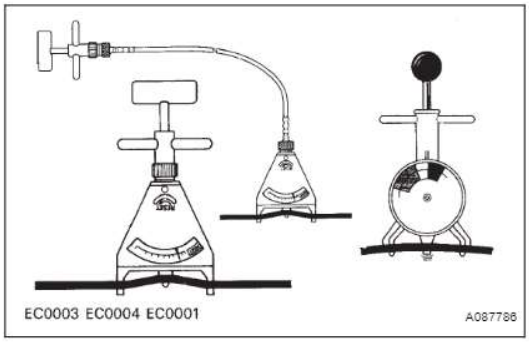
ENGINE

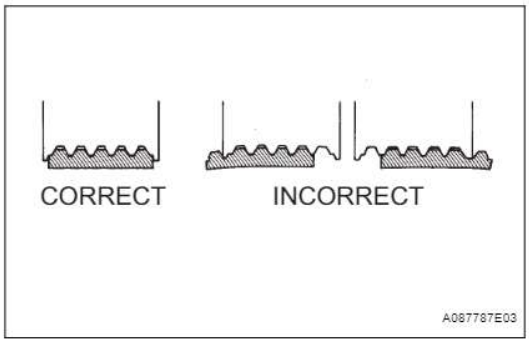
INSPECTION

1. **INSPECT ENGINE COOLANT**
   HINT:
   See page CO-7
2. **INSPECT ENGINE OIL**
3. **INSPECT BATTERY**
   HINT:
   See page CH-4
4. **INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY**
5. **INSPECT SPARK PLUG**
   HINT:
   See page IG-5

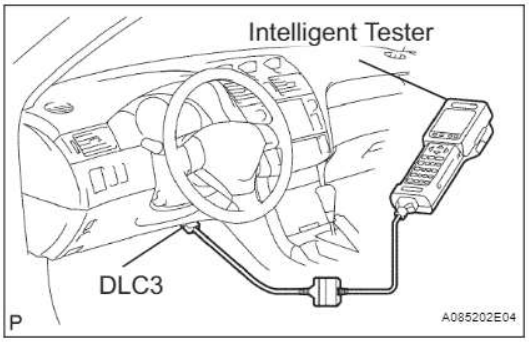


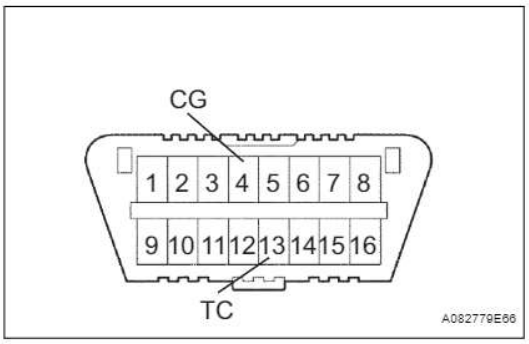
6. **INSPECT V-RIBBED BELT**
   (a) Using a belt tension gauge, check the belt tension.
   Belt tension gauge:
   DENSO BTG-20 (95506-00020)
   Borroughs No. BT-33-73F
   Drive belt tension

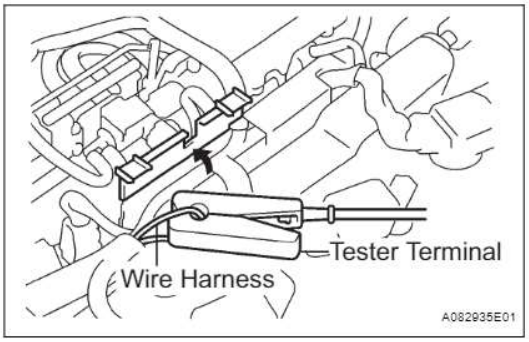
Item	Condition	Specified Condition
Cooler compressor to crankshaft pulley	New belt	143 to 165 lbf
Cooler compressor to crankshaft pulley	Used belt	80 to 132 lbf
Vane pump	New belt	132 to 154 lbf
Vane pump	Used belt	55 to 88 lbf



   (b) Check the drive belt fits.
   HINT:
   - After installing the drive belt, check that it fits properly in the ribbed grooves. Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the crankshaft pulley.
   - A "new belt" is a belt which has been used for less than 5 minutes on a running engine.
   - A "used belt" is a belt which has been used on a running engine for 5 minutes or more.
   - After installing a new belt, run the engine for approximately 5 minutes and then recheck the tension.
7. **INSPECT IGNITION TIMING**
   (a) Warm up the engine.







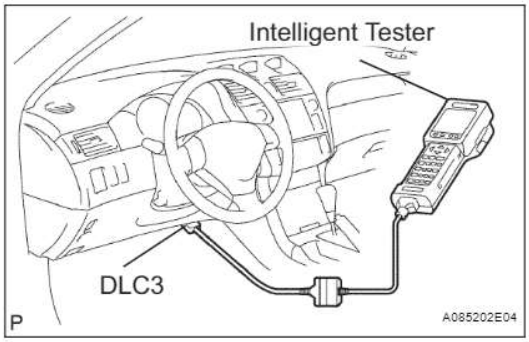
(b) When using the intelligent tester:
Check the ignition timing.
(1) Connect the intelligent tester to the DLC3.
(2) Enter DATA LIST MODE on the intelligent tester.
Ignition timing:
8 to 12° BTDC @ idle
HINT:
Please refer to the intelligent tester operator's manual for help on selecting the DATA LIST.

(c) When not using the intelligent tester:
Check the ignition timing.
(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
NOTICE:
- **Confirm the terminal numbers before connecting them. Connection with a wrong terminal can damage the engine.**
- **Turn off all electrical systems before connecting the terminals.**
- **Perform this inspection after the cooling fan motor is turned off.**

(2) Remove the V-bank cover.
(3) Pull out the wire harness as shown in the illustration.
(4) Connect the tester terminal of the timing light to the engine.
NOTICE:
- **Use a timing light which can detect the first signal.**

(5) Check the ignition timing at idle.
Ignition timing:
8 to 12° BTDC @ idle
NOTICE:
When checking the ignition timing, the transmission should be in the neutral position.
HINT:
Run the engine at 1,000 to 1,300 rpm for 5 seconds, and then check that the engine rpm returns to idle speed.
(6) Disconnect terminals 13 (TC) and 4 (CG) of the DLC3.
(7) Check the ignition timing at idle.
Ignition timing:
7 to 24° BTDC @ idle
(8) Confirm that ignition timing moves to the advanced angle side when the engine rpm is increased.
(9) Remove the timing light.

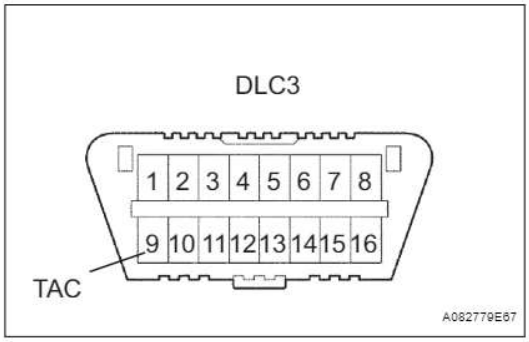
8. INSPECT ENGINE IDLE SPEED
(a) Warm up the engine.



(b) When using the intelligent tester:
Check the idle speed.
(1) Connect the intelligent tester to the DLC3.
HINT:
Please refer to the intelligent tester operator's manual for further details.
(2) Enter DATA LIST MODE on the intelligent tester.
Idle speed

Item	Specified Condition
M/T	650 to 750 rpm
A/T	610 to 710 rpm

NOTICE:
- **When checking the idle speed, the transmission should be in the neutral position.**
- **Check the idle speed with the cooling fan off.**
- **Switch off all accessories and air conditioning before connecting the intelligent tester.**

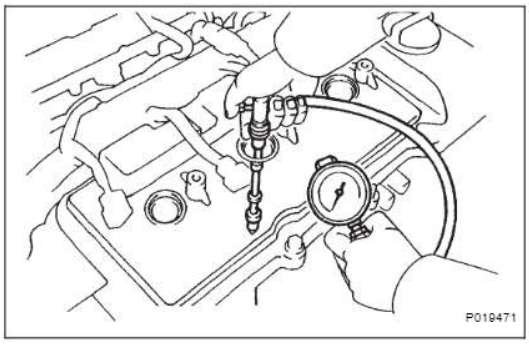


(c) When not using the intelligent tester:
Check the idle speed.
(1) Using SST, connect tachometer tester probe to terminal 9 (TAC) of the DLC3.
SST 09843-18030
(2) Check the idle speed.
Idle speed

Item	Specified Condition
M/T	650 to 750 rpm
A/T	610 to 710 rpm

9. INSPECT COMPRESSION

(a) Warm up and stop the engine.
(b) Disconnect the injector connectors.
(c) Remove the intake air surge tank (See page FU-15).
(d) Remove the 6 ignition coils.
(e) Remove the 6 spark plugs.



(f) Check the cylinder compression pressure.
(1) Insert a compression gauge into the spark plug hole.
(2) Fully open the throttle.
(3) While cranking the engine, measure the compression pressure.
Compression pressure:
1.5 MPa (15.3 kgf/cm ^{2}, 218 psi)
Minimum pressure:
1.0 MPa (10.2 kgf/cm ^{2}, 145 psi)
Difference between each cylinder:
100 kPa (1.0 kgf/cm ^{2}, 15 psi)

NOTICE:

- **Always use a fully charged battery to obtain an engine speed of 250 rpm or more.**
- **Check the other cylinders' compression pressure in the same way.**
- **This measurement must be done as quickly as possible.**

(4) If the cylinder compression is low, pour a small amount of engine oil into the cylinder through the spark plug hole and inspect again.
HINT:
- If adding oil increases the compression, the piston rings and/or cylinder bore may be worn or damaged.
- If pressure stays low, a valve may be stuck or seated improperly, or there may be leakage in the gasket.

EM

10. INSPECT CO/HC

(a) Start the engine.
(b) Rev the engine at 2,500 rpm for approximately 180 seconds.
(c) Insert CO/HC meter testing probe at least 40 cm (1.3 ft) into the tailpipe during idling.
(d) Immediately check CO/HC concentration at idle and/or 2,500 rpm.
HINT:
Check regulations and restrictions in your area when performing 2 mode CO/HC concentration testing (engine check at both idle speed and at 2,500 rpm).
(e) If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.
(1) Check A/F sensor and heated oxygen sensor operation (See page EC-11 and EC-11).
(2) See the table below for possible causes, and then inspect and repair.

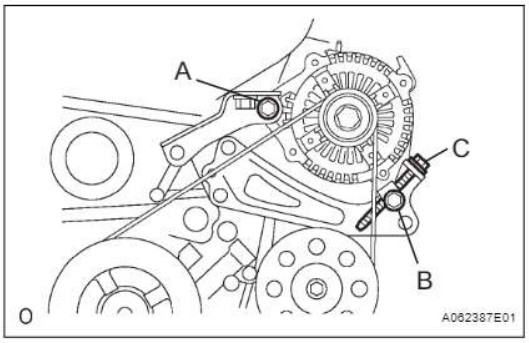
CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignitions: – Incorrect timing – Fouled, shorted or improperly gapped plugs 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinders
Low	High	Rough idle (fluctuating HC reading)	1. Vacuum leaks: – PCV hoses – Intake manifold – Throttle body – Brake booster line 2. Lean mixture causing misfire

CO	HC	Problems	Causes
High	High	Rough idle (black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty SFI system: – Faulty pressure regulator – Defective ECT sensor – Defective MAF meter – Faulty ECM – Faulty injectors – Faulty throttle position sensor

DRIVE BELT

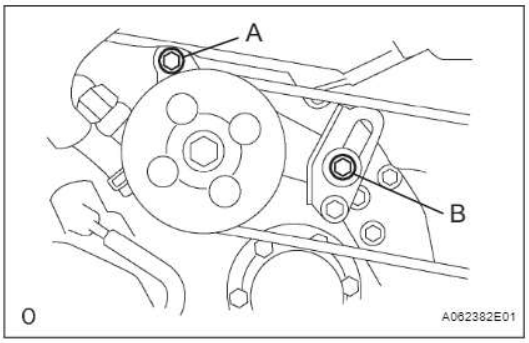
REMOVAL

1. **REMOVE FRONT WHEEL RH**
2. **REMOVE FRONT FENDER APRON SEAL RH**
3. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1**
   (a) Loosen bolts A and B.
   (b) Loosen adjusting bolt C and remove the belt.



EM

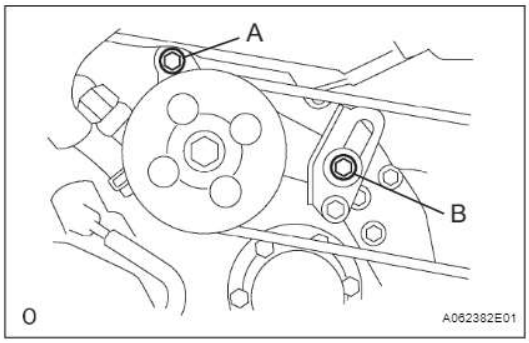
4. **REMOVE VANE PUMP V BELT**
   (a) Loosen bolts A and B, and remove the belt.



INSTALLATION

1. INSTALL VANE PUMP V BELT

(a) Install the belt on each pulley.

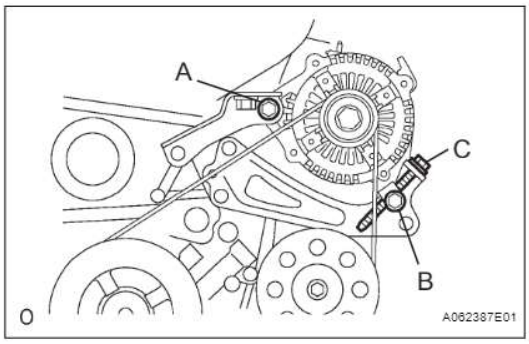


(b) Using a bar, adjust the belt tension and tighten bolt B.
Torque: 43 N*m (439 kgf*cm, 32 ft.*lbf)

(c) Tighten bolt A.
Torque: 43 N*m (439 kgf*cm, 32 ft.*lbf)

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

(a) Install the belt on each pulley.



(b) Tighten adjusting bolt C, and adjust the belt tension.

(c) First tighten bolt A, then bolt B.
Torque: Bolt A
58 N*m (591 kgf*cm, 43 ft.*lbf)
Bolt B
18 N*m (184 kgf*cm, 13 ft.*lbf)

3. INSTALL FRONT FENDER APRON SEAL RH

4. INSTALL FRONT WHEEL RH

EM

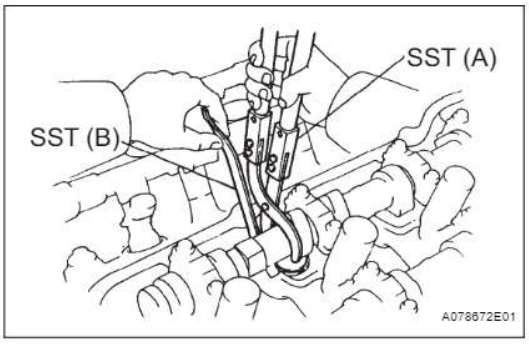
The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a new No. 10 shim.

New shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness
1	2.500 (0.0984)	10	2.950 (0.1161)
2	2.550 (0.1004)	11	3.000 (0.1181)
3	2.600 (0.1024)	12	3.050 (0.1201)
4	2.650 (0.1043)	13	3.100 (0.1220)
5	2.700 (0.1063)	14	3.150 (0.1240)
6	2.750 (0.1083)	15	3.200 (0.1260)
7	2.800 (0.1102)	16	3.250 (0.1280)
8	2.850 (0.1122)	17	3.300 (0.1299)
9	2.900 (0.1142)	-	-

EM

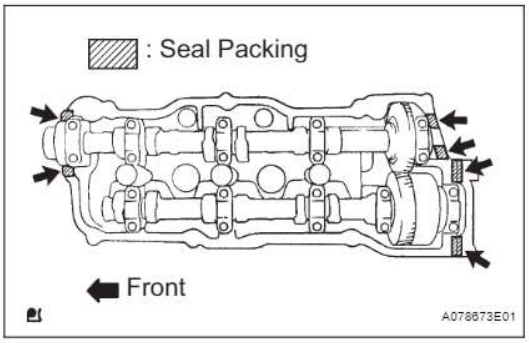
HINT:
A shim's thickness is written on its face in millimeters.



(h) Place a new adjusting shim on the valve lifter with the imprinted number facing down.

(i) Press down the valve lifter with SST (A), and remove SST (B).
SST 09248-55040 (09248-05410, 09248-05420)

(j) Recheck the valve clearance.



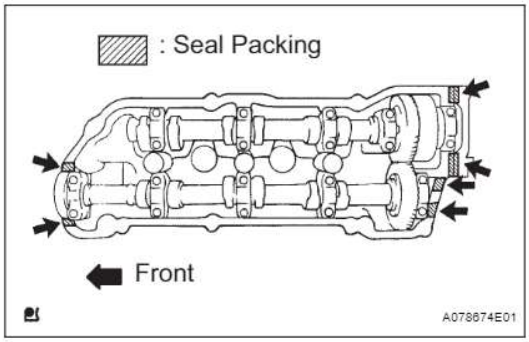
INSTALLATION

1. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY

(a) Apply seal packing to the cylinder head as shown in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**
- **Do not start the engine for at least 2 hours after installing the cylinder head cover.**

(b) Install the cylinder head cover with the 9 bolts. Tighten the bolts uniformly in several steps.
Torque: 8.0 N*m (80 kgf*cm, 71 in.*lbf)

(c) Install the engine wire harness with the 3 nuts.
Torque: 8.4 N*m (85 kgf*cm, 74 in.*lbf)



2. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY LH

(a) Apply seal packing to the cylinder head as shown in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3minutes after applying seal packing.**
- **Do not start the engine for at least 2 hours after installing the cylinder head cover.**

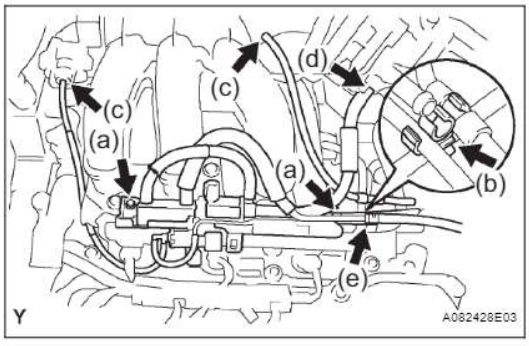
(b) Install the cylinder head cover with the 9 bolts.
Tighten the bolts uniformly in several steps.
Torque: 8.0 N*m (80 kgf*cm, 71 in.*lbf)

(c) Using an torx socket wrench, install the engine wire harness protector with the 2 bolts.

3. INSTALL IGNITION COIL ASSEMBLY
Torque: 8.0 N*m (80 kgf*cm, 71 in.*lbf)

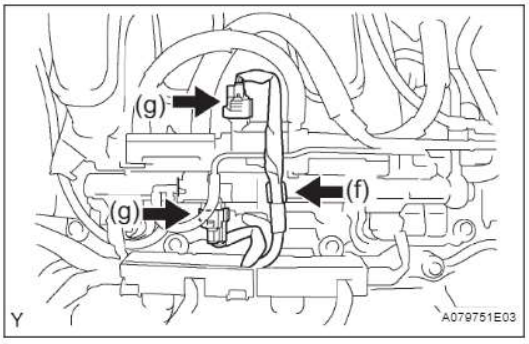
4. INSTALL INTAKE AIR SURGE TANK

(a) Install a new gasket to the intake air surge tank.
(b) Install the intake air surge tank and emission control valve bracket with the 2 nuts.
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)
(c) Using an 8 mm socket hexagon wrench, tighten the 4 bolts.
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)
(d) Install the surge tank stay No. 2 with the 2 bolts.
Torque: 20 N*m (199 kgf*cm, 15 ft.*lbf)
(e) Install the surge tank stay No. 1 with the 2 bolts.
Torque: 20 N*m (199 kgf*cm, 15 ft.*lbf)
(f) Install the engine hanger No. 1 with the 2 bolts.
Torque: 20 N*m (199 kgf*cm, 15 ft.*lbf)
(g) Install the pressure feed tube with the 3 nuts.
Torque: 7.8 N*m (80 kgf*cm, 69 ft.*lbf)
(h) Connect the ventilation hose.
(i) Connect the union to check valve hose.
(j) Connect the water by-pass hose No. 2.
(k) Connect the water by-pass hose No. 3.
(l) Connect the throttle motor connector.



5. INSTALL EMISSION CONTROL VALVE SET

(a) Install the valve set with the 2 nuts.
(b) Install the clamp.
(c) Connect the 2 vacuum hoses.
(d) Connect the fuel vapor feed hose No. 2.
(e) Connect the fuel vapor feed hose No. 1.



(f) Install the wire harness clamp.
(g) Connect the 2 VSV connectors.

6. **INSTALL AIR CLEANER ASSEMBLY**

7. **INSTALL FRONT SUSPENSION UPPER BRACE CENTER (W/ FRONT SUSPENSION BRACE UPPER CENTER)**
Torque: 80 N*m (816 kgf*cm, 59 ft.*lbf)

8. **INSTALL RADIATOR HOSE INLET**

9. **INSTALL V-BANK COVER SUB-ASSEMBLY**
(a) Fit the 2 retainers and install the V-bank cover.
(b) Using a 5 mm socket hexagon wrench, tighten the 3 nuts.
Torque: 7.9 N*m (81 kgf*cm, 70 in.*lbf)

10. **INSTALL FRONT FENDER APRON SEAL RH**

11. **ADD ENGINE COOLANT**
HINT:
See page CO-7

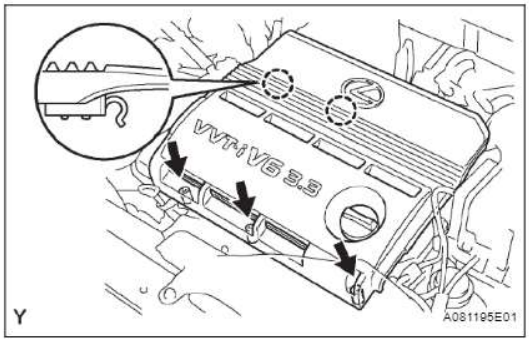
12. **CHECK FOR ENGINE COOLANT LEAKS**

EM

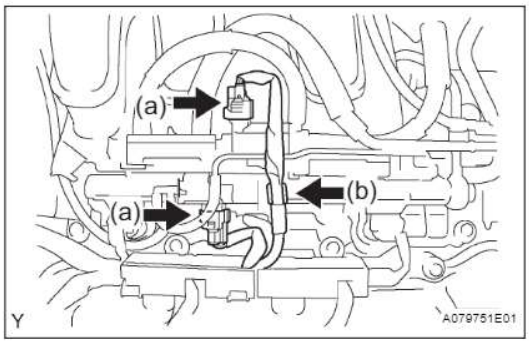
VALVE CLEARANCE

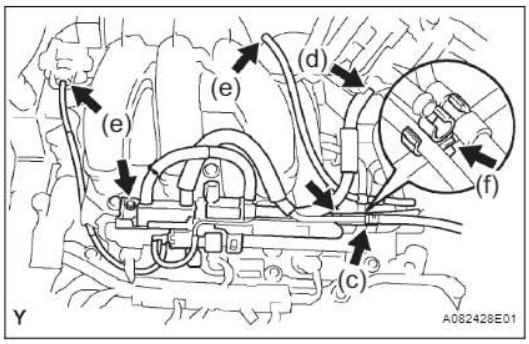
REMOVAL

1. **DRAIN ENGINE COOLANT**
   HINT:
   See page CO-7
2. **REMOVE FRONT FENDER APRON SEAL RH**
3. **REMOVE V-BANK COVER SUB-ASSEMBLY**
   (a) Using a 5 mm socket hexagon wrench, remove the 3 nuts.
   (b) Remove the V-bank cover.

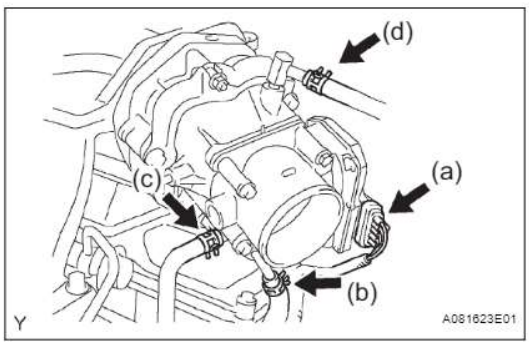


4. **REMOVE RADIATOR HOSE INLET**
5. **REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/FRONT SUSPENSION BRACE UPPER CENTER)**
6. **REMOVE AIR CLEANER ASSEMBLY**
7. **REMOVE EMISSION CONTROL VALVE SET**
   (a) Disconnect the 2 VSV connectors.
   (b) Remove the wire harness clamp.

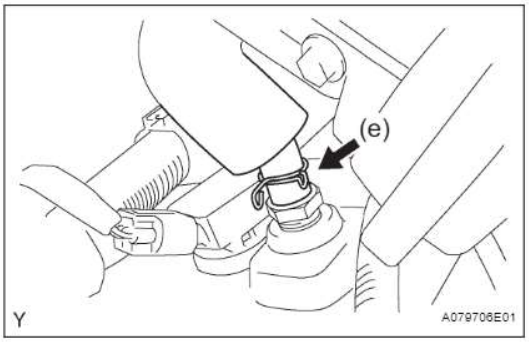




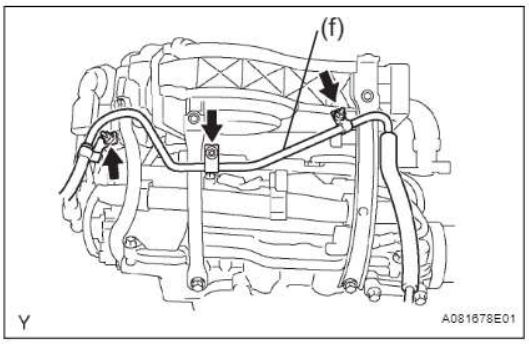
   (c) Disconnect the fuel vapor feed hose No. 1.
   (d) Disconnect the fuel vapor feed hose No. 2.
   (e) Disconnect the 2 vacuum hoses.
   (f) Remove the clamp.
   (g) Remove the 2 nuts and the emission control valve set.



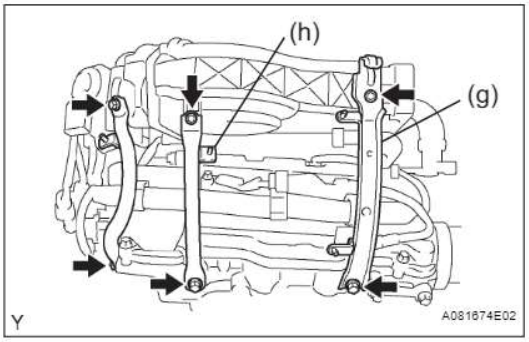
8. **REMOVE INTAKE AIR SURGE TANK**
   (a) Disconnect the throttle motor connector.
   (b) Disconnect the water by-pass hose No. 3.
   (c) Disconnect the water by-pass hose No. 2.
   (d) Disconnect the union to check valve hose.



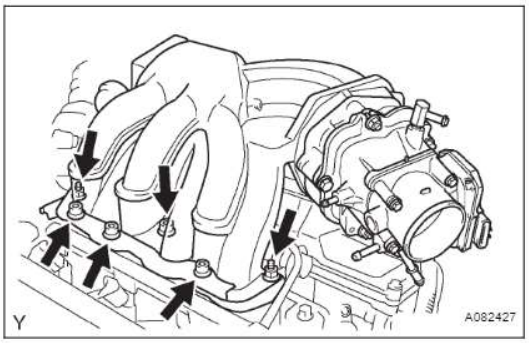
(e) Disconnect the ventilation hose.



(f) Remove the 3 nuts and disconnect the pressure feed tube.

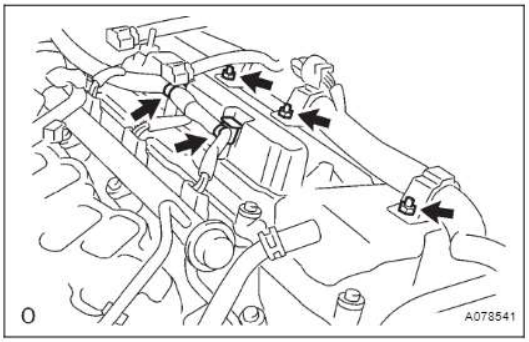


(g) Remove the 2 bolts and engine hanger No. 1.
(h) Remove the 2 bolts and surge tank stay No. 1.
(i) Remove the 2 bolts and surge tank stay No. 2.



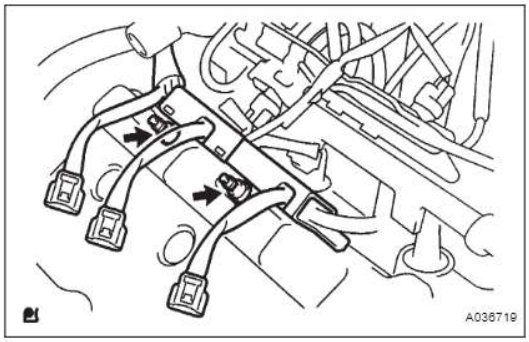
(j) Using an 8 mm socket hexagon wrench, remove the 4 bolts.
(k) Remove the 2 nuts, emission control valve bracket and intake air surge tank.
(l) Remove the gasket from the intake air surge tank.

9. REMOVE IGNITION COIL ASSEMBLY



10. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY

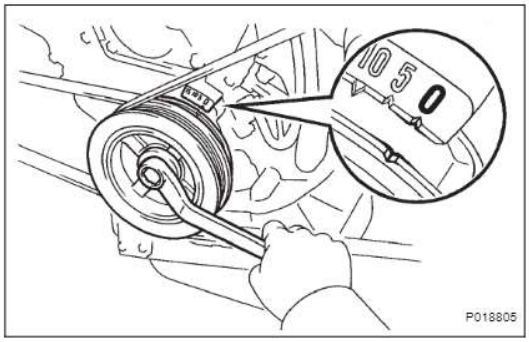
(a) Remove the 2 engine wire harness clamps.
(b) Remove the 3 nuts and disconnect the engine wire harness.
(c) Remove the 9 bolts and cylinder head cover.



11. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY LH

(a) Using an E6 torx socket wrench, remove the 2 bolts and disconnect the engine wire harness protector.

(b) Remove the 9 bolts and cylinder head cover.

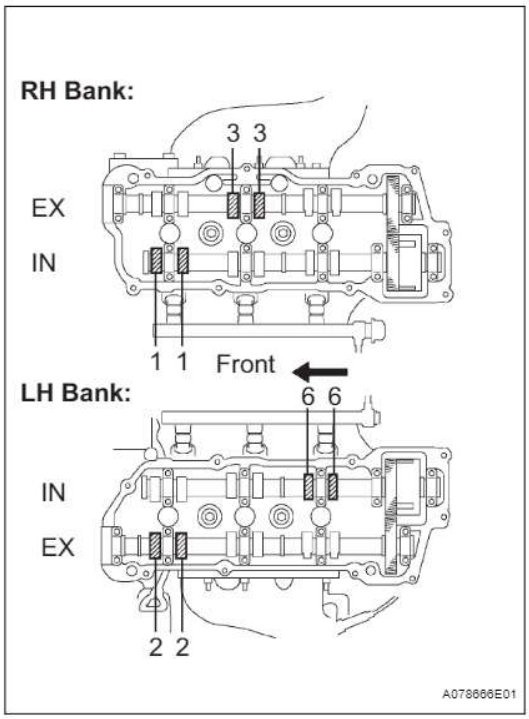


INSPECTION

1. INSPECT VALVE CLEARANCE

(a) Turn the crankshaft pulley, and align the timing notch with timing mark 0 of the No. 1 timing belt cover.

(b) Check that the valve lifters on the No. 1 timing belt cover (IN and EX) are both loose.
If not, turn the crankshaft 1 revolution (360°) and align the mark as above.



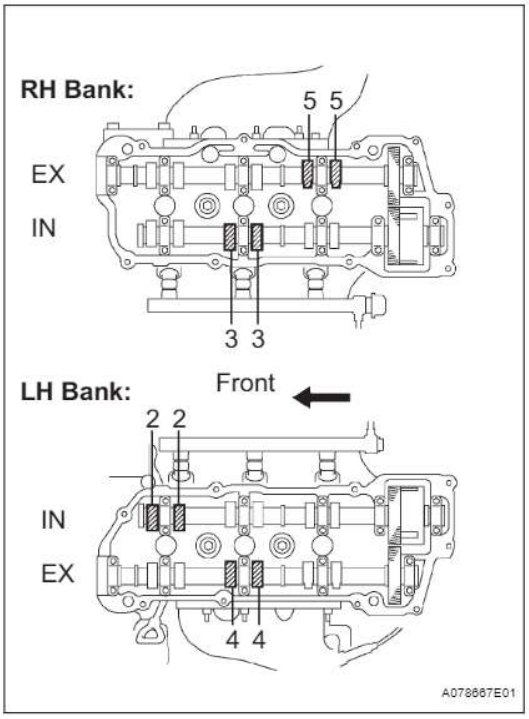
(c) Check the valves indicated in the illustration on the left.

(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
Valve clearance (Cold)

Item	Specified Condition
Intake	0.15 to 0.25 mm (0.006 to 0.010 in.)
Exhaust	0.25 to 0.35 mm (0.010 to 0.014 in.)

(2) Record valve clearance measurements that are out of the specified range. These measurements will be used later to determine the size of the adjustment shim to be installed.

EM



(d) Turn the crankshaft 2/3 of a revolution (240°), and check the valves indicated in the illustration on the left.

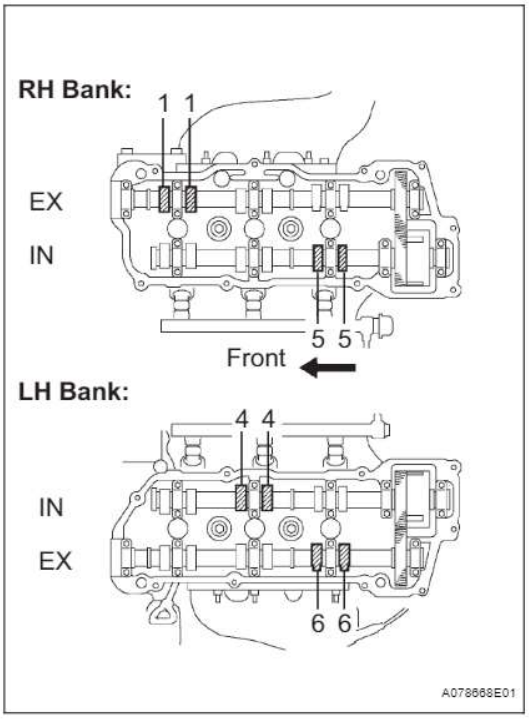
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold)

Item	Specified Condition
Intake	0.15 to 0.25 mm (0.006 to 0.010 in.)
Exhaust	0.25 to 0.35 mm (0.010 to 0.014 in.)

(2) Record valve clearance measurements that are out of the specified range. These measurements will be used later to determine the size of the adjustment shim to be installed.

EM



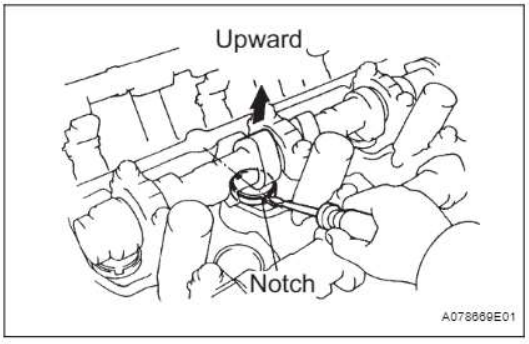
(e) Turn the crankshaft 2/3 of a revolution (240°), and check the valves indicated in the illustration on the left.

(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

Valve clearance (Cold)

Item	Specified Condition
Intake	0.15 to 0.25 mm (0.006 to 0.010 in.)
Exhaust	0.25 to 0.35 mm (0.010 to 0.014 in.)

(2) Record valve clearance measurements that are out of the specified range. These measurements will be used later to determine the size of the adjustment shim to be installed.

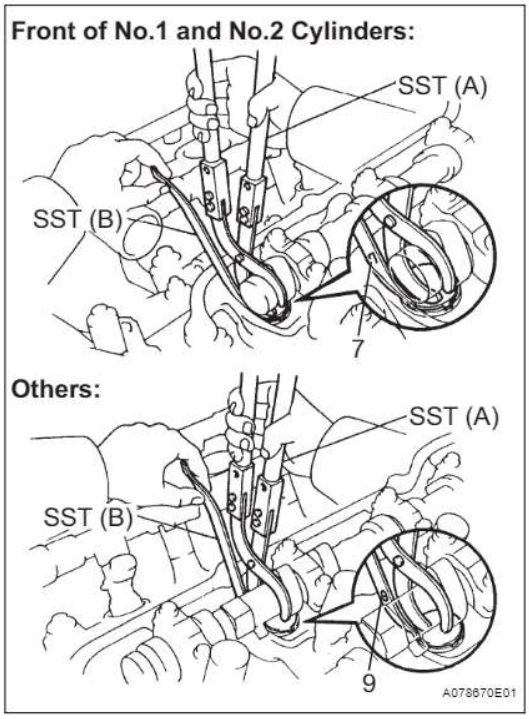


ADJUSTMENT

1. ADJUST VALVE CLEARANCE

(a) Turn the camshaft so that the cam lobe faces upward.

(b) Turn the valve lifter with a screwdriver so that the notches are perpendicular to the camshaft.

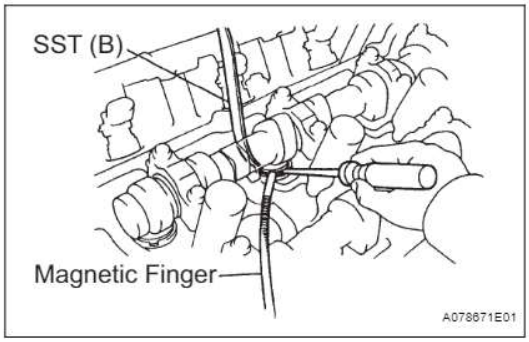


(c) Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

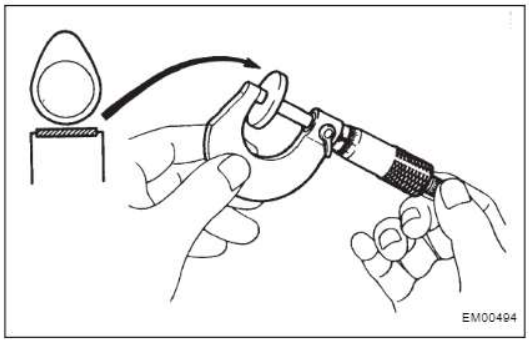
SST 09248-55040 (09248-05410, 09248-05420)

HINT:

- Apply SST (B) at a slight angle on the side marked with "9" or "7" at the position shown in the illustration.
- When SST (B) is inserted too deeply, it will get pinched by the shim. To prevent it from becoming stuck, insert it gently from the intake side at a slight angle.



(d) Using a small screwdriver and magnetic finger, remove the adjusting shim.



(e) Using a micrometer, measure the thickness of the removed shim.

(f) Calculate the thickness of a new shim so that the valve clearance comes within the specified value.

A	Thickness of new shim
B	Measured valve clearance
C	Measured valve clearance

Specified value (Cold):

Intake A = B + (C - 0.20 mm (0.0079 in.))

Exhaust A = B + (C - 0.30 mm (0.0118 in.))

(g) Select a new shim with a thickness as close as possible to the calculated values.

EXAMPLE (Intake):

Measured valve clearance = 0.45 mm (0.0177 in.)

0.45 mm (0.0177 in.) - 0.20 mm (0.0079 in.) = 0.25 mm (0.0098 in.)

(Measured - Specification = Excess clearance)

Us shim measurement = 2.80 mm (0.1102 in.)

EM

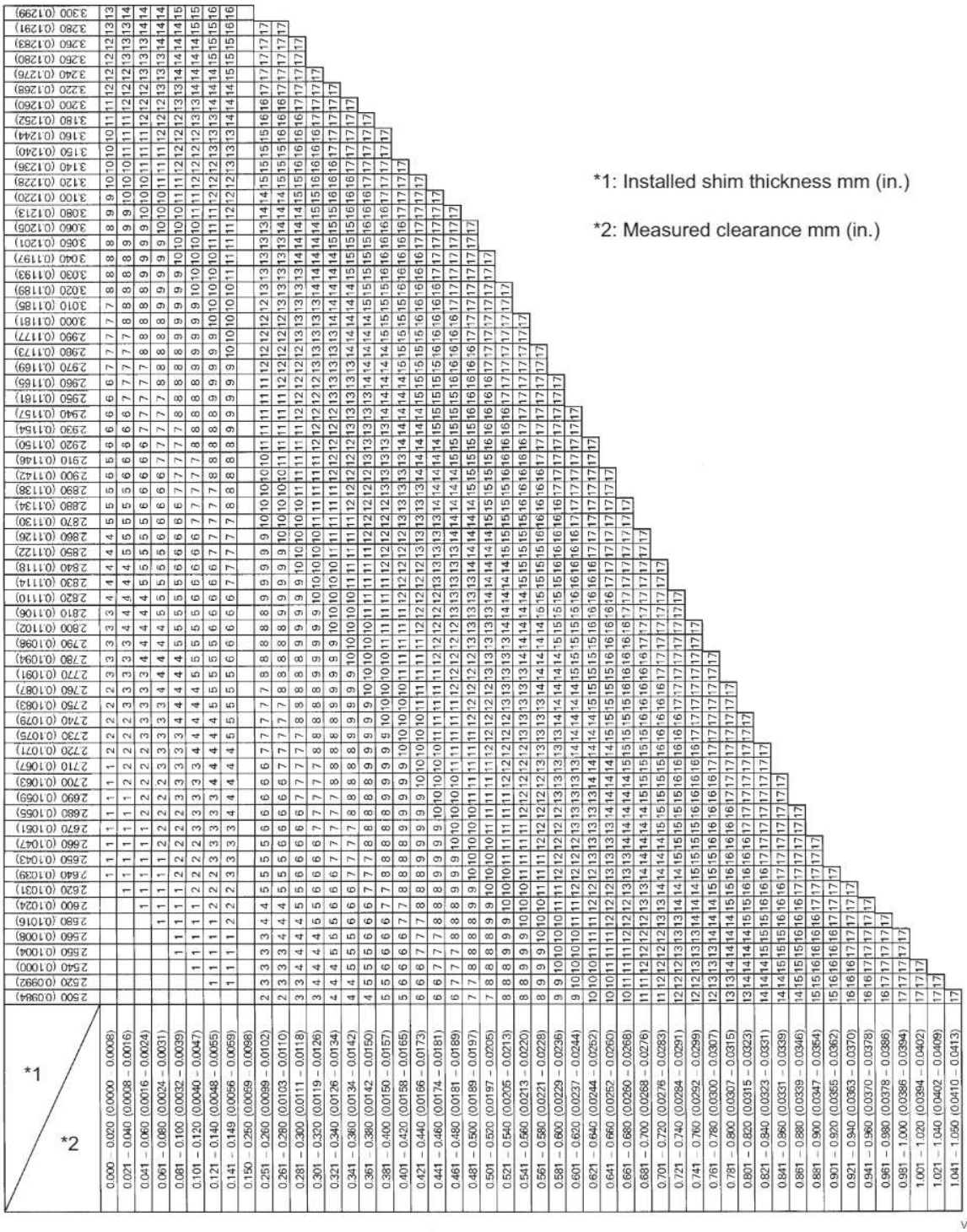
0.25 mm (0.0098 in.) + 2.80 mm (0.1102 in.) = 3.05 mm (0.1201 in.)
(Excess clearance + Used shim = ideal new shim)
Closest new shim = 3.05 mm (0.1201 in.)
Select No. 12 shim

HINT:

- Shims are available in 17 sizes in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).
- Refer to adjusting shim selection chart on the following 2 pages.

EM

Adjusting Shim Selection Chart (Intake)



Intake valve clearance (Cold):
0.15 to 0.25 mm (0.006 to 0.010 in.)
EXAMPLE:

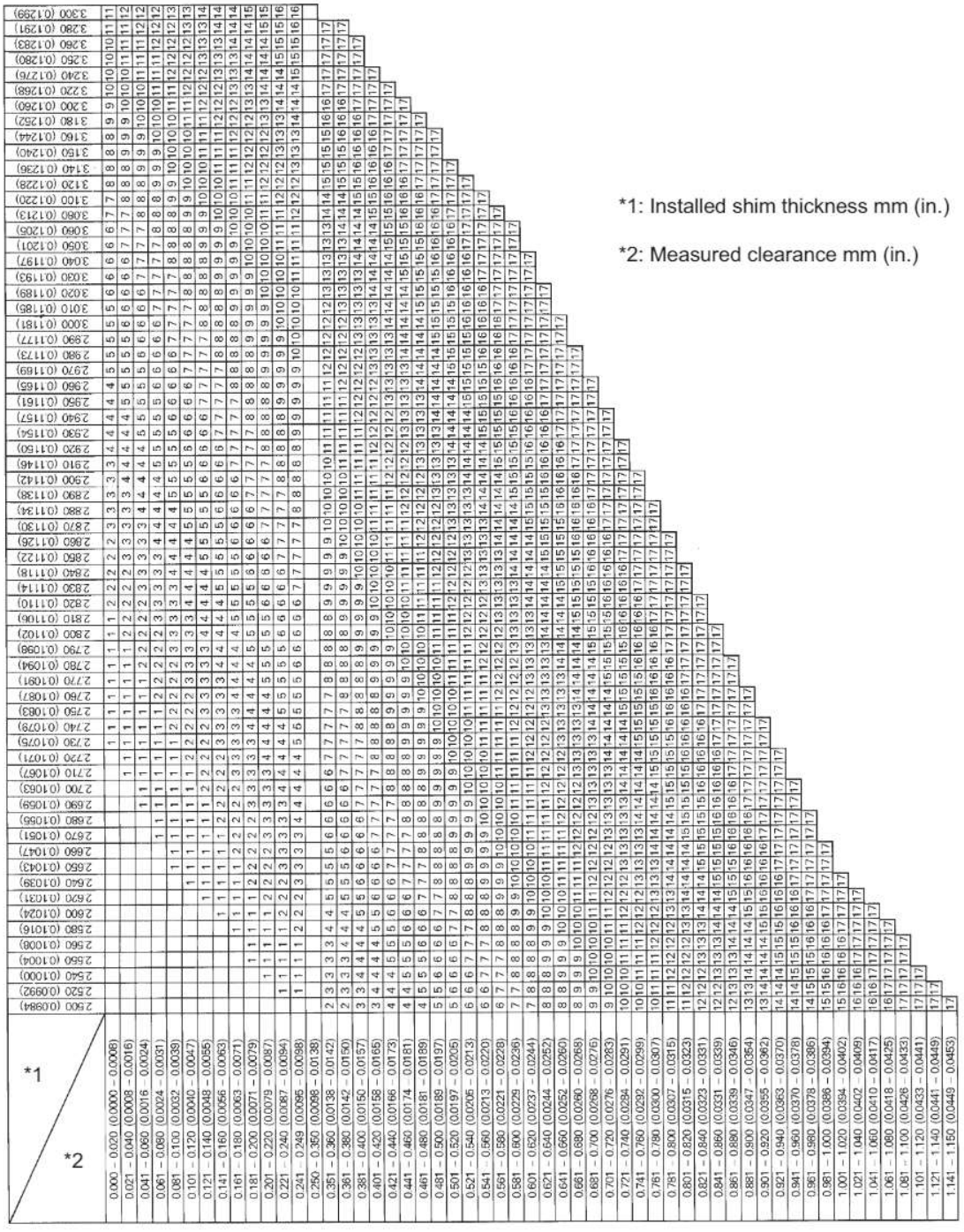
The 2.800mm (0.1102 in.) shim is installed, and the measured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a new No.12 shim.

New shim thickness mm (in.)

Shim No.	Thickness	Shim No.	Thickness
1	2.500 (0.0984)	10	2.950 (0.1161)
2	2.550 (0.1004)	11	3.000 (0.1181)
3	2.600 (0.1024)	12	3.050 (0.1201)
4	2.650 (0.1043)	13	3.100 (0.1220)
5	2.700 (0.1063)	14	3.150 (0.1240)
6	2.750 (0.1083)	15	3.200 (0.1260)
7	2.800 (0.1102)	16	3.250 (0.1280)
8	2.850 (0.1122)	17	3.300 (0.1299)
9	2.900 (0.1142)	-	-

HINT:
A shim's thickness is written on its face in millimeters.

Adjusting Shim Selection Chart (Exhaust)



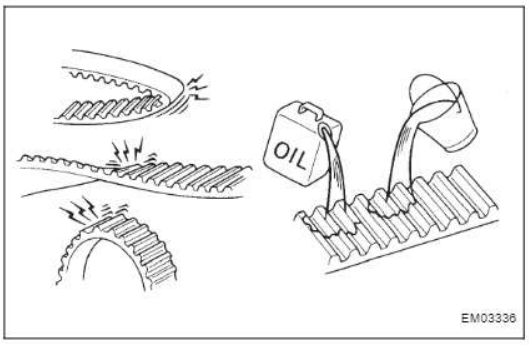
Exhaust valve clearance (Cold):
0.25 to 0.35 mm (0.010 to 0.014 in.)
EXAMPLE:

INSTALLATION

1. INSTALL TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when instaling the mounting bolt of the camshaft timing pulley.**



(a) Remove any oil or water on the pulleys, and keep them clean.

NOTICE:

- **If there is a trace of water and/or oil on the timing belt, repair the leakage and install a new timing belt.**
- **Only wipe the pulleys. Do not use cleaning agents on the pulleys.**

(b) Inspect the idler pulleys.

(1) Check that the idler pulleys turn smoothly.

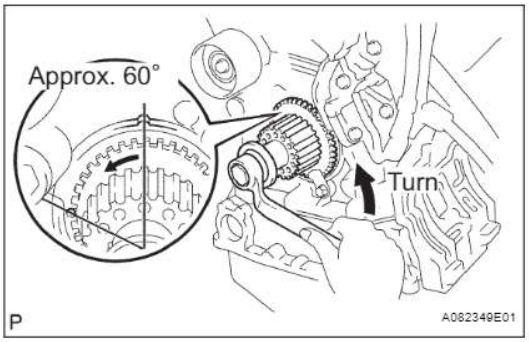
(2) Visually check the sealed portion of the idler pulleys for oil leakage.

(c) Inspect the water pump.

(1) Turn the pulley, and check that the water pump bearing moves smoothly without any noise.

(2) Visually check the drain hole for coolant leakage.

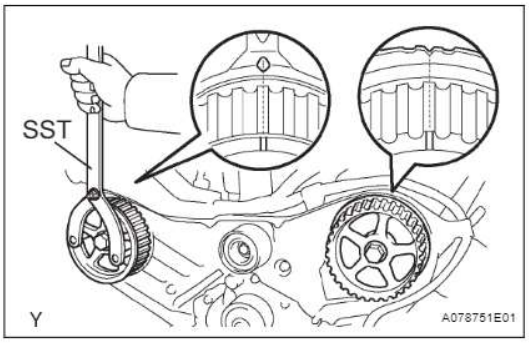
(d) Temporarily install the crankshaft pulley bolt and washer to the crankshaft.



(e) Turn the crankshaft counterclockwise by approximately 60°.

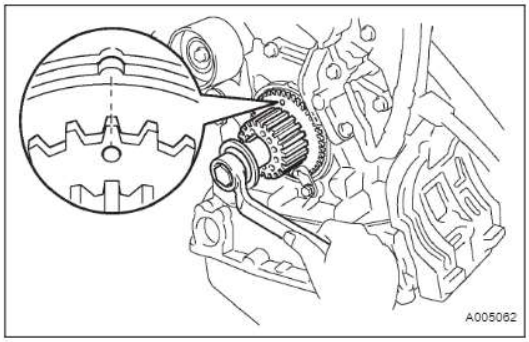
NOTICE:

To prevent the piston head and the valve head from colliding, set the crankshaft pulley at approximately 60° BTDC/compression position.

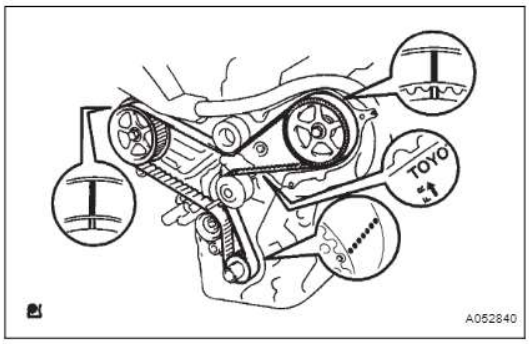


(f) Using SST, turn the timing pulleys, and align the timing marks of the timing pulleys with the No. 3 timing belt cover.

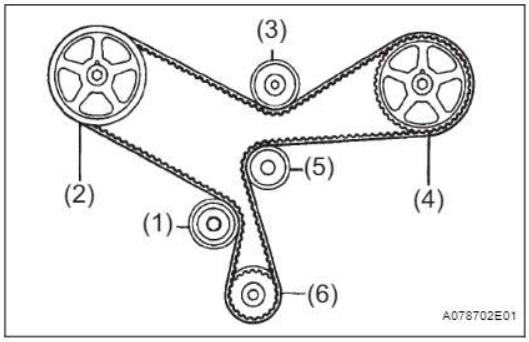
SST 09960-10010 (09962-01000, 09963-01000)



(g) Turn the crankshaft, and align the timing mark of the crankshaft timing pulley with the oil pump body.

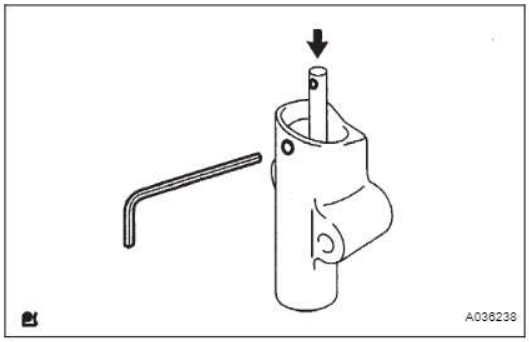


(h) Face the front mark on the timing belt forward.
(i) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
(j) Align the installation marks on the timing belt with the timing marks of the camshaft timing pulleys.



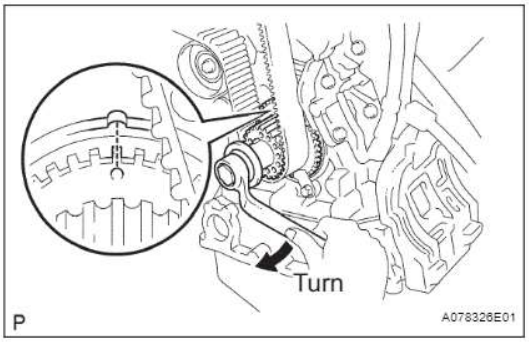
(k) Install the timing belt in this order.

1st	Crankshaft timing pulley
2nd	Water pump pulley
3rd	LH camshaft timing pulley
4th	No. 2 idler pulley
5th	RH camshaft timing pulley
6th	No. 1 idler pulley

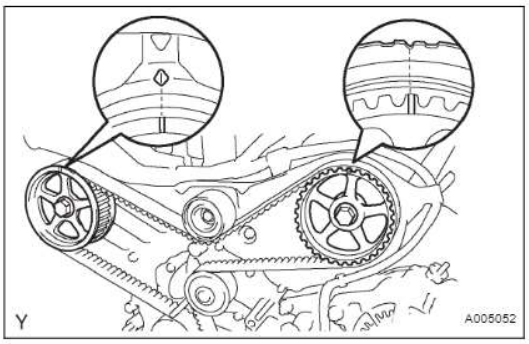


2. INSTALL TIMING BELT TENSIONER ASSEMBLY

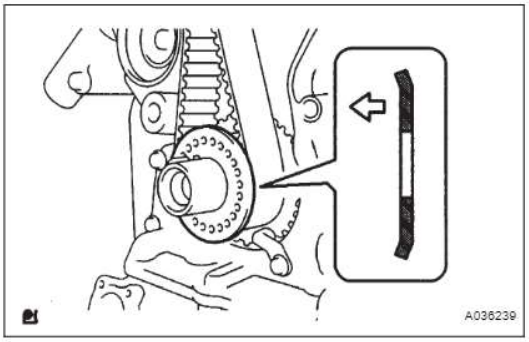
(a) Set the timing belt tensioner upright on the press.
(b) Slowly press in the push rod.
NOTICE:
Do not apply pressure of more than 9.8 kN (1,000 kgf, 2,205 lbf) to the rod.
(c) Align the holes of the push rod and housing, and pass a 1.5 mm hexagon wrench through the holes to keep the setting position of the push rod.
(d) Release the push rod.
(e) Temporarily install the tensioner with the 2 bolts.
Torque: 27 N*m (280 kgf*cm, 20 ft.*lbf)
NOTICE:
Install the tensioner's bolts uniformly and evenly. Installing the tensioner at an angle may cause it to malfunction.
(f) Remove the 1.5 mm hexagon wrench from the tensioner.



(g) Turn the crankshaft 2 revolutions slowly and align the timing mark of the crankshaft timing pulley with the oil pump body.
NOTICE:
Always turn the crankshaft clockwise.



(h) Check that the timing marks of the RH and LH timing pulleys are aligned with the timing marks of the No. 3 timing belt cover as shown in the illustration.
If the marks do not align, remove the timing belt and reinstall it.
(i) Remove the crankshaft pulley bolt.

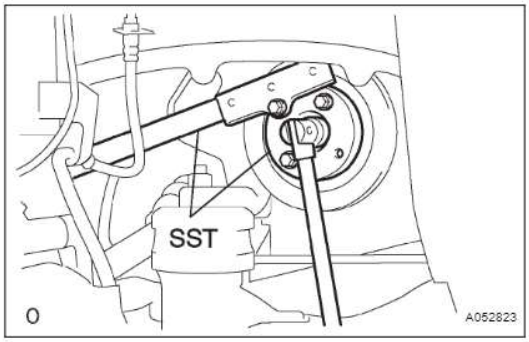


3. INSTALL TIMING BELT GUIDE NO.2
(a) Install the timing belt guide, facing the cup side toward the engine front.

4. INSTALL ENGINE MOUNTING BRACKET RH
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)

5. INSTALL TIMING BELT NO.2 COVER
(a) Visually check for cracks and breaks on the gasket of the timing belt cover.
HINT:
If it is judged that water is entering the gasket replace the timing belt cover.
(b) Install the timing belt cover.
Torque: 8.5 N*m (87 kgf*cm, 76 in.*lbf)

6. INSTALL TIMING BELT NO.1 COVER
(a) Visually check for cracks and breaks on the gasket of the timing belt cover.
HINT:
If it is judged that water is entering the gasket replace the timing belt cover.
(b) Install the timing belt cover with the 5 bolts.
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)
(c) Install the engine wire protector cover to the timing belt No. 3 cover.



7. **INSTALL CRANKSHAFT PULLEY**
   (a) Align the pulley set key with the key groove of the pulley, and slide on the pulley.
   (b) Using SST, install the pulley bolt.
   SST 09213-54015 (91651-60855), 09330-00021
   Torque: 220 N*m (2250 kgf*cm, 162 ft.*lbf)

8. **INSTALL GENERATOR BRACKET NO.2**
   Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)

9. **INSTALL ENGINE MOUNTING STAY NO.2 RH**
   HINT:
   See page EM-82

10. **INSTALL ENGINE MOVING CONTROL ROD**
    HINT:
    See page EM-83

11. **INSTALL VANE PUMP V BELT**
    HINT:
    See page EM-6

12. **INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1**
    HINT:
    See page EM-6

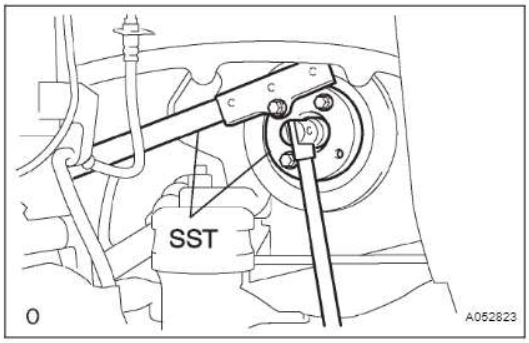
13. **INSPECT DRIVE BELT TENSION**
    HINT:
    See page EM-1

14. **INSTALL FRONT WHEEL RH**

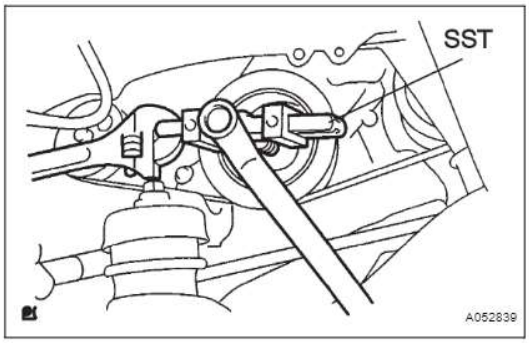
TIMING BELT

REMOVAL

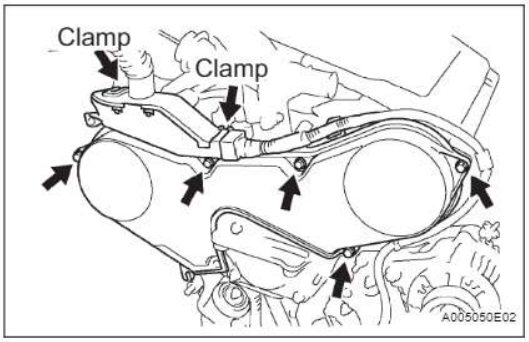
1. **REMOVE FRONT WHEEL RH**
2. **REMOVE FRONT FENDER APRON SEAL RH**
3. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1**
   HINT:
   See page EM-6
4. **REMOVE VANE PUMP V BELT**
   HINT:
   See page EM-6
5. **REMOVE ENGINE MOVING CONTROL ROD**
   HINT:
   See page EM-64
6. **REMOVE ENGINE MOUNTING STAY NO.2 RH**
   HINT:
   See page EM-64
7. **REMOVE GENERATOR BRACKET NO.2**
8. **REMOVE CRANKSHAFT PULLEY**
   (a) Using SST, loosen the pulley bolt.
   SST 09213-58013 (91651-60855), 09330-00021



   (b) Using SST and the pulley bolt, remove the pulley.
   SST 09950-50013 (09951-05010, 09952-05010, 09953-05010, 09954-05030)
   NOTICE:
   Before using SST, apply lubricating oil on the threads and tip of the center bolt 100.



9. **REMOVE TIMING BELT NO.1 COVER**



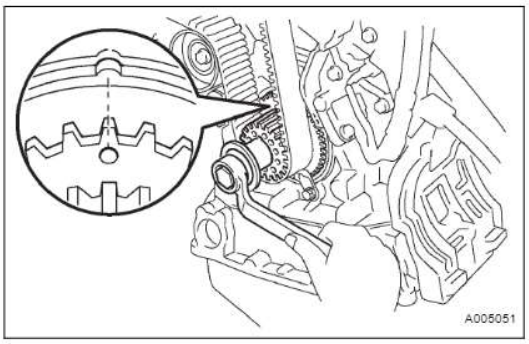
10. REMOVE TIMING BELT NO.2 COVER

(a) Disconnect the engine wire protector clamps from the timing belt No. 3 cover.

(b) Remove the 5 bolts and timing belt cover.

11. REMOVE ENGINE MOUNTING BRACKET RH

12. REMOVE TIMING BELT GUIDE NO.2

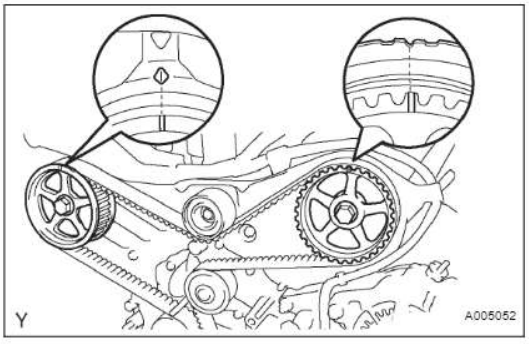


13. REMOVE TIMING BELT

(a) Set the No. 1 cylinder to TDC/compression.

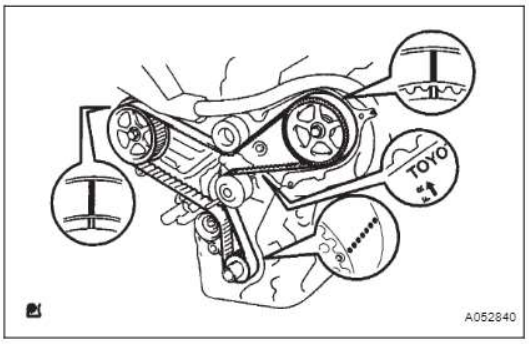
(1) Temporarily install the crankshaft pulley bolt with the washer to the crankshaft.

(2) Turn the crankshaft clockwise, and align the timing marks of the crankshaft timing pulley and oil pump body.



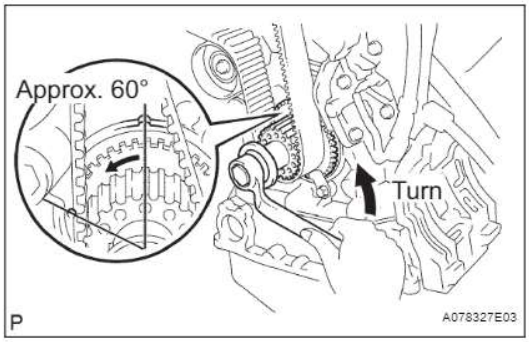
(3) Check that the timing marks of the camshaft timing pulleys and No. 3 timing belt cover are aligned. If not, turn the crankshaft 1 revolution (360°).

(4) Remove the crankshaft pulley bolt.



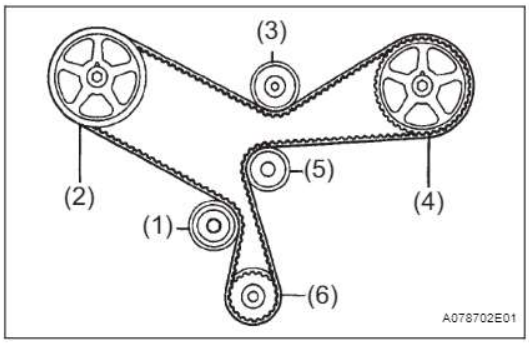
(b) If reusing the timing belt, check that there are 4 installation marks on the timing belt as shown in the illustration.

(1) If the installation marks have disappeared, put new installation marks on the timing belt before removal.



(c) Set the No. 1 cylinder to approximately 60°BTDC/ compression.
(1) Turn the crankshaft counterclockwise by approximately 60°.
NOTICE:
With timing belt removed: The crankshaft pulley must be at the correct angle to avoid damage in later steps. If the crankshaft pulley is at the wrong angle and then the camshaft timing pulley and the camshaft are removed, the piston head and valve head may come in contact and incur damage.

(d) Remove the timing belt tensioner.
NOTICE:
Do not reinstall the tensioner with its plunger extended.



(e) Remove the timing belt in this order.

1st	No. 1 idler pulley
2nd	RH camshaft timing pulley
3rd	No. 2 idler pulley
4th	LH camshaft timing pulley
5th	Water pump pulley
6th	Crankshaft timing pulley

EM

DISASSEMBLY

1. REMOVE W/HEAD STRAIGHT SCREW PLUG NO.1

(a) Using a 14 mm straight hexagon wrench, remove the 2 screw plugs.

2. REMOVE W/HEAD STRAIGHT SCREW PLUG NO.2

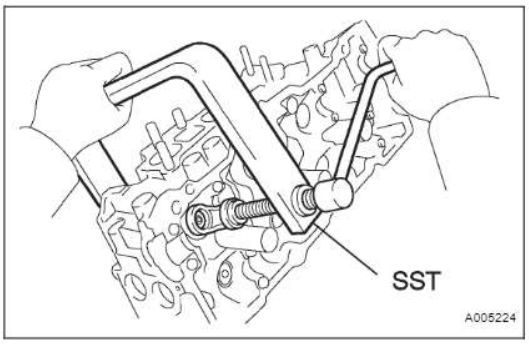
(a) Using a 14 mm straight hexagon wrench, remove the 2 screw plugs.

3. REMOVE VALVE LIFTER

HINT:
The lifters must be returned to their original locations when reassembling.

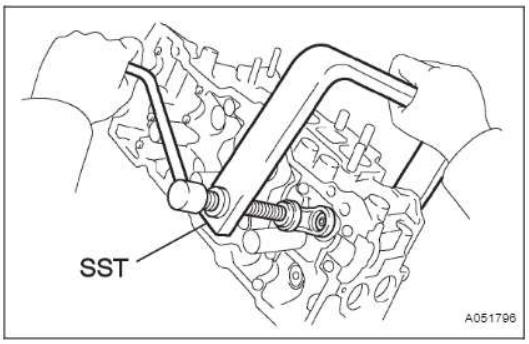
4. REMOVE INTAKE VALVE

(a) Using SST, compress the valve spring and remove the 2 retainer locks, retainer, spring, seat and valve.
SST 09202-70020 (09202-00010)
HINT:
The valves, spring seat, valve springs, spring retainers and retainer locks must be returned to their original locations when reassembling.



5. REMOVE EXHAUST VALVE

(a) Using SST, compress the valve spring and remove the 2 retainer locks, retainer, spring, seat and valve.
SST 09202-70020 (09202-00010)
HINT:
The valves, spring seat, valve springs, spring retainers and retainer locks must be returned to their original locations when reassembling.



6. REMOVE VALVE STEM OIL SEAL

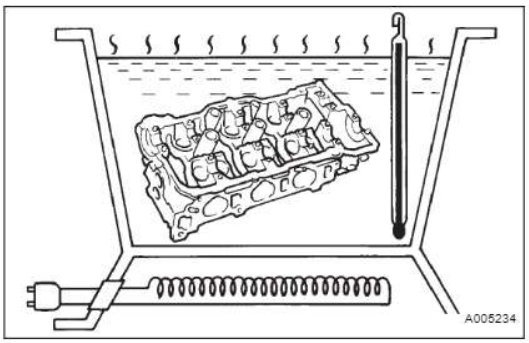
(a) Using needle-nose pliers, remove the oil seal.

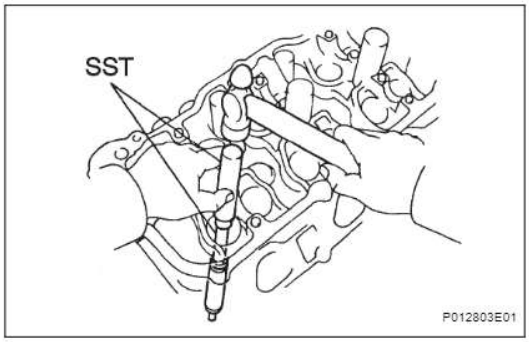
7. REMOVE VALVE SPRING SEAT

8. REMOVE SEMICIRCULAR PLUG

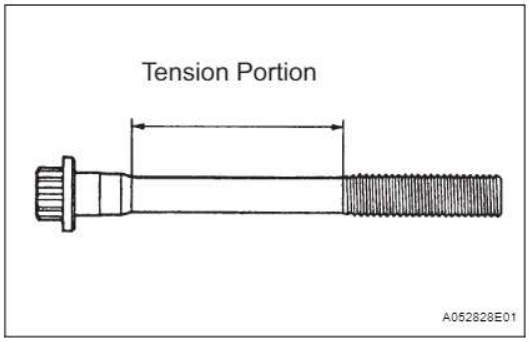
9. REMOVE VALVE GUIDE BUSHING

(a) Heat the cylinder head to approximately 80 to 100°C (176 to 212°F).





(b) Using SST and a hammer, tap out the guide bushing.
SST 09201-10000, 09201-01055, 09950-70010 (09951-07100)

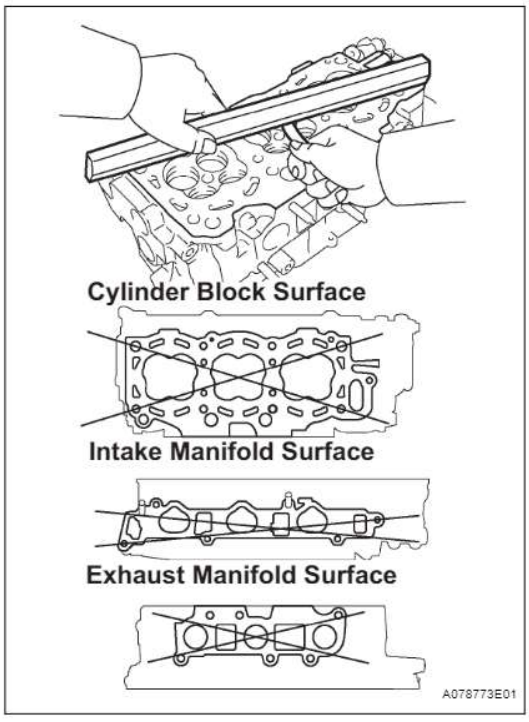


INSPECTION

1. INSPECT CYLINDER HEAD SET BOLT

(a) Using a vernier caliper, measure the tension portion diameter of the bolt.
Specified outside diameter:
8.75 to 9.05 mm (0.3445 to 0.3563 in.)
If the diameter is less than the minimum, replace the bolt.

EM

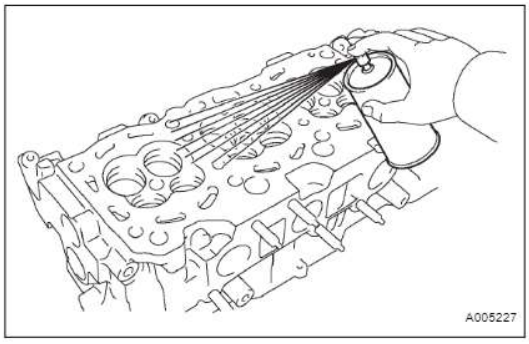


2. INSPECT CYLINDER HEAD FOR FLATNESS

(a) Using a precision straight edge and a feeler gauge, measure the surface contacting the cylinder block and the manifolds for warpage.
Maximum warpage

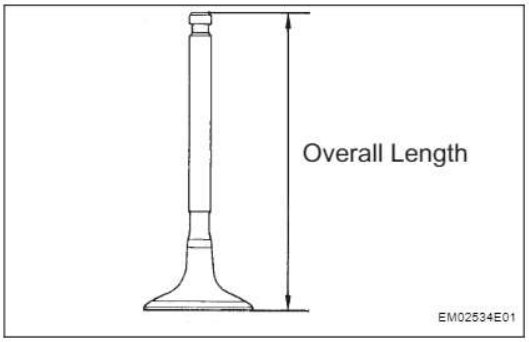
Item	Specified Condition
Cylinder block surface	0.05 mm (0.0020 in.)
Intake manifold surface	0.10 mm (0.0039 in.)
Exhaust manifold surface	0.10 mm (0.0039 in.)

If the warpage is greater than the maximum, replace the cylinder head.



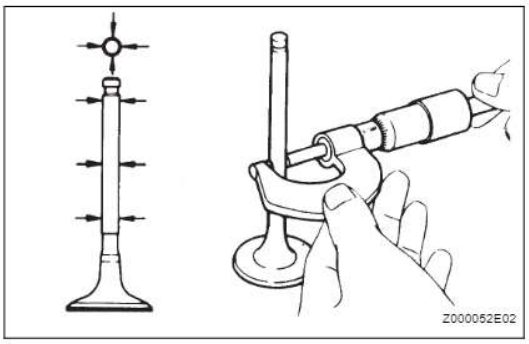
3. INSPECT CYLINDER HEAD FOR CRACKS

(a) Using a dye penetrate, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.
If cracked, replace the cylinder head.

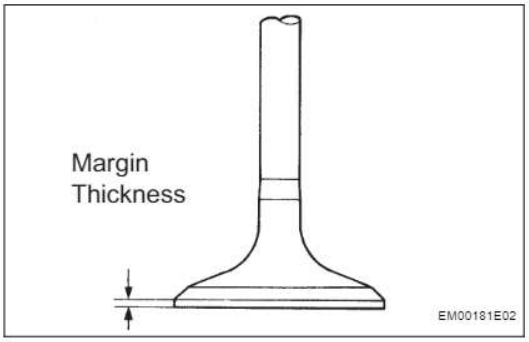


4. INSPECT INTAKE VALVE

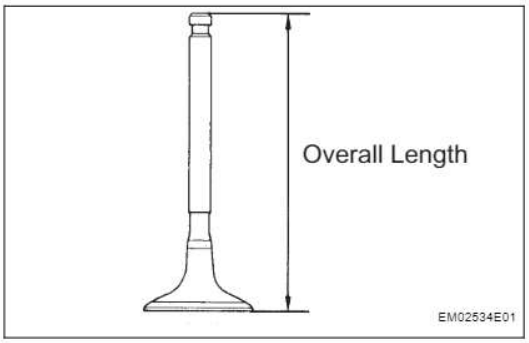
(a) Check the valve's overall length.
Specified overall length:
94.95 to 95.45 mm (3.7382 to 3.7579 in.)
If the overall length is less than the minimum, replace the valve.



(b) Using a micrometer, measure the diameter of the valve stem.
Valve stem diameter:
5.470 to 5.485 mm (0.2154 to 0.2159 in.)

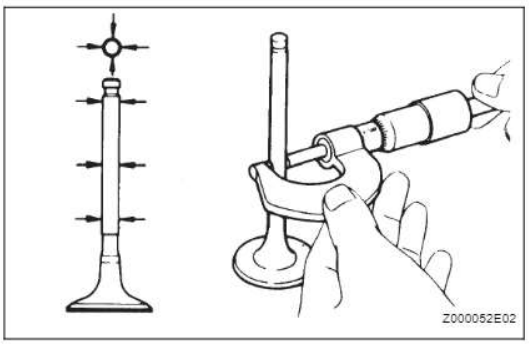


(c) Check the valve head margin thickness.
Specified margin thickness:
0.5 to 1.0 mm (0.020 to 0.039 in.)
If the margin thickness is less than the minimum, replace the valve.

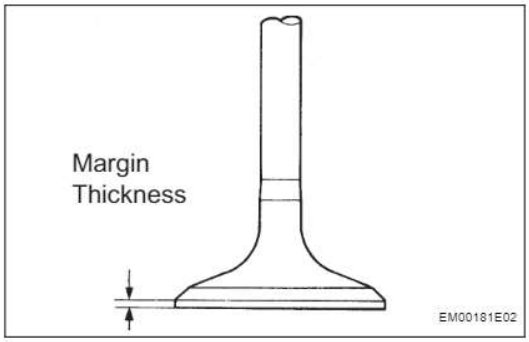


5. INSPECT EXHAUST VALVE

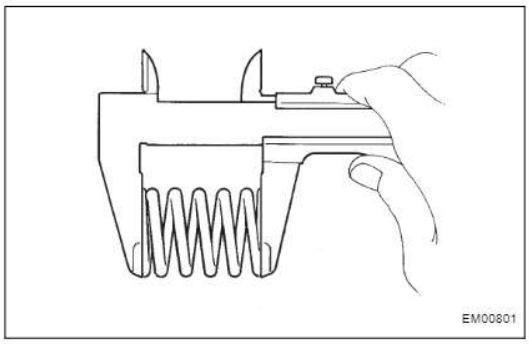
(a) Check the valve overall length.
Specified overall length:
94.90 to 95.40 mm (3.7362 to 3.7559 in.)
If the overall length is less than the minimum, replace the valve.



(b) Using a micrometer, measure the diameter of the valve stem.
Valve stem diameter:
5.465 to 5.480 mm (0.2152 to 0.2157 in.)

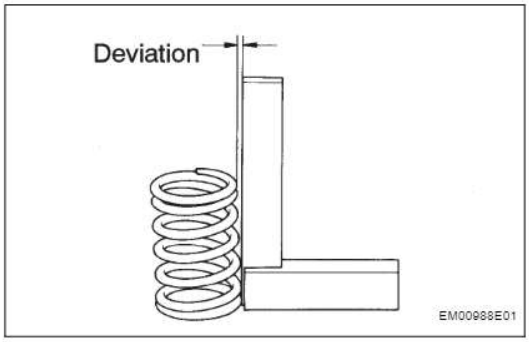


(c) Check the valve head margin thickness.
Specified margin thickness:
0.5 to 1.0 mm (0.020 to 0.039 in.)
If the margin thickness is less than the minimum, replace the valve.

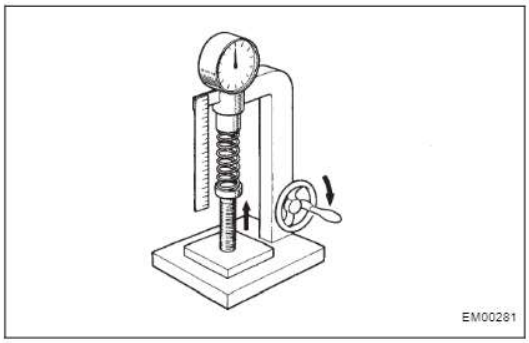


6. INSPECT INNER COMPRESSION SPRING

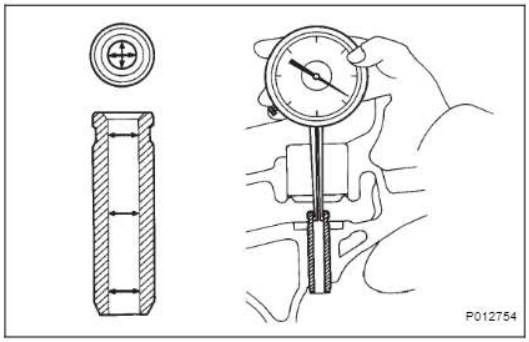
(a) Using a vernier caliper, measure the free length of the valve spring.
Free length:
45.50 mm (1.7913 in.)
If the free length is not as specified, replace the valve spring.



(b) Using steel squares, measure the deviation of the valve spring.
Maximum deviation:
2.0 mm (0.079 in.)
If the deviation is greater than the maximum, replace the valve spring.



(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.
Installed tension:
86 to 206 N (19.0 to 21.0 kgf, 41.9 to 46.3 lbf)
at 33.8 mm (1.331 in.)
If the installed tension is not as specified, replace the valve spring.



7. INSPECT VALVE GUIDE BUSING OIL CLEARANCE

(a) Using a caliper gauge, measure the inside diameter of the guide bushing.
Bushing inside diameter:
5.510 to 5.530 mm (0.2169 to 0.2177 in.)

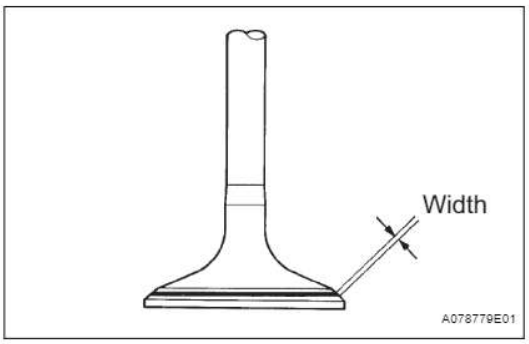
(b) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.
Specified oil clearance

Item	Specified Condition
Intake	0.025 to 0.080 mm (0.0010 to 0.0031 in.)
Exhaust	0.030 to 0.100 mm (0.0012 to 0.0039 in.)

If the clearance is greater than the maximum, replace the valve and guide bushing.

8. INSPECT VALVE SEAT

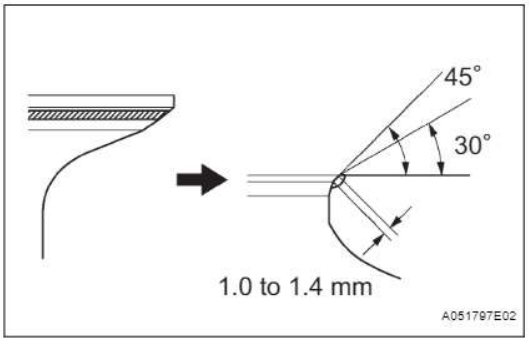
(a) Apply a light coat of prussian blue (or white lead) to the valve face.
(b) Lightly press the valve against the seat.
NOTICE:
Do not rotate the valve.

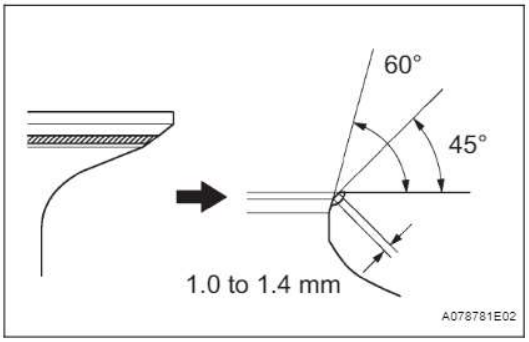


(c) Check the valve face and valve seat according to the following procedure.
(1) If blue appears 360° around the valve face, the valve face is concentric. If not, replace the valve.
(2) If blue appears 360° around the valve seat, the guide and valve face are concentric. If not, resurface the valve seat.
(3) Check that the valve seat contact is in the middle of the valve face with the width between 1.0 to 1.4 mm (0.039 to 0.055 in.).

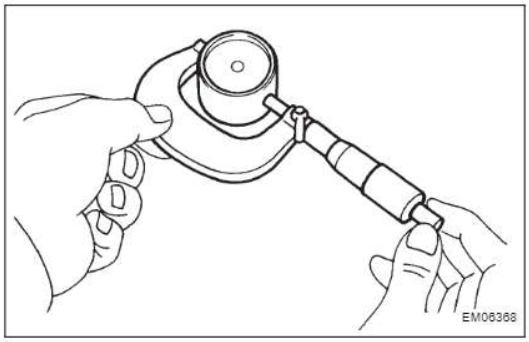
9. REPAIR VALVE SEAT
NOTICE:
Releasing the seat-cutter pressure gradually helps to make smoother valve seat faces.

(a) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.



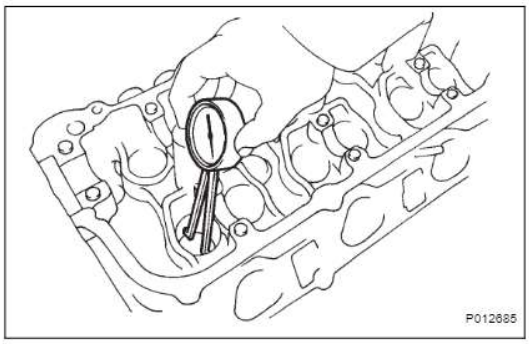


(b) If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.
(c) Handrub the valve and valve seat with an abrasive compound.
(d) Recheck the valve seating position.



10. INSPECT VALVE LIFTER

(a) Using a micrometer, measure the lifter diameter.
Lifter diameter:
30.966 to 30.976 mm (1.2191 to 1.2195 in.)



11. INSPECT VALVE LIFTER OIL CLEARANCE

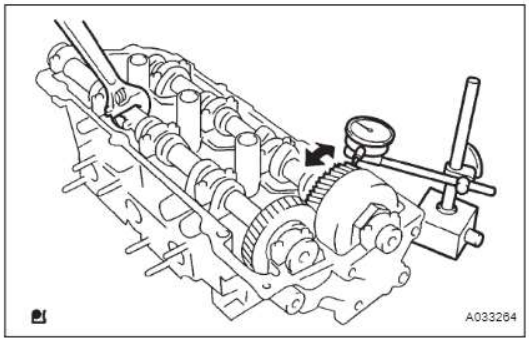
(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.
Lifter bore diameter:
31.009 to 31.025 mm (1.2208 to 1.2215 in.)

(b) Subtract the lifter diameter measurement from the lifter bore diameter measurement.
Specified oil clearance:
0.033 to 0.070 mm (0.0013 to 0.0028 in.)
If the oil clearance is greater than the maximum, replace the lifter. If necessary, replace the cylinder head.

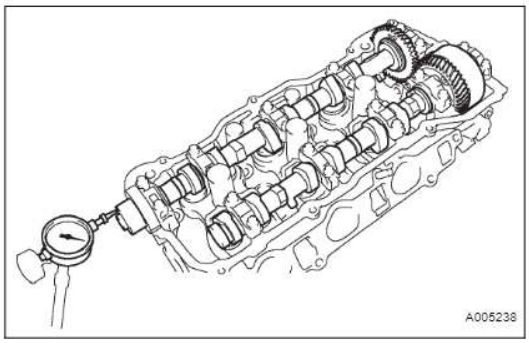
EM

12. INSPECT CAMSHAFT GEAR BACKLASH

(a) Install the camshaft timing gear assembly.
(b) Install the camshafts to the cylinder head.
NOTICE:
- **Install without valves and sub gear.**
- **Install with its timing mark matched.**



(c) Set the dial indicator to the teeth of the intake camshaft at a right angle (90°).
(d) Measure the backlash of the camshaft timing gear at least 4 positions.
Specified backlash:
0.020 to 0.300 mm (0.0008 to 0.0118 in.)
If the backlash is greater than the maximum, replace the camshafts.

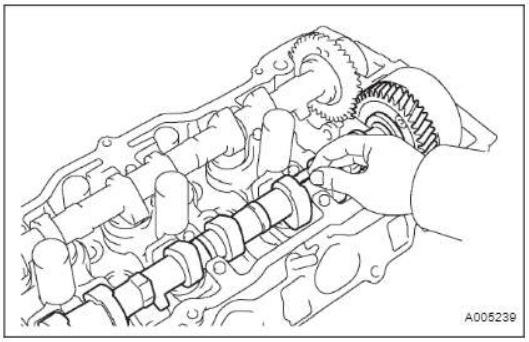


13. INSPECT CAMSHAFT THRUST CLEARANCE

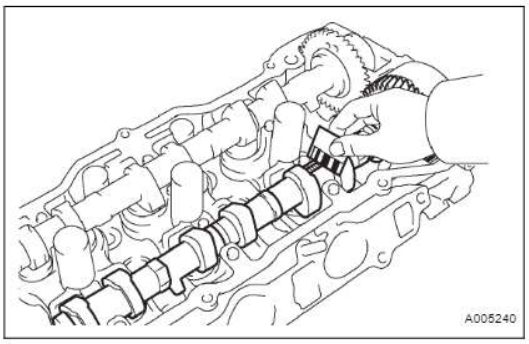
(a) Install the camshafts.
(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.
Specified thrust clearance:
0.040 to 0.120 mm (0.0016 to 0.0047 in.)
If the thrust clearance is greater than the maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head together.

14. INSPECT CAMSHAFT OIL CLEARANCE

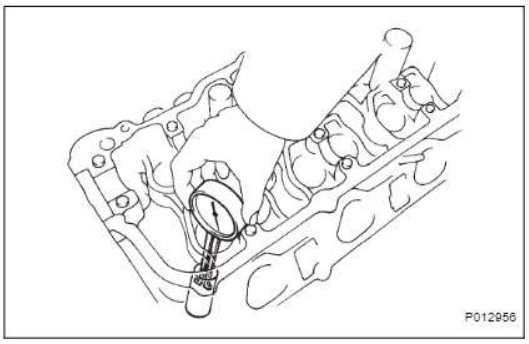
(a) Clean the bearing caps and camshaft journals.
(b) Place the camshafts on the cylinder head.



(c) Lay a strip of plastigage across each of the camshaft journals.
(d) Install the bearing caps.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)
NOTICE:
Do not turn the camshaft.
(e) Remove the bearing caps.



(f) Measure the plastigage at its widest point.
Specified oil clearance:
0.025 to 0.100 mm (0.0010 to 0.0039 in.)
If the oil clearance is greater than the maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head together.
NOTICE:
Completely remove the plastigage.



REASSEMBLY

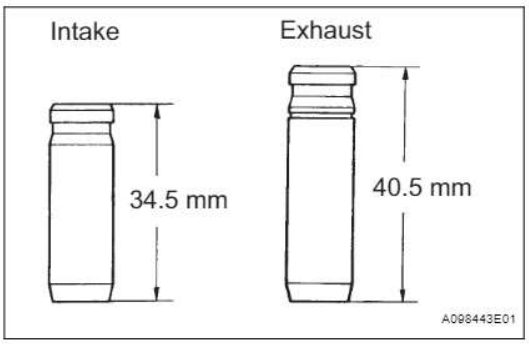
1. INSTALL VALVE GUIDE BUSHING

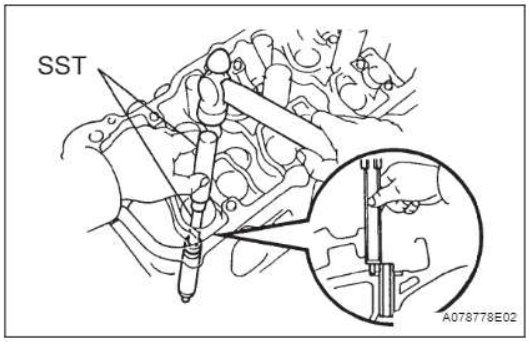
(a) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.
Diameter:
10.295 to 10.313 mm (0.4053 to 0.4060 in.)
If the bushing bore diameter of the cylinder head is greater than 10.313 mm (0.4060 in.), machine the bushing bore to the dimension of 10.345 to 10.363 mm (0.4073 to 0.4080 in.).
Bushing diameter

Size	Specified Condition
STD	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
O/S	10.383 to 10.394 mm (0.4088 to 0.4092 in.)

HINT:
Different bushes are used for the intake and exhaust.
Bushing length

Item	Specified Condition
Intake	34.5 mm (1.358 in.)
Exhaust	40.5 mm (1.594 in.)





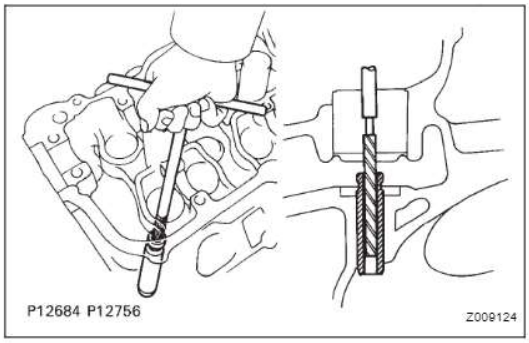
(b) Heat the cylinder head to approximately 80 to 100°C (176 to 212°F)

(c) Using SST and a hammer, tap in a new guide bushing to the specified protrusion height.

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Protrusion height

Item	Specified Condition
Intake	11.1 to 11.5 mm (0.437 to 0.453 in.)
Exhaust	8.9 to 9.3 mm (0.350 to 0.336 in.)

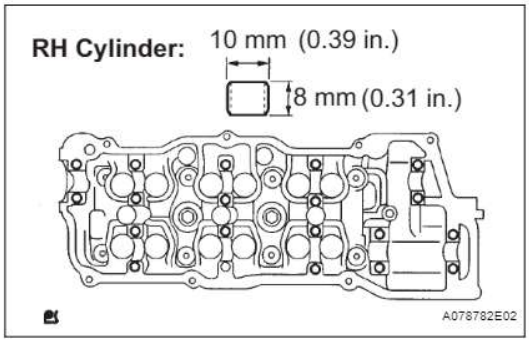


(d) Using a sharp 5.5 mm reamer, ream the guide bushing to obtain the standard specified clearance between the guide bushing and the valve stem.

Standard oil clearance

Item	Specified Condition
Intake	0.025 to 0.060 mm (0.0010 to 0.0024 in.)
Exhaust	0.030 to 0.065 mm (0.0012 to 0.0026 in.)

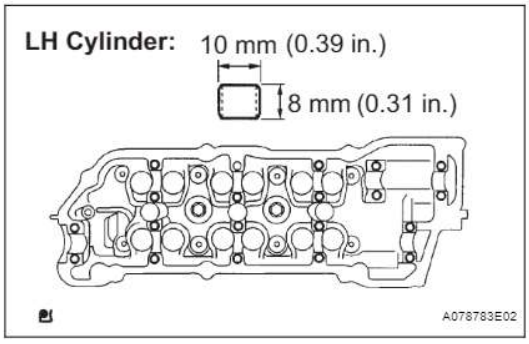
EM



2. INSTALL RING W/HEAD PIN

(a) Using a plastic-faced hammer, tap in a new ring pin to the specified protrusion height.

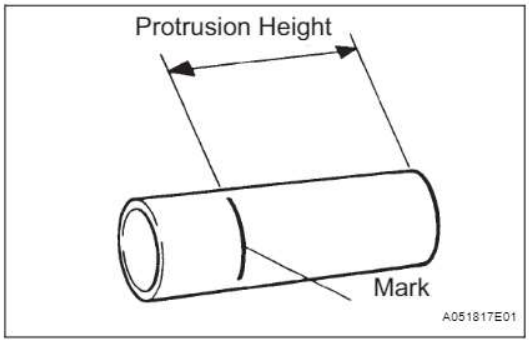
Protrusion height:
3 mm (0.12 in.)



3. INSTALL RING PIN

(a) Using a plastic-faced hammer, tap in a new ring pin to the specified protrusion height.

Protrusion height:
3 mm (0.12 in.)



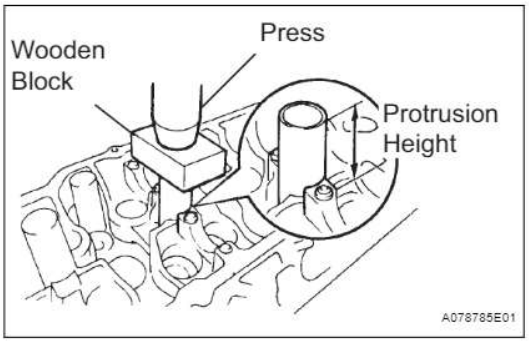
4. INSTALL SPARK PLUG TUBE

(a) Using paint, mark the standard position from the edge.

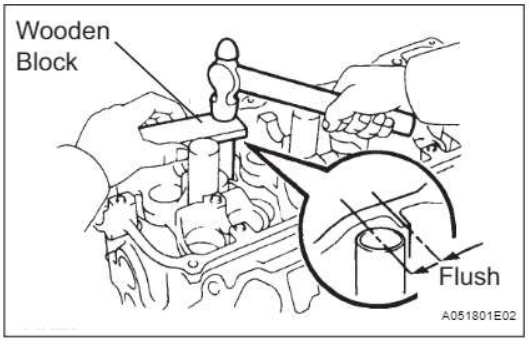
Standard protrusion height:
42.4 to 43.4 mm (1.669 to 1.709 in.)

HINT:
Use either end of the spark plug tube.

(b) Apply adhesive to the spark plug tube where it will be pressed into the cylinder head.
Adhesive:
Part No. 08833-00070 THREE BOND 1324 or equivalent
NOTICE:
- **Install the spark plug tube within 3 minutes after applying adhesive.**
- **Do not deform the spark plug tube.**
- **Do not expose the seal to coolant for at least 1 hour after installing.**

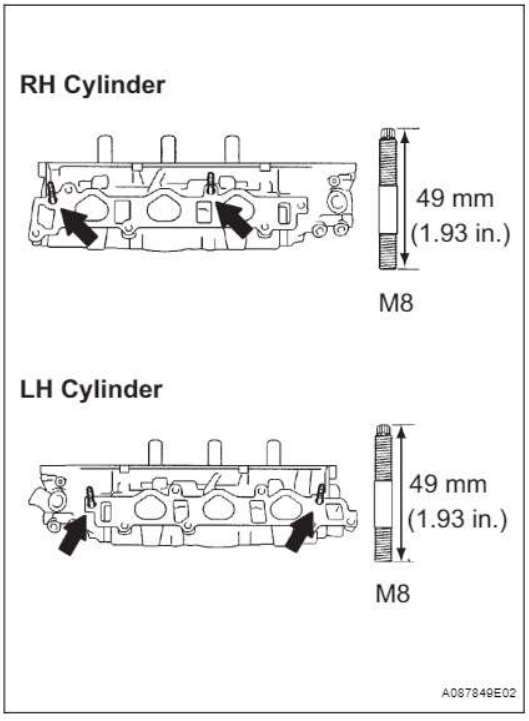


(c) Using a press and wooden block, install the spark plug tube to the required protrusion height.
NOTICE:
Be careful not to drip the adhesive.



5. INSTALL PCV PIPE

(a) Using a wooden block and hammer, tap in 2 new PCV pipes until their top edges are flush with the cylinder head edge.
NOTICE:
Be careful not to damage the cylinder head edge.

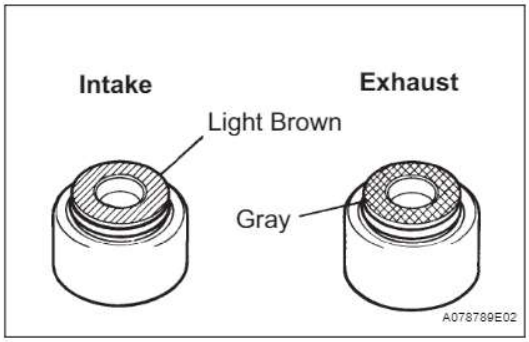


6. INSTALL STUD BOLT

(a) Install the stud bolts on the intake side.
Torque: 7.5 N*m (76 kgf*cm, 66 in.*lbf)

7. INSTALL STUD BOLT

(a) Install the stud bolts on the exhaust side.
Torque: 20 N*m (199 kgf*cm, 14 ft.*lbf)



8. INSTALL VALVE STEM OIL SEAL

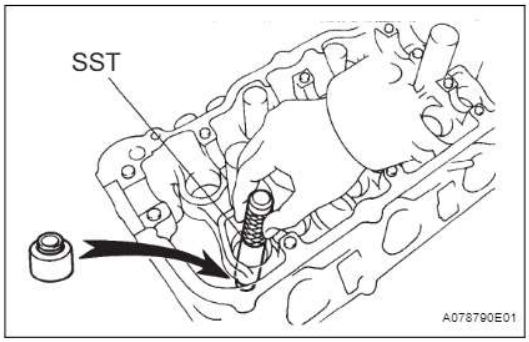
(a) Apply a light coat of engine oil on the valve stem.

NOTICE:

Pay close attention when installing the intake and exhaust oil seals. For example, installing the intake oil seal into the exhaust or installing the exhaust oil seal to the intake can cause installation problems later.

HINT:

The intake valve oil seal is light brown and the exhaust valve oil seal is gray.



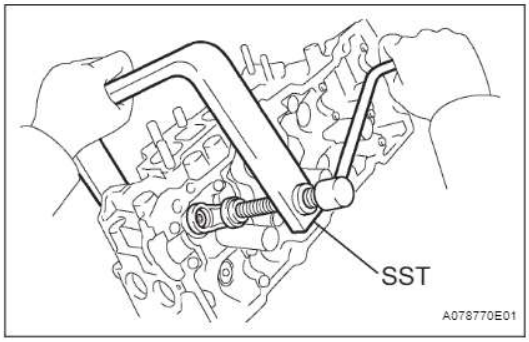
(b) Using SST, push in a new oil seal.

SST 09201-41020

NOTICE:

Failure to use SST will cause the seal to be damaged or improperly seated.

EM



9. INSTALL INTAKE VALVE

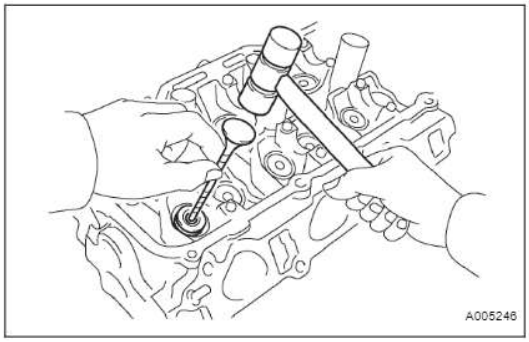
(a) Install the valve, spring seat, valve spring and spring retainer.

NOTICE:

Install the same part in the same combination to the original locations.

(b) Using SST, compress the valve spring and place the 2 retainer locks around the valve stem.

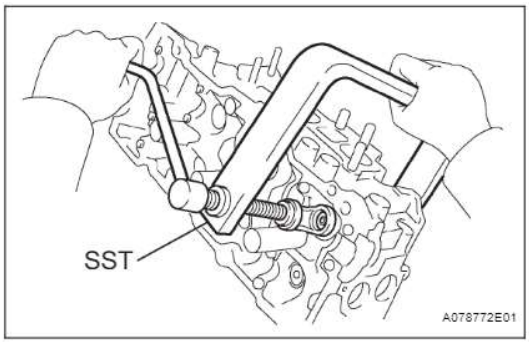
SST 09202-70020 (09202-00010)



(c) Using a plastic-faced hammer and a discarded valve with its tip wrapped in tape, lightly tap the installed valve to ensure that it is securely fit.

NOTICE:

Be careful not to damage the installed valve stem tip.



10. INSTALL EXHAUST VALVE

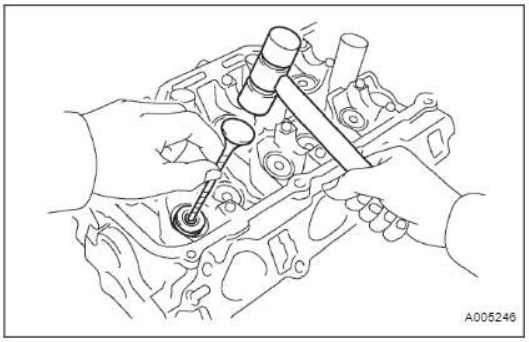
(a) Install the valve, spring seat, valve spring and spring retainer.

NOTICE:

Install the same parts in the same combination to the original locations.

(b) Using SST, compress the valve spring and place the 2 retainer locks around the valve stem.

SST 09202-70020 (09202-00010)



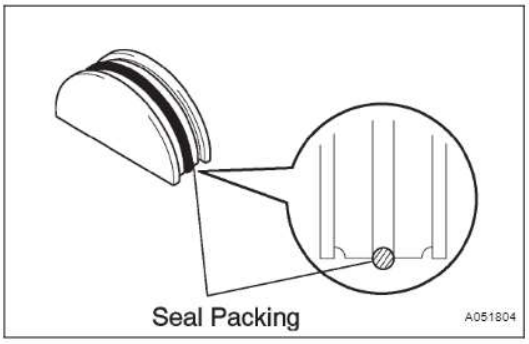
(c) Using a plastic-faced hammer and a discarded valve with its tip wrapped in tape, lightly tap the installed valve to ensure that it is securely fit.
NOTICE:
Be careful not to damage the installed valve stem tip.

11. INSTALL VALVE LIFTER

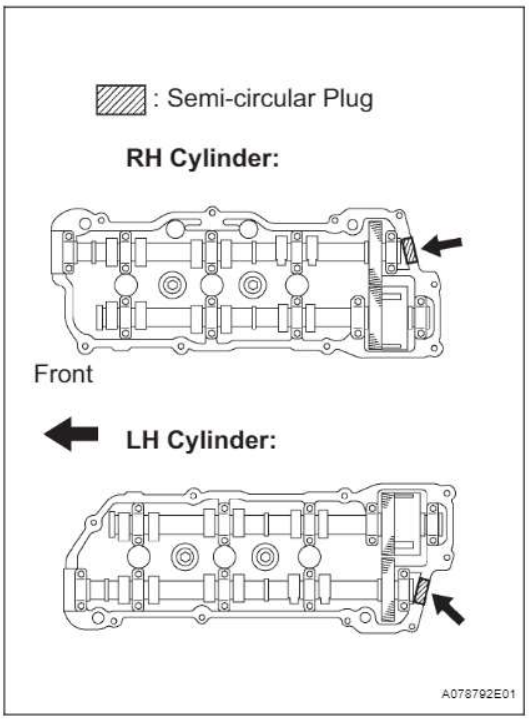
(a) Apply a light coat of engine oil on the valve lifter.
NOTICE:
Install the same part in the same combination to the original locations.
(b) Install the valve lifter.
(c) Check that the valve lifter rotates smoothly by hand.

12. INSTALL SEMICIRCULAR PLUG

(a) Remove any old seal packing (FIPG) material.
(b) Apply seal packing to the semi circular plug grooves.
Seal packing:
Part No. 08826-00080 or equivalent



EM



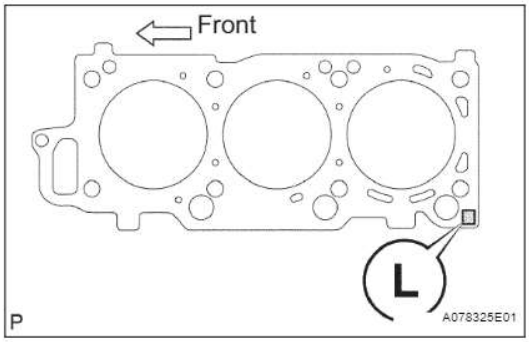
(c) Install the 2 semi-circular plugs to the cylinder heads.
NOTICE:
- **Install the plugs so that it is flush with the top of the cylinder head.**
- **Install the semi circular plugs within 3 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing.**

13. INSTALL W/HEAD STRAIGHT SCREW PLUG NO.2

(a) Using a 14 mm straight hexagon wrench, install 2 new gaskets and the 2 screw plugs.
Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)

14. INSTALL W/HEAD STRAIGHT SCREW PLUG NO.1

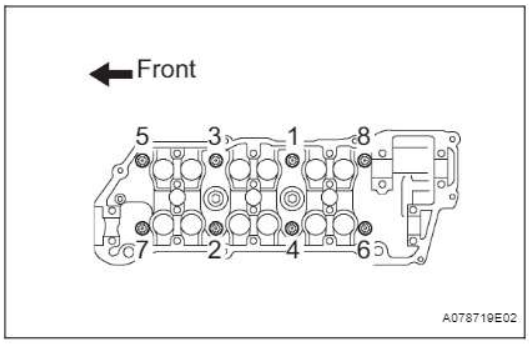
(a) Using a 14 mm straight hexagon wrench, install 2 new gaskets and the 2 screw plugs.
Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)



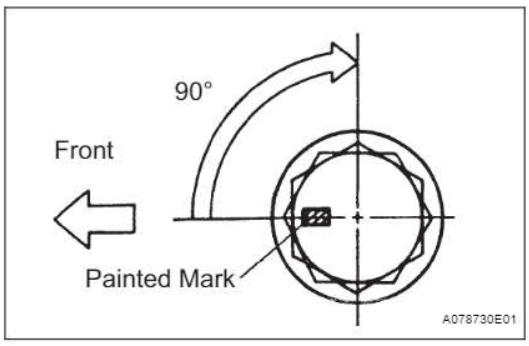
INSTALLATION

1. **INSTALL CYLINDER HEAD GASKET NO.2**
   (a) Place a new cylinder head gasket on the cylinder block with the L mark as shown in the illustration.
   NOTICE:
   - **Remove any oil from the contact surface.**
   - **Make sure the cylinder head gasket is facing in the correct direction.**

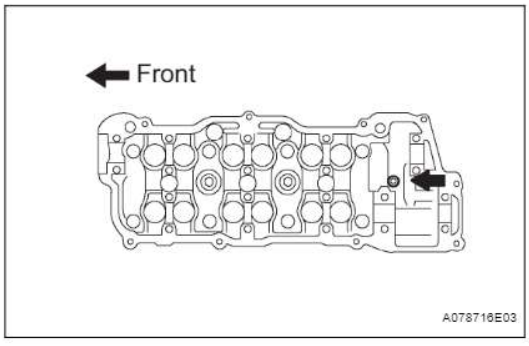
2. **INSTALL CYLINDER HEAD LH**
   NOTICE:
   - **To prevent damage to the block, place the the gasket carefully.**
   - **The cylinder head bolts are tightened in 2 successive steps.**



   (a) Apply a light coat of engine oil on the threads of the cylinder head bolts.
   (b) Install the plate washer to the cylinder head bolts.
   (c) Uniformly install and tighten the 8 cylinder head bolts in the sequence shown in the illustration.
   Torque: 54 N*m (550 kgf*cm, 40 ft.*lbf)



   (d) Mark the front side of each cylinder head bolt head with paint as shown in the illustration.
   (e) Retighten the cylinder head bolts by 90°in the same sequence as step (c).
   (f) Check that each painted mark is now at a 90° angle to the front.



   (g) Using an 8 mm socket hexagon wrench, install the hexagon bolt.
   Torque: 19 N*m (189 kgf*cm, 14 ft.*lbf)
   (h) Install the wire harness clamp bracket with the bolt.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)
   (i) Connect the ground cable with the bolt.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

3. **INSTALL CYLINDER HEAD GASKET**

4. **INSTALL CYLINDER HEAD SUB-ASSEMBLY**
   HINT:
   See page EM-131

5. **INSTALL CAMSHAFT SUB GEAR**

6. **INSTALL CAMSHAFT TIMING GEAR ASSEMBLY**

7. **INSTALL NO.4 CAMSHAFT SUB-ASSEMBLY**

EM

8. **INSTALL NO.3 CAMSHAFT SUB-ASSEMBLY**
9. **INSTALL NO.2 CAMSHAFT**
   HINT:
   See page EM-134
10. **INSTALL CAMSHAFT**
    HINT:
    See page EM-135
11. **INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY**
    HINT:
    See page EM-131
12. **INSTALL IGNITION COIL ASSEMBLY**
    Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
13. **INSTALL VANE PUMP ASSEMBLY**
    HINT:
    See page PS-23
14. **INSTALL TIMING BELT NO.3 COVER**
15. **INSTALL CAMSHAFT TIMING PULLEY**
16. **INSTALL NO.2 TIMING BELT IDLER SUB-ASSEMBLY**
    Torque: 43 N*m (438 kgf*cm, 32 ft.*lbf)
17. **INSTALL TIMING BELT**
    HINT:
    See page EM-140
18. **INSTALL TIMING BELT TENSIONER ASSEMBLY**
    HINT:
    See page EM-141
19. **INSTALL CHAIN VIBRATION DAMPER NO.1**
20. **INSTALL ENGINE MOUNTING BRACKET RH**
    Torque: 28 N*m (286 kgf*cm, 21 in.*lbf)
21. **INSTALL TIMING BELT NO.2 COVER**
    HINT:
    See page EM-23
22. **INSTALL TIMING BELT NO.1 COVER**
    HINT:
    See page EM-24
23. **INSTALL CRANKSHAFT PULLEY**
    HINT:
    See page EM-24
24. **INSTALL GENERATOR BRACKET NO.2**
    Torque: 28 N*m (286 kgf*cm, 21 in.*lbf)
25. **INSTALL ENGINE MOUNTING STAY NO.2 RH**
    HINT:
    See page EM-82
26. **INSTALL ENGINE MOVING CONTROL ROD**
    HINT:
    See page EM-83

27. **INSTALL VANE PUMP V BELT**
HINT:
See page EM-6

28. **INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1**
HINT:
See page EM-6

29. **INSPECT DRIVE BELT TENSION**

30. **INSTALL WATER OUTLET**

31. **INSTALL INTAKE MANIFOLD**

32. **INSTALL NO.1 FUEL PIPE SUB-ASSEMBLY**
HINT:
See page FU-19

33. **INSTALL INTAKE AIR SURGE TANK**
HINT:
See page FU-19

34. **INSTALL AIR CLEANER ASSEMBLY**

35. **CONNECT VACUUM HOSES**
HINT:
See page EM-82

36. **INSTALL FRONT SUSPENSION UPPER BRACE CENTER**
Torque: 80 N*m (816 kgf*cm, 59 in.*lbf)

37. **INSTALL V-BANK COVER SUB-ASSEMBLY**
HINT:
See page EM-82

38. **INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY RH**
HINT:
See page EM-76
(a) Install a new gasket and the exhaust manifold converter to the front exhaust pipe.
Torque: 62 N*m (633 kgf*cm, 46 in.*lbf)

39. **INSTALL FRONT EXHAUST PIPE ASSEMBLY**
HINT:
See page EX-4

40. **INSTALL FRONT EXHAUST NO.1 SUPPORT BRACKET**
HINT:
See page EX-4

41. **INSTALL FRONT WHEEL RH**

42. **ADD ENGINE OIL**

43. **ADD ENGINE COOLANT**
HINT:
See page CO-7

44. **CHECK FOR ENGINE OIL LEAKS**

45. **CHECK FOR ENGINE COOLANT LEAKS**
HINT:
See page CO-8

46. **CHECK FOR FUEL LEAKS**
HINT:
See page FU-8

47. **CHECK FOR EXHAUST GAS LEAKS**

48. **INSPECT IGNITION TIMING**
HINT:
See page EM-1

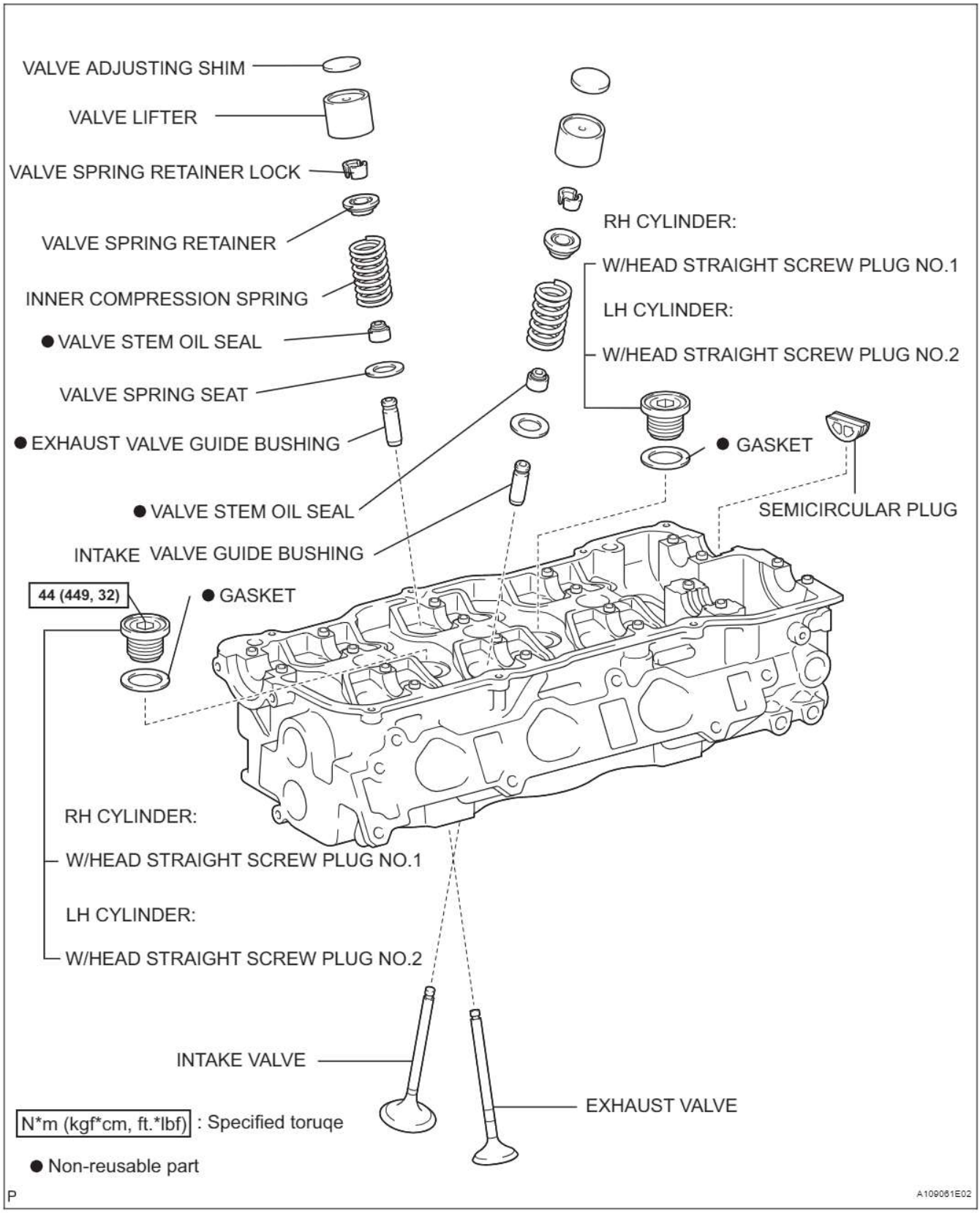
49. **INSPECT ENGINE IDLE SPEED**
HINT:
See page EM-1

50. **INSPECT COMPRESSION**
HINT:
See page EM-1

51. **INSPECT CO/HC**
HINT:
See page EM-1

CYLINDER HEAD

COMPONENTS

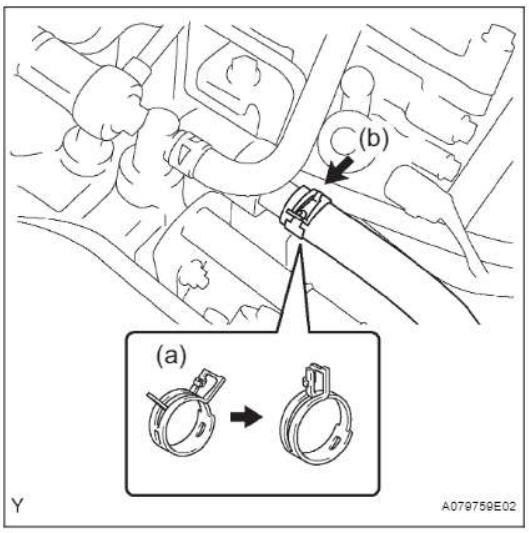


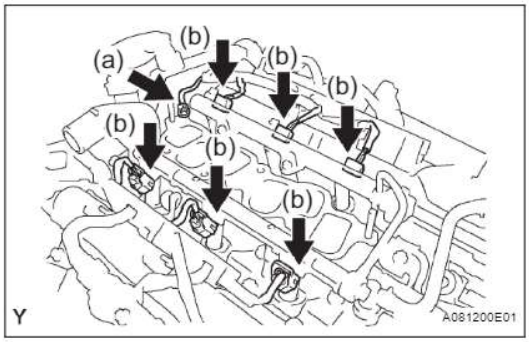
EM

EM

REMOVAL

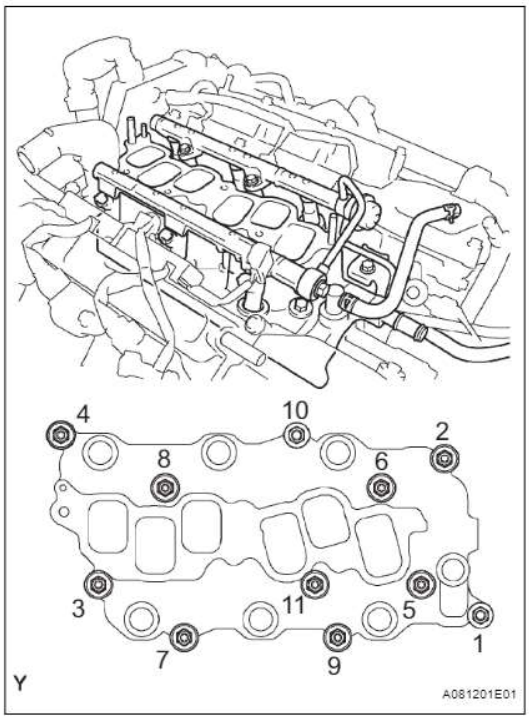
1. **WORK FOR PREVENTING GASOLINE FROM SPILLING OUT**
   HINT:
   See page FU-1
2. **DRAIN ENGINE COOLANT**
   HINT:
   See page CO-7
3. **DRAIN ENGINE OIL**
4. **REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET**
5. **REMOVE FRONT EXHAUST PIPE ASSEMBLY**
   HINT:
   See page EX-3
6. **REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY RH**
7. **REMOVE V-BANK COVER SUB-ASSEMBLY**
   HINT:
   See page EM-7
8. **REMOVE FRONT SUSPENSION UPPER BRACE CENTER (W/ FRONT SUSPENSION BRACE UPPER CENTER)**
9. **REMOVE AIR CLEANER ASSEMBLY**
10. **REMOVE INTAKE AIR SURGE TANK**
    HINT:
    See page FU-15
11. **REMOVE NO.1 FUEL PIPE SUB-ASSEMBLY**
    HINT:
    See page FU-16
12. **REMOVE HEATER INLET WATER HOSE**
    (a) Lock the hose clamp as shown in the illustration.
    (b) Disconnect the heater inlet water hose.





13. REMOVE INTAKE MANIFOLD

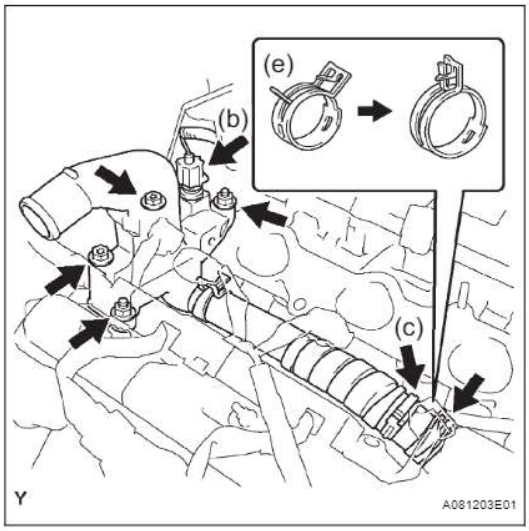
(a) Remove the nut and disconnect the ground cable.
(b) Disconnect the 6 fuel injector connectors.



(c) Uniformly loosen and remove the intake manifold's 9 bolts and 2 nuts in the sequence shown in the illustration. Remove the intake manifold.

14. REMOVE RADIATOR HOSE INLET

EM



15. REMOVE WATER OUTLET

(a) Disconnect the radiator hose inlet.
(b) Disconnect the engine coolant temperature sensor connector.
(c) Remove the clamp.
(d) Remove the 2 bolts, 2 nuts and 2 washers.
(e) Lock the hose clamp as shown in the illustration, and remove the water outlet together with the water by-pass hose No. 1.
(f) Remove the 2 gaskets from the 2 cylinder heads.

16. REMOVE FRONT WHEEL RH

17. REMOVE FRONT FENDER APRON SEAL RH

18. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1

HINT:
See page EM-6

19. REMOVE VANE PUMP V BELT

HINT:
See page EM-6

20. **REMOVE ENGINE MOVING CONTROL ROD**
HINT:
See page EM-64

21. **REMOVE ENGINE MOUNTING STAY NO.2 RH**
HINT:
See page EM-64

22. **REMOVE GENERATOR BRACKET NO.2**

23. **REMOVE CRANKSHAFT PULLEY**
HINT:
See page EM-96

24. **REMOVE TIMING BELT NO.1 COVER**

25. **REMOVE TIMING BELT NO.2 COVER**

26. **REMOVE ENGINE MOUNTING BRACKET RH**

27. **REMOVE TIMING BELT GUIDE NO.2**

28. **REMOVE TIMING BELT**
HINT:
See page EM-20

29. **REMOVE NO.2 TIMING BELT IDLER SUB-ASSEMBLY**

30. **REMOVE CAMSHAFT TIMING PULLEY**
HINT:
See page EM-98

31. **REMOVE TIMING BELT NO.3 COVER**

32. **REMOVE VANE PUMP ASSEMBLY**
HINT:
See page PS-17

33. **REMOVE IGNITION COIL ASSEMBLY**

34. **REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY**

35. **REMOVE CAMSHAFT**
HINT:
See page EM-98

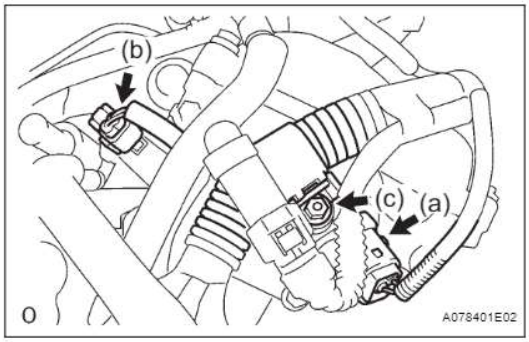
36. **REMOVE NO.2 CAMSHAFT**
HINT:
See page EM-99

37. **REMOVE NO.3 CAMSHAFT SUB-ASSEMBLY**

38. **REMOVE NO.4 CAMSHAFT SUB-ASSEMBLY**

39. **REMOVE CAMSHAFT TIMING GEAR ASSEMBLY**

40. **REMOVE CAMSHAFT SUB GEAR**

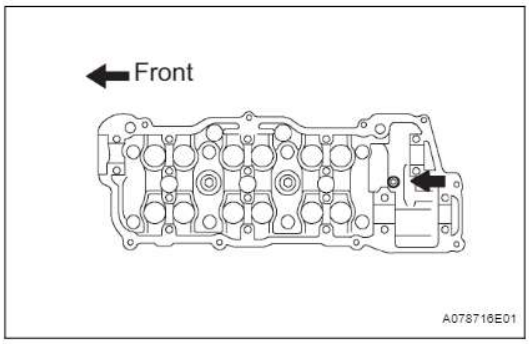


41. REMOVE CYLINDER HEAD SUB-ASSEMBLY

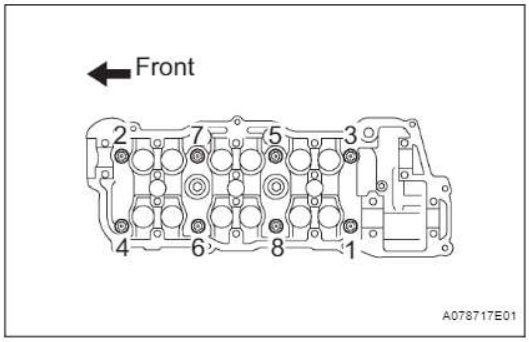
(a) Disconnect the VVT sensor connector.

(b) Disconnect the camshaft timing oil control valve connector.

(c) Remove the nut and disconnect the engine wire harness clamp.



(d) Using an 8 mm socket hexagon wrench, remove the hexagon bolt.



(e) Uniformly loosen the 8 cylinder head bolts in the sequence shown in the illustration. Remove the 8 cylinder head bolts and plate washers.

NOTICE:

- **Be careful not to drop the washers into the cylinder head.**
- **Head warpage or cracking could result from removing bolts in an incorrect order.**

42. REMOVE CYLINDER HEAD GASKET

43. REMOVE CYLINDER HEAD LH

44. REMOVE CYLINDER HEAD GASKET NO.2

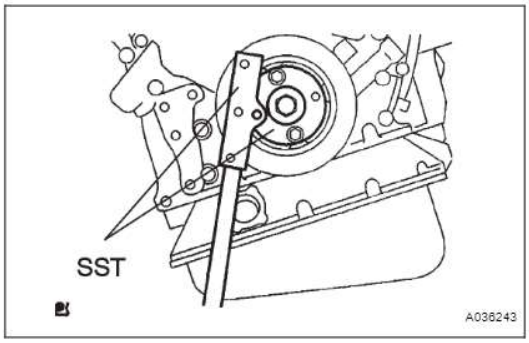
EM

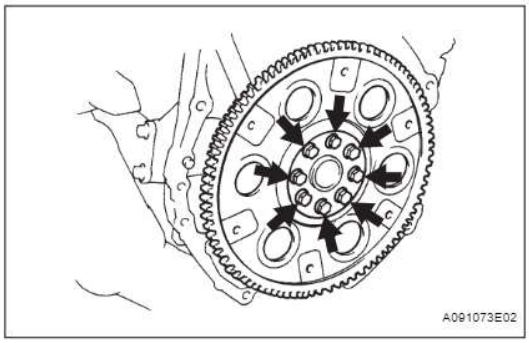
ENGINE REAR OIL SEAL

REMOVAL

1. **REMOVE AUTOMATIC TRANSAXLE ASSEMBLY**
   HINT:
   See page AX-155

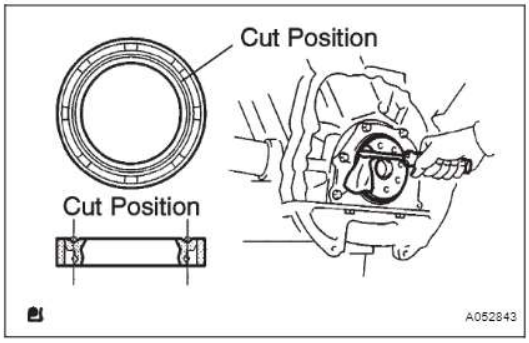
2. **REMOVE DRIVE PLATE & RING GEAR SUB-ASSEMBLY**
   (a) Using SST, hold the crankshaft.
   SST 09213-54015 (91651-60855), 09330-00021





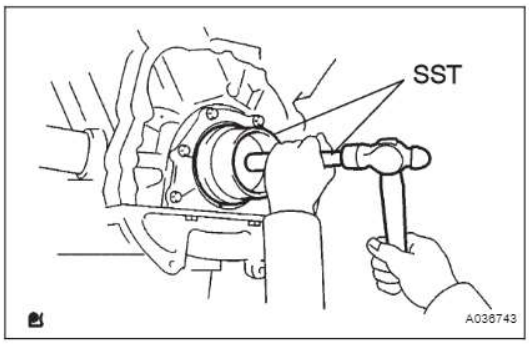
(b) Remove the 8 bolts, rear spacer, drive plate and front spacer.

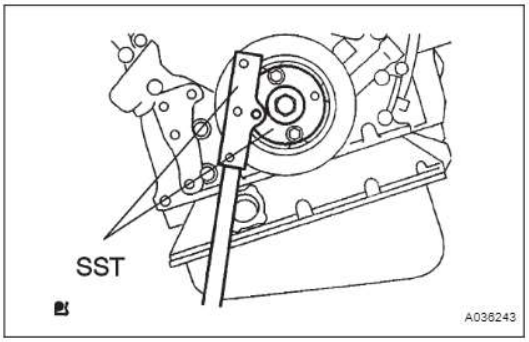
3. **REMOVE ENGINE REAR OIL SEAL**
   (a) Using a knife, cut through the oil seal lip.
   (b) Using a screwdriver with its tip wrapped in tape, pry out the oil seal.
   NOTICE:
   After the removal, check if the crankshaft is not damaged. If it is damaged, smooth the surface with 400-grit sandpaper.

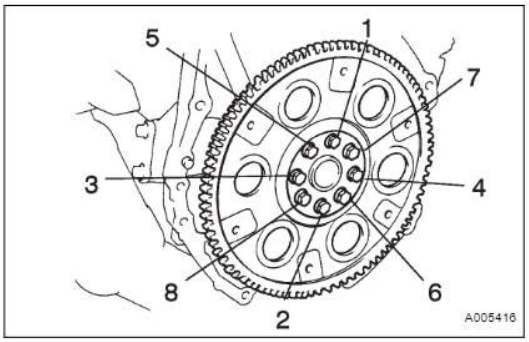


INSTALLATION

1. **INSTALL ENGINE REAR OIL SEAL**
   (a) Apply MP grease to a new oil seal lip.
   NOTICE:
   Keep the lip free from foreign matter.
   (b) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
   SST 09223-15030, 09950-70010 (09951-07100)
   NOTICE:
   - **Be careful not to tap the oil seal at an angle.**
   - **Wipe off extra grease from the crankshaft.**







2. INSTALL DRIVE PLATE & RING GEAR SUB-ASSEMBLY

(a) Using SST, hold the crankshaft.
SST 09213-54015 (91651-60855), 09330-00021

(b) Clean the bolts and bolt holes.

(c) Apply adhesive to 2 or 3 threads of the bolts.
Adhesive:
Part No. 08833-00070, THREE BOND 1324 or equivalent

(d) Install the front spacer, drive plate and rear spacer on the crankshaft.

(e) Uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
Torque: 83 N*m (846 kgf*cm, 61 ft.*lbf)
NOTICE:
Do not start the engine for at least an hour after installing.

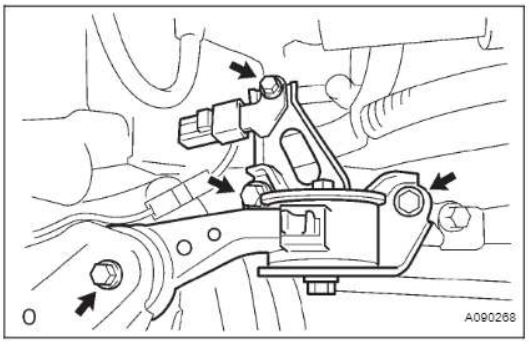
3. INSTALL AUTOMATIC TRANSAXLE ASSEMBLY

HINT:
See page AX-158

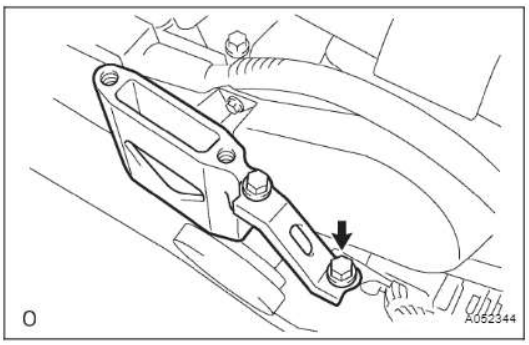
EM

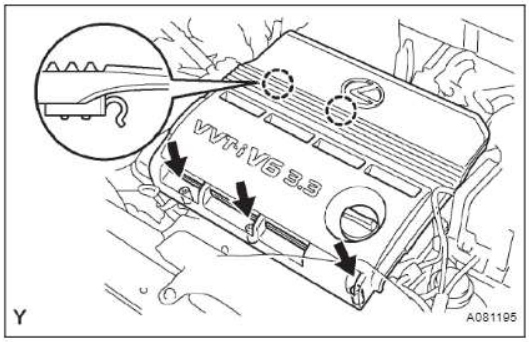
REMOVAL

1. **WORK FOR PREVENTING GASOLINE FORM SPILLING OUT**
   HINT:
   See page FU-1
2. **REMOVE FRONT WHEEL RH**
3. **REMOVE ENGINE UNDER COVER RH**
4. **REMOVE ENGINE UNDER COVER LH**
5. **REMOVE FRONT FENDER APRON SEAL RH**
6. **DRAIN ENGINE OIL**
7. **DRAIN ENGINE COOLANT**
   HINT:
   See page CO-7
8. **DRAIN AUTOMATIC TRANSAXLE FLUID**
9. **REMOVE BATTERY**
10. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1**
    HINT:
    See page EM-6
11. **REMOVE VANE PUMP V BELT**
    HINT:
    See page EM-6
12. **REMOVE ENGINE MOVING CONTROL ROD**
    (a) Remove the 4 bolts and control rod.



13. **REMOVE ENGINE MOUNTING STAY NO.2 RH**
    (a) Remove the bolt, mounting stay No. 2 RH and mounting bracket No. 2 RH.
14. **REMOVE UNION TO CHECK VALVE HOSE**
    (a) Remove the vacuum hose for the brake booster.





15. REMOVE V-BANK COVER SUB-ASSEMBLY

(a) Using a 5 mm hexagon wrench, remove the 3 nuts.

(b) Disconnect the 2 clips, and remove the cover.

16. REMOVE AIR CLEANER INLET ASSEMBLY

17. REMOVE AIR CLEANER ASSEMBLY

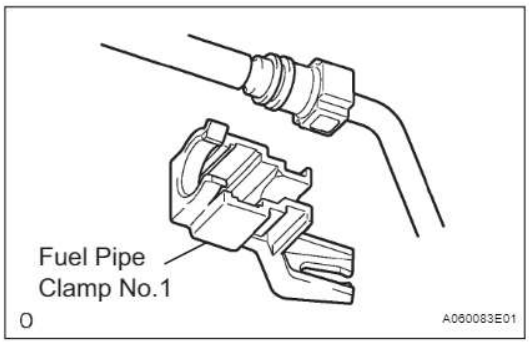
18. REMOVE AIR CLEANER BRACKET

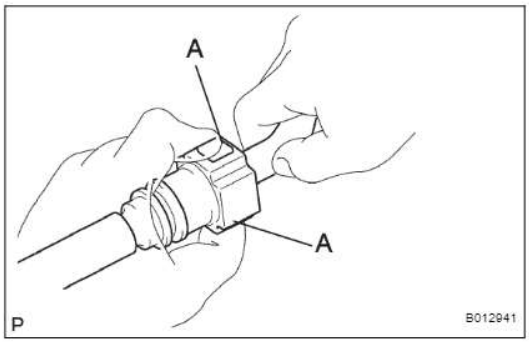
19. REMOVE AIR CLEANER INLET NO.1

20. REMOVE INTAKE AIR CONNECTOR SUB-ASSEMBLY

21. REMOVE NO.1 FUEL PIPE SUB-ASSEMBLY

(a) Remove the fuel pipe clamp.





(b) Disconnect the connector from the tube while pinching part A with fingers as shown in the illustration.

NOTICE:

- **Check for contamination in the pipe and around the connector. Clean if necessary and then disconnect the connector.**
- **Disconnect the connector with your hands.**
- **Do not bend, fold or rotate the nylon tube.**
- **If the pipe and connector are stuck together, push and pull the connector until it comes free.**
- **Put the pipe and connector ends in vinyl bags to prevent damage and contamination.**

22. REMOVE RADIATOR HOSE INLET

23. REMOVE RADIATOR HOSE OUTLET

24. DISCONNECT OIL COOLER INLET HOSE

25. DISCONNECT OIL COOLER OUTLET HOSE

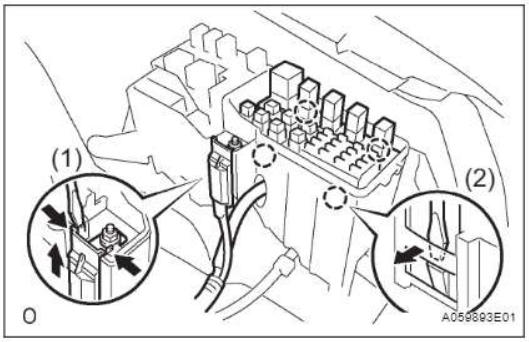
26. DISCONNECT HEATER INLET WATER HOSE

27. DISCONNECT HEATER OUTLET WATER HOSE

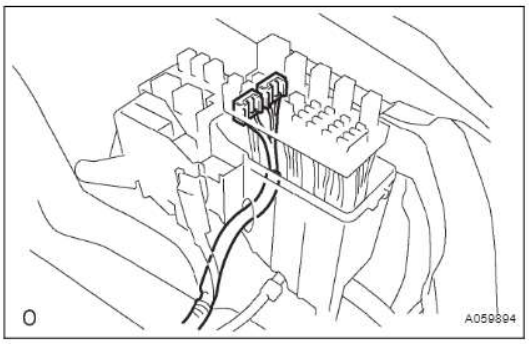
28. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY

29. DISCONNECT ENGINE WIRE

(a) Disconnect the engine wire from the ECM and passenger side J/B.



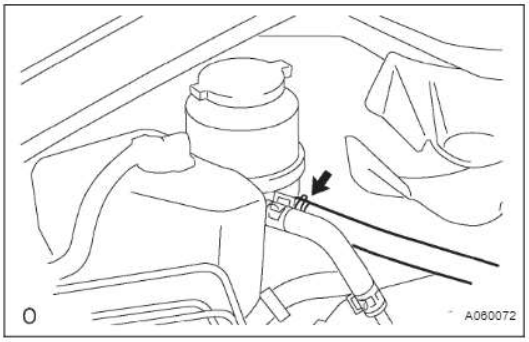
(b) Disconnect the engine wire from the engine room J/B.
(1) Remove the nut and separate the wire harness.
(2) Using a screwdriver, unlock the engine room J/B. Pull the engine room J/B upward.



(3) Disconnect the engine wire connectors.
(c) Pull out the engine wire.
(d) Remove the body ground.

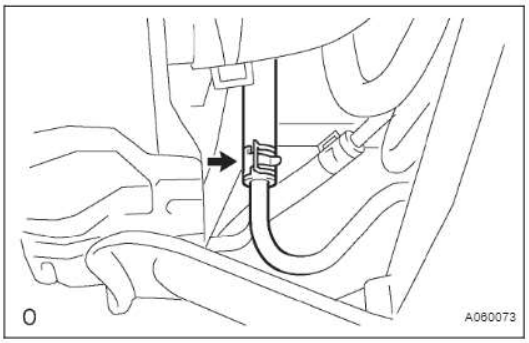
30. REMOVE FLOOR SHIFT CABLE TRANSMISSION CONTROL SELECT

HINT:
See page AX-138



31. DISCONNECT OIL RESERVOIR TO PUMP HOSE NO.1

(a) Disconnect oil reservoir to pump hose No. 1.



32. DISCONNECT STEERING GEAR OUTLET RETURN TUBE

(a) Disconnect steering gear outlet return tube.

33. REMOVE EXHAUST PIPE NO.1 SUPPORT BRACKET

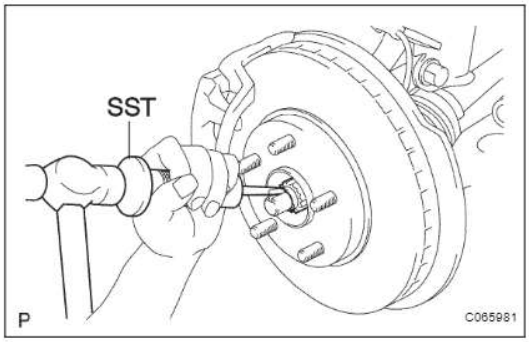
34. REMOVE FRONT EXHAUST PIPE ASSEMBLY

35. DISCONNECT FRONT STABILIZER LINK ASSEMBLY LH

(a) Using a 6 mm socket hexagon wrench, hold the ball stud.
(b) Remove the nut and disconnect the stabilizer link.

36. DISCONNECT FRONT STABILIZER LINK ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.



37. REMOVE FRONT AXLE HUB LH NUT

(a) Using SST and a hammer, strike the lock nut covering to remove it.
SST 09930-00010
NOTICE:
- **Set the drive shaft's groove so that it faces up. Then use the SST and hammer.**
- **Remove the covering from the lock nut completely or the screw of the drive shaft may be damaged.**
- **Do not sharpen the tip of the SST.**

(b) Using a 30 mm socket wrench, remove the lock nut.

38. REMOVE FRONT AXLE HUB RH NUT

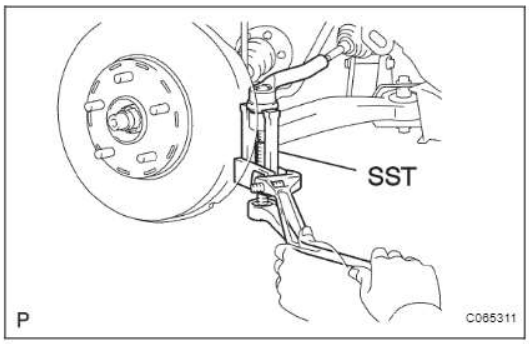
HINT:
Use the same procedures described for the LH side.

39. DISCONNECT SPEED SENSOR FRONT LH

(a) Remove the bolt and disconnect the speed sensor from the steering knuckle.
NOTICE:
Keep the speed sensor tip and connection free of foreign matter.

40. DISCONNECT SPEED SENSOR FRONT RH

HINT:
Use the same procedures described for the LH side.

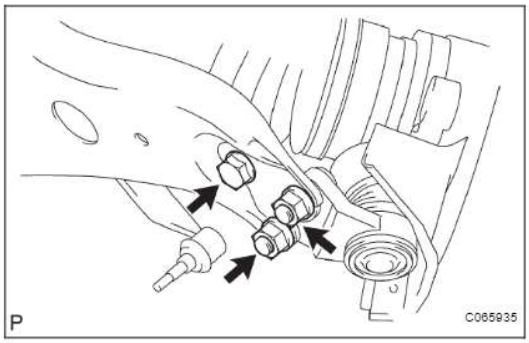


41. DISCONNECT TIE ROD ASSEMBLY LH

(a) Remove the cotter pin and nut.
(b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09628-62011
NOTICE:
Do not damage the dust cover of the ball joint.

42. DISCONNECT TIE ROD ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.



43. DISCONNECT FRONT SUSPENSION ARM SUB-ASSEMBLY LOWER NO.1 LH

(a) Remove the bolt and 2 nuts, and separate the front suspension arm from the lower ball joint.
(b) Using a plastic hammer, disconnect the drive shaft from the axle hub.

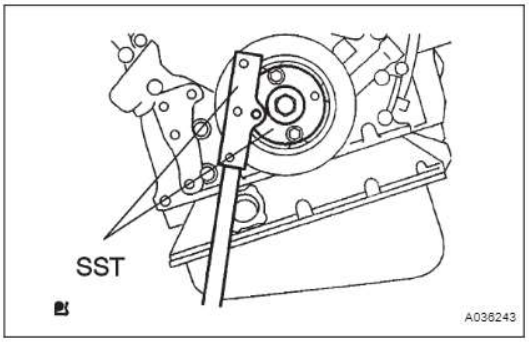
44. DISCONNECT FRONT SUSPENSION ARM SUB-ASSEMBLY LOWER NO.1 RH

HINT:
Use the same procedures described for the LH side.

45. REMOVE STARTER ASSEMBLY

HINT:
See page ST-6

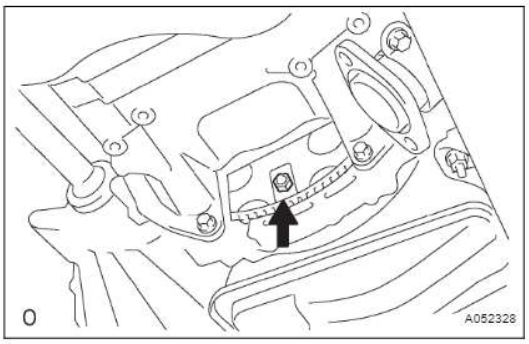
46. REMOVE EXHAUST PIPE SUPPORT BRACKET NO.1



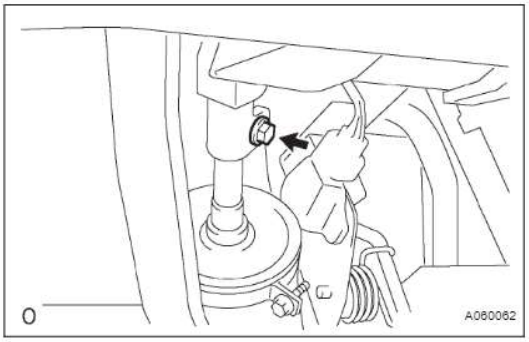
47. REMOVE DRIVE PLATE & TORQUE CONVERTER CLUTCH SETTING BOLT

(a) Using SST, hold the crankshaft.
SST 09213-54015 (91651-60855), 09330-00021

(b) Remove the 2 bolts and flywheel housing under cover.

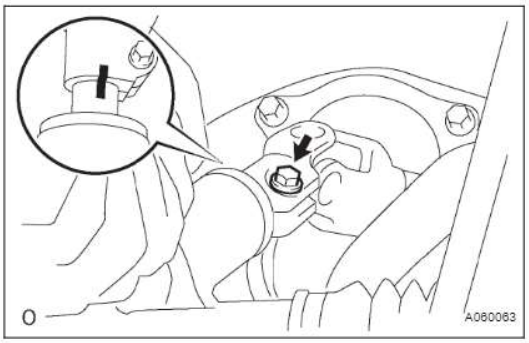


(c) Remove the 6 torque converter setting bolts.



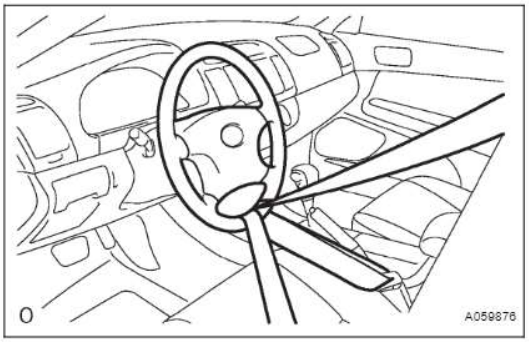
48. DISCONNECT STEERING INTERMEDIATE SHAFT ASSEMBLY

(a) Loosen the sliding yoke bolt.



(b) Place matchmarks on the steering intermediate shaft and control valve shaft.

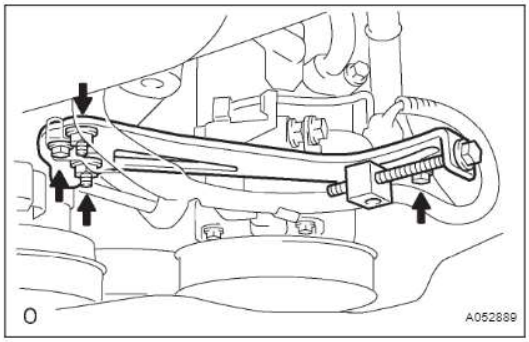
(c) Remove the bolt and disconnect the steering intermediate shaft.



(d) To prevent the steering wheel from rotating, fix the wheel with the seat belt.
NOTICE:
If the steering wheel is not fixed, the spiral cable will be damaged.

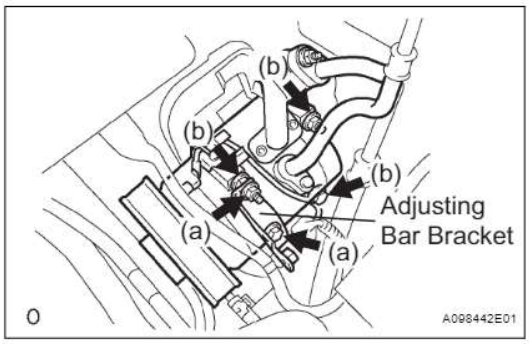
49. REMOVE GENERATOR ASSEMBLY
HINT:
See page CH-8

50. REMOVE GENERATOR BRACKET NO.2



51. REMOVE GENERATOR BELT ADJUSTING BAR

(a) Remove the 2 bolts, 2 nuts and the adjusting bar.



52. DISCONNECT COMPRESSOR AND MAGNETIC CLUTCH

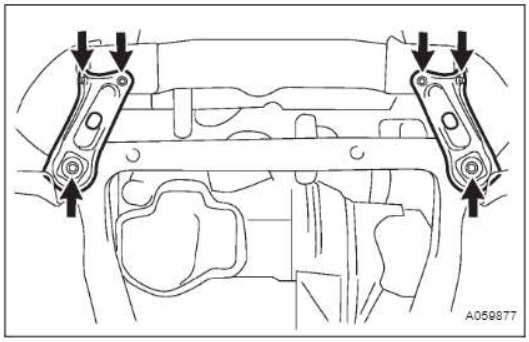
(a) Remove the bolt, nut and adjusting bar bracket.

(b) Remove the 3 bolts and disconnect the compressor.
HINT:
Hang up the hoses instead of detaching them.

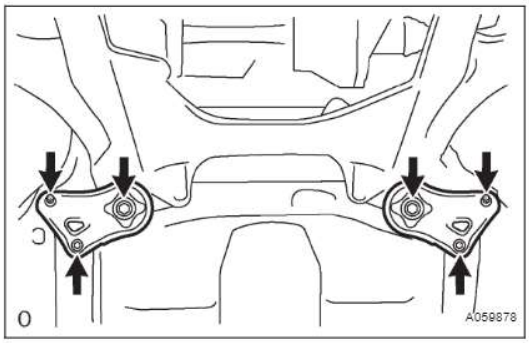
53. REMOVE ENGINE ASSEMBLY WITH TRANSAXLE

(a) Set the engine lifter.

EM

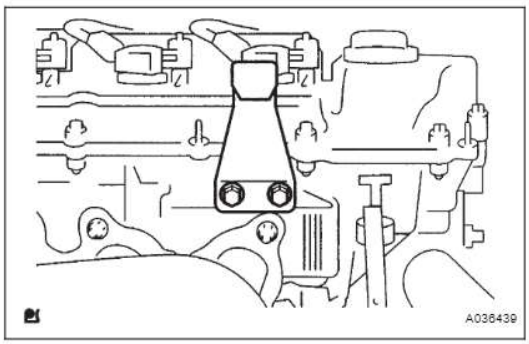


(b) Remove the 4 bolts, 2 nuts and frame side rail plate RH and LH.



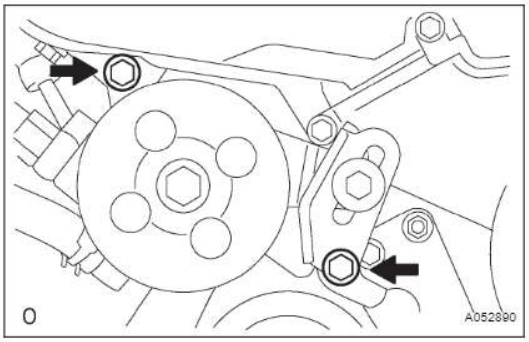
(c) Remove the 4 bolts, 2 nuts, and front suspension member brace rear RH and LH.

(d) Carefully, remove the engine assembly from the vehicle.



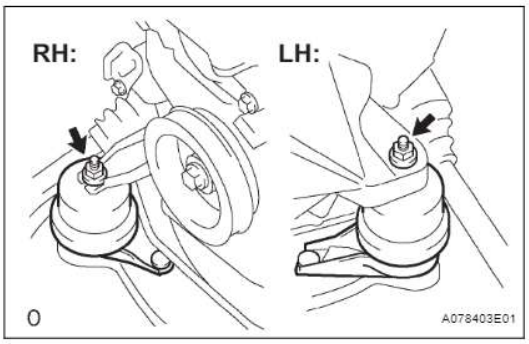
(e) Install the engine hanger as shown in the illustration.
No. 2 engine hanger: Part No. 12282-20020
Bolt: Part No. 91621-60822
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)

(f) Using a chain block and an engine sling device, hang the engine assembly.



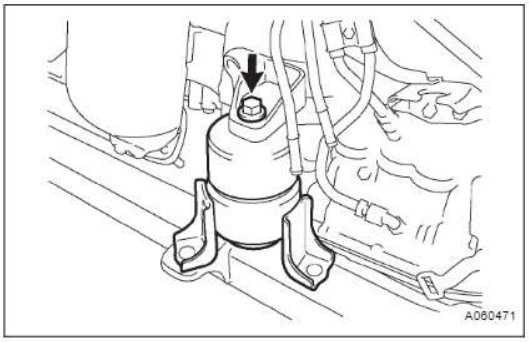
54. REMOVE VANE PUMP ASSEMBLY

(a) Remove the power steering oil pressure sensor harness.
(b) Remove the pressure feed tube clamp.
(c) Remove the 2 bolts and vane pump.



55. REMOVE FRONT FRAME ASSEMBLY

(a) Remove the 2 nuts and disconnect the engine mounting insulator RH and LH.



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

56. REMOVE FRONT DRIVE SHAFT ASSEMBLY LH

HINT:
See page DS-5

57. REMOVE FRONT DRIVE SHAFT ASSEMBLY RH

HINT:
See page DS-6

58. REMOVE ENGINE WIRE

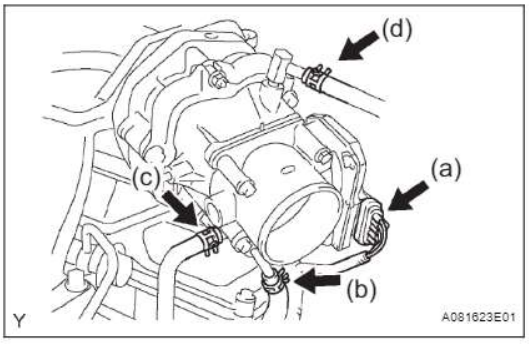
59. REMOVE AUTOMATIC TRANSAXLE ASSEMBLY

HINT:
See page AX-155

60. REMOVE DRIVE PLATE & RING GEAR SUB-ASSEMBLY

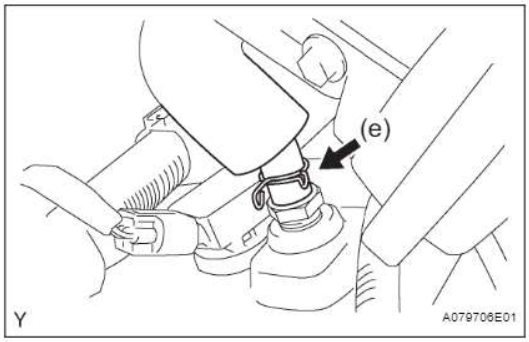
HINT:
See page EM-45

61. INSTALL ENGINE STAND

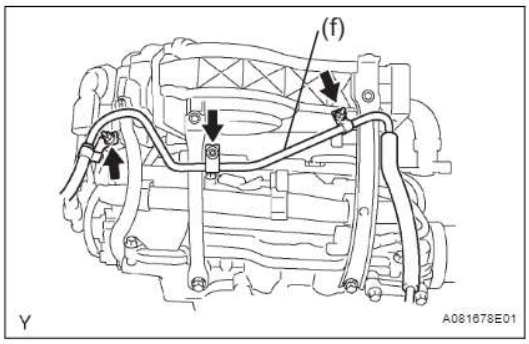


62. REMOVE INTAKE AIR SURGE TANK

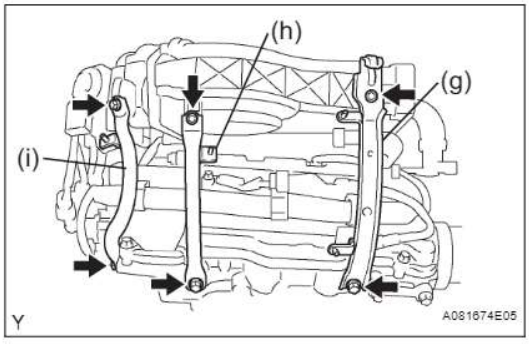
(a) Disconnect the throttle body connector.
(b) Disconnect the water by-pass hose No. 3.
(c) Disconnect the water by-pass hose No. 2.
(d) Disconnect the union to check valve hose.



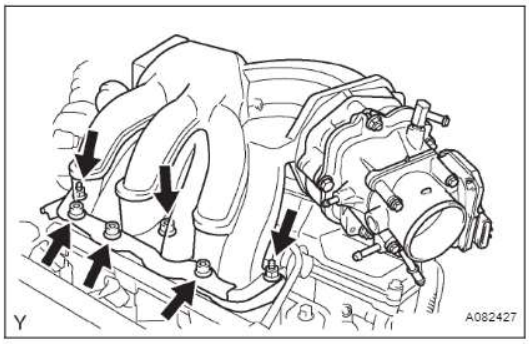
(e) Disconnect the ventilation hose.



(f) Remove the 3 nuts and separate the pressure feed tube.

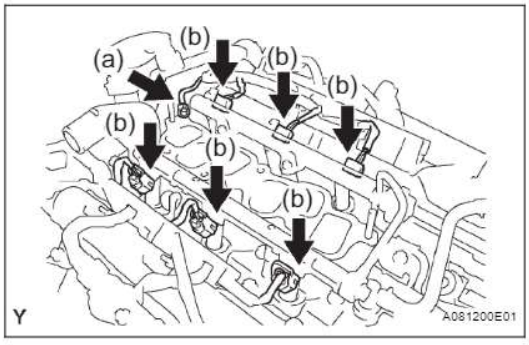


(g) Remove the 2 bolts and engine hunger No. 1.
(h) Remove the 2 bolts and surge tank stay No. 1.
(i) Remove the 2 bolts and surge tank stay No. 2.



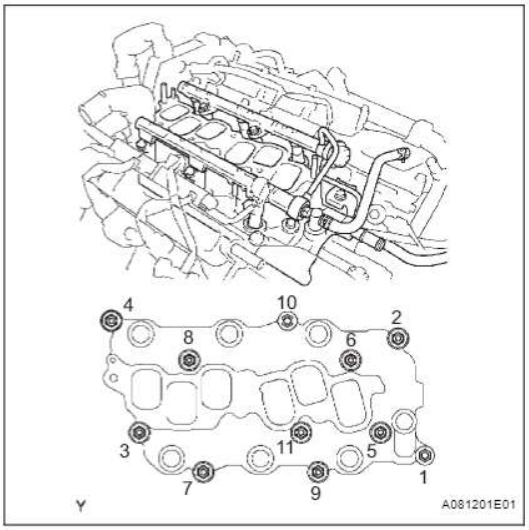
(j) Using an 8 mm socket hexagon wrench, remove the 4 bolts.
(k) Remove the 2 nuts, emission control valve bracket and surge tank.
(l) Remove the gasket from the surge tank.

63. REMOVE IGNITION COIL ASSEMBLY



64. REMOVE INTAKE MANIFOLD

(a) Remove the nut and disconnect the ground cable.
(b) Disconnect the 6 fuel injector connectors.

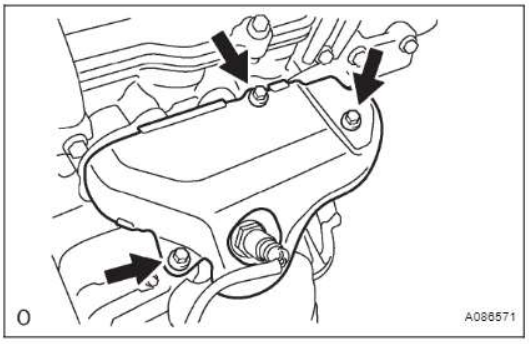


(c) Uniformly, loosen and remove the 9 bolts and 2 nuts in the sequence shown in the illustration. Remove the intake manifold.

65. REMOVE WATER OUTLET

HINT:

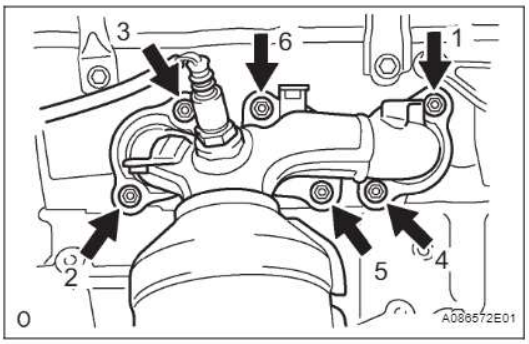
See page EM-27



66. REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY RH

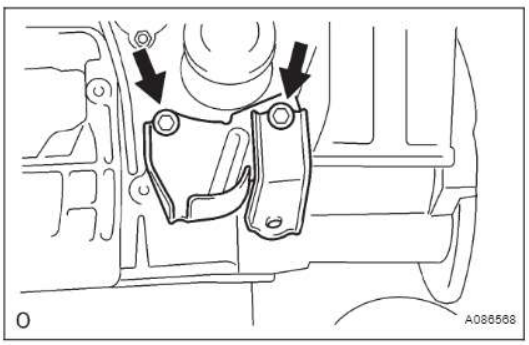
(a) Disconnect the A/F sensor connector.

(b) Remove the 3 bolts and insulator.



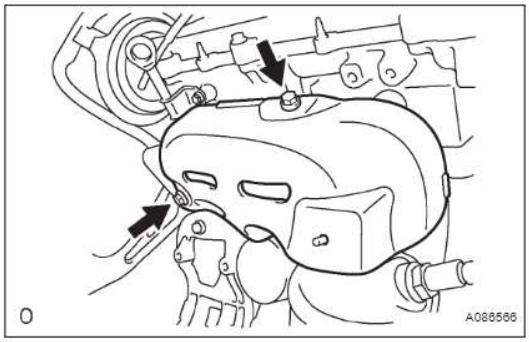
(c) Uniformly loosen and remove the 6 nuts in the sequence shown in the illustration.

(d) Remove the manifold and gasket.



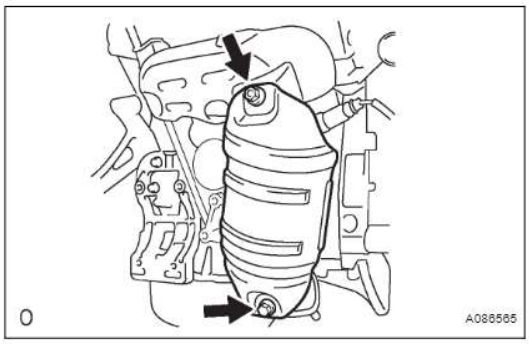
67. REMOVE MANIFOLD STAY NO.2

(a) Remove the 2 bolts and manifold stay.

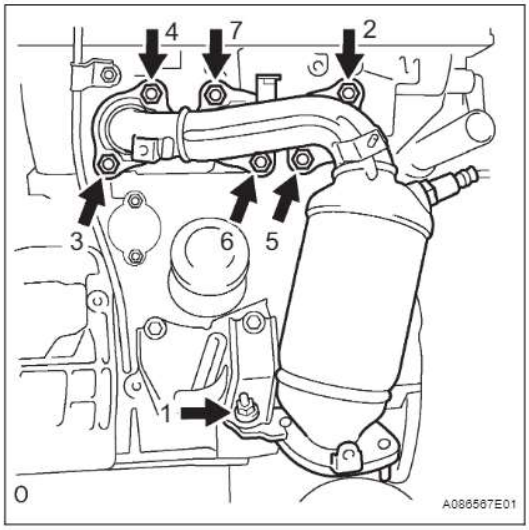


68. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.2

(a) Remove the 2 bolts and insulator.



(b) Remove the bolt, nut and insulator.

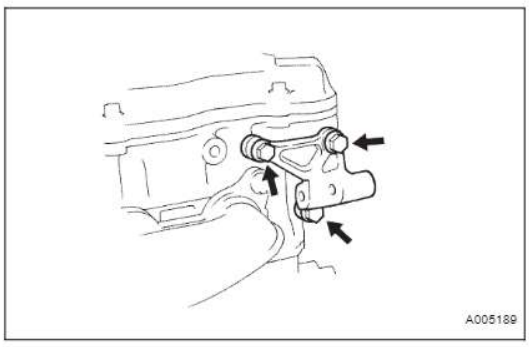


69. REMOVE EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY NO.2

(a) Uniformly loosen and remove the 7 nuts in the sequence shown in the illustration.

(b) Remove the converter and gasket.

70. REMOVE DRIVE SHAFT BEARING BRACKET



71. REMOVE PUMP BRACKET

(a) Remove the 3 bolts and pump bracket.

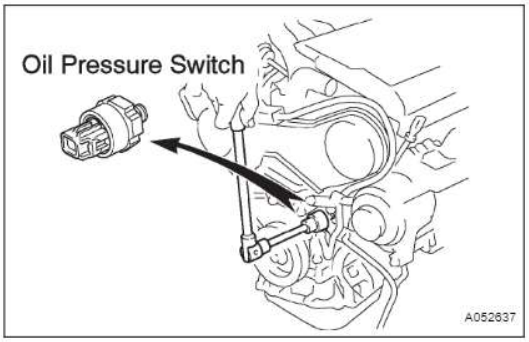
72. REMOVE GENERATOR BRACKET NO.1

73. REMOVE COMPRESSOR MOUNTING BRACKET NO.1

74. REMOVE WATER INLET PIPE

75. REMOVE WATER INLET

76. REMOVE THERMOSTAT



77. REMOVE ENGINE OIL PRESSURE SWITCH ASSEMBLY

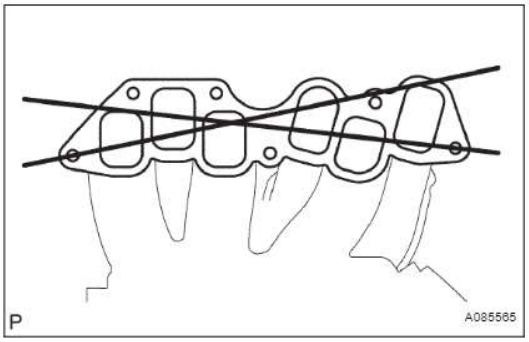
(a) Remove the engine oil pressure switch assembly.

78. REMOVE KNOCK SENSOR

(a) Remove 2 nuts and 2 sensor.

79. REPLACE PARTIAL ENGINE ASSEMBLY

INSPECTION



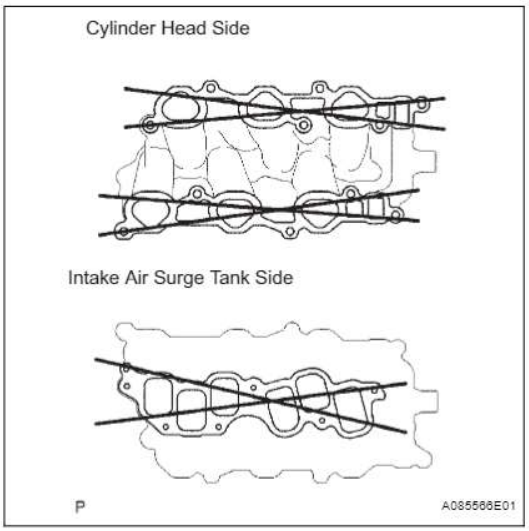
1. INSPECT INTAKE AIR SURGE TANK

(a) Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage:

0.10 mm (0.0039 in.)

If the warpage is greater than the maximum, replace the manifold.



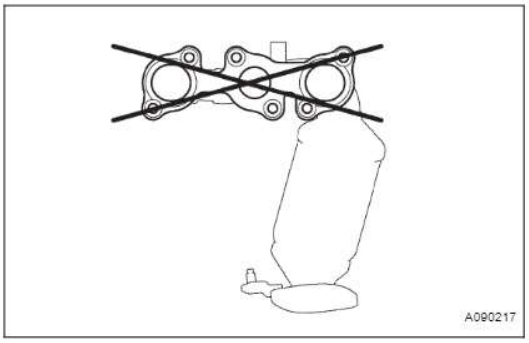
2. INSPECT INTAKE MANIFOLD

(a) Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head and air intake surge tank for warpage.

Maximum warpage

Item	Specified Condition
Intake air surge tank side	0.15 mm (0.0059 in.)
Cylinder head side	0.08 mm (0.0031 in.)

If warpage is greater than the maximum, replace the manifold.



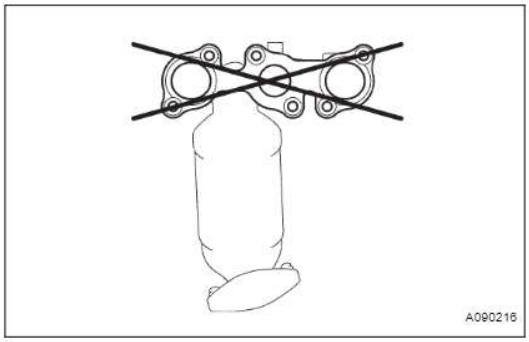
3. INSPECT EXHAUST MANIFOLD SUB-ASSEMBLY RH

(a) Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage:

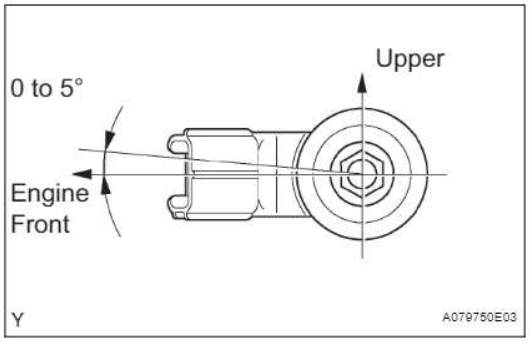
0.50 mm (0.0196 in.)

If the warpage is greater than the maximum, replace the manifold.

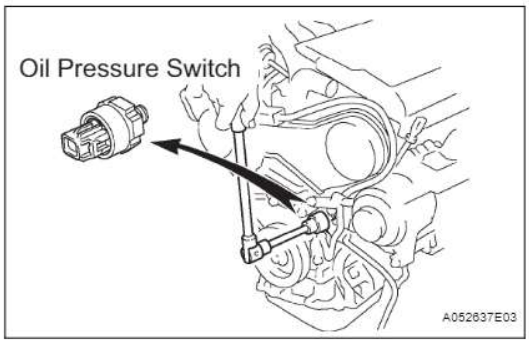


4. **INSPECT EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY NO.2**
   (a) Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.
   Maximum warpage:
   0.50 mm (0.0196 in.)
   If the warpage is greater than the maximum, replace the manifold.

INSTALLATION

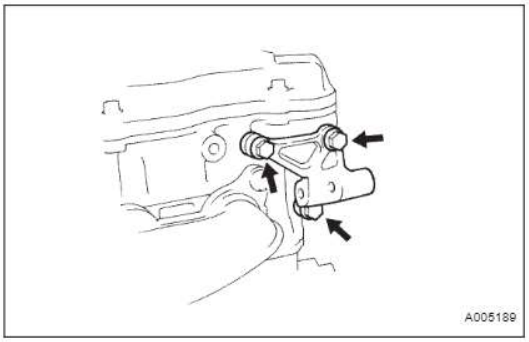


1. **INSTALL KNOCK SENSOR**
   (a) Install the 2 knock sensors with the 2 nuts, as shown in the illustration.
   Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)



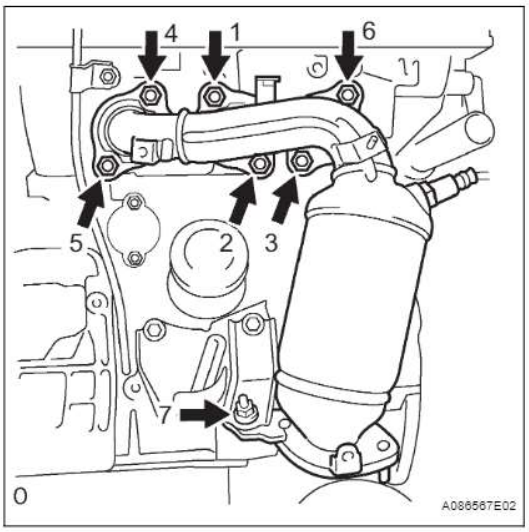
2. **INSTALL ENGINE OIL PRESSURE SWITCH ASSEMBLY**
   (a) Clean the threads of the oil pressure switch. Apply adhesive to 2 or 3 threads of the oil pressure switch.
   Adhesive:
   Part No. 08833-00080 THREE BOND 1344, LOCTITE 242 or equivalent
   (b) Install the oil pressure switch.
   Torque: 15 N*m (152 kgf*cm, 11 ft.*lbf)
3. **INSTALL THERMOSTAT**
   HINT:
   See page CO-12
4. **INSTALL WATER INLET**
   HINT:
   See page CO-12
5. **INSTALL WATER INLET PIPE**
   HINT:
   See page CO-12
6. **INSTALL COMPRESSOR MOUNTING BRACKET NO.1**
   Torque: 25 N*m (255 kgf*cm, 18 ft.*lbf)
7. **INSTALL GENERATOR BRACKET NO.1**
   Torque: 58 N*m (591 kgf*cm, 43 ft.*lbf)
8. **INSTALL PUMP BRACKET**
   Torque: 32 N*m (326 kgf*cm, 24 ft.*lbf)

EM



9. INSTALL DRIVE SHAFT BEARING BRACKET

(a) Install drive shaft bearing bracket.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)

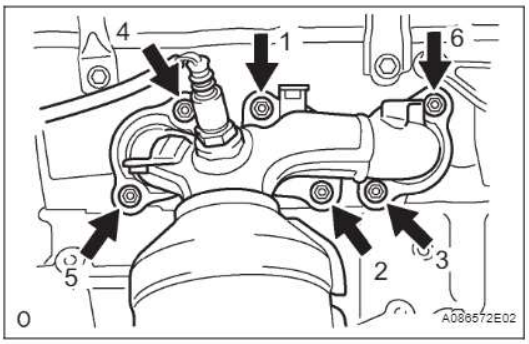


10. INSTALL EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY NO.2

(a) Install a new gasket and the converter with the 7 nuts. Uniformly, tighten the 7 nuts in the sequence shown in the illustration.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)
(b) Retighten nuts 1 and 2 as shown in the illustration.

11. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.2
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

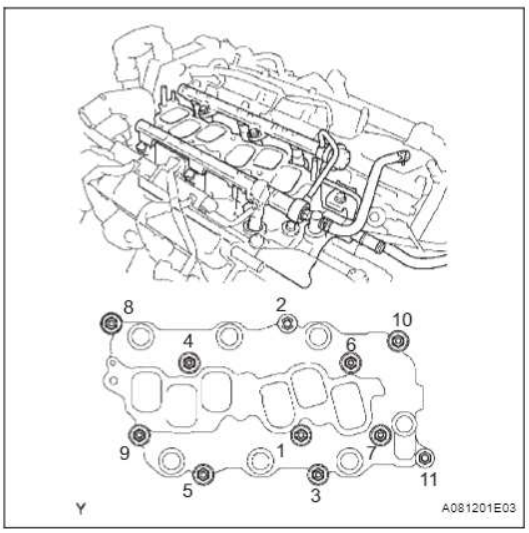
12. INSTALL MANIFOLD STAY NO.2
Torque: 34 N*m (347 kgf*cm, 25 ft.*lbf)



13. INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY RH

(a) Install a new gasket and the exhaust manifold with the 5 nuts. Uniformly tighten the 5 nuts in the sequence shown in the illustration.
Torque: 49 N*m (500 kgf*cm, 49 ft.*lbf)
(b) Retighten nuts 1 and 2 shown in the illustration.

14. INSTALL WATER OUTLET
HINT:
See page EM-42



15. INSTALL INTAKE MANIFOLD

(a) Install the intake manifold with the 9 bolts, 2 nuts and 2 washers. Uniformly tighten the bolts and nuts in the sequence shown in the illustration.
Torque: 15 N*m (153 kgf*cm, 11 ft.*lbf)
(b) Retighten the water outlet mounting bolts and nuts.
Torque: 15 N*m (153 kgf*cm, 11 ft.*lbf)
(c) Install the ground cable with the nut.
Torque: 8.4 N*m (86 kgf*cm, 74 in.*lbf)
(d) Connect the heater inlet water hose.

16. INSTALL IGNITION COIL ASSEMBLY
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

17. INSTALL INTAKE AIR SURGE TANK

(a) Install a new gasket to the intake air surge tank.

(b) Install the intake air surge tank and emission control valve bracket with the 2 nuts.
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)
(c) Using an 8 mm socket hexagon wrench, tighten the 4 bolts.
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)
(d) Install the surge tank stay No. 2 with the 2 bolts.
Torque: 20 N*m (199 kgf*cm, 15 ft.*lbf)
(e) Install the surge tank stay No. 1 with the 2 bolts.
Torque: 20 N*m (199 kgf*cm, 15 ft.*lbf)
(f) Install the engine hanger No. 1 with the 2 bolts.
Torque: 20 N*m (199 kgf*cm, 15 ft.*lbf)
(g) Install the pressure feed tube with the 3 nuts.
Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)
(h) Connect the ventilation hose.
(i) Connect the union to check valve hose.
(j) Connect the water by-pass hose No. 2.
(k) Connect the water by-pass hose No. 3.
(l) Connect the throttle motor connector.

EM

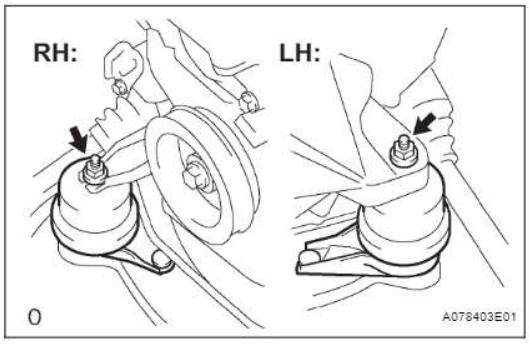
18. INSTALL DRIVE PLATE & RING GEAR SUB-ASSEMBLY
HINT:
See page EM-46

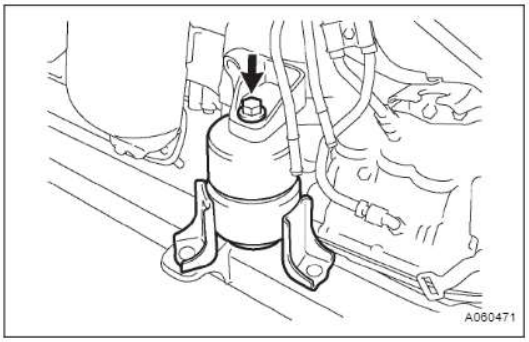
19. INSTALL AUTOMATIC TRANSAXLE ASSEMBLY
HINT:
See page AX-158

20. INSTALL FRONT DRIVE SHAFT ASSEMBLY RH
HINT:
See page DS-15

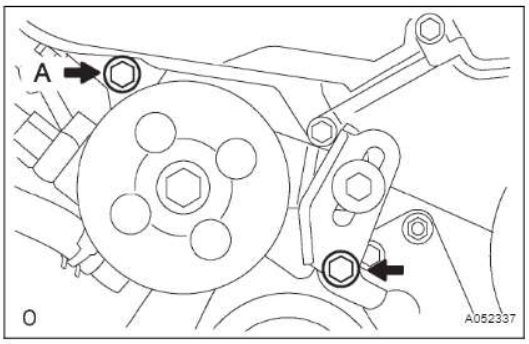
21. INSTALL FRONT DRIVE SHAFT ASSEMBLY LH
HINT:
See page DS-14

22. INSTALL FRONT FRAME ASSEMBLY
(a) Install the engine mounting insulator RH and LH with the 2 nuts.
Torque: 95 N*m (969 kgf*cm, 70 ft.*lbf)



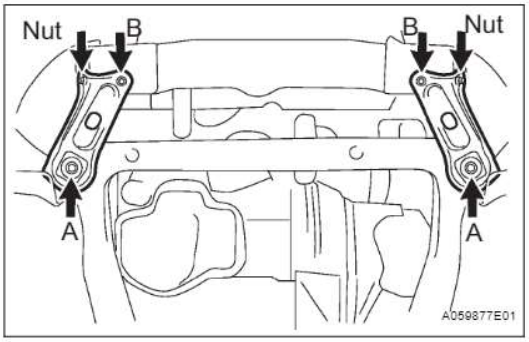


(b) Install the engine mounting insulator FR with the bolt.
Torque: 87 N*m (887 kgf*cm, 64 ft.*lbf)



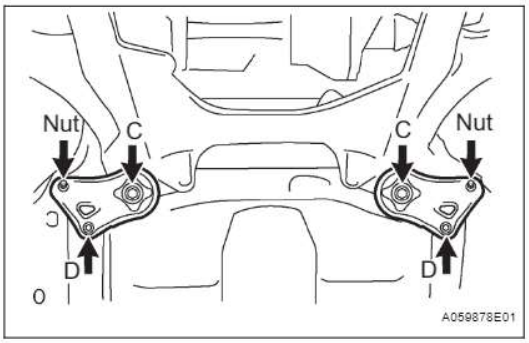
23. INSTALL VANE PUMP ASSEMBLY

(a) Install the vane pump with the 2 bolts.
Torque: 43 N*m (439 kgf*cm, 32 ft.*lbf)
HINT:
After adjusting the V-ribbed belt, tighten bolt A.

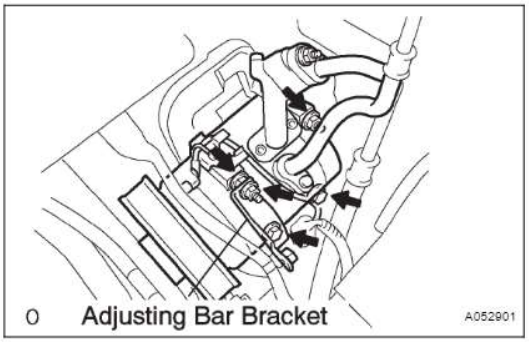


24. INSTALL ENGINE ASSEMBLY WITH TRANSAXLE

(a) Set the engine assembly with transaxle on the engine lifter.
(b) Install the engine assembly to the vehicle.
(c) Install the frame side rail plate RH and LH with the 4 bolts and 2 nuts.
Torque: Bolt A
85 N*m (867 kgf*cm, 63 ft.*lbf)
Torque: Bolt B
32 N*m (326 kgf*cm, 24 ft.*lbf)

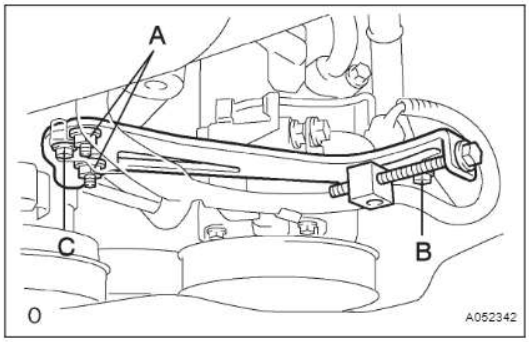


(d) Install the front suspension member brace rear RH and LH with the 4 bolts and 2 nuts.
Torque: Bolt C
85 N*m (867 kgf*cm, 63 ft.*lbf)
Torque: Bolt D and Nut
32 N*m (326 kgf*cm, 24 ft.*lbf)



25. INSTALL COMPRESSOR AND MAGNETIC CLUTCH

(a) Install the compressor with the 3 bolts.
Torque: 25 N*m (250 kgf*cm, 18 ft.*lbf)
(b) Install the adjusting bar bracket with the bolt and nut.
Torque: Bolt
25 N*m (250 kgf*cm, 18 ft.*lbf)
Nut
26 N*m (260 kgf*cm, 19 ft.*lbf)

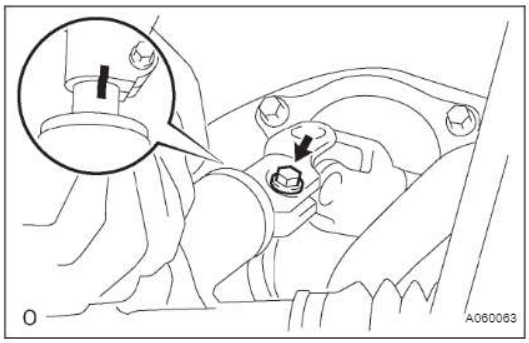


26. INSTALL GENERATOR BELT ADJUSTING BAR

(a) Install the adjusting bar with the 2 bolts and 2 nuts.
Torque: Nut A
43 N*m (438 kgf*cm, 32 ft.*lbf)
Bolt B
18 N*m (184 kgf*cm, 13 ft.*lbf)
Bolt C
8.0 N*m (82 kgf*cm, 71 in.*lbf)

27. INSTALL GENERATOR BRACKET NO.2
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)

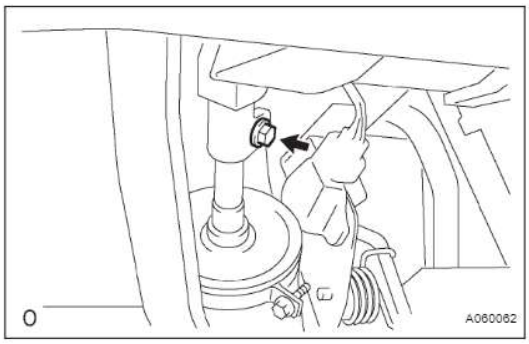
28. INSTALL GENERATOR ASSEMBLY
HINT:
See page CH-14



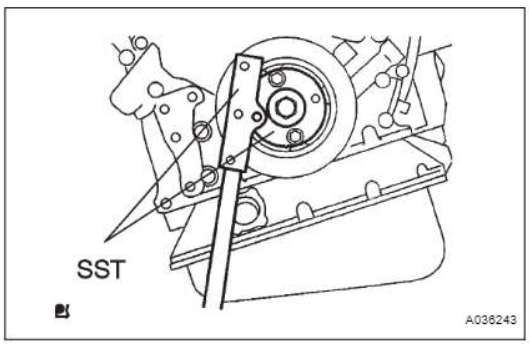
29. INSTALL STEERING INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the intermediate shaft and control valve shaft, and install the bolt.
Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf)

EM



(b) Tighten the sliding yoke bolt.
Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf)

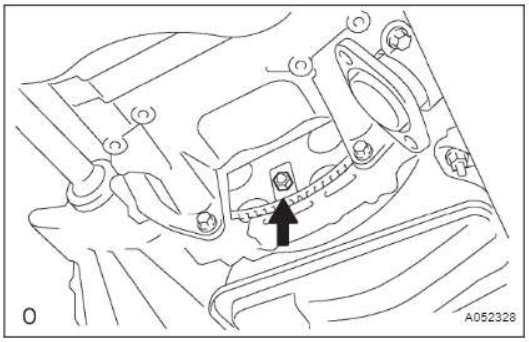


30. INSTALL DRIVE PLATE & TORQUE CONVERTER CLUTCH SETTING BOLT

(a) Using SST, hold the crankshaft.
SST 09213-54015 (91651-60855), 09330-00021

(b) Using kerosene or gasoline, clean the bolts thoroughly.

(c) Apply adhesive to 2 or 3 threads of the bolt end.
Adhesive:
Part No. 08833-00070, THREE BOND 1324 or equivalent

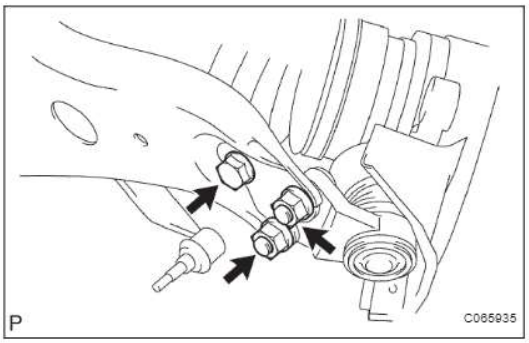


(d) Install the 6 torque converter set bolts.
Torque: 41 N*m (418 kgf*cm, 30 ft.*lbf)
NOTICE:
First tighten the green colored bolt and then tighten the 5 bolts.

(e) Install the flywheel housing under cover with the 2 bolts.
Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)

31. INSTALL EXHAUST PIPE SUPPORT BRACKET NO.1
Torque: 21 N*m (214 kgf*cm, 15 ft.*lbf)

32. INSTALL STARTER ASSEMBLY
HINT:
See page ST-13



33. INSTALL FRONT SUSPENSION ARM SUB-ASSEMBLY LOWER NO.1 LH
(a) Install the drive shaft to the steering knuckle.
(b) Install the suspension lower arm with the bolt and 2 nuts.
Torque: 75 N*m (764 kgf*cm, 55 ft.*lbf)

34. INSTALL FRONT SUSPENSION ARM SUB-ASSEMBLY LOWER NO.1 RH
HINT:
Use the same procedures described for the LH side.

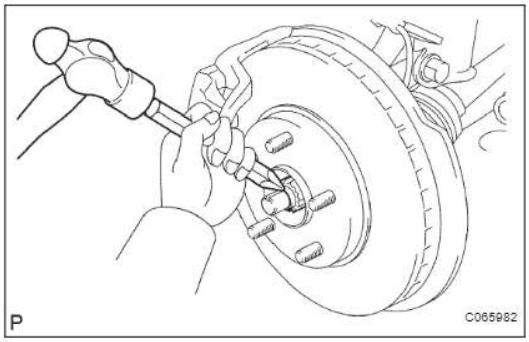
35. INSTALL TIE ROD ASSEMBLY LH
(a) Connect the tie rod end to the steering knuckle with the castle nut.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)
NOTICE:
- **Prevent lubricants from contacting the thread and taper portions.**
- **After tightening the castle nut, tighten it an additional 60° so that a cotter pin can be inserted.**

(b) Insert a new cotter pin.

36. INSTALL TIE ROD ASSEMBLY RH
HINT:
Use the same procedures described for the LH side.

37. INSTALL SPEED SENSOR FRONT LH
HINT:
See page DS-15

38. INSTALL SPEED SENSOR FRONT RH
HINT:
Use the same procedures described for the LH side.



39. INSTALL FRONT AXLE HUB LH NUT

(a) Using a 30 mm socket wrench, install a new hub nut.
Torque: 294 N*m (2,998 kgf*cm, 217 ft.*lbf)

(b) Using a chisel and hammer, tapped the hub nut.

40. INSTALL FRONT AXLE HUB RH NUT

HINT:
Use the same procedures described for the LH side.

41. INSTALL FRONT STABILIZER LINK ASSEMBLY LH

(a) Using a 6 mm socket hexagon wrench, hold the ball stud and install the nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)

42. INSTALL FRONT STABILIZER LINK ASSEMBLY RH

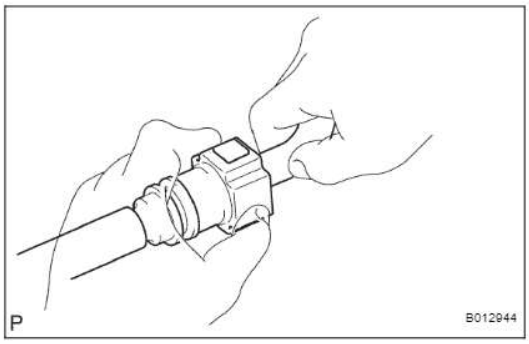
HINT:
Use the same procedures described for the LH side.

43. INSTALL FRONT EXHAUST PIPE ASSEMBLY

HINT:
See page EX-4

44. INSTALL FRONT EXHAUST PIPE NO.1 SUPPORT BRACKET

HINT:
See page EX-4



45. CONNECT NO.1 FUEL PIPE SUB-ASSEMBLY

(a) Push in the fuel tube connector to the fuel pipe until connector makes a "click" sound.
NOTICE:
- **Check for damage or contamination on the connected part of the pipe.**
- **After having finished the connection, check if the pipe and the connector are securely connected by trying to pull them apart.**

(b) Install the fuel pipe clamp.

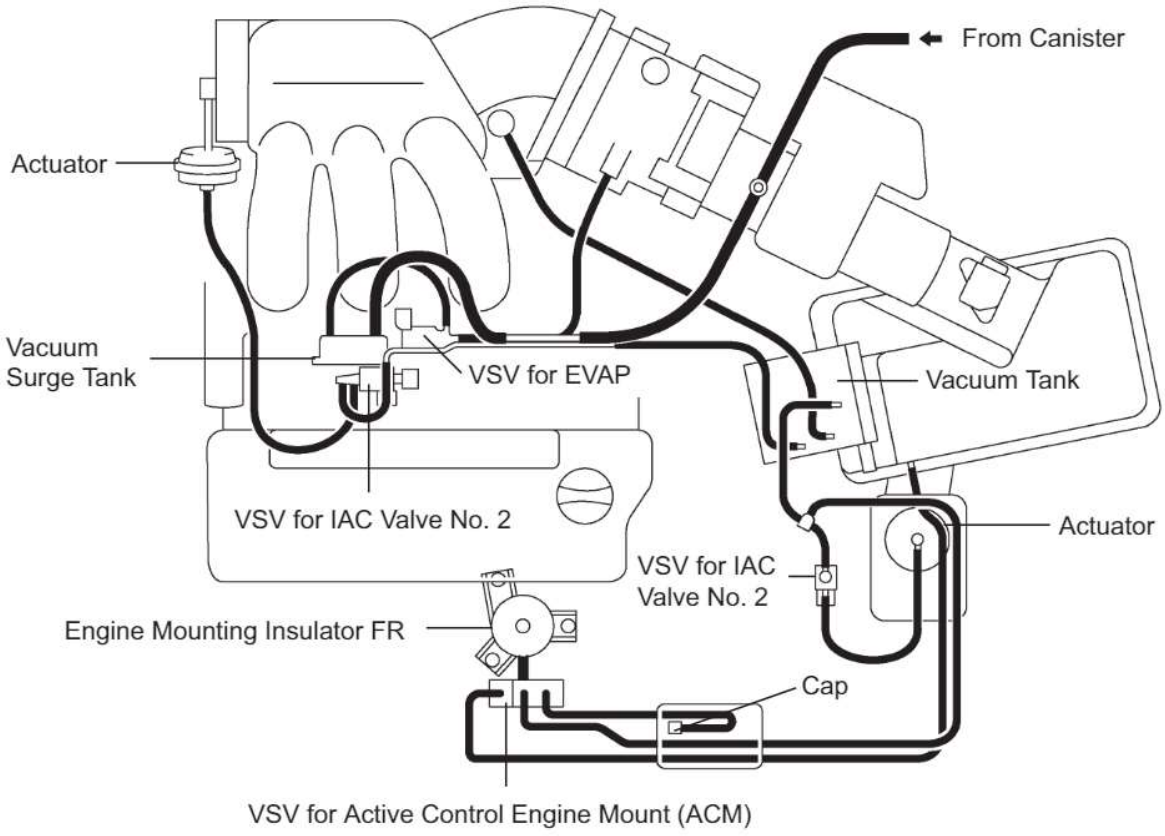
46. INSTALL AIR CLEANER ASSEMBLY

EM

47. CONNECT VACUUM HOSES

(a) Connect the vacuum hoses.

Vacuum Hose Routing Diagram

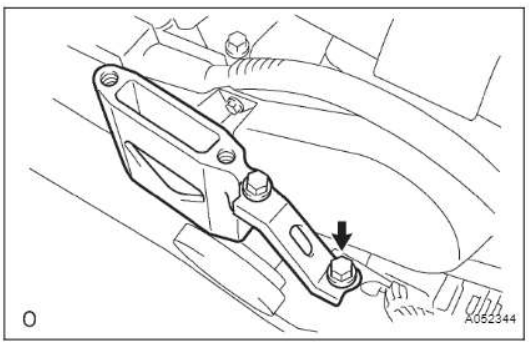


48. INSTALL V-BANK COVER SUB-ASSEMBLY

(a) Fit the 2 retainers and install the V-bank cover.

(b) Using a 5 mm socket hexagon wrench, tighten the 3 nuts.

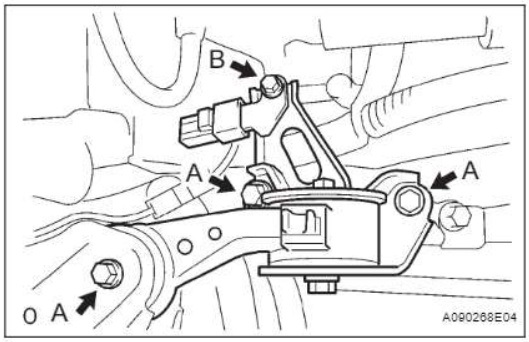
Torque: 7.9 N*m (81 kgf*cm, 70 in.*lbf)



49. INSTALL ENGINE MOUNTING STAY NO.2 RH

(a) Install the mounting stay and mounting bracket with the bolt.

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



50. INSTALL ENGINE MOVING CONTROL ROD

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

Torque: Bolt A
64 N*m (653 kgf*cm, 47 ft.*lbf)
Bolt B
23 N*m (235 kgf*cm, 17 ft.*lbf)

51. INSTALL VANE PUMP V BELT

HINT:
See page EM-6

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

HINT:
See page EM-6

53. INSPECT DRIVE BELT TENSION

HINT:
See page EM-1

54. INSTALL FRONT WHEELS

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

55. ADD AUTOMATIC TRANSAXLE FLUID

HINT:
See page AX-119

56. ADD ENGINE OIL

HINT:
See page LU-1

57. ADD ENGINE COOLANT

HINT:
See page CO-7

58. ADD POWER STEERING FLUID

59. BLEED POWER STEERING FLUID

HINT:
See page PS-3

60. INSPECT OIL LEAK

61. CHECK FOR ENGINE COOLANT LEAKS

HINT:
See page CO-8

62. INSPECT FOR FUEL LEAKS

63. CHECK FOR EXHAUST GAS LEAKS

64. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

HINT:
See page SP-9

65. INSPECT IGNITION TIMING

HINT:
See page EM-1

66. INSPECT ENGINE IDLE SPEED

HINT:
See page EM-1

EM

67. INSPECT CO/HC

HINT:

See page EM-1

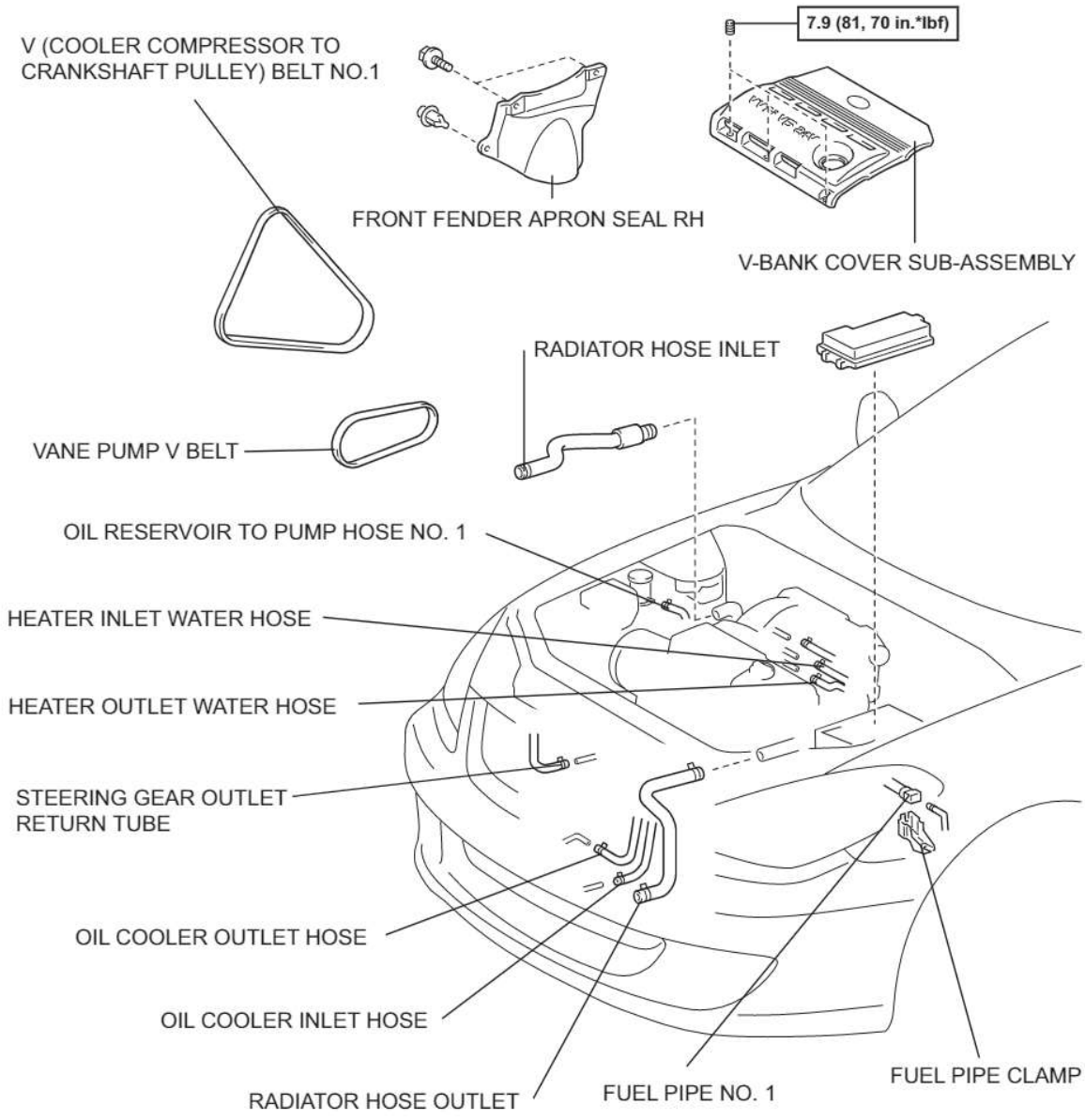
68. CHECK ABS SPEED SENSOR SIGNAL

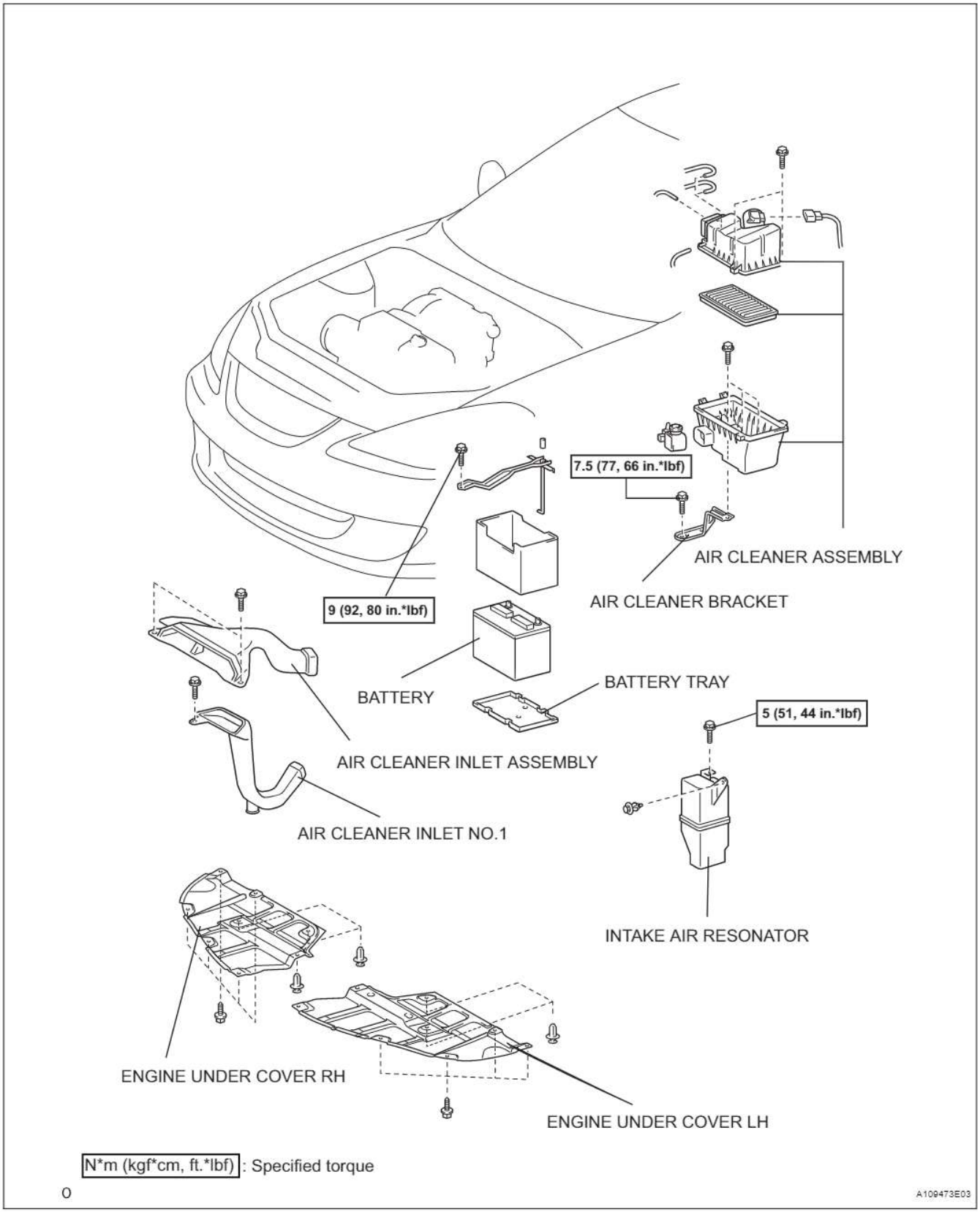
HINT:

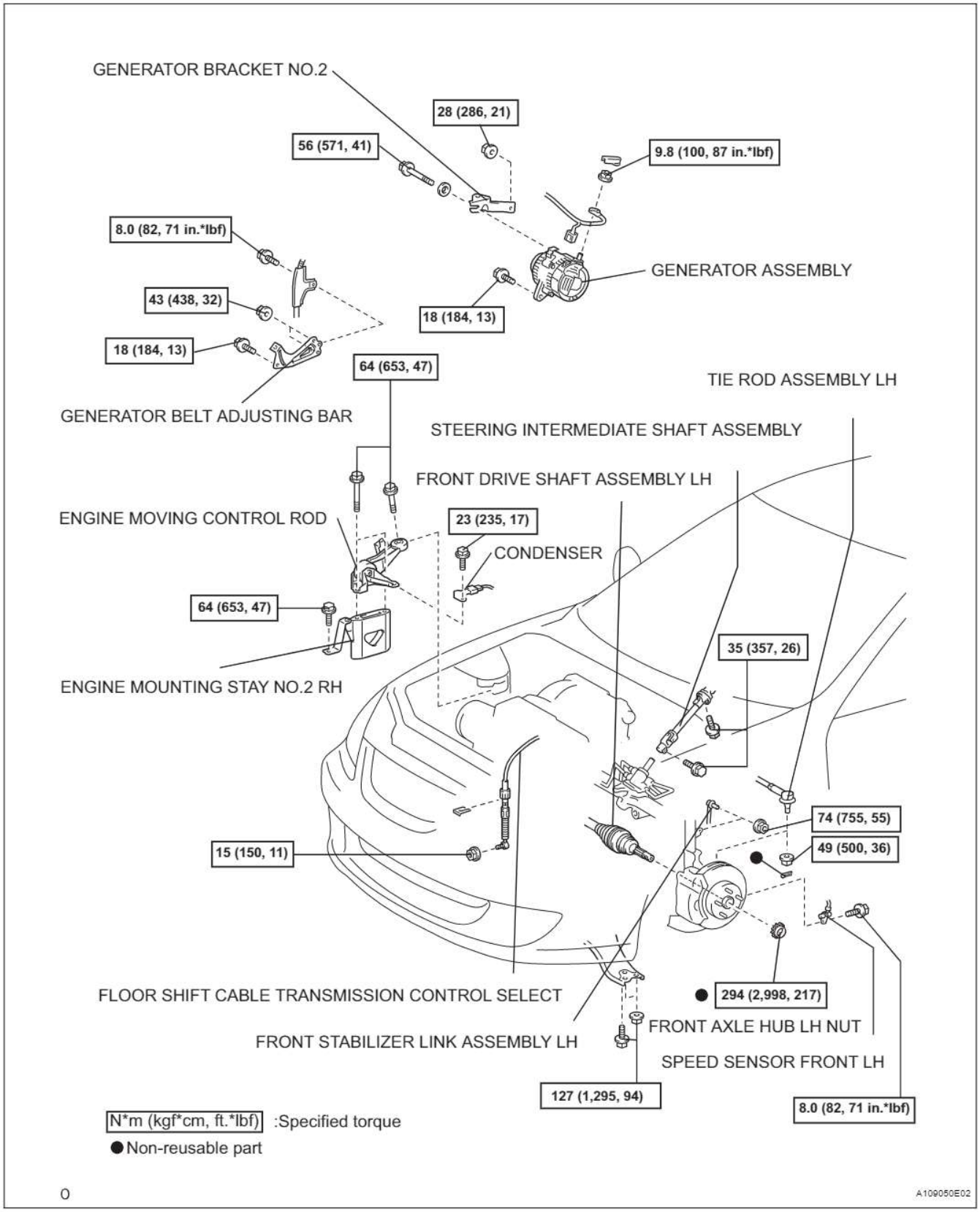
See page BC-10

ENGINE ASSEMBLY

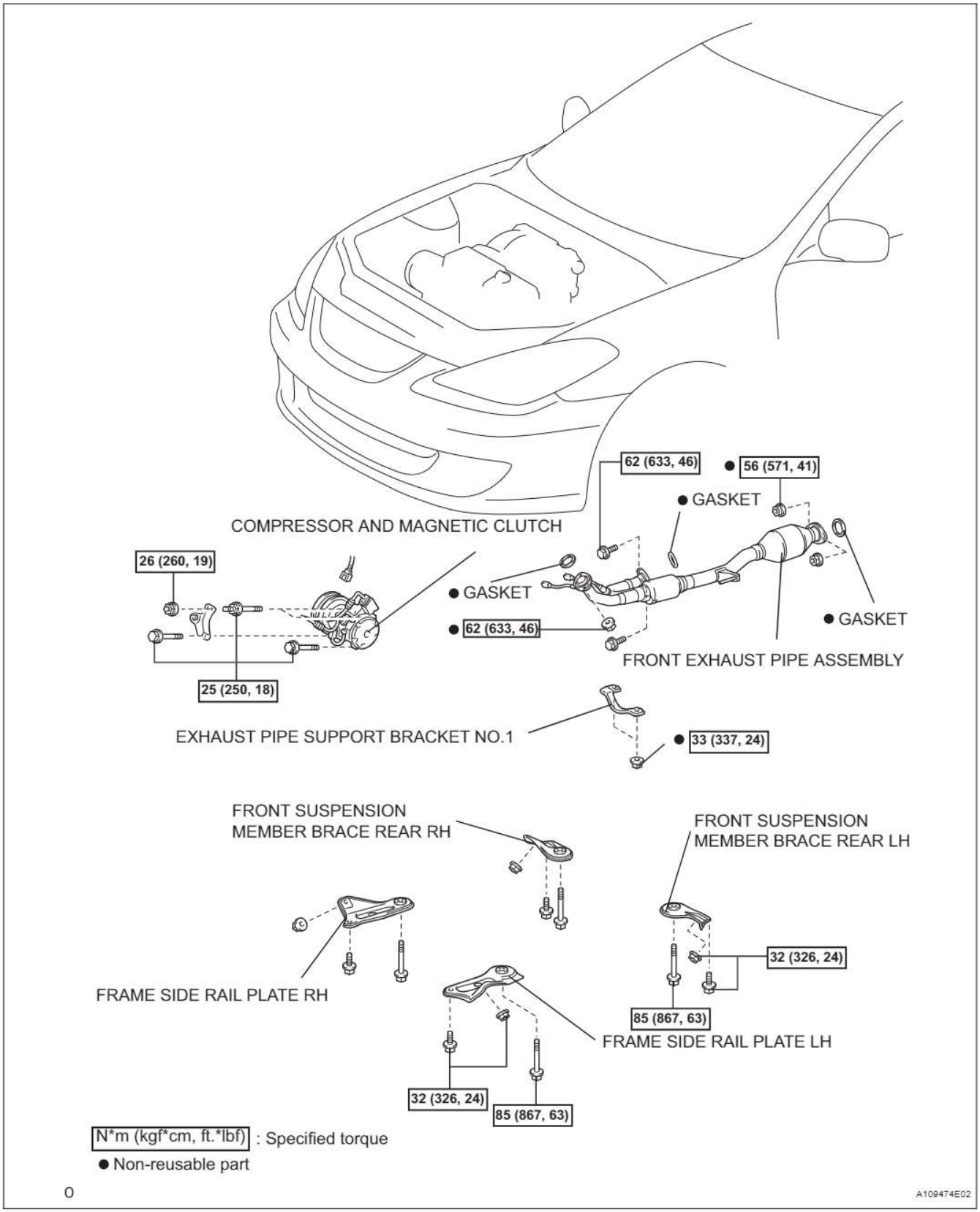
COMPONENTS

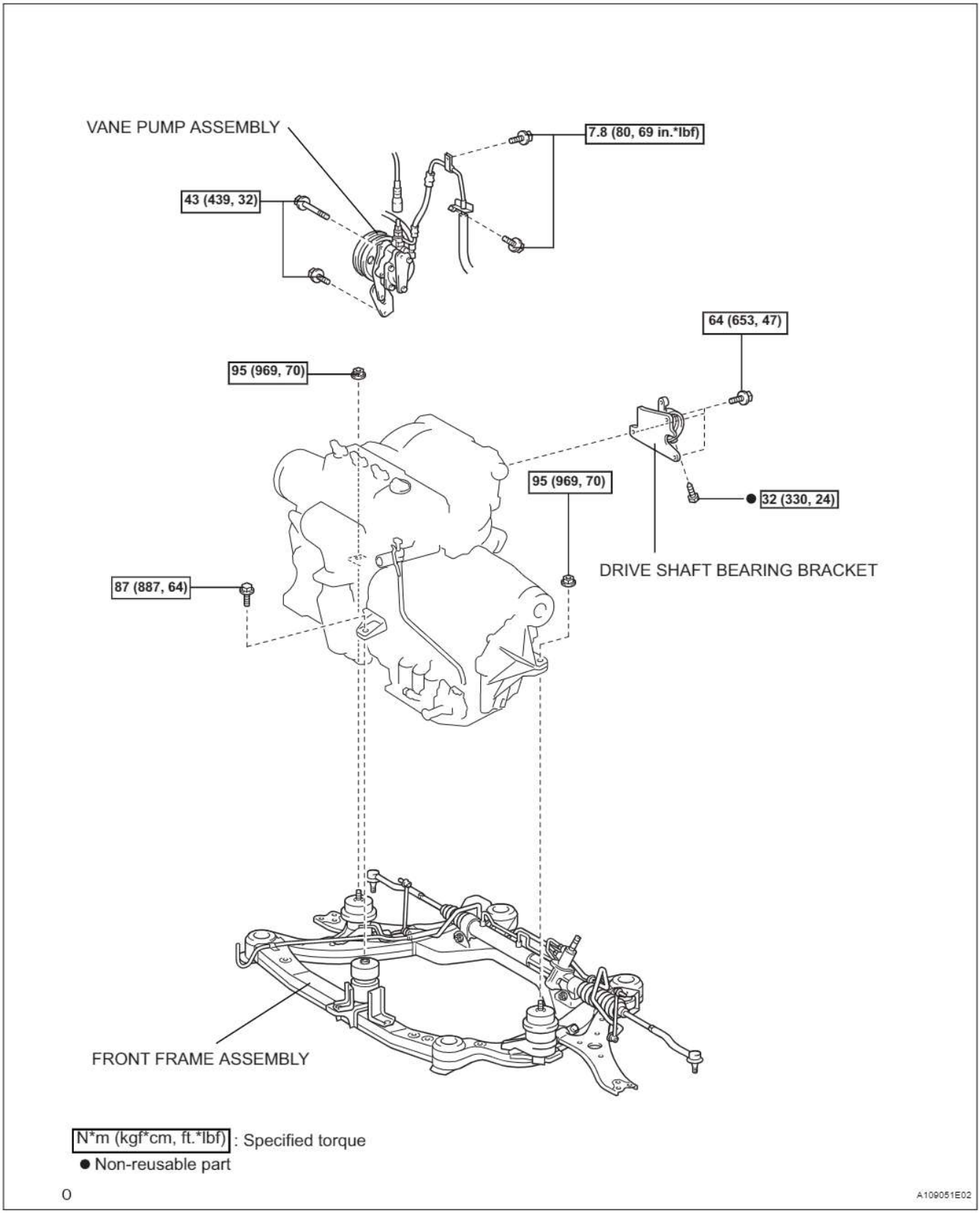


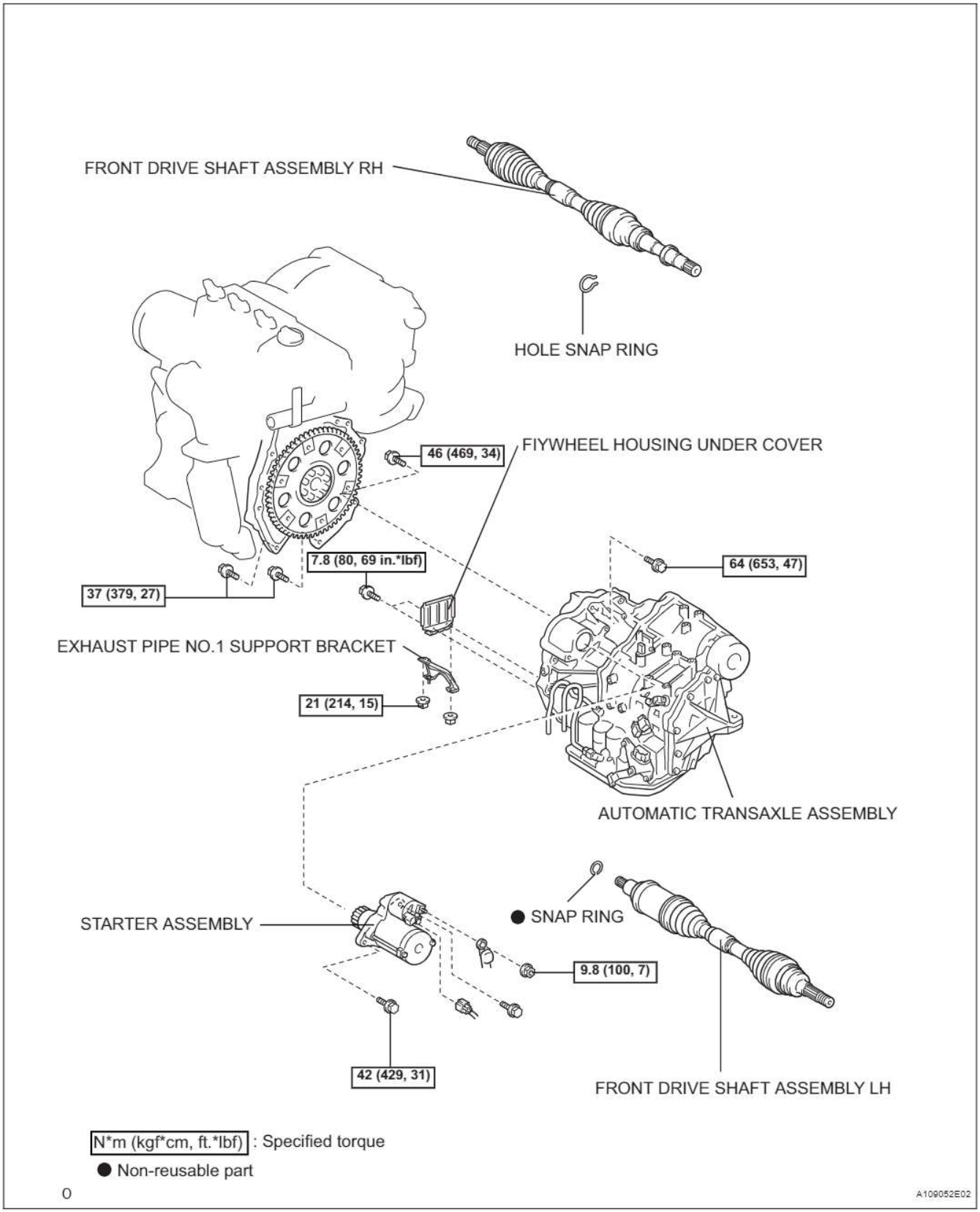

7.5 (77, 66 in.*lbf)
AIR CLEANER ASSEMBLY
AIR CLEANER BRACKET
9 (92, 80 in.*lbf)
BATTERY
BATTERY TRAY
5 (51, 44 in.*lbf)
AIR CLEANER INLET ASSEMBLY
AIR CLEANER INLET NO.1
INTAKE AIR RESONATOR
ENGINE UNDER COVER RH
ENGINE UNDER COVER LH
N*m (kgf*cm, ft.*lbf) : Specified torque
A109473E03

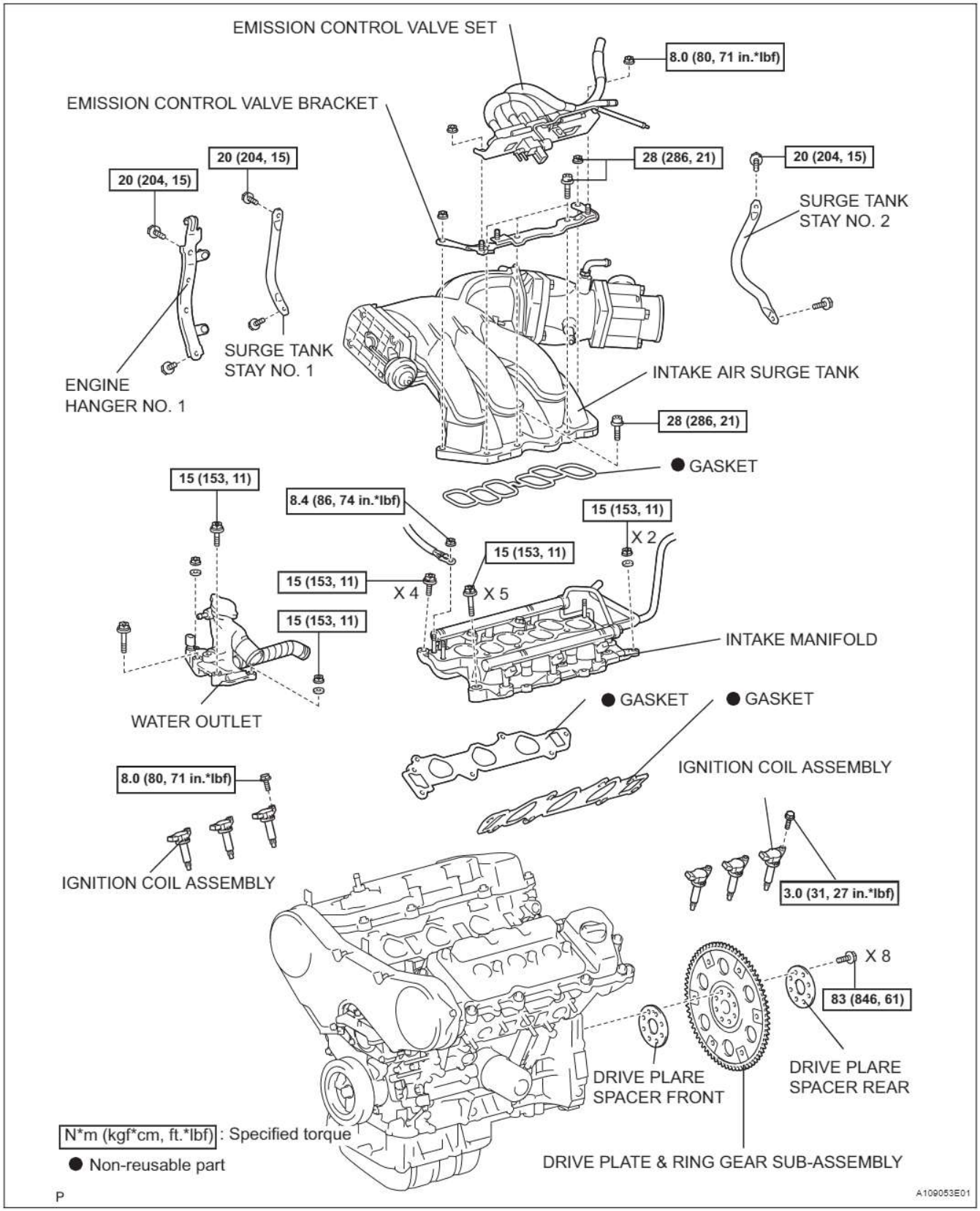

GENERATOR BRACKET NO.2
28 (286, 21)
56 (571, 41)
9.8 (100, 87 in.*lbf)
8.0 (82, 71 in.*lbf)
GENERATOR ASSEMBLY
43 (438, 32)
18 (184, 13)
18 (184, 13)
64 (653, 47)
TIE ROD ASSEMBLY LH
GENERATOR BELT ADJUSTING BAR
STEERING INTERMEDIATE SHAFT ASSEMBLY
FRONT DRIVE SHAFT ASSEMBLY LH
ENGINE MOVING CONTROL ROD
23 (235, 17)
CONDENSER
64 (653, 47)
35 (357, 26)
ENGINE MOUNTING STAY NO.2 RH
74 (755, 55)
49 (500, 36)
15 (150, 11)
FLOOR SHIFT CABLE TRANSMISSION CONTROL SELECT
294 (2,998, 217)
FRONT AXLE HUB LH NUT
FRONT STABILIZER LINK ASSEMBLY LH
SPEED SENSOR FRONT LH
127 (1,295, 94)
8.0 (82, 71 in.*lbf)
N*m (kgf*cm, ft.*lbf) :Specified torque
● Non-reusable part
A109050E02

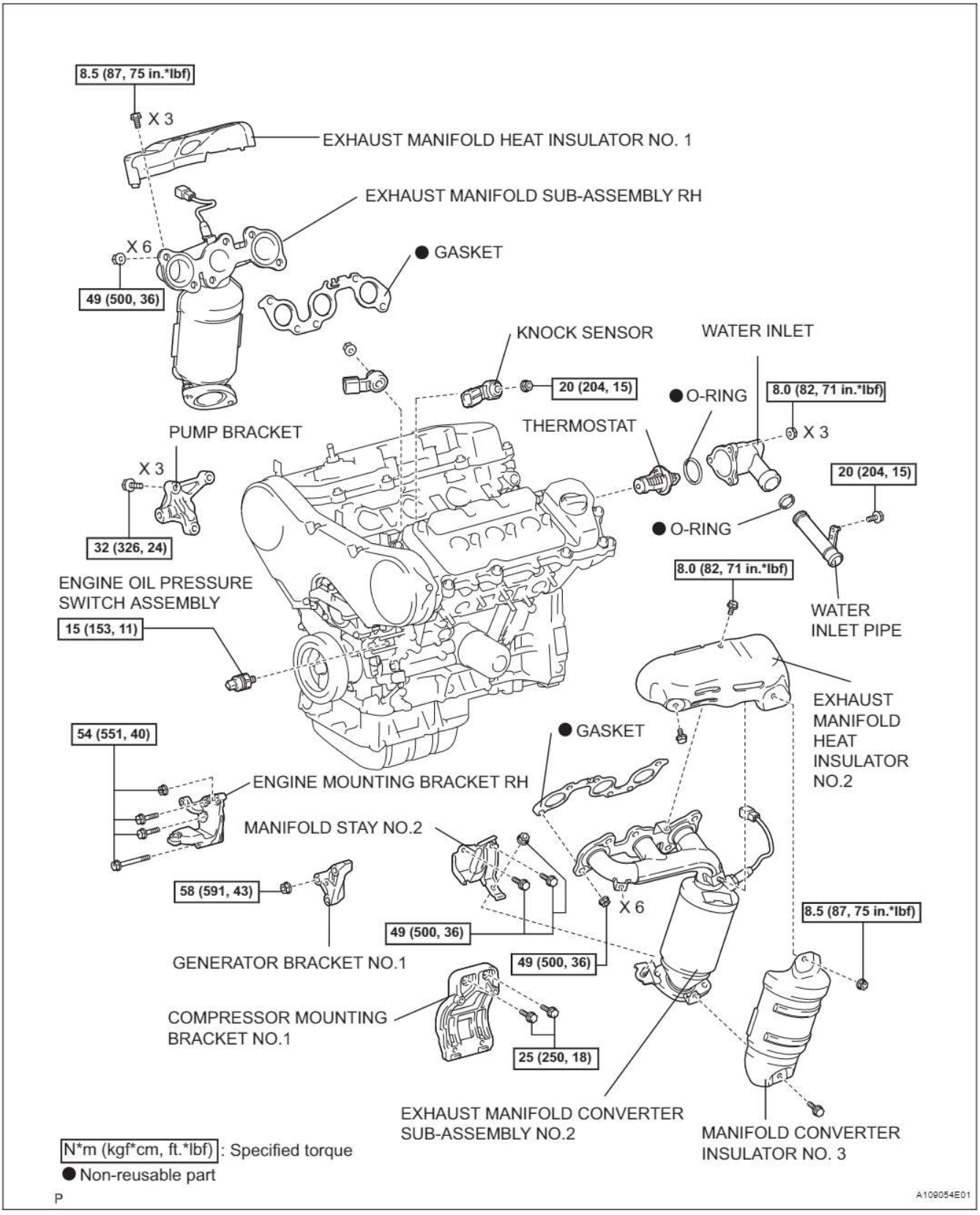
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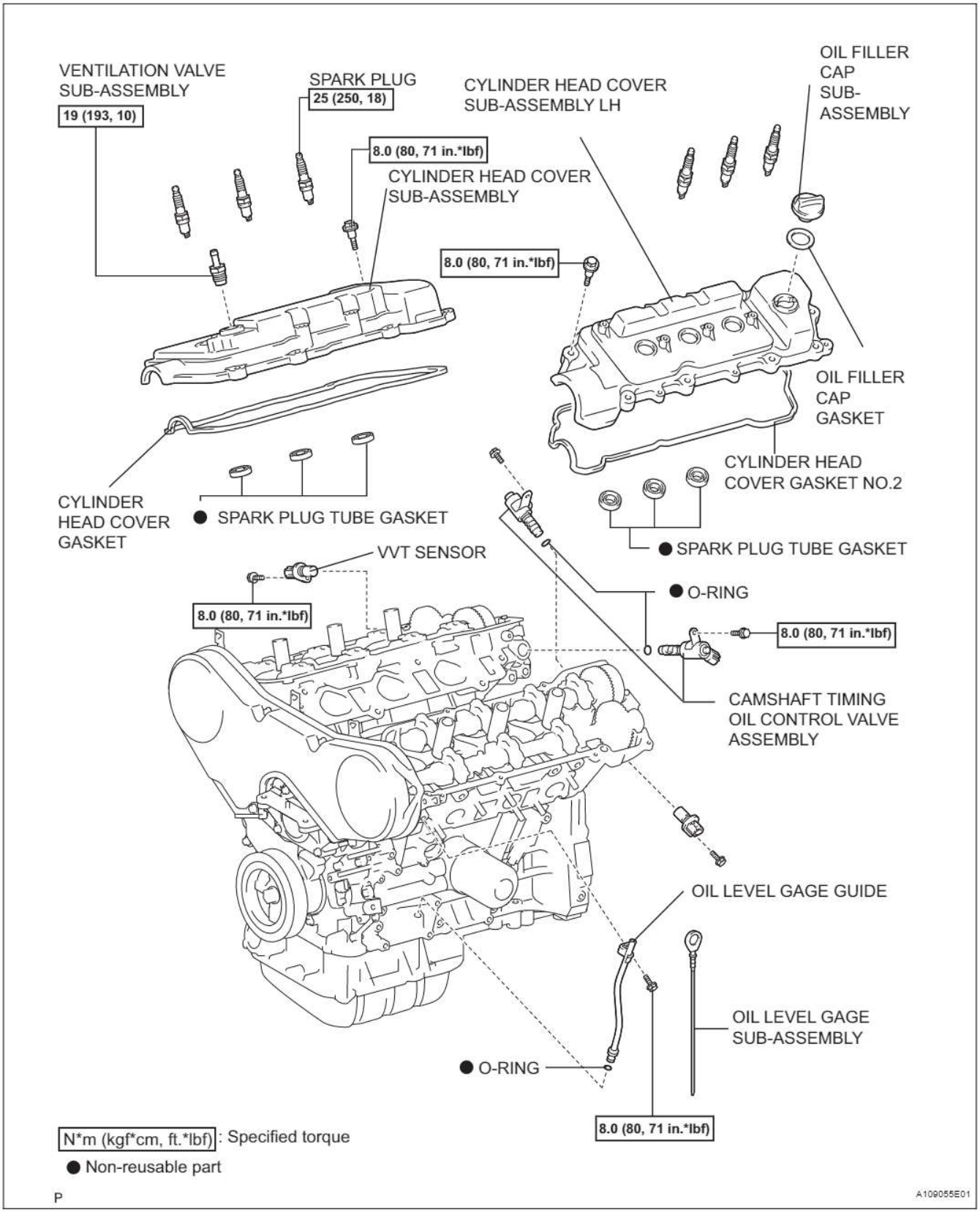

62 (633, 46)
56 (571, 41)
GASKET
COMPRESSOR AND MAGNETIC CLUTCH
26 (260, 19)
GASKET
62 (633, 46)
GASKET
FRONT EXHAUST PIPE ASSEMBLY
25 (250, 18)
EXHAUST PIPE SUPPORT BRACKET NO.1
33 (337, 24)
FRONT SUSPENSION MEMBER BRACE REAR RH
FRONT SUSPENSION MEMBER BRACE REAR LH
32 (326, 24)
FRAME SIDE RAIL PLATE RH
85 (867, 63)
FRAME SIDE RAIL PLATE LH
32 (326, 24)
85 (867, 63)
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
A109474E02


VANE PUMP ASSEMBLY
7.8 (80, 69 in.*lbf)
43 (439, 32)
64 (653, 47)
95 (969, 70)
95 (969, 70)
32 (330, 24)
DRIVE SHAFT BEARING BRACKET
87 (887, 64)
FRONT FRAME ASSEMBLY
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
A109051E02

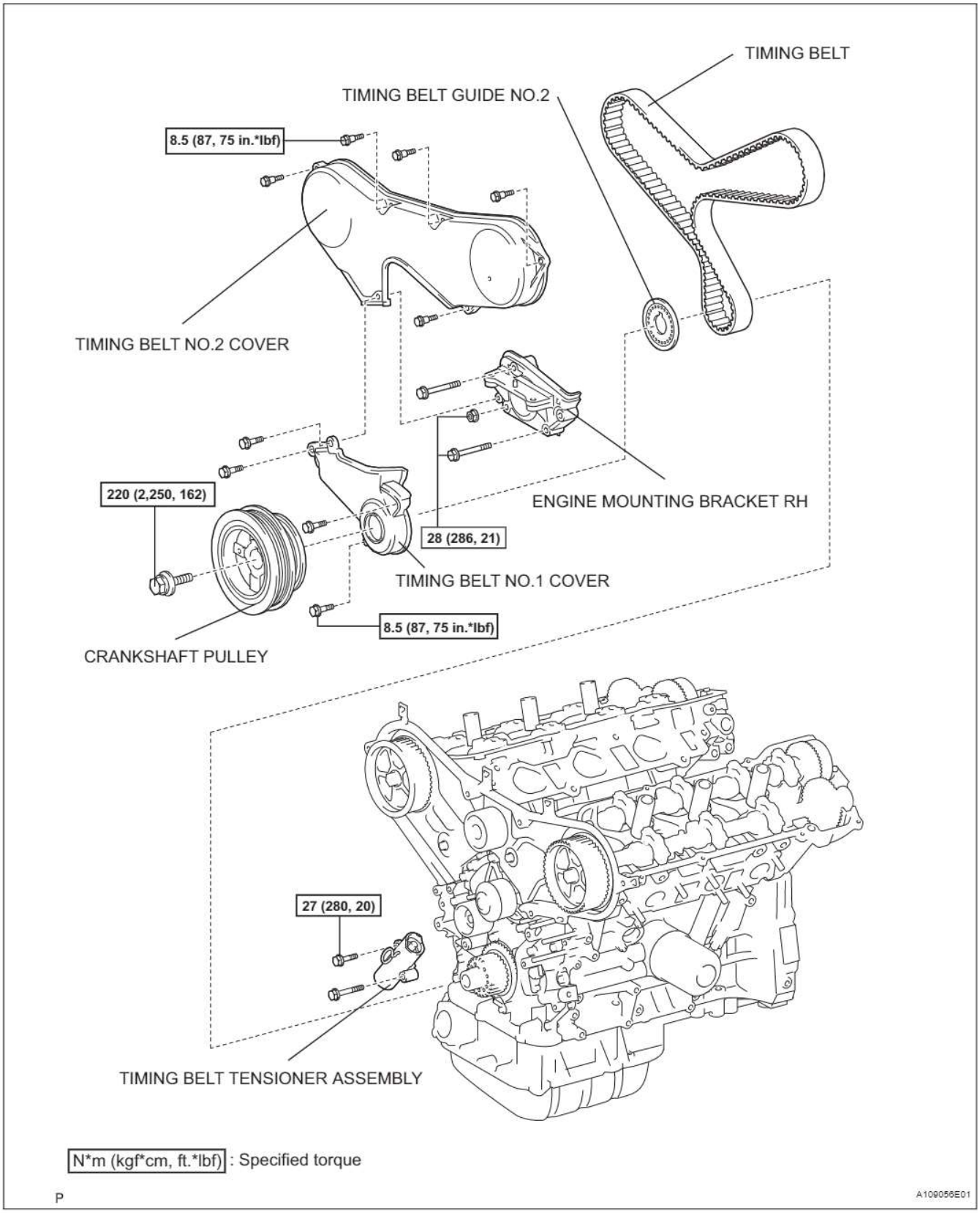

FRONT DRIVE SHAFT ASSEMBLY RH
HOLE SNAP RING
FIYWHEEL HOUSING UNDER COVER
46 (469, 34)
7.8 (80, 69 in.*lbf)
64 (653, 47)
37 (379, 27)
EXHAUST PIPE NO.1 SUPPORT BRACKET
21 (214, 15)
AUTOMATIC TRANSAXLE ASSEMBLY
STARTER ASSEMBLY
● SNAP RING
9.8 (100, 7)
42 (429, 31)
FRONT DRIVE SHAFT ASSEMBLY LH
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
A109052E02

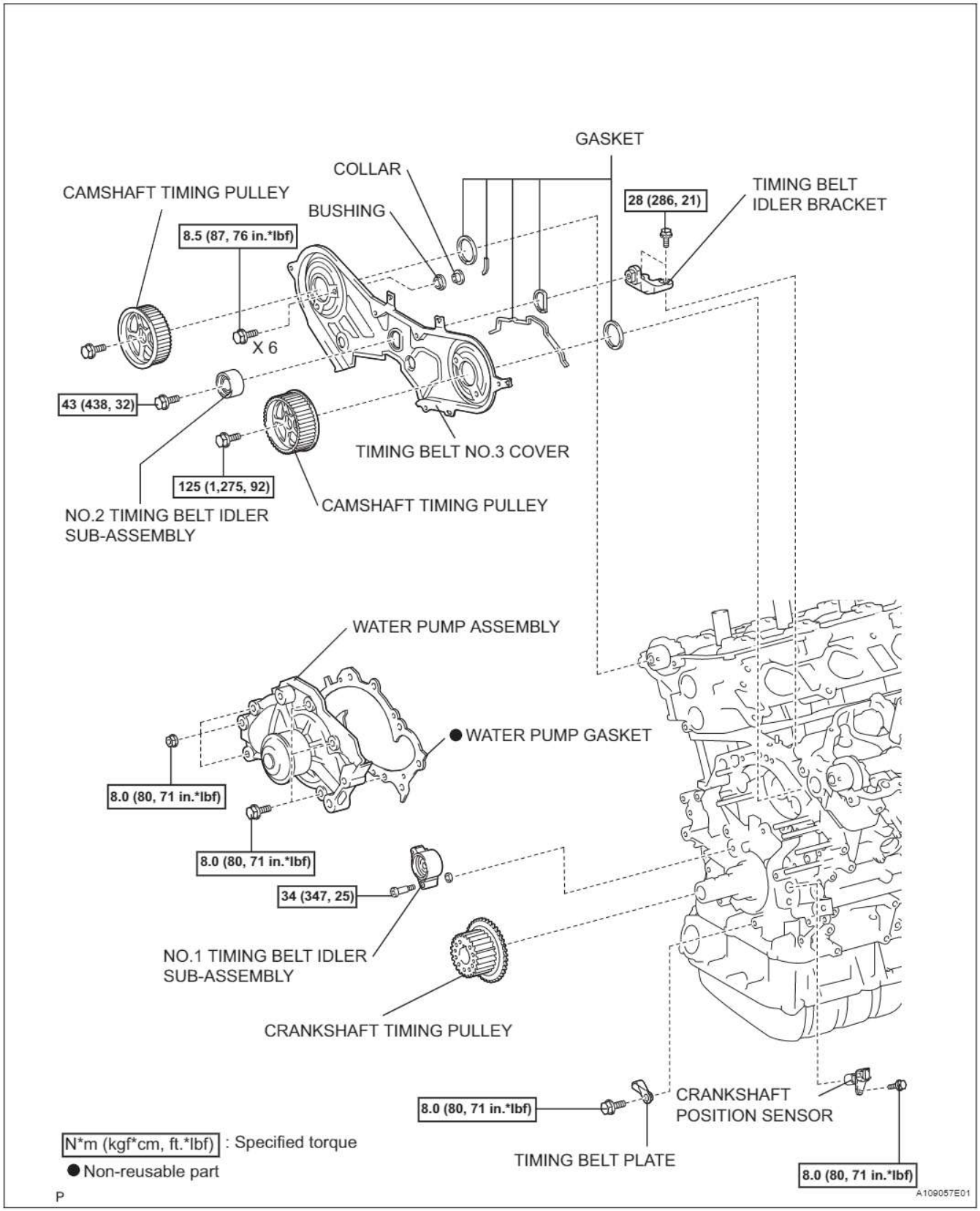

EMISSION CONTROL VALVE SET
8.0 (80, 71 in.*lbf)
EMISSION CONTROL VALVE BRACKET
20 (204, 15)
20 (204, 15)
28 (286, 21)
20 (204, 15)
SURGE TANK STAY NO. 2
SURGE TANK STAY NO. 1
ENGINE HANGER NO. 1
INTAKE AIR SURGE TANK
28 (286, 21)
● GASKET
15 (153, 11)
8.4 (86, 74 in.*lbf)
15 (153, 11)
X 2
15 (153, 11)
15 (153, 11)
X 4
X 5
15 (153, 11)
INTAKE MANIFOLD
WATER OUTLET
● GASKET
● GASKET
IGNITION COIL ASSEMBLY
8.0 (80, 71 in.*lbf)
IGNITION COIL ASSEMBLY
3.0 (31, 27 in.*lbf)
X 8
83 (846, 61)
DRIVE PLARE SPACER FRONT
DRIVE PLARE SPACER REAR
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
DRIVE PLATE & RING GEAR SUB-ASSEMBLY
P
A109053E01

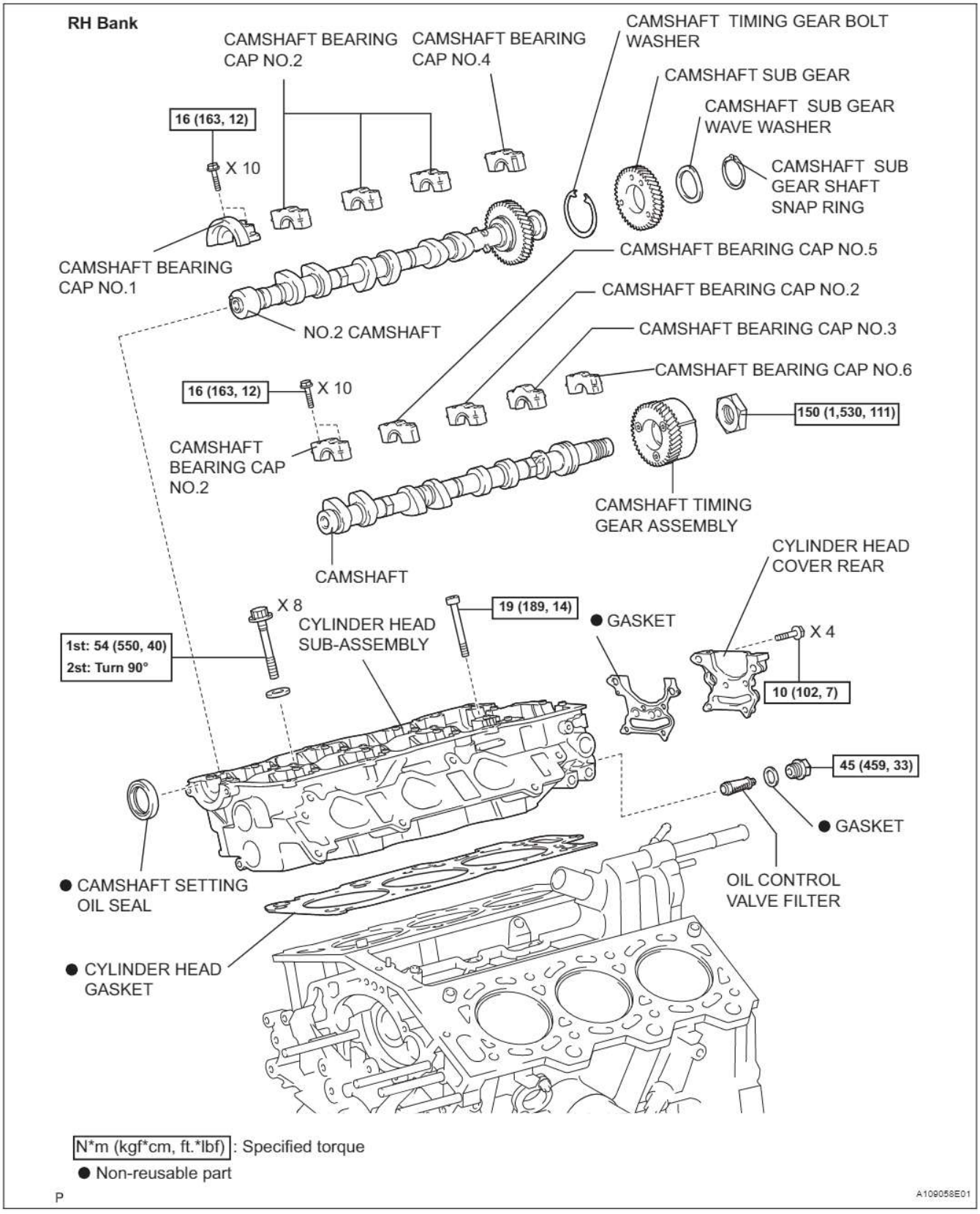

8.5 (87, 75 in.*lbf)
X 3
EXHAUST MANIFOLD HEAT INSULATOR NO. 1
EXHAUST MANIFOLD SUB-ASSEMBLY RH
X 6
GASKET
49 (500, 36)
KNOCK SENSOR
WATER INLET
20 (204, 15)
O-RING
8.0 (82, 71 in.*lbf)
PUMP BRACKET
THERMOSTAT
X 3
X 3
20 (204, 15)
O-RING
32 (326, 24)
8.0 (82, 71 in.*lbf)
ENGINE OIL PRESSURE SWITCH ASSEMBLY
WATER INLET PIPE
15 (153, 11)
EXHAUST MANIFOLD HEAT INSULATOR NO.2
54 (551, 40)
GASKET
ENGINE MOUNTING BRACKET RH
MANIFOLD STAY NO.2
58 (591, 43)
X 6
8.5 (87, 75 in.*lbf)
49 (500, 36)
49 (500, 36)
GENERATOR BRACKET NO.1
COMPRESSOR MOUNTING BRACKET NO.1
25 (250, 18)
EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY NO.2
MANIFOLD CONVERTER INSULATOR NO. 3
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
P
A109054E01

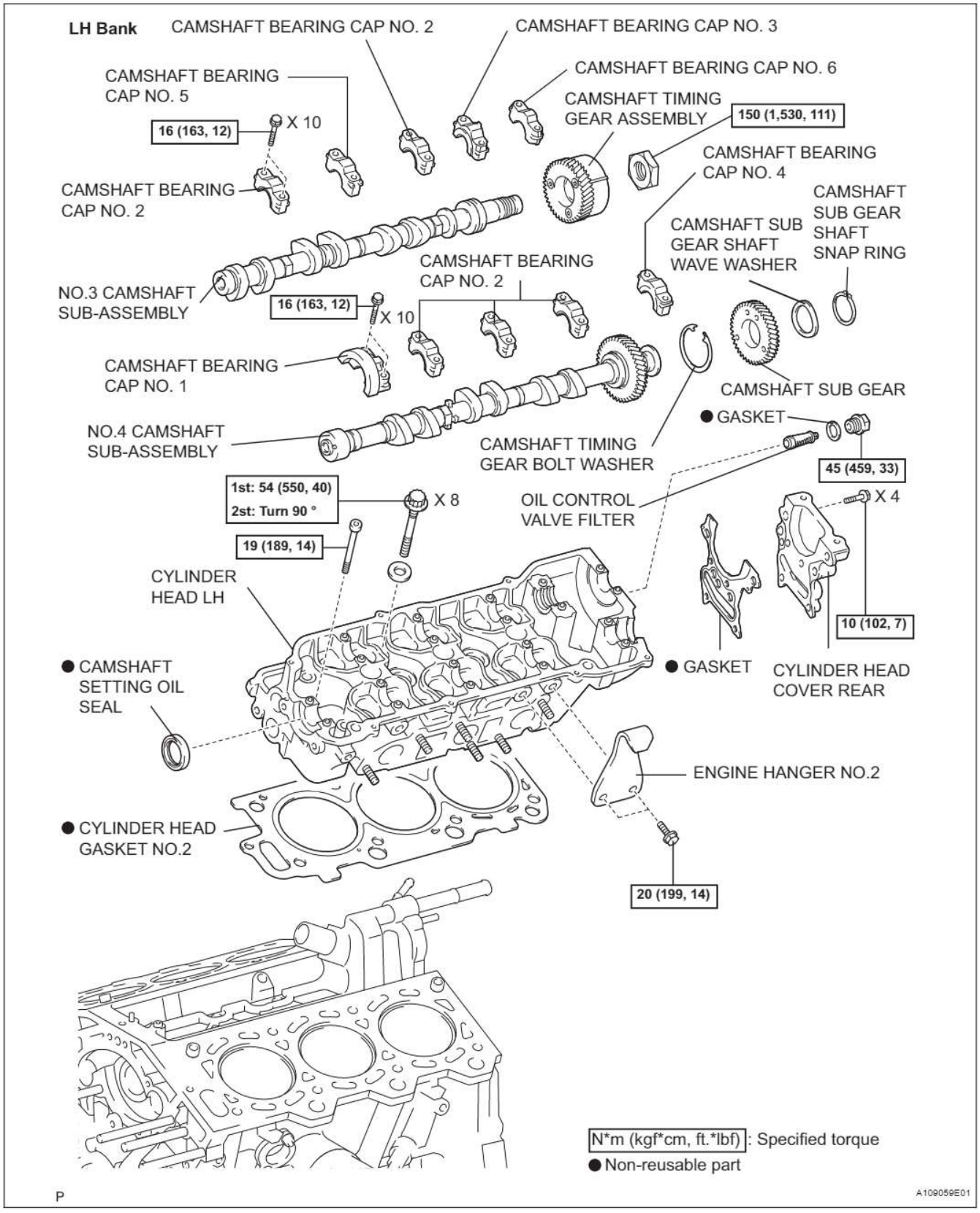

VENTILATION VALVE SUB-ASSEMBLY
19 (193, 10)
SPARK PLUG
25 (250, 18)
8.0 (80, 71 in.*lbf)
CYLINDER HEAD COVER SUB-ASSEMBLY LH
OIL FILLER CAP SUB-ASSEMBLY
CYLINDER HEAD COVER SUB-ASSEMBLY
8.0 (80, 71 in.*lbf)
OIL FILLER CAP GASKET
CYLINDER HEAD COVER GASKET NO.2
CYLINDER HEAD COVER GASKET
● SPARK PLUG TUBE GASKET
● SPARK PLUG TUBE GASKET
VVT SENSOR
● O-RING
8.0 (80, 71 in.*lbf)
8.0 (80, 71 in.*lbf)
CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY
OIL LEVEL GAGE GUIDE
OIL LEVEL GAGE SUB-ASSEMBLY
● O-RING
8.0 (80, 71 in.*lbf)
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109055E01

EM

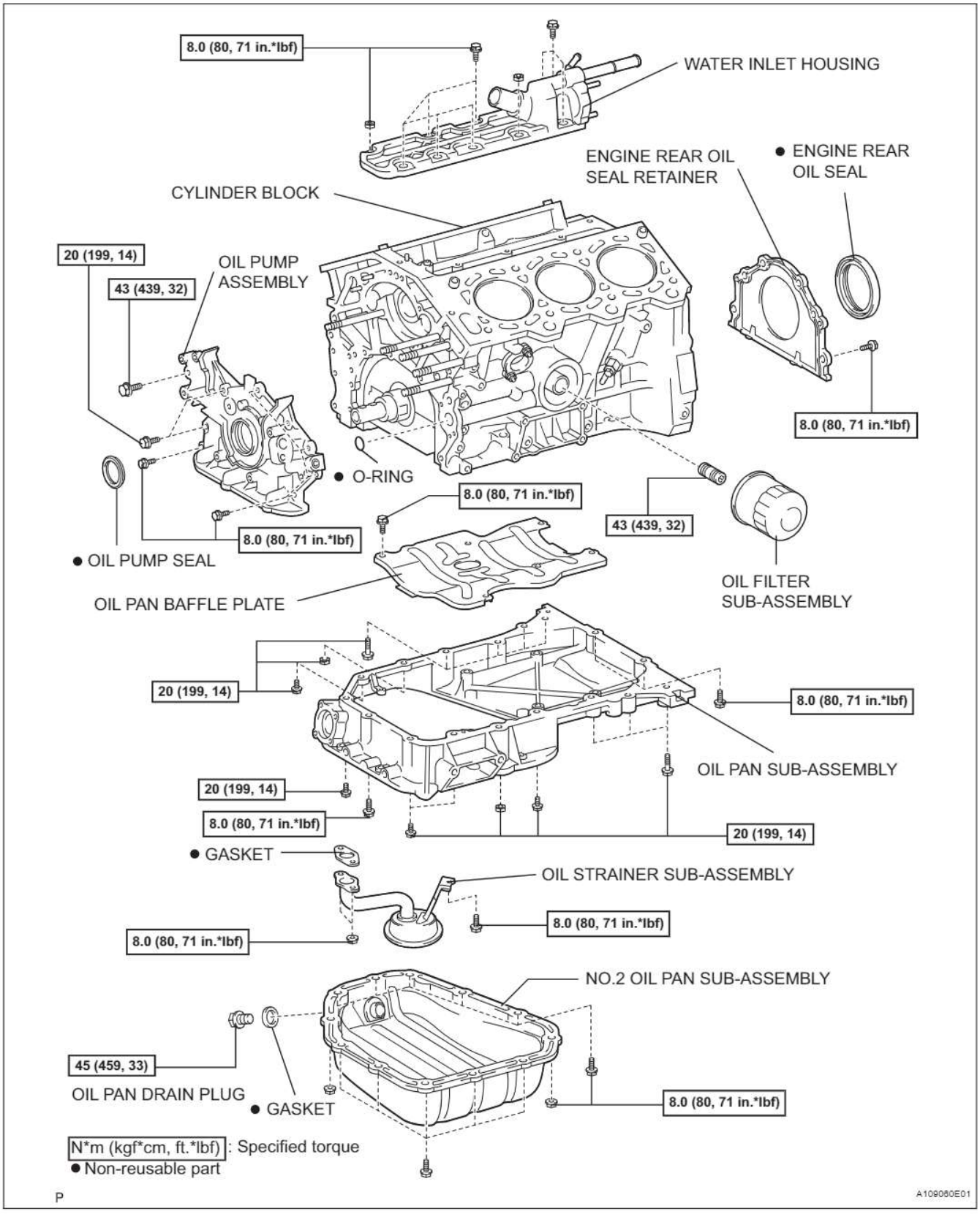

TIMING BELT
TIMING BELT GUIDE NO.2
8.5 (87, 75 in.*lbf)
TIMING BELT NO.2 COVER
220 (2,250, 162)
ENGINE MOUNTING BRACKET RH
28 (286, 21)
TIMING BELT NO.1 COVER
8.5 (87, 75 in.*lbf)
CRANKSHAFT PULLEY
27 (280, 20)
TIMING BELT TENSIONER ASSEMBLY
N*m (kgf*cm, ft.*lbf) : Specified torque
P
A109056E01

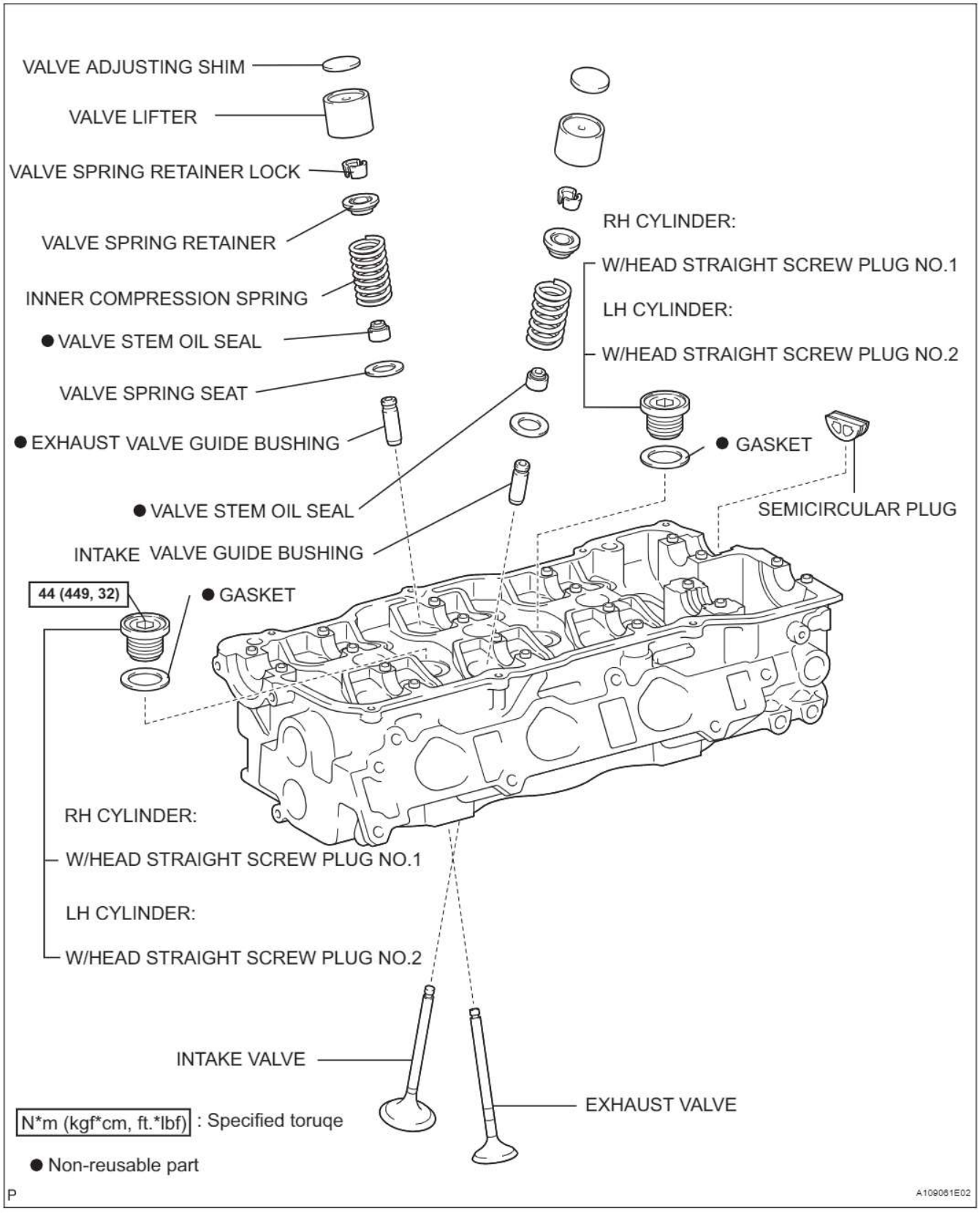

GASKET
COLLAR
CAMSHAFT TIMING PULLEY
BUSHING
8.5 (87, 76 in.*lbf)
28 (286, 21)
TIMING BELT IDLER BRACKET
X 6
43 (438, 32)
TIMING BELT NO.3 COVER
125 (1,275, 92)
CAMSHAFT TIMING PULLEY
NO.2 TIMING BELT IDLER SUB-ASSEMBLY
WATER PUMP ASSEMBLY
● WATER PUMP GASKET
8.0 (80, 71 in.*lbf)
8.0 (80, 71 in.*lbf)
34 (347, 25)
NO.1 TIMING BELT IDLER SUB-ASSEMBLY
CRANKSHAFT TIMING PULLEY
8.0 (80, 71 in.*lbf)
CRANKSHAFT POSITION SENSOR
TIMING BELT PLATE
8.0 (80, 71 in.*lbf)
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
P
A109057E01


RH Bank
CAMSHAFT BEARING CAP NO.2
CAMSHAFT BEARING CAP NO.4
CAMSHAFT TIMING GEAR BOLT WASHER
CAMSHAFT SUB GEAR
CAMSHAFT SUB GEAR WAVE WASHER
CAMSHAFT SUB GEAR SHAFT SNAP RING
16 (163, 12)
X 10
CAMSHAFT BEARING CAP NO.1
NO.2 CAMSHAFT
CAMSHAFT BEARING CAP NO.5
CAMSHAFT BEARING CAP NO.2
CAMSHAFT BEARING CAP NO.3
CAMSHAFT BEARING CAP NO.6
16 (163, 12)
X 10
150 (1,530, 111)
CAMSHAFT BEARING CAP NO.2
CAMSHAFT TIMING GEAR ASSEMBLY
CAMSHAFT
CYLINDER HEAD COVER REAR
X 8
19 (189, 14)
GASKET
X 4
1st: 54 (550, 40)
2st: Turn 90°
CYLINDER HEAD SUB-ASSEMBLY
10 (102, 7)
45 (459, 33)
GASKET
CAMSHAFT SETTING OIL SEAL
OIL CONTROL VALVE FILTER
CYLINDER HEAD GASKET
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
P
A109058E01

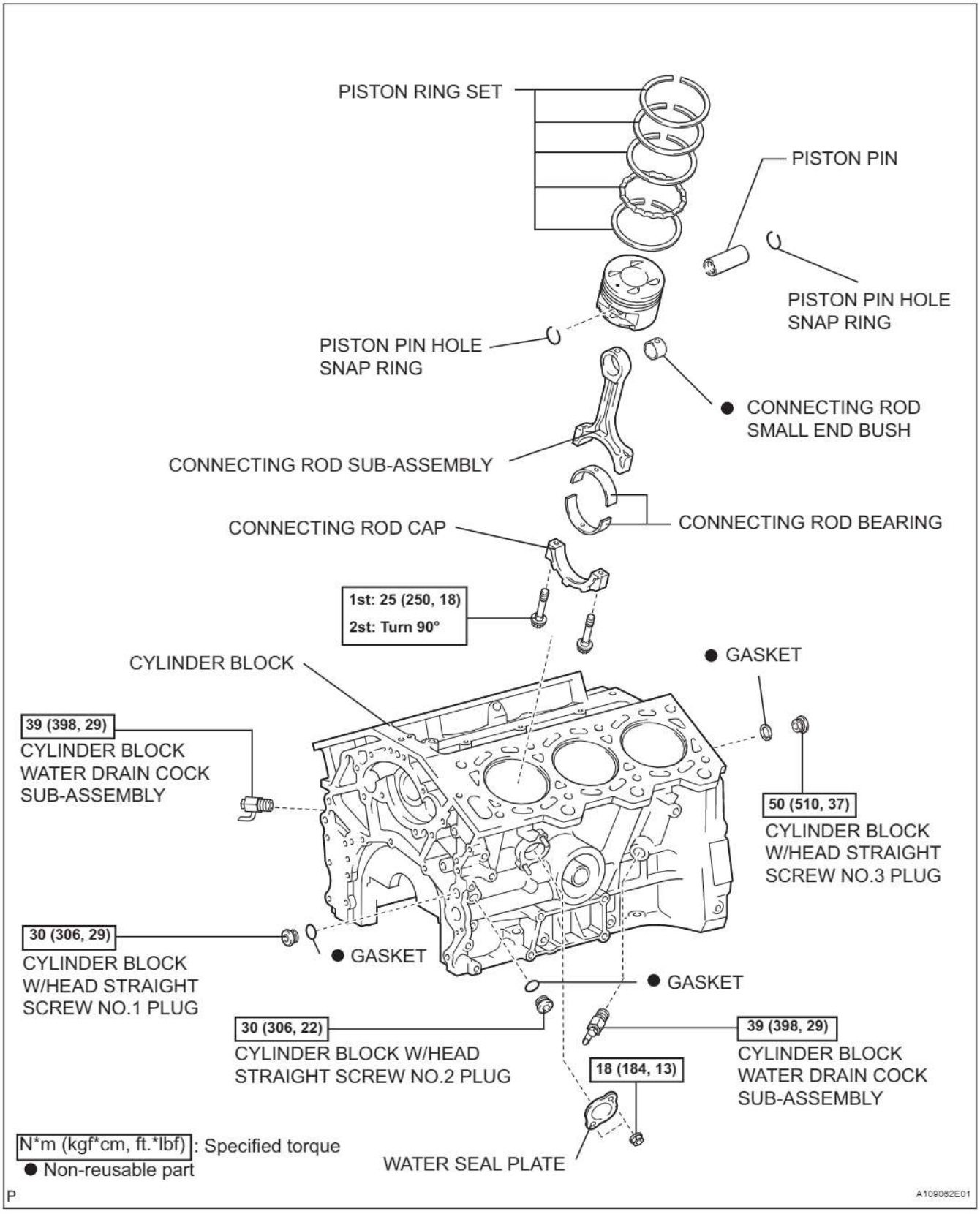

LH Bank
CAMSHAFT BEARING CAP NO. 2
CAMSHAFT BEARING CAP NO. 3
CAMSHAFT BEARING CAP NO. 6
CAMSHAFT BEARING CAP NO. 5
CAMSHAFT TIMING GEAR ASSEMBLY
150 (1,530, 111)
16 (163, 12)
X 10
CAMSHAFT BEARING CAP NO. 4
CAMSHAFT BEARING CAP NO. 2
CAMSHAFT SUB GEAR SHAFT SNAP RING
CAMSHAFT SUB GEAR SHAFT WAVE WASHER
CAMSHAFT BEARING CAP NO. 2
NO.3 CAMSHAFT SUB-ASSEMBLY
16 (163, 12)
X 10
CAMSHAFT BEARING CAP NO. 1
CAMSHAFT SUB GEAR
GASKET
NO.4 CAMSHAFT SUB-ASSEMBLY
CAMSHAFT TIMING GEAR BOLT WASHER
45 (459, 33)
1st: 54 (550, 40)
2st: Turn 90 °
X 8
OIL CONTROL VALVE FILTER
X 4
19 (189, 14)
CYLINDER HEAD LH
10 (102, 7)
CAMSHAFT SETTING OIL SEAL
GASKET
CYLINDER HEAD COVER REAR
ENGINE HANGER NO.2
CYLINDER HEAD GASKET NO.2
20 (199, 14)
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
P
A109059E01

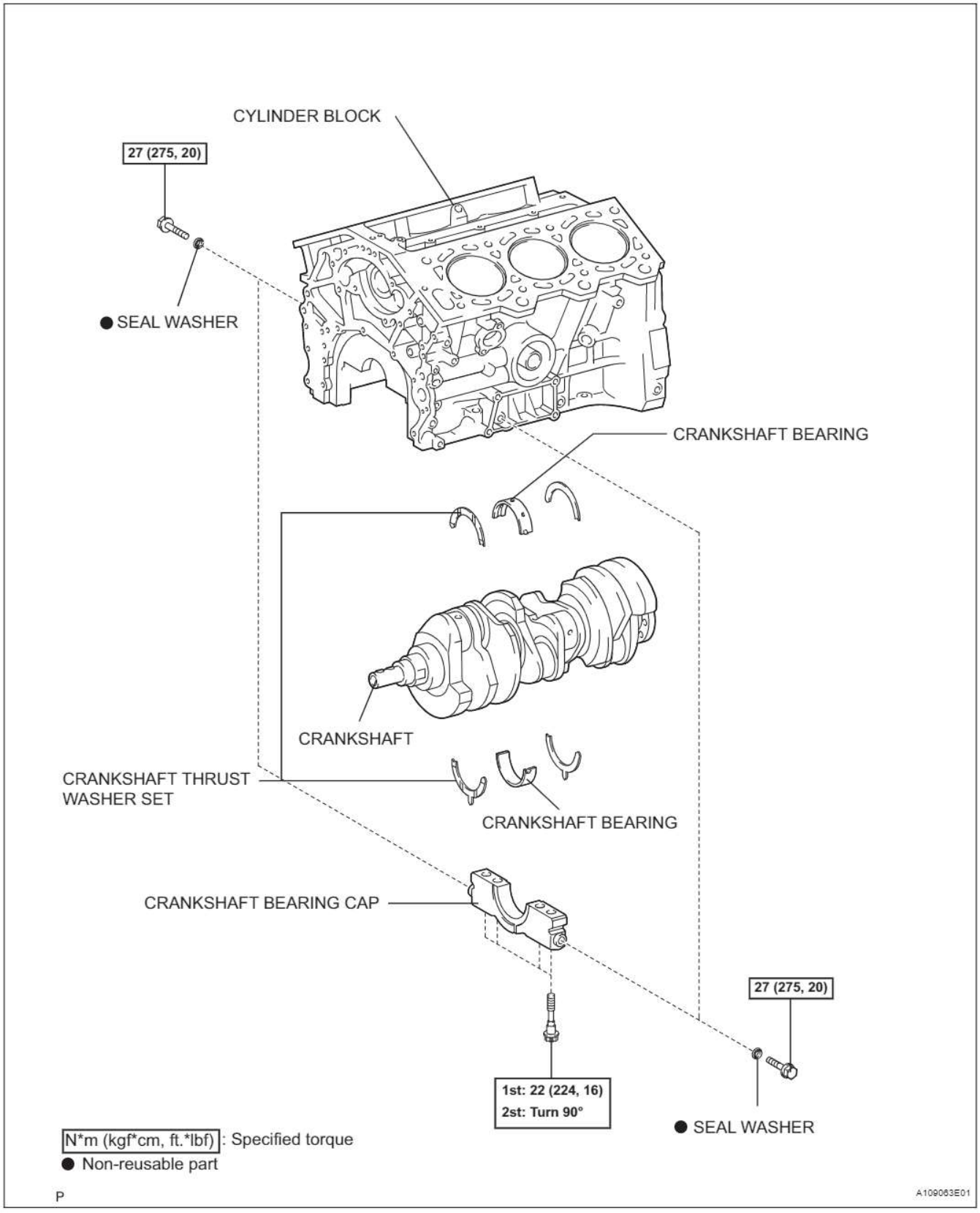
EM


8.0 (80, 71 in.*lbf)
WATER INLET HOUSING
ENGINE REAR OIL SEAL RETAINER
● ENGINE REAR OIL SEAL
CYLINDER BLOCK
20 (199, 14)
43 (439, 32)
OIL PUMP ASSEMBLY
8.0 (80, 71 in.*lbf)
● O-RING
8.0 (80, 71 in.*lbf)
43 (439, 32)
8.0 (80, 71 in.*lbf)
● OIL PUMP SEAL
OIL FILTER SUB-ASSEMBLY
OIL PAN BAFFLE PLATE
20 (199, 14)
8.0 (80, 71 in.*lbf)
OIL PAN SUB-ASSEMBLY
20 (199, 14)
8.0 (80, 71 in.*lbf)
20 (199, 14)
● GASKET
OIL STRAINER SUB-ASSEMBLY
8.0 (80, 71 in.*lbf)
8.0 (80, 71 in.*lbf)
NO.2 OIL PAN SUB-ASSEMBLY
45 (459, 33)
OIL PAN DRAIN PLUG
● GASKET
8.0 (80, 71 in.*lbf)
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109060E01


VALVE ADJUSTING SHIM
VALVE LIFTER
VALVE SPRING RETAINER LOCK
VALVE SPRING RETAINER
INNER COMPRESSION SPRING
● VALVE STEM OIL SEAL
VALVE SPRING SEAT
● EXHAUST VALVE GUIDE BUSHING
● VALVE STEM OIL SEAL
INTAKE VALVE GUIDE BUSHING
44 (449, 32)
● GASKET
RH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.1
LH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.2
● GASKET
SEMICIRCULAR PLUG
RH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.1
LH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.2
INTAKE VALVE
EXHAUST VALVE
N*m (kgf*cm, ft.*lbf) : Specified toruqe
● Non-reusable part
P
A109061E02

EM


PISTON RING SET
PISTON PIN
PISTON PIN HOLE SNAP RING
PISTON PIN HOLE SNAP RING
● CONNECTING ROD SMALL END BUSH
CONNECTING ROD SUB-ASSEMBLY
CONNECTING ROD CAP
CONNECTING ROD BEARING
1st: 25 (250, 18)
2st: Turn 90°
CYLINDER BLOCK
● GASKET
39 (398, 29)
CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY
50 (510, 37)
CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG
30 (306, 29)
CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG
● GASKET
● GASKET
30 (306, 22)
CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG
39 (398, 29)
CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY
18 (184, 13)
WATER SEAL PLATE
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109062E01

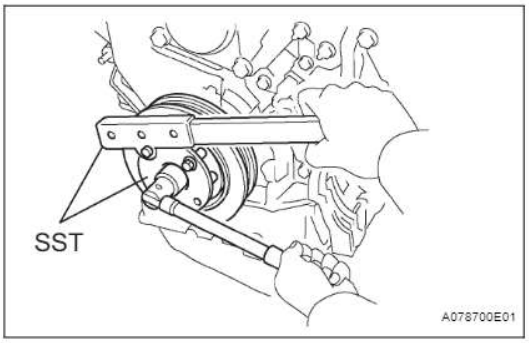

CYLINDER BLOCK
27 (275, 20)
● SEAL WASHER
CRANKSHAFT BEARING
CRANKSHAFT
CRANKSHAFT THRUST WASHER SET
CRANKSHAFT BEARING
CRANKSHAFT BEARING CAP
27 (275, 20)
1st: 22 (224, 16)
2st: Turn 90°
● SEAL WASHER
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109063E01

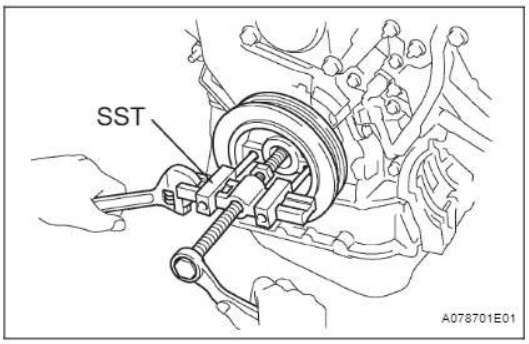
EM

EM

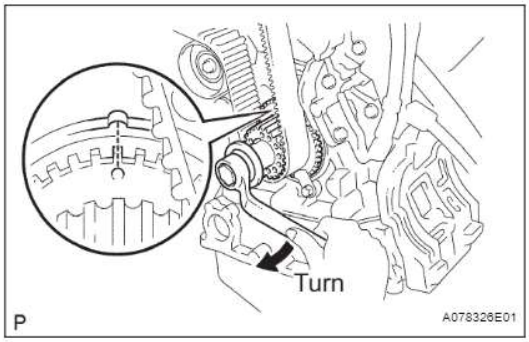
DISASSEMBLY

1. **REMOVE SPARK PLUG**
2. **REMOVE VENTILATION VALVE SUB-ASSEMBLY**
3. **REMOVE OIL FILTER CAP SUB-ASSEMBLY**
4. **REMOVE OIL FILLER CAP GASKET**
5. **REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY LH**
6. **REMOVE CYLINDER HEAD COVER GASKET NO.2**
7. **REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY**
8. **REMOVE CYLINDER HEAD COVER GASKET**
9. **REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY**
10. **REMOVE VVT SENSOR**
    (a) Remove the sensor.
    (b) Remove the O-ring from the sensor.
11. **REMOVE OIL LEVEL GAGE SUB-ASSEMBLY**
12. **REMOVE OIL LEVEL GAGE GUIDE**
13. **REMOVE CRANKSHAFT PULLEY**
    (a) Using SST, loosen the pulley bolt.
    SST 09213-54015 (91651-60855), 09330-00021



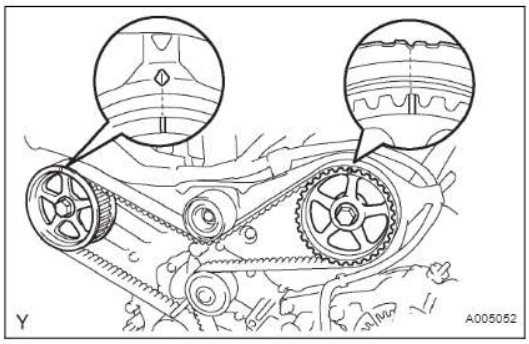


    (b) Using SST and the pulley bolt, remove the pulley.
    SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
    NOTICE:
    Before using SST, apply lubricating oil on the threads and tip of the center bolt 150.
14. **REMOVE TIMING BELT NO.1 COVER**
15. **REMOVE TIMING BELT NO.2 COVER**
16. **REMOVE ENGINE MOUNTING BRACKET RH**
17. **REMOVE TIMING BELT GUIDE NO.2**



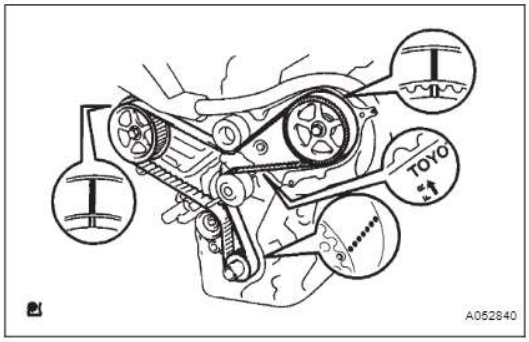
18. REMOVE TIMING BELT

(a) Set the No. 1 cylinder to TDC/compression.
  (1) Temporarily install the crankshaft pulley bolt and washer to the crankshaft.
  (2) Turn the crankshaft clockwise, and align the timing mark of the crankshaft timing pulley with the oil pump body.

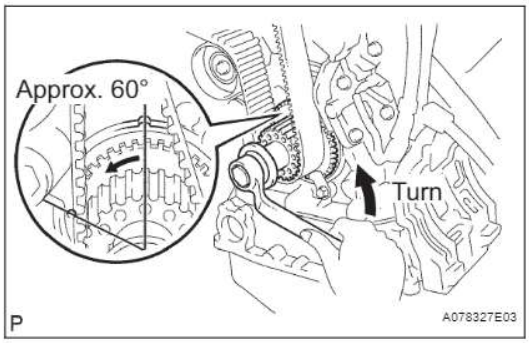


  (3) Check that timing marks of the camshaft timing pulleys and No. 3 timing belt cover are aligned. If not, turn the crankshaft 1 revolution (360°).
  (4) Remove the crankshaft pulley bolt.

EM

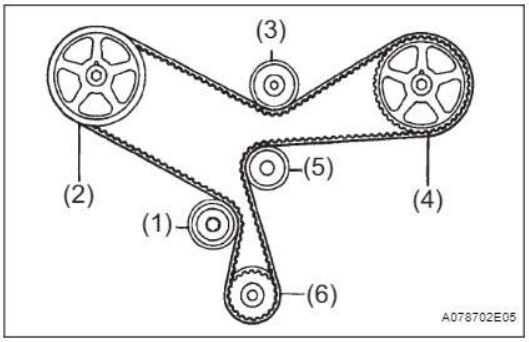


(b) If reusing the timing belt, check that there are 4 installation marks on the timing belt as shown in the illustration.
  (1) If the installation marks have disappeared, put new installation marks on the timing belt before removing.



(c) Set the No. 1 cylinder to approximately 60° BTDC/ compression.
  (1) Turn the crankshaft counterclockwise by approximately 60°.
  NOTICE:
  With timing belt removed: The crankshaft pulley must be at the correct angle to avoid damage in later steps. If the crankshaft pulley is at the wrong angle and the camshaft timing pulley and the camshaft are removed, the piston head and valve head may come in contact and incur damage.

(d) Remove the timing belt tensioner.
  NOTICE:
  Do not reinstall the tensioner with its plunger extended.



(e) Remove the timing belt in this order.

1st	No. 1 idler pulley
2nd	RH camshaft timing pulley
3rd	No. 2 idler pulley
4th	LH camshaft timing pulley
5th	Water pump pulley
6th	Crankshaft timing pulley

19. REMOVE NO.1 TIMING BELT IDLER SUB-ASSEMBLY

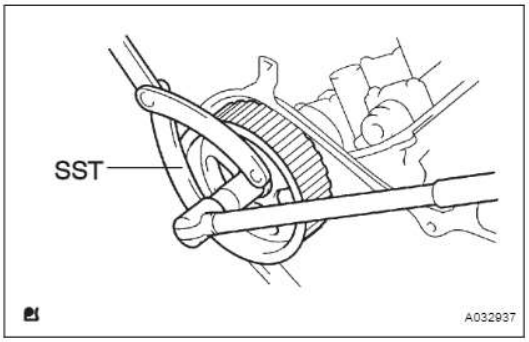
(a) Using a 10 socket hexagon wrench, remove the pivot bolt, timing belt idler No. 1 and plate washer.

20. REMOVE NO.2 TIMING BELT IDLER SUB-ASSEMBLY

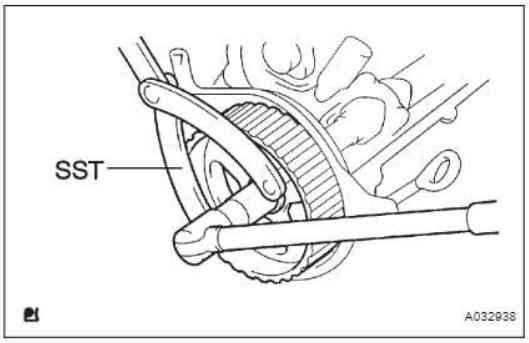
21. REMOVE CRANKSHAFT POSITION SENSOR

22. REMOVE CAMSHAFT TIMING PULLEY

(a) Using SST, remove the bolt and RH timing pulley.
SST 09960-10010 (09962-01000, 09963-01000)



(b) Using SST, remove the bolt and LH timing pulley.
SST 09960-10010 (09962-01000, 09963-01000)
HINT:
Be sure to return the RH and LH camshaft timing pulleys to their original locations when reassembling.



23. REMOVE TIMING BELT NO.3 COVER

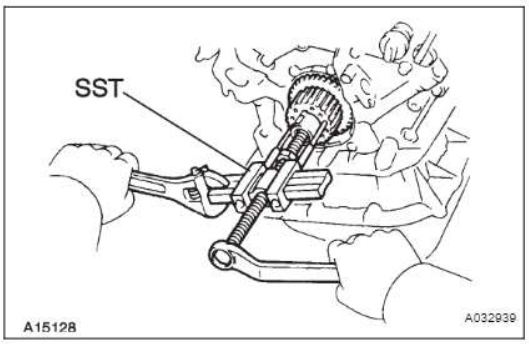
24. REMOVE TIMING BELT IDLER BRACKET

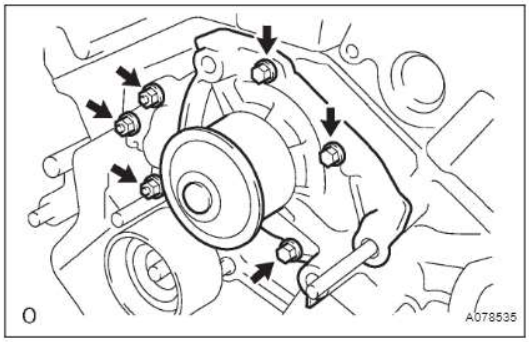
25. REMOVE CRANKSHAFT TIMING PULLEY

(a) Remove the bolt and the timing belt plate.
(b) Install the pulley bolt to the crankshaft.
(c) Using SST, remove the crankshaft timing pulley.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05011)

NOTICE:

- **Do not scratch the sensor part of the crankshaft timing pulley.**
- **Before using SST, apply lubricating oil on the threads and tip of the center bolt 150.**





26. REMOVE WATER PUMP ASSEMBLY

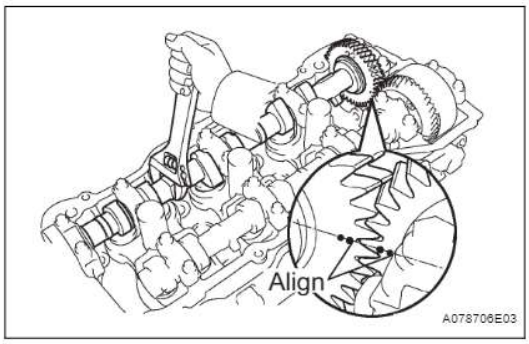
(a) Remove the 3 bolts and 3 nuts, then remove the water pump and the gasket.

27. REMOVE CAMSHAFT

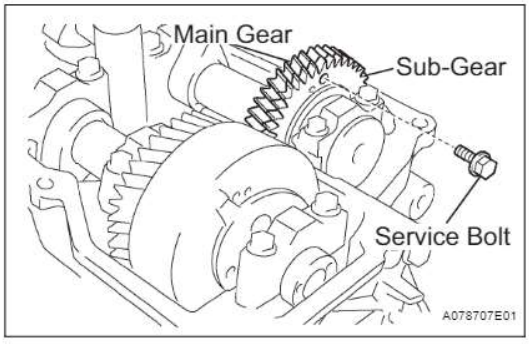
NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, damage to the cylinder head or to the camshaft may result. To avoid this, the following steps should be carried out.

(a) Align the camshaft drive and driven gear's timing marks (2 dot marks each) by turning the camshaft with a wrench.



EM



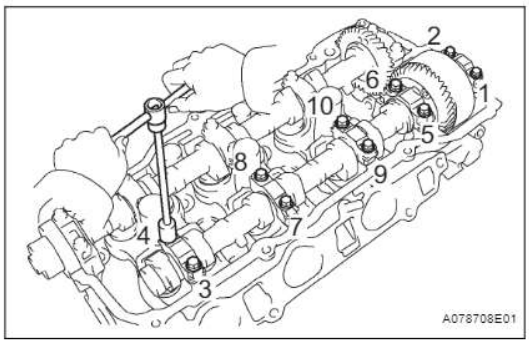
(b) Secure the exhaust camshaft sub gear to the main gear with a service bolt.
Recommended service bolt:

Item	Specified Condition
Thread diameter	6 mm
Thread pitch	1 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)

Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

HINT:

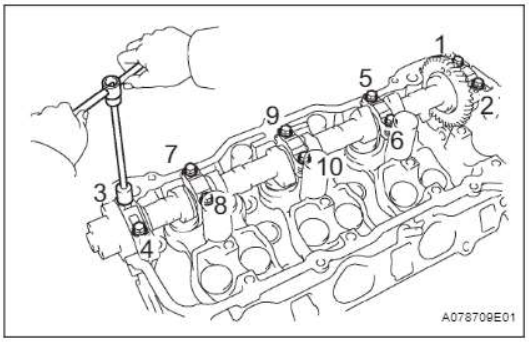
When removing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



(c) Uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration. Remove the 5 bearing caps and the camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the portion of the cylinder head receiving the shaft thrust.**



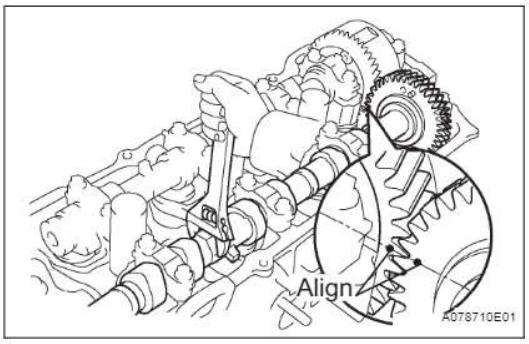
28. REMOVE NO.2 CAMSHAFT

(a) Uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration. Remove the 5 bearing caps and the No. 2 camshaft.
NOTICE:
- **Do not pry out the camshaft.**
- **Be careful not to damage the portion of the cylinder head receiving the shaft thrust.**

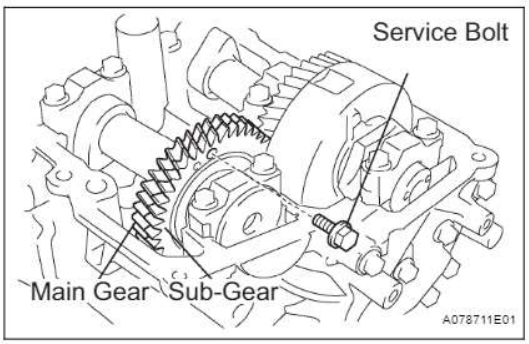
(b) Remove the oil seal from the No. 2 camshaft.

29. REMOVE NO.3 CAMSHAFT SUB-ASSEMBLY
NOTICE:
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, damage to the cylinder head or to the camshaft may result. To avoid this, the following steps should be carried out.

EM



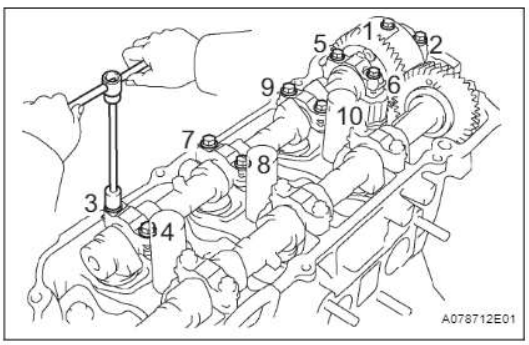
(a) Align the camshaft drive and driven gear's timing marks (1 dot mark each) by turning the camshaft with a wrench.



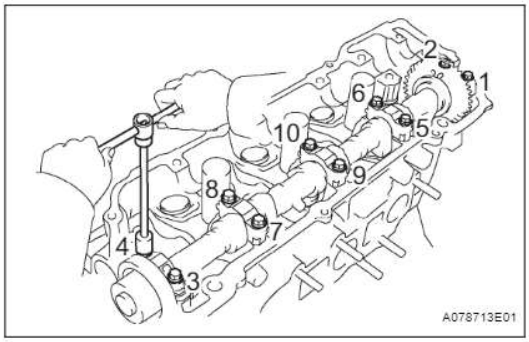
(b) Secure the exhaust camshaft sub gear to the main gear with a service bolt.
Recommended service bolt:

Thread diameter	6 mm
Thread pitch	1 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)

Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)
HINT:
When removing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



(c) Uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration. Remove the 5 bearing caps and the No. 3 camshaft.
NOTICE:
- **Do not pry out the camshaft.**
- **Be careful not to damage the portion of the cylinder head receiving the shaft thrust.**



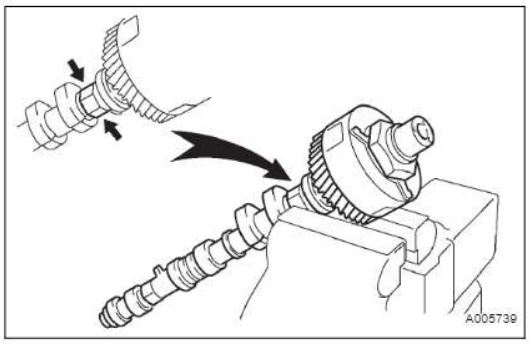
30. REMOVE NO.4 CAMSHAFT SUB-ASSEMBLY

(a) Uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration. Remove the 5 bearing caps and the No. 4 camshaft.

NOTICE:

- **Do not pry out the camshaft.**
- **Be careful not to damage the portion of the cylinder head receiving the shaft thrust.**

(b) Remove the oil seal from the No. 4 camshaft.



31. REMOVE CAMSHAFT TIMING GEAR ASSEMBLY

NOTICE:

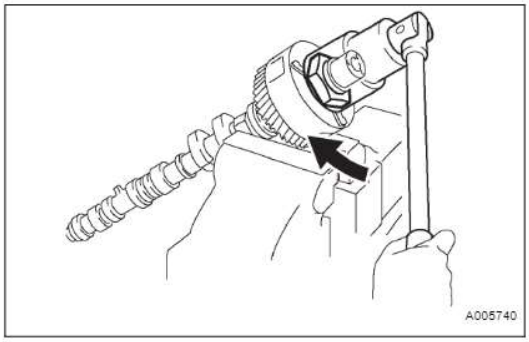
Do not remove or install the timing gear (VVT-i) unless you are replacing the VVT-i or the camshaft.

(a) Clamp the camshaft in a vise on the hexagonal lobe.

NOTICE:

Do not damage the camshaft.

EM



(b) Using a 46 mm socket wrench, remove the lock nut by turning it clockwise.

NOTICE:

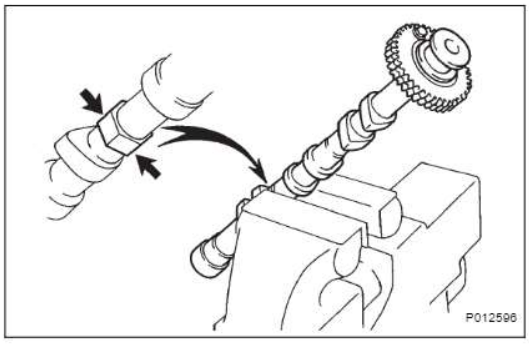
- **Remove it with the lock-pin engaged and locked at the extreme retarded angle position.**
- **The lock nut has LH threads.**
- **Only use the socket wrench. Other tools will deform the cam angle rotor.**

(c) Remove the timing gear (VVT-i).

NOTICE:

Never remove the 3 bolts on the gear.

If it is difficult to remove the VVT-i, tap it lightly using a plastic-faced hammer and then remove it.

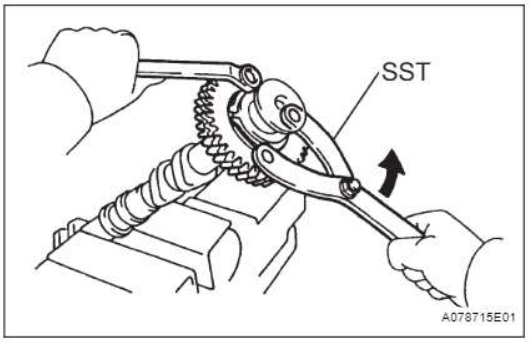


32. REMOVE CAMSHAFT SUB GEAR

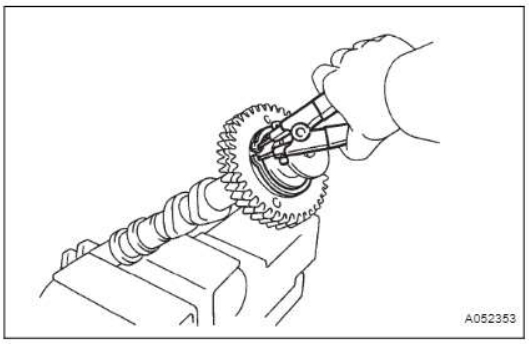
(a) Clamp the camshaft in a vise on the hexagonal lobe.

NOTICE:

Be careful not to damage the camshaft.



(b) Using SST, turn the sub gear counterclockwise, and remove the service bolt.
SST 09960-10010 (09962-01000, 09963-00500)

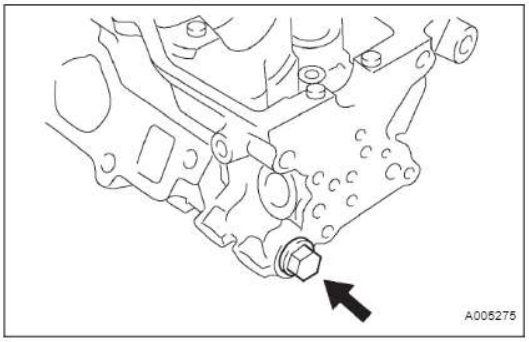


(c) Using snap ring pliers, remove the snap ring.
(d) Remove the wave washer, camshaft sub gear and camshaft gear bolt washer.
HINT:
Arrange the camshaft sub gears and gear bolt washers (RH and LH sides) so that they can be returned to the original location when reassembling.

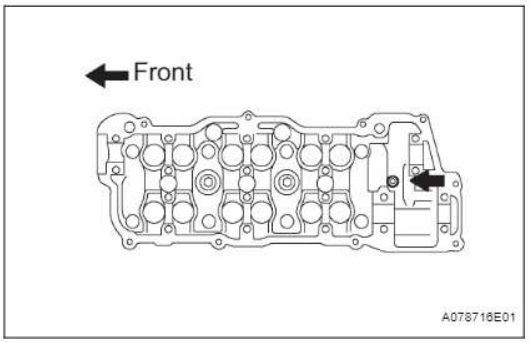
EM

33. REMOVE ENGINE HANGER NO.2

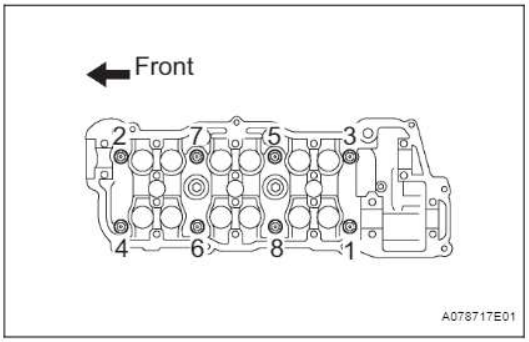
34. REMOVE CYLINDER HEAD COVER REAR



35. REMOVE OIL CONTROL VALVE FILTER
(a) Remove the plug, gasket and valve filter.

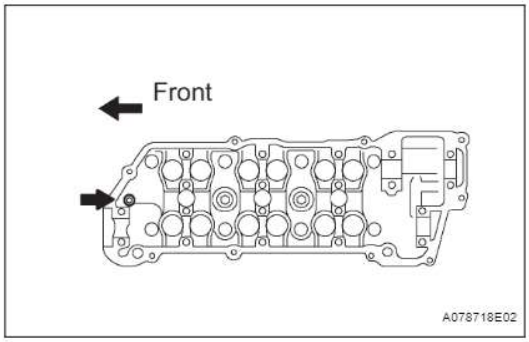


36. REMOVE CYLINDER HEAD SUB-ASSEMBLY
(a) Using an 8 mm socket hexagon wrench, remove the hexagon bolt.



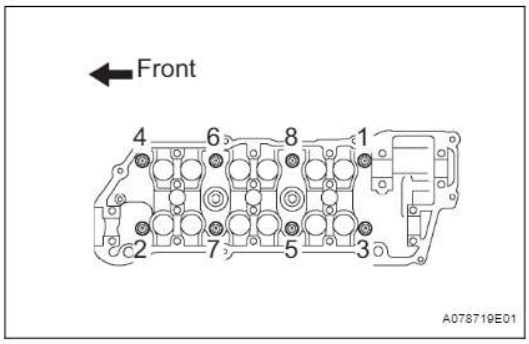
(b) Uniformly loosen the 8 cylinder head bolts in the sequence shown in the illustration. Remove the 8 cylinder head bolts and plate washers.
NOTICE:
- **Be careful not to drop washers into the cylinder head.**
- **Head warpage or cracking could result from removing bolts in an incorrect order.**

37. REMOVE CYLINDER HEAD GASKET



38. REMOVE CYLINDER HEAD LH

(a) Using an 8 mm socket hexagon wrench, remove the hexagon bolt.

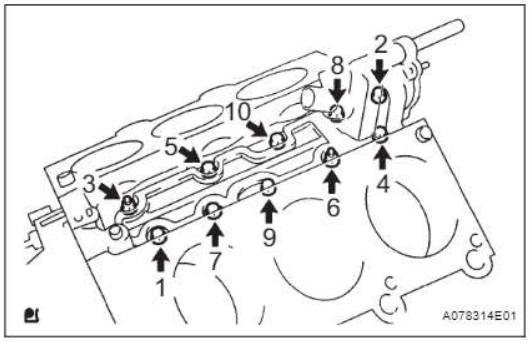


(b) Uniformly loosen the 8 cylinder head bolts in the sequence shown in the illustration. Remove the 8 cylinder head bolts and plate washers.

NOTICE:

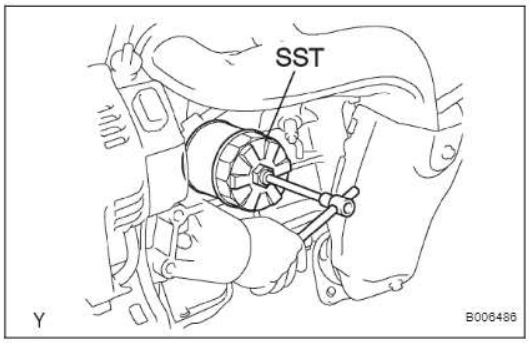
- **Be careful not to drop washers into the cylinder head.**
- **Head warpage or cracking could result from removing bolts in an incorrect order.**

39. REMOVE CYLINDER HEAD GASKET NO.2



40. REMOVE WATER INLET HOUSING

(a) Uniformly loosen and remove the 8 bolts and 2 nuts in the sequence shown in the illustration. Remove the water inlet housing.

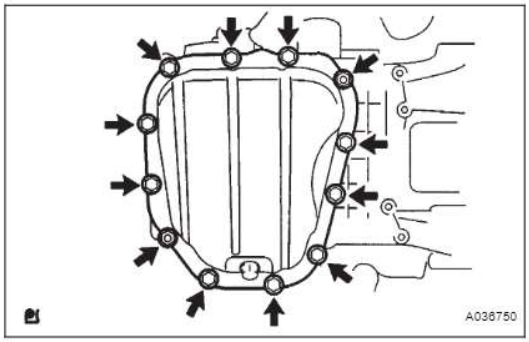


41. REMOVE OIL FILTER SUB-ASSEMBLY

(a) Using SST, remove the oil filter.
SST 09228-07501

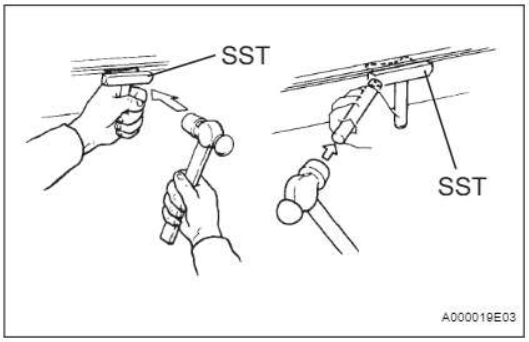
(b) Using a 12 mm socket hexagon wrench, remove the oil filter union.

42. REMOVE OIL PAN DRAIN PLUG



43. REMOVE NO.2 OIL PAN SUB-ASSEMBLY

(a) Remove the 10 bolts and 2 nuts.



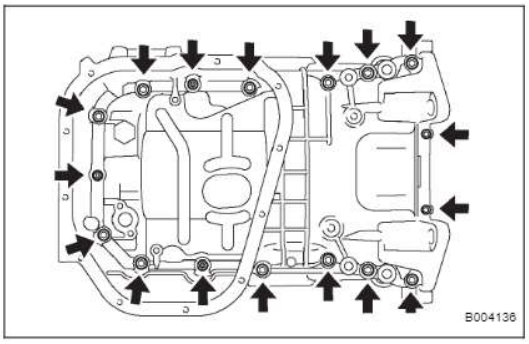
(b) Insert the blade of SST between oil pan No. 1 and oil pan No. 2. Cut through the sealer and remove the oil pan No. 2.
SST 09032-00100
NOTICE:
- **Do not damage the contact surface of oil pan No. 1 and oil pan No. 2.**
- **Do not damage the flange portion of oil pan No. 2 during removal.**

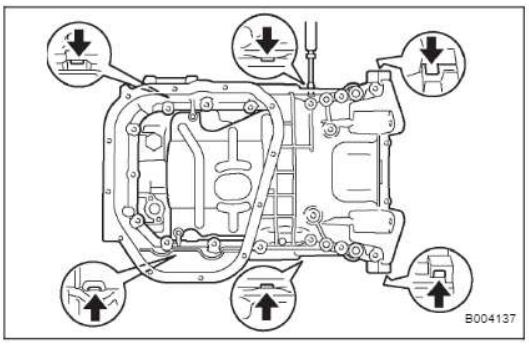
44. REMOVE OIL STRAINER SUB-ASSEMBLY

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

45. REMOVE OIL PAN SUB-ASSEMBLY

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





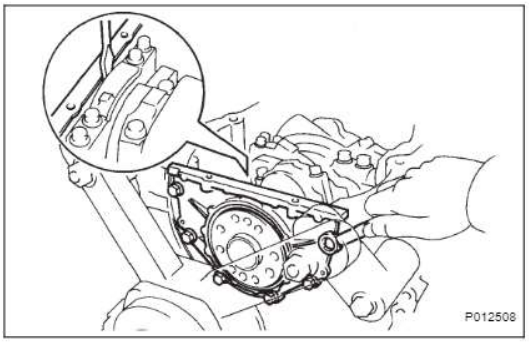
(b) Using a screwdriver, remove the oil pan by prying between the cylinder block and the oil pan.
NOTICE:
Be careful not to damage the contact surfaces of the oil pan and cylinder block.

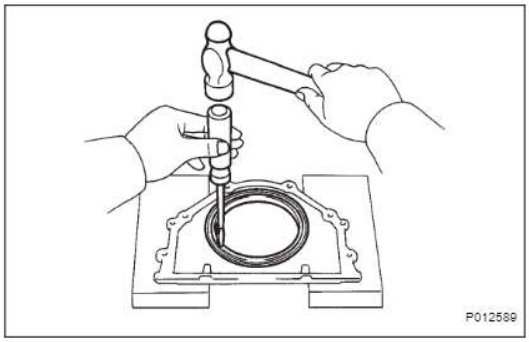
46. REMOVE OIL PAN BAFFLE PLATE

47. REMOVE ENGINE REAR OIL SEAL RETAINER

(a) Uniformly loosen and remove the 6 bolts.

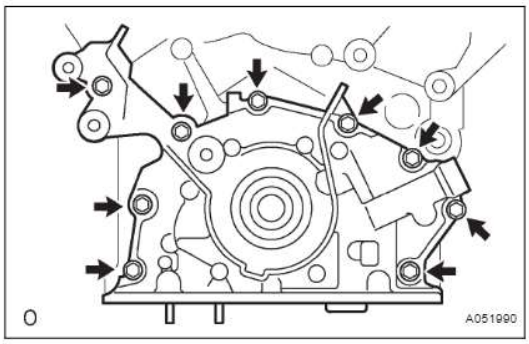
(b) Using a screwdriver, remove the oil seal retainer by prying between the oil seal retainer and the main bearing cap.





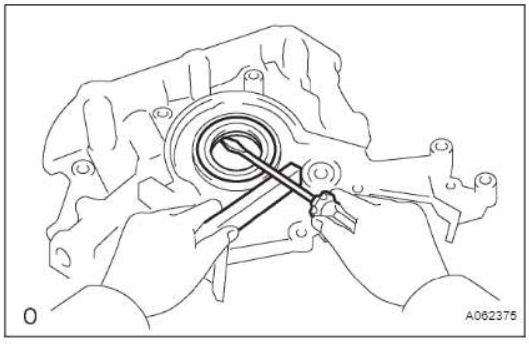
48. REMOVE ENGINE REAR OIL SEAL

(a) Using a screwdriver and a hammer, tap out the oil seal.



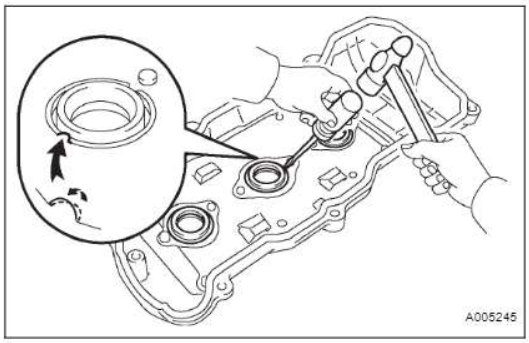
49. REMOVE OIL PUMP ASSEMBLY

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



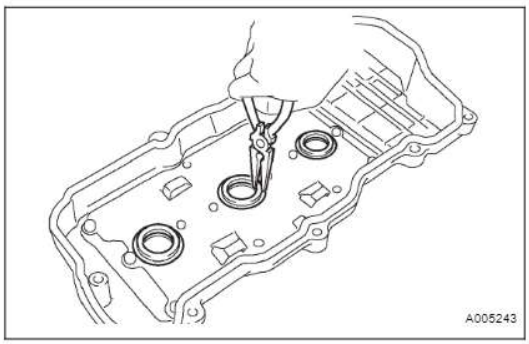
50. REMOVE OIL PUMP SEAL

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



51. REMOVE SPARK PLUG TUBE GASKET

(a) Bend up the tab on the ventilation baffle plate which prevents the gasket from slipping out.
NOTICE:
Be careful not to damage the baffle plate of the cylinder head cover.
(b) Using a screwdriver and a hammer, tap out the gasket.



(c) Using needle-nose pliers, pry out the gasket.
NOTICE:
Be careful not to damage the cylinder head cover.

52. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY

53. REMOVE WATER SEAL PLATE

54. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG

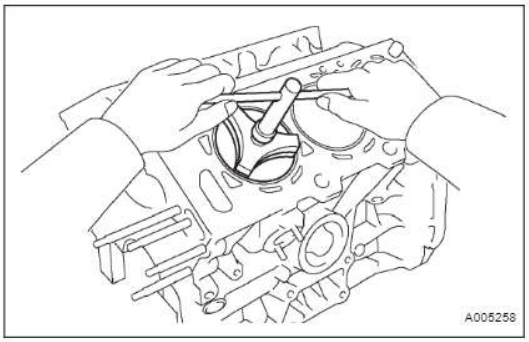
(a) Using a 10 mm socket hexagon wrench, remove the screw plug.

55. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG

(a) Using a 10 mm socket hexagon wrench, remove the screw plug.

56. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG

(a) Using a 10 mm socket hexagon wrench, remove the screw plug.

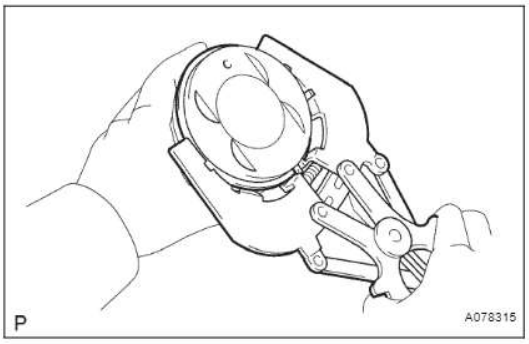


57. REMOVE PISTON AND CONNECTING ROD

(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.

(b) Push out the piston and the connecting rod assembly from the top of the cylinder block.
HINT:
- Keep the bearings, the connecting rod and the cap together.
- Arrange the piston and the connecting rod assemblies in correct order so they can be returned to the original locations when reassembling.

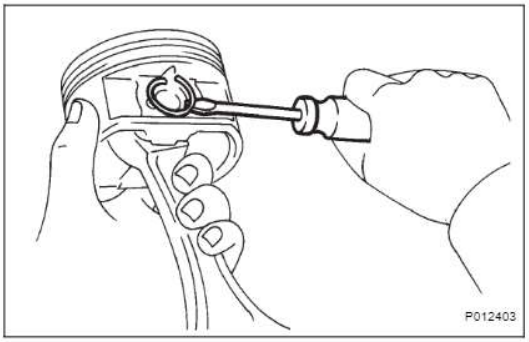
58. REMOVE CONNECTING ROD BEARING



59. REMOVE PISTON RING SET

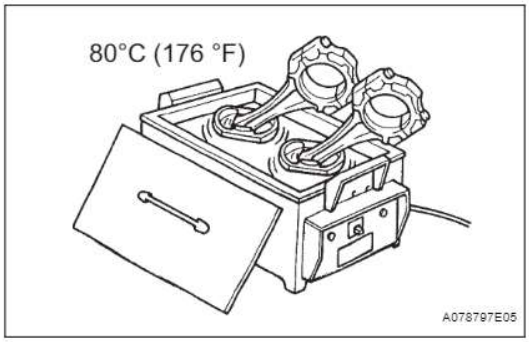
(a) Using a piston ring expander, remove the 2 compression rings.

(b) Remove the 2 side rails and oil ring by hand.



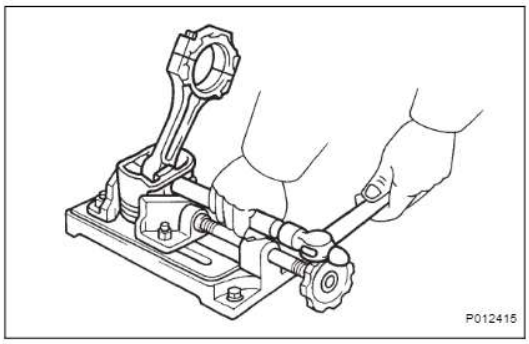
60. REMOVE PISTON PIN HOLE SNAP RING

(a) Using a small screwdriver, pry out the 2 snap rings.



61. REMOVE W/PIN PISTON SUB-ASSEMBLY

(a) Gradually heat the piston to approximately 80°C (176°F).



(b) Using a plastic-faced hammer and a brass bar, lightly tap out the piston pin and remove the connecting rod.
HINT:
- The piston and pin are a matched set.
- The pistons, the pins, the rings, the connecting rods and the bearings must be returned to their original locations when reassembling.

62. REMOVE CRANKSHAFT

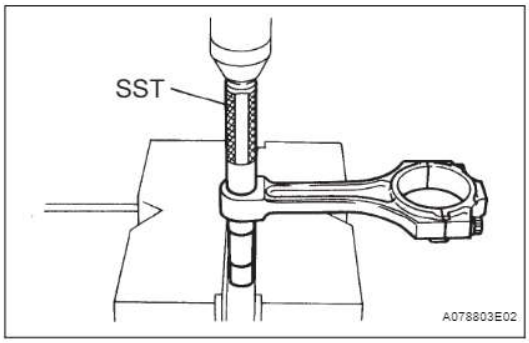
(a) Lift the crankshaft.

(b) Remove the 4 upper main bearings and 2 upper thrust washers from the cylinder block.
HINT:
Arrange the main bearing caps, bearings and thrust washers in the correct order.

63. REMOVE CRANKSHAFT THRUST WASHER SET

64. REMOVE CRANKSHAFT BEARING

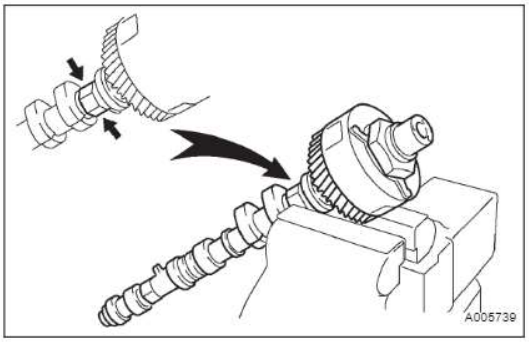
65. CLEAN CYLINDER BLOCK
NOTICE:
If the cylinder is washed at high temperatures, the cylinder liner sticks out beyond the cylinder block. Always wash the cylinder block at a temperature of 45°C (113°F) or less.

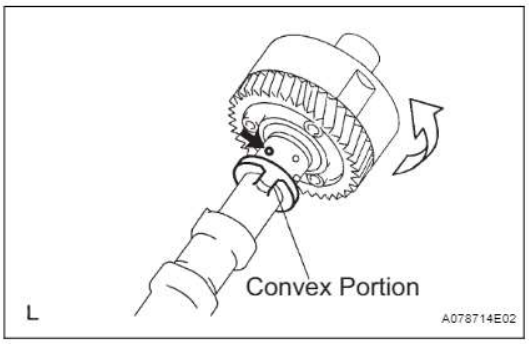


66. REMOVE CONNECTING ROD SMALL END BUSH

(a) Using SST and a press, press out the bushing.
SST 09222-30010

EM





INSPECTION

1. INSPECT CAMSHAFT TIMING GEAR ASSEMBLY

(a) Clamp the camshaft in a vise on the hexagonal lobe.

(b) Check that the VVT-i does not turn.

(c) Cover all the oil ports with vinyl tape except the port on the advanced angle side (nearest to the convex portion) shown in the illustration.

(d) Using an air gun, apply about 100 kPa (1 kgf/cm ^{2}, 14 psi) of air pressure to the port on the advanced angle side.

NOTICE:

Some oil spraying will occur. Contain the spray with a shop rag.

HINT:

This operation releases the lock pin for the extreme retarded angle lock.

(e) Under the condition above, check that the VVT-i can be turned by hand to the advanced angle side, the direction of the white arrow in the illustration.

Standard:

Can be turned

HINT:

The VVT-i will turn to the advanced angle side without applying force by hand depending on the force of the air pressure applied. Also, if applying pressure to the oil path is difficult as a result of air leakage from the port, the lock-pin may be difficult to release.

(f) Check that the VVT-i moves freely within a 30° range. Avoid moving the VVT-i unit to the extreme retarded angle position as the lock-pin will re-engage.

Standard:

Smooth movable range is about 30°

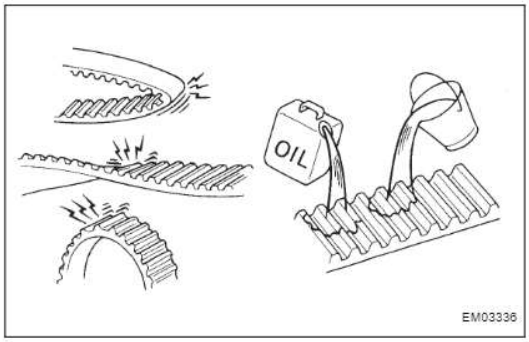
(g) Turn VVT-i by hand and lock it at the extreme retarded angle position.

2. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when installing or removing the mounting bolt of the camshaft timing pulley.**

Check the belt for any defects, as shown in the illustrations. Also, check these points below.



(a) If there is premature parting:
- Check for proper installation.
- Check the timing cover gasket for damage and proper installation.

(b) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.

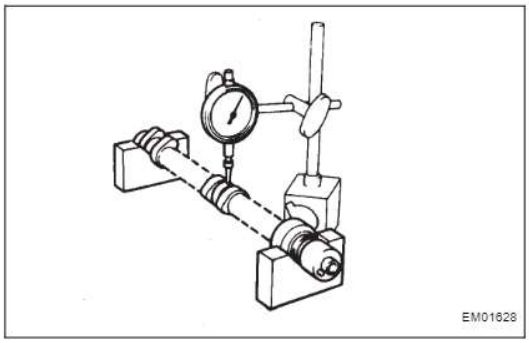
(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock and water pump.

(d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.

(e) If there is noticeable wear on the belt teeth:
- Check the timing cover for damage.
- Check that the gasket has been installed correctly.
- Check for foreign object on the pulley teeth.

If there is any doubt about the belt condition, replace the timing belt.

EM

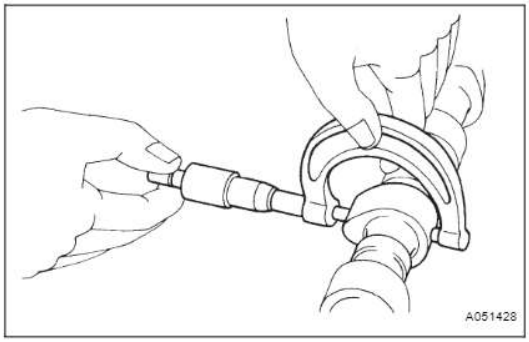


3. INSPECT CAMSHAFT

(a) Inspect the camshaft for runout.
(1) Place the camshaft on V-blocks.
(2) Using a dial indicator, measure the runout at the center journal.

Maximum circle runout:
0.06 mm (0.0024 in.)

If the runout is greater than the maximum, replace the camshaft.

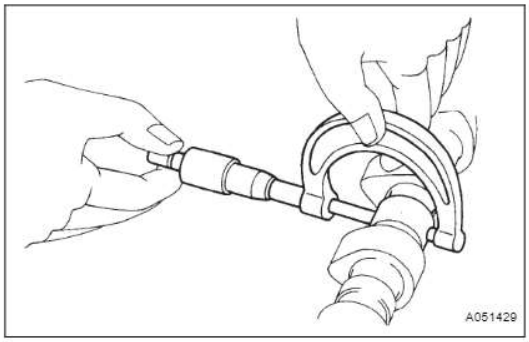


(b) Inspect the cam lobes.
(1) Using a micrometer, measure the cam lobe height.

Specified cam lobe height

Item	Specified Condition
Intake	42.980 to 43.232 mm (1.6921 to 1.7020 in.)
Exhaust	42.960 to 43.110 mm (1.6874 to 1.6972 in.)

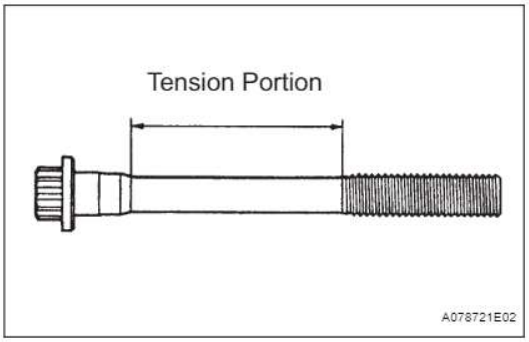
If the cam lobe height is less than the minimum, replace the camshaft.



(c) Inspect the camshaft journals.
(1) Using a micrometer, measure the journal diameter.

Journal diameter:
26.959 to 26.975 mm (1.0614 to 1.0620 in.)

If the journal diameter is not as specified, check the oil clearance.



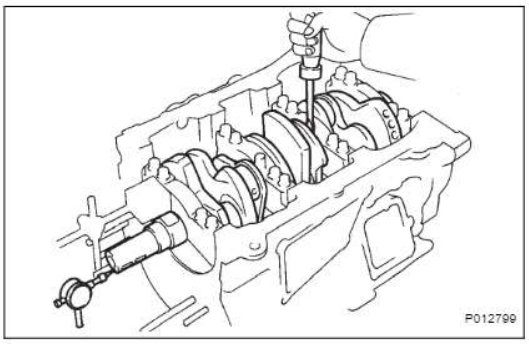
4. INSPECT CYLINDER HEAD SET BOLT

(a) Using a vernier caliper, measure the tension portion diameter of the bolt.

Specified outside diameter:

8.75 to 9.05 mm (0.3445 to 0.3563 in.)

If the diameter is less than the minimum, replace the bolt.



5. INSPECT CRANKSHAFT THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Specified thrust clearance:

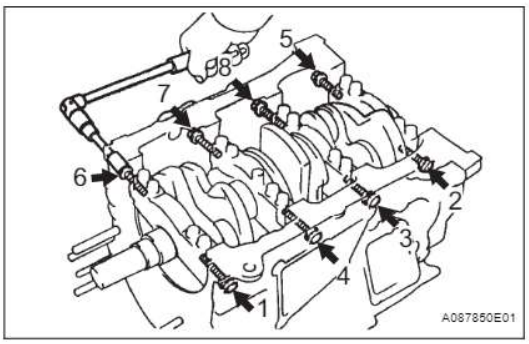
0.04 to 0.30 mm (0.0016 to 0.0118 in.)

If the thrust clearance is greater than the maximum, replace the thrust washers as a set. Check the crankshaft for wear, repair or replace if necessary.

Thrust washer thickness:

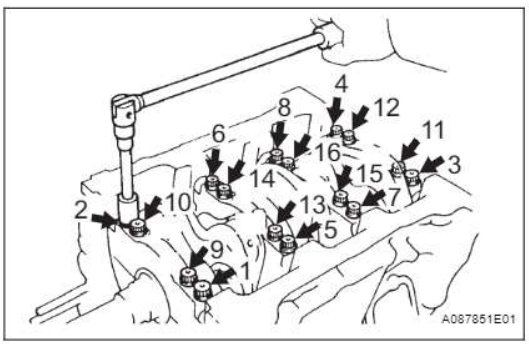
1.93 to 1.98 mm (0.0760 to 0.0780 in.).

EM

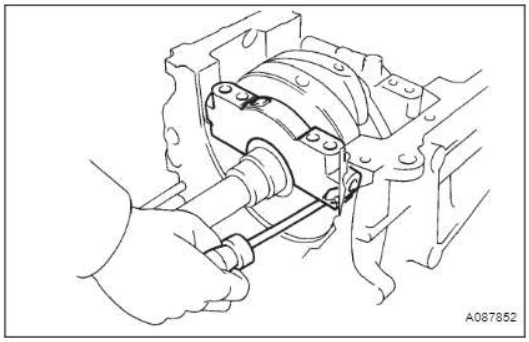


6. INSPECT CRANKSHAFT OIL CLEARANCE

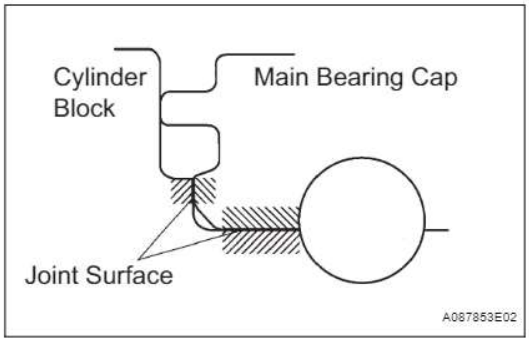
(a) Uniformly loosen and remove the 8 main bearing cap bolts and seal washers in the sequence shown in the illustration (Procedure "A").



(b) Uniformly loosen and remove the 16 main bearing cap bolts the sequence shown in the illustration (Procedure "B").



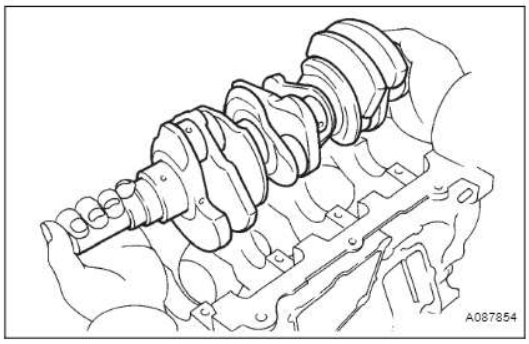
(c) Remove the 4 main bearing caps and 4 lower bearings. Also remove the 2 lower thrust washers, located under the No. 2 main bearing cap (Procedure "C").



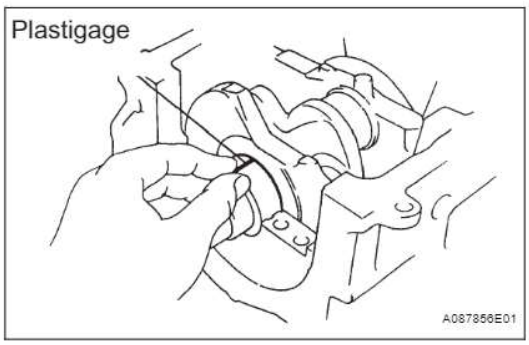
- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in correct order.

NOTICE:
Using a screwdriver, push up on the cap little by little, alternating from the right to left side until the cap is free. Take care not to damage the contact surfaces of the cap and cylinder block.

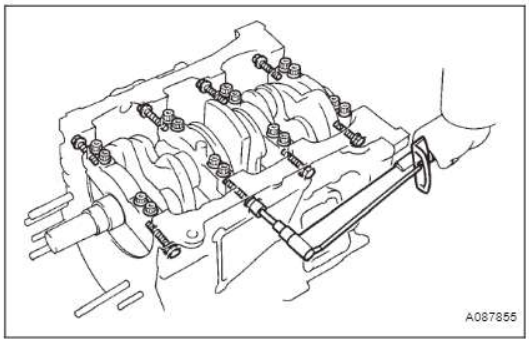
EM



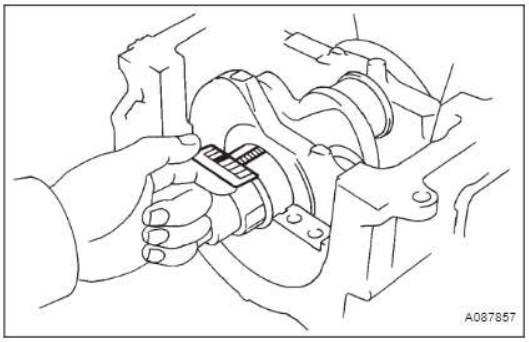
(d) Lift out the crankshaft.
HINT:
Keep the upper bearings together with the cylinder block.
(e) Clean each main journal and bearing.
(f) Check each main journal and bearing for pitting and scratches.
If the journal or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



(g) Place the crankshaft on the cylinder block.
(h) Lay a strip of Plastigage across each journal.



(i) Install the 4 main bearing caps.
NOTICE:
Do not turn the crankshaft.
(j) Remove the main bearing caps (See procedure "A" to "C").

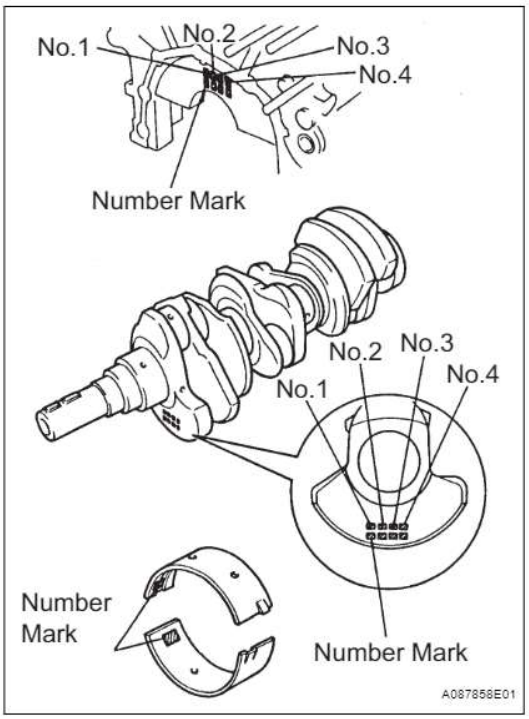


(k) Measure the Plastigage at its widest point.

Specified oil clearance

No. 1 and No. 4 journals	**0.014 to 0.050 mm (0.0006 to 0.0020 in.)**
No. 2 and No. 3 journals	**0.026 to 0.060 mm (0.0010 to 0.0024 in.)**

If the oil clearance is greater than the maximum, replace the bearings. If necessary, replace the crankshaft.



(l) Check number mark.

HINT:

If using a bearing, replace it with one that has the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then refer to the table on the next page for the appropriate bearing number. The No. 1 and No. 4 journal bearings have 5 standard bearing sizes, marked 3, 4, 5, 6 and 7 accordingly. The No. 2 and No. 3 journal bearings have 5 standard bearing sizes, marked 1, 2, 3, 4 and 5 accordingly.

No. 1 and No. 4 journal bearings

Cylinder block + Crankshaft =	**0 to 5**	**6 to 11**	**12 to 17**	**18 to 23**	**24 to 28**
Replacement Bearing	**3**	**4**	**5**	**6**	**7**

HINT:

EXAMPLE:

Cylinder block imprinted number mark is 06

Crankshaft imprinted number mark is 08

6 + 8 = 14

Select the bearing marked "5"

No. 1 and No. 4 journal standard Bearings selection chart

Cylinder block number mark	Crankshaft number mark												
	00	01	02	03	04	05	06	07	"08"	09	10	11	12
00	3	3	3	3	3	3	4	4	4	4	4	4	5
01	3	3	3	3	3	4	4	4	4	4	4	5	5
02	3	3	3	3	4	4	4	4	4	4	5	5	5
03	3	3	3	4	4	4	4	4	4	5	5	5	5
04	3	3	4	4	4	4	4	4	5	5	5	5	5
05	3	4	4	4	4	4	4	5	5	5	5	5	5
"06"	4	4	4	4	4	4	5	5	"5"	5	5	5	6
07	4	4	4	4	4	5	5	5	5	5	5	6	6
08	4	4	4	4	5	5	5	5	5	5	6	6	6
09	4	4	4	5	5	5	5	5	5	6	6	6	6
10	4	4	5	5	5	5	5	5	6	6	6	6	6

11	4	5	5	5	5	5	5	6	6	6	6	6	6
12	5	5	5	5	5	5	6	6	6	6	6	6	7
13	5	5	5	5	5	6	6	6	6	6	6	7	7
14	5	5	5	5	6	6	6	6	6	6	7	7	7
15	5	5	5	6	6	6	6	6	6	7	7	7	7
16	5	5	6	6	6	6	6	6	7	7	7	7	7

No. 2 and No. 3 journal bearings

Cylinder block + Crankshaft =	0 to 5	6 to 11	12 to 17	18 to 23	24 to 28
Replacement Bearing	1	2	3	4	5

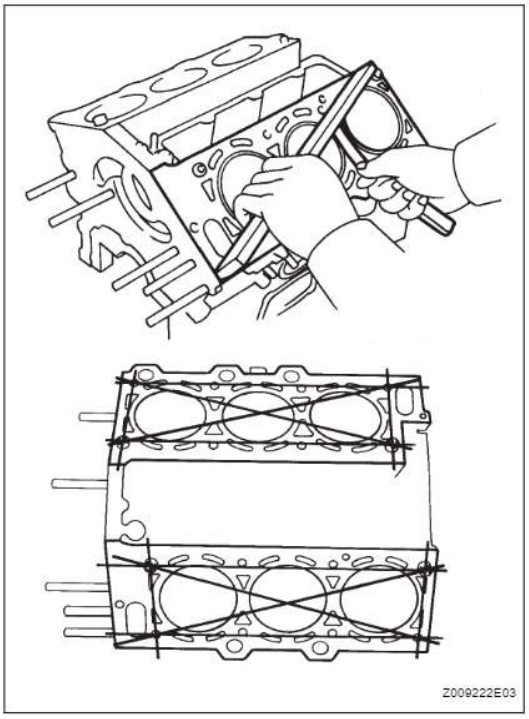
HINT:
EXAMPLE:
Cylinder block imprinted number mark is 06
Crankshaft imprinted number mark is 08
6 + 8 = 14
Select the bearing marked "3"

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No. 2 and No. 3 journal standard Bearings selection chart

Cylinder block number mark	Crankshaft number mark												
	00	01	02	03	04	05	06	07	"08"	09	10	11	12
00	1	1	1	1	1	1	2	2	2	2	2	2	3
01	1	1	1	1	1	2	2	2	2	2	2	3	3
02	1	1	1	1	2	2	2	2	2	2	3	3	3
03	1	1	1	2	2	2	2	2	2	3	3	3	3
04	1	1	2	2	2	2	2	2	3	3	3	3	3
05	1	2	2	2	2	2	2	3	3	3	3	3	3
"06"	2	2	2	2	2	2	3	3	"3"	3	3	3	4
07	2	2	2	2	2	3	3	3	3	3	3	4	4
08	2	2	2	2	3	3	3	3	3	3	4	4	4
09	2	2	2	3	3	3	3	3	3	4	4	4	4
10	2	2	3	3	3	3	3	3	4	4	4	4	4
11	2	3	3	3	3	3	3	4	4	4	4	4	4
12	3	3	3	3	3	3	4	4	4	4	4	4	5
13	3	3	3	3	3	4	4	4	4	4	4	5	5
14	3	3	3	3	4	4	4	4	4	4	5	5	5
15	3	3	3	4	4	4	4	4	4	5	5	5	5
16	3	3	4	4	4	4	4	4	5	5	5	5	5

(m) Completely remove the Plastigage.

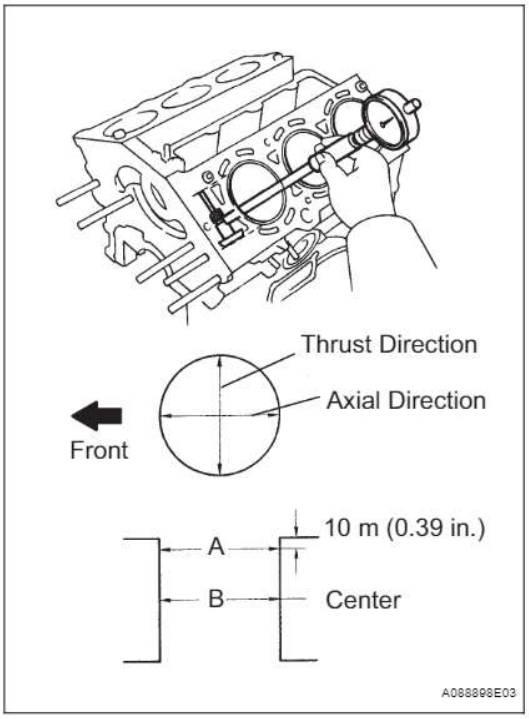


7. INSPECT CYLINDER BLOCK FOR FLATNESS

(a) Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head gasket for warpage.

Maximum warpage:
0.05 mm (0.0020 in.)

If the warpage is greater than the maximum, replace the cylinder block.

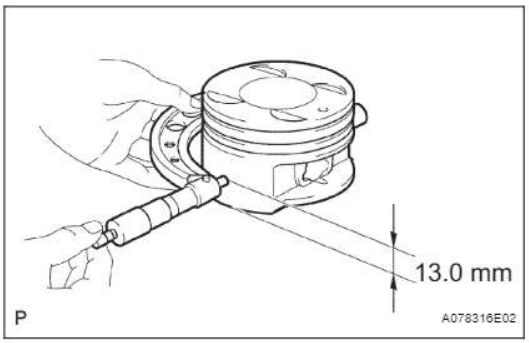


8. INSPECT CYLINDER BORE

(a) Using a cylinder gauge, measure the cylinder bore diameter at positions A and B in the thrust and axial directions.

Specified diameter:
92.000 to 92.132 mm (3.6220 to 3.6272 in.)

If the diameter is greater than the maximum, replace the cylinder block.



9. INSPECT W/PIN PISTON SUB-ASSEMBLY

(a) Using a micrometer, measure the diameter of the piston. When you measure the diameter, attach the micrometer to a location 13.0 mm (0.512 in.) above the pistons bottom and perpendicular to the piston pin hole.

Piston diameter:
91.953 to 91.967 mm (3.6202 to 3.6207 in.)

10. INSPECT PISTON OIL CLEARANCE

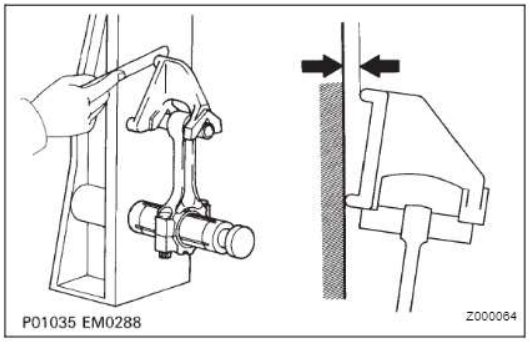
(a) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Specified oil clearance:

0.033 to 0.130 mm (0.0013 to 0.0051 in.)

If the oil clearance is greater than the maximum, replace all the 6 pistons. If necessary, replace the cylinder block.

11. INSPECT CONNECTING ROD SUB-ASSEMBLY



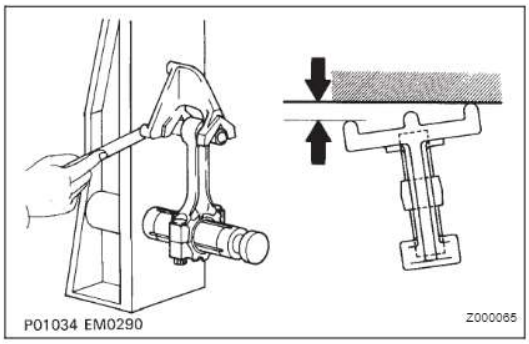
(a) Using a rod aligner and feeler gauge, check the connecting rod alignment.

(1) Check for misalignment.

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If misalignment is greater than the maximum, replace the connecting rod assembly.



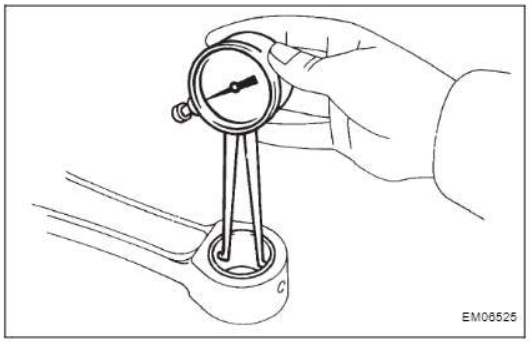
(2) Check for twist.

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If the twist is greater than the maximum, replace the connecting rod assembly.

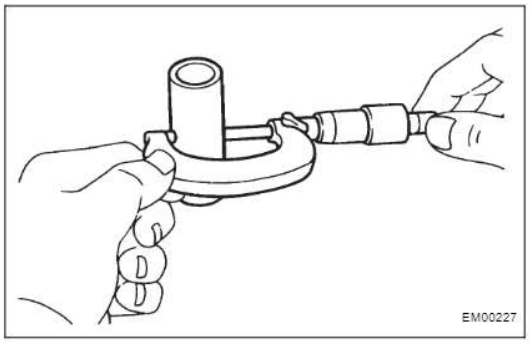
12. INSPECT PISTON PIN OIL CLEARANCE



(a) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

Bushing inside diameter:

22.005 to 22.014 mm (0.8663 to 0.8667 in.)



(b) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:

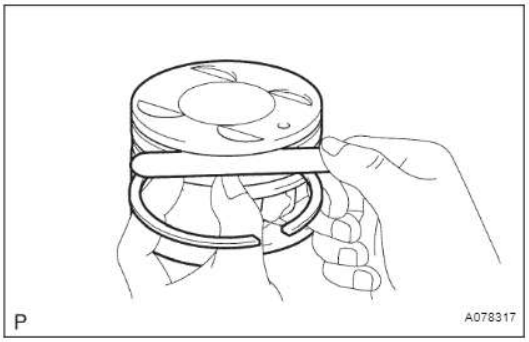
21.997 to 22.006 mm (0.8660 to 0.8664 in.)

(c) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

Specified oil clearance:

0.005 to 0.050 mm (0.0002 to 0.0020 in.)

If the oil clearance is greater than the maximum, replace the bushing. If necessary, replace the piston and the piston pin together.



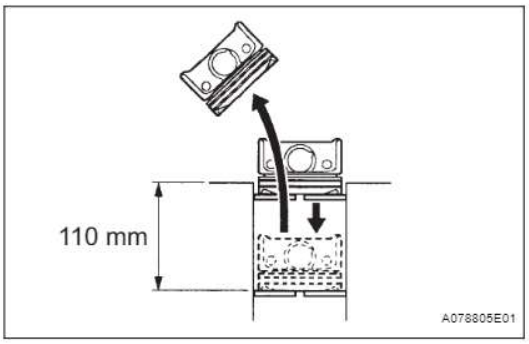
13. INSPECT RING GROOVE CLEARANCE

(a) Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

Ring groove clearance

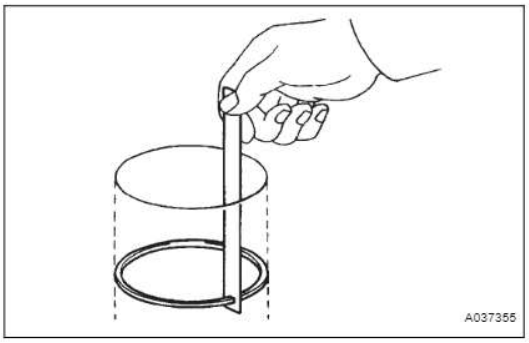
Item	Specified Condition
No. 1	0.03 to 0.08 mm (0.0012 to 0.0031 in.)
No. 2	0.02 to 0.06 mm (0.0008 to 0.0024 in.)
Oil	0.03 to 0.11 mm (0.0012 to 0.0043 in.)

If the clearance is not as specified, replace the piston.



14. INSPECT PISTON RING END GAP

(a) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 110 mm (4.33 in.) from the top of the cylinder block.



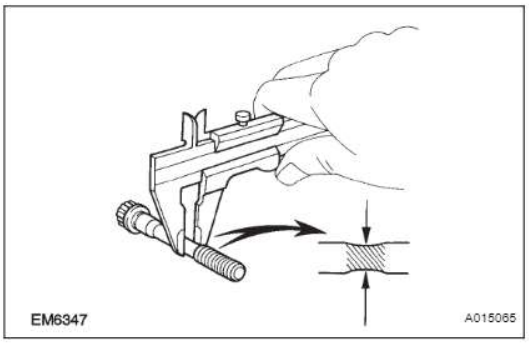
(b) Using a feeler gauge, measure the end gap.

Specified end gap

Item	Specified Condition
No. 1	0.30 to 0.95 mm (0.0118 to 0.0374 in.)
No. 2	0.50 to 1.05 mm (0.0197 to 0.0413 in.)
Oil (Side rail)	0.15 to 1.00 mm (0.0059 to 0.0394 in.)

If the end gap is greater than the maximum, replace the piston ring.

If the end gap is greater than the maximum even with a new piston ring, replace the cylinder block.



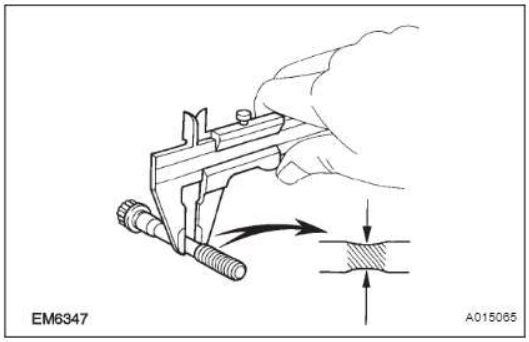
15. INSPECT CONNECTING ROD BOLT

(a) Using a vernier caliper, measure the tension portion diameter of the bolt.

Specified diameter:

7.0 to 7.3 mm (0.276 to 0.287 in.)

If the diameter is less than the minimum, replace the bolt.



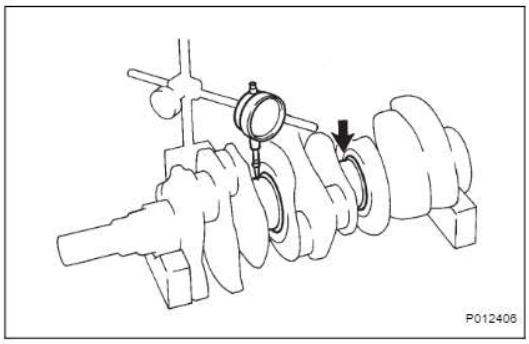
16. INSPECT CRANKSHAFT BEARING CAP SET BOLT

(a) Using a vernier caliper, measure the tension portion diameter of the bolt.

Specified diameter:

7.2 to 7.6 mm (0.283 to 0.299 in.)

If the diameter is less than the minimum, replace the bolt.



17. INSPECT CRANKSHAFT

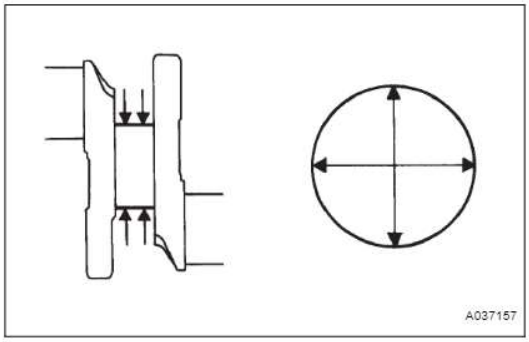
(a) Using a dial indicator and V-blocks, measure the runout as shown in the illustration.

Maximum circle runout:

0.06 mm (0.0024 in.)

If the circle runout is greater than the maximum, replace the crankshaft.

EM



(b) Using a micrometer, measure the diameter of each main journal.

Diameter:

60.988 to 61.000 mm (2.4011 to 2.4016 in.)

If the diameter is not as specified, check the oil clearance (see step 7).

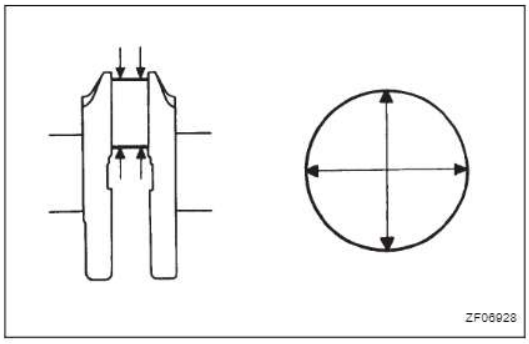
If necessary, replace the crankshaft.

(c) Check each main journal for taper and out-of-round as shown in the illustration.

Maximum taper and out-of-round:

0.02 mm (0.0008 in.)

If the taper and out-of-round is greater than the maximum, replace the crankshaft.



(d) Using a micrometer, measure the diameter of each crank pin.

Diameter:

52.992 to 53.000 mm (2.0863 to 2.0866 in.)

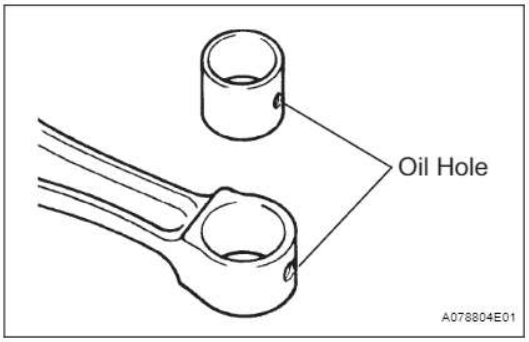
If the diameter is not as specified, check the oil clearance (see step 7).

(e) Check each crank pin for taper and out-of-round as shown in the illustration.

Maximum taper and out-of-round:

0.02 mm (0.0008 in.)

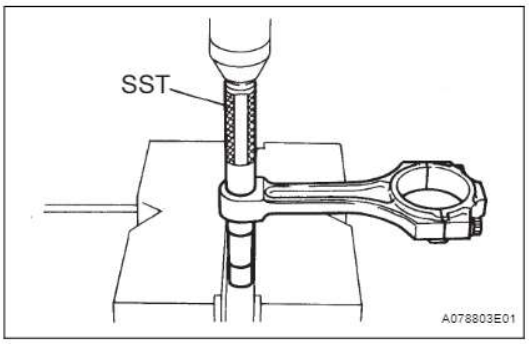
If the taper and out-of-round is greater than the maximum, replace the crankshaft.



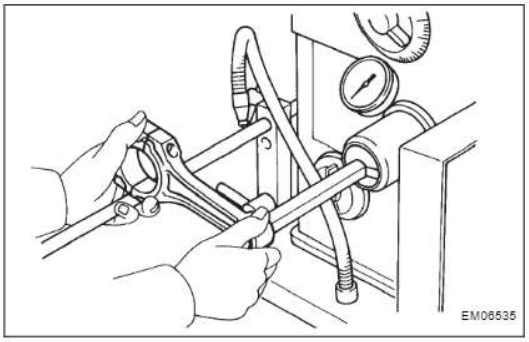
REASSEMBLY

1. INSTALL CONNECTING ROD SMALL END BUSH

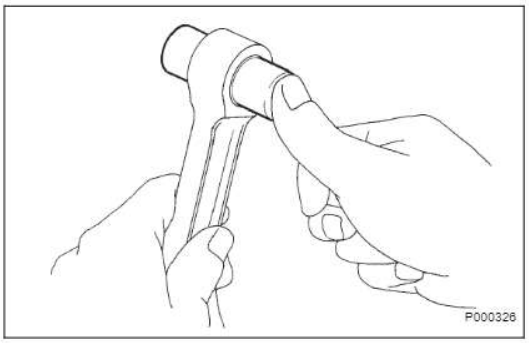
(a) Align the oil holes of a new bushing and the connecting rod.



(b) Using SST and a press, press in the bushing.
SST 09222-30010

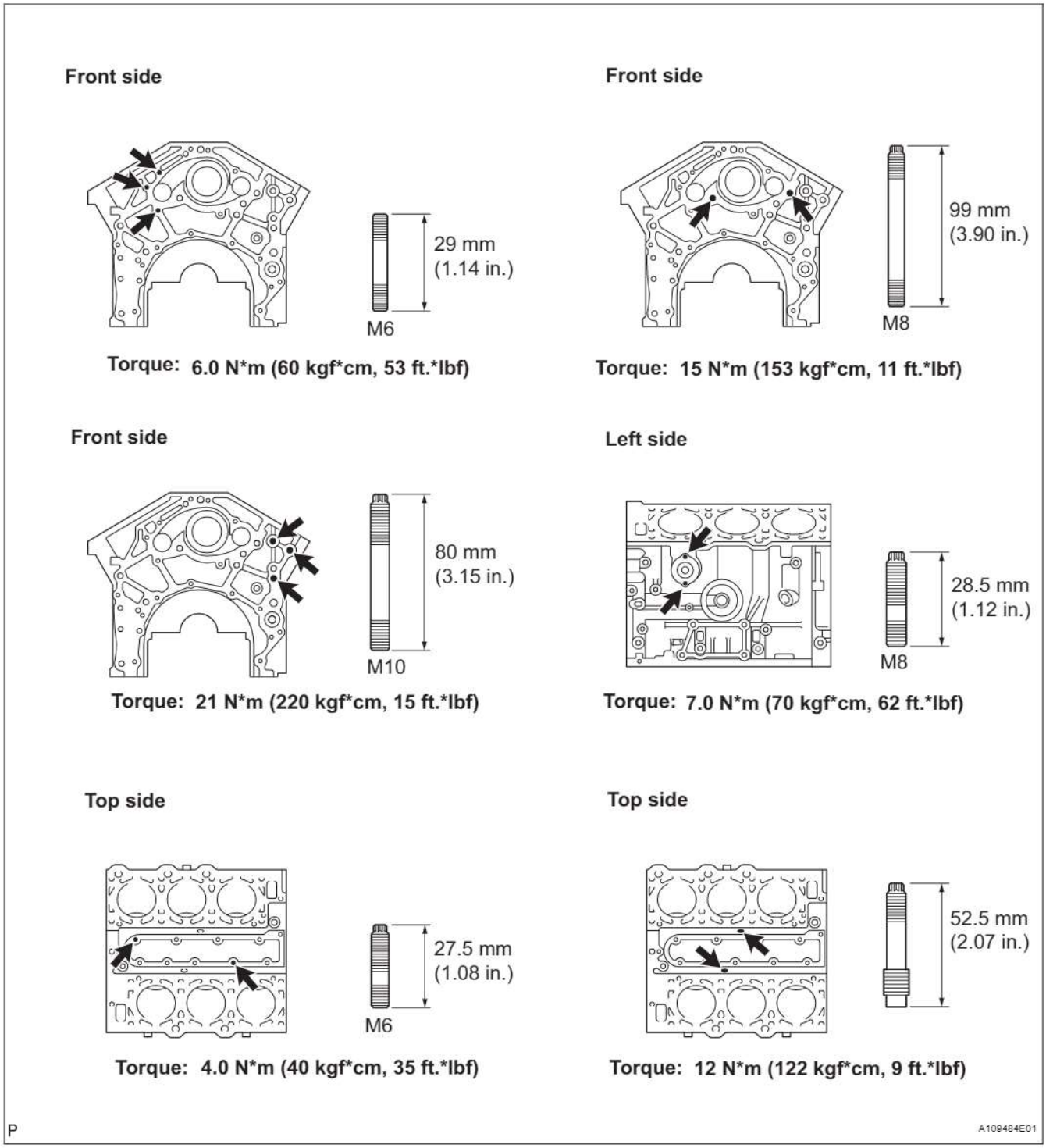


(c) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance between the bushing and piston pin.
Standard oil clearance:
0.005 to 0.011 mm (0.0002 to 0.0004 in.)



(d) Check that the piston pin fits at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

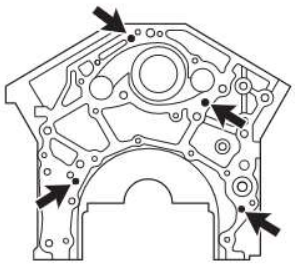
2. INSTALL STUD BOLT



EM

3. INSTALL STRAIGHT PIN

Front Side



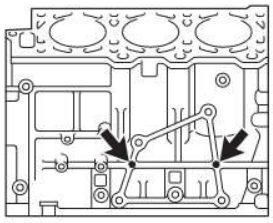
4 mm (0.16 in.)



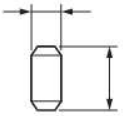
12 mm (0.47 in.)

Protrusion Height:
6 mm (0.24 in.)

Right Side



4 mm (0.16 in.)

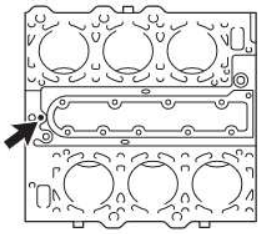


12 mm (0.47 in.)

Protrusion Height:
6 mm (0.24 in.)

EM

Top Side



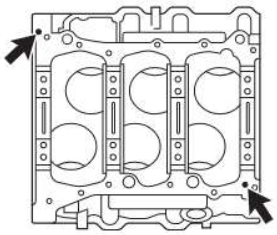
4 mm (0.16 in.)



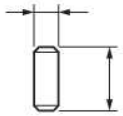
12 mm (0.47 in.)

Protrusion Height:
6 mm (0.24 in.)

Bottom Side



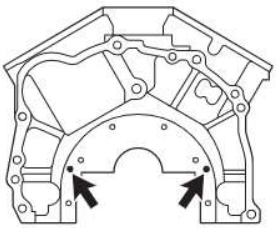
4 mm (0.16 in.)



12 mm (0.47 in.)

Protrusion Height:
6 mm (0.24 in.)

Back Side



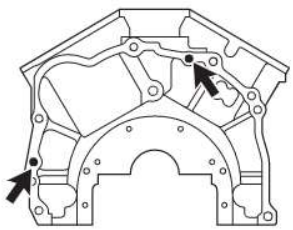
4 mm (0.16 in.)



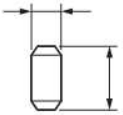
12 mm (0.47 in.)

Protrusion Height:
6 mm (0.24 in.)

Back Side



10 mm



22 mm (0.87 in.)

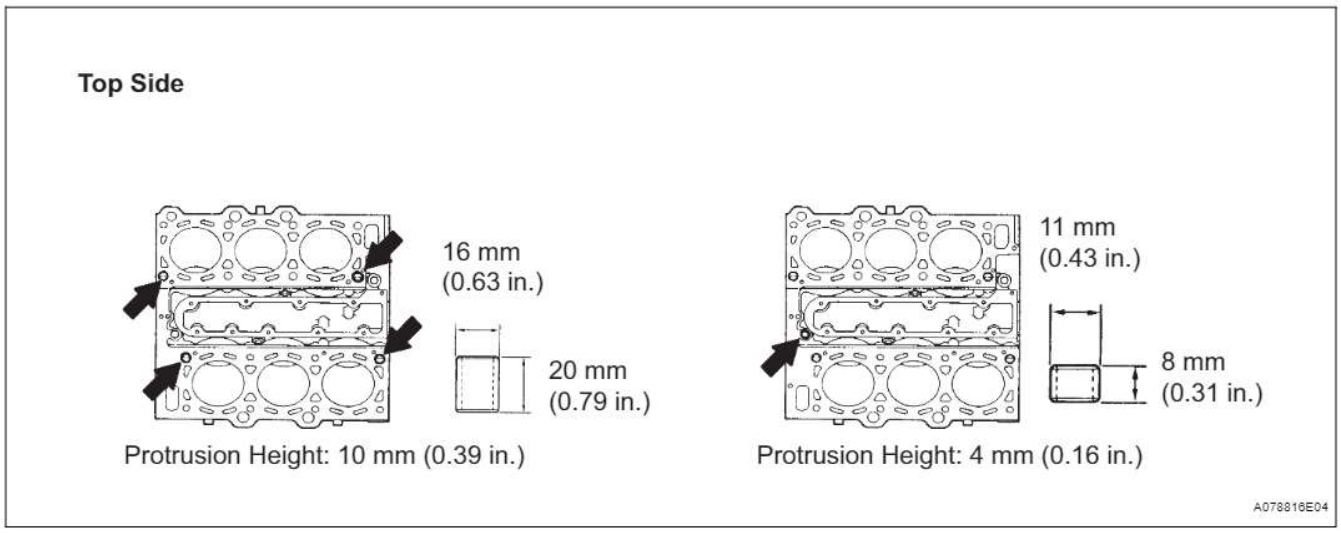
Protrusion Height:
11 mm (0.43 in.)

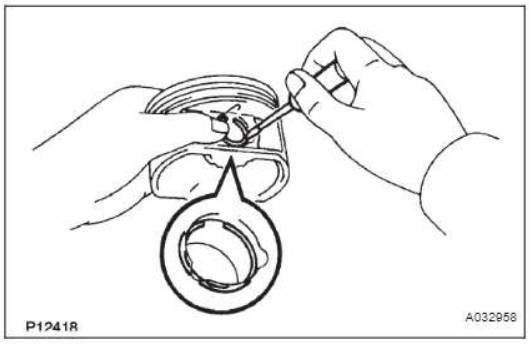
P

A109485E01

4. INSTALL RING PIN

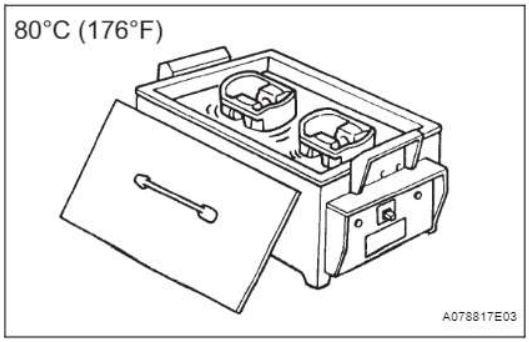
(a) Install ring pin.





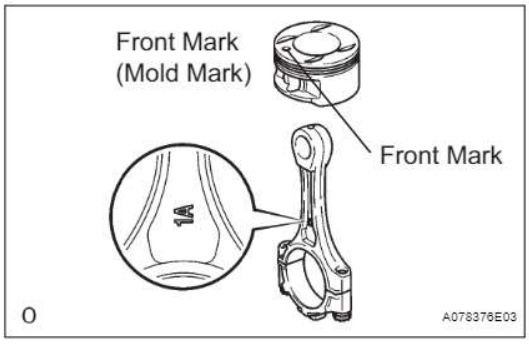
5. INSTALL PISTON PIN HOLE SNAP RING

(a) Using a small screwdriver, install a new snap ring at one end of the piston pin hole.
HINT:
Be sure that the end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.



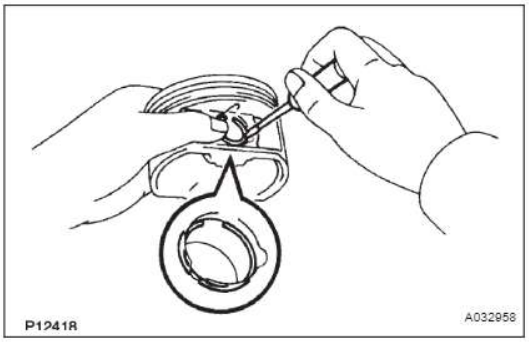
6. INSTALL W/PIN PISTON SUB-ASSEMBLY

(a) Gradually heat the piston to about 80°C (176°F).



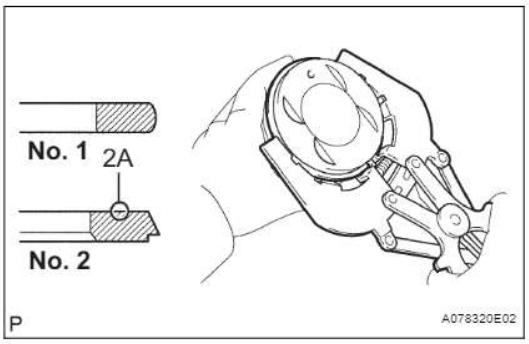
(b) Coat the piston pin with engine oil.

(c) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb until the pin contacts the snap ring.



7. INSTALL PISTON PIN HOLE SNAP RING

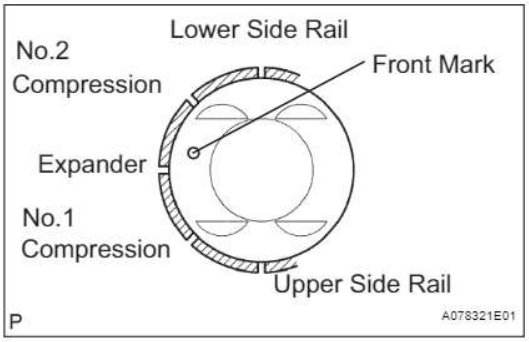
(a) Using a small screwdriver, install a new snap ring on the other end of the piston pin hole.
HINT:
Be sure that the end of gap of the snap ring is not aligned with the pin hole cutout portion of the piston.



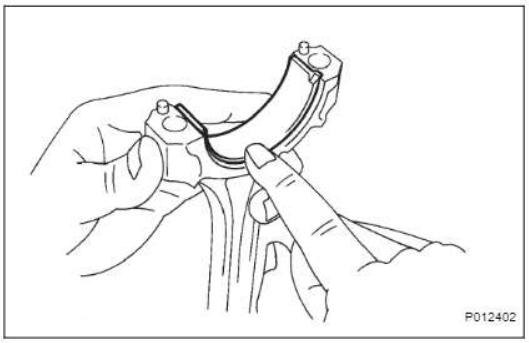
8. INSTALL PISTON RING SET

(a) Install the oil ring expander and the 2 side rails by hand.

(b) Using a piston ring expander, install the 2 compression rings.
HINT:
The compression ring No. 2 is installed with code mark "2A" faced upward as shown in the illustration.

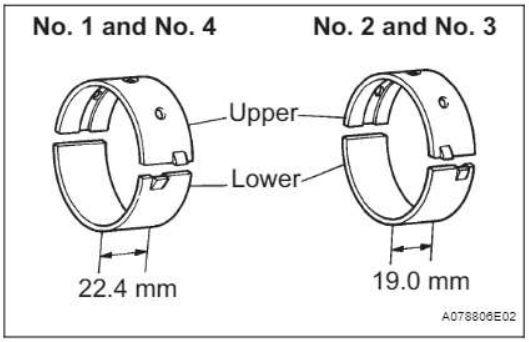


(c) Position the piston rings so that the ring ends are arranged as shown in the illustration.
NOTICE:
Do not align the ring ends.



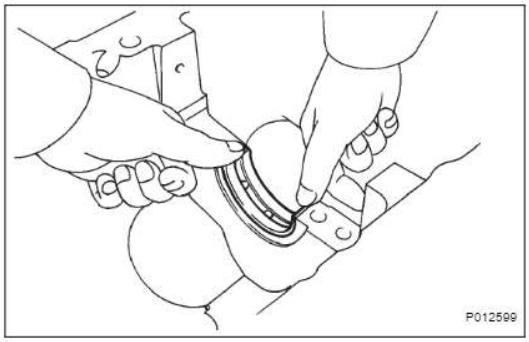
9. INSTALL CONNECTING ROD BEARING

(a) Align the key of the bearing with the keyway of the connecting rod or connecting cap.
NOTICE:
Clean the backside of the bearing and the bearing surface of the connecting rod. The surface should be free of dust and oils.

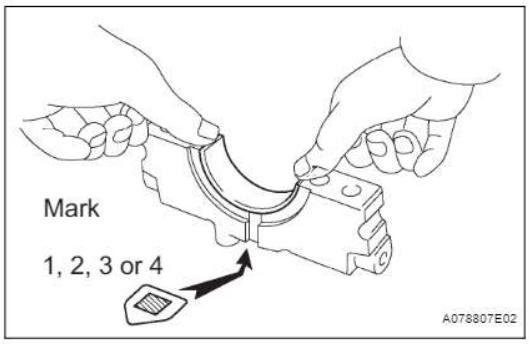


10. INSTALL CRANKSHAFT BEARING

(a) Install crank shaft bearing.
HINT:
Main bearings come in widths of 22.4 mm (0.882 in.) and 19.0 mm (0.748 in.). Install the 22.4mm (0.882 in.) bearings in the No. 1 and No. 4 cylinder block journal positions with the main bearing cap. Install the 19.0 mm (0.748 in.) bearings in the No. 2 and No. 3 positions.

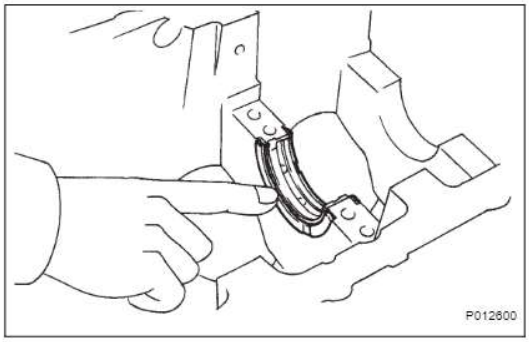


(b) Align the key of the bearing with the keyway of the cylinder block, and push in the 4 upper bearings.
NOTICE:
Do not apply engine oil to the bearing and its contact surface.



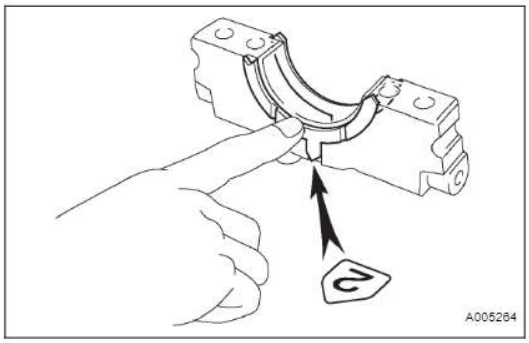
(c) Align the key of the bearing with the keyway of the main bearing cap, and push in the 4 lower bearings.
NOTICE:
Do not apply engine oil to the bearing and its contact surface.
HINT:
A number is marked on each main bearing cap to indicate the installation position.

EM



11. INSTALL CRANKSHAFT THRUST WASHER SET

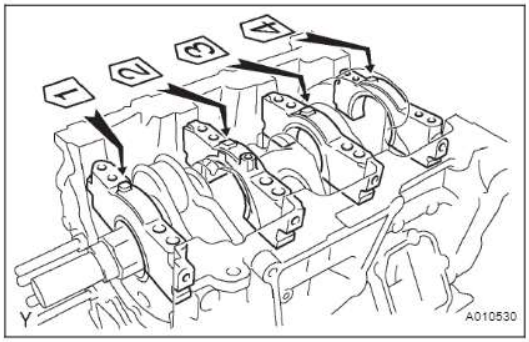
(a) Install the 2 thrust washers under the No. 2 journal position of the cylinder block with the oil grooves facing outward.



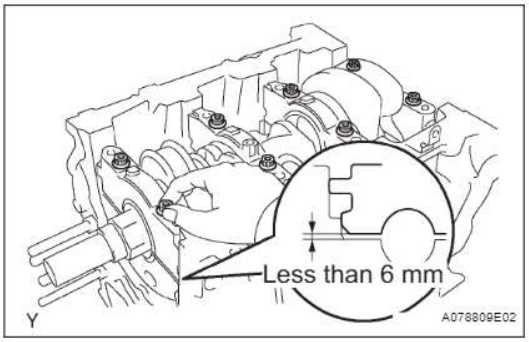
(b) Install the 2 thrust washers on the No. 2 bearing cap with the grooves facing outward.

12. INSTALL CRANKSHAFT

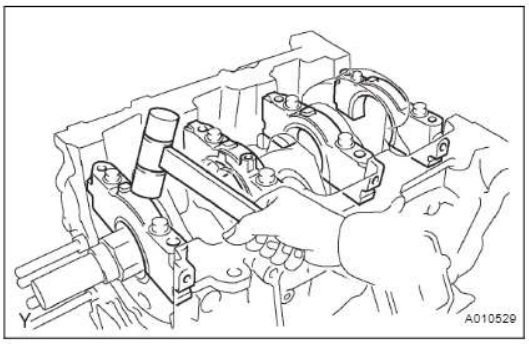
(a) Apply engine oil to the upper bearing and install the crankshaft on the cylinder block.



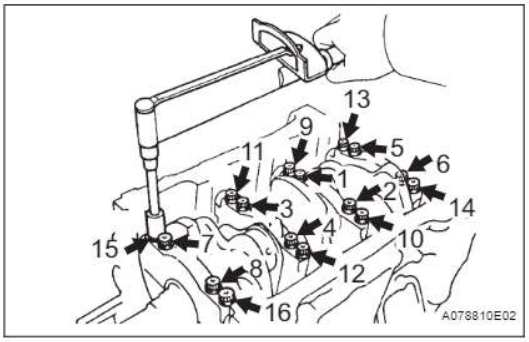
(b) Examine the front marks and numbers and install the bearing caps on the cylinder block.
(c) Apply a light coat of engine oil on the threads of the bearing cap bolts.
(d) Temporarily install the 8 main bearing cap bolts to the inside positions.



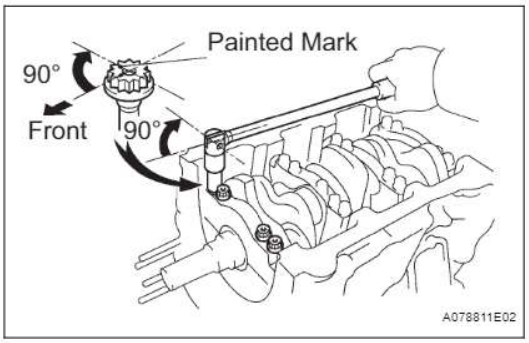
(e) Install the main bearing cap by hand using the inner bolt as a guide. Stop the main bearing cap is about 6 mm (0.23 in.) away from contacting with the block.



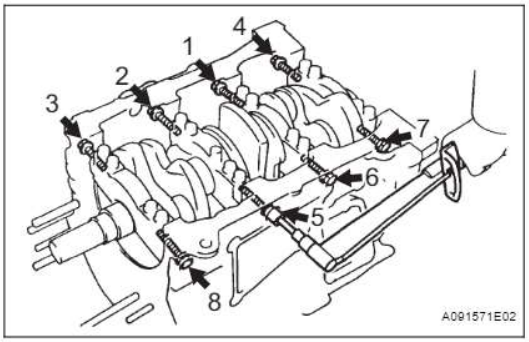
(f) Using a plastic-faced hammer, lightly tap the bearing cap to ensure a proper fit.
(g) Apply a light coat of engine oil on the threads of the main bearing cap bolts.



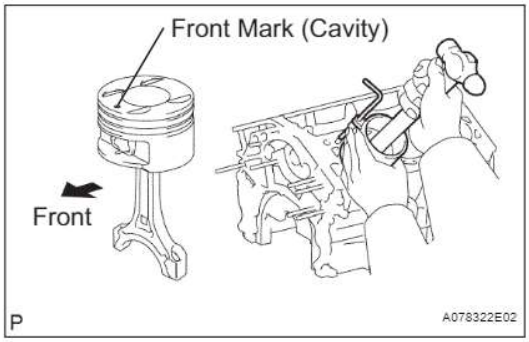
(h) Uniformly install and tighten the 16 main bearing cap bolts in the sequence shown in the illustration.
Torque: 22 N*m (224 kgf*cm, 16 ft.*lbf)



(i) Mark the front side of the bearing cap bolts with paint.
(j) Retighten the bearing cap bolts by 90°in the same sequence as step (h).
(k) Check that each painted mark is now at a 90°angle to the front.
(l) Check that the crankshaft turns smoothly.
(m) Install a new seal washer to the main bearing cap bolt.

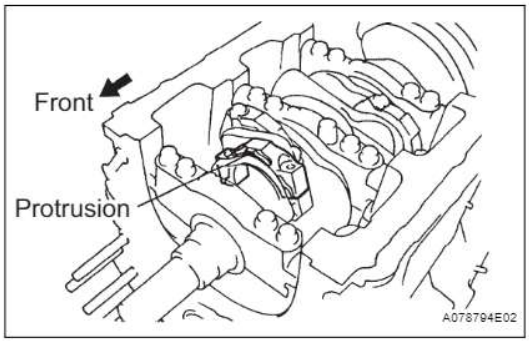


(n) Uniformly install and tighten the 8 main bearing cap bolts in the sequence shown in the illustration.
Torque: 27 N*m (275 kgf*cm, 20 ft.*lbf)
HINT:
Use the short bolt for the marked position (arrow).

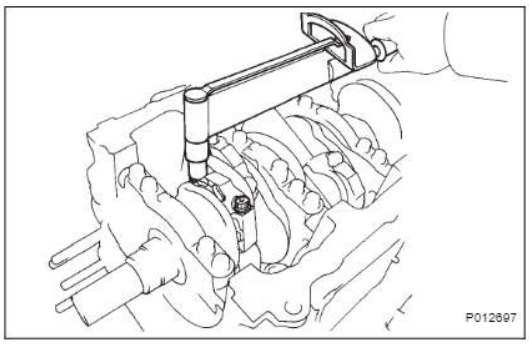


13. INSTALL PISTON AND CONNECTING ROD

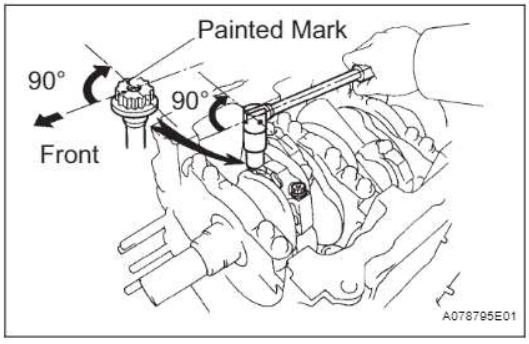
(a) Apply engine oil to the cylinder walls, the pistons, and the surfaces of connecting rod bearings.
(b) Check the position of the piston ring ends.
(c) Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.
NOTICE:
Match the numbered connecting rod cap with the connecting rod.



(d) Check that the protrusion of the connecting rod cap is facing the correct direction.
(e) Apply a light coat of engine oil on the threads of the connecting rod cap bolts.

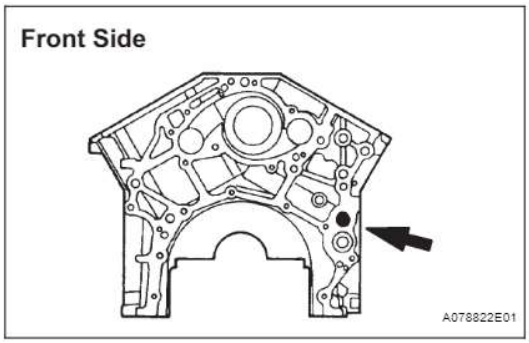


(f) Tighten the bolts in several steps by the specified torque.
Torque: 25 N*m (250 kgf*cm, 18 ft.*lbf)

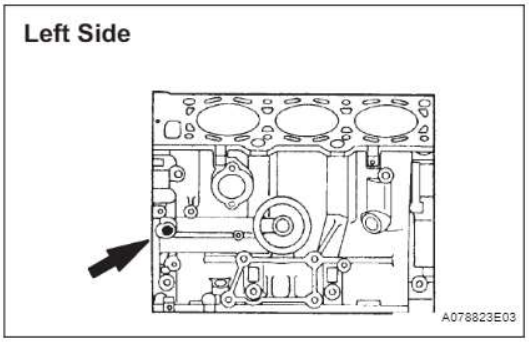


(g) Mark the front side of each connecting cap bolt with paint.
(h) Retighten the cap bolts by 90°as shown in the illustration.
(i) Check that the crankshaft turns smoothly.

14. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG

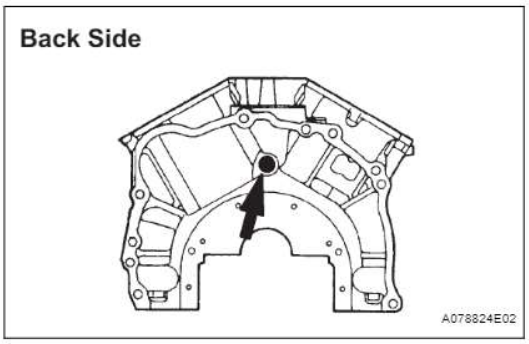


(a) Using a 10 mm socket hexagon wrench, install a new gasket and the screw plug.
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)



15. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG

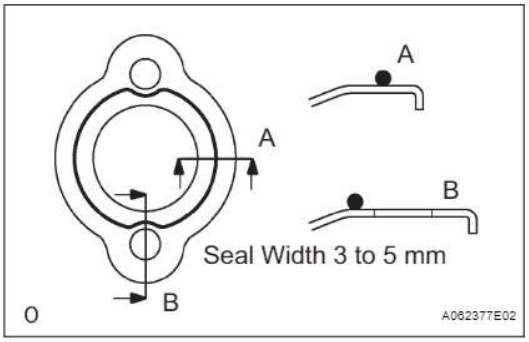
(a) Using a 10 mm socket hexagon wrench, install a new gasket and the screw plug.
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)



16. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG

(a) Using a 10 mm socket hexagon wrench, install a new gasket and the screw plug.
Torque: 50 N*m (510 kgf*cm, 37 ft.*lbf)

EM



17. INSTALL WATER SEAL PLATE

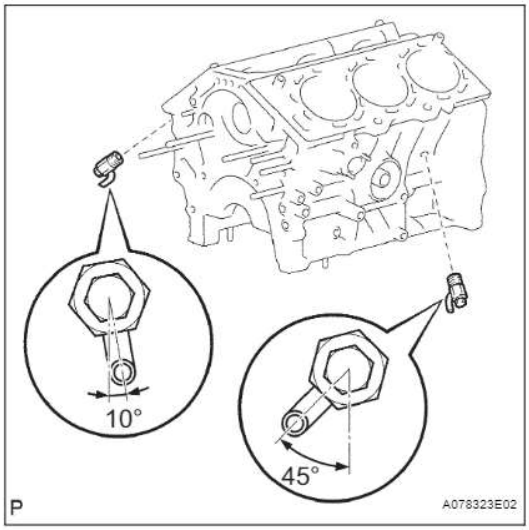
(a) Remove any old seal packing from the contact surface.

(b) Apply a continuous bead of seal packing (diameter 3 to 5 mm (0.12 to 0.20 in.)) as shown in the illustration.
Seal packing:
Part No. 08826-00100 or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Install the seal plate within 3 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing.**

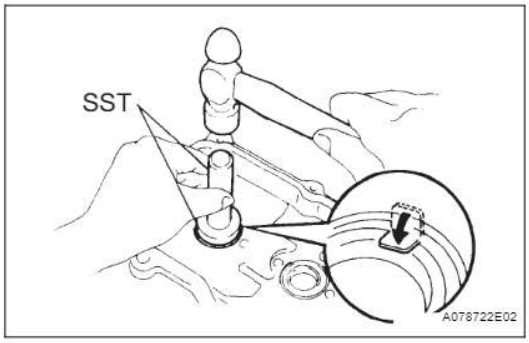
(c) Install the seal plate with the 2 nuts.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)

18. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY

(a) Apply adhesive to 2 or 3 threads of the drain cock end.
Adhesive:
Part No. 08833-00070, THREE BOND 1324 or equivalent



(b) After applying the specified torque, rotate the drain cock clockwise as shown in the illustration.
Torque: 39 N*m (398 kgf*cm, 29 ft.*lbf)
NOTICE:
- **Install the drain cock within 3 minutes after applying adhesive.**
- **Do not expose the seal to coolant for at least 1 hour after installing.**
- **Do not rotate the drain cock more than 1 revolution (360°) after tightening the drain cock with the specified torque.**
- **Do not loosen the drain cock after setting it correctly.**

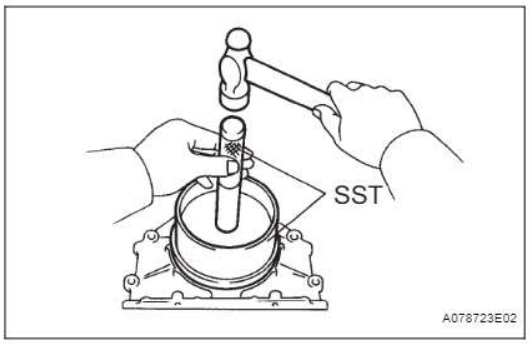


19. INSTALL SPARK PLUG TUBE GASKET

(a) Using SST and a hammer, tap in a new gasket until its surface is flush with the upper edge of the cylinder head cover.
SST 09950-60010 (09951-00430), 09950-70010 (09951-07100)

(b) Return the ventilation plate tab to its original position.

(c) Apply a light coat of MP grease to the gasket lip.



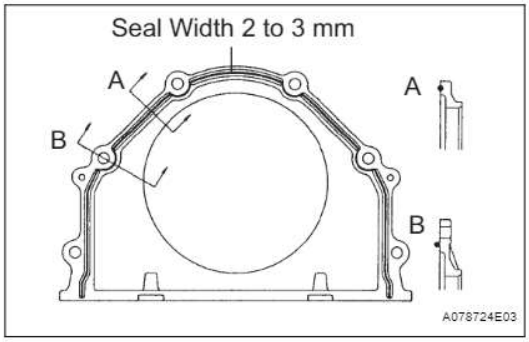
20. INSTALL ENGINE REAR OIL SEAL

(a) Using SST and a hammer, a tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223-15030, 09950-70010 (09951-07100)
NOTICE:
- **Be careful not to tap the oil seal at an angle.**
- **Keep the gap between the rear oil seal retainer edge and the oil seal free of foreign matter.**

(b) Apply MP grease to the oil seal lip.

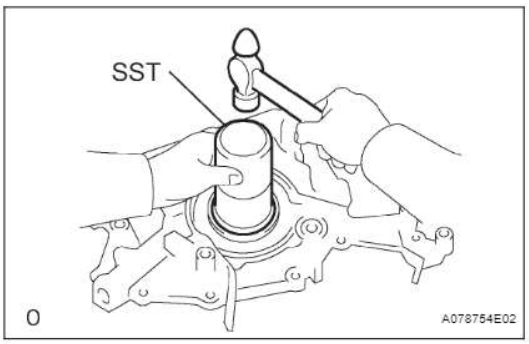
21. INSTALL ENGINE REAR OIL SEAL RETAINER

(a) Remove any old packing material from the contact surface.



(b) Apply a continuous bead of seal packing (diameter 2to 3 mm (0.08 to 0.12 in.)) as show in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Install the oil seal retainer within 3 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing.**

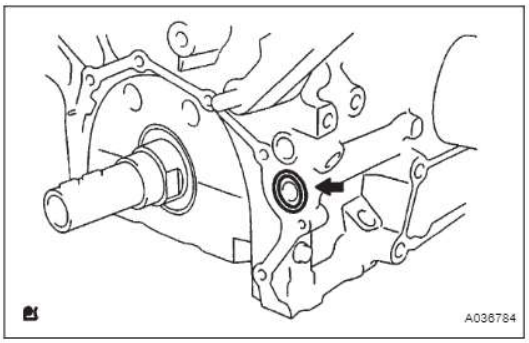
(c) Install the oil seal retainer. Tighten the 6 bolts uniformly.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)



22. INSTALL OIL PUMP SEAL

(a) 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
NOTICE:
- **Be careful not to tap the oil seal at an angle.**
- **Keep the gap between the oil pump body edge and the oil seal free of foreign matter.**

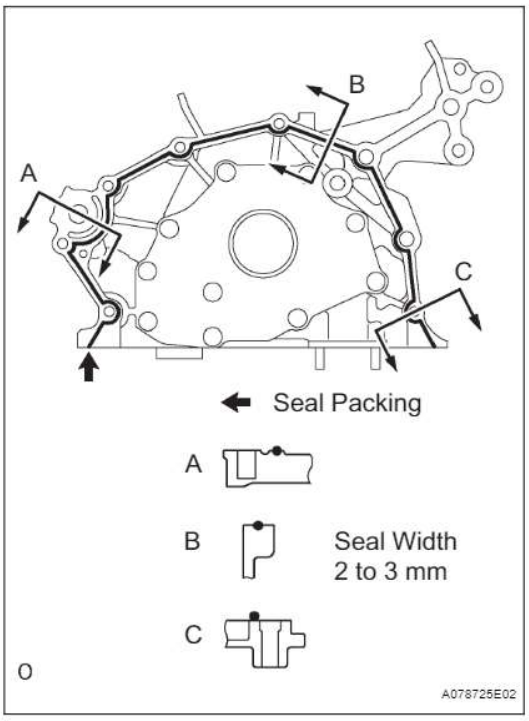
(b) Apply MP grease to the oil seal lip.



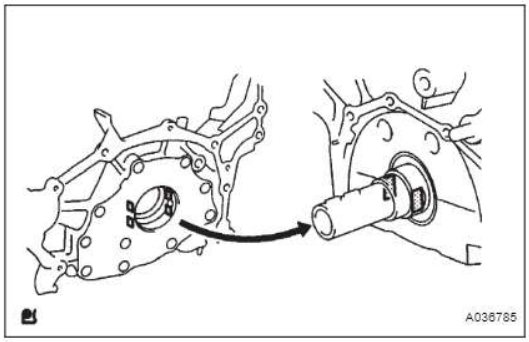
23. INSTALL OIL PUMP ASSEMBLY

(a) Remove any old packing material from the contact surface.

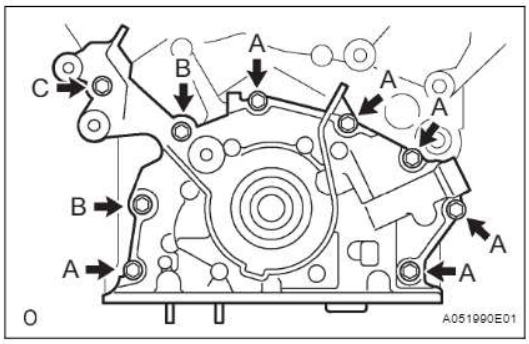
(b) Apply a light coat of engine oil to a new O-ring and place it on the cylinder block.



(c) Apply a continuous bead of seal packing (diameter 2 to 3 mm (0.08 to 0.12 in.)) as shown in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Apply seal packing to the inner side of the bolt holes.**
- **Install the oil pump within 3 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing the oil pump.**



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



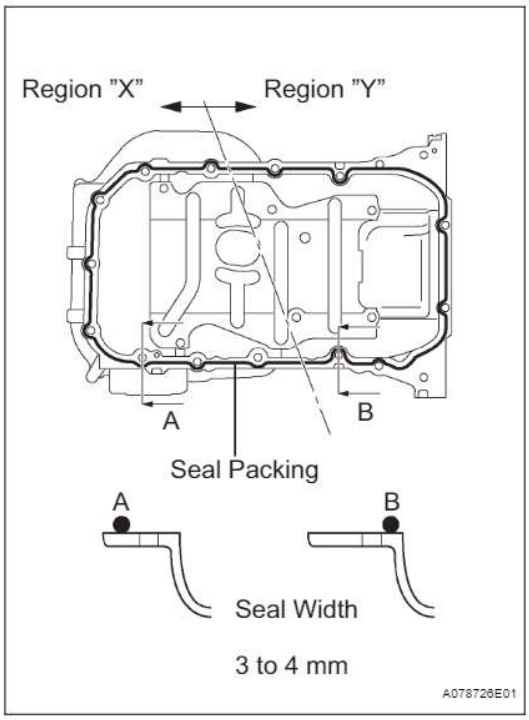
(e) Install the oil pump with the 9 bolts. Tighten the bolts uniformly in several steps. A
Torque: Bolt A
8.0 N*m (82 kgf*cm, 71 in.*lbf)
Bolt B
20 N*m (204 kgf*cm, 15 ft.*lbf)
Bolt C
43 N*m (439 kgf*cm, 32 ft.*lbf)

24. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 8.0 N*m (80 kgf*cm, 71 in.*lbf)

25. INSTALL OIL PAN BAFFLE PLATE
Torque: 8.0 N*m (80 kgf*cm, 71 in.*lbf)

26. INSTALL OIL PAN SUB-ASSEMBLY

(a) Remove any old seal packing from the contact surface.



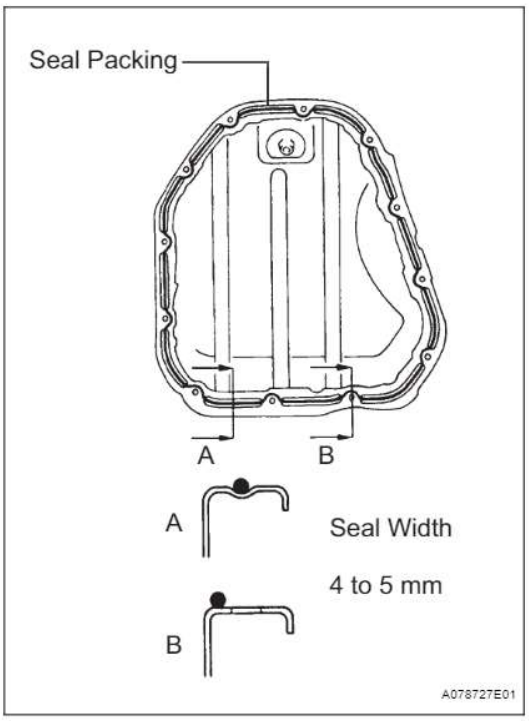
(b) Apply a continuous bead of seal packing (diameter 3 to 4 mm (0.12 to 0.16 in.)) as shown in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Apply seal packing to the outer side of the bolt holes in region "X".**
- **Apply seal packing to the inner side of the bolt holes in region "Y".**
- **Install the oil pan within 3 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing.**

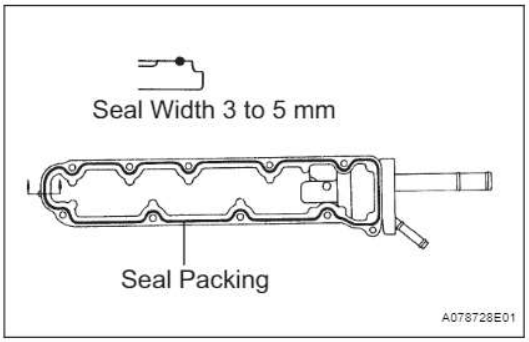
(c) Install the oil pan No. 1 with the 15 bolts and 2 nuts. Tighten the bolts uniformly in several steps.
Torque: 10 mm head
8.0 N*m (82 kgf*cm, 71 in.*lbf)
12 mm head
20 N*m (199 kgf*cm, 14 ft.*lbf)

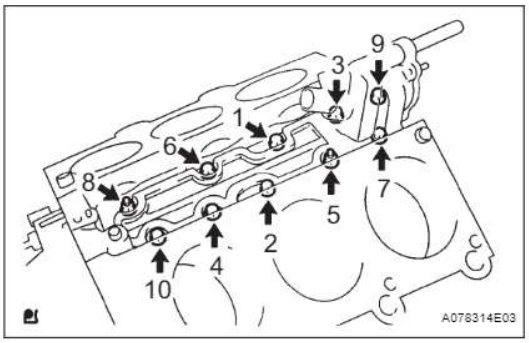
27. INSTALL OIL STRAINER SUB-ASSEMBLY

(a) Install a new gasket and the oil strainer with the bolt and 2 nuts.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

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28. INSTALL NO.2 OIL PAN SUB-ASSEMBLY

(a) Remove any old seal packing from the contact surface.

(b) Apply a continuous bead of seal packing (diameter 4 to 5 mm (0.16 to 0.20 in.)) as shown in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
HINT:
- Remove any oil from the contact surface.
- Apply seal packing to the inner side of the bolt holes.
- Install the oil pan within 3 minutes after applying seal packing.
- Do not expose the seal to engine oil for at least 2 hours after installing.

(c) Install the oil pan No. 2 with the 10 bolts and 2 nuts.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

29. INSTALL OIL PAN DRAIN PLUG

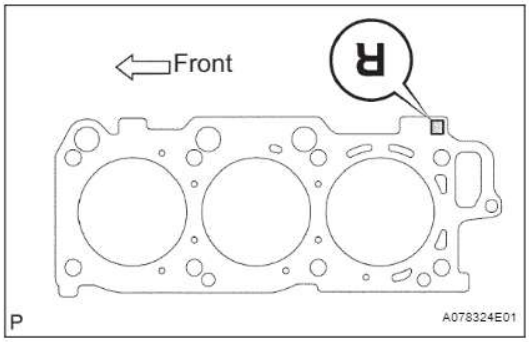
(a) Install the drain plug with a new gasket.
Torque: 45 N*m (459 kgf*cm, 33 ft.*lbf)

30. INSTALL WATER INLET HOUSING

(a) Remove any old packing material from the contact surface.

(b) Apply a continuous bead of seal packing (diameter 3 to 5 mm (0.12 to 0.20 in.)) as shown in the illustration.
Seal packing:
Part No. 08826-00100 or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Install the water inlet housing within 3 minutes after applying seal packing.**
- **Do not expose the seal to coolant for at least 2 hours after installing.**

(c) Install the water inlet housing with the 8 bolts and 2 nuts. Uniformly tighten the bolts and nuts in the sequence shown in the illustration.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)



31. INSTALL CYLINDER HEAD GASKET

(a) Place a new cylinder head gasket on the cylinder block with the R mark upside down, as shown in the illustration.

NOTICE:

- **Remove any oil from the contact surface.**
- **Make sure the cylinder head gasket is facing in the correct direction.**

32. INSTALL CYLINDER HEAD SUB-ASSEMBLY

NOTICE:

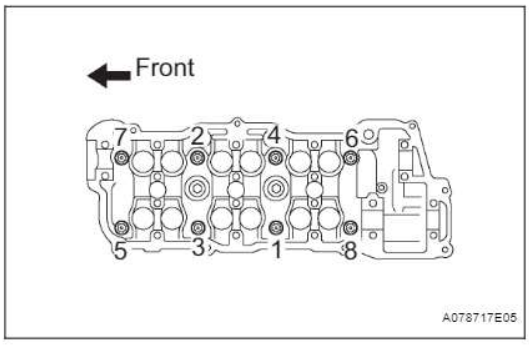
- **To prevent damage to the block, place the gasket carefully.**
- **The cylinder head bolts are tightened in 2 successive steps.**

(a) Apply a light coat of engine oil on the threads of the cylinder head bolts.

(b) Install the plate washers to the cylinder head bolts.

(c) Uniformly install and tighten the 8 cylinder head bolts in the sequence shown in the illustration (Procedure "A").

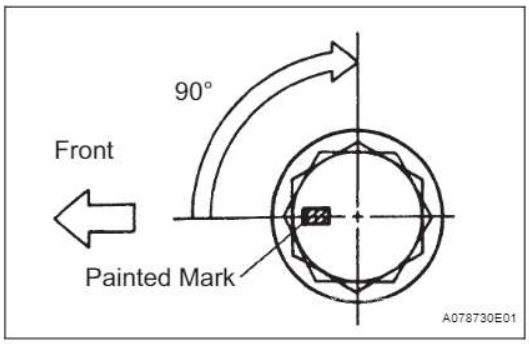
Torque: 54 N*m (550 kgf*cm, 40 ft.*lbf)



(d) Mark the front side of each cylinder head bolt head with paint as shown in the illustration.

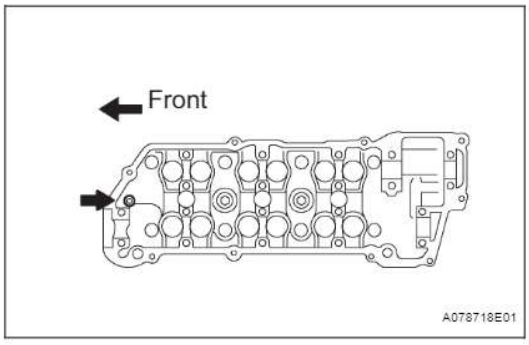
(e) Retighten the cylinder head bolts by 90°in the same sequence as (Procedure "A").

(f) Check that each painted mark is now at a 90°angle to the front.

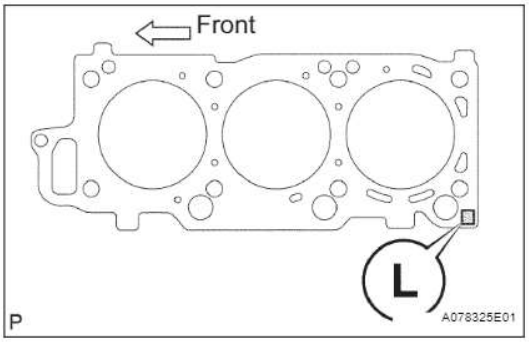


(g) Using an 8 mm socket hexagon wrench, install the hexagon bolt.

Torque: 19 N*m (189 kgf*cm, 14 ft.*lbf)



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33. INSTALL CYLINDER HEAD GASKET NO.2

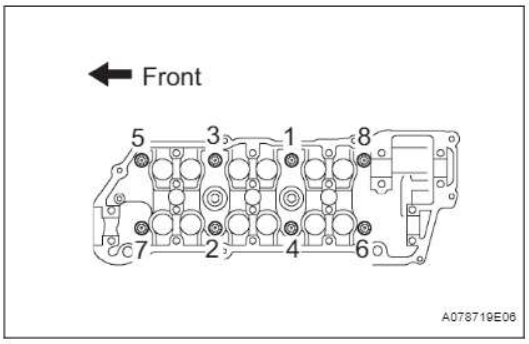
(a) Place a new cylinder head gasket on the cylinder block with the L mark as shown in the illustration.
NOTICE:
- **Remove any oil from the contact surface.**
- **Make sure the cylinder head gasket is facing in the correct direction.**

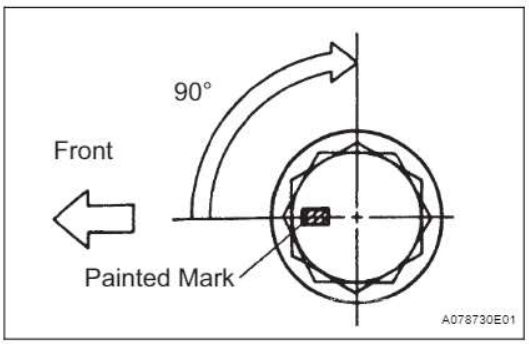
34. INSTALL CYLINDER HEAD LH
NOTICE:
- **To prevent damage to the block, place the gasket carefully.**
- **The cylinder head bolts are tightened in 2 successive steps.**

(a) Apply a light coat of engine oil on the threads of the cylinder head bolts.

(b) Install the plate washers to the cylinder head bolts.

(c) Uniformly install and tighten the 8 cylinder head bolts in the sequence shown in the illustration.
Torque: 54 N*m (550 kgf*cm, 40 ft.*lbf)

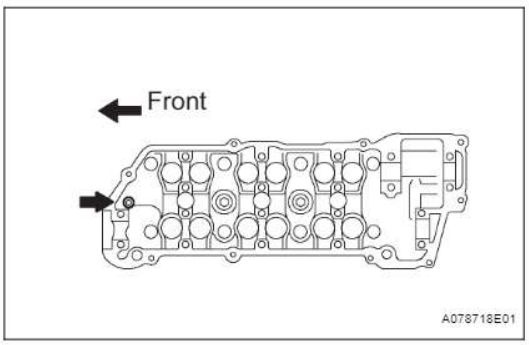




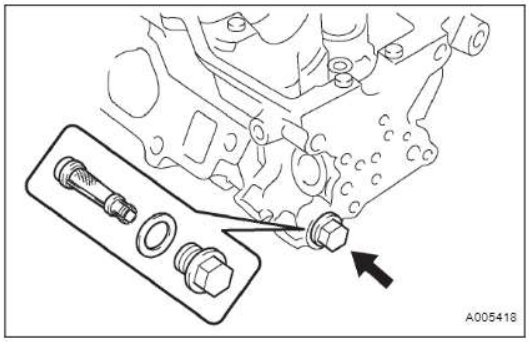
(d) Mark the front side of each cylinder head bolt head with paint as shown in the illustration.

(e) Retighten the cylinder head bolts by 90°in the same sequence as step (c).

(f) Check that each painted mark is now at a 90°angle to the front.



(g) Using an 8 mm socket hexagon wrench, install the hexagon bolt.
Torque: 19 N*m (189 kgf*cm, 14 ft.*lbf)



35. INSTALL OIL CONTROL VALVE FILTER

(a) Check that no foreign matter is on the mesh part of the filter.

(b) Assemble the valve filter and the plug.

(c) Install a new gasket and the plug.

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

36. INSTALL CYLINDER HEAD COVER REAR

(a) Install a new gasket and the rear cover with the 4 bolts.

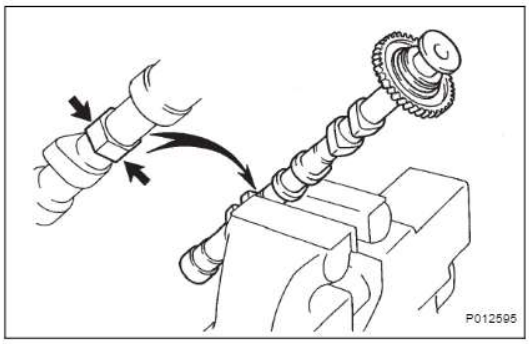
Torque: 10 N*m (102 kgf*cm, 7 ft.*lbf)

37. INSTALL CAMSHAFT SUB GEAR

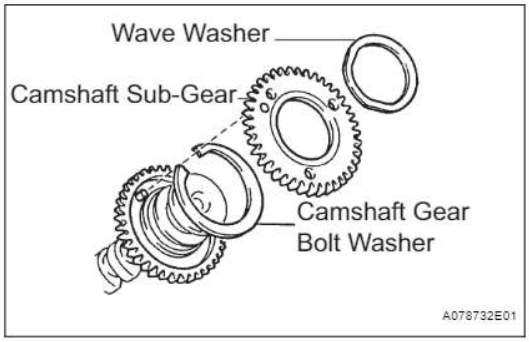
(a) Clamp the camshaft's hexagonal lobe in a vise.

NOTICE:

Be careful not to damage the camshaft.



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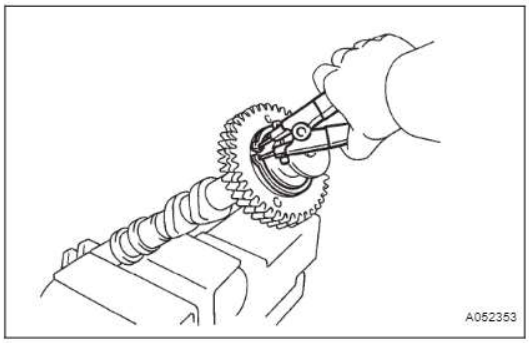


(b) Install the camshaft gear bolt washer and the camshaft sub gear.

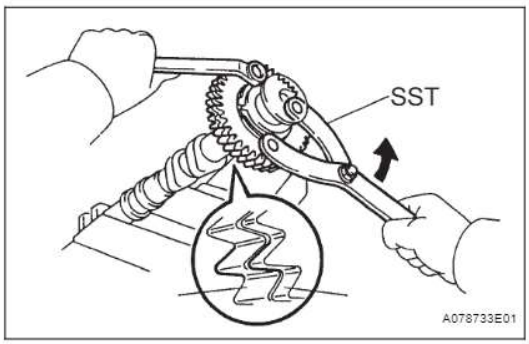
HINT:

Attach the pins on the gears to the gear bolt washer ends.

(c) Install the wave washer.



(d) Using snap ring pliers, install the snap ring.



(e) Using SST, align the holes of the camshaft main gear and sub gear by turning the camshaft sub gear counterclockwise, and temporarily install a service bolt.

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

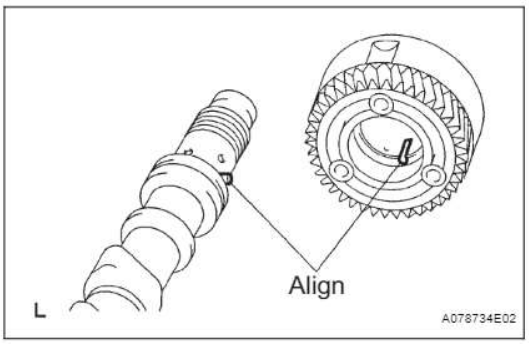
(f) Align the gear teeth of the main gear and sub gear, and tighten the service bolt.

Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

NOTICE:

Be careful not to damage the camshaft journals.

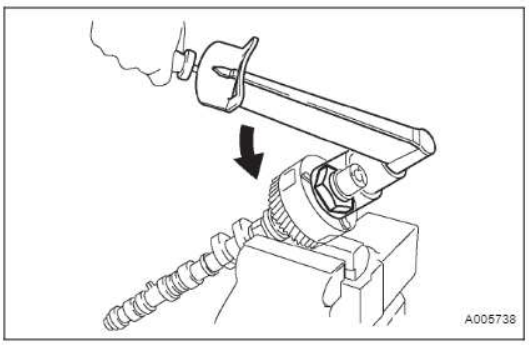
HINT:
When installing the camshaft, make certain that the torsional spring force of the sub gear has been eliminated by installation of the service bolt.



38. INSTALL CAMSHAFT TIMING GEAR ASSEMBLY

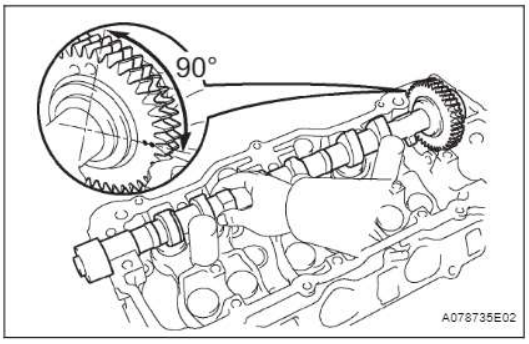
(a) Align the pin with the pin groove and install the VVT-i on the camshaft.
NOTICE:
Install the VVT-i with the lock-pin engaged and locked at the extreme retarded angle position.

(b) Apply engine oil on a new nut, the mounting surface of the VVT-i and the screw threads.
NOTICE:
- **Be sure to apply oil, otherwise the specified torque cannot be obtained.**
- **New nuts must be used when replacing the VVT-i unit.**

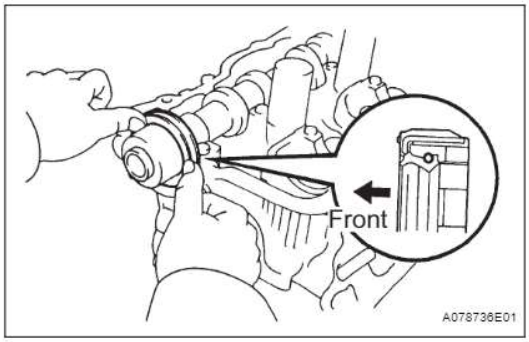


(c) Using a 46 mm socket wrench, install and tighten an oily lock nut by turning it counterclockwise.
Torque: 150 N*m (1,530 kgf*cm, 111 ft.*lbf)
NOTICE:
- **The lock nut has LH threads.**
- **Never use any tool other than the socket wrench. Other tools will deform the cam angle rotor.**

39. INSTALL NO.2 CAMSHAFT
NOTICE:
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, damage to the cylinder head or to the camshaft may result. To avoid this, the following steps must be carried out.

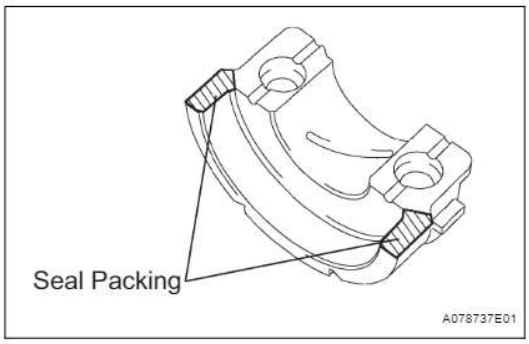


(a) Apply new engine oil to the thrust portion and journal of the camshaft.
(b) Place the No. 2 camshaft at a 90°angle of the timing mark (2 dot marks) on the cylinder head.
(c) Apply MP grease to a new oil seal lip.

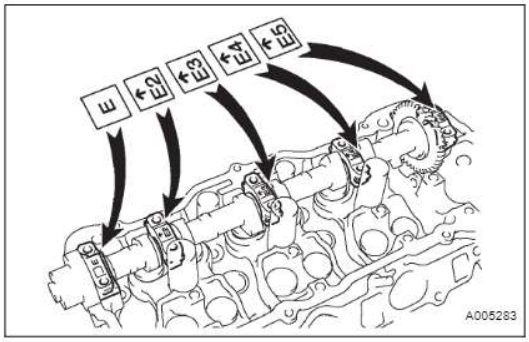


(d) Install the oil seal to the camshaft.
NOTICE:
- **Make sure the oil seal is installed facing the correct direction, as shown in the illustration.**
- **Insert the oil seal until it cannot be pushed any further.**

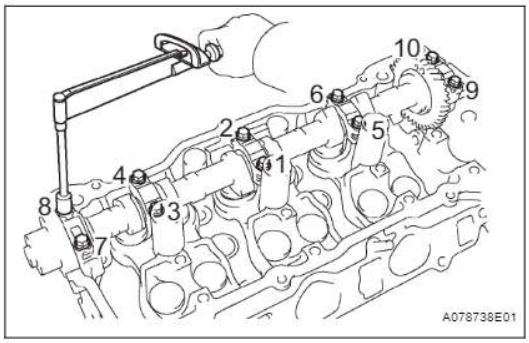
(e) Remove any old packing material from the contact surface.



(f) Apply seal packing to the No. 1 bearing cap as shown in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
- **Install the No. 1 bearing cap within 5 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing.**



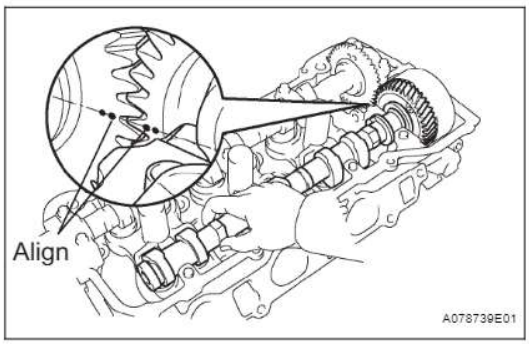
(g) Install the 5 bearing caps in their proper locations.
(h) Apply a light coat of engine oil on the threads of the bearing cap bolts.

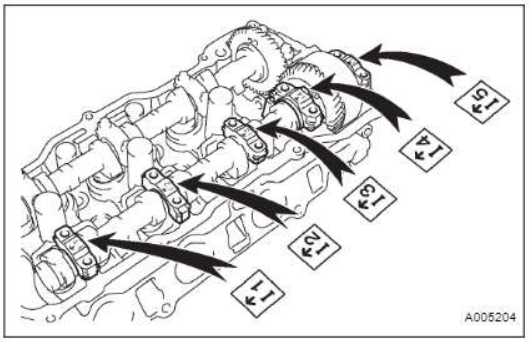


(i) Uniformly tighten the 10 bearing cap bolts in the sequence shown in the illustration.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)

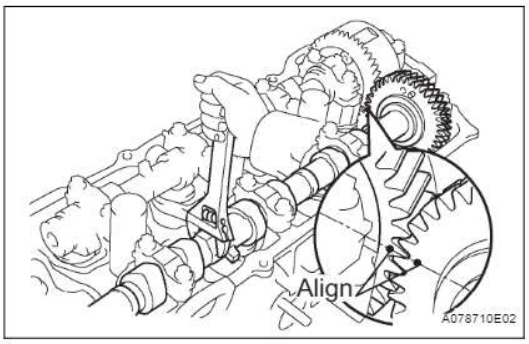
40. INSTALL CAMSHAFT
NOTICE:
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, damage to the cylinder head or to the camshaft may result. To avoid this, the following steps must be carried out.

(a) Apply new engine oil to the thrust portion and journal of the camshaft.
(b) Align the camshaft drive and driven gear's timing marks (2 dot marks each).
(c) Place the camshaft on the cylinder head.



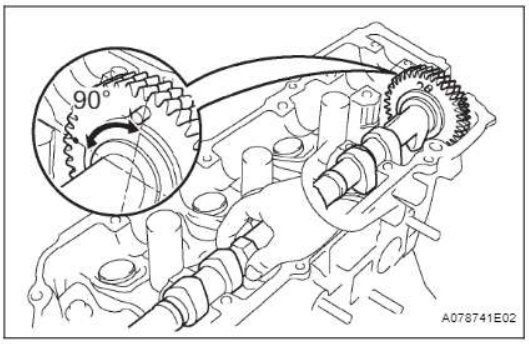


(d) Install the 5 bearing caps in their proper locations.
(e) Apply a light coat of engine oil on the threads of the bearing cap bolts.

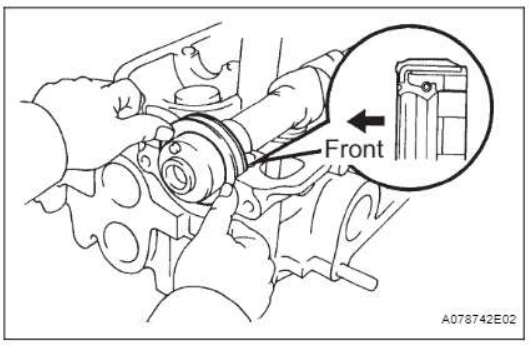


(f) Uniformly tighten the 10 bearing cap bolts uniformly in the sequence shown in the illustration.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)
(g) Remove the service bolt.

41. INSTALL NO.4 CAMSHAFT SUB-ASSEMBLY
NOTICE:
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, damage to the cylinder head or to the camshaft may result. To avoid this, the following steps must be carried out.

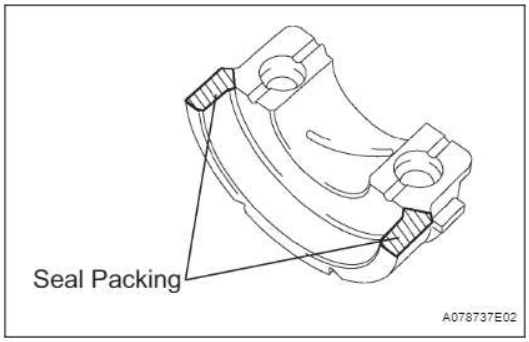


(a) Apply new engine oil to the thrust portion and journal of the camshaft.
(b) Place the No. 4 camshaft at a 90°angle of the timing mark (1 dot mark) on the cylinder head.
(c) Apply MP grease to a new oil seal lip.

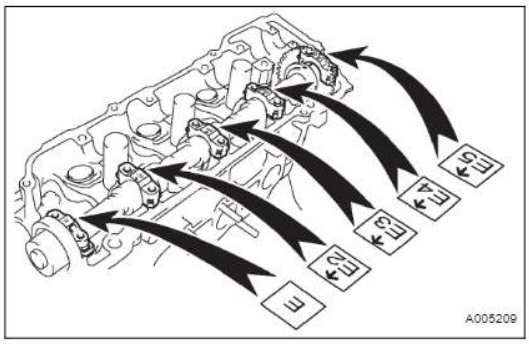


(d) Install the oil seal to the camshaft.
NOTICE:
- **Make sure the oil seal is installed facing the correct direction, as shown in the illustration.**
- **Insert the oil seal until it cannot be pushed any further.**

(e) Remove any old packing material from the contact surface.

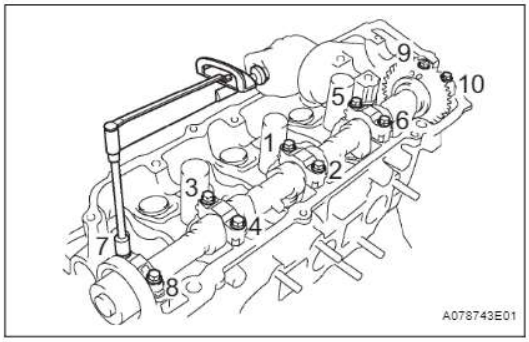


(f) Apply seal packing to the No. 1 bearing cap as shown in the illustration.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
- **Install the No. 1 bearing cap within 5 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing. Seal Packing**



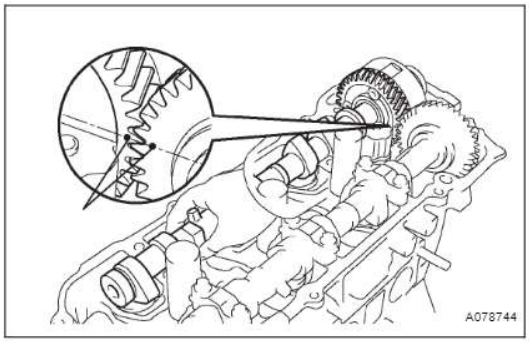
(g) Install the 5 bearing caps in their proper locations.
(h) Apply a light coat of engine oil on the threads of the bearing cap bolts.

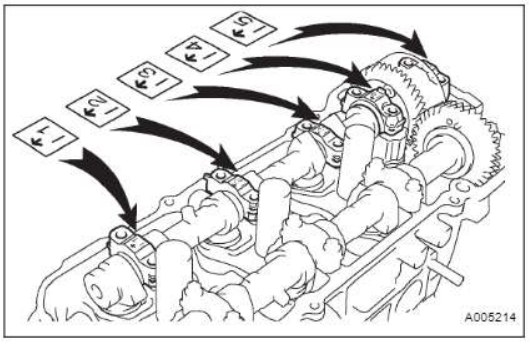
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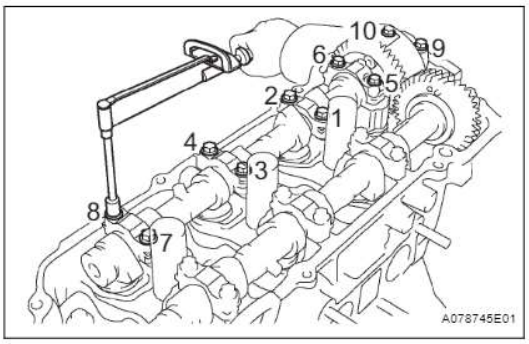
(i) Uniformly tighten the 10 bearing cap bolts in the sequence shown in the illustration.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)

42. INSTALL NO.3 CAMSHAFT SUB-ASSEMBLY
NOTICE:
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, damage to the cylinder head or to the camshaft may result. To avoid this, the following steps must be carried out.
(a) Apply new engine oil to the thrust position and journal of the camshaft.
(b) Align the camshaft drive and driven gear's timing mark (1 dot mark each).
(c) Place the camshaft on the cylinder head.



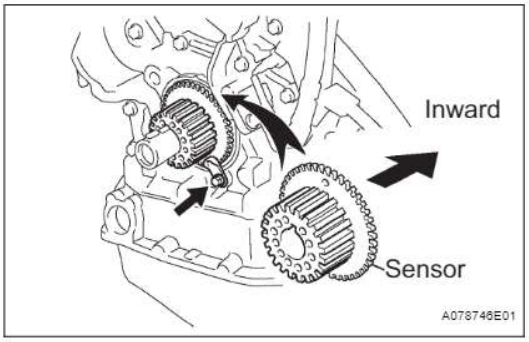


(d) Install the 5 bearing caps in their proper locations.
(e) Apply a light coat of engine oil on the threads of the bearing cap bolts.

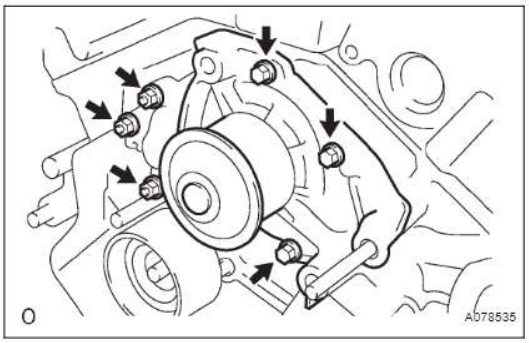


(f) Uniformly tighten the 10 bearing cap bolts in the sequence show in the illustration.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)
(g) Remove the service bolt.

EM



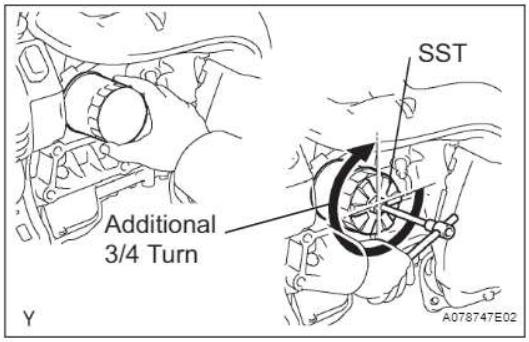
43. INSTALL CRANKSHAFT TIMING PULLEY
(a) Align the keyway of the timing pulley with the key located on the crankshaft and slide the timing pulley into place.
NOTICE:
Do not scratch the sensor area of the crankshaft timing pulley.
(b) Install the timing belt plate with the bolt.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)



44. INSTALL WATER PUMP ASSEMBLY
(a) Install a new gasket and the water pump with the 3 bolts and 3 nuts.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

45. INSTALL OIL LEVEL GAGE GUIDE
(a) Apply a light coat of engine oil to a new O-ring and install it to the level gage guide.
(b) Install the level gage guide.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

46. INSTALL OIL FILTER SUB-ASSEMBLY
(a) Using a 12 mm socket hexagon wrench, install the oil filter union.
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)
(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.

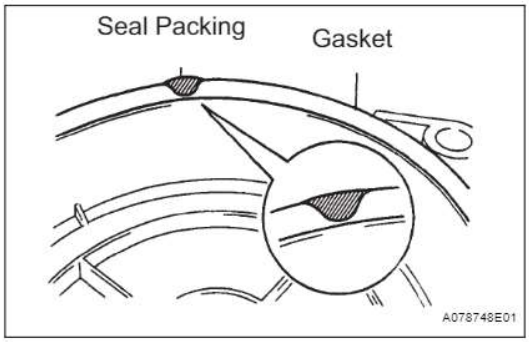


(e) Using SST, tighten it an additional 3/4 turn.

47. INSTALL TIMING BELT IDLER BRACKET
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)

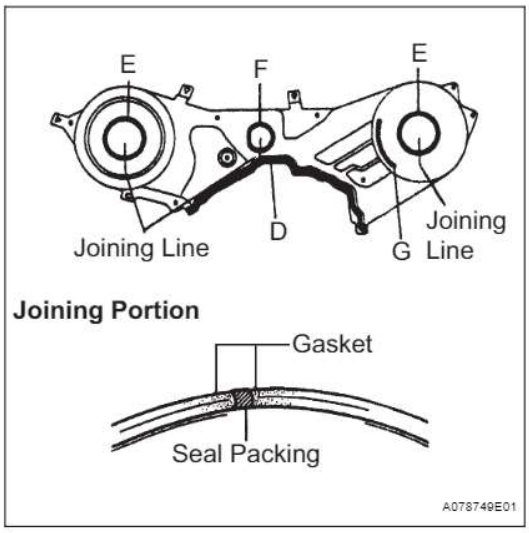
48. INSTALL TIMING BELT NO.3 COVER

(a) Visually check for cracks and breaks on the gasket of the timing belt cover.
HINT:
If water is entering through cracks or breaks in the gasket, repair according to these guidelines: 1) if the crack length is within 2 to 3 cm (0.79 to 1.18 in.), repair with seal packing; or 2) if the crack length is over 3 cm (1.18 in.), replace the gasket.



(b) If the timing belt cover gasket needs to be repaired, follow the procedure below.
(1) Repair the cracks and breaks by applying the seal packing to the damaged area.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
When applying the seal packing, apply it as wide and high as the gasket.

(c) If the timing belt cover gasket needs to be replaced, follow the procedure below.
(1) Using a screwdriver and gasket scraper, remove the remaining gasket.
NOTICE:
Be careful not to damage the timing belt cover.



(2) Remove the backing paper from a new gasket, and affix the gasket along the groove of the timing belt cover as shown in the illustration.
NOTICE:
- **Affix the gasket in the center of the groove.**
- **At the corners, try to keep the gasket thickness uniform.**

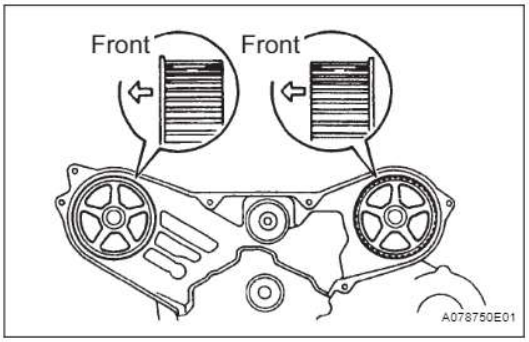
Length

Gasket	D	E	F	G
Specified Condition	335 mm (13.19 in.)	180 mm (7.09 in.)	133 mm (5.24 in.)	72 mm (2.83 in.)

(3) If there is a gap on the joint of the gasket, apply seal packing to close the gap.
Seal packing:
Part No. 08826-00080 or equivalent
NOTICE:
When applying the seal packing, apply it as wide and high as the gasket.

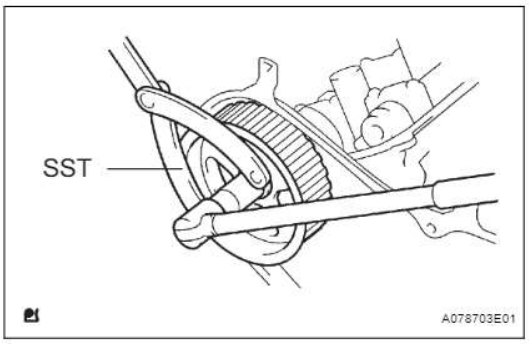
(d) Install the timing belt cover with the 6 bolts.
Torque: 8.5 N*m (87 kgf*cm, 76 in.*lbf)

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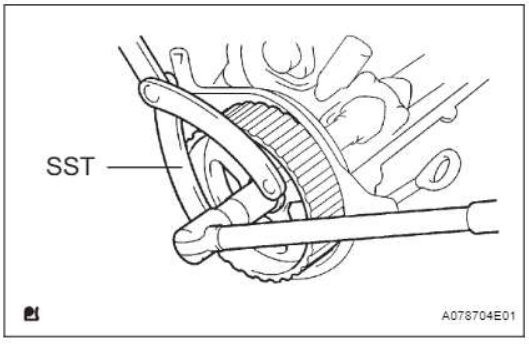


49. INSTALL CAMSHAFT TIMING PULLEY

(a) Install the camshaft timing pulley with the belt guide properly oriented and tighten the bolt temporarily.
HINT:
- Face the belt guide of the RH timing pulley towards the front of the engine.
- Face the belt guide of the LH timing pulley towards the rear of the engine.



(b) Using SST, tighten the RH pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 125 N*m (1,275 kgf*cm, 92 ft.*lbf)



(c) Using SST, tighten the LH pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 125 N*m (1,275 kgf*cm, 92 ft.*lbf)

50. INSTALL NO.2 TIMING BELT IDLER SUB-ASSEMBLY
Torque: 34 N*m (347 kgf*cm, 25 ft.*lbf)

51. INSTALL NO,1 TIMING BELT IDLER SUB-ASSEMBLY

(a) Using a 10 mm socket hexagon wrench, install the washer and timing belt idler No. 1 with the pivot bolt.
Torque: 34 N*m (347 kgf*cm, 25 ft.*lbf)

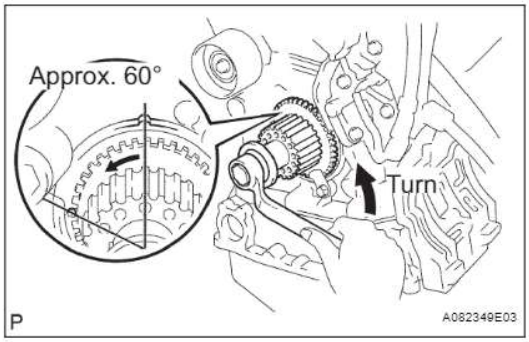
52. INSTALL TIMING BELT

(a) Remove any oil or water on the pulleys and keep them clean.
NOTICE:
- **If there is a trace of water and/or oil on the timing belt, repair the leakage and install a new timing belt.**
- **Only wipe the pulleys. Do not use cleaning agents on the pulleys.**

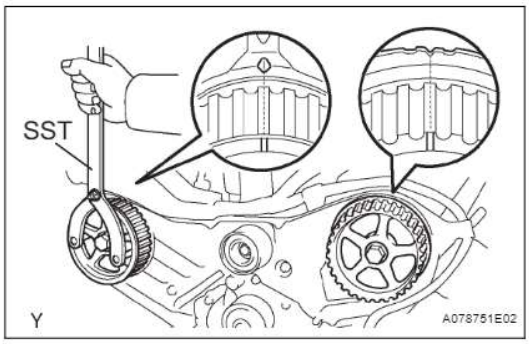
(b) Inspect the idler pulleys.
(1) Check that the idler pulley turns smoothly.
(2) Visually check the sealed portion of the idler pulley for oil leakage.

(c) Inspect the water pump.
(1) Turn the pulley, and check that the water pump bearing moves smoothly without any noise.
(2) Visually check the drain hole for coolant leakage.

(d) Temporarily install the crankshaft pulley bolt and washer to the crankshaft.

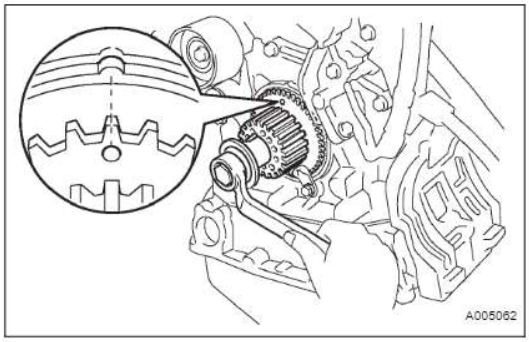


(e) Turn the crankshaft counterclockwise by approximately 60°.
NOTICE:
To prevent the piston head and the valve head from colliding, set the crankshaft pulley at approximately 60 °BTDC/compression position.

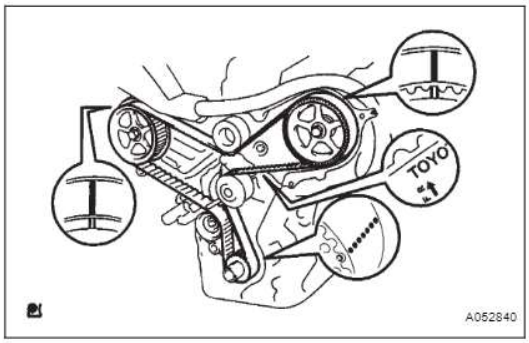


(f) Using SST, turn the crankshaft pulley, and align the timing marks of the timing pulleys with the No. 3 timing belt cover.
SST 09960-10010 (09962-01000, 09963-01000)

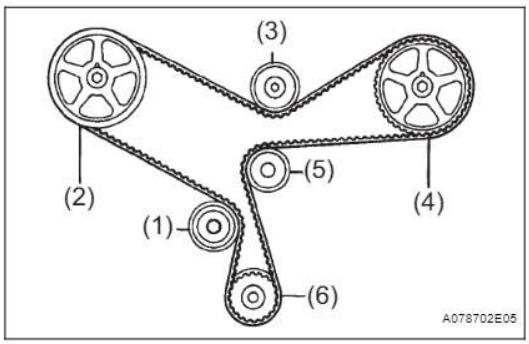
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(g) Turn the crankshaft, and align the timing mark of the crankshaft timing pulley with the oil pump body.



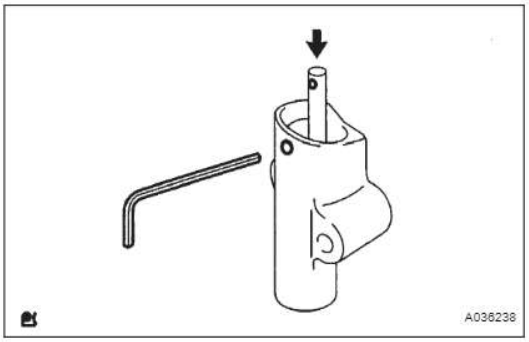
(h) Face the front mark on the timing belt forward.
(i) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
(j) Align the installation marks on the timing belt with the timing marks of the camshaft timing pulleys.



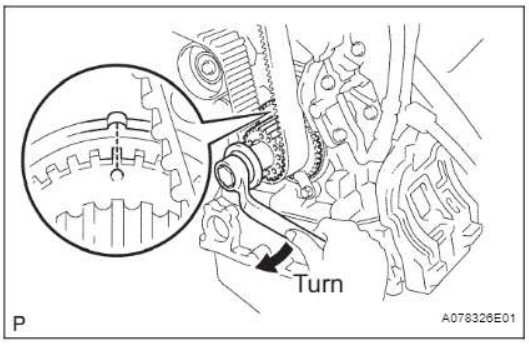
(k) Install the timing belt in this order.

1st	Crankshaft timing pulley
2nd	Water pump pulley
3rd	LH camshaft timing pulley
4th	No. 2 idler pulley
5th	RH camshaft timing pulley
6th	No. 1 idler pulley

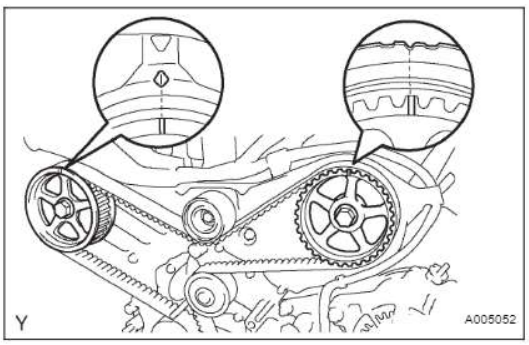
53. INSTALL TIMING BELT TENSIONER ASSEMBLY
(a) Set the timing belt tensioner uprightly on the press.



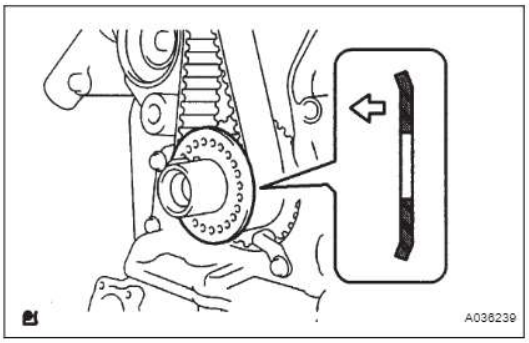
(b) Slowly press in the push rod.
NOTICE:
Do not apply pressure of more than 9.8 kN (1,000 kgf, 2,205 lbf) to the rod.
(c) Align the holes of the push rod and housing, pass a 1.5 mm hexagon wrench through the holes to keep the setting position of the push rod.
(d) Release the press.
(e) Temporarily install the tensioner with the 2 bolts.
Torque: 27 N*m (280 kgf*cm, 20 ft.*lbf)
NOTICE:
Install the tensioner's bolts uniformly and evenly. Installing the tensioner at an angle may cause it to malfunction.
(f) Remove the 1.5 mm hexagon wrench from the tensioner.



(g) Turn the crankshaft 2 revolutions slowly, and align the timing mark of the crankshaft timing pulley with the oil pump body.
NOTICE:
Always turn the crankshaft clockwise.



(h) Check that the timing marks of the RH and LH timing pulleys are aligned with the timing marks of the No. 3 timing belt cover as shown in the illustration. If the marks do not align, remove the timing belt and reinstall it.
(i) Remove the crankshaft pulley bolt.



54. INSTALL TIMING BELT GUIDE NO.2
(a) Install the timing belt guide, facing the cup side toward the engine front.

55. INSTALL ENGINE MOUNTING BRACKET RH
Torque: 28 N*m (286 kgf*cm, 21 ft.*lbf)

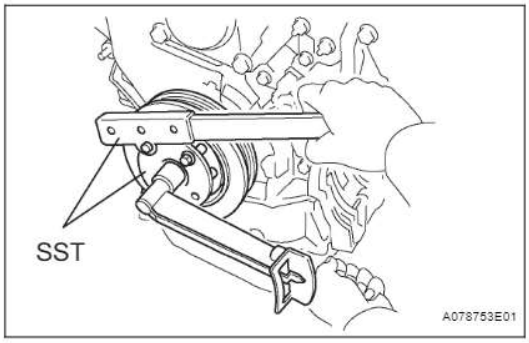
56. INSTALL TIMING BELT NO.2 COVER
(a) Visually check for cracks and breaks on the gasket of the timing belt cover. If there is a trace that water is entering at the visual check, replace the timing belt cover. A036239
(b) Install the timing belt cover.
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

57. INSTALL TIMING BELT NO.1 COVER

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

(b) Install the timing belt cover.

Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)



58. INSTALL CRANKSHAFT PULLEY

(a) Align the keyway of the pulley with the key located on the crankshaft and slide the pulley into place.

(b) Using SST, install the pulley bolt.

SST 09213-54015 (91651-60855), 09330-00021

Torque: 220 N*m (2,250 kgf*cm, 162 ft.*lbf)

59. INSTALL VVT SENSOR

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

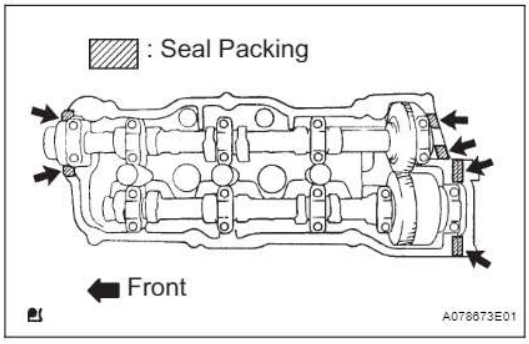
60. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

61. INSTALL ENGINE HANGER NO.2

Torque: 20 N*m (199 kgf*cm, 14 ft.*lbf)

62. INSPECT VALVE CLEARANCE



63. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY

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

(b) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing:

Part No. 08826-00080 or equivalent

NOTICE:

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

(c) Install the cylinder head cover with the 9 bolts. Tighten the bolts uniformly in several steps.

Torque: 8.0 N*m (80 kgf*cm, 71 in.*lbf)

64. INSTALL VENTILATION VALVE SUB-ASSEMBLY

(a) Apply adhesive to 2 or 3 threads.

Adhesive:

Part No. 08833-00070, THREE BOND 1324 or equivalent

(b) Install the ventilation valve.

Torque: 19 N*m (193 kgf*cm, 14 ft.*lbf)

65. INSTALL OIL FILLER CAP GASKET

66. INSTALL OIL FILLER CAP SUB-ASSEMBLY

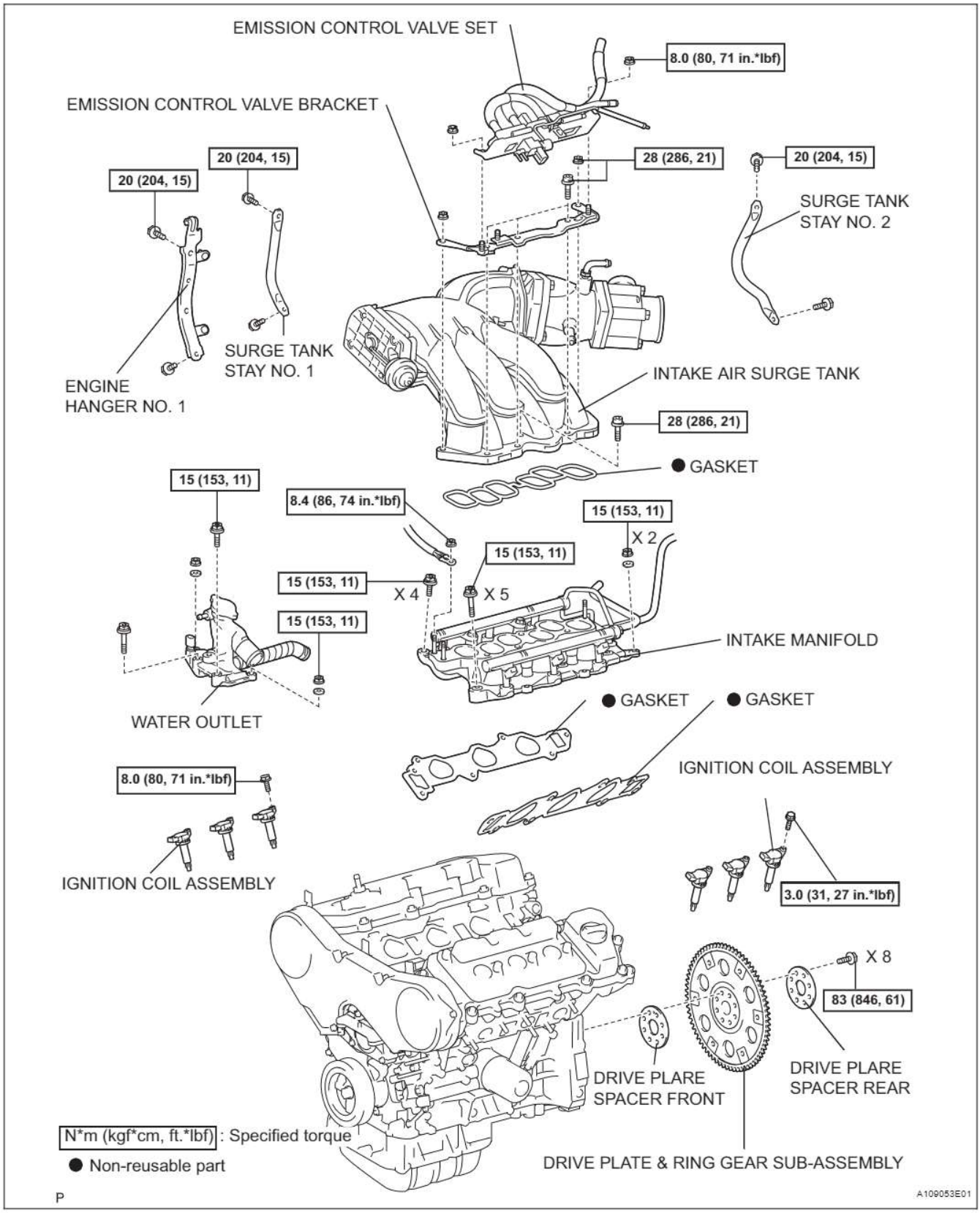
67. INSTALL SPARK PLUG

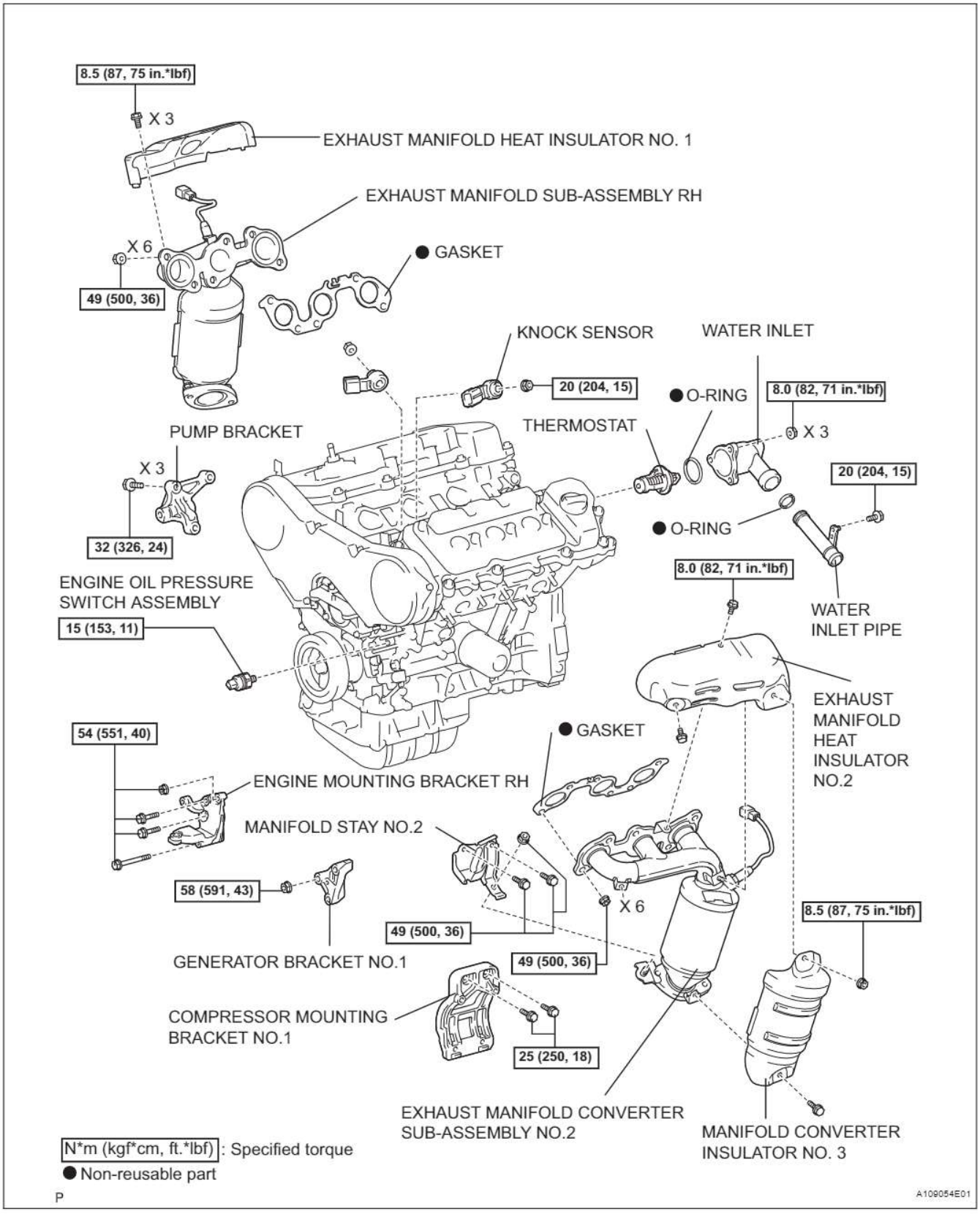
Torque: 25 N*m (250 kgf*cm, 18 ft.*lbf)

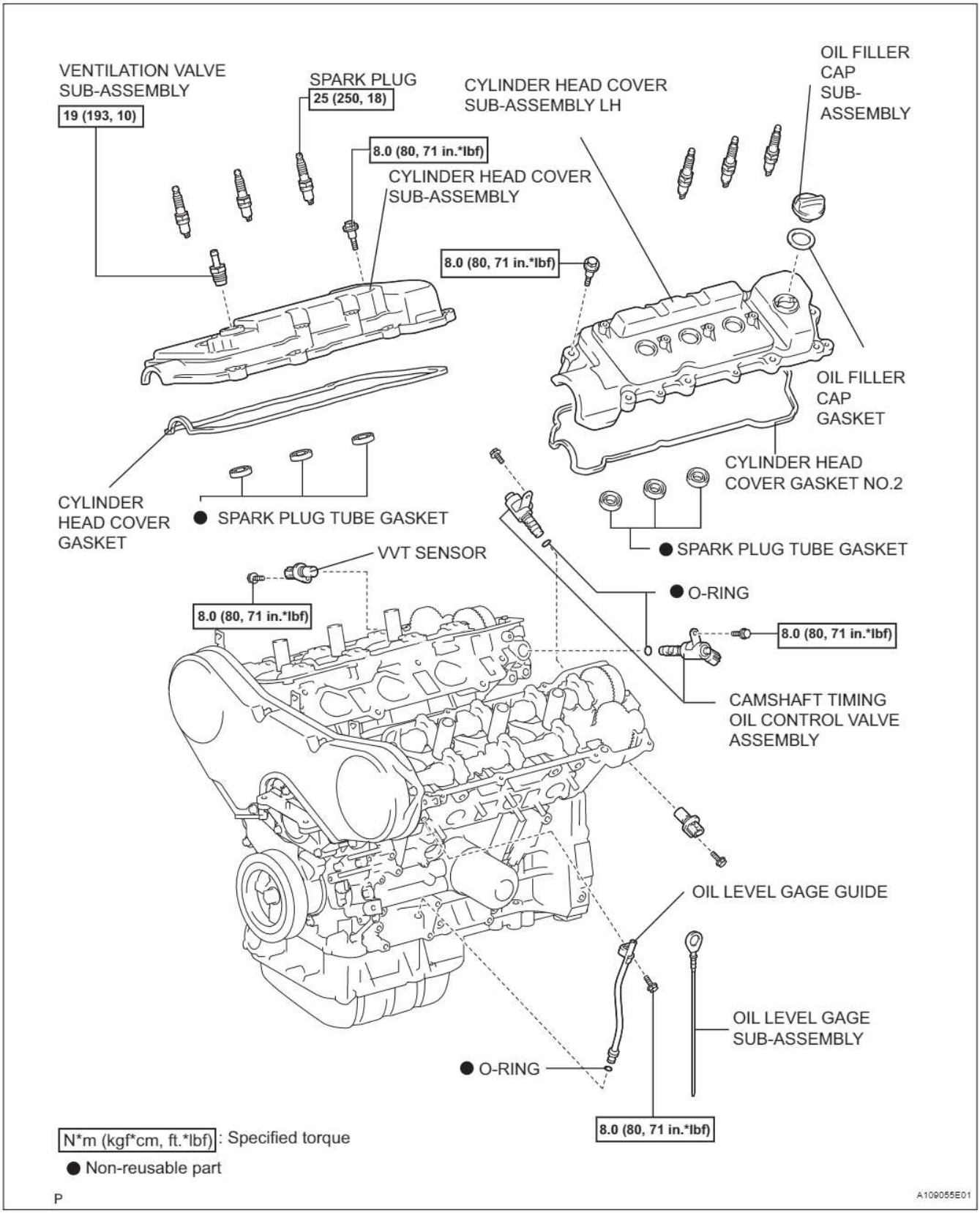
EM

ENGINE UNIT

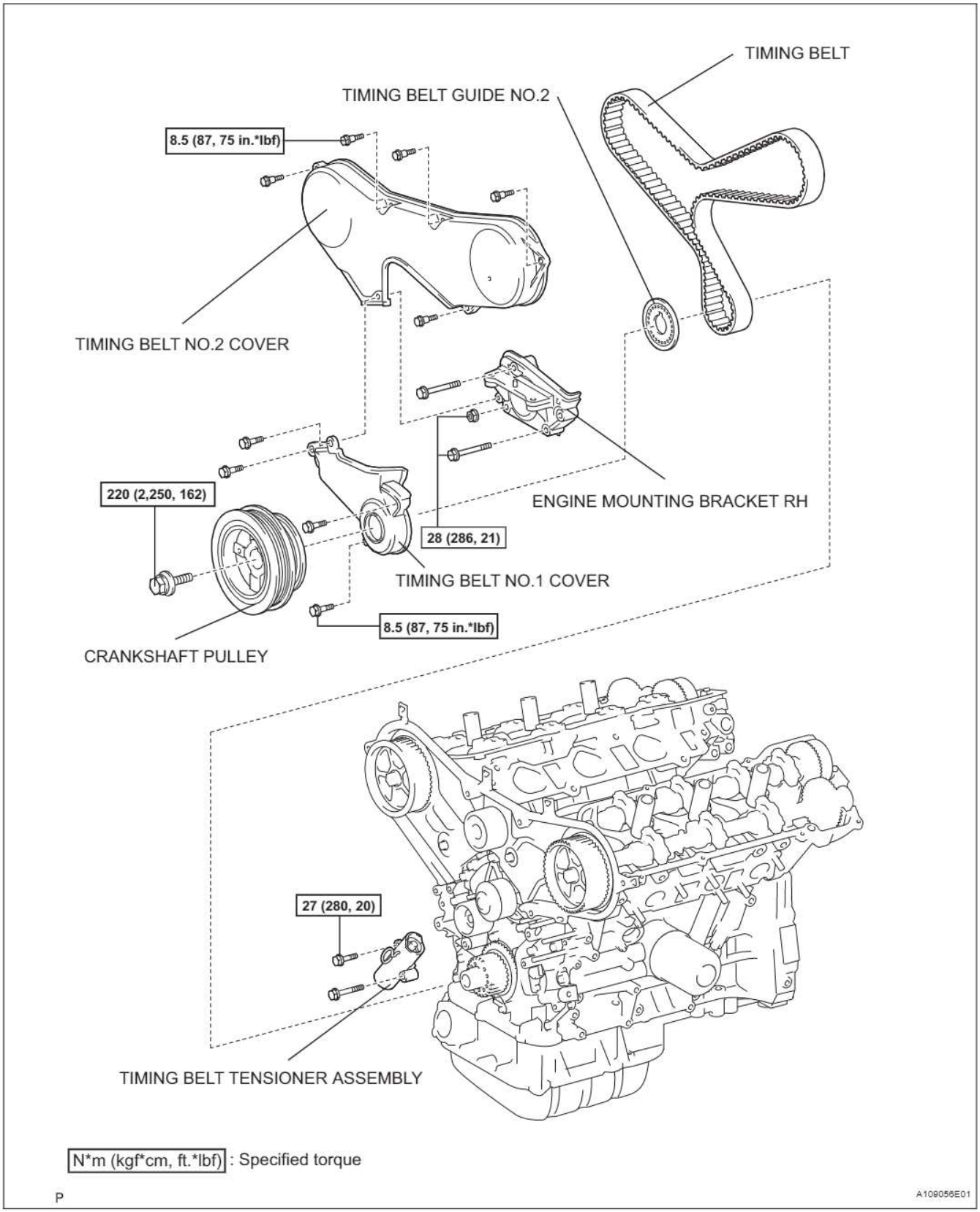
COMPONENTS

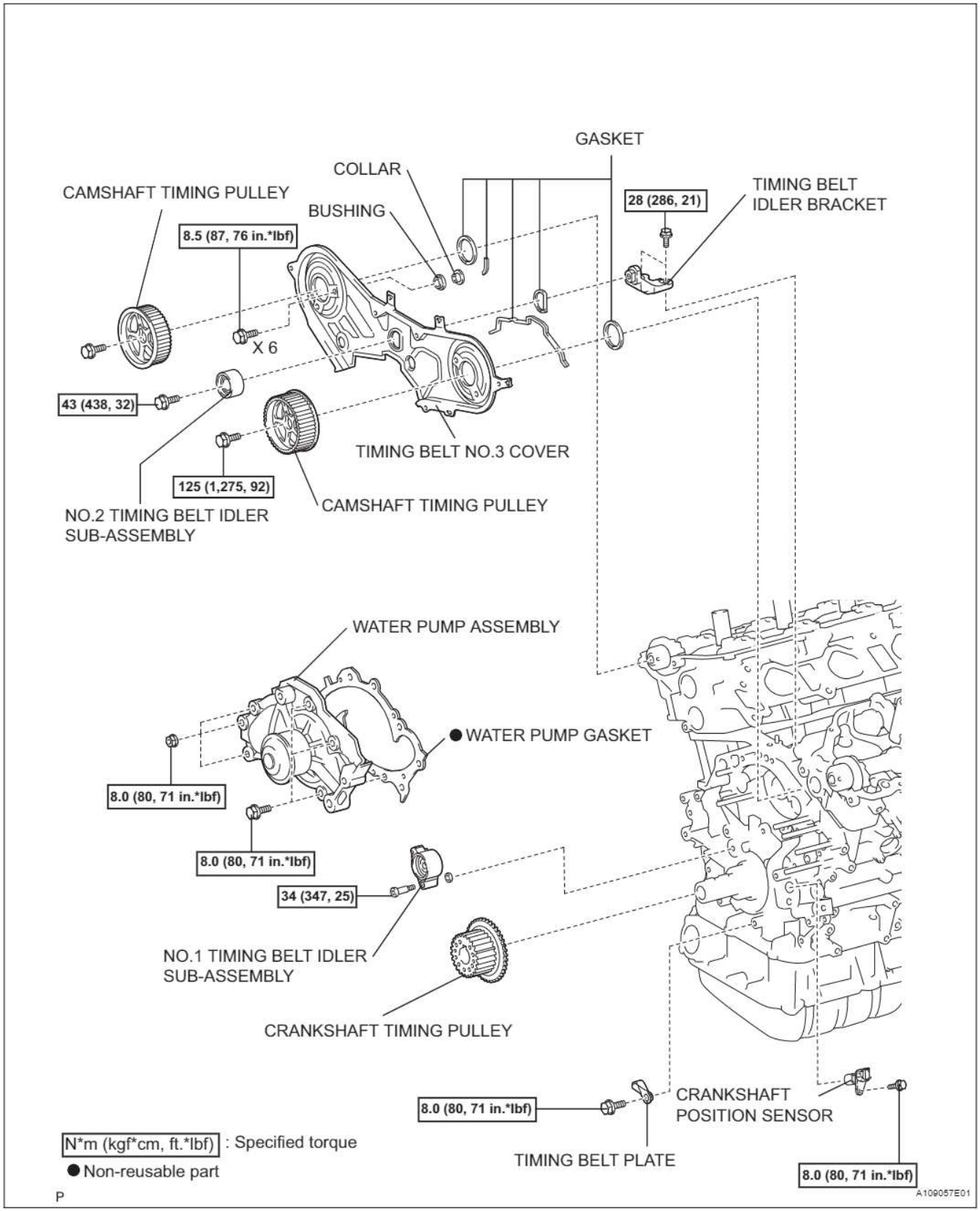


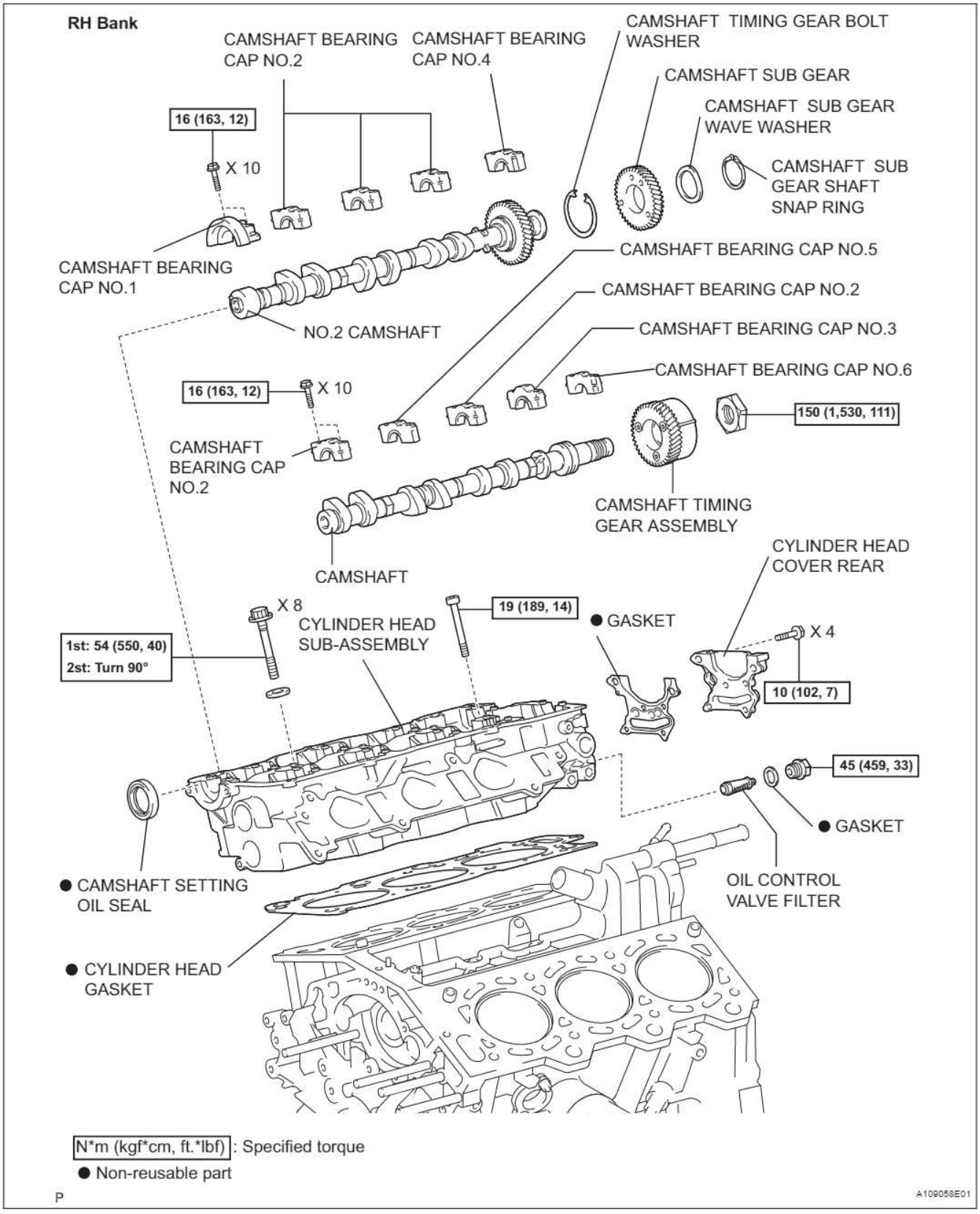

8.5 (87, 75 in.*lbf)
X 3
EXHAUST MANIFOLD HEAT INSULATOR NO. 1
EXHAUST MANIFOLD SUB-ASSEMBLY RH
X 6
GASKET
49 (500, 36)
KNOCK SENSOR
WATER INLET
20 (204, 15)
O-RING
8.0 (82, 71 in.*lbf)
PUMP BRACKET
THERMOSTAT
X 3
X 3
20 (204, 15)
O-RING
32 (326, 24)
8.0 (82, 71 in.*lbf)
ENGINE OIL PRESSURE SWITCH ASSEMBLY
WATER INLET PIPE
15 (153, 11)
EXHAUST MANIFOLD HEAT INSULATOR NO.2
54 (551, 40)
GASKET
ENGINE MOUNTING BRACKET RH
MANIFOLD STAY NO.2
58 (591, 43)
X 6
8.5 (87, 75 in.*lbf)
49 (500, 36)
49 (500, 36)
GENERATOR BRACKET NO.1
COMPRESSOR MOUNTING BRACKET NO.1
25 (250, 18)
EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY NO.2
MANIFOLD CONVERTER INSULATOR NO. 3
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
P
A109054E01

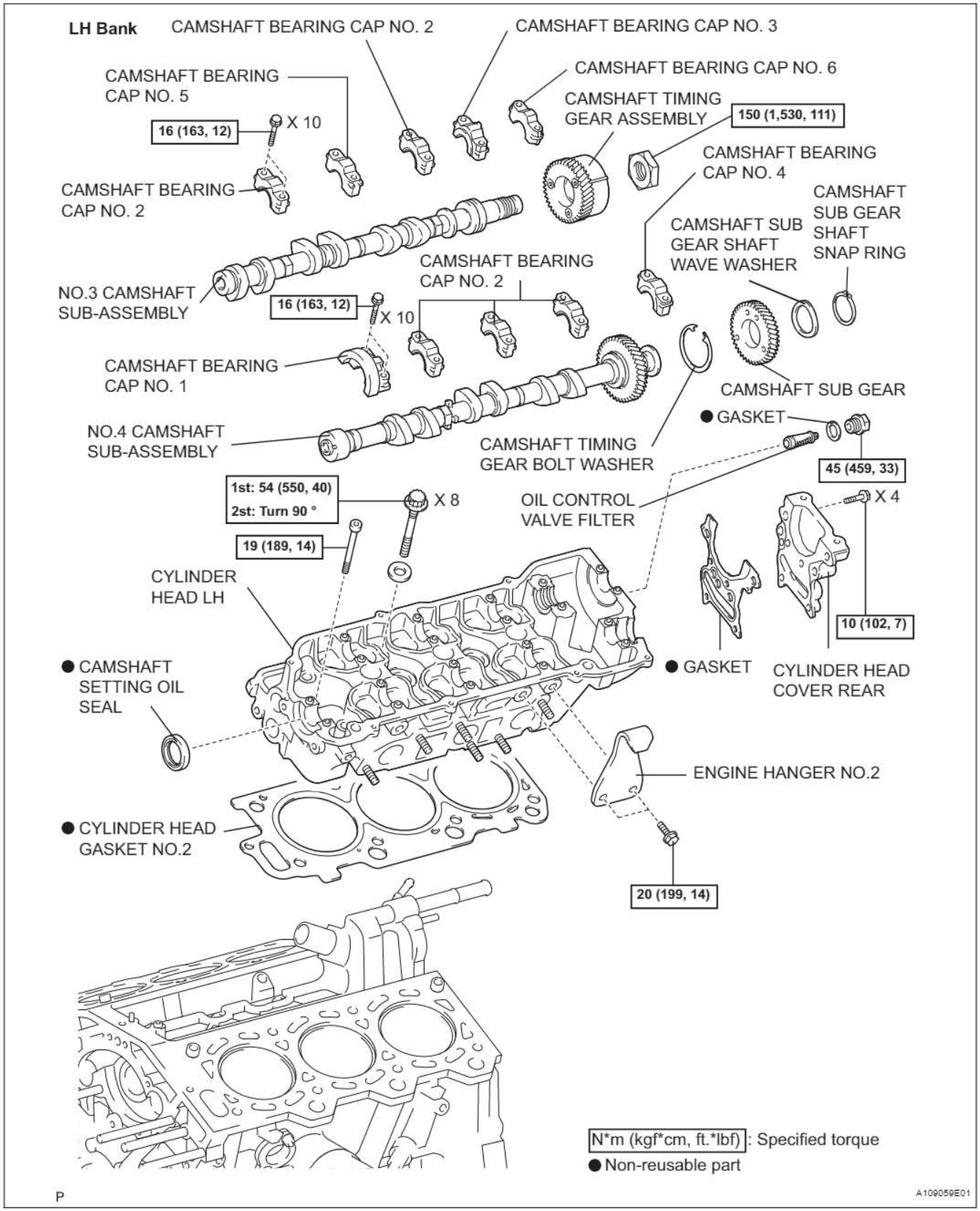

VENTILATION VALVE SUB-ASSEMBLY
19 (193, 10)
SPARK PLUG
25 (250, 18)
8.0 (80, 71 in.*lbf)
CYLINDER HEAD COVER SUB-ASSEMBLY LH
OIL FILLER CAP SUB-ASSEMBLY
CYLINDER HEAD COVER SUB-ASSEMBLY
8.0 (80, 71 in.*lbf)
OIL FILLER CAP GASKET
CYLINDER HEAD COVER GASKET NO.2
CYLINDER HEAD COVER GASKET
● SPARK PLUG TUBE GASKET
● SPARK PLUG TUBE GASKET
VVT SENSOR
● O-RING
8.0 (80, 71 in.*lbf)
8.0 (80, 71 in.*lbf)
CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY
OIL LEVEL GAGE GUIDE
OIL LEVEL GAGE SUB-ASSEMBLY
● O-RING
8.0 (80, 71 in.*lbf)
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109055E01

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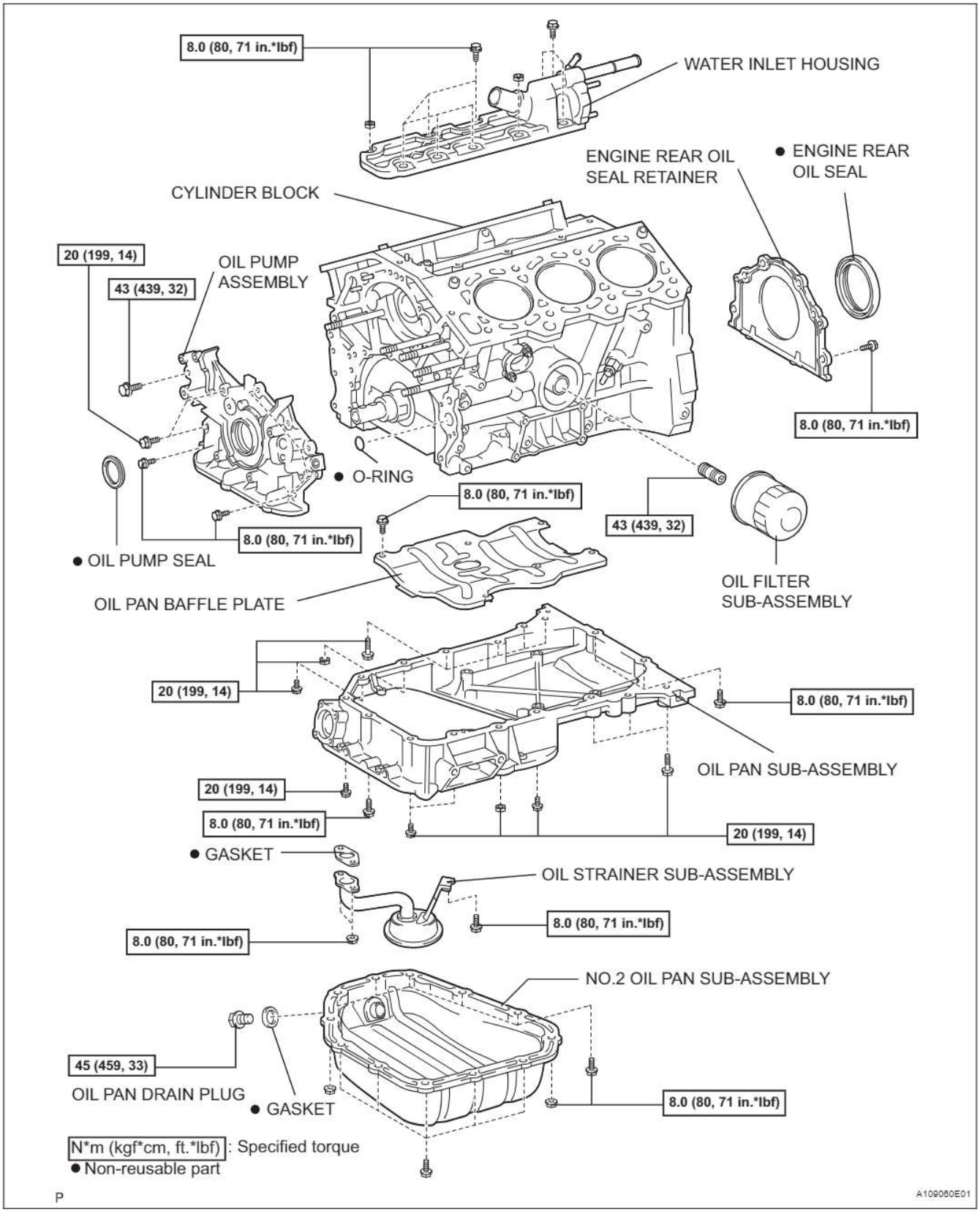

TIMING BELT
TIMING BELT GUIDE NO.2
8.5 (87, 75 in.*lbf)
TIMING BELT NO.2 COVER
220 (2,250, 162)
28 (286, 21)
ENGINE MOUNTING BRACKET RH
TIMING BELT NO.1 COVER
8.5 (87, 75 in.*lbf)
CRANKSHAFT PULLEY
27 (280, 20)
TIMING BELT TENSIONER ASSEMBLY
N*m (kgf*cm, ft.*lbf) : Specified torque
P
A109056E01

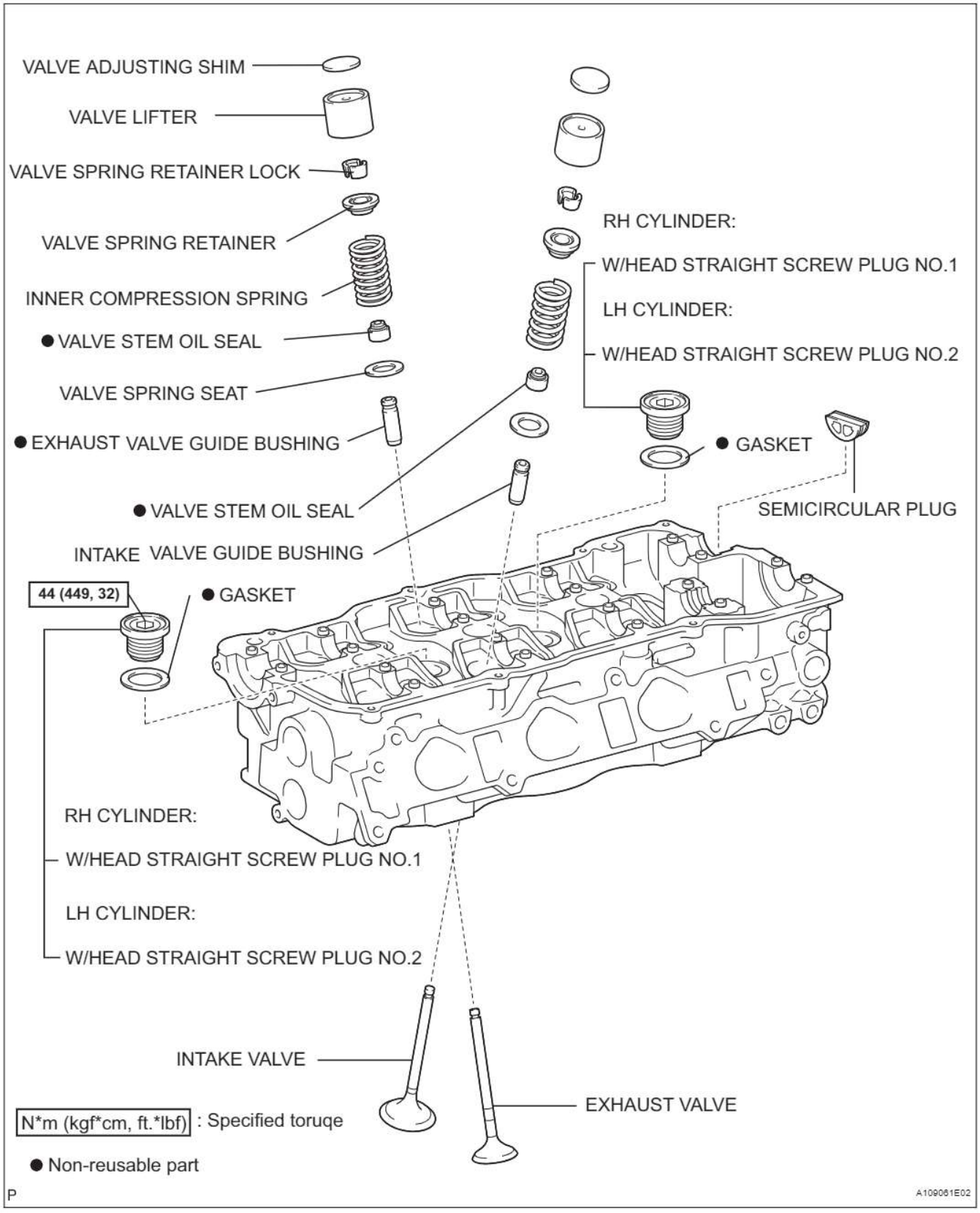

GASKET
COLLAR
CAMSHAFT TIMING PULLEY
BUSHING
8.5 (87, 76 in.*lbf)
28 (286, 21)
TIMING BELT IDLER BRACKET
X 6
43 (438, 32)
TIMING BELT NO.3 COVER
125 (1,275, 92)
CAMSHAFT TIMING PULLEY
NO.2 TIMING BELT IDLER SUB-ASSEMBLY
WATER PUMP ASSEMBLY
● WATER PUMP GASKET
8.0 (80, 71 in.*lbf)
8.0 (80, 71 in.*lbf)
34 (347, 25)
NO.1 TIMING BELT IDLER SUB-ASSEMBLY
CRANKSHAFT TIMING PULLEY
8.0 (80, 71 in.*lbf)
CRANKSHAFT POSITION SENSOR
TIMING BELT PLATE
8.0 (80, 71 in.*lbf)
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
P
A109057E01


RH Bank
CAMSHAFT BEARING CAP NO.2
CAMSHAFT BEARING CAP NO.4
CAMSHAFT TIMING GEAR BOLT WASHER
CAMSHAFT SUB GEAR
CAMSHAFT SUB GEAR WAVE WASHER
CAMSHAFT SUB GEAR SHAFT SNAP RING
16 (163, 12)
X 10
CAMSHAFT BEARING CAP NO.1
NO.2 CAMSHAFT
CAMSHAFT BEARING CAP NO.5
CAMSHAFT BEARING CAP NO.2
CAMSHAFT BEARING CAP NO.3
CAMSHAFT BEARING CAP NO.6
16 (163, 12)
X 10
150 (1,530, 111)
CAMSHAFT BEARING CAP NO.2
CAMSHAFT TIMING GEAR ASSEMBLY
CAMSHAFT
CYLINDER HEAD COVER REAR
X 8
19 (189, 14)
GASKET
X 4
1st: 54 (550, 40)
2st: Turn 90°
CYLINDER HEAD SUB-ASSEMBLY
10 (102, 7)
45 (459, 33)
GASKET
CAMSHAFT SETTING OIL SEAL
OIL CONTROL VALVE FILTER
CYLINDER HEAD GASKET
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
P
A109058E01

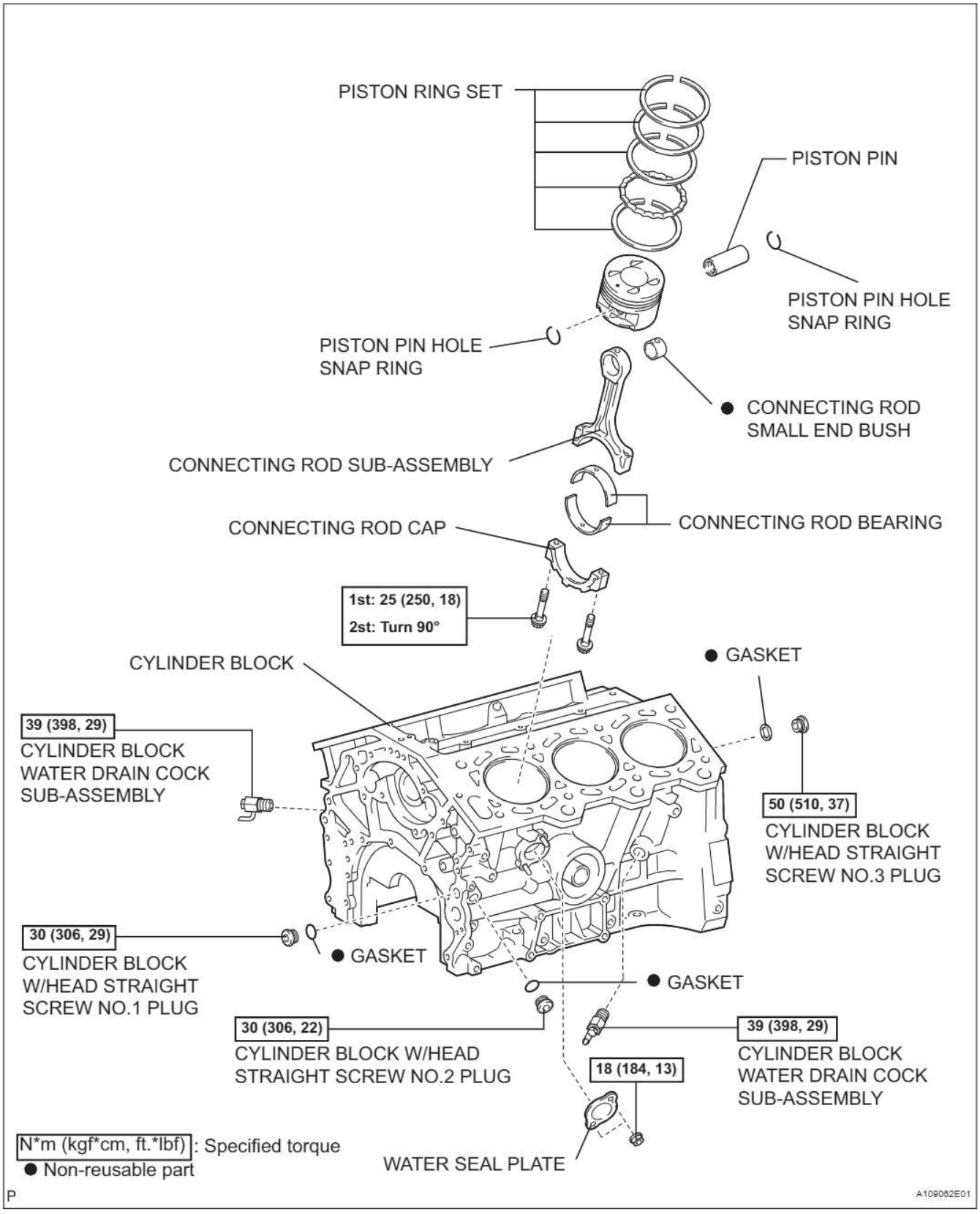

LH Bank
CAMSHAFT BEARING CAP NO. 2
CAMSHAFT BEARING CAP NO. 3
CAMSHAFT BEARING CAP NO. 6
CAMSHAFT BEARING CAP NO. 5
CAMSHAFT TIMING GEAR ASSEMBLY
150 (1,530, 111)
16 (163, 12)
X 10
CAMSHAFT BEARING CAP NO. 4
CAMSHAFT BEARING CAP NO. 2
CAMSHAFT SUB GEAR SHAFT WAVE WASHER
CAMSHAFT SUB GEAR SHAFT SNAP RING
CAMSHAFT BEARING CAP NO. 2
NO.3 CAMSHAFT SUB-ASSEMBLY
16 (163, 12)
X 10
CAMSHAFT BEARING CAP NO. 1
CAMSHAFT SUB GEAR
GASKET
NO.4 CAMSHAFT SUB-ASSEMBLY
CAMSHAFT TIMING GEAR BOLT WASHER
45 (459, 33)
1st: 54 (550, 40)
2st: Turn 90 °
X 8
OIL CONTROL VALVE FILTER
X 4
19 (189, 14)
CYLINDER HEAD LH
10 (102, 7)
CAMSHAFT SETTING OIL SEAL
GASKET
CYLINDER HEAD COVER REAR
ENGINE HANGER NO.2
CYLINDER HEAD GASKET NO.2
20 (199, 14)
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
P
A109059E01

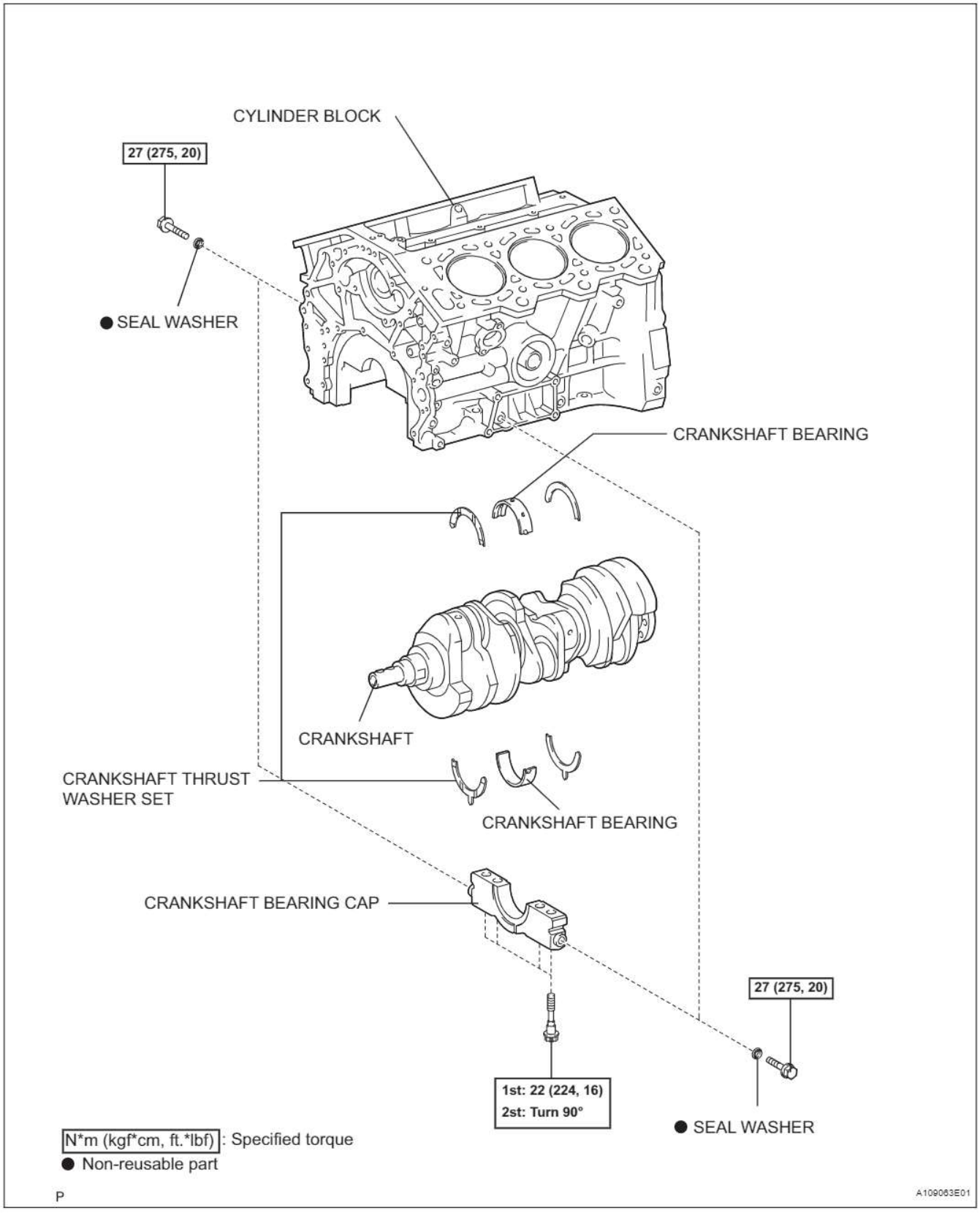
EM


8.0 (80, 71 in.*lbf)
WATER INLET HOUSING
ENGINE REAR OIL SEAL RETAINER
● ENGINE REAR OIL SEAL
CYLINDER BLOCK
20 (199, 14)
43 (439, 32)
OIL PUMP ASSEMBLY
8.0 (80, 71 in.*lbf)
● O-RING
8.0 (80, 71 in.*lbf)
43 (439, 32)
8.0 (80, 71 in.*lbf)
● OIL PUMP SEAL
OIL FILTER SUB-ASSEMBLY
OIL PAN BAFFLE PLATE
20 (199, 14)
8.0 (80, 71 in.*lbf)
OIL PAN SUB-ASSEMBLY
20 (199, 14)
8.0 (80, 71 in.*lbf)
20 (199, 14)
● GASKET
OIL STRAINER SUB-ASSEMBLY
8.0 (80, 71 in.*lbf)
8.0 (80, 71 in.*lbf)
NO.2 OIL PAN SUB-ASSEMBLY
45 (459, 33)
OIL PAN DRAIN PLUG
● GASKET
8.0 (80, 71 in.*lbf)
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109060E01


VALVE ADJUSTING SHIM
VALVE LIFTER
VALVE SPRING RETAINER LOCK
VALVE SPRING RETAINER
INNER COMPRESSION SPRING
● VALVE STEM OIL SEAL
VALVE SPRING SEAT
● EXHAUST VALVE GUIDE BUSHING
● VALVE STEM OIL SEAL
INTAKE VALVE GUIDE BUSHING
44 (449, 32)
● GASKET
RH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.1
LH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.2
● GASKET
SEMICIRCULAR PLUG
RH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.1
LH CYLINDER:
W/HEAD STRAIGHT SCREW PLUG NO.2
INTAKE VALVE
EXHAUST VALVE
N*m (kgf*cm, ft.*lbf) : Specified toruqe
● Non-reusable part
P
A109061E02

EM


PISTON RING SET
PISTON PIN
PISTON PIN HOLE SNAP RING
PISTON PIN HOLE SNAP RING
● CONNECTING ROD SMALL END BUSH
CONNECTING ROD SUB-ASSEMBLY
CONNECTING ROD CAP
CONNECTING ROD BEARING
1st: 25 (250, 18)
2st: Turn 90°
CYLINDER BLOCK
● GASKET
39 (398, 29)
CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY
50 (510, 37)
CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG
30 (306, 29)
CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG
● GASKET
● GASKET
30 (306, 22)
CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG
39 (398, 29)
CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY
18 (184, 13)
WATER SEAL PLATE
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109062E01


CYLINDER BLOCK
27 (275, 20)
● SEAL WASHER
CRANKSHAFT BEARING
CRANKSHAFT
CRANKSHAFT THRUST WASHER SET
CRANKSHAFT BEARING
CRANKSHAFT BEARING CAP
27 (275, 20)
1st: 22 (224, 16)
2st: Turn 90°
● SEAL WASHER
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
P
A109063E01

EM