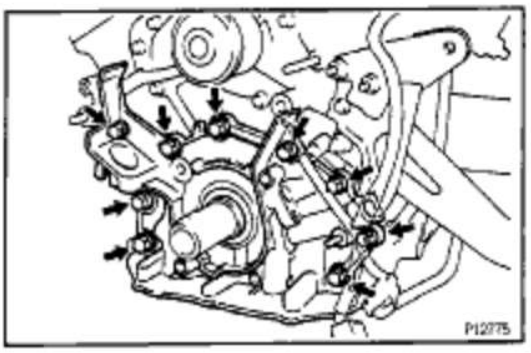

(b) Using a screwdriver, remove the No. 1 oil pan by prying the portions between the cylinder block and No.1 oil pan.

**NOTICE: Be careful not to damage the contact surfaces of the cylinder block and No.1 oil pan.**



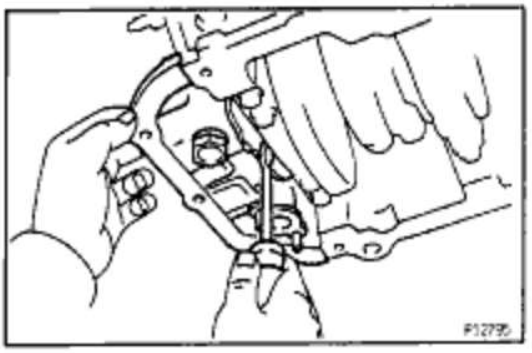

**20. REMOVE OIL PAN BAFFLE PLATE**

Remove the 6 bolts and baffle plate.




**21. REMOVE OIL PUMP**

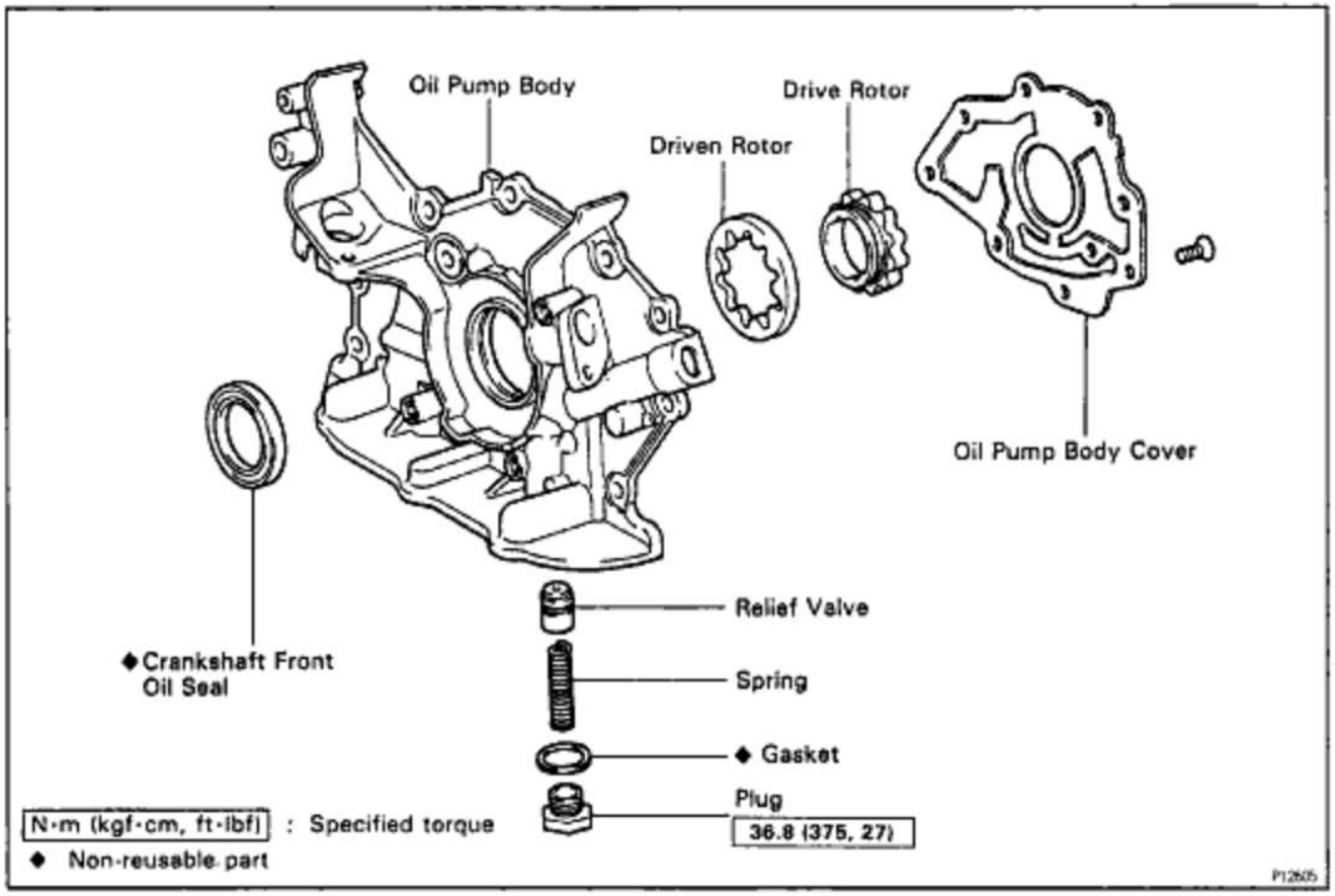
(a) Remove the 9 bolts.

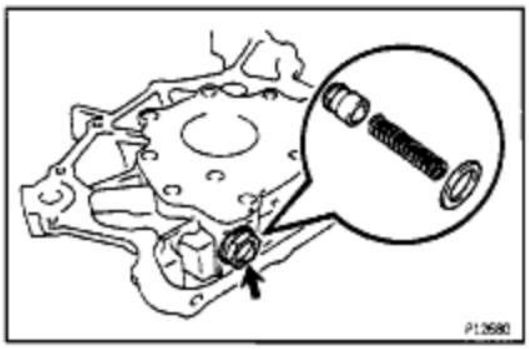



(b) Remove the oil pump by prying a screwdriver between the oil pump and main bearing cap.

(c) Remove the 0–ring.

# COMPONENTS FOR DISASSEMBLY AND ASSEMBLY

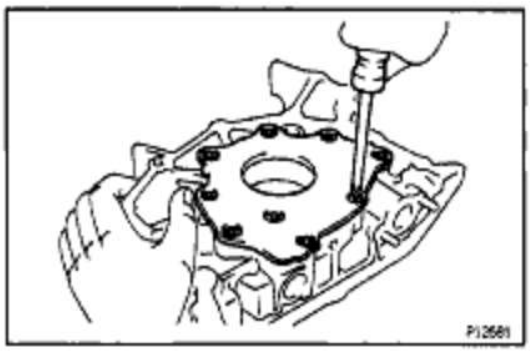



## OIL PUMP DISASSEMBLY

### 1. REMOVE RELIEF VALVE

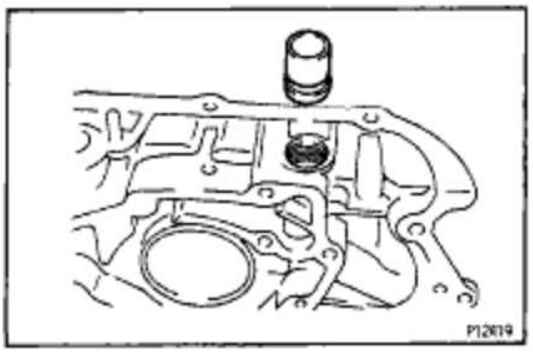
Remove the plug, gasket, spring and relief valve.




### 2. REMOVE DRIVE AND DRIVEN ROTORS

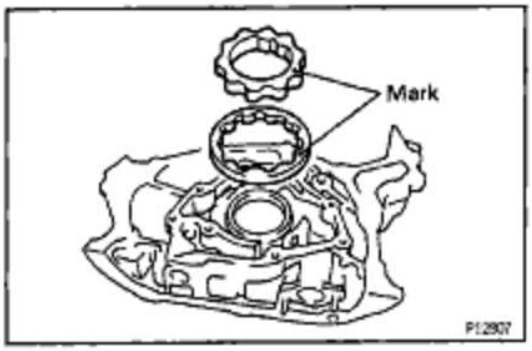
Remove the 9 screws, pump body cover, drive and driven rotors.

# OIL PUMP INSPECTION



### 1. INSPECT RELIEF VALVE

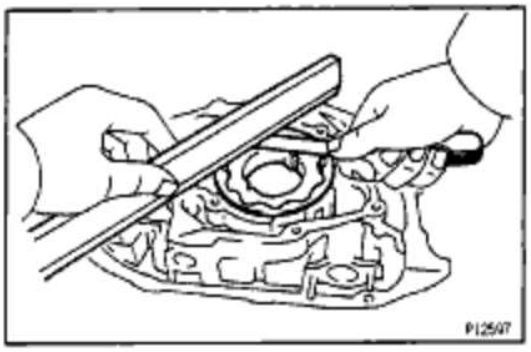
Coat the valve with engine oil and check that it falls smoothly into the valve hole by its own weight.
If it does not, replace the relief valve. If necessary, replace the oil pump assembly.




### 2. INSPECT DRIVE AND DRIVEN ROTORS

**A. Place drive and driven rotors into oil pump body**

Place the drive and driven rotors into the oil pump body with the mark facing upward.



**B. Inspect rotor side clearance**

Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

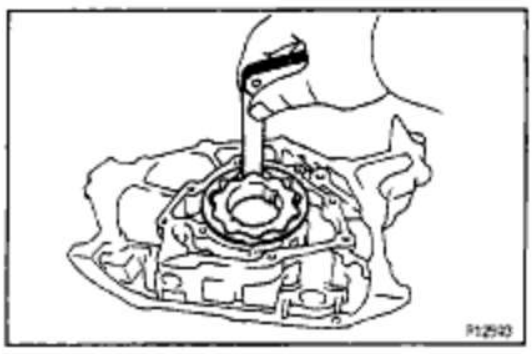
**Standard side clearance:**

**0.030 – 0.090 mm (0.0012 – 0.0035 in.)**

**Maximum side clearance:**

**0.15 mm (0.0059 in.)**

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



**C. Inspect rotor tip clearance**

Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

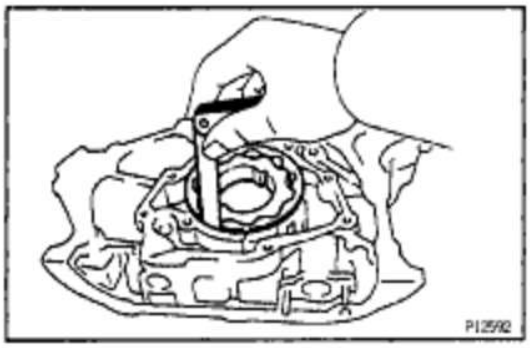
**Standard tip clearance:**

**0.110 – 0.240 mm (0.0043 – 0.0094 In.)**

**Maximum tip clearance:**

**0.35 mm (0.0138 in.)**

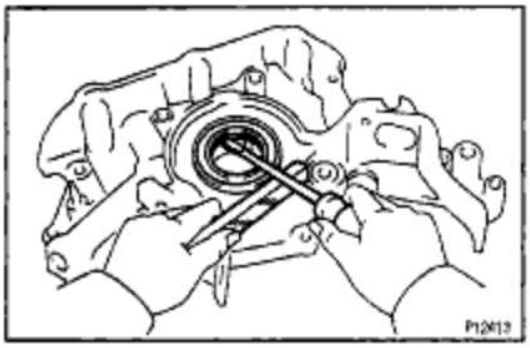
If the tip clearance is greater than maximum, replace the rotors as a set.



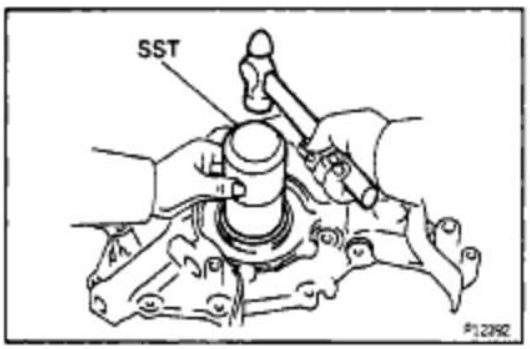
**D. Inspect rotor body clearance**
Using a feeler gauge, measure the clearance between the driven rotor and body.
**Standard body clearance:**
**0.100 – 0.175 mm (0.0039 – 0.0069 In.)**
**Maximum body clearance:**
**0.30 mm (0.0118 in.)**
If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

## CRANKSHAFT FRONT OIL SEAL REPLACEMENT

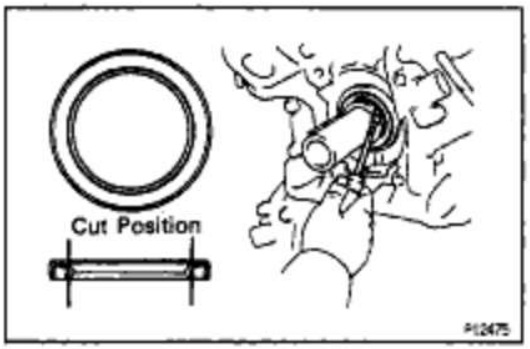
HINT: There are 2 methods (A and B) to replace the oil seal which are as follows:



**REPLACE CRANKSHAFT FRONT OIL SEAL**
**A. If oil pump is removed from cylinder block:**
(a) Using a screwdriver, pry out the oil seal.

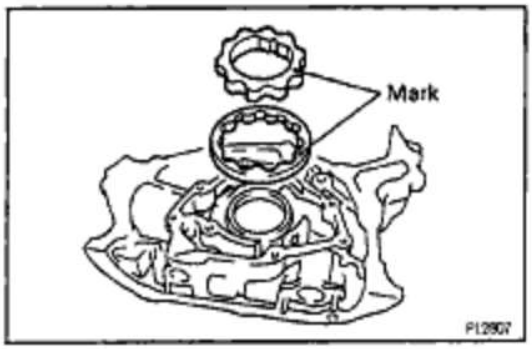



(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.
SST 09223 – 00010
(c) Apply MP grease to the oil seal lip.




**B. If oil pump is installed to the cylinder block:**
(a) Using a knife, cut off the oil seal lip.
(b) Using a screwdriver, pry out the oil seal.
**NOTICE: Be careful not to damage the crankshaft. Tape the screwdriver tip.**


(c) Apply MP grease to a new oil seal lip.
(d) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.
SST 09223 – 00010

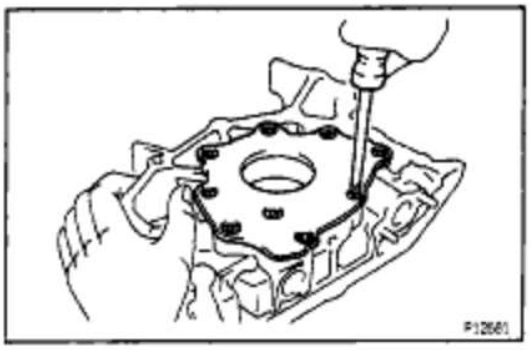



## OIL PUMP ASSEMBLY

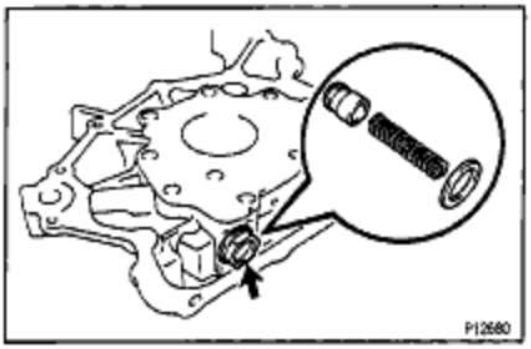
**(See Components for Disassembly and Assembly)**

### 1. INSTALL DRIVE AND DRIVEN ROTORS

(a) Place the drive and driven rotors into pump body with the marks facing the pump body cover side.

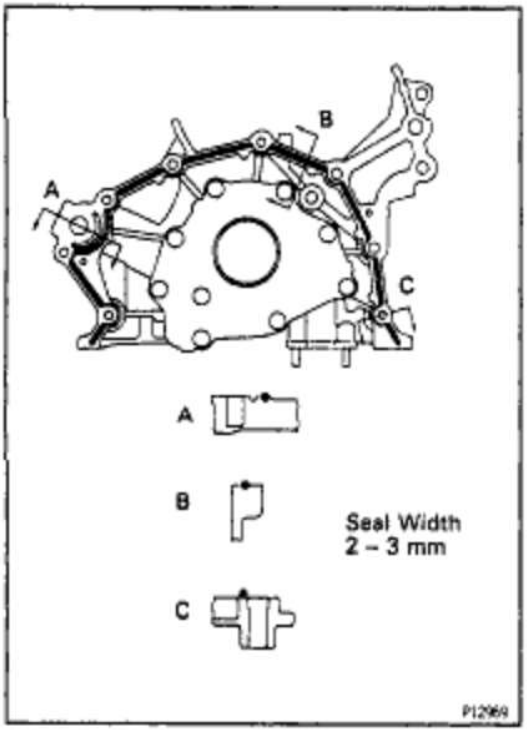



(b) Install the pump body cover with the 9 screws.




### 2. INSTALL RELIEF VALVE

(a) Insert the relief valve and spring into the pump body hole.
(b) Install the plug with a new gasket.
**Torque: 36.8 N–m (375 kgf–cm, 37 ft–lbf)**




# OIL PUMP INSTALLATION

**(See Components for Removal and Installation)**

**1. INSTALL OIL PUMP**

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

(b) Apply seal packing to the oil pump as shown in the illustration.

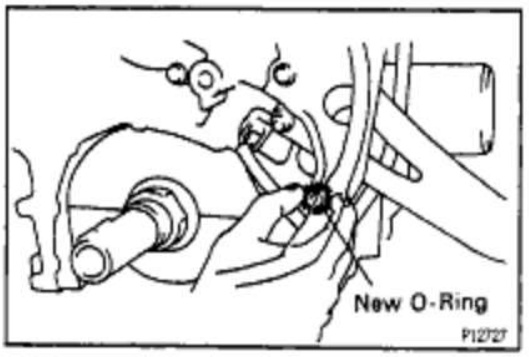
**Seal packing:**

**Part No. 08826–00080 or equivalent**

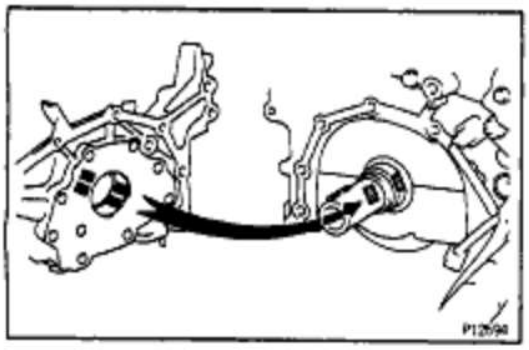
- Install a nozzle that has been cut to a 2–3 mm (0.08–0.12 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

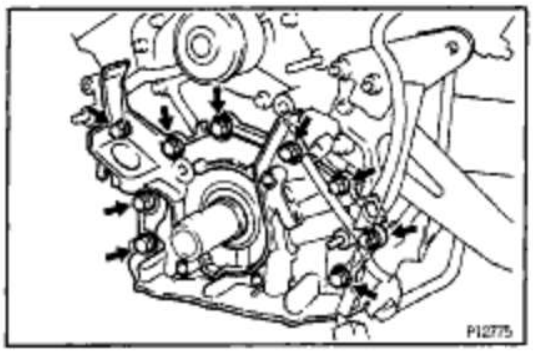
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.




(c) Place a new 0 – ring in position on the cylinder block.



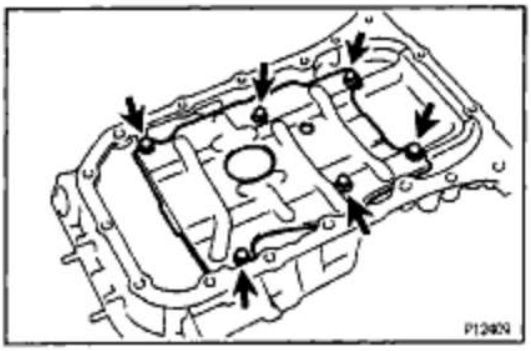
(d) Engage the spline teeth of the oil pump drive gear with the large teeth of the crankshaft, and slide the oil pump on the crankshaft.




(e) Install the oil pump with the 9 bolts.

**Torque:**

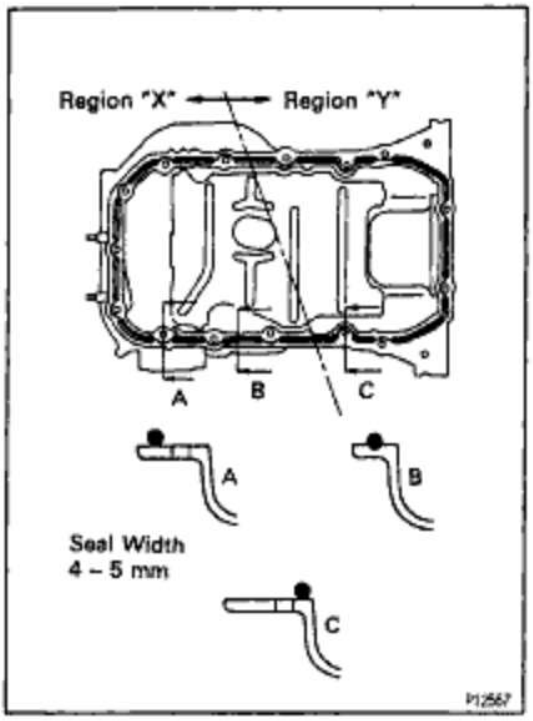
**8 N–m (80 kgf–cm, 69 in.–lbf) for 10 mm head bolt**
**19.5 N–m (200 kgf–cm, 14 ft–lbf) for 12 mm head bolt**




**2. INSTALL OIL PAN BAFFLE PLATE**

Install the baffle plate with the 6 bolts.

**Torque: 8 N–m (80 kgf–cm, 69 in.–lbf)**




**3. INSTALL NO.1 OIL PAN**

(a) Remove any old packing (FIPG) material and be care–f ul not to drop any oil on the contact surfaces of the oil pan, oil pump and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

(b) Apply seal packing to the oil pan as shown in the illustration.

**Seal packing:**

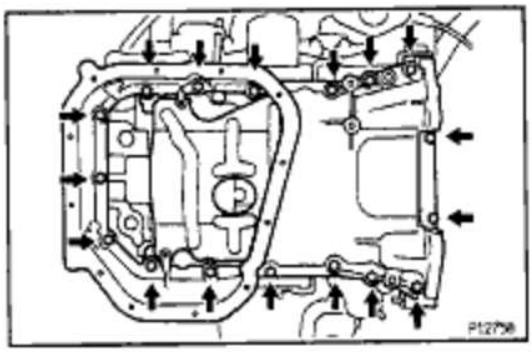
**Part No. 08826–00080 or equivalent**

**Region “X” is at the outer side of the bolt hole.**
**Region “Y” Is at the inner side of the bolt hole.**

- Install a nozzle that has been cut to a 4–5 mm (0.16–0.20 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

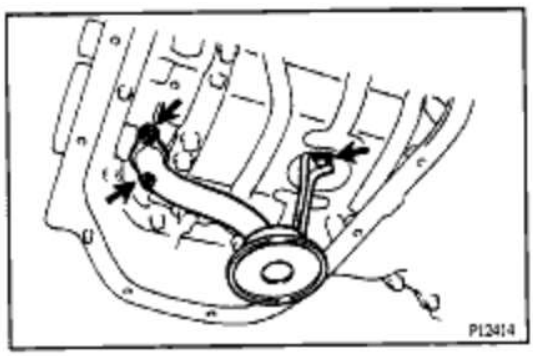
- Parts must be assembled within 3 minutes of application. Otherwise the material must be re–moved and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Install the oil pan with the 17 bolts.

**Torque:**

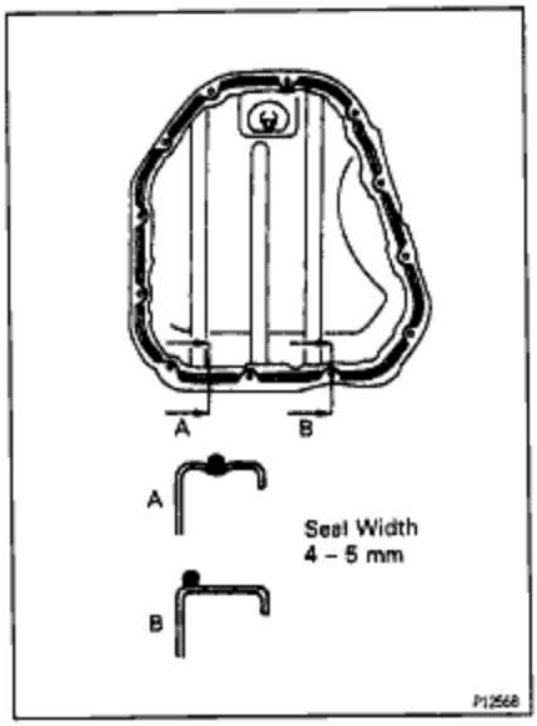
**8 N–m (80 kgf–cm, 69 in.–lbf) for 10 mm head bolt**
**19.5 N–m (200 kgf–cm. 14 ft–lbf) for 12 mm head bolt**



**4. INSTALL OIL STRAINER**

Install a new gasket and the oil strainer with the bolt and 2 nuts.

**Torque: 8 N–m (80 kgf–cm, 69 in.–lbf)**




**5. INSTALL NO.2 OIL PAN**

(a) Remove any old packing (FIPG) material and be care. ful not to drop any oil on the contact surface of the No. 1 and No.2 oil pans.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove al the loose material.
- Using a non–residue solvent, clean both sealing surfaces.

**NOTICE: Do not use a solvent which will affect the paint ed surfaces.**

(b) Apply seal packing to the No.2 oil pan as shown in the illustration.

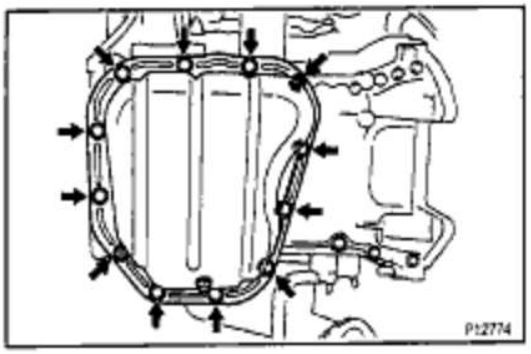
**Seal packing:**

**Part No. 088218–00080 or equivalent**

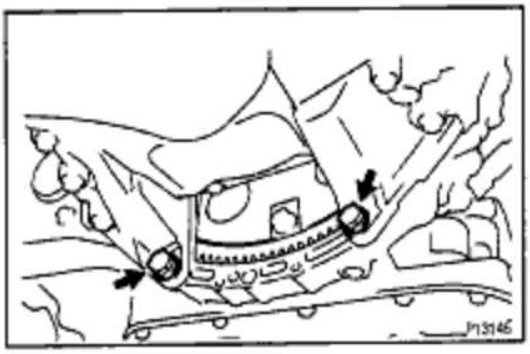
- Install a nozzle that has been cut to a 4–5 mm (0.16 – 0.20 in.) opening.

HINT: Avoid –applying an excessive amount to the surface.

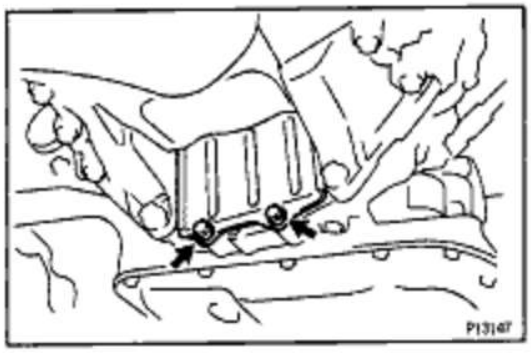
- Parts must be assembled within 3 minutes an application. Otherwise the material must be re–moved and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.




(c) Install the No.2 oil pan with the 10 bolts and 2 nuts.
**Torque: 8 N–m (80 kgf–cm, 69 in.–lbf)**

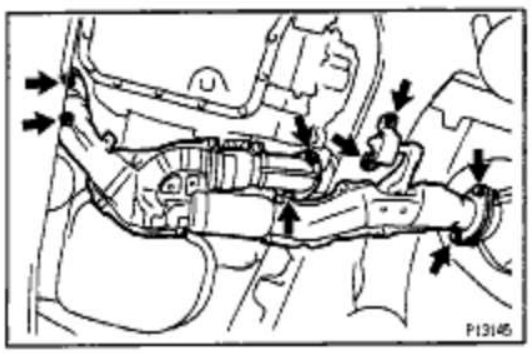



**6. INSTALL BOLTS HOLDING NO.1 OIL PAN TO TRANSAXLE**
Install the 2 bolts.
**Torque: 37 N–m (380 kgf–cm, 27 ft–lbf)**

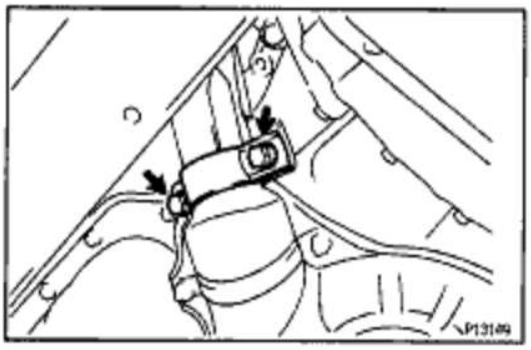



**7. INSTALL FLYWHEEL HOUSING UNDERCOVER**
Install the undercover with the 2 bolts.
**Torque: 7.8 N–m (80 kgf–cm, 69 in.–lbf)**

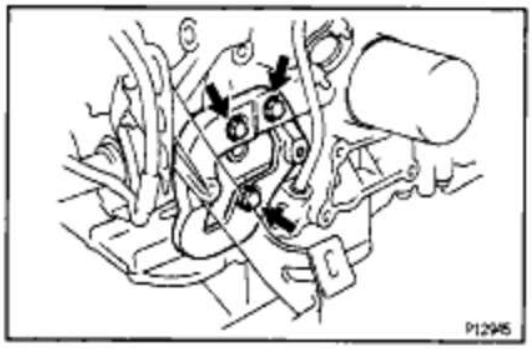
**8. INSTALL FRONT EXHAUST PIPE STAY**
Install the pipe stay with the 2 bolts.
**Torque: 21 N–m (210 kgf–cm, 15 ft–lbf)**




**9. INSTALL FRONT EXHAUST PIPE**
(a) Temporarily install 3 new gaskets and the front ex–haust pipe with the 2 bolts and6 nuts.
(b) Tighten the 4 nuts holding the exhaust manifolds to the front exhaust pipe.
**Torque: 62 N–m (630 kgf–cm, 46 ft–lbf)**
(c) Tighten the 2 bolts and 2 nuts holding the three–way catalytic converter to the front exhaust pipe.
**Torque: 56 N–m (570 kgf–cm, 41 ft–lbf)**
(d) Connect the bracket with the 2 bolts.
**Torque: 19 N–m (195 kgf–cm, 14 ft–lbf)**

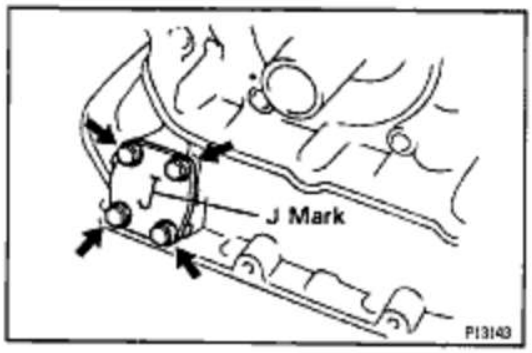


(e) Connect the front exhaust pipe clamp with the 2 bolts.
**Torque: 29 N–m (300 kgf–cm, 22 ft–lbf)**

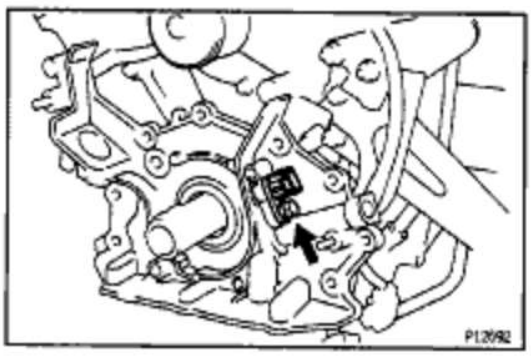


**10. INSTALL A/C COMPRESSOR HOUSING BRACKET**
Install the housing bracket with the 3 bolts.
**Torque: 26 N–m (250 kgf–cm, 18 ft–lbf)**

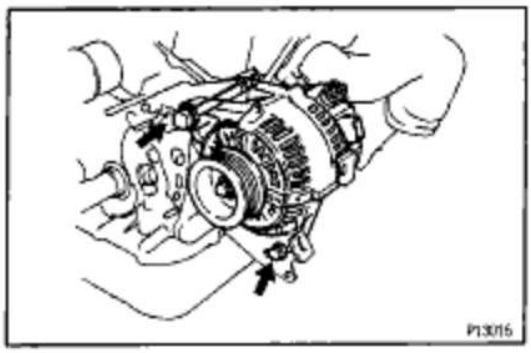
**11. INSTALL A/C COMPRESSOR**
(a) Install the A/C compressor and drive belt adjusting bar bracket with the 5 bolts.
**Torque: 25 N–m (250 kgf–cm, 18 ft–lbf)**




**12. INSTALL OIL HOLE COVER PLATE**
Install a new gasket and the hole cover plate (J mark facing outward) with the 4 bolts.
**Torque: 8 N–m (80 kgf–cm, 69 in.–lbf)**

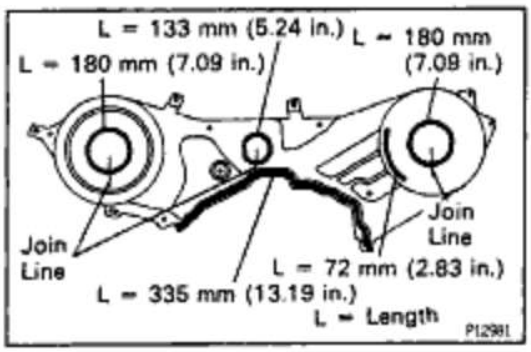


**13. INSTALL CRANKSHAFT POSITION SENSOR**
Install the position sensor with the bolt.
**Torque: 8 N–m (80 kgf–cm, 89 in.–lbf)**



### 14. INSTALL GENERATOR

Install the generator with the 2 bolts. Do not tighten the bolts yet.




### 15. INSTALL NO.3 TIMING BELT COVER

(a) Check that the timing belt cover gaskets have no cracks or peeling, etc.

If the gaskets do have cracks or peeling etc., replace them using the following steps.

(1) Using a screwdriver and gasket scraper, remove all the old gasket material.

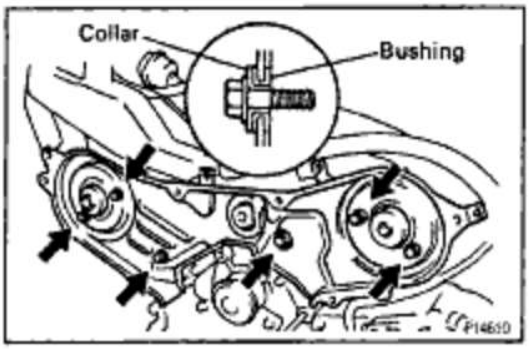
(2) Thoroughly clean all components to remove all the loose material.

(3) Remove the backing paper from a new gasket and install the gasket evenly to the part of the belt cover shaded black in the illustration.

**NOTICE: When joining gaskets, do not leave a gap between them. Cut off any excess gasket.**

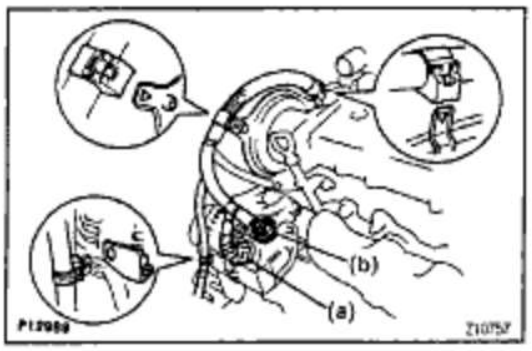
(4) After installing the gasket, press down on it so that the adhesive firmly sticks to the belt cover.

(b) Install new gaskets to the No.3 belt cover.




(c) Install the belt cover with the 6 bolts.

**Torque: 8.5 N–m (85 kgf–cm. 74 in.–lbf)**

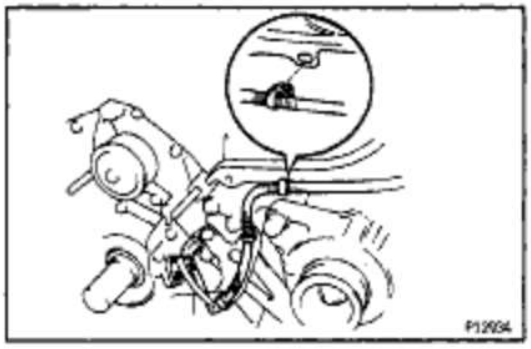



### 16. CONNECT ENGINE WIRE

(a) Connect the generator connector.

(b) Connect the generator wire with the nut.

(c) Connect the engine wire with the 3 clamps.



(d) Connect the crankshaft position sensor connector.
(e) Connect the engine wire with the wire clamp.

**17. INSTALL TIMING PULLEYS**
**(See steps 1 to 5 on pages EG2–49, 50)**
**18. INSTALL TIMING BELT**
**(See steps6 to 27 on pages EG2–51 to 66)**
**19. FILL ENGINE WITH OIL**
**Capacity:**
**Drain and refill**
**w/ Oil filter change**
**4.7 liters (5.0 US qts, 4.1 Imp. qts)**
**w/o Oil filter change**
**4.5 liters (4.8 US qts, 4.0 Imp. qts)**
**20. CONNECT NEGATIVE (–) TERMINAL CABLE TO BATTERY**
**21. START ENGINE AND CHECK FOR LEAKS**
**22. RECHECK ENGINE ENGINE OIL LEVEL**

# SERVICE SPECIFICATIONS

## SERVICE DATA

| | | | |
|---|---|---|---|
| Oil pressure | At idle speed (normal operating temperature)<br>At 3,000 rpm (normal operating temperature) | | 29 kPa (0.3 kgf/cm², 43 psi) or more<br>294 – 539 kPa (3.0 – 5.5 kgf/cm², 43 – 78 psi) |
| Oil pump | Side clearance | STD | 0.030 – 0.090 mm (0.0012 – 0.0035 in.) |
| | | Maximum | 0.15 mm (0.0059 in.) |
| | Body clearance | STD | 0.100 – 0.175 mm (0.0039 – 0.0069 in.) |
| | | Maximum | 0.30 mm (0.0118 in.) |
| | Tip clearance | STD | 0.110 – 0.240 mm (0.0043 – 0.0094 in.) |
| | | Maximum | 0.35 mm (0.0138 in.) |

## TORQUE SPECIFICATIONS

| Pert tightened | N-m | kgf-cm | ft-lbf |
|---|---|---|---|
| Oil pressure switch x Cylinder block | 13 | 130 | 9 |
| No.2 oil pan x Drain plug | 37 | 375 | 27 |
| Oil pump x Plug (for relief valve) | 36.8 | 375 | 37 |
| Oil pump x Cylinder block (10 mm head bolt) | 8 | 80 | 69 in.-lbf |
| Oil pump x Cylinder block (12 mm head bolt) | 19.5 | 200 | 14 |
| Oil pan baffle plate x No.1 oil pan | 8 | 80 | 69 in.-lbf |
| No.1 idler pulley x Oil pump | 34 | 350 | 25 |
| No. 1 oil pan x Cylinder block | 19.5 | 200 | 14 |
| No. 1 oil pan x Oil pump | 8 | 80 | 69 in.-lbf |
| No.1 oil pan x Rear oil seal retainer | 8 | 80 | 69 in.-lbf |
| Oil strainer x Main bearing cap | 8 | 80 | 69 in.-lbf |
| Oil strainer x Oil pump | 8 | 80 | 69 in.-lbf |
| No.2 oil pan x No. 1 oil pan | 8 | 80 | 69 in.-lbf |
| Flywheel housing under cover x Transaxle | 8 | 80 | 69 in.-lbf |
| Exhaust pipe stay x No.1 oil pan | 21 | 210 | 15 |
| Exhaust pipe clamp x Exhaust pipe stay | 29 | 300 | 22 |
| A/C compressor housing bracket x Cylinder block | 25 | 250 | 18 |
| A/C compressor x A/C compressor housing bracket | 25 | 255 | 18 |
| Oil hole cover plate x No.2 oil pan | 8 | 80 | 69 in.-lbf |
| No.1 oil pan x Transaxle case | 37 | 380 | 27 |
| Front exhaust pipe x Exhaust manifold | 62 | 630 | 46 |
| Front exhaust pipe x Converter | 56 | 570 | 41 |
| Crankshaft position sensor x Oil pump | 8 | 80 | 69 in.-lbf |
| No.3 timing belt cover x Cylinder head | 8.5 | 85 | 74 in.-lbf |