

ENGINE — LUBRICATION SYSTEM

LUBRICATION SYSTEM

DESCRIPTION

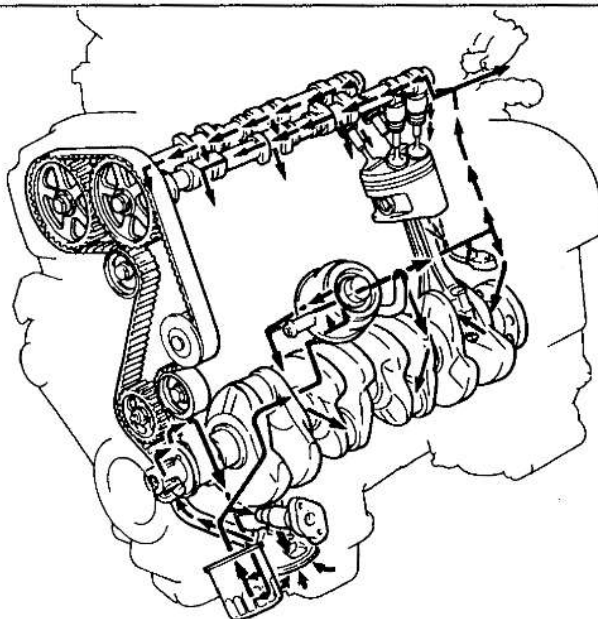
A fully pressurized, fully filtered lubrication system has been adopted for this engine.

EG140-01

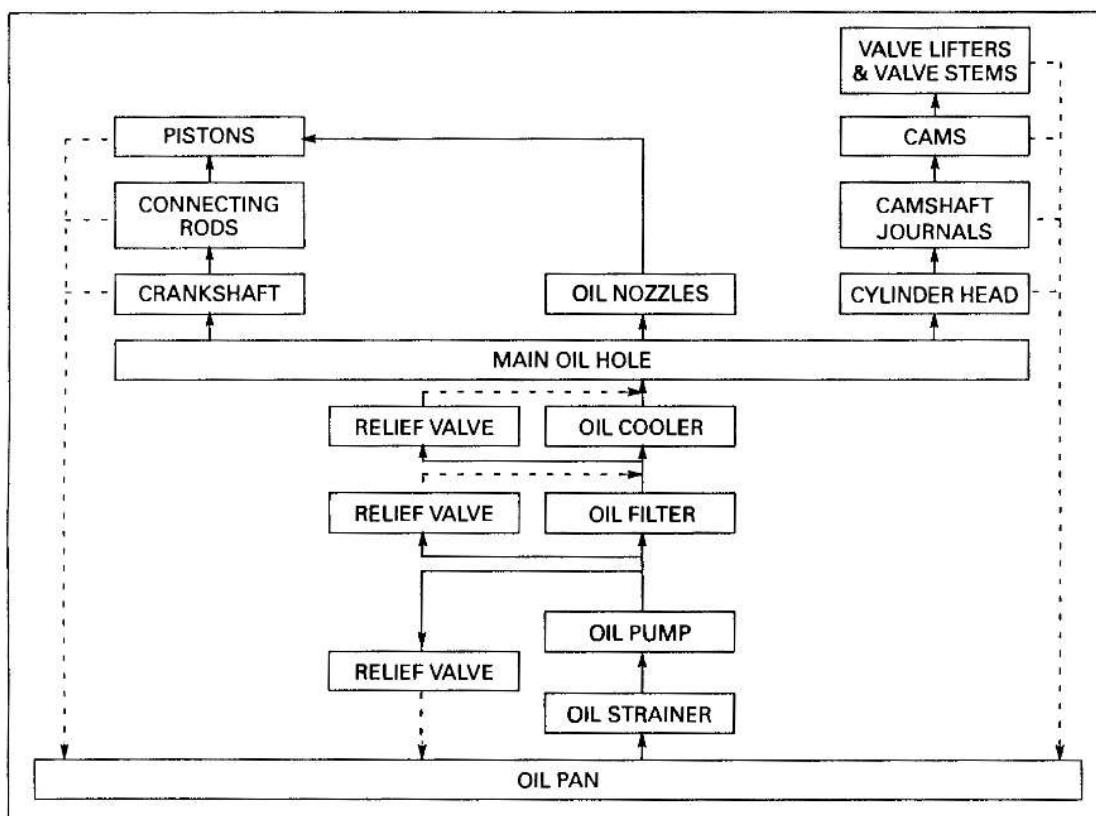
OPERATION

EG

EG148-01



P18018



Z13239

EG-376**ENGINE — LUBRICATION SYSTEM**

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 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 2 rotors changes as they rotate. Oil is drawn in when the space widens and discharged when the space becomes narrow.

OIL PRESSURE REGULATOR (RELIEF VALVE)

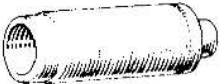
At high engine speeds, the engine oil supplied by the oil pump exceeds the capacity of the engine to utilize it. For that reason, the oil pressure regulator works to prevent an oversupply of oil. During normal oil supply, a coil spring and valve keep the bypass closed, but when too much oil is being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

OIL FILTER

The oil filter is a full flow type filter with a relief valve built into the 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.

ENGINE — LUBRICATION SYSTEM**EG-377****PREPARATION****SST (SPECIAL SERVICE TOOLS)**

EG14U-08

	09032-00100	Oil Pan Seal Cutter	
	09226-10010	Crankshaft Front & Rear Bearing Replacer	Crankshaft front oil seal
	09228-06500	Oil Filter Wrench	
	09620-30010	Steering Gear Box Replacer Set	
	(09627-30010)	Steering Sector Shaft Bushing Replacer	Oil pump oil seal
	(09631-00020)	Handle	Oil pump oil seal
	09816-30010	Oil Pressure Switch Socket	Oil pressure switch for ST202
	09960-10010	Variable Pin Wrench Set	
	(09962-01000)	Variable Pin Wrench Arm Assy	Oil pump pulley
	(09963-00500)	Pin 5	Oil pump pulley

EG

RECOMMENDED TOOLS

EG14V-08

	09090-04000	Engine Sling Device	For suspending engine
	09200-00010	Engine Adjust Kit	

EG-378**ENGINE — LUBRICATION SYSTEM**

EG14W-08

EQUIPMENT

Oil pressure gauge	
Torque wrench	

EG14X-0K

LUBRICANT**EG**

Item	Capacity	Classification
Engine oil		API grade SG, SH or ILSC multigrade engine oil and recommended viscosity oil
Dry fill	5.2 liters (5.5 US qts, 4.6 Imp. qts)	
Drain and refill		
w/ Oil filter change	4.5 liters (4.8 US qts, 4.0 Imp. qts)	
w/o Oil filter change	4.0 liters (4.2 US qts, 3.5 Imp. qts)	

EG14Y-08

SSM (SPECIAL SERVICE MATERIALS)

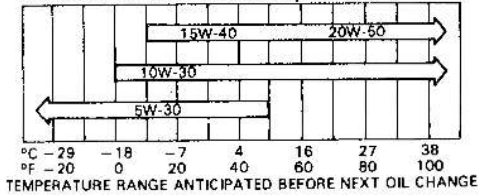
08826-00080	Seal packing or equivalent	No.1 oil pan No.2 oil pan
08833-00080	Adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent	Oil pressure switch

ENGINE — LUBRICATION SYSTEM

OIL PRESSURE CHECK

EG425-01

Recommended Viscosity (SAE) :



P02645

1. CHECK ENGINE OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If the quality is visibly poor, replace the oil.

Oil grade:

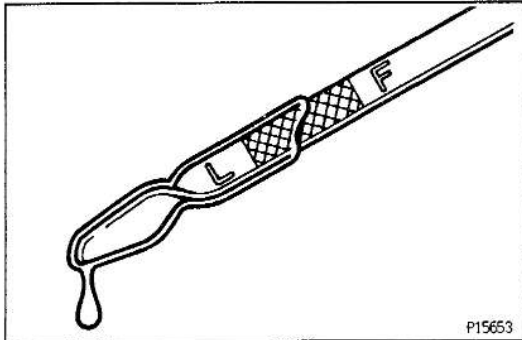
API grade SG, SH or ILSAC multigrade engine oil.

Recommended viscosity is as shown in the illustration.

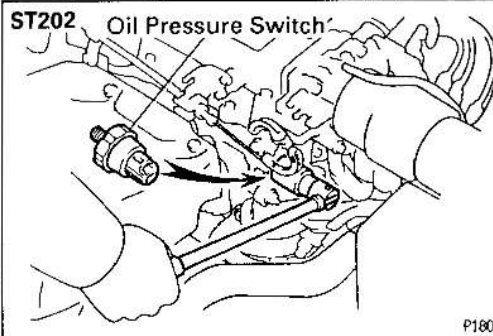
2. CHECK ENGINE OIL LEVEL

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

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



P15653



P18030

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

(a) SW20:

Disconnect the throttle body from the ACIS valve.

(b) Remove the oil pressure switch.

HINT (ST202): Use SST.

SST 09816-30010

(c) 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

29 kPa (0.3 kgf/cm², 4.3 psi) or more

At 5,000 rpm

245 - 490 kPa

(2.5 - 5.0 kgf/cm², 36 - 71 psi)

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

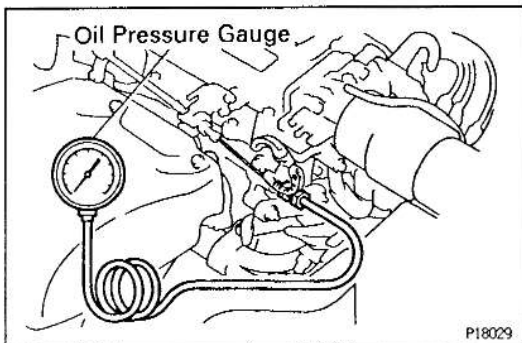
Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

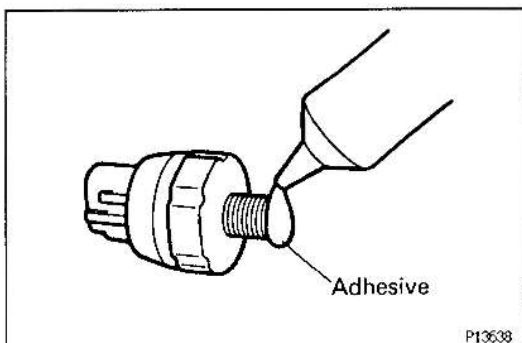
Part No. 08833-00080, THREE BOND 1344,

LOCTITE 242 or equivalent

7. START ENGINE, AND CHECK FOR OIL LEAKS



P18029



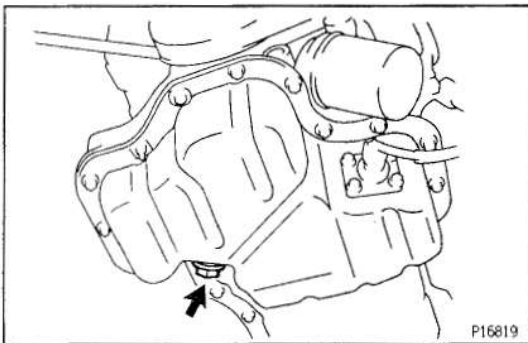
P13638

OIL AND FILTER REPLACEMENT

EG180-05

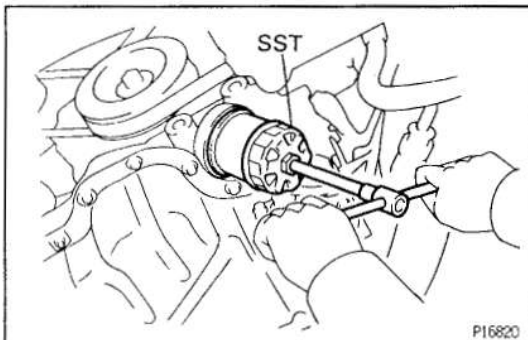
CAUTION:

- 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.
- Care should be taken, therefore, when changing engine oil to minimize the frequency and length of time your skin is exposed to used engine oil. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be thoroughly washed 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 filters must be disposed of only at designated disposal sites.



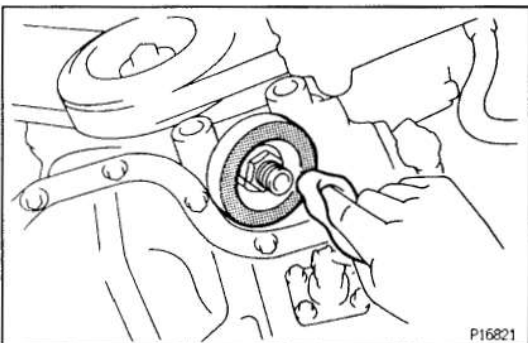
1. DRAIN ENGINE OIL

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



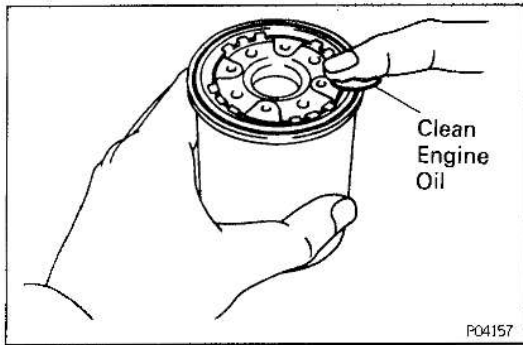
2. REPLACE OIL FILTER

- Using SST, remove the oil filter.
SST 09228-06500

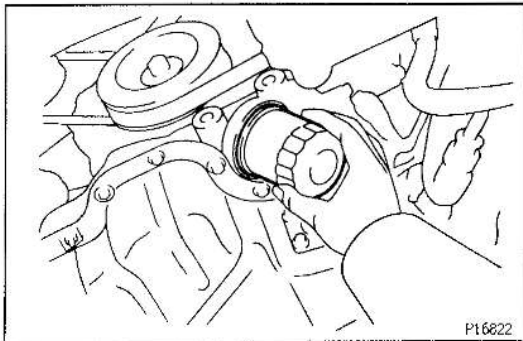


- Clean the oil filter contact surface on the oil filter mounting.

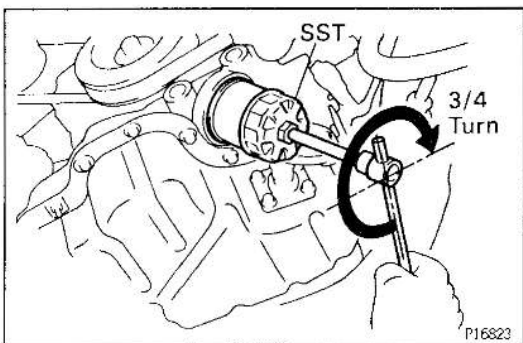
EG

ENGINE — LUBRICATION SYSTEM**EG-381**

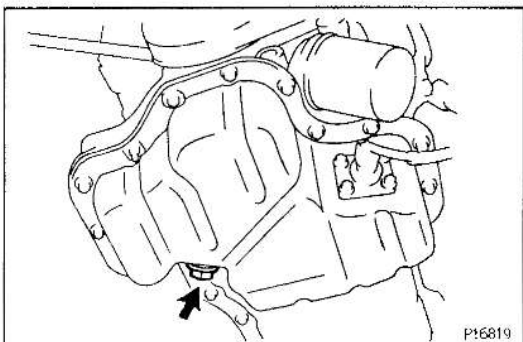
- (c) Lubricate the filter rubber gasket with clean engine oil.



- (d) Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.



- (e) Using SST, give it an additional 3/4 turn to seat the filter.
SST 09228-06500

**3. FILL WITH ENGINE OIL**

- (a) Clean and install the oil drain plug with a new gasket.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)
- (b) Fill with new engine oil.

Oil grade:**See step 1 on page EG-379)****Capacity:****Drain and refill****w/ Oil filter change****4.5 liters (4.8 US qts, 4.0 Imp. qts)****w/o Oil filter change****4.0 liters (4.2 US qts, 3.5 Imp. qts)****Dry fill****5.2 liters (5.5 US qts, 4.6 Imp. qts)**

- (c) Reinstall the oil filler cap.

4. START ENGINE AND CHECK FOR OIL LEAKS**5. RECHECK ENGINE OIL LEVEL****EG**

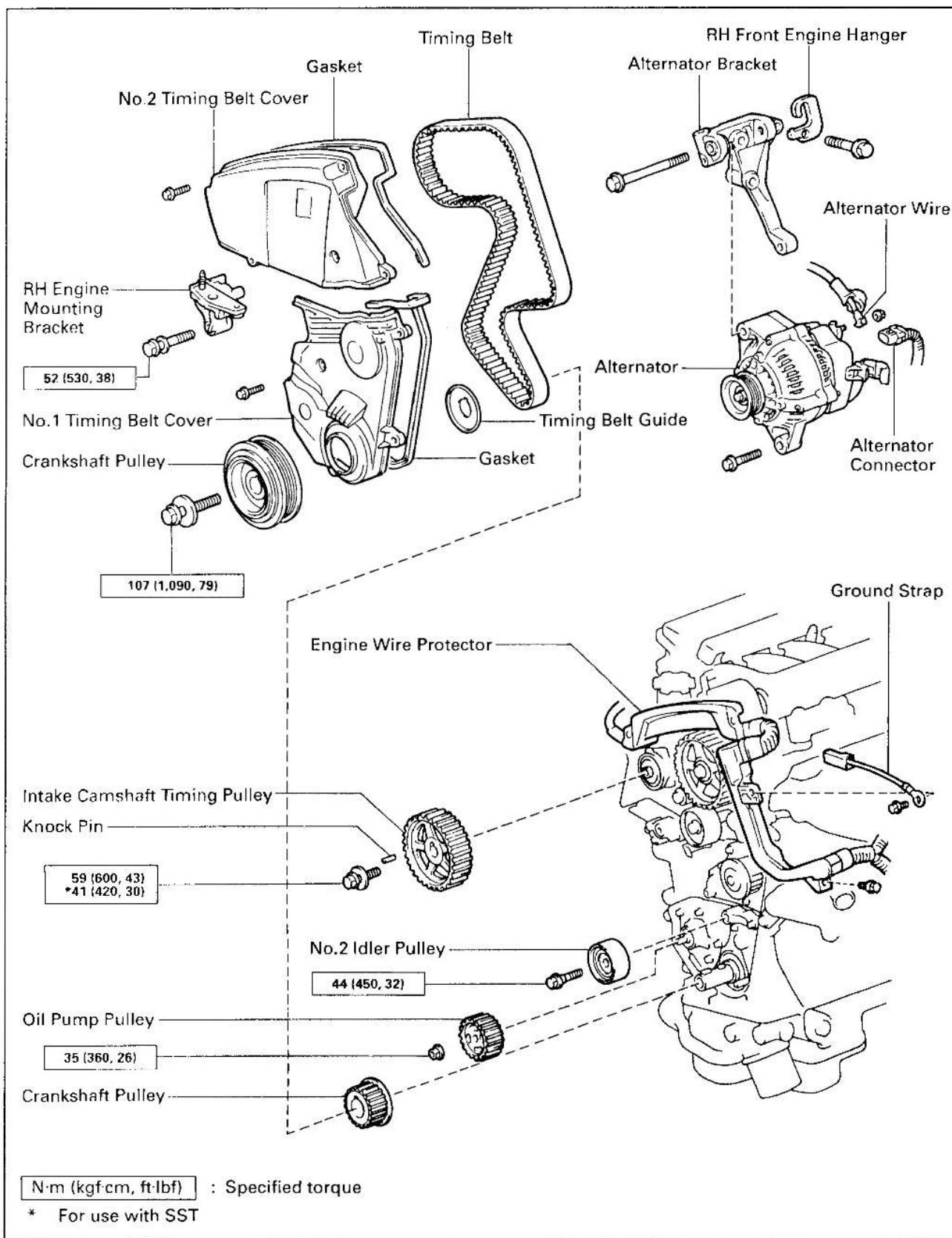
EG-382

ENGINE — LUBRICATION SYSTEM

OIL PUMP COMPONENTS FOR REMOVAL AND INSTALLATION (ST202)

EG162-06

EG

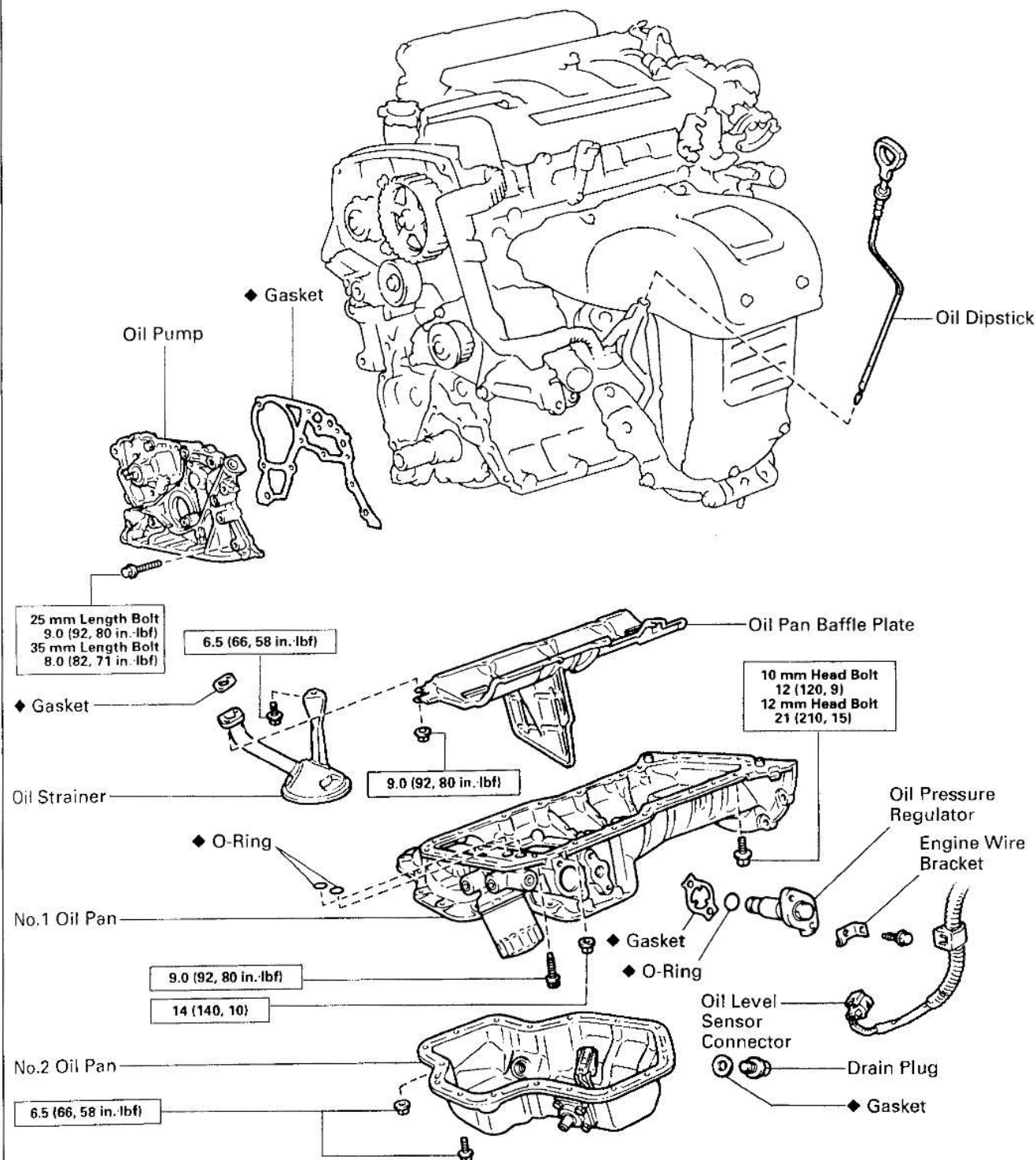


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ENGINE — LUBRICATION SYSTEM

EG-383

EG



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

◆ Non-reusable part

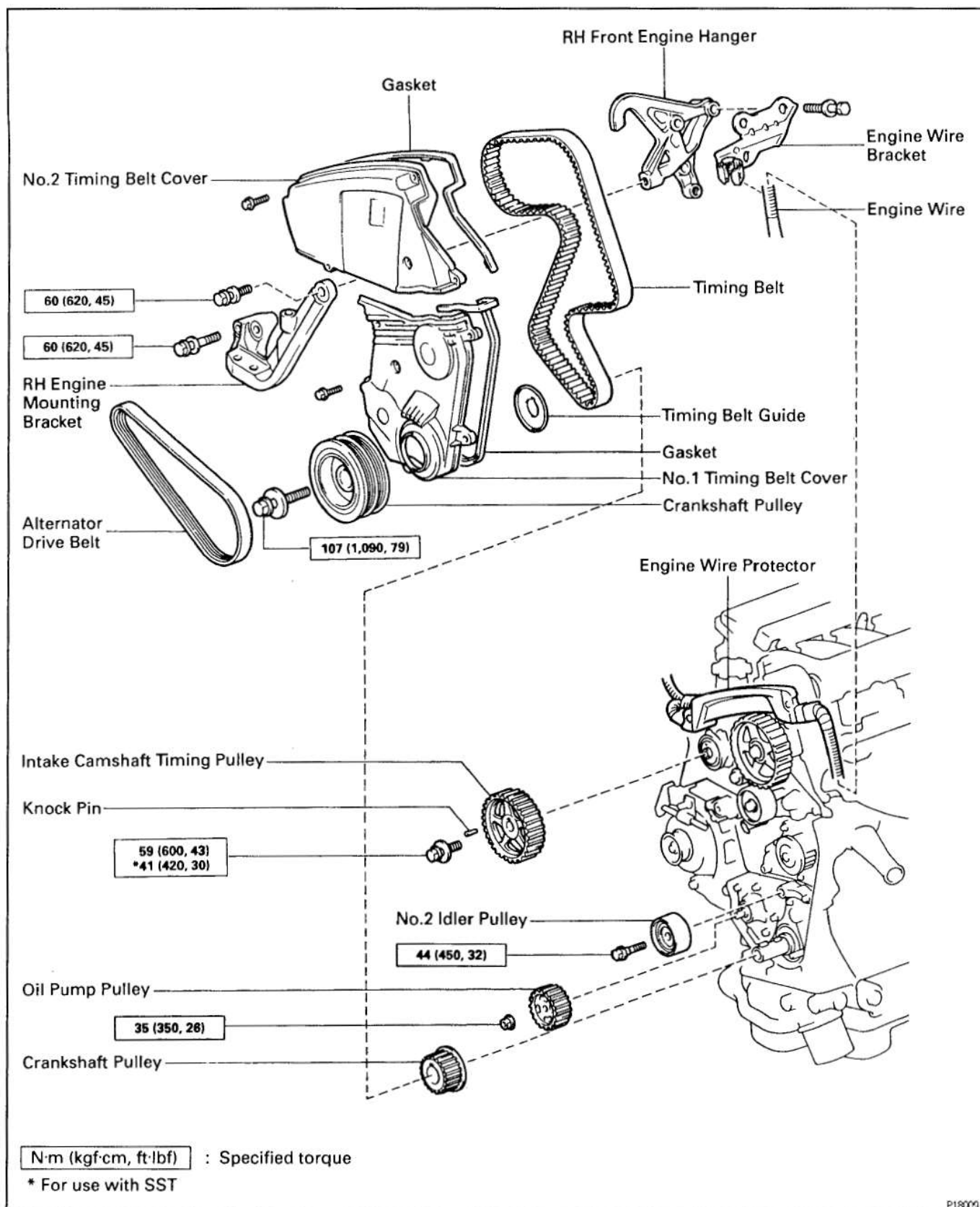
P16380

EG-384

ENGINE – LUBRICATION SYSTEM

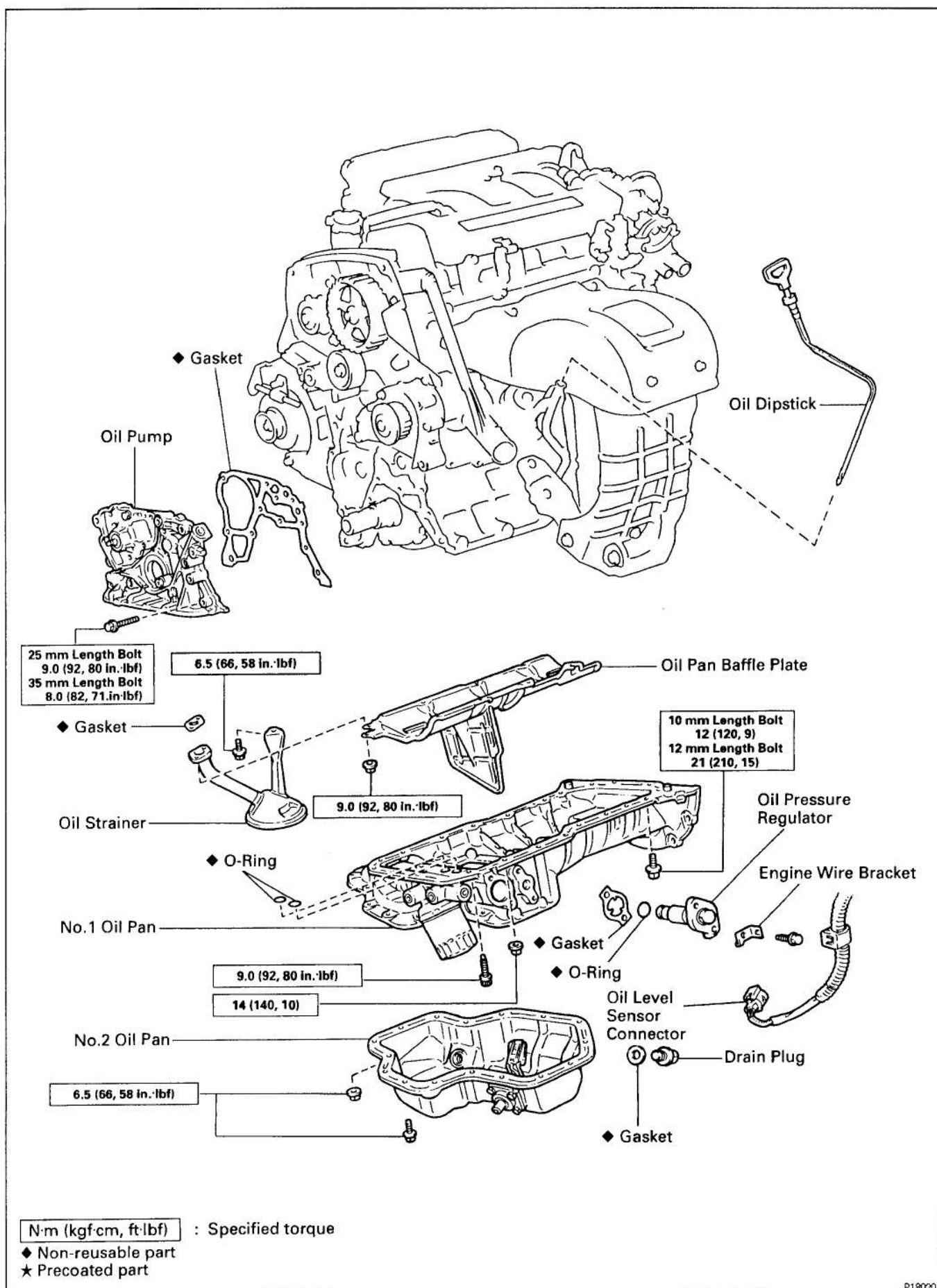
EG182-07

COMPONENTS FOR REMOVAL AND INSTALLATION (SW20)



ENGINE — LUBRICATION SYSTEM

EG



P18020

OIL PUMP REMOVAL

(See Components for Removal and Installation)

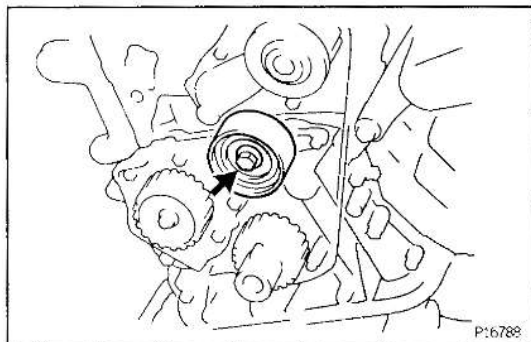
HINT: When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

1. REMOVE TIMING BELT

(See steps 1 to 6 and 8 to 13 on pages EG-49 to 54)

2. REMOVE NO.2 IDLER PULLEY

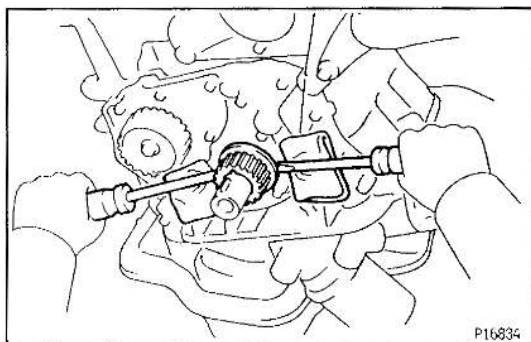
Remove the bolt and pulley.



3. REMOVE CRANKSHAFT TIMING PULLEY

If the pulley cannot be removed by hand, use 2 screwdrivers.

HINT: Position shop rags as shown to prevent damage.

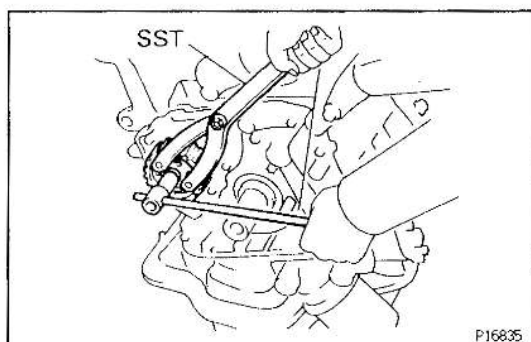


4. REMOVE OIL PUMP PULLEY

(a) Using SST, loosen the pulley nut.

SST 09960-10010 (09962-01000, 09963-00500)

(b) Remove the nut and pulley.

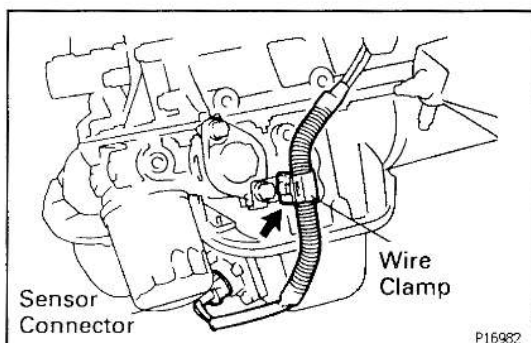


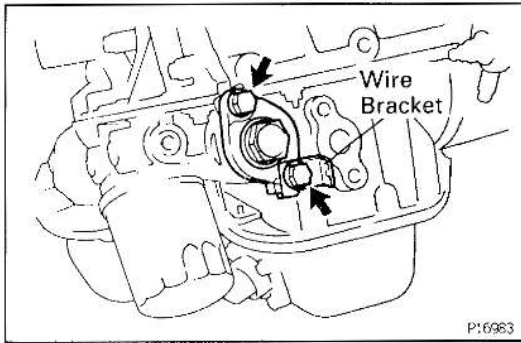
5. DISCONNECT OIL LEVEL SENSOR CONNECTOR

(a) Disconnect the wire clamp from the wire bracket on the oil pressure regulator.

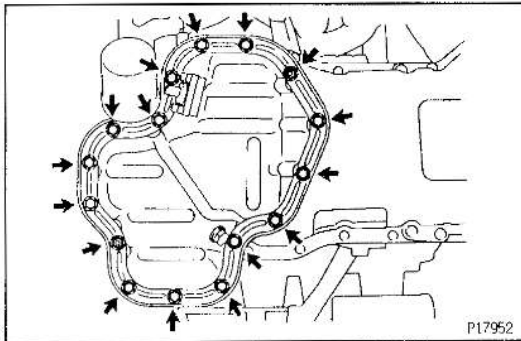
(b) Disconnect the oil level sensor connector.

6. REMOVE OIL DIPSTICK

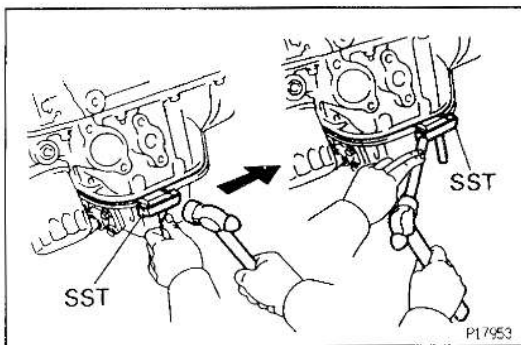


ENGINE – LUBRICATION SYSTEM**7. REMOVE OIL PRESSURE REGULATOR**

- (a) Remove the 2 bolts, wire bracket, pressure regulator and gasket.
- (b) Remove the O-ring from the pressure regulator.

**8. REMOVE NO.2 OIL PAN**

- (a) Remove the 14 bolts and 2 nuts.

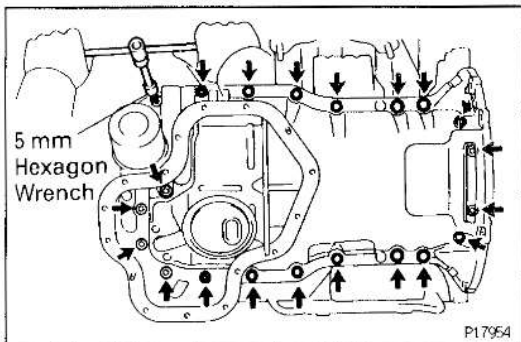


- (b) Insert the blade of SST between the No.1 oil pan and No.2 oil pan, and cut off applied sealer and remove the No.1 oil pan.

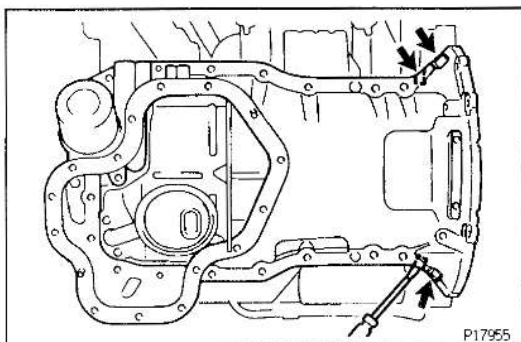
SST 09032-00100

NOTICE:

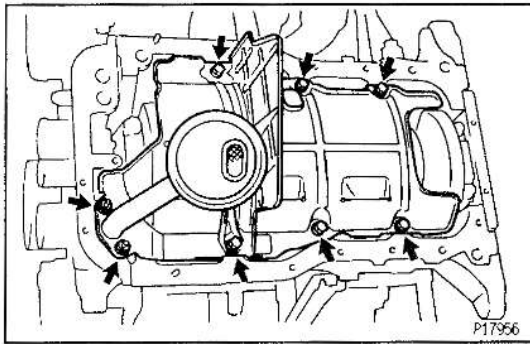
- Be careful not to damage the No.2 oil pan contact surface of the No.1 oil pan.
- Be careful not to damage the No.2 oil pan flange.

**9. REMOVE NO.1 OIL PAN**

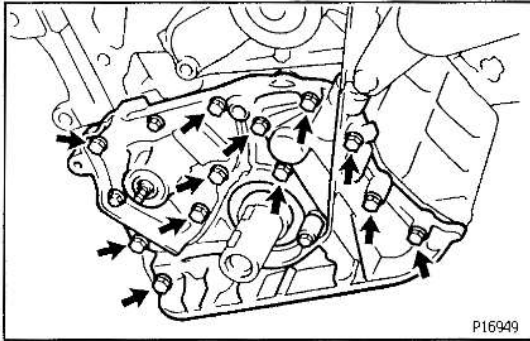
- (a) Remove the 12 bolts, 7 hexagon bolts (use a 5 mm hexagon wrench) and 2 nuts.



- (b) Remove the oil pan by prying the portions between the cylinder block and oil pan with a screwdriver.
NOTICE: Be careful not to damage the contact surfaces of the cylinder block and oil pan.
- (c) Remove the 2 O-rings from the oil pump.

EG-388**ENGINE — LUBRICATION SYSTEM****10. REMOVE OIL STRAINER AND OIL PAN BAFFLE PLATE**

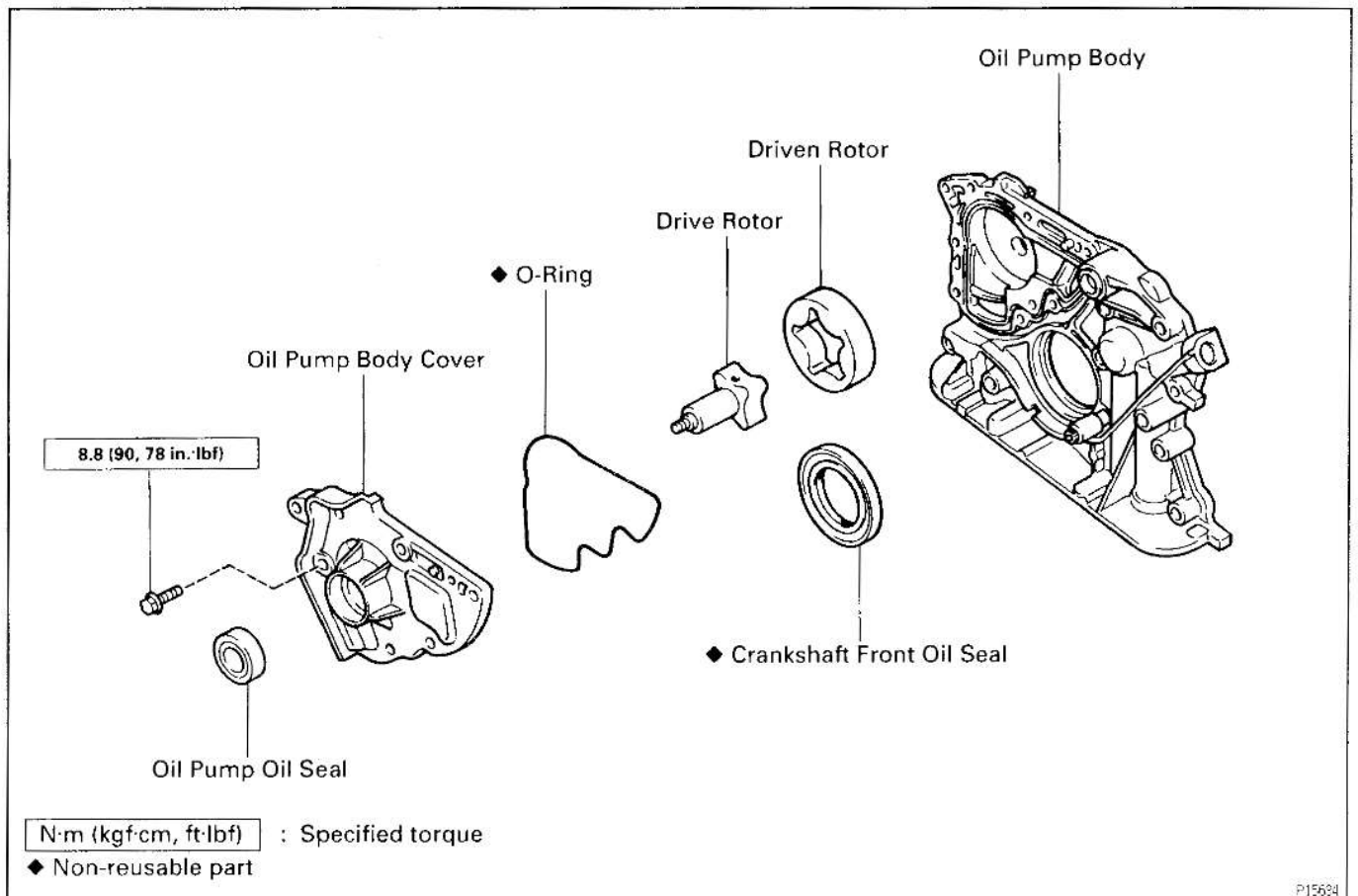
Remove the 2 bolts, 6 nuts, oil strainer, baffle plate and gasket.

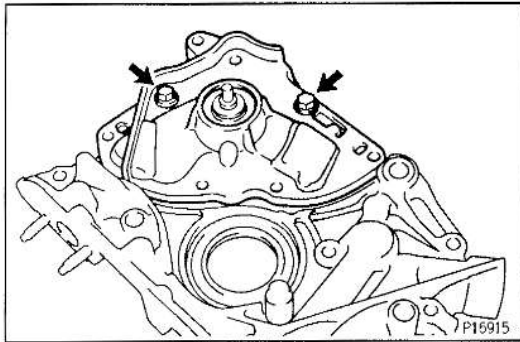
**11. REMOVE OIL PUMP**

- (a) Remove the 12 bolts.
- (b) Remove the oil pump and gasket.

COMPONENTS FOR DISASSEMBLY AND ASSEMBLY

EG158-0A



ENGINE — LUBRICATION SYSTEM**EG-389****OIL PUMP DISASSEMBLY**

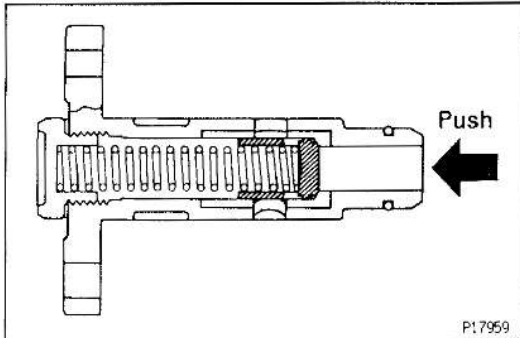
EG41U-01

(See Components for Disassembly and Assembly)

REMOVE DRIVE AND DRIVEN ROTORS

Remove the 2 bolts, pump body cover, O-ring, the drive and driven rotors.

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**OIL PUMP INSPECTION**

EG187-03

1. INSPECT OIL PRESSURE REGULATOR

Push the valve with a wooden stick to check if it is stuck.

If stuck, replace the pressure regulator assembly.

2. INSPECT DRIVE AND DRIVEN ROTORS**A. Inspect rotor body clearance**

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

Standard body clearance:

0.10 — 0.16 mm (0.0039 — 0.0063 in.)

Maximum body clearance:

0.20 mm (0.0079 in.)

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

B. Inspect rotor tip clearance

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

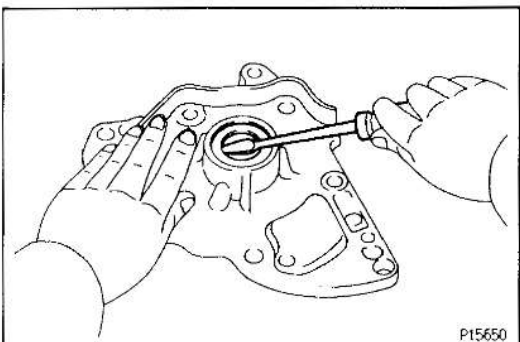
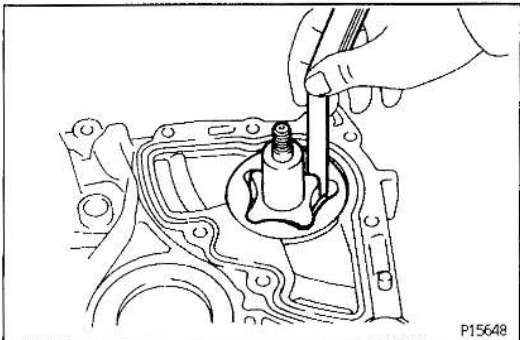
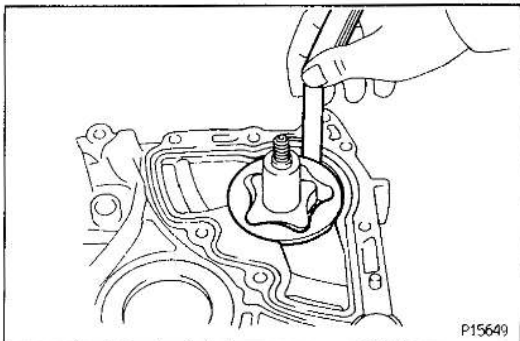
Standard tip clearance:

0.04 — 0.16 mm (0.0016 — 0.0063 in.)

Maximum tip clearance:

0.20 mm (0.0079 in.)

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

**OIL PUMP OIL SEAL REPLACEMENT**

EG188-03

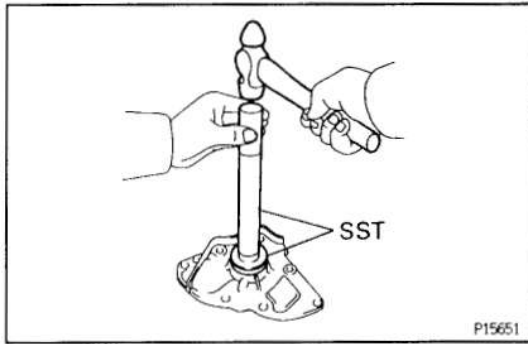
1. REMOVE OIL SEAL

Using a screwdriver, pry out the oil seal.

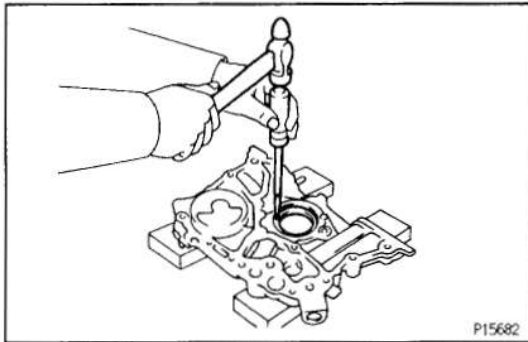
EG-390

ENGINE — LUBRICATION SYSTEM

EG

**2. INSTALL OIL SEAL**

- (a) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump cover edge.
SST 09620-30010 (09627-30010, 09631-00020)
- (b) Apply MP grease to the oil seal lip.

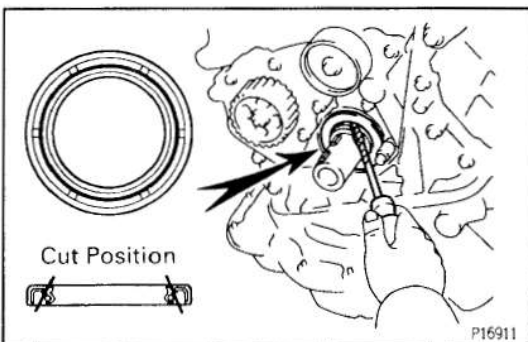
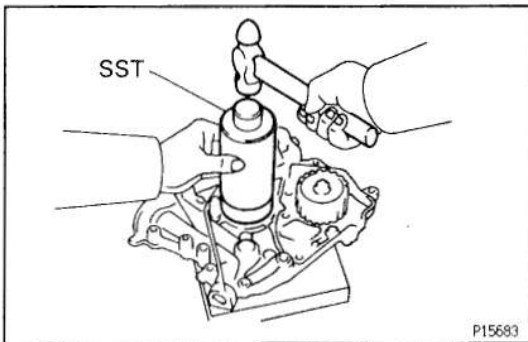
**CRANKSHAFT FRONT OIL SEAL REPLACEMENT**

EG156-06

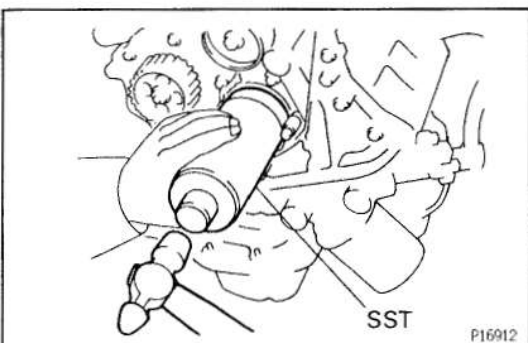
HINT: There are 2 methods (A and B) to replace the oil seal which are as follows:

REPLACE CRANKSHAFT FRONT OIL SEAL**A. If oil pump is removed from cylinder block:**

- (a) Using a screwdriver and hammer, tap 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 09226-10010
- (c) Apply MP grease to the oil seal lip.

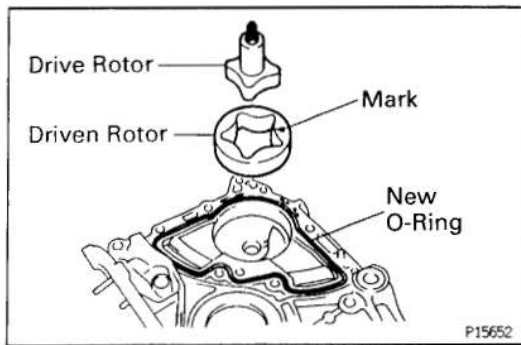
**B. If oil pump is installed to the cylinder block:**

- (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 09226-10010

EG41V-01



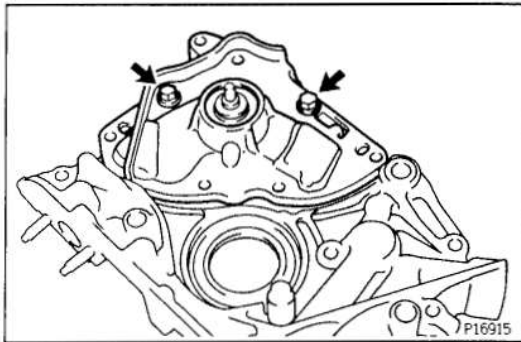
OIL PUMP ASSEMBLY

(See Components for Disassembly and Assembly)
INSTALL DRIVE AND DRIVEN ROTORS

- Place the drive and driven rotors into pump body with the mark on the driven rotor facing the pump body cover side.
- Install a new O-ring to the oil pump body.

EG

- Install the oil pump body cover with the 2 bolts.
Torque: 8.8 N·m (90 kgf·cm, 78 in.-lbf)
HINT: Use the 16 mm (0.63 in.) long bolt.



OIL PUMP INSTALLATION

EG41W-01

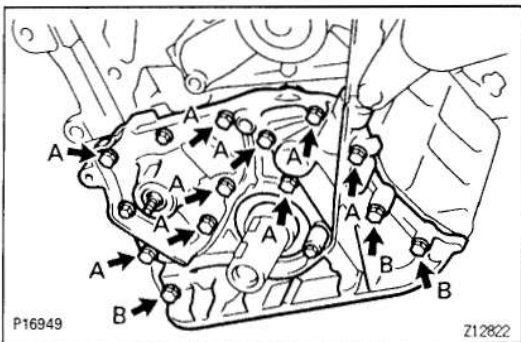
(See Components for Removal and Installation)

1. INSTALL OIL PUMP

Install a new gasket and the oil pump with the 12 bolts. Uniformly tighten the the bolts in several passes.

Torque:

- 25 mm (0.98 in.) long bolt (A)**
9.0 N·m (92 kgf·cm, 80 in.-lbf)
- 35 mm (1.38 in.) long bolt (B)**
8.0 N·m (82 kgf·cm, 71 in.-lbf)

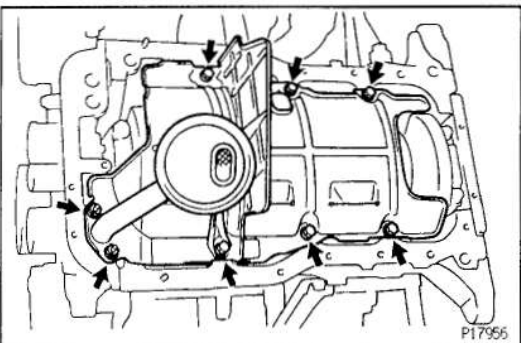


2. INSTALL OIL PAN BAFFLE PLATE AND OIL STRAINER

Install a new gasket, the oil strainer and baffle plate with the 6 bolts and 2 nuts.

Torque:

- Bolt**
6.5 N·m (66 kgf·cm, 58 in.-lbf)
- Nut**
9.0 N·m (92 kgf·cm, 80 in.-lbf)



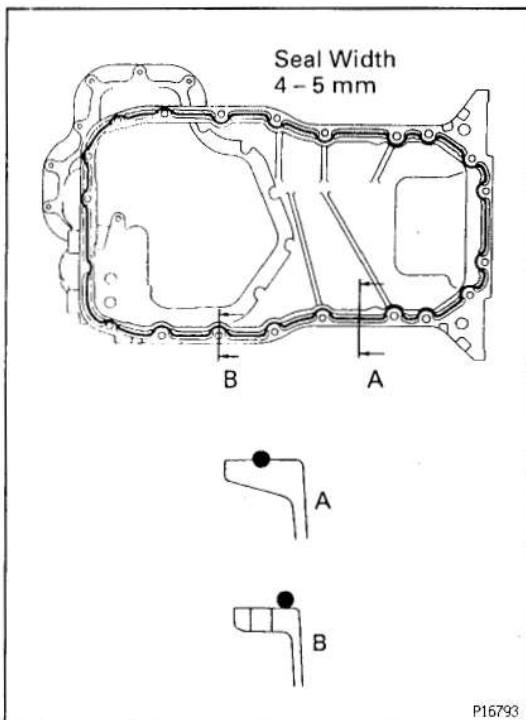
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ENGINE — LUBRICATION SYSTEM

3. INSTALL NO.1 OIL PAN

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pan and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.

NOTICE: Do not use a solvent which will affect the painted surfaces.

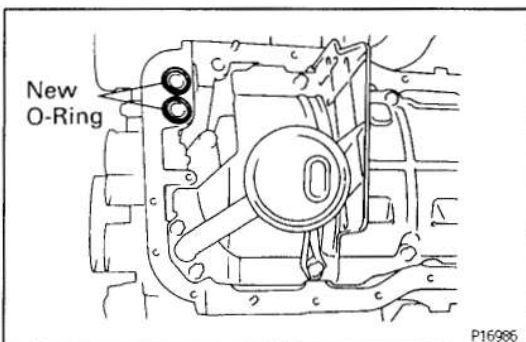


- (b) Apply seal packing to the oil pan as shown in the illustration.

Seal packing:

Part No. 08826-00080 or equivalent

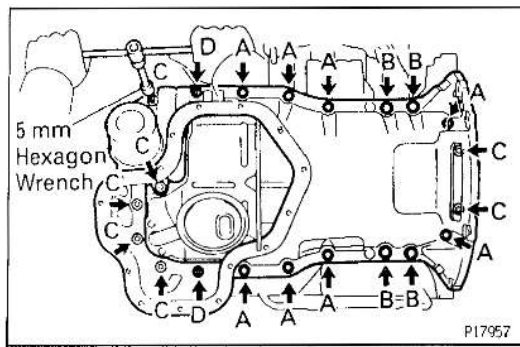
- Install a nozzle that has been cut to a 4 — 5 mm (0.16 — 0.20 in.) opening.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



- (c) Install 2 new O-rings to the oil pump.

ENGINE – LUBRICATION SYSTEM

EG-393



- (d) Install the oil pan with the 12 bolts, 7 hexagon bolts (use a 5 mm hexagon wrench) and 2 nuts. Uniformly tighten the the bolts and nuts in several passes.

Torque:

20 mm (0.79 in.) long bolt for 10 mm head (A)

12 N·m (120 kgf·cm, 9 ft·lbf)

25 mm (0.98 in.) long bolt for 12 mm head (B)

21 N·m (210 kgf·cm, 15 ft·lbf)

Hexagon bolt (C)

9.0 N·m (92 kgf·cm, 80 in·lbf)

Nut (D)

14 N·m (140 kgf·cm, 10 ft·lbf)

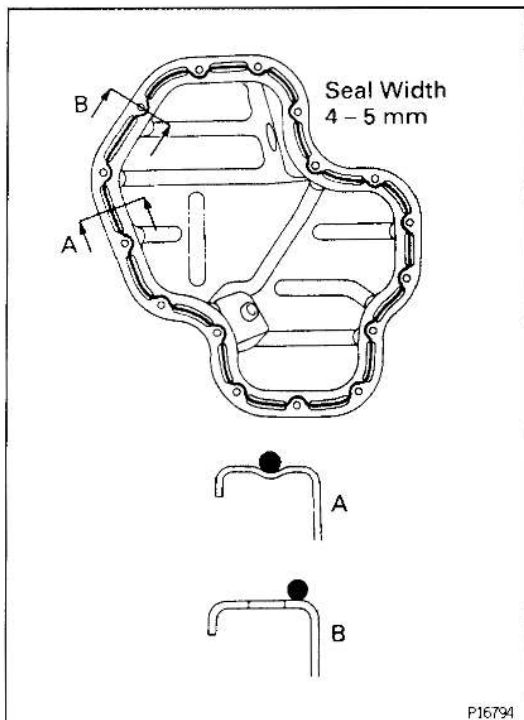
EG

4. INSTALL NO.2 OIL PAN

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 oil pan and No.2 oil pan.

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

NOTICE: Do not use a solvent which will affect the painted surfaces.

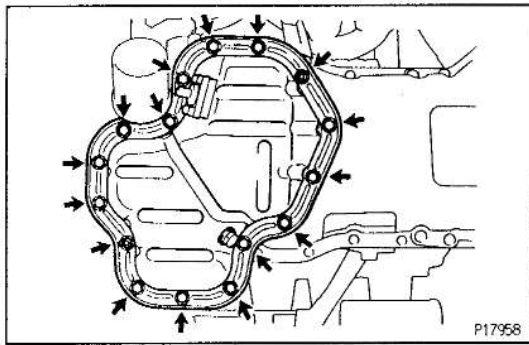


- (b) Apply seal packing to the oil pan as shown in the illustration.

Seal packing:

Part No. 08826-00080 or equivalent

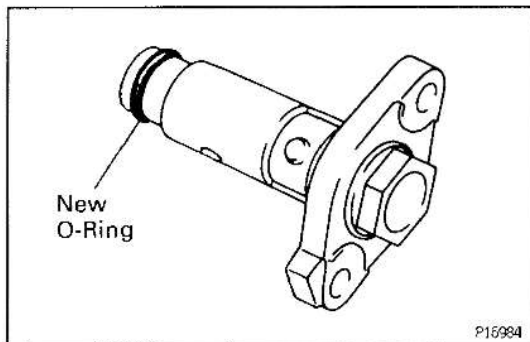
- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

EG-394**ENGINE — LUBRICATION SYSTEM**

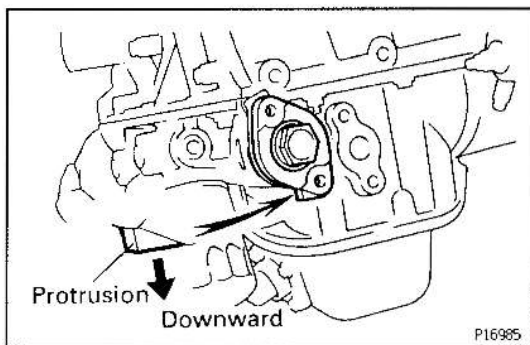
- (c) Install the oil pan with the 14 bolts and 2 nuts. Uniformly tighten the the bolts and nuts in several passes.

Torque: 6.5 N·m (66 kgf·cm, 58 in.-lbf)

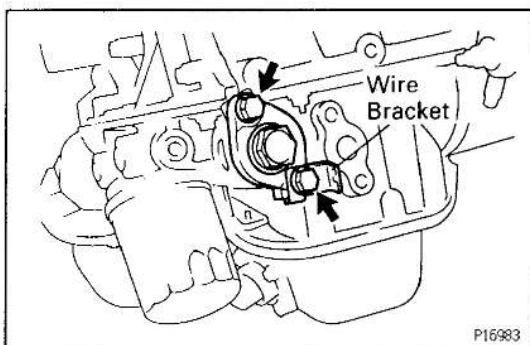
HINT: Use the 18 mm (0.71 in.) long bolt.

**5. INSTALL OIL PRESSURE REGULATOR**

- (a) Install a new O—ring to the pressure regulator.
(b) Luricate the O—ring with clean engine oil.

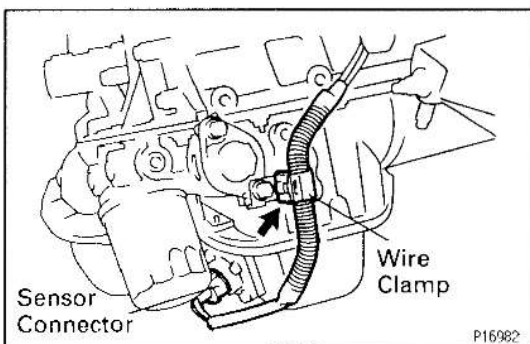


- (c) Install a new gasket to the pressure regulator.
(d) Attach the pressure regulator to the No.1 oil pan, facing the protrusion downward.



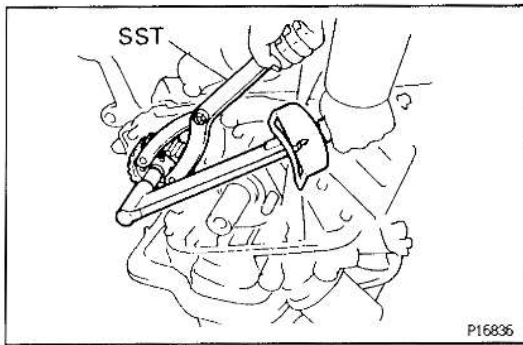
- (e) Install the pressure regulator and wire bracket with the 2 bolts.

Torque: 18 N·m (180 kgf·cm, 13 ft-lbf)

**6. CONNECT OIL LEVEL SENSOR CONNECTOR**

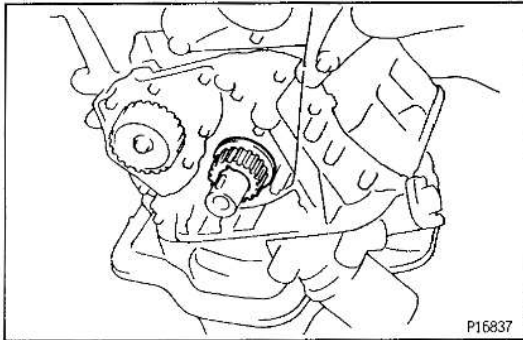
- (a) Connect the level sensor connector.
(b) Install the wire clamp to the wire bracket on the pressure regulator.

7. INSTALL OIL DIPSTICK

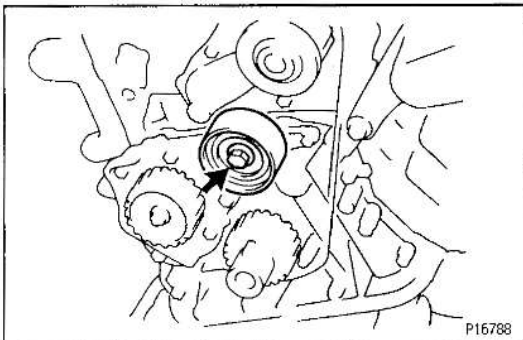
ENGINE — LUBRICATION SYSTEM**8. INSTALL OIL PUMP PULLEY**

- (a) Align the cutouts of the pulley and shaft, and slide on the pulley.
- (b) Using SST, install the pulley nut.
SST 09960-10010 (09962-01000, 09963-00500)
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

EG

**9. INSTALL CRANKSHAFT TIMING PULLEY**

- (a) Align the timing pulley set key with the key groove of the pulley.
- (b) Slide on the timing pulley, facing the flange side inward.

**10. INSTALL NO.2 IDLER PULLEY**

- (a) Install the pulley with the bolt.
Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)
- (b) Check that the idler pulley moves smoothly.

11. INSTALL TIMING BELT

(See steps 7 to 12 and 14 to 20 on pages EG-59 to 65)

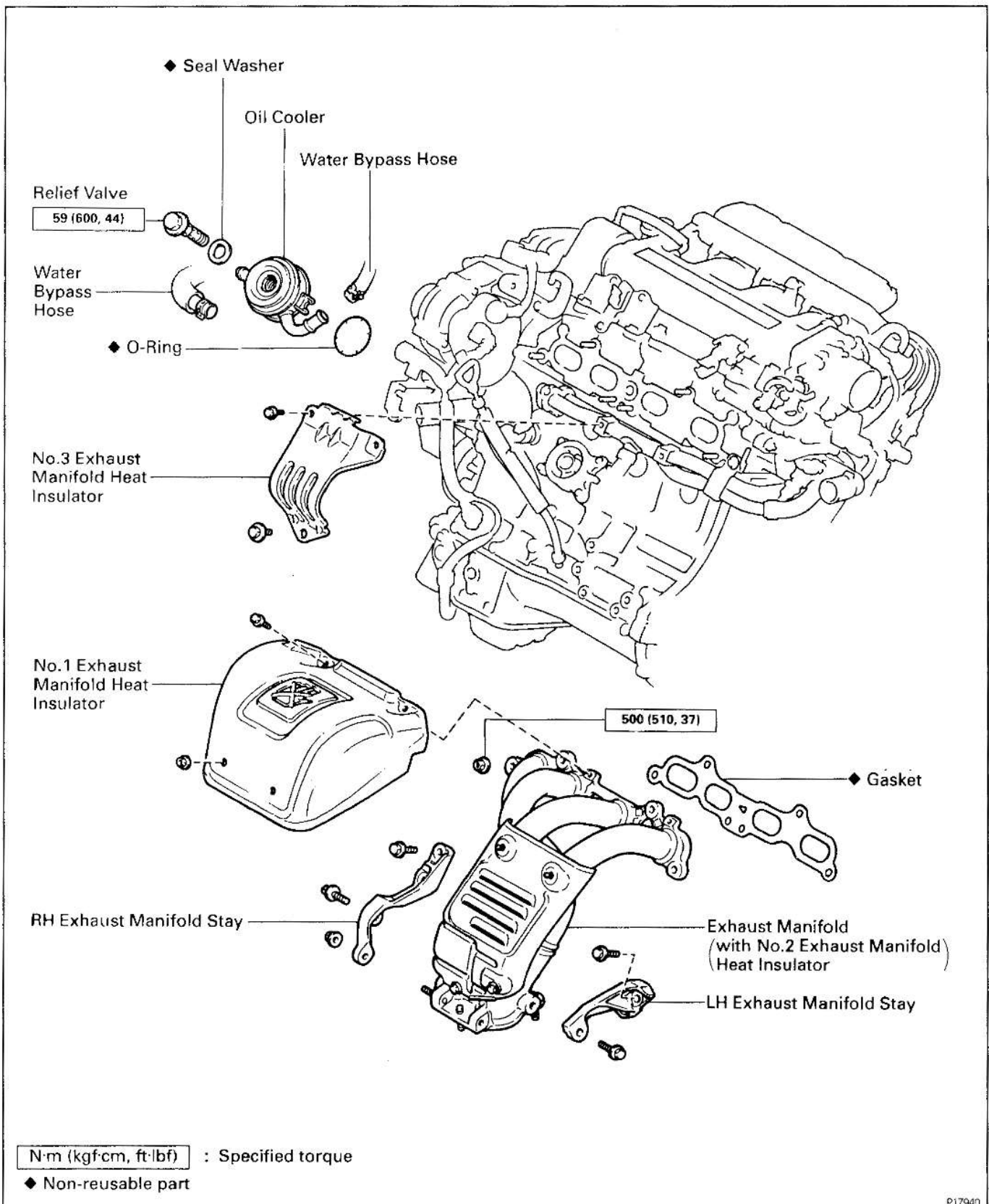
12. INSTALL OIL DIPSTICK**13. FILL WITH ENGINE OIL****14. START ENGINE AND CHECK FOR OIL LEAKS****15. RECHECK ENGINE OIL LEVEL**

EG-396

ENGINE – LUBRICATION SYSTEM

OIL COOLER COMPONENTS FOR REMOVAL AND INSTALLATION (ST202)

P0308-03



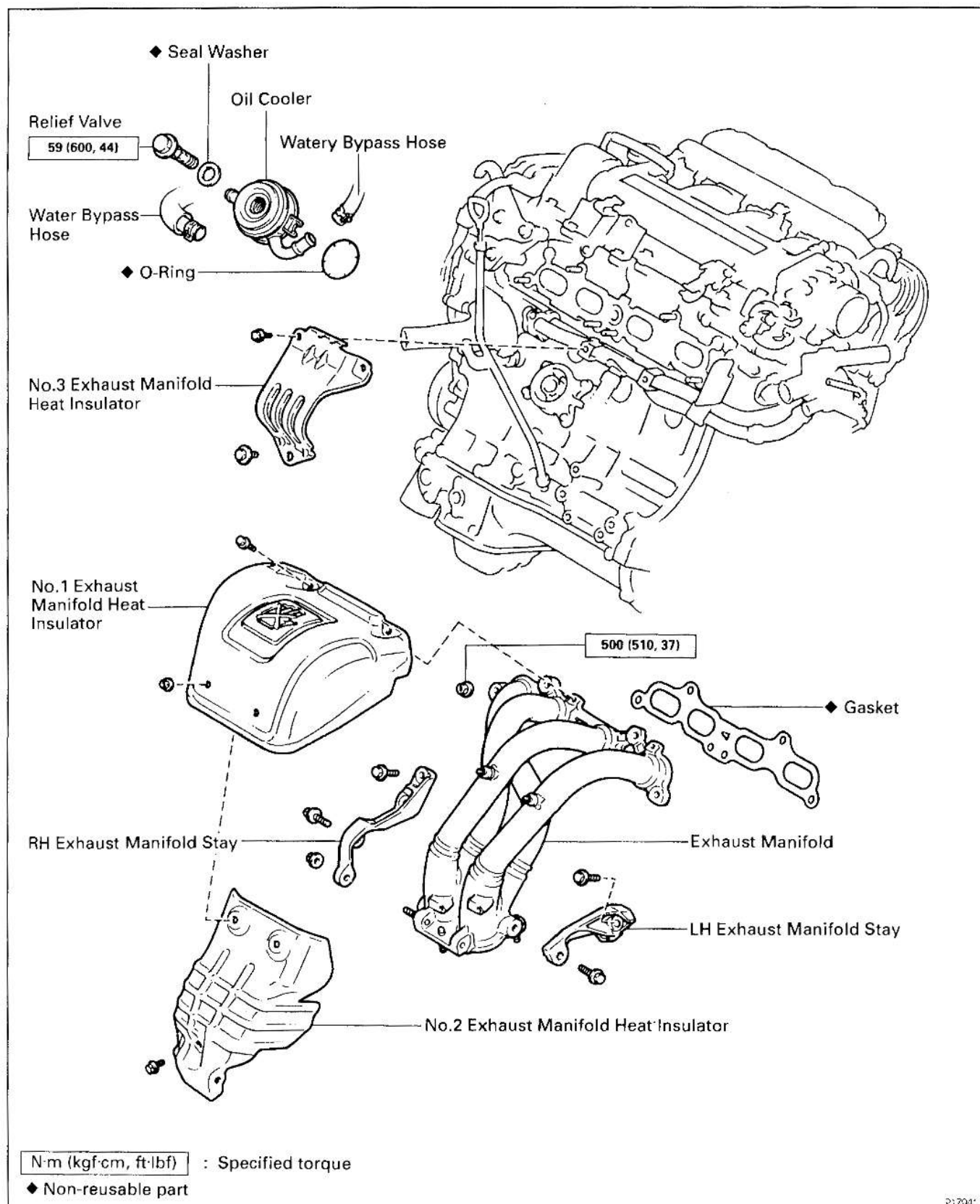
ENGINE — LUBRICATION SYSTEM

EG-397

E0308-04

COMPONENTS FOR REMOVAL AND
INSTALLATION (SW20)

EG

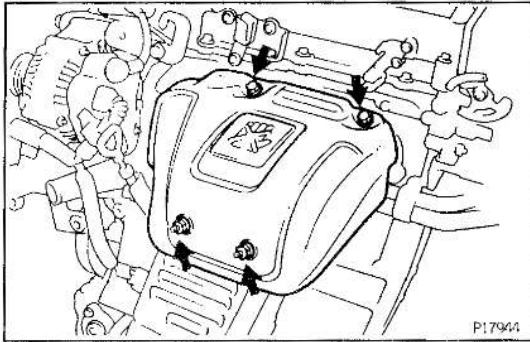


P17041

EG-398

ENGINE — LUBRICATION SYSTEM

EG41X-01

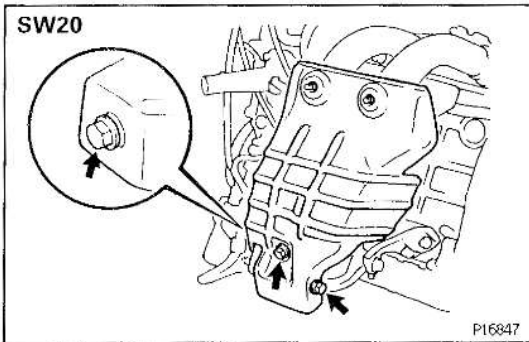


OIL COOLER REMOVAL

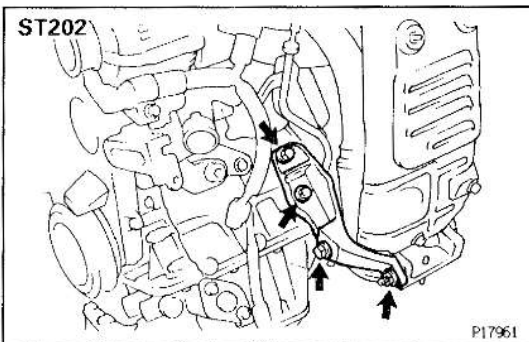
(See Components for Removal and Installation)

1. REMOVE EXHAUST MANIFOLD

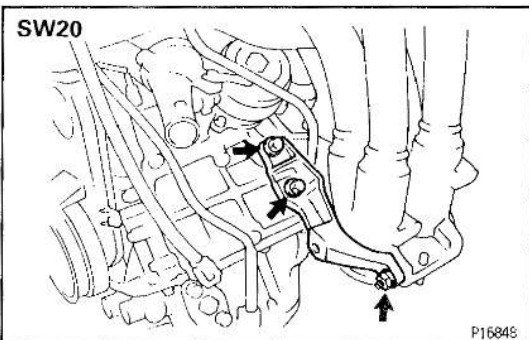
- (a) Remove the 2 bolts, 2 nuts and No.1 exhaust manifold heat insulator.



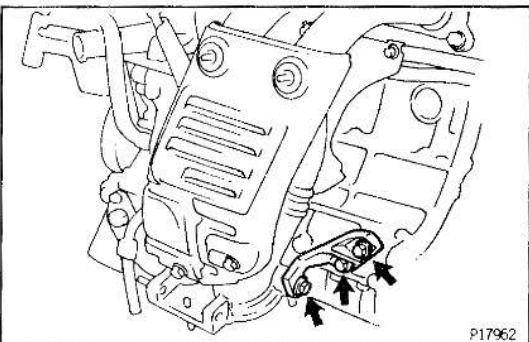
- (b) SW20:
Remove the 3 bolts and No.2 exhaust manifold heat insulator.



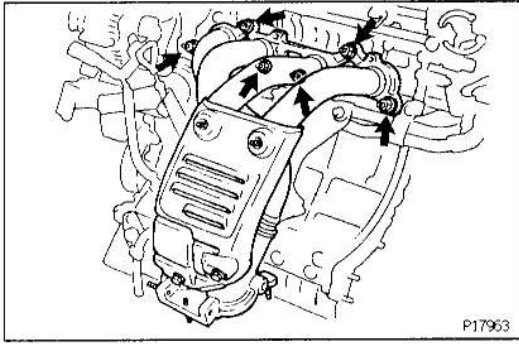
- (c) ST202:
Remove the 3 bolts, nut and RH exhaust manifold stay.



- (d) SW20:
Remove the 2 bolts, nut and RH exhaust manifold stay.

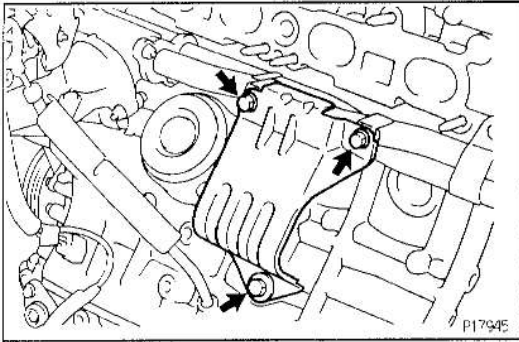


- (e) Remove the 3 bolts and LH exhaust manifold stay.

ENGINE – LUBRICATION SYSTEM

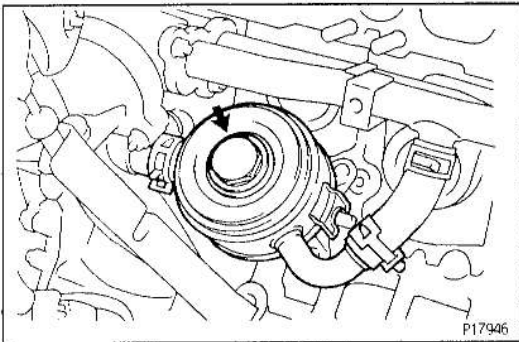
- (f) Remove the 6 nuts, exhaust manifold and gasket.

EG



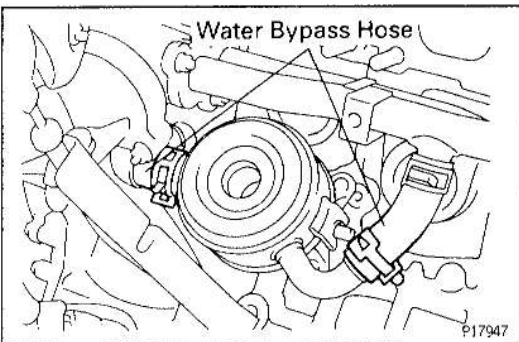
2. REMOVE NO.3 EXHAUST MANIFOLD HEAT INSULATOR

Remove the 3 bolts and No.3 exhaust manifold heat insulator.



3. REMOVE OIL COOLER

- (a) Remove the relief valve and seal washer.



- (b) Disconnect the 2 water bypass hoses from the oil cooler, and remove the oil cooler.
 (c) Remove the O—ring from the oil cooler.

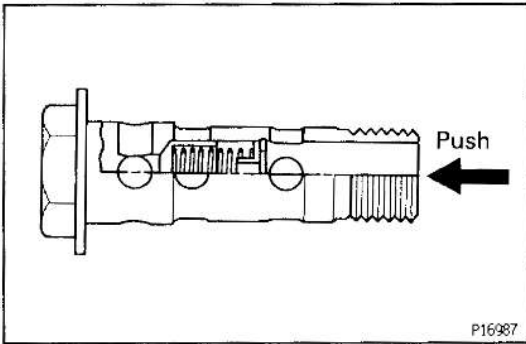
EG-400**ENGINE — LUBRICATION SYSTEM**

E0086-07

OIL COOLER INSPECTION**1. INSPECT RELIEF VALVE**

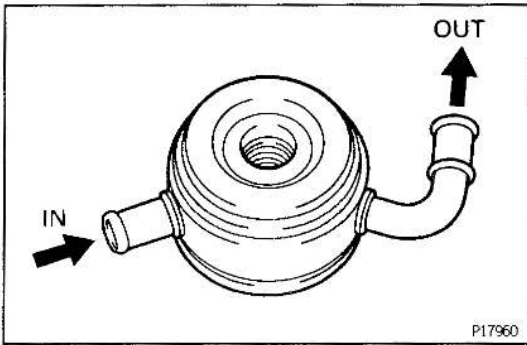
Push the valve with a wooden stick to check if it is stuck.

If stuck, replace the relief valve.

**2. INSPECT OIL COOLER**

Check the oil cooler for damage or clogging.

If necessary, replace the oil cooler.

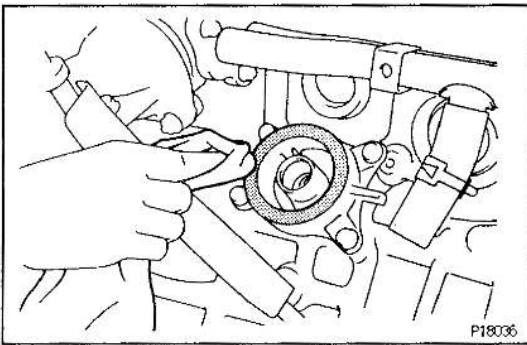
**OIL COOLER INSTALLATION**

E041Y-01

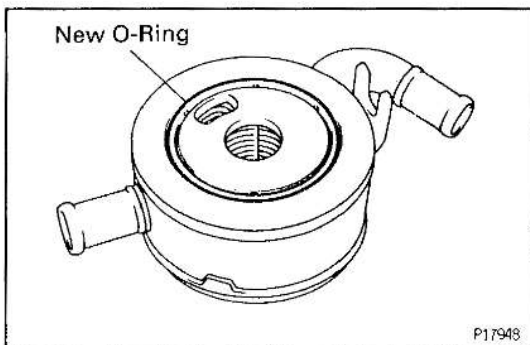
(See Components for Removal and Installation)

1. INSTALL OIL COOLER

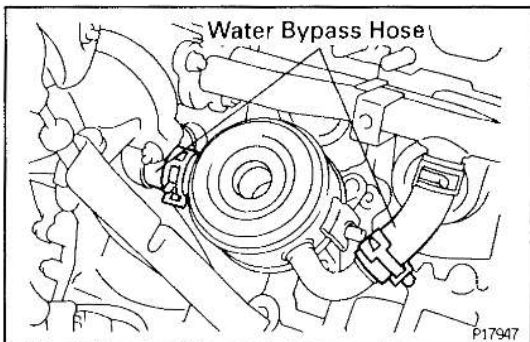
(a) Clean the oil cooler contact surface on the oil cooler mounting.



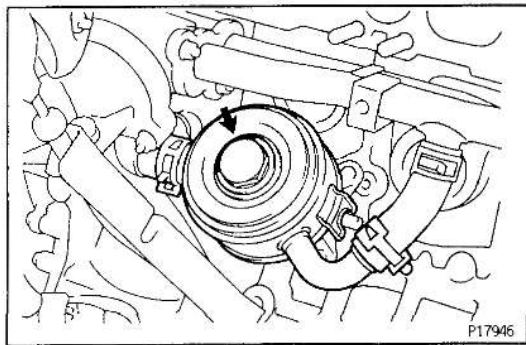
(b) Install a new O—ring to the oil cooler.



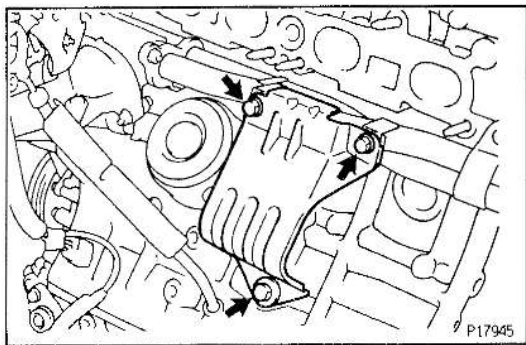
(c) Connect the 2 water bypass hoses to the oil cooler.



ENGINE — LUBRICATION SYSTEM



- (d) Apply a light coat of engine oil on the threads of the relief valve.
- (e) Install a new seal washer and the relief valve.
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)

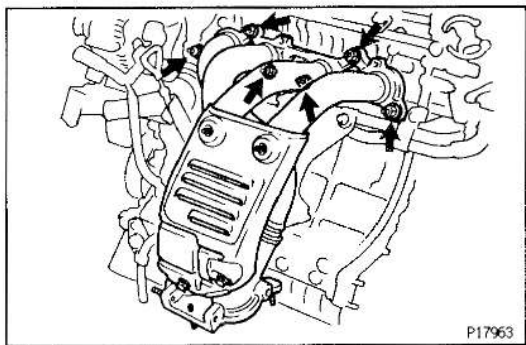


2. INSTALL NO.3 EXHAUST MANIFOLD HEAT INSULATOR

Install the heat insulator with the 3 bolts.

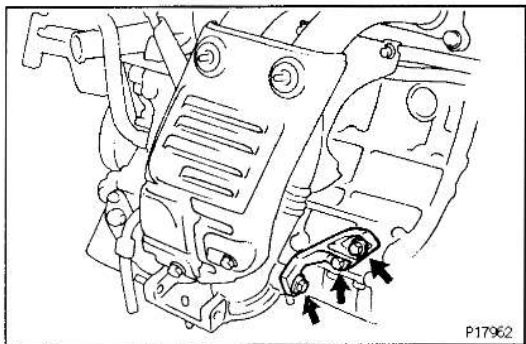
Torque:

- 12 mm bolt head
18 N·m (180 kgf·cm, 13 ft·lbf)
- 14 mm bolt head
37 N·m (380 kgf·cm, 27 ft·lbf)

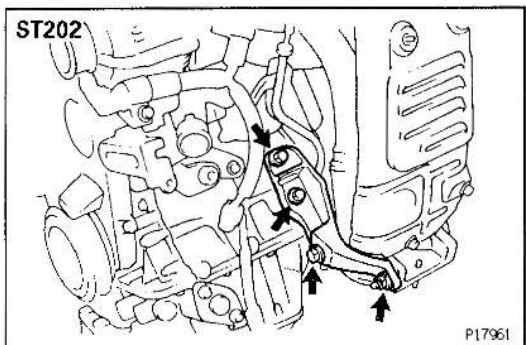


3. INSTALL EXHAUST MANIFOLD

- (a) Install a new gasket and the exhaust manifold with the 6 nuts. Uniformly tighten the nuts in several passes.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

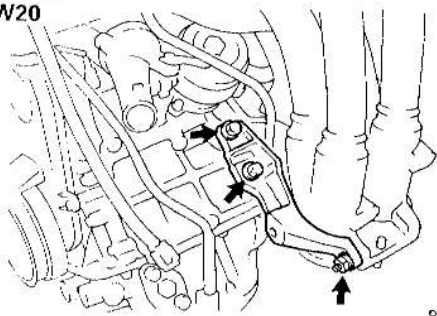


- (b) Install the LH exhaust manifold stay with the 3 bolts. Alternately tighten the bolts.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)



- (c) ST202:
Install the RH exhaust manifold stay with the 3 bolts and nut. Alternately tighten the bolts and nut.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

EG

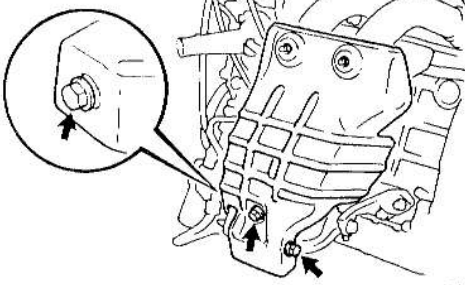
EG-402**ENGINE – LUBRICATION SYSTEM****SW20**

P15848

(d) SW20:

Install the RH exhaust manifold stay with the 2 bolts and nut. Alternately tighten the bolts and nut.

Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

SW20

P15847

(e) SW20:

Install the No.2 exhaust manifold heat insulator with the 3 bolts.

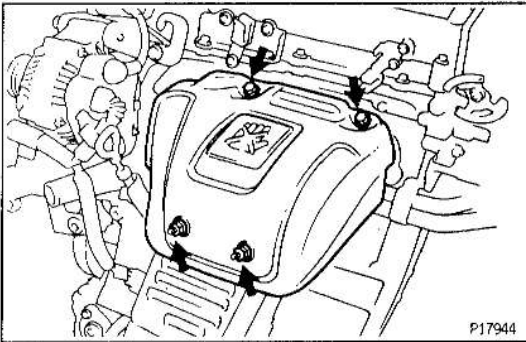
Torque:

12 mm head

20 N·m (200 kgf·cm, 15 ft·lbf)

14 mm head

37 N·m (380 kgf·cm, 27 ft·lbf)



P17944

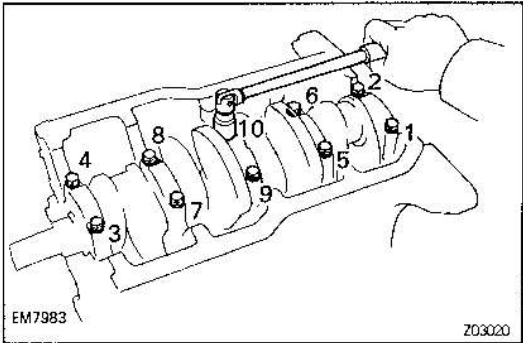
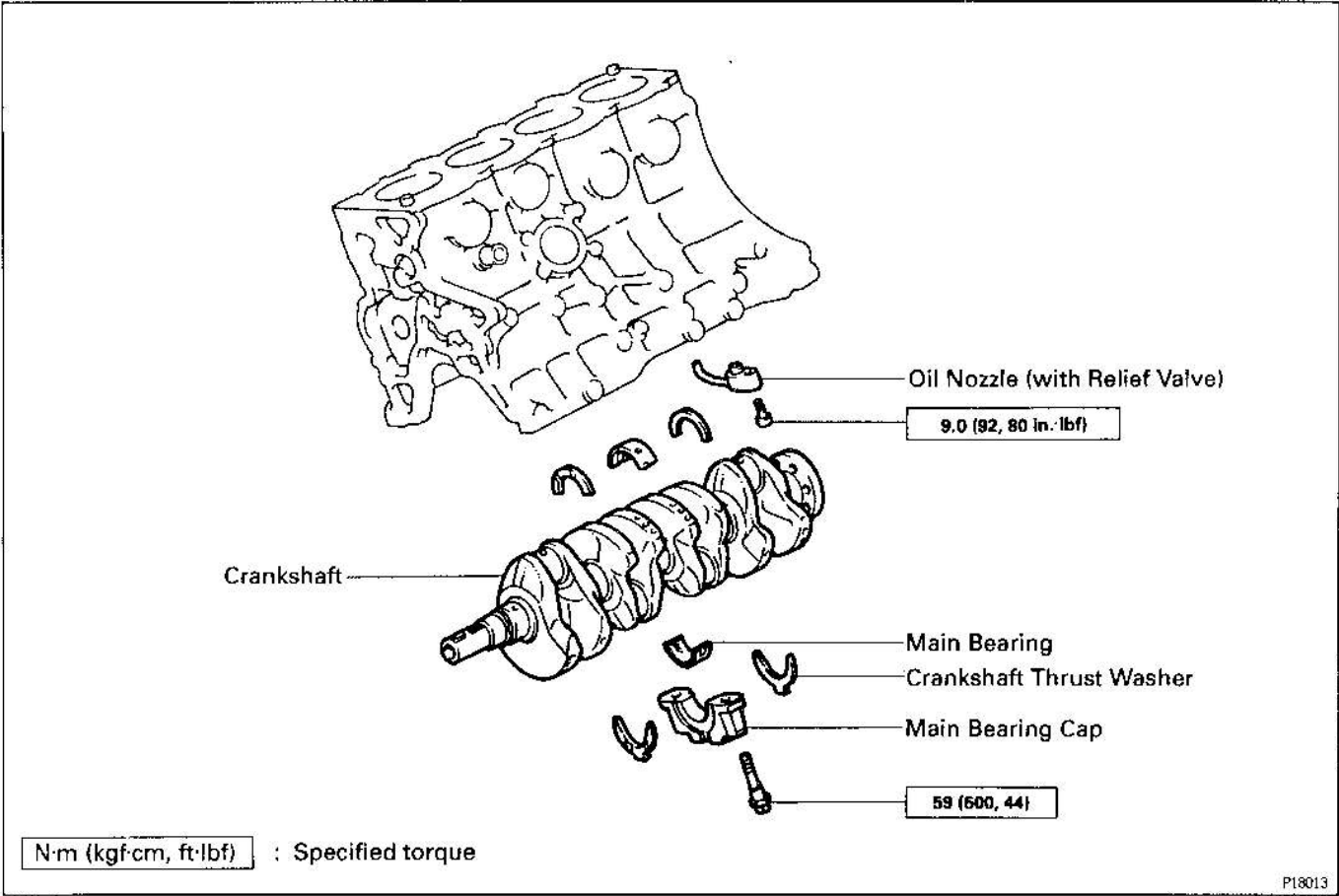
(f) Install the No.1 exhaust manifold heat insulator with the 2 bolts and 2 nuts.

Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)

- 4. FILL WITH ENGINE COOLANT**
- 5. START ENGINE AND CHECK FOR LEAKS**
- 6. CHECK ENGINE OIL LEVEL**

OIL NOZZLE COMPONENTS FOR REMOVAL AND INSTALLATION

EG084-04

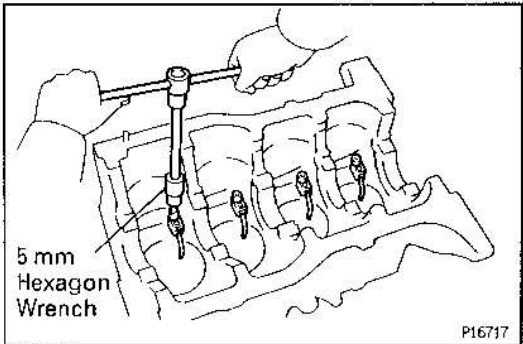


OIL NOZZLES REMOVAL

EG432-01

(See Components for Removal and Installation)

1. REMOVE OIL CRANKSHAFT
(See pages EG – 129 to 138)

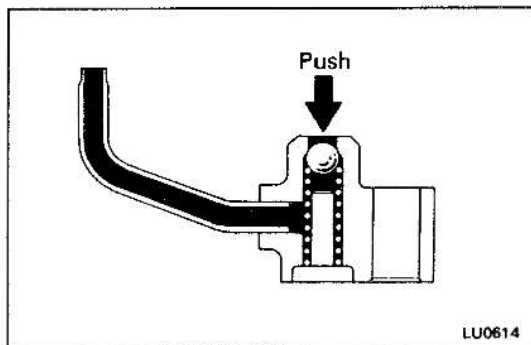


2. REMOVE OIL NOZZLES

Using a 5 mm hexagon wrench, remove the bolt and oil nozzle. Remove the 4 nozzles.

EG-404**ENGINE — LUBRICATION SYSTEM**

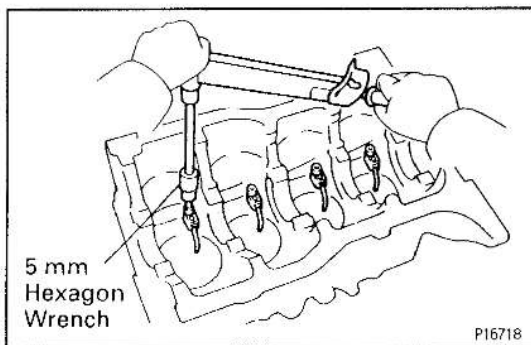
EG108-01

**OIL NOZZLES INSPECTION****INSPECT RELIEF VALVE**

Push the valve with a wooden stick to check if it is stuck.

If stuck, replace the relief valve.

EG

**OIL NOZZLES INSTALLATION**

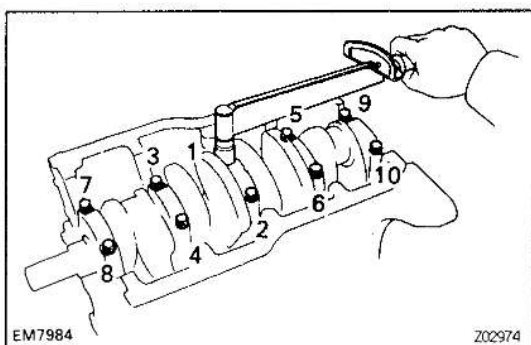
EG432-01

(See Components for Removal and Installation)

1. INSTALL OIL NOZZLES

Using a 5 mm hexagon wrench, install the oil nozzle with the bolt. Install the 4 nozzles.

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

**2. INSTALL CRANKSHAFT**

(See pages EG—151 to 157)

ENGINE — LUBRICATION SYSTEM

EG-405

SERVICE SPECIFICATIONS

SERVICE DATA

EG15A-08

Oil pressure		at idle speed	29 kPa (0.3 kgf/cm ² , 43 psi) or more
		at 5,000 rpm	245 — 490 kPa (2.5 — 5.0 kgf/cm ² , 36 — 71 psi)
Oil pump	Body clearance	STD	0.10 — 0.16 mm (0.0039 — 0.0063 in.)
		Limit	0.20 mm (0.0079 in.)
	Tip clearance	STD	0.04 — 0.16 mm (0.0016 — 0.0063 in.)
		Limit	0.20 mm (0.0079 in.)

EG

TORQUE SPECIFICATIONS

EG15C-0F

Part tightened	N·m	kgf·cm	ft·lbf
Oil pan x Drain plug	37	380	27
Oil pump body cover x Oil pump body	8.8	90	78 in·lbf
Oil pump x Cylinder block	25 mm long bolt	9.0	80 in·lbf
	35 mm long bolt	8.0	71 in·lbf
Oil strainer x Oil pump	9.0	92	80 in·lbf
Oil strainer x Cylinder block	6.5	66	58 in·lbf
Oil pan baffle plate x Cylinder block	6.5	66	58 in·lbf
No.1 oil pan x Oil pump	9.0	92	80 in·lbf
No.1 oil pan x Rear oil seal retainer	9.0	92	80 in·lbf
No.1 oil pan x Cylinder block			
	20 mm (0.79 in.) long bolt for 10 mm head	12	120
	25 mm (0.98 in.) long bolt for 12 mm head	21	210
	Nut	14	140
No.1 oil pan x No.2 oil pan	6.5	66	58 in·lbf
Oil pressure regulator x No.2 oil pan	18	180	13
Oil pump pulley x Oil pump drive shaft	35	360	26
No.2 idler pulley x Oil pump	44	450	32
Oil cooler x Oil cooler bracket (Relief valve)	59	600	44
No.3 exhaust manifold heat insulator x Water bypass pipe	18	180	13
No.3 exhaust manifold heat insulator x Cylinder block	37	380	27
Exhaust manifold x Cylinder head	50	510	37
Exhaust manifold stay x Exhaust manifold	58	590	43
Exhaust manifold stay x Cylinder block	58	590	43
No.2 exhaust manifold heat insulator x Exhaust manifold			
	12 mm head	20	200
	14 mm head	37	380
No.1 exhaust manifold heat insulator x Exhaust manifold	20	200	15
Oil nozzle x Cylinder block	9.0	92	80 in·lbf

EG-406

ENGINE — LUBRICATION SYSTEM

— MEMO —

