



**Technical Service
Information Bulletin**

July 19, 2007

Title:

**BRIEF ENGINE KNOCK/RATTLE NOISE
AT COLD STARTUP**

Models:

'07 GS 350

ENGINE
EG020-07
REVISED

TSIB REVISION NOTICE:

- December 5, 2007: VINs have been updated in the Production Change Information table. Part numbers for the camshaft timing gear assembly have been updated in the Parts Information table.

Previous versions of this TSIB should be discarded.

Introduction Immediately following a cold soak startup, some 2007 model year GS 350 vehicles may exhibit a brief rattle/knock noise from the engine compartment for approximately one second. Refer to the repair procedure below to address customer concerns.

- Applicable Vehicles**
- 2007 model year **GS 350** vehicles equipped with **2GR-FSE engine** and produced **BEFORE** the Production Change Effective VINs shown below.

**Production
Change
Information**

MODEL	PLANT	DRIVETRAIN	PRODUCTION CHANGE EFFECTIVE VIN
GS 350	Tahara	2WD	JTHBE96S*70024487
		4WD	JTHCE96S*70010861

**Warranty
Information**

OP CODE	DESCRIPTION	TIME	OFF	T1	T2
EG7027	R & R Bank 1 & Bank 2 Intake Camshaft Gear Assembly	6.0	13050-3104#	06	40

Applicable Warranty*:

This repair is covered under the Lexus Powertrain Warranty. This warranty is in effect for 72 months or 70,000 miles, whichever occurs first, from the vehicle's in-service date.


* Warranty application is limited to correction of a problem based upon a customer's specific complaint.



Parts
Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
13050-31071 13050-31081 13050-31120	13050-31161	Gear Assembly, Camshaft Timing	2
90430-16012	Same	Gasket, Oil Pipe	4
90430-16016	Same		2
11328-31030	Same	Gasket, Timing Gear Cover	1
11159-31010	11159-0P010	Gasket, Camshaft Bearing Cap	4
90430-10024	90430-A0001		2
23915-46011	Same	Insulator, Fuel Pump	1
11214-31020	Same	Gasket, Cylinder Head Cover No. 2	1
11213-31040	Same	Gasket Cylinder Head Cover	1
17176-31060	Same	Gasket, Air Surge Tank to Intake Manifold	1

Required
Tools &
Equipment

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER	QTY
TIS Techstream* NOTE: Software version 2.10.016 or later is required. 	ADE	TSPKG1	1

* Essential SST.

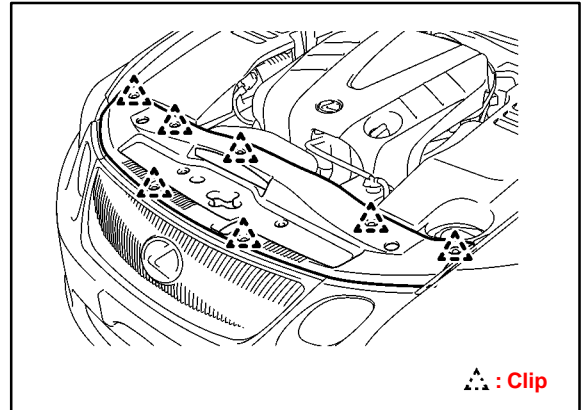
NOTE:

- Additional Techstream units may be ordered by calling Approved Dealer Equipment (ADE) at 1-800-368-6787.
- The Lexus Diagnostic Tester and CAN Interface Module may also be used to perform the service procedures listed in this bulletin.

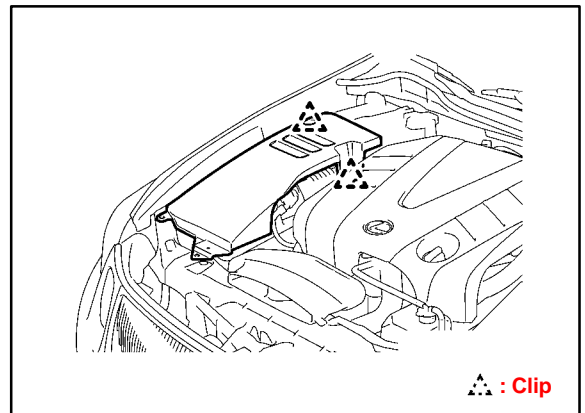
TOOLS & MATERIAL	QUANTITY
Toyota Genuine Adhesive 1344, Three Bond 1344, or Equivalent	As Needed
FIPG Sealant: P/N 08826-00080, or Equivalent	As Needed

Repair Procedure

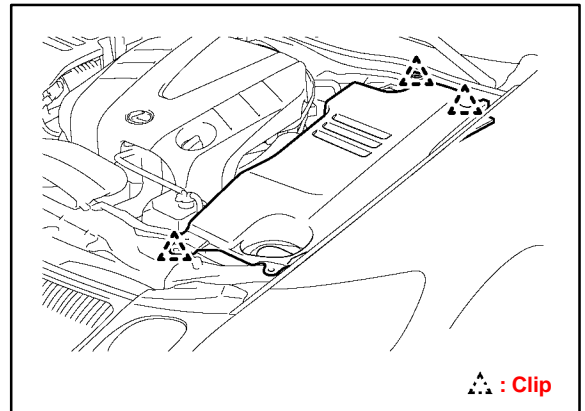
1. Disconnect the cable from the negative (-) battery terminal.
2. Remove the cool air intake duct seal by removing the 7 clips.



3. Remove the engine compartment side cover RH by removing 2 clips.

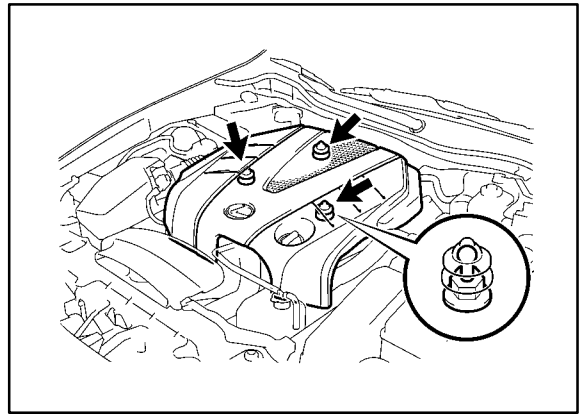


4. Remove the engine compartment side cover LH by removing the 3 clips.



Repair Procedure
(Continued)

5. Remove the V-bank cover sub-assembly.
 - A. Hold the front of the V-bank cover and raise it to disengage the 3 clips on the front of the cover.
 - B. Continue to raise the cover to disengage the clip on the rear of the cover and remove the cover.



NOTE:

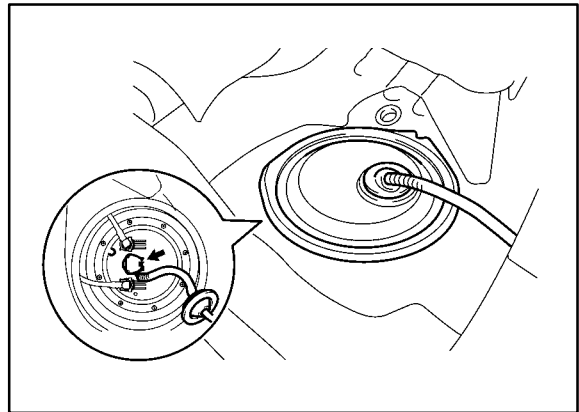
Attempting to disengage both the rear and front clips at the same time may cause the cover to break.

6. Discharge the fuel system pressure.

FUEL SYSTEM CAUTIONS:

- Do NOT smoke or work near an open flame when working on the fuel system.
- Keep gasoline away from rubber or leather parts.
- Do NOT allow fuel to spray when removing the pipe between the high pressure side fuel pump and the fuel injector. The fuel in the pipe is highly pressurized.
- Wear safety goggles while working with fuel system under pressure.
- Do NOT disconnect any part of the fuel system until you have discharged the fuel system pressure.
- Even after discharging the fuel pressure, place a shop rag over fittings as you separate them to reduce risk of fuel spray on yourself or in the engine compartment.

- A. Disconnect the fuel pump connector.
- B. Connect the cable to the negative (–) battery terminal.
- C. Start the engine. After the engine has stopped on its own, turn the engine switch OFF.



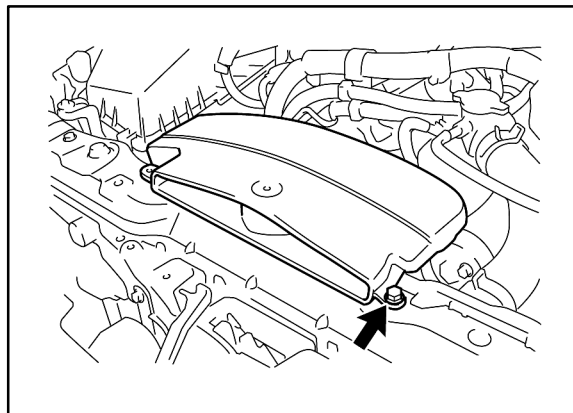
HINT:

DTC P0171/P0172 (System Too Lean) may be set.

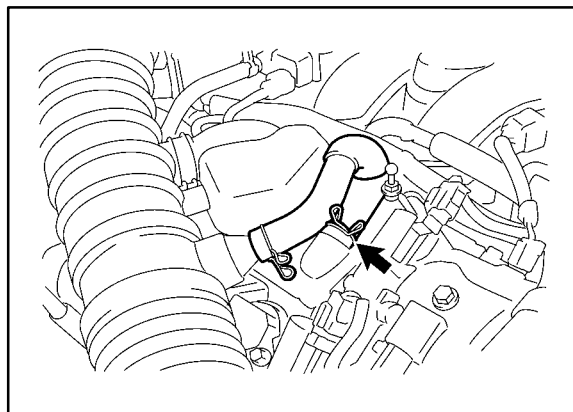
- D. Crank the engine again, and then check that the engine does NOT start.
- E. Loosen the fuel tank cap to discharge the pressure in the fuel tank completely.
- F. Reconnect the fuel pump connector.
- G. Disconnect the cable from the negative (–) battery terminal.

**Repair
Procedure**

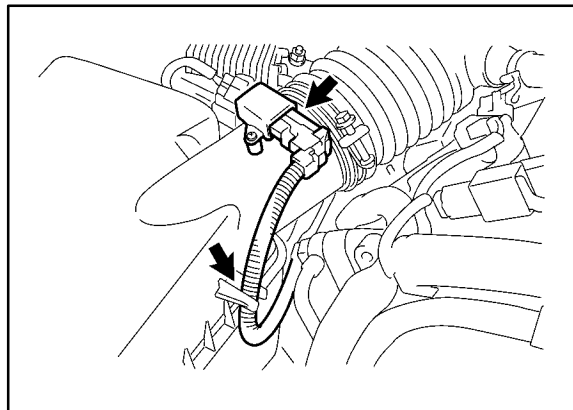
7. Remove the No. 1 inlet air cleaner by removing the bolt and clip.



8. Disconnect the No. 2 ventilation hose from the cylinder head.

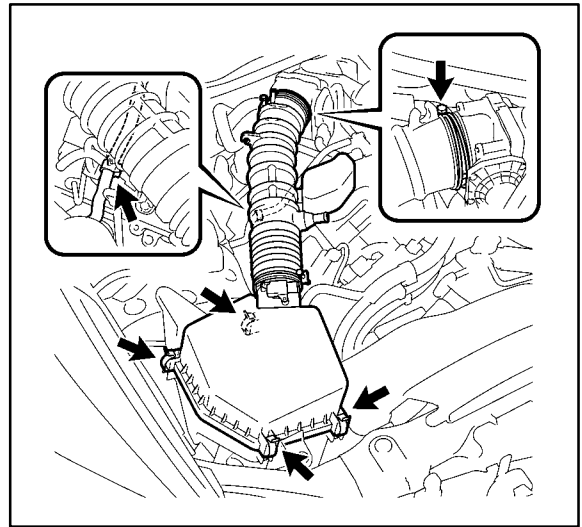


9. Remove the air cleaner cap with air cleaner hose.
 - A. Disconnect the MAF meter connector.
 - B. Disconnect the clamp from the air cleaner cap.

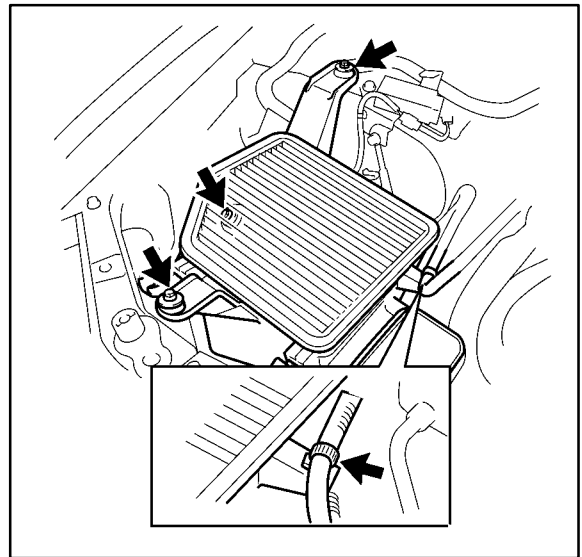


**Repair
Procedure**
(Continued)

- C. Disconnect the purge line hose.
- D. Disconnect the 4 clamps.
- E. Remove the hose clamp and air cleaner cap with air cleaner hose.

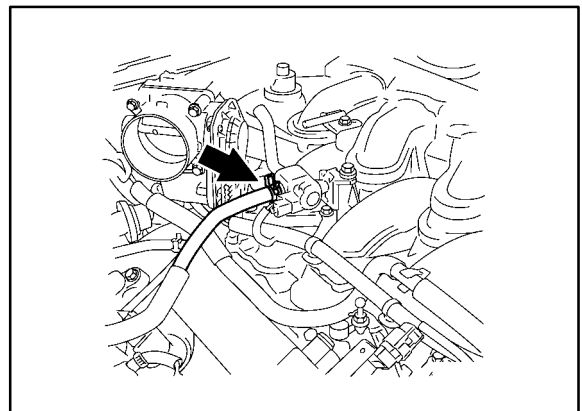


10. Remove the air cleaner case sub-assembly by removing 3 bolts, clamp, and the case.



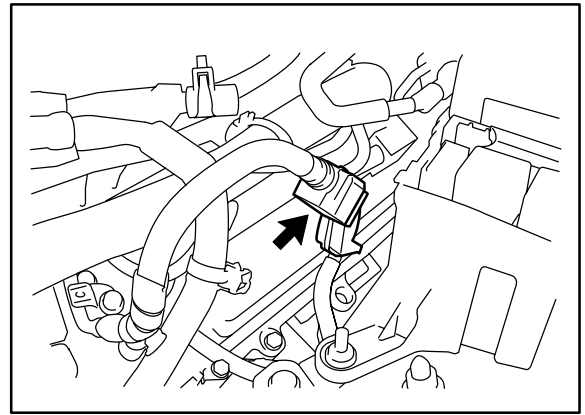
11. Disconnect the union to check valve hose by removing the clamp.

12. Disconnect the No. 2 fuel vapor feed hose by removing the clamp.



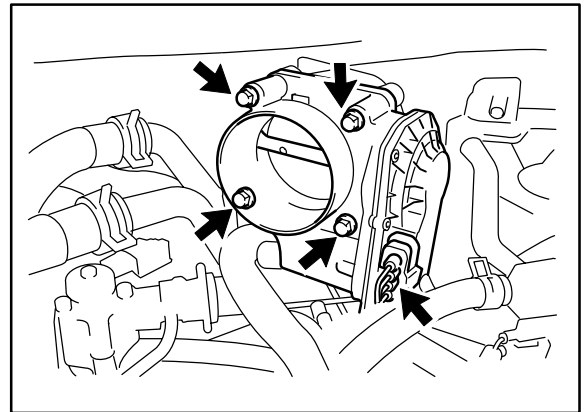
**Repair
Procedure**
(Continued)

13. Disconnect the fuel main tube.



14. Remove the throttle body assembly (with motor).

- A. Disconnect the throttle motor connector.
- B. Remove the 4 bolts and disconnect the throttle body from the intake surge tank.



HINT:

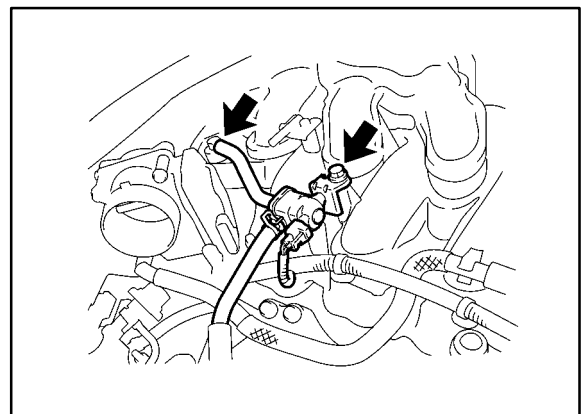
Do NOT disconnect the water bypass hose.

15. Remove the intake air surge tank assembly.

NOTE:

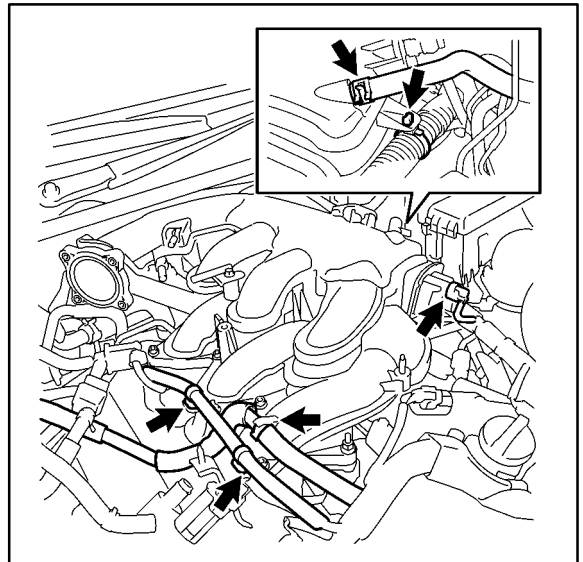
Cover the top surface of the intake manifold with duct tape (or equivalent) to prevent foreign material from falling into the engine.

- A. Disconnect the vacuum hose from the intake air surge tank.
- B. Remove the bolt and disconnect the No. 1 vacuum switching valve assembly from the intake air surge tank.

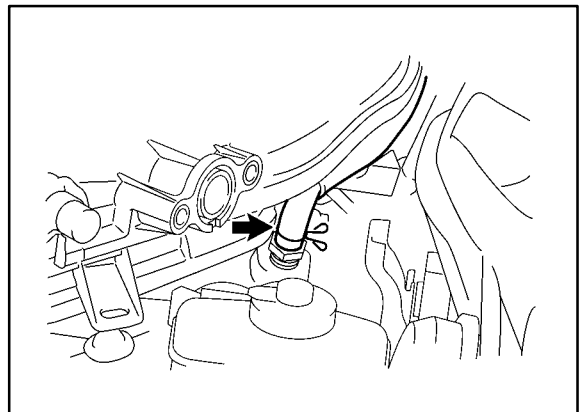


**Repair
Procedure**
(Continued)

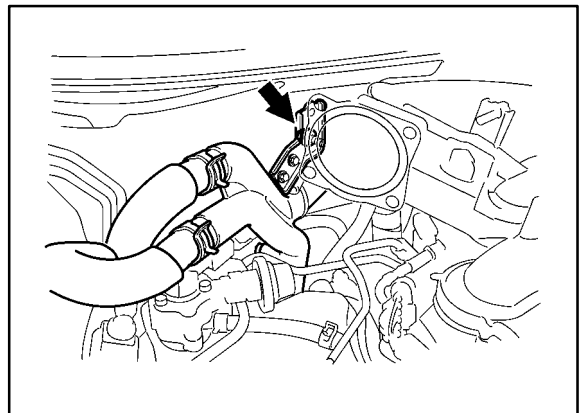
- C. Disconnect the wire harness and hose from the surge tank.



- D. Disconnect the ventilation hose from the intake air surge tank.

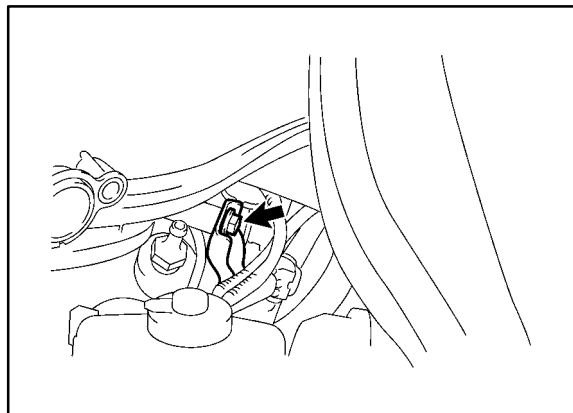


- E. Remove the bolt and water hose joint from the intake air surge tank.



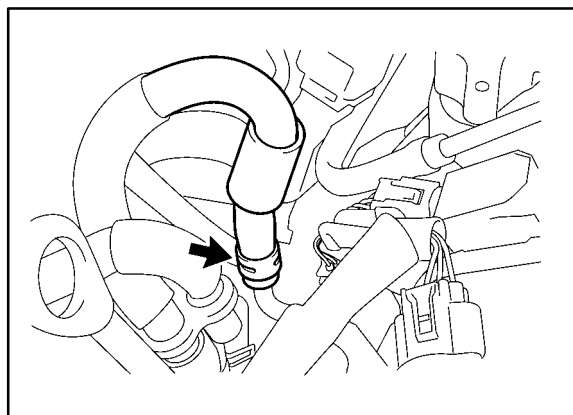
**Repair
Procedure**
(Continued)

- F. Remove the bolt and disconnect the surge tank stay.
- G. Using a 5-mm hexagon socket wrench, remove the 7 bolts, 2 nuts, and gasket.

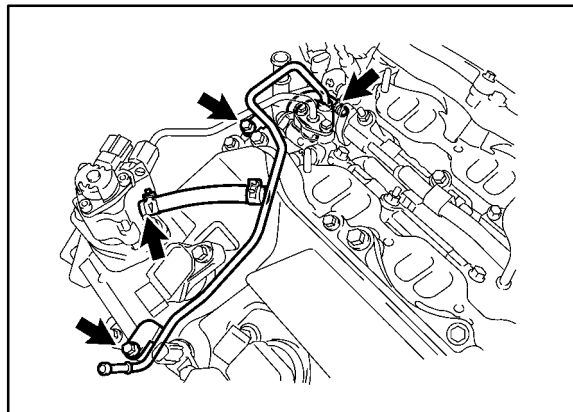


16. Remove fuel pipe No. 1.

- A. Disconnect the No. 3 fuel hose from the No. 1 fuel pipe.



- B. Disconnect the 2 fuel hoses.
- C. Remove the 2 bolts and No. 1 fuel pipe.

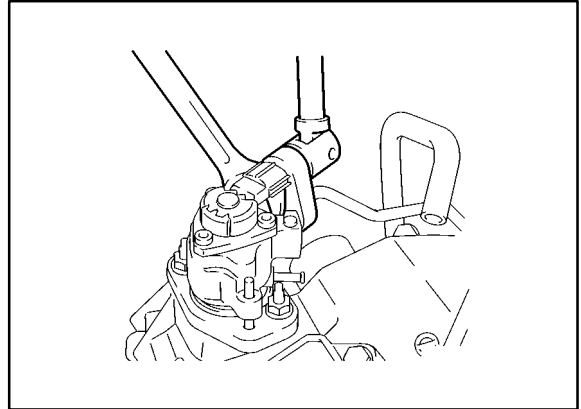


**Repair
Procedure**
(Continued)

17. Disconnect fuel pipe No. 2.
- A. Disconnect the fuel high pressure side fuel pump connector.
 - B. Secure the union bolt in place on the fuel pump side with a 21-mm wrench. Using a 19-mm union nut wrench, loosen the union and remove the fuel pipe.

NOTE:

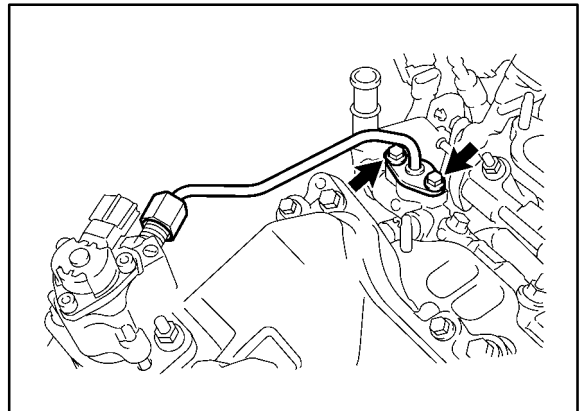
- There must be absolutely **NO** free play in the union on the fuel pump side.
- If the union on the fuel pump side has free play, replace the fuel pump.



- C. Remove the 2 bolts on the delivery pipe side.

NOTE:

- Do **NOT** remove the fuel pipe from the delivery pipe. Only remove the 2 bolts.
- If the No. 2 fuel pipe is accidentally removed, replace its O-ring, No. 1 backup ring, and No. 2 backup ring.



18. Remove the fuel pump assembly.
- A. Remove the 2 nuts, 2 stud bolts, and fuel pump.
 - B. Remove the fuel insulator from the cylinder head cover.

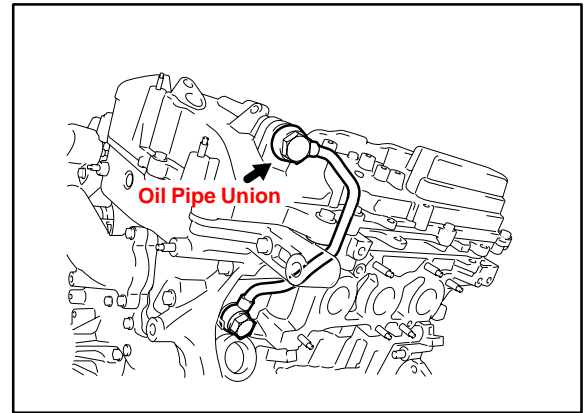
NOTE:

- To keep the nipple joint for the fuel pipe free of foreign matter, cover with a plastic bag.
- Remove the engine oil out of the oil pool from the cylinder head cover's fuel pump attachment hole.

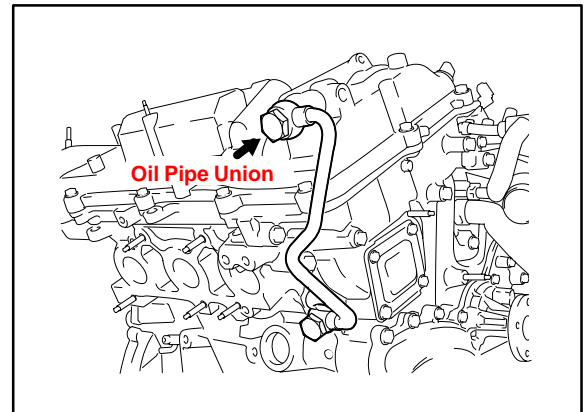
19. Remove the ignition coil assemblies.

**Repair
Procedure**
(Continued)

20. Remove the No. 1 oil pipe union bolt from the oil pipe.



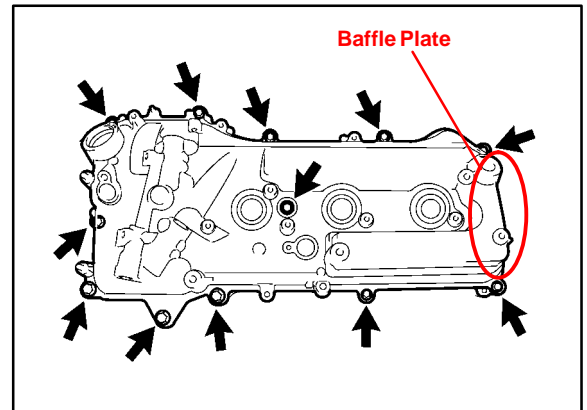
21. Remove No. 2 oil pipe union bolt from the oil pipe.



22. Remove the cylinder head cover LH.
A. Remove the 12 bolts, oil seal washer, and cylinder head cover.

NOTE:

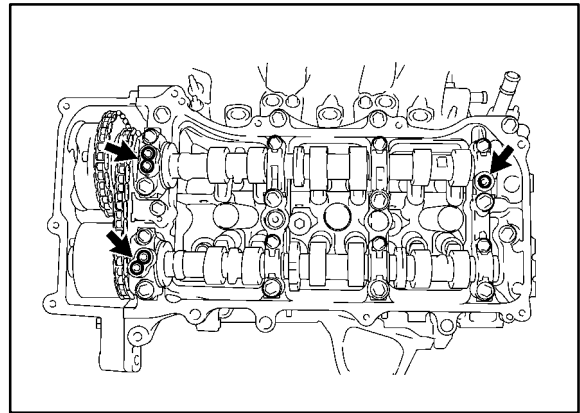
- Cover the hole around the timing chain with shop rags to prevent foreign material from falling into the engine.
- The baffle plate is located on the back of the portion shown in the illustration.
- Do NOT damage the baffle plate when removing the cylinder head cover.



- B. Remove the cylinder head cover gasket from the cylinder head cover.

**Repair
Procedure**
(Continued)

C. Remove the 3 gaskets.

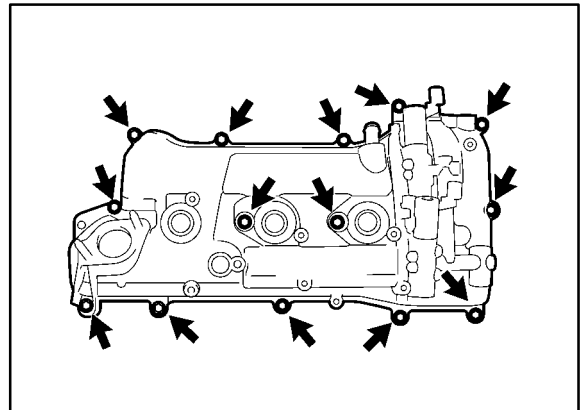


23. Remove the cylinder head cover RH.

A. Remove the 12 bolts, 2 oil seal washers, and cylinder head cover.

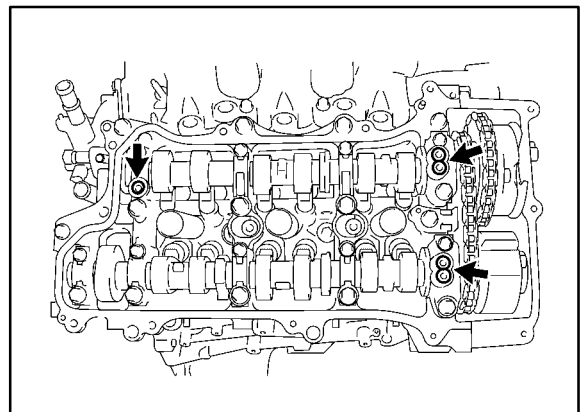
NOTE:

- Cover the hole around the timing chain with shop rags to prevent foreign material from falling into the engine.
- The baffle plate is located on the back of the portion shown in the illustration.
- Do NOT damage the baffle plate when removing the cylinder head cover.



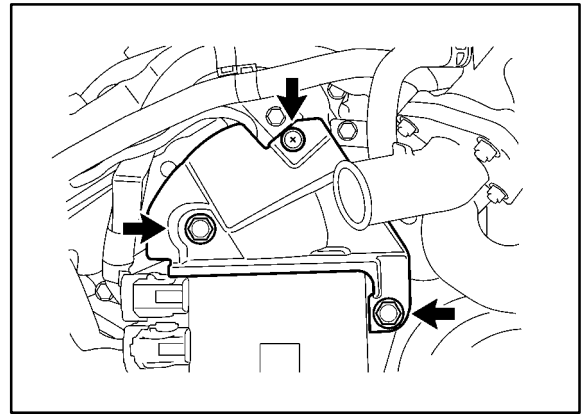
B. Remove the cylinder head cover gasket from the cylinder head cover.

C. Remove the 3 gaskets.

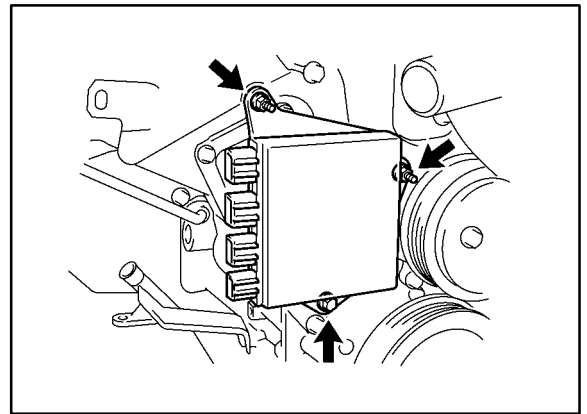


**Repair
Procedure**
(Continued)

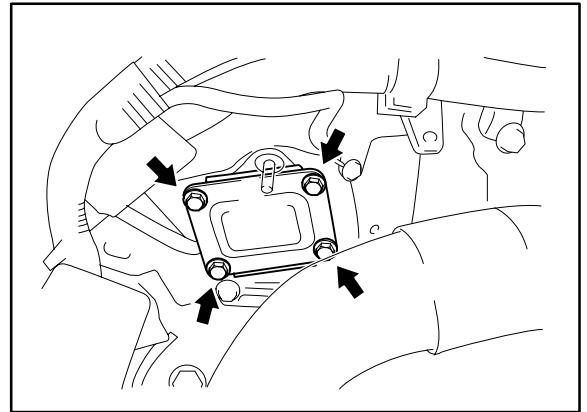
24. Remove engine cover No. 1 by removing the 3 clips.



25. Remove the injector driver by removing the bolt and 2 nuts.



26. Remove the timing chain cover plate by removing the 4 bolts, timing chain cover plate, and timing chain cover plate gasket.



27. Set the No. 1 cylinder to TDC/compression.
- A. Set the timing mark to 0° on the timing chain cover by rotating the crankshaft clockwise.
 - B. Check that the timing marks of the camshaft timing gear assembly are aligned with the timing marks of the camshaft bearing cap.

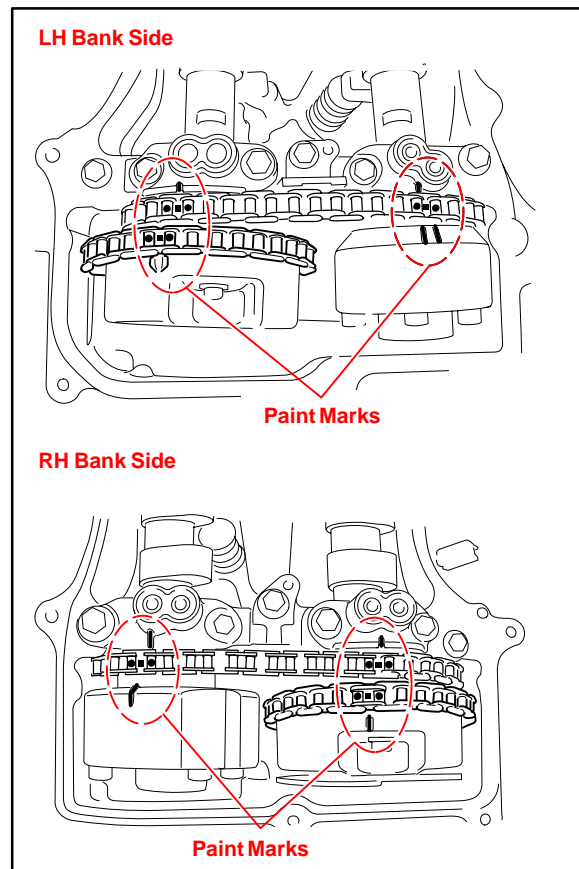
HINT:

If the timing marks are NOT aligned, turn the crankshaft one revolution (360°) clockwise and align the timing marks.

Repair Procedure
(Continued)

- C. Using a paint marker, mark the sprocket wheel, timing mark of the camshaft timing gear assembly, and the timing chain itself.

HINT:
Wipe any oil off before marking.

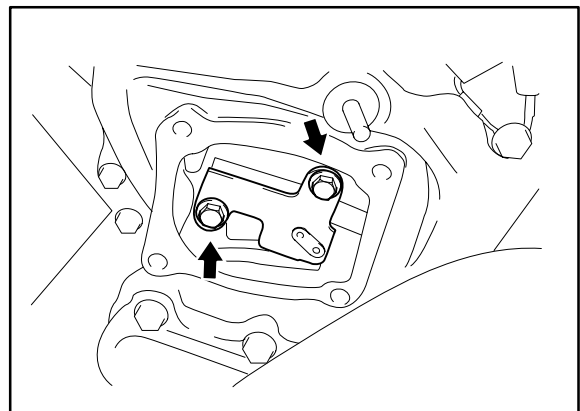


28. Remove the chain tensioner assembly No. 1.
- A. Loosen tension from the timing chain by rotating the crankshaft 30° counterclockwise.

HINT:
The procedure above is to prevent the valve and piston from hitting each other when turning the crankshaft.

- B. Remove the 2 bolts and No. 1 chain tensioner assembly.

NOTE:
Do NOT drop the No. 1 chain tensioner assembly and bolts inside the timing chain cover.



Repair Procedure
(Continued)

29. Remove the timing chain.

LH bank:

A. Loosen tension from the timing chain by rotating the crankshaft.

HINT:

Oil may spray out of the holes on top of the No. 3 camshaft bearing cap when rotating the crankshaft. Use shop rags to prevent any spray.

B. Remove the timing chain from the timing gear and rest it on the camshaft timing gear assembly temporarily.

RH bank:

A. Loosen tension from the timing chain by rotating the crankshaft.

NOTE:

Oil may spray out of the holes on top of the No. 1 camshaft bearing cap when rotating the crankshaft. Use shop rags to prevent any spray.

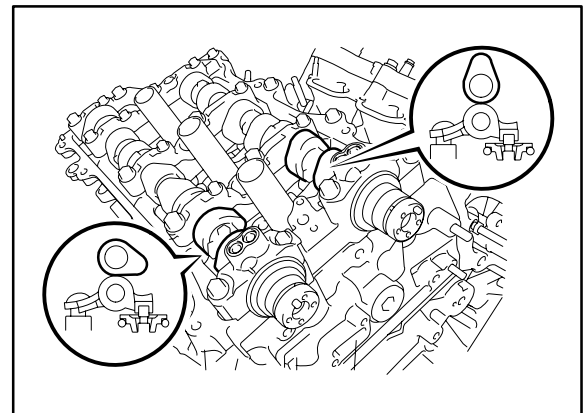
B. Rotate the crankshaft clockwise until the flat surface of the timing exhaust gear assembly faces the vertical position.

C. Remove the timing chain from the timing gear and rest it on the camshaft timing gear assembly temporarily.

30. Remove the camshaft bearing cap.

RH bank:

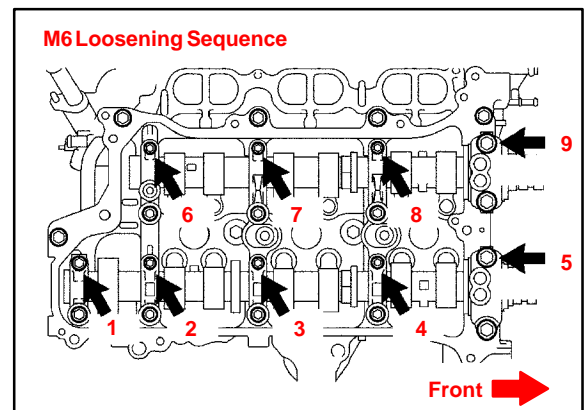
A. Check that the camshafts are in the neutral position shown in the illustration.



B. Uniformly loosen and remove the 9 camshaft bearing cap M6 bolts in the sequence shown in the illustration.

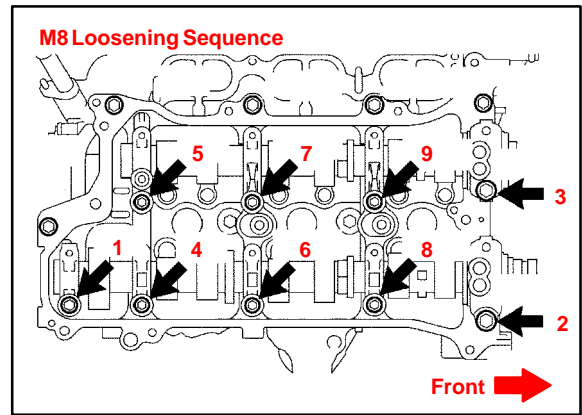
HINT:

Keep the camshaft horizontal while loosening the bearing cap bolts.



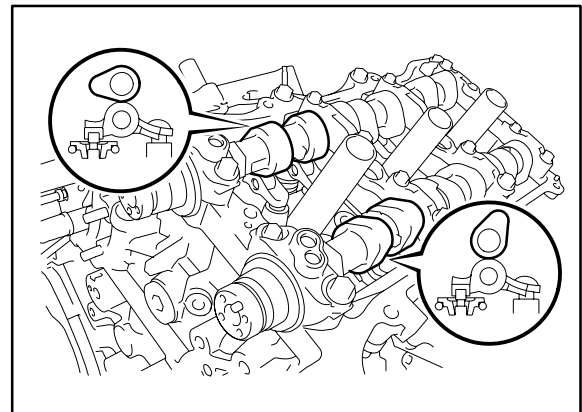
Repair Procedure
(Continued)

- C. Uniformly loosen and remove the 9 camshaft bearing cap M8 bolts in the sequence shown in the illustration.
- D. Remove the 6 camshaft bearing caps.



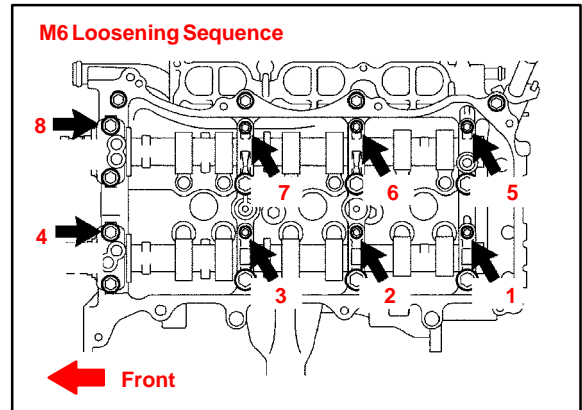
LH bank:

- A. Check that the camshafts are in the neutral position shown in the illustration.

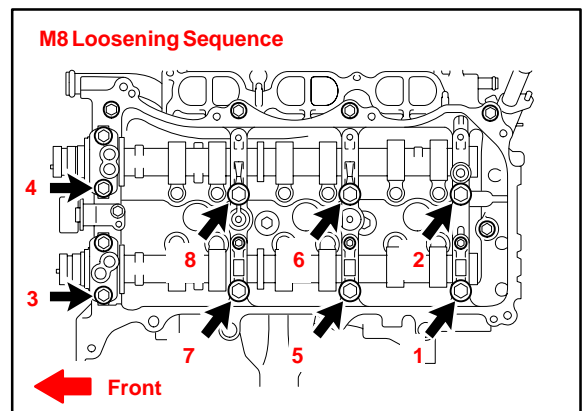


- B. Uniformly loosen and remove the 8 camshaft bearing cap M6 bolts in the sequence shown in the illustration.

HINT:
Keep the camshaft horizontal while loosening the bearing cap bolts.

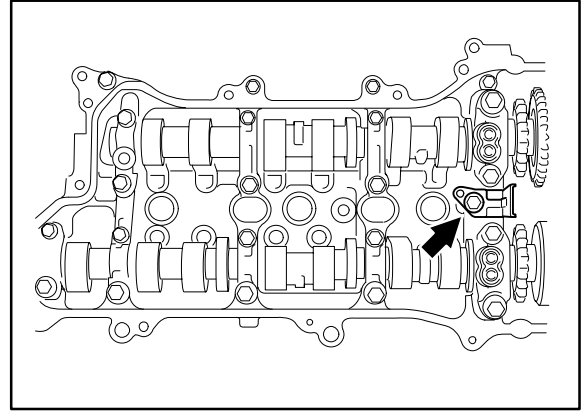


- C. Uniformly loosen and remove the 8 camshaft bearing cap M8 bolts in the sequence shown in the illustration.
- D. Remove the 5 camshaft bearing caps.

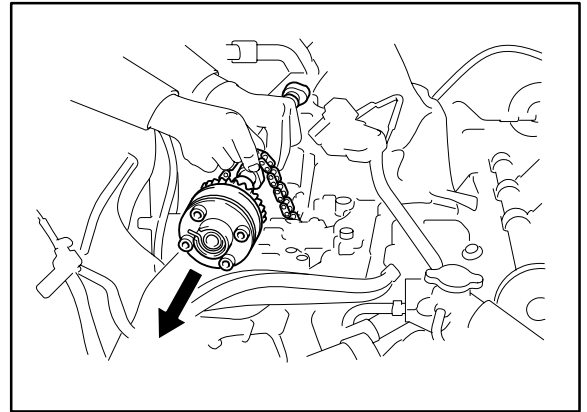


**Repair
Procedure**
(Continued)

31. Remove the No. 2 camshaft.
- A. Remove the bolt for the No. 2 chain tensioner assembly.
 - B. While holding No. 2 camshaft, remove the No. 2 chain tensioner assembly.



- C. While holding the No. 2 chain, slide the No. 2 camshaft out toward the front of the vehicle.



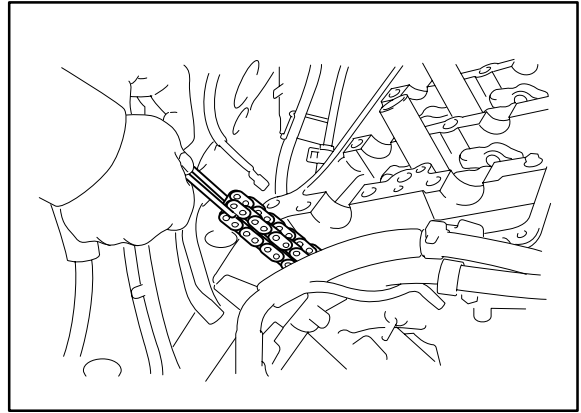
32. Remove the No. 1 camshaft.
- A. Hold the rear portion of the No. 1 camshaft (with tilt position).
 - B. Hold the timing chain from the timing gear, and slide the No. 1 camshaft (with No. 2 chain) out toward the rear of the vehicle.

NOTE:

Keep tension on the timing chain to avoid separation from the crankshaft timing gear.

**Repair
Procedure**
(Continued)

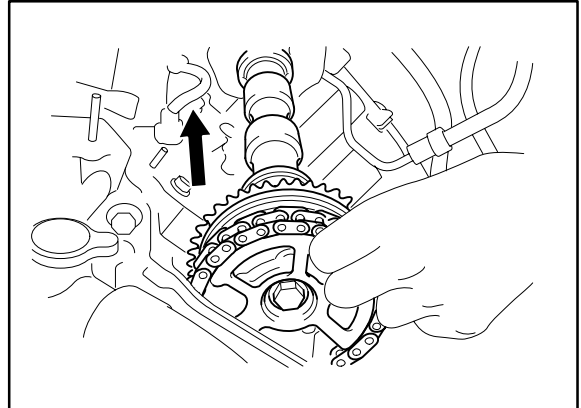
- C. Tie the timing chain to the oil pipe with a strap.



33. Remove camshaft No. 4.
- Remove the bolt for the No. 3 chain tensioner assembly.
 - While holding the No. 4 camshaft, remove the No. 3 chain tensioner assembly.
 - Hold the No. 2 chain, and slide the No. 4 camshaft out toward the front of the vehicle.
34. Remove camshaft No. 3.
- Hold the rear portion of the No. 3 camshaft (with tilt position).
 - Remove the timing chain from the timing gear, and slide the No. 3 camshaft (with the No. 2 chain) out toward the rear of the vehicle.

NOTE:

Keep tension on the timing chain to avoid separation from the crankshaft timing gear.

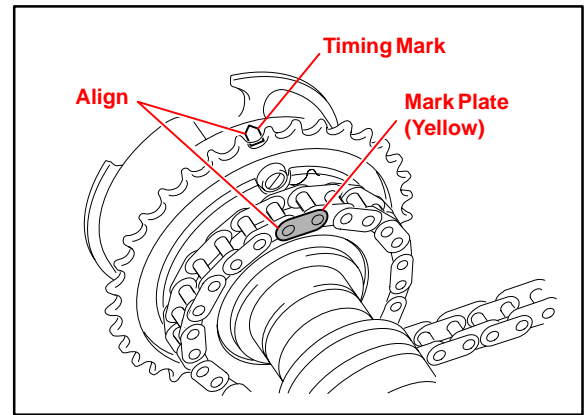


- C. Tie the timing chain to the oil pipe with a strap.

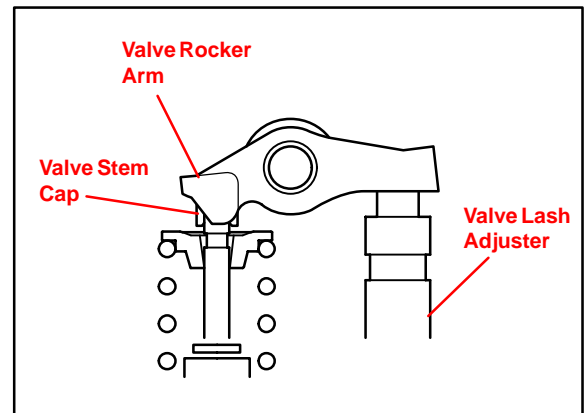
35. Remove and replace the Bank 1 intake camshaft gear assemblies.
- Clamp the hexagonal portion of the camshaft in a vice and remove the bolt.
 - Install the NEW intake camshaft gear assemblies and torque bolt.
Torque: 100 N•m (1020 kgf•cm, 74 ft•lbf)
 - Repeat for the Bank 2 intake camshaft gear assembly.

Repair Procedure
(Continued)

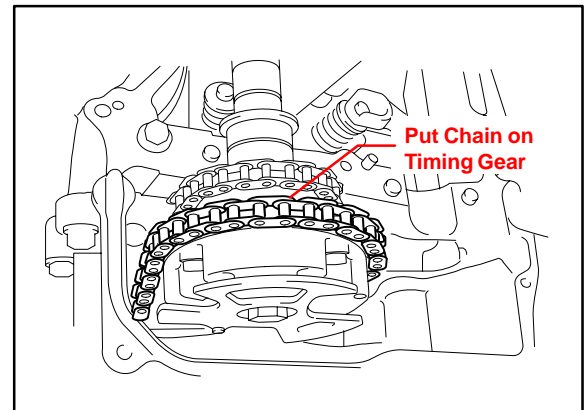
36. Install the No. 3 camshaft.
- Align the mark plate (yellow) of the No. 2 chain with the timing marks of the camshaft timing gear assembly shown in the illustration.
 - Clean the camshaft journals and apply engine oil.



- Make sure that the valve rocker arms are installed with the lash adjuster and valve stem cap properly as shown in the illustration.



- Temporarily put the timing chain to the No. 3 camshaft on the camshaft timing gear assembly and place the No. 3 camshaft on the camshaft housing LH.



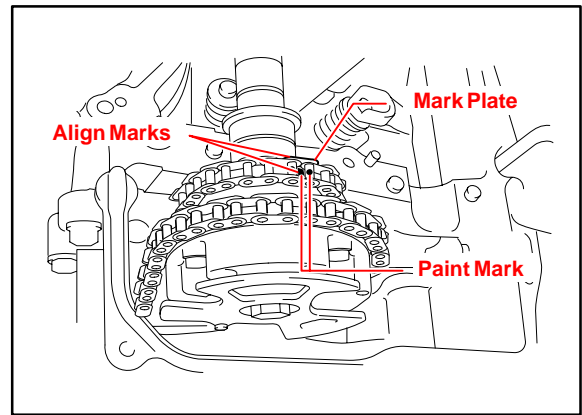
NOTE:

- Temporarily put the timing chain on the camshaft timing gear assembly without installing to the sprocket.
- Place the camshaft as the timing mark faces on the top.

37. Install the No. 1 camshaft using the same procedure as step 36.
38. Install the No. 4 camshaft.
- Clean the camshaft journals and apply engine oil to them.
 - Hold the No. 2 chain and slide the No. 4 camshaft in from the front of the vehicle.

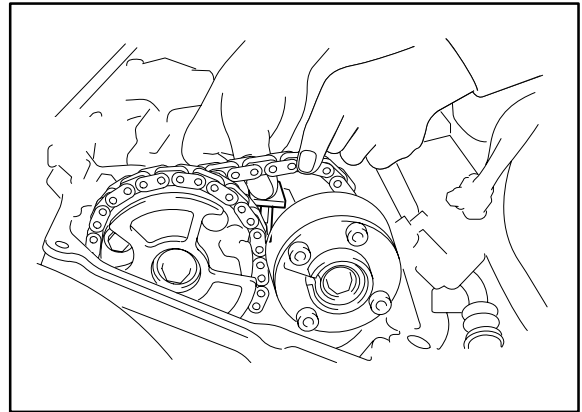
**Repair
Procedure**
(Continued)

- C. Align the mark plate (yellow) with the timing marks of the camshaft timing exhaust gear LH.



- D. Hold the No. 2 chain and install the No. 3 chain tensioner assembly.

Torque: 21 N•m (214 kgf•cm, 15 ft•lbf)

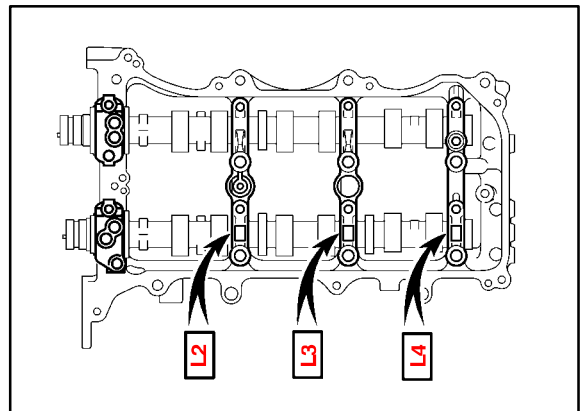


39. Install the No. 2 camshaft using the same procedure as step 38.

40. Install the camshaft bearing cap.

LH bank:

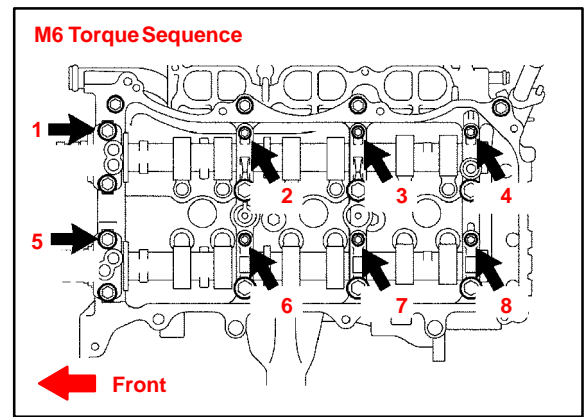
- A. Clean the camshaft bearing caps and apply engine oil.
- B. Make sure that the valve rocker arms are properly installed with each lash adjuster and valve stem cap.
- C. Make sure of the marks and numbers on the camshaft bearing caps and temporarily tighten the 16 bolts.



**Repair
Procedure**
(Continued)

- D. Tighten the 8 M6 bolts in the sequence shown in the illustration.

Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)

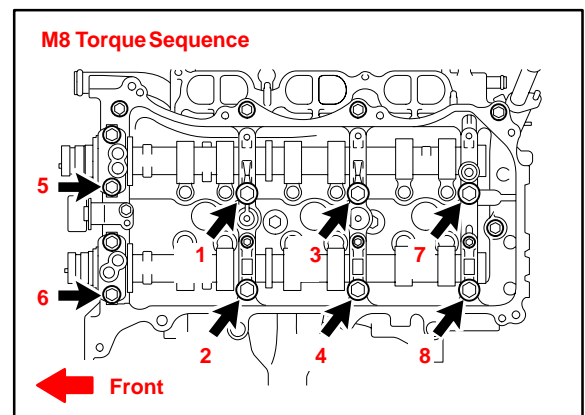


- E. Tighten the 8 M8 bolts in the sequence shown in the illustration.

Torque: 28 N•m (286 kgf•cm, 21 ft•lbf)

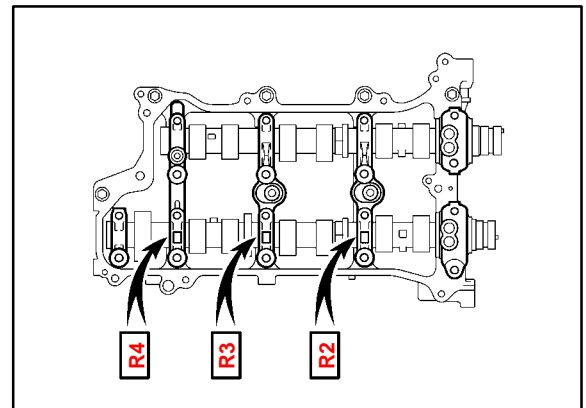
- F. Tighten the 8 M6 bolts to their final torque value in the sequence shown in the illustration.

Torque: 16 N•m (163 kgf•cm, 12 ft•lbf)



RH bank:

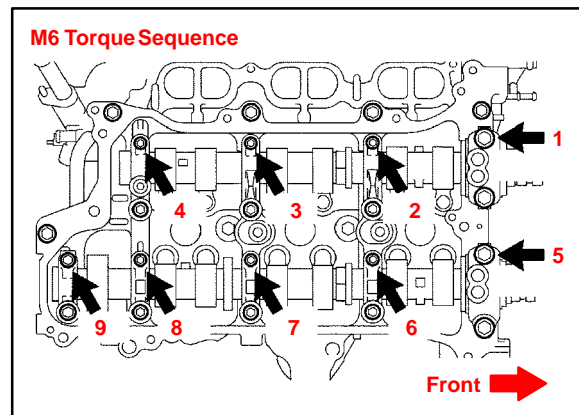
- Clean the camshaft bearing caps and apply engine oil.
- Make sure that the valve rocker arms are properly installed with each lash adjuster and valve stem cap.
- Make sure of the marks and numbers on the camshaft bearing caps and temporarily tighten the 16 bolts.



Repair Procedure
(Continued)

- D. Tighten the 9 M6 bolts in the sequence shown in the illustration.

Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)

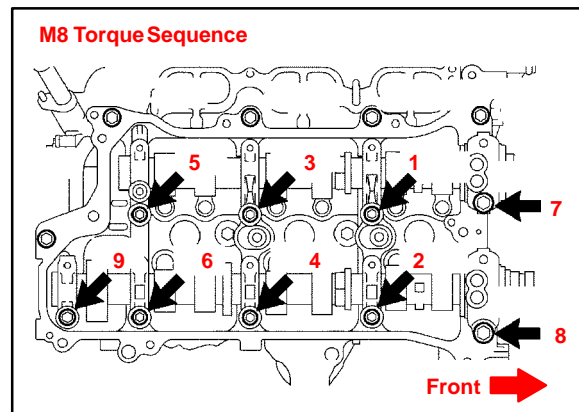


- E. Tighten the 9 M8 bolts in the sequence shown in the illustration.

Torque: 28 N•m (286 kgf•cm, 21 ft•lbf)

- F. Tighten the 9 M6 bolts to their final torque value in the sequence shown in the illustration.

Torque: 16 N•m (163 kgf•cm, 12 ft•lbf)



41. Install the timing chain.

LH bank:

Align the mark plate (yellow) of the timing chain with the timing marks of the camshaft timing gear assembly and install to the sprocket.

NOTE:

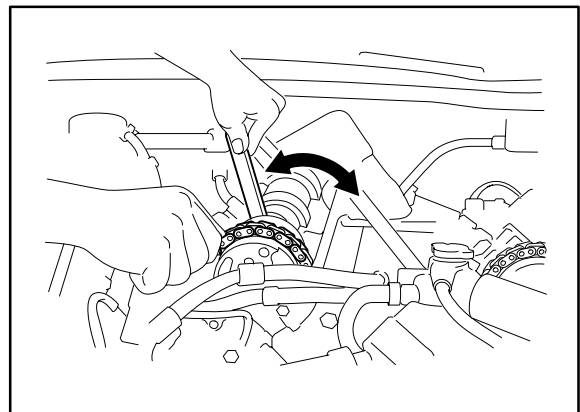
If the paint mark is **NOT** aligned, turn the crankshaft slightly to adjust the position.

RH bank:

- A. Align the mark plate (yellow) of the timing chain with the timing marks of the camshaft timing gear assembly and install to the sprocket.

NOTE:

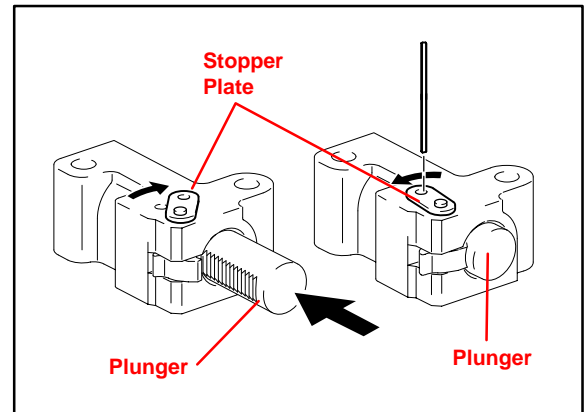
If the paint mark is **NOT** aligned, turn the crankshaft and adjust one notch each as shown in the illustration.



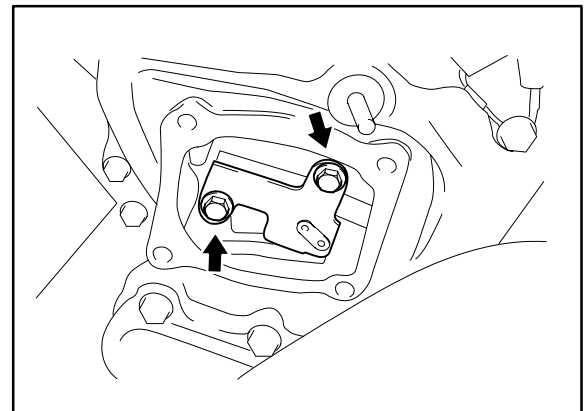
**Repair
Procedure**
(Continued)

- B. Set the No. 1 cylinder to TDC/compression, by aligning the timing mark to 0° on the timing chain cover by rotating the crankshaft counterclockwise.
 - C. Slightly turn the crankshaft and loosen tension for the timing chain where the No. 1 chain tensioner is attached.
42. Install the No. 1 chain tensioner assembly.

- A. Move the stopper plate upward to release the lock, and push the plunger deep into the tensioner.
- B. Move the stopper plate downward to set the lock, and insert a hexagon wrench into the hole of the stopper plate.

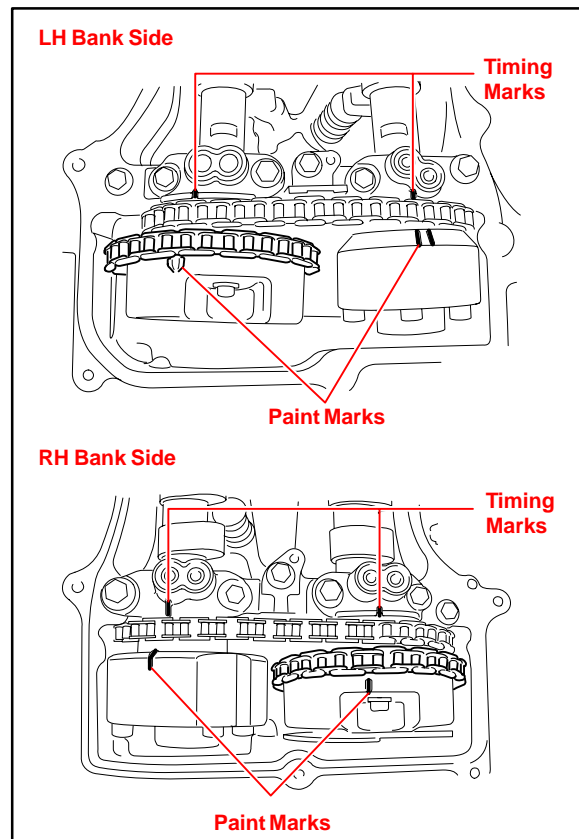


- C. Install the No. 1 chain tensioner assembly with the 2 bolts.
Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)

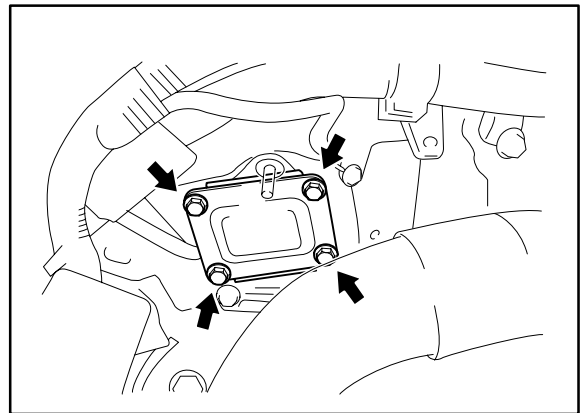


**Repair
Procedure**
(Continued)

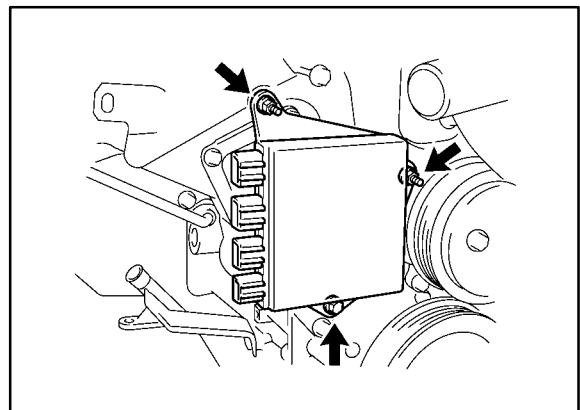
- D. Remove the lock pin of the No. 1 chain tensioner assembly. Check that each timing mark is aligned with the crankshaft at the TDC/compression.
- E. Turn the crankshaft 2 rotations and double-check that each timing mark is positioned properly.



43. Install the NEW gasket and the timing chain cover plate with the 4 bolts.
Torque: 9 N•m (93 kgf•cm, 7 ft•lbf)

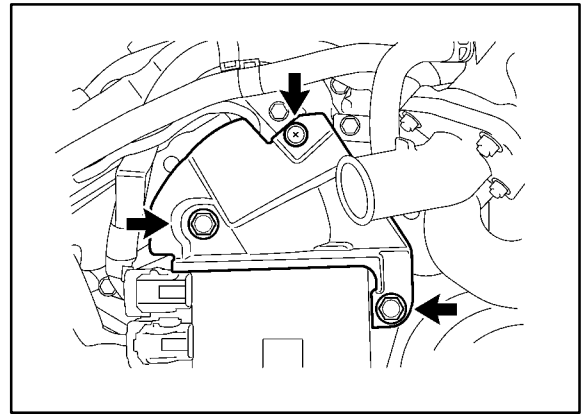


44. Install the injector driver with the bolt and 2 nuts.
Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)



**Repair
Procedure**
(Continued)

45. Install the No. 1 engine cover with the 3 clips.



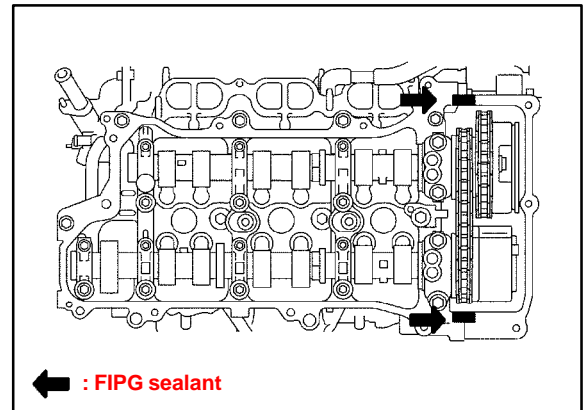
46. Install the cylinder head cover RH.

- A. Apply FIPG sealant as shown in the illustration.

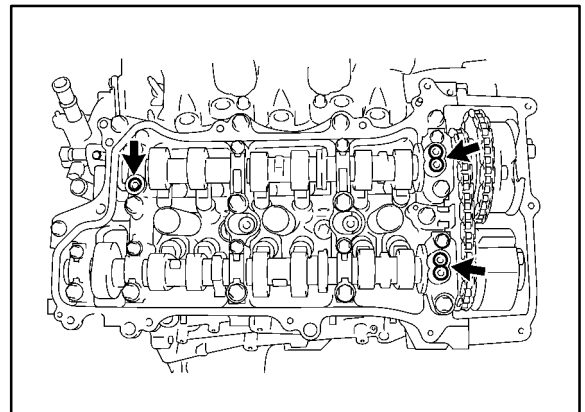
**FIPG sealant: P/N 08826-00080
(or equivalent)**

NOTE:

- Remove any oil from the contact surface.
- Install the head cover within 3 minutes after applying the FIPG sealant.
- Do NOT start the engine for at LEAST 2 hours after installing.

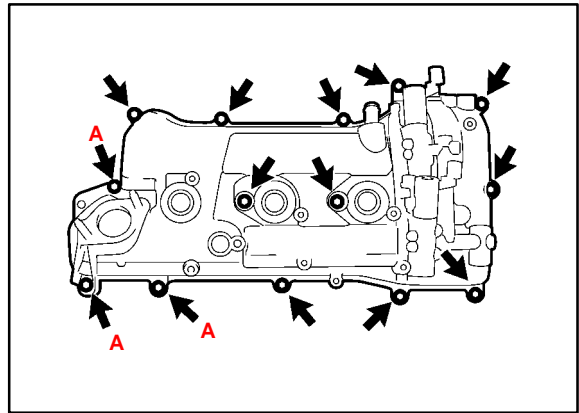


- B. Install 3 NEW gaskets as shown in the illustration.
- C. Install a NEW gasket to the head cover.



**Repair
Procedure**
(Continued)

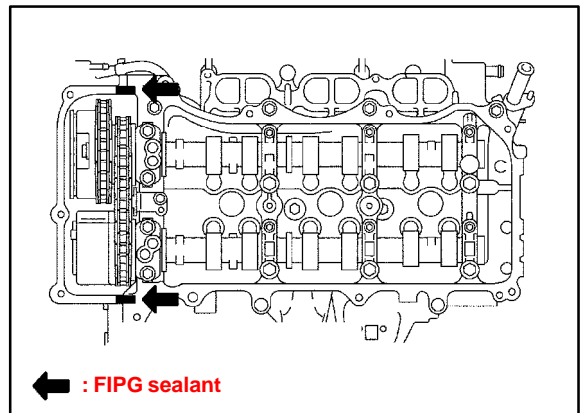
- D. Install the head cover with the 14 bolts.
- Torque:**
- Bolts A:**
21 N•m (214 kgf•cm, 15 ft•lbf)
- Bolts except A:**
10 N•m(102 kgf•cm, 7 ft•lbf)



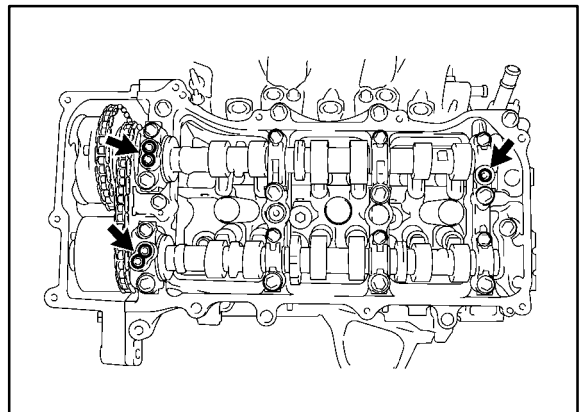
47. Install the cylinder head cover LH.
- A. Apply FIPG sealant as shown in the illustration.
- FIPG sealant: P/N 08826-00080 (or equivalent)**

NOTE:

- Remove any oil from the contact surface.
- Install the head cover within 3 minutes after applying FIPG sealant.
- Do NOT start the engine for at LEAST 2 hours after installing.



- B. Install 3 NEW gaskets as shown in the illustration.
- C. Install a NEW gasket to the head cover.



**Repair
Procedure**
(Continued)

- D. Install the head cover with the 12 bolts.

Torque:

Bolts A:

21 N•m (214 kgf•cm, 15 ft•lbf)

Bolts except A:

10 N•m(102 kgf•cm, 7 ft•lbf)

- E. For 4WD:

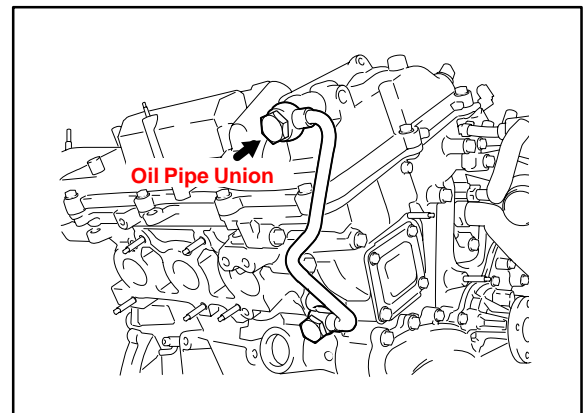
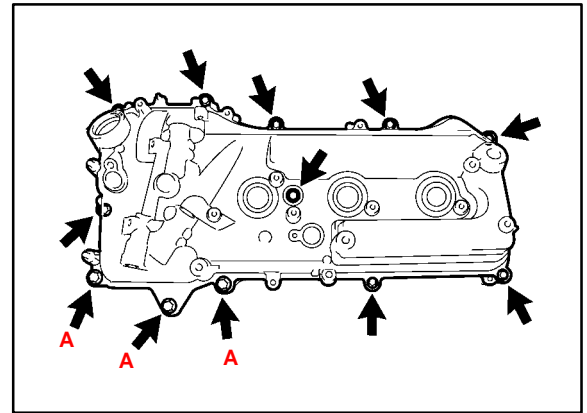
Install the engine hanger with the 2 bolts.

Torque: 33 N•m

(337 kgf•cm, 24 ft•lbf)

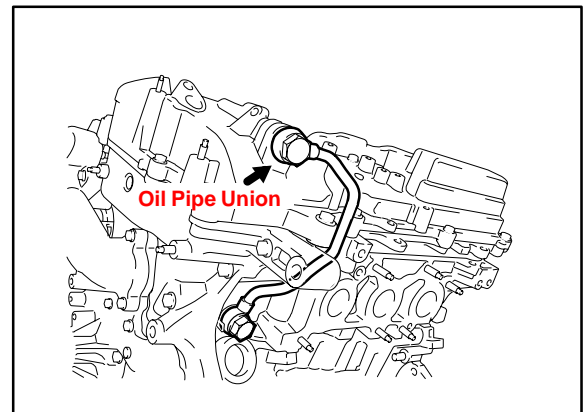
48. Install the oil pipe union bolt to the No. 2 oil pipe.

Torque: 60 N•m (612 kgf•cm, 44 ft•lbf)



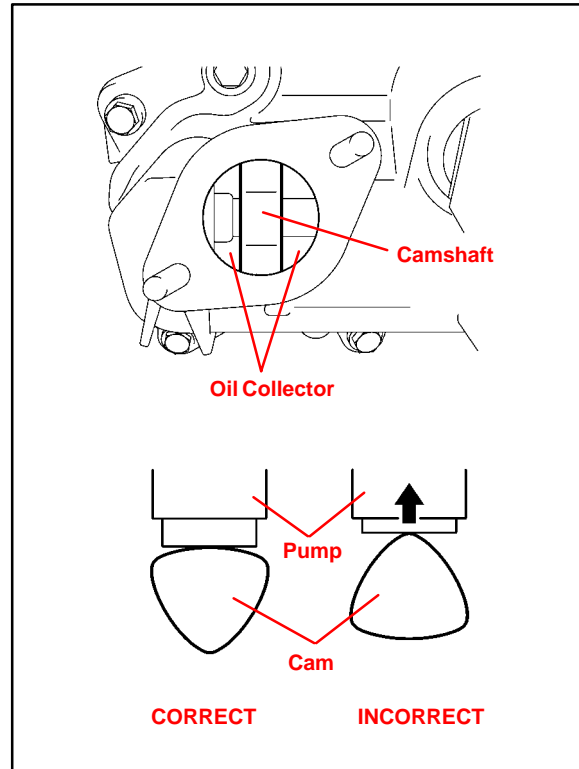
49. Install the oil pipe union bolt to the No. 1 oil pipe.

Torque: 60 N•m (612 kgf•cm, 44 ft•lbf)

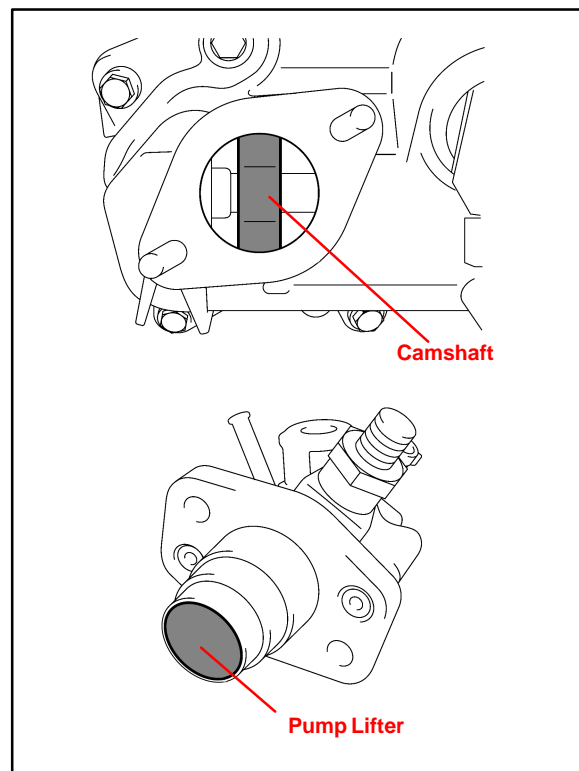


- Repair Procedure**
(Continued)
50. Install the ignition coil assemblies.
51. Install the fuel pump assembly.

- A. Turn the crankshaft until the flat of the cam is facing the cylinder head cover's fuel pump attachment hole as shown in the illustration.
- B. Pour 30 cc of engine oil into the cylinder head oil collector through the cylinder head cover's fuel pump attachment hole.



- C. Apply a coat of engine oil to the pump activation cam and pump lifter part.

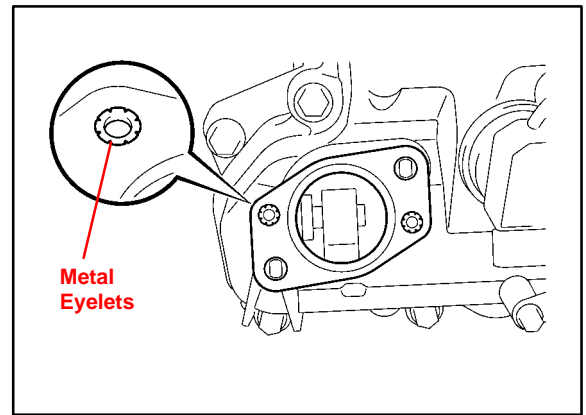


**Repair
Procedure**
(Continued)

- D. Install the NEW fuel insulator to the cylinder head cover.

NOTE:

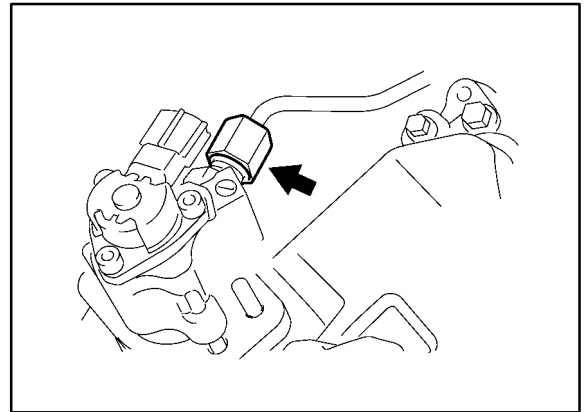
The open sides of the metal eyelets must be facing upward as shown in the illustration.



- E. Temporarily install the No. 2 fuel pipe sub-assembly to the fuel pump assembly.

NOTE:

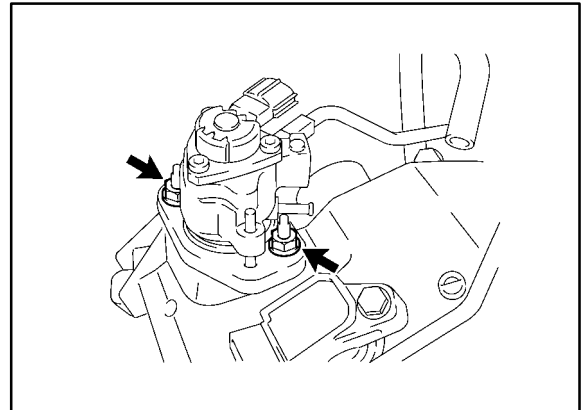
Be careful NOT to damage the sealing surface of the fuel pipe when temporarily installing the fuel pipe.



- F. Install the 2 studs.
Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)

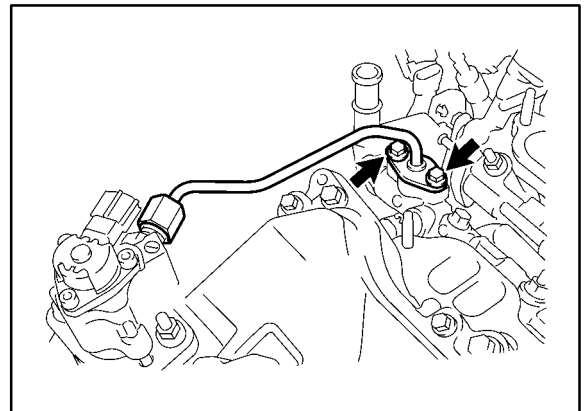
- G. Install the 2 nuts and tighten them in several passes.
Torque: 25 N•m (255 kgf•cm, 18 ft•lbf)

- H. Connect the fuel hose.



52. Connect the No. 2 fuel pipe.

- A. Install the No. 2 fuel pipe to the delivery pipe with the 2 bolts.
Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)

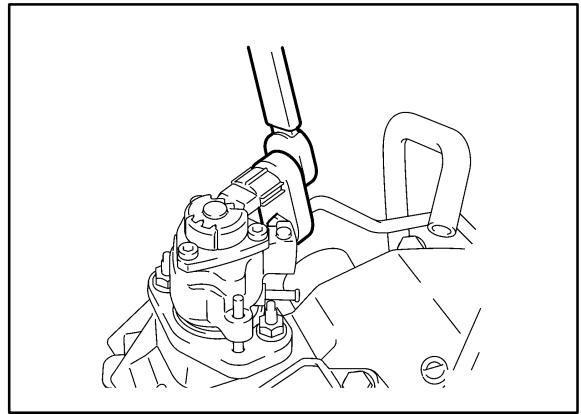


**Repair
Procedure**
(Continued)

- B. Using a 19-mm union nut wrench,
connect the fuel pipe.

**Torque: 30 N•m
(306 kgf•cm, 22 ft•lbf)**

- C. Connect the connector to the
fuel pump.

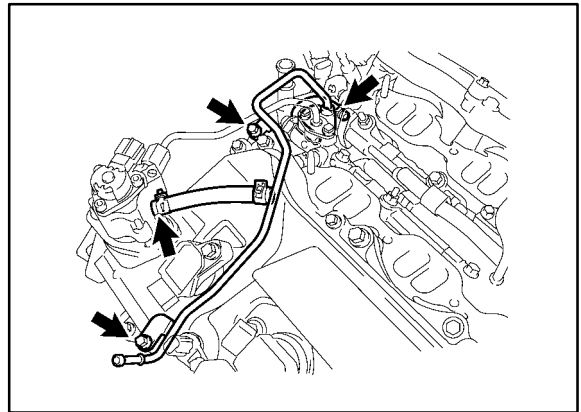


53. Install the No. 1 fuel pipe.

- A. Install the No. 1 fuel pipe with the
2 bolts.

Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)

- B. Connect the 2 fuel hoses.



54. Connect the fuel main tube.

55. Install the air surge tank assembly.

- A. Install a NEW gasket to the intake
air surge tank.

- B. Using a 5-mm hexagon socket
wrench, install the 6 bolts.

Torque:

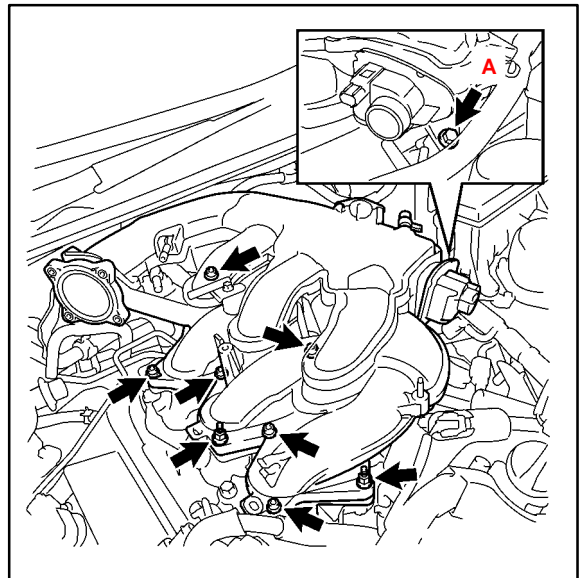
**Bolts except A:
18 N•m (184 kgf•cm, 13 ft•lbf)**

- C. Install the bolt and 2 nuts to the
intake air surge tank.

Torque:

**Bolt A:
21 N•m (214 kgf•cm, 15 ft•lbf)**

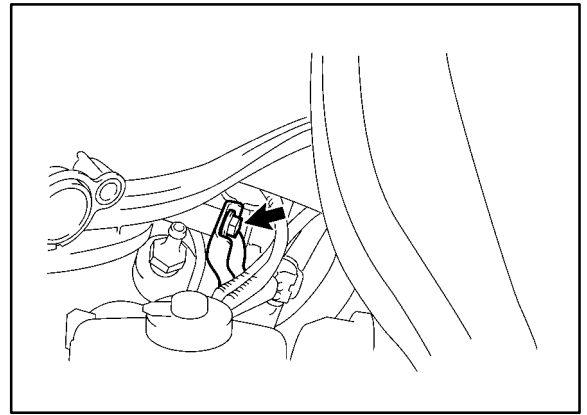
**Nut:
16 N•m (163 kgf•cm, 12 ft•lbf)**



**Repair
Procedure**
(Continued)

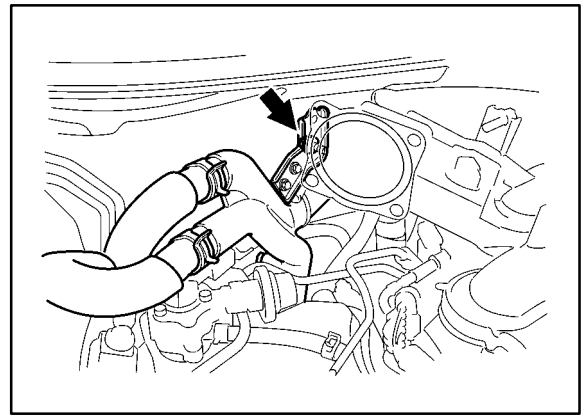
- D. Install the surge tank stay to the intake air surge tank.

Torque: 21 Nm (214 kgf•cm, 15 ft•lbf)

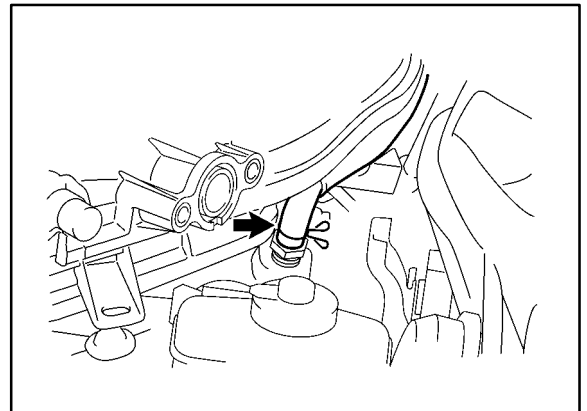


- E. Connect the water hose joint with the bolt.

Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)

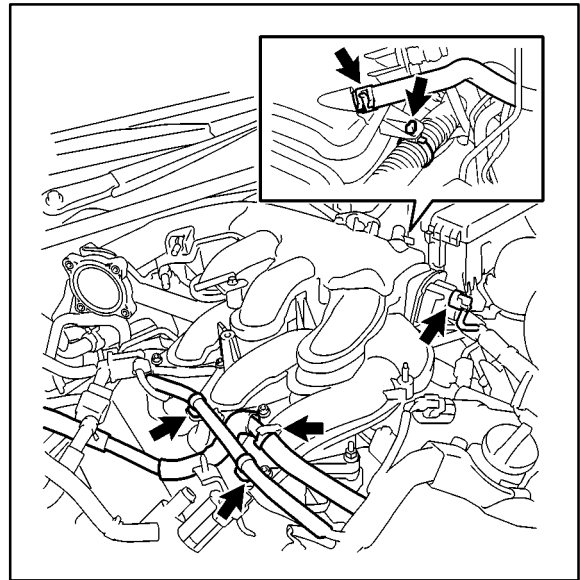


- F. Connect the ventilation hose to the intake air surge tank.

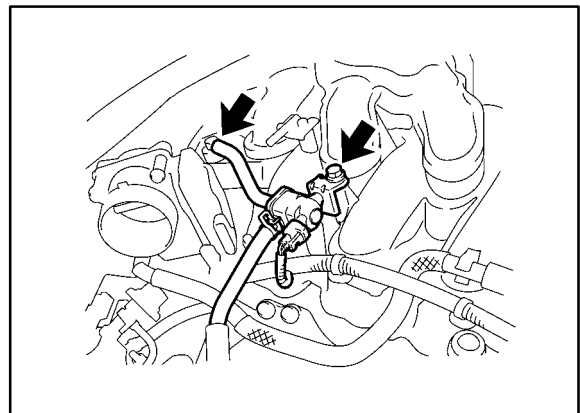


**Repair
Procedure**
(Continued)

- G. Connect the wire harness and hose to the intake air surge tank.



- H. Connect the No. 1 vacuum switching valve assembly to the intake air surge tank.
Torque: 18 N•m (184 kgf•cm, 13 ft•lbf)
- I. Connect the vacuum hose to the intake air surge tank.

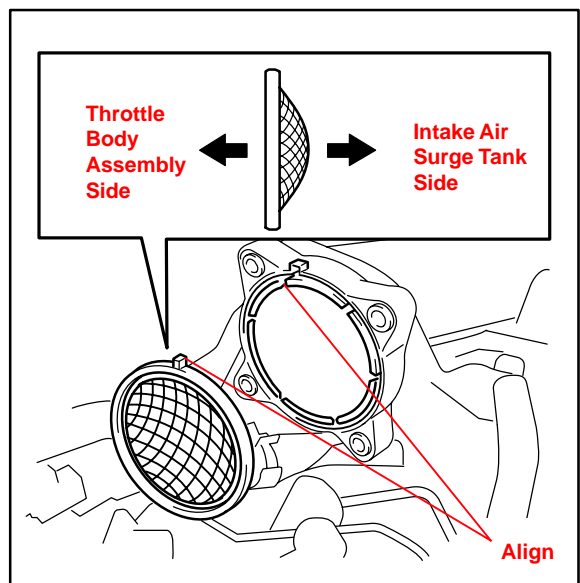


56. Install the throttle body assembly (with motor).

- A. Install a NEW gasket to the intake air surge tank.

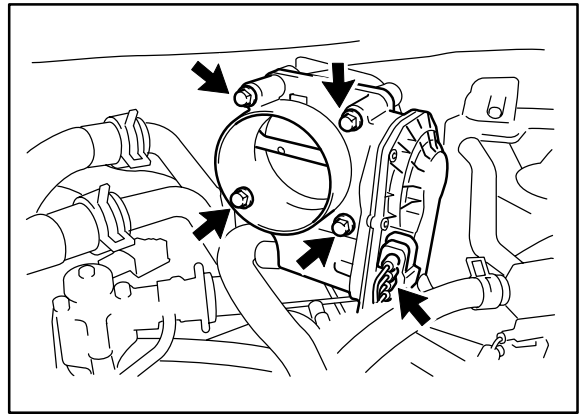
NOTE:

- Align the protrusion of the gasket on the intake air surge tank.
- Make sure the direction of the gasket is as shown in the illustration.

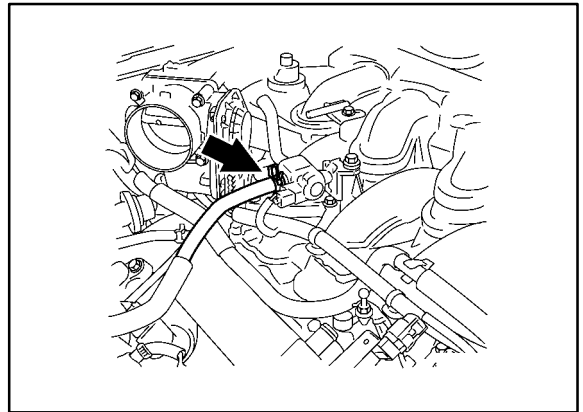


**Repair
Procedure**
(Continued)

- B. Install the throttle body with the 4 bolts.
Torque: 10 N•m (102 kgf•cm, 7 ft•lbf)
- C. Connect the throttle body connector.

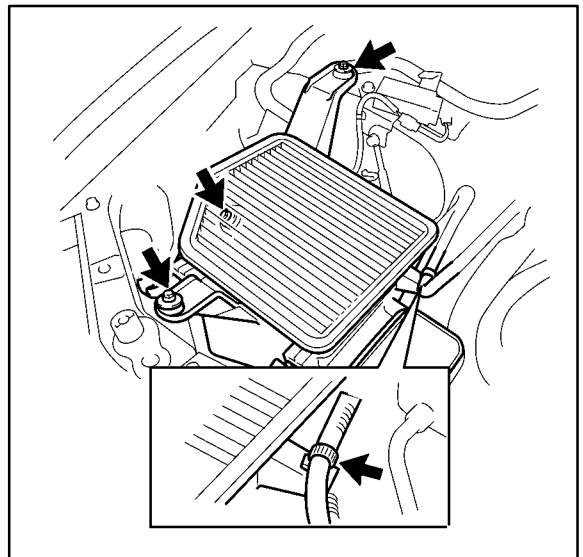


57. Connect the No. 2 fuel vapor hose.
Install the clamp and connect the
No. 2 fuel vapor feed hose.



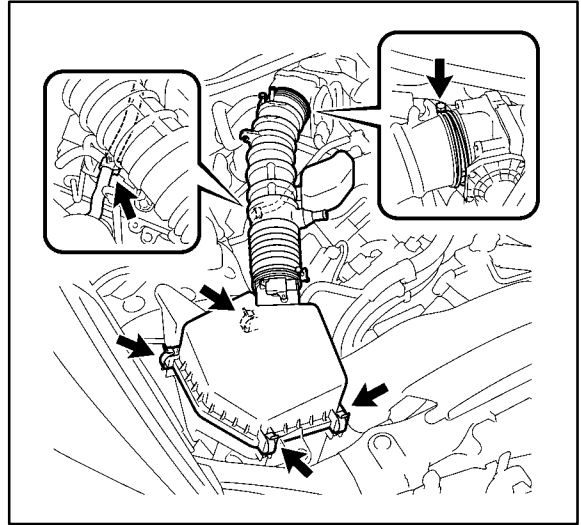
58. Connect the union to check valve
hose to the surge tank.

59. Install the air cleaner case
sub-assembly with the 3 bolts.
Torque: 5.0 N•m (51 kgf•cm, 44 in.•lbf)

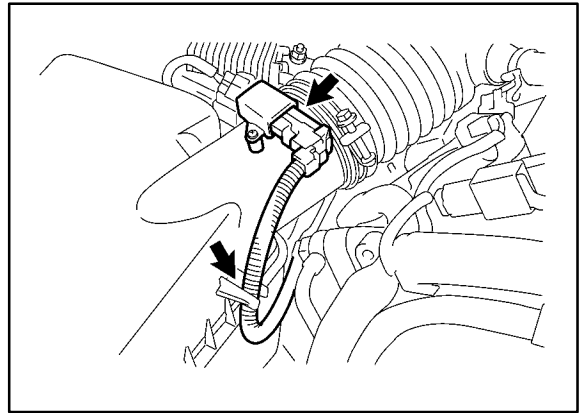


**Repair
Procedure**
(Continued)

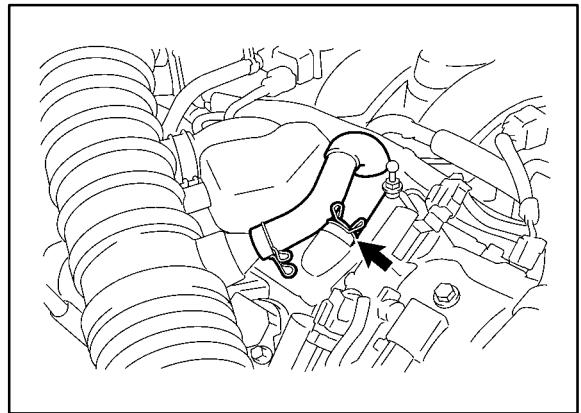
60. Install the air cleaner cap with air cleaner hose.
- A. Install the hose clamp and air cleaner cap with air cleaner hose.
 - B. Connect the 4 clamps.
 - C. Connect the purge line hose.
 - D. Connect the clamp to the air cleaner cap.



- E. Connect the MAF meter connector and clamp to the air cleaner.

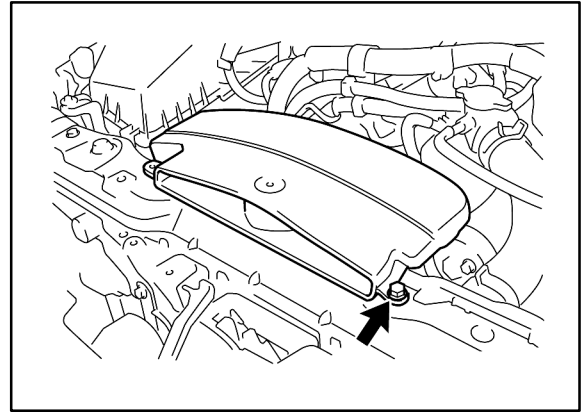


61. Connect the No. 2 ventilation hose from the cylinder head.



**Repair
Procedure**
(Continued)

62. Install the No. 1 air cleaner inlet with the bolt and clip.
Torque: 5.0 N•m (51 kgf•cm, 44 in.•lbf)



63. Connect the cable to the negative (–) battery terminal.
Torque: 5.4 N•m (55 kgf•cm, 48 in.•lbf)
64. Check for fuel leaks.
- Connect TIS Techstream to DLC3.
 - Turn the engine switch ON (IG). Do NOT start the engine.
 - Select the following menus:
Powertrain / Engine / Active Test / FUEL PUMP / SPD.
 - Check for fuel leaks.
Check that there are NO fuel leaks anywhere in the system. If there is a fuel leak, repair or replace parts as necessary.
65. Check for engine oil leaks.
66. Check the ignition timing.
- Warm up the engine and then stop the engine.

NOTE:

A warmed up engine should have an engine coolant temperature of over 176°F (80°C), have an engine oil temperature of 140°F (60°C), and the engine rpm should be stabilized.

- Connect Techstream to DLC3.
- Start the engine and maintain engine rpm at idle speed.
- Select the following menus:
Powertrain / Engine / Data List / IGN ADVANCE.
Ignition timing: 5 to 15° BTDC at idle

HINT:

Refer to the TIS Techstream *Help* menu for further details.

- Check that ignition timing advances as engine speed increases.

**Repair
Procedure**
(Continued)

67. Check engine idle speed.
A. Warm up and then stop the engine.

NOTE:

- A warmed up engine should have an engine coolant temperature of over 176°F (80°C), have an engine oil temperature of 140°F (60°C), and the engine rpm should be stabilized.
- Switch OFF all accessories and A/C before connecting TIS Techstream.

- B. Connect TIS Techstream to DLC3.
C. Raise the engine speed to 2,500 rpm for approximately 90 seconds, and then return to idle.
D. Select the following menus:
Powertrain / Engine / Active Test / ENGINE SPD.
Idle speed: 650 to 750 rpm

NOTE:

When checking the idle speed, the transmission should be in Neutral or Park.

HINT:

Refer to the TIS Techstream *Help* menu for further details. If the idle speed is NOT as specified, check the air intake system.

- E. Clear all DTCs.
F. Disconnect Techstream from DLC3.

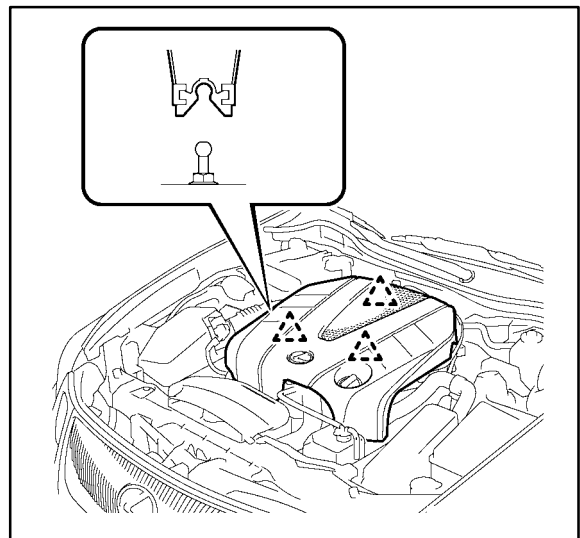
68. Check the engine oil level.

Stop the engine, and wait 5 minutes. The oil level should be between the dipstick's low level mark and full level mark. If low, check for leakage and add oil up to the full level mark.

69. Install the V-bank cover sub-assembly.
Attach the 3 clips to install the V-bank cover.

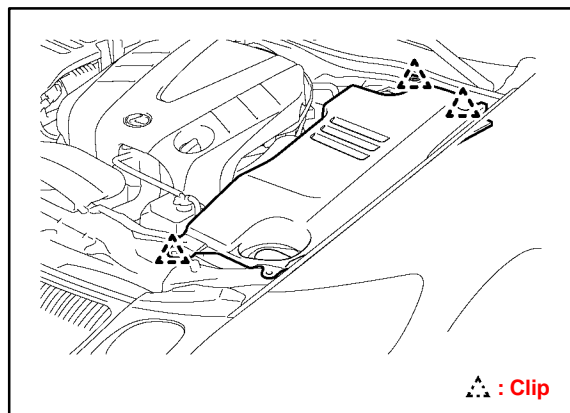
NOTE:

- Be sure to engage the clips securely.
- Do NOT apply excessive force or hit the cover to engage the clip. This may cause the cover to break.

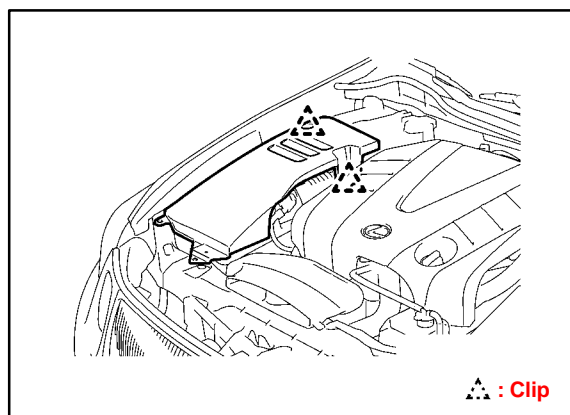


**Repair
Procedure**
(Continued)

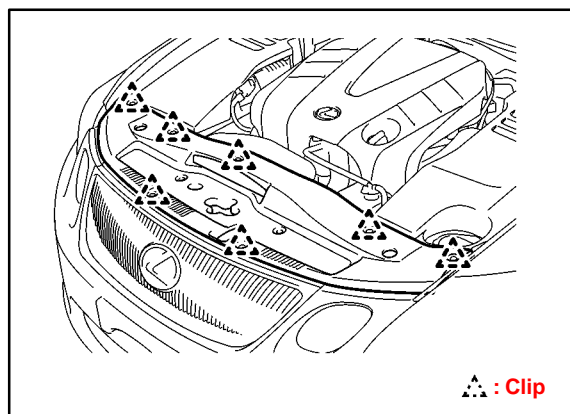
70. Install the engine compartment side cover LH with the 3 clips and nut.



71. Install the engine compartment side cover RH with the 2 clips.

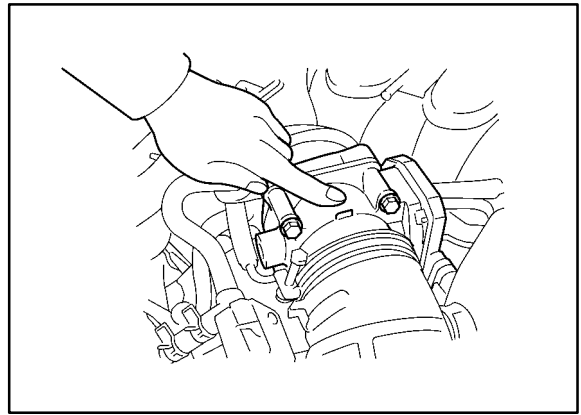


72. Install the cool air intake duct seal with the 7 clips.



**Repair
Procedure**
(Continued)

73. Check the function of the throttle body.
- Check the throttle control motor operating sounds.
- A. Turn the engine switch ON (IG).
 - B. When pressing the accelerator pedal, check the operating sound of the running motor. Make sure that NO friction noises emit from the motor. If friction noise exists, replace the throttle body.



74. Re-initialize any affected power systems.

Refer to TSIB No. PD007-07, *“Power System Initialization During PDS.”*