



Technical Service BULLETIN

May 19, 2003

Title:

VVTli - INTERMITTENT VARIABLE LIFT OPERATION

Models:

'00 – '02 Celica GTS

ENGINE
EG010-03

Introduction In some cases, owners of 2000 – 2002 model year Celica GTS vehicles equipped with the 2ZZ-GE engine may complain of an intermittent slight loss of power and/or variable lift function at engine speeds over 6,000 rpm under high load. This can be caused if the bolt securing the rocker shaft separates, allowing the shaft to rotate in its bore. This rotation, when it occurs, can cause misalignment of the oil feed passages to the rocker shafts, resulting in a lack of variable lift operation and low power at higher engine rpm.

- Applicable Vehicles**
- **2000 – 2002 model year Celica GTS vehicles equipped with 2ZZ-GE engine produced BEFORE the Production Change Effective VIN shown below.**

Production Change Information

MODEL	ENGINE	PRODUCTION CHANGE EFFECTIVE VIN
Celica GTS	2ZZ-GE	JTDDY3#T#20060197

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
90105-06293	Same	Bolt, Flange	2
96741-19009		Ring, O	1
12255-88600		Gasket, Ventilation	1
15338-22010		Gasket, Cam Timing Oil Control Valve Housing	1

Required Tools & Material

TOOLS & MATERIALS	PART NUMBER	QUANTITY
FIPG Sealant	–	1
Shop Rags	–	8
Seal Packing	00295-00103 (or equivalent)	–

Warranty Information

OP CODE	DESCRIPTION	TIME	OFF	T1	T2
EG3001	Variable Lift Bolt Extraction	6.5	90105-06293	04	12

Applicable Warranty*:

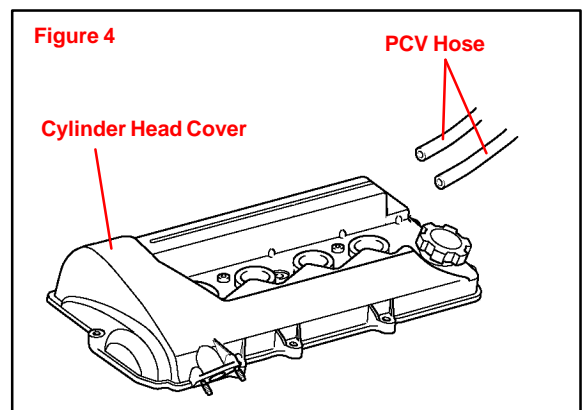
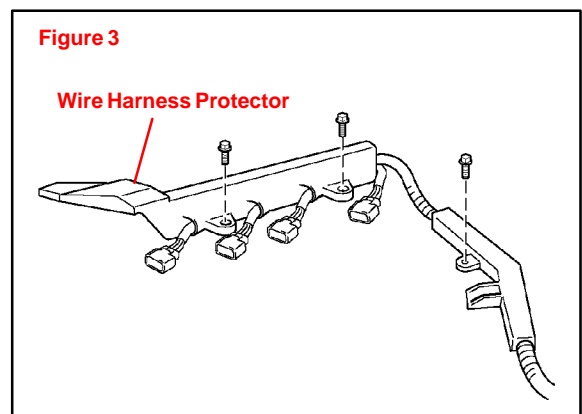
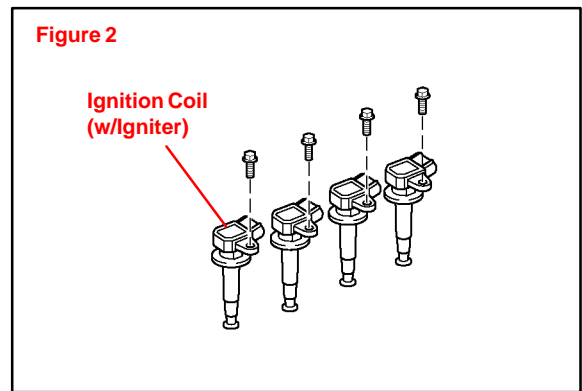
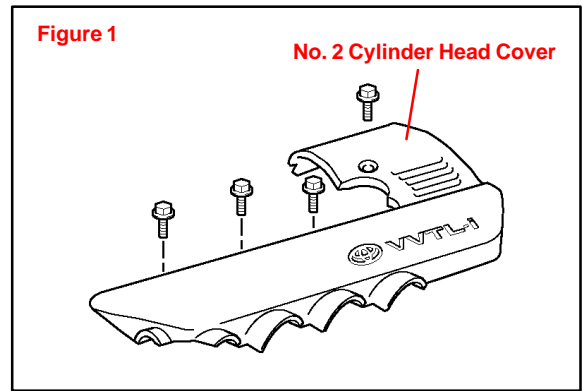
This repair is covered under the Toyota Powertrain Warranty. This warranty is in effect for 60 months or 60,000 miles, whichever occurs first, from the vehicle's in-service date.

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



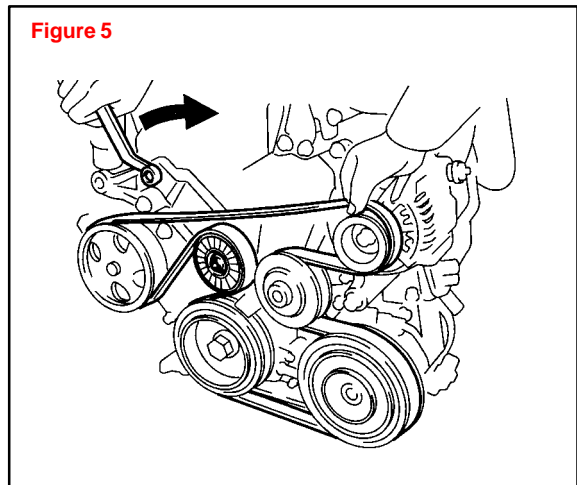
**Repair
Procedure**

1. Remove Valve Cover
 - A. Disconnect the negative and then the positive battery terminals.
 - B. Remove the battery tie-down bracket and battery.
 - C. Remove the 4 bolts and No. 2 cylinder head cover. (Figure 1.)
 - D. Remove the ignition coils. (Figure 2.)
 - E. Remove the wiring harness and protector from cylinder head cover. (Figure 3.)
 - F. Disconnect the 2 PCV hoses from the cylinder head cover. (Figure 4.)

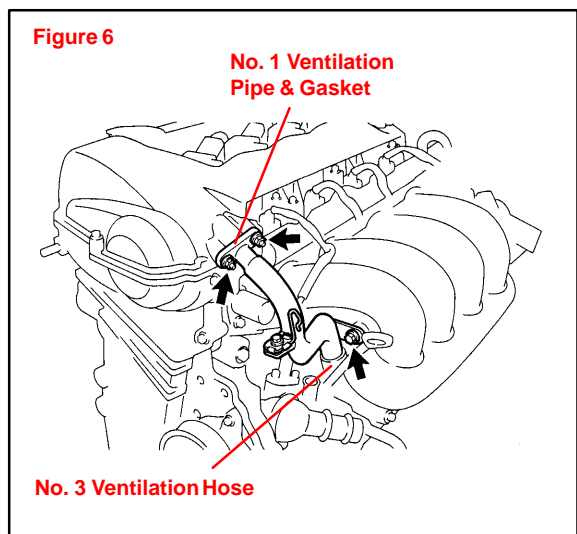


Repair Procedure
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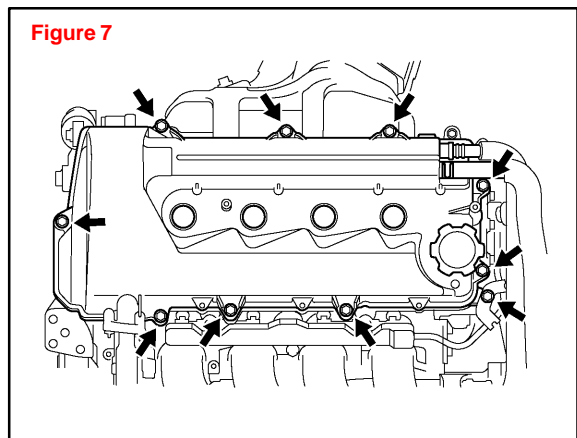
- G. Remove drive belt.
 - a. Turn the drive belt tensioner slowly clockwise and loosen it. Then, remove the drive belt and replace the drive belt tensioner slowly and carefully. (Figure 5.)



- H. Remove the 2 nuts, 1 bolt and disconnect the No. 3 ventilation hose from the No. 1 ventilation pipe. (Figure 6.)
- I. Remove the No. 1 ventilation pipe and gasket.

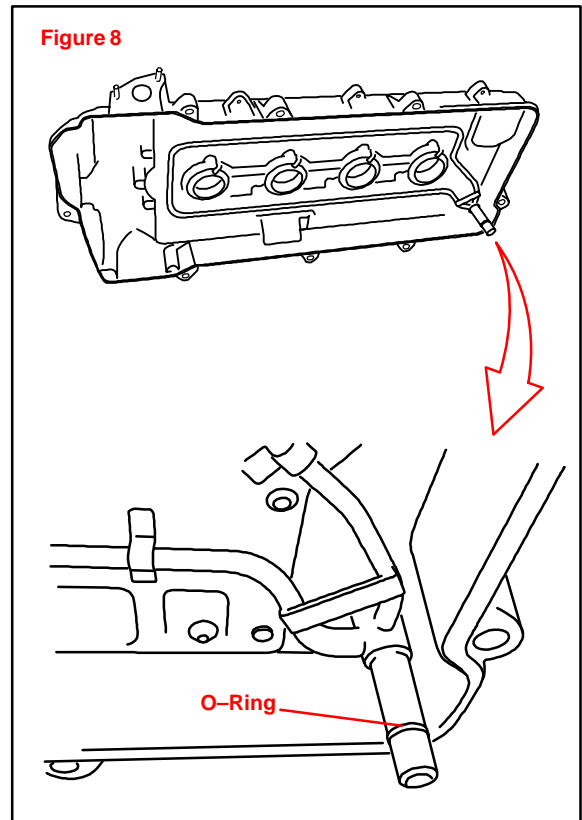


- J. Remove the 9 bolts, pull back the wire harness protector, and remove the cylinder head cover and gasket. (Figure 7.)

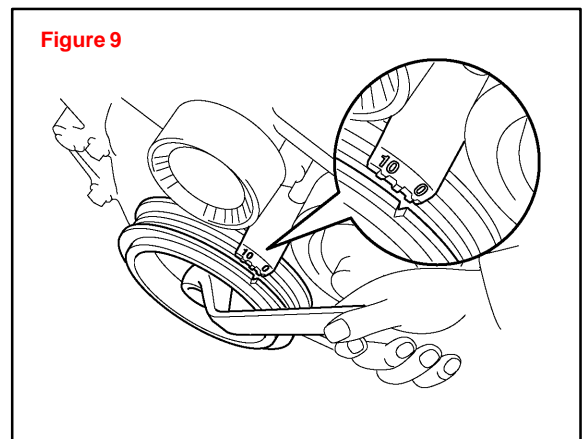


Repair Procedure
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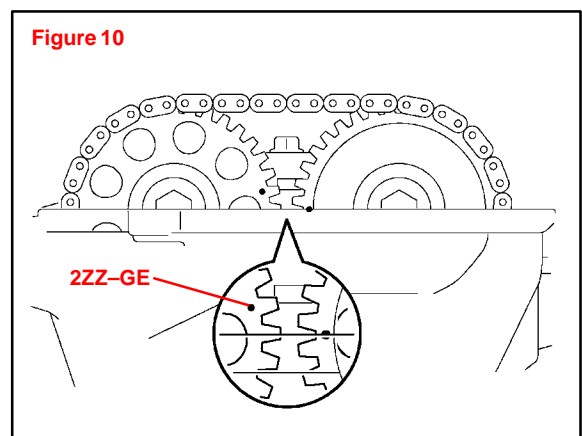
- K. Remove the O–ring from the cylinder head cover oil supply pipe. (Figure 8.)



- 2. Set No. 1 cylinder to TDC/compression.
 - A. Turn the crankshaft pulley, and align its groove with timing mark “0” of the timing chain cover. (Figure 9.)

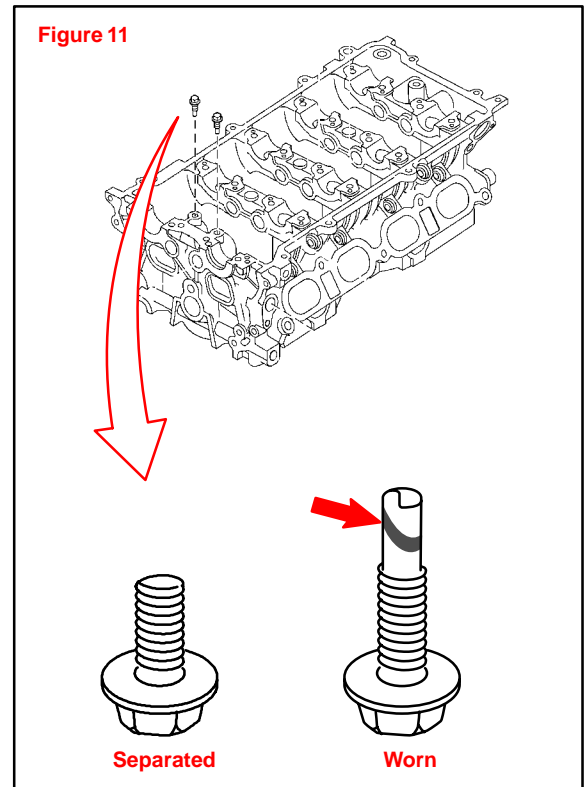


- B. Check that the point marks of the camshaft timing sprockets are in a straight line on the timing chain cover surface with the exhaust cam dot set one tooth above as shown in Figure 10. If not, turn the crankshaft one revolution (360°) and align the marks as explained above.

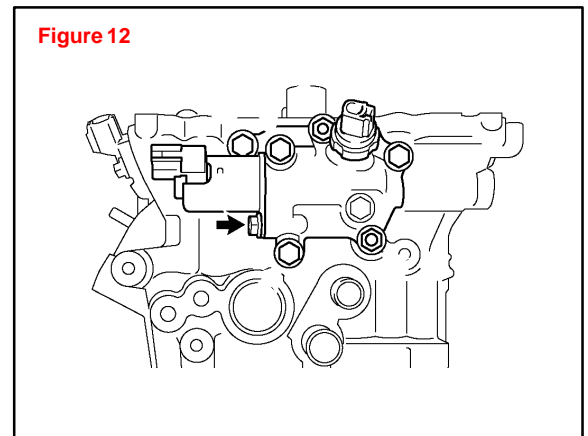


Repair Procedure
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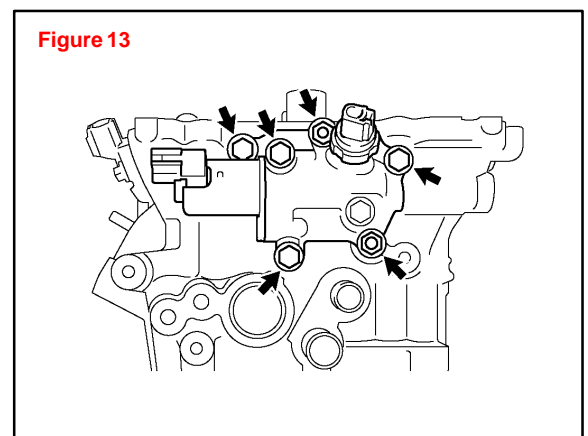
3. Remove and inspect bolts to confirm separation. (Figure 11.)



4. Remove the bolt and oil control valve for VVTLi. (Figure 12.)

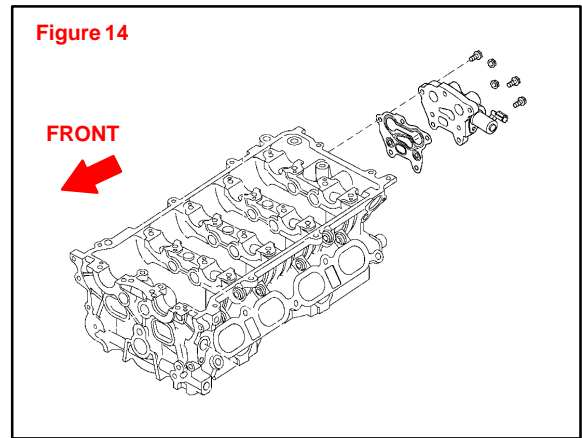


- A. Remove the 4 bolts and 2 nuts. (Figure 13.)

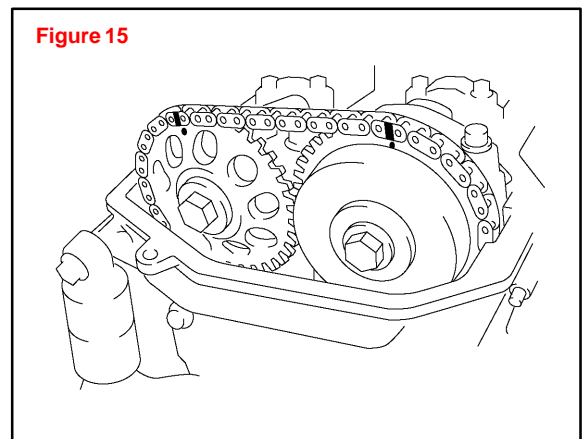


Repair Procedure
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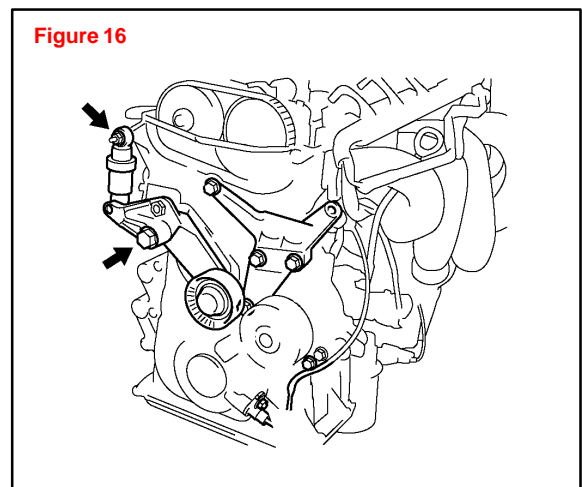
- B. Remove the oil control valve housing and gasket. (Figure 14.)



- 5. Paint matchmarks on cam sprockets and chain. (Figure 15.)

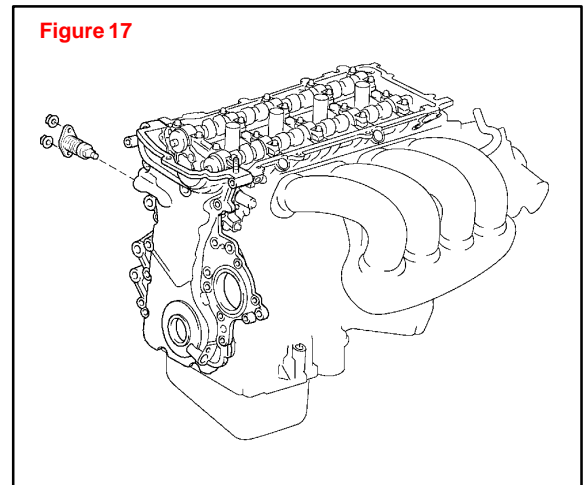


- 6. Remove drive belt tensioner.
 - A. Remove the bolt, nut and drive belt tensioner. (Figure 16.)

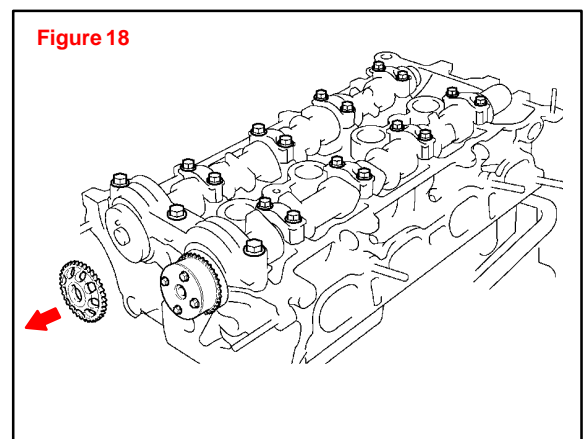


**Repair
Procedure**
(Continued)

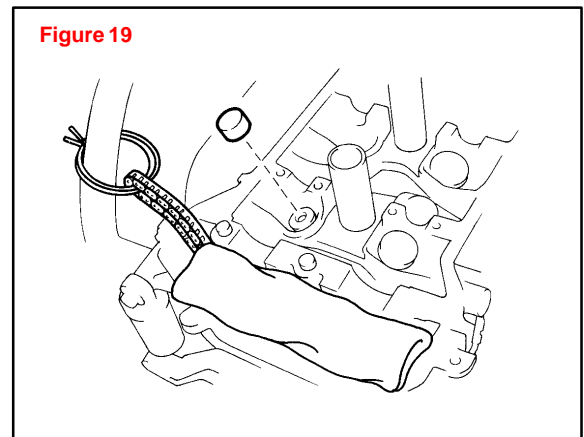
7. Remove timing chain tensioner.
 - A. Remove the 2 securing nuts and the timing chain tensioner. (Figure 17.)



8. Remove exhaust cam drive sprocket. (Figure 18.)

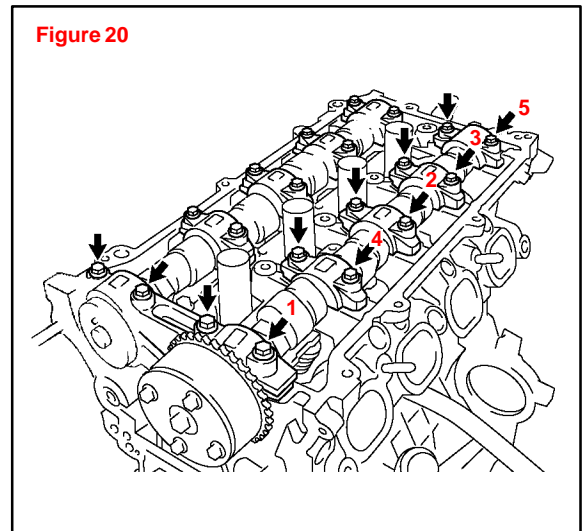


9. Secure the timing chain to prevent the chain from falling into the timing chain cover. (Figure 19.)

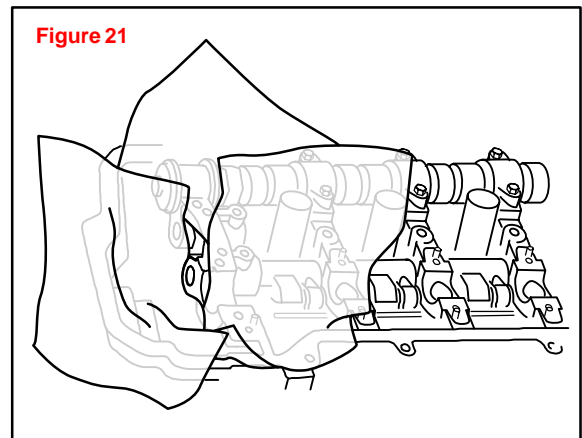


Repair Procedure
(Continued)

10. Remove intake camshaft assembly (also remove exhaust camshaft if exhaust rocker shaft bolt is separated).
 - A. Uniformly loosen and remove the 12 bearing cap bolts, in several passes, in the sequence shown, and remove the 5 bearing caps and intake camshaft. (Figure 20.)

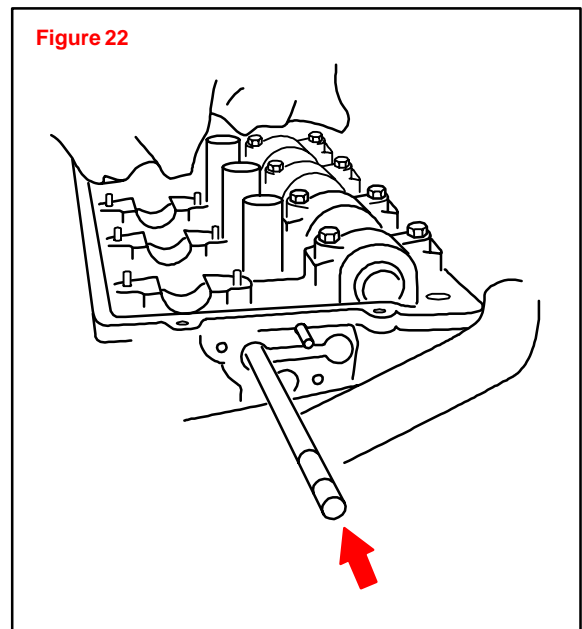


11. Place shop rags between the timing chain cover and the cylinder head around the rocker shaft opening as shown in Figure 21.



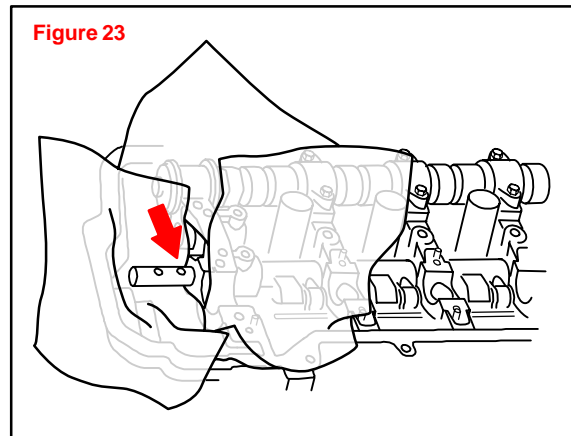
12. Push or gently tap the rocker shaft out into the opening between the timing chain cover and head using a large punch and hammer. (Figure 22.)

NOTE:
Once the hole in the shaft is pushed past the end of the head, the separated piece of bolt will tend to bounce or fall out into the timing chain cover.
Seal the opening with rags to prevent losing a piece of the separated bolt down into the timing chain cover.

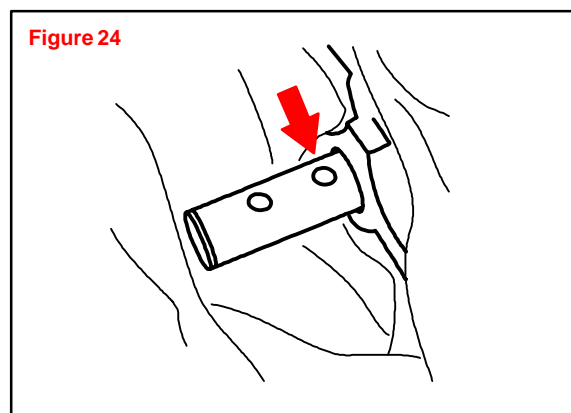


**Repair
Procedure**
(Continued)

13. Be careful to push the rocker shaft only as far as the second hole where the piece of bolt is separated, and no further. (Figure 23.)



14. Once the hole is exposed, remove the separated piece of bolt and inspect for damage to the shaft or shaft housing. (Figure 24.)

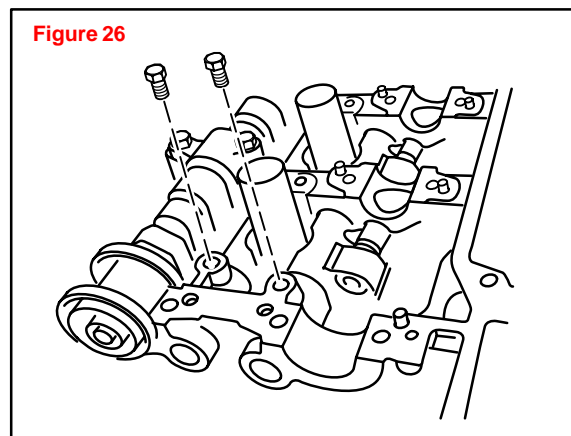
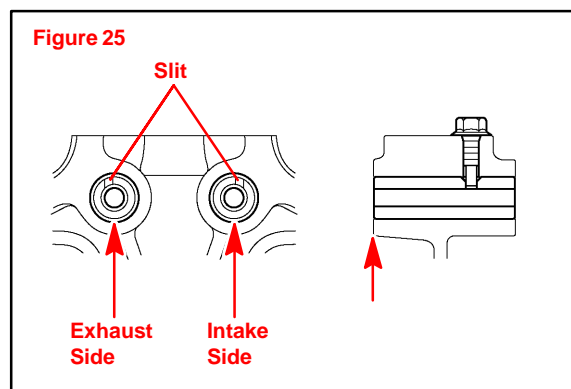


15. Align the rocker shafts back in their correct positions (Figure 25) and install the rocker shaft set bolts (Figure 26).

**Torque: 7.5 N•m
(76 kgf•cm, 66 in.•lbf)**

HINT:

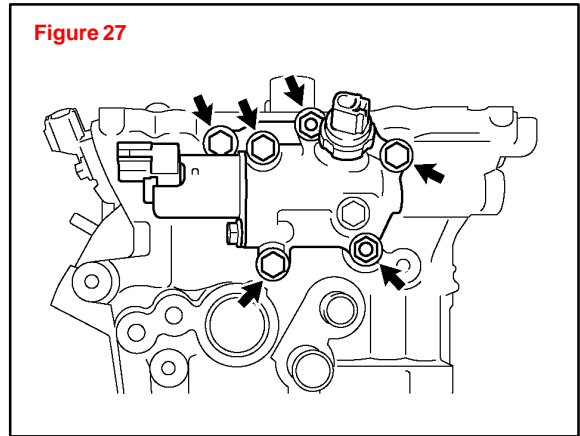
- Position the slit of the rocker shaft in the direction shown in Figure 25.
- Align the rocker shaft end with the cylinder head end.



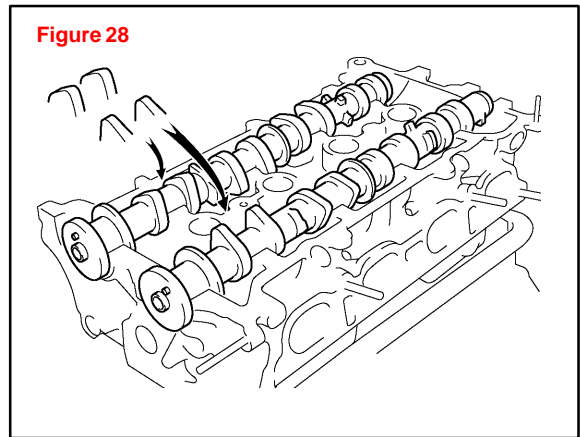
Repair Procedure
(Continued)

16. Install the oil control valve housing.
 - A. Install the oil control valve filter.
 - B. Install the gasket and oil control valve housing with the 4 bolts and 2 nuts. (Figure 27.)

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

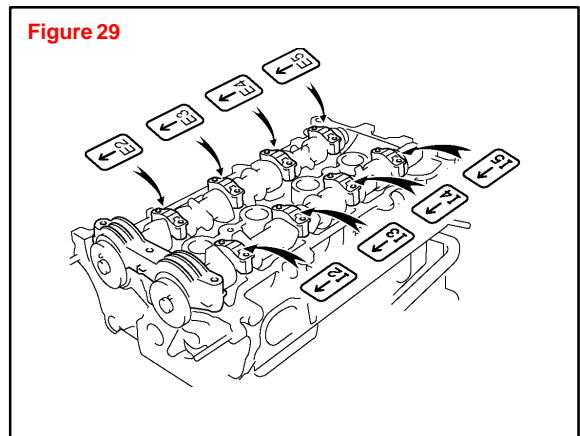


17. Install camshaft(s).
 - A. Place the camshaft(s) on the cylinder head with the No. 1 cam lobes facing as shown in the illustration. (Figure 28.)



- B. Install the bearing caps in their proper locations. (Figure 29.)

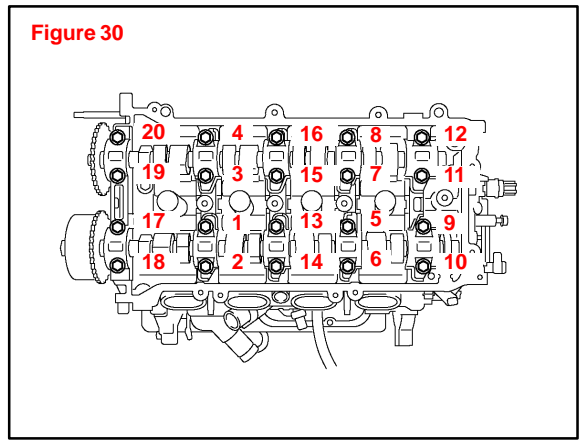
HINT:
Camshaft bearing caps have a number and front mark.



Repair Procedure
(Continued)

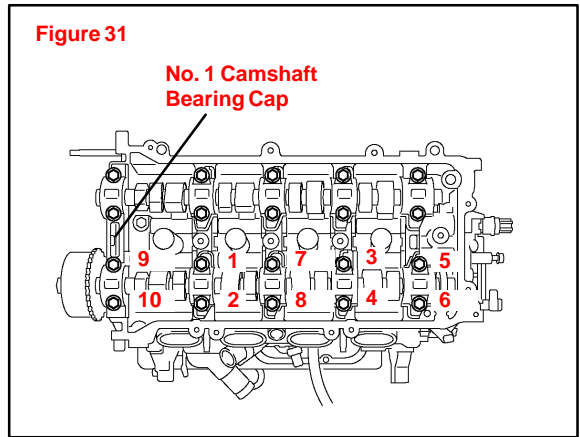
- C. If you removed both camshafts, install and uniformly tighten the 20 bearing cap bolts. After tightening the No. 1 camshaft bearing cap hand tight, tighten the rest in several passes, in the sequence shown. (Figure 30.)

Torque: 18.5 N•m
(189 kgf•cm, 14 ft•lbf)

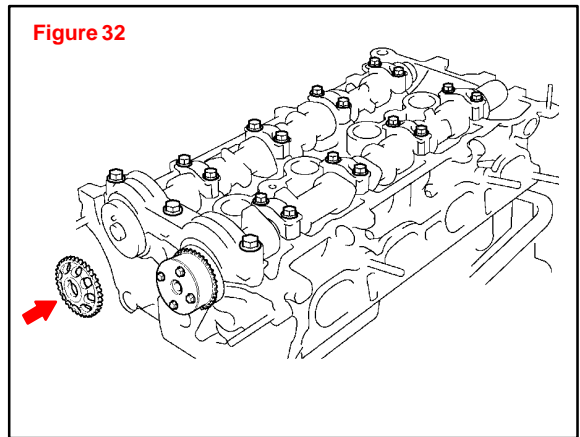


- D. If it was only necessary to remove the intake camshaft, install and uniformly tighten the 10 bearing cap bolts. After tightening the No. 1 camshaft bearing cap hand tight, tighten the rest in several passes, in the sequence shown. (Figure 31.)

Torque: 18.5 N•m
(189 kgf•cm, 14 ft•lbf)



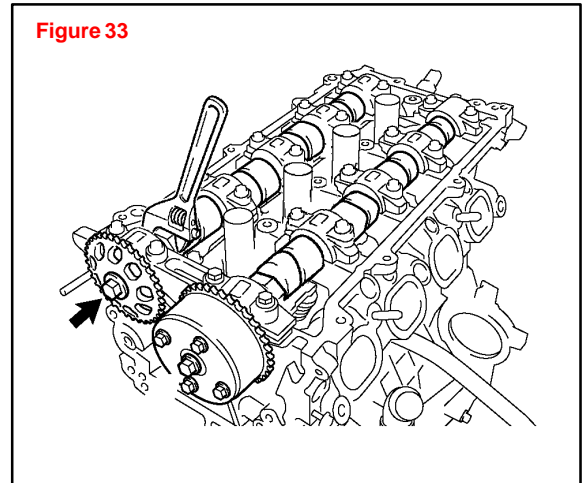
- 18. Install camshaft timing sprocket.
 - A. Align the knock pin hole in the exhaust camshaft timing sprocket with the knock pin of the camshaft. (Figure 32.)



Repair Procedure
(Continued)

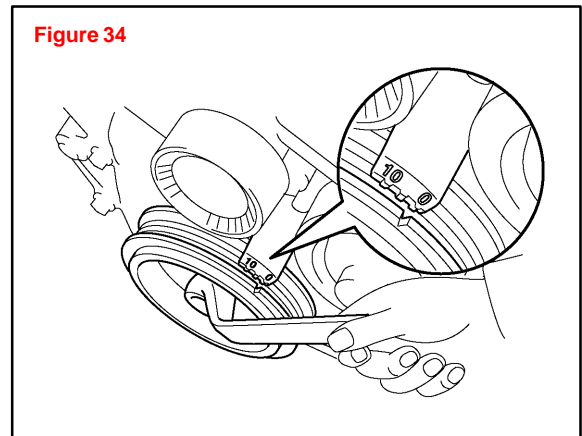
- B. Temporarily install the timing sprocket bolt.
- C. Hold the hexagonal wrench head portion of the camshaft with a wrench, and tighten the timing sprocket bolt. (Figure 33.)

**Torque: 54 N•m
(551 kgf•cm, 40 ft•lbf)**



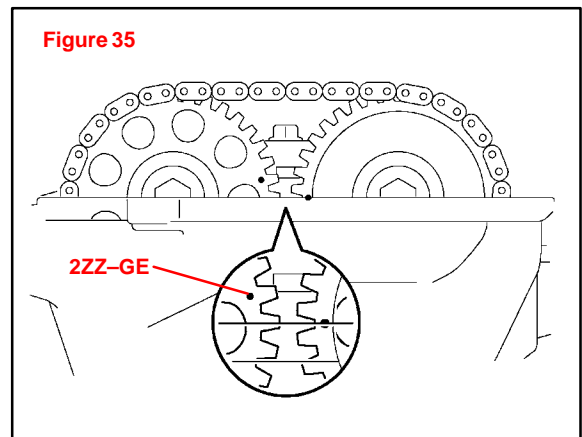
- 19. Set No. 1 cylinder to TDC/compression.

- A. Turn the crankshaft pulley, and align its groove with timing mark "0" of the timing chain cover. (Figure 34.)



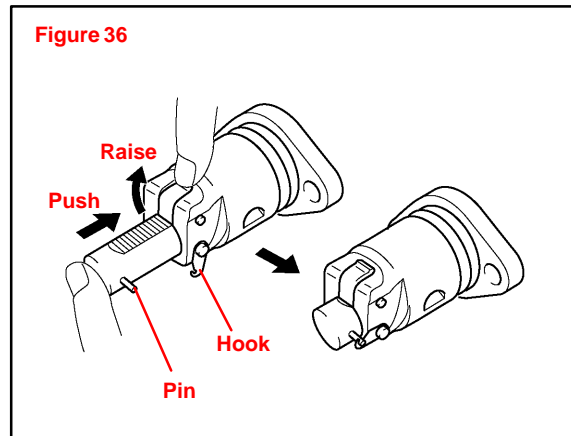
- B. Turn the hexagonal wrench head portion of the camshafts, and align the point marks of the camshaft timing sprockets. (Figure 35.)

- C. Install timing chain ensuring there is no slack on the intake side of the chain.

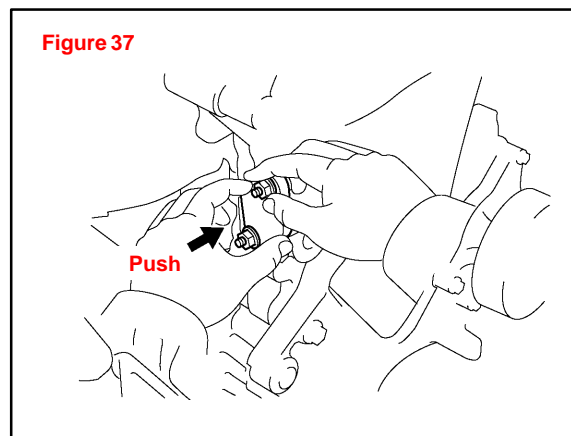


Repair Procedure
(Continued)

20. Install chain tensioner.
- A. Check the chain tensioner.
 - B. Release the ratchet pawl, fully push in the plunger and apply the hook to the pin so that the plunger cannot spring out. (Figure 36.)



- C. Insert the tensioner with your hand until it reaches to the chamfered position and install nut temporarily. (Figure 37.)
- D. Then, by tightening the nuts, insert the chain tensioner to the fully installed position.



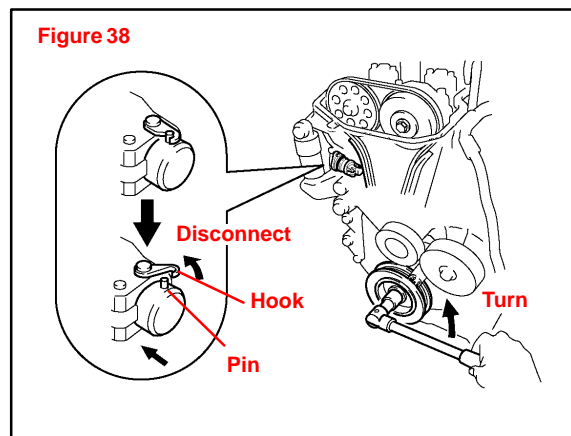
HINT:

- If the hook is released while pushing in, remove the tensioner and re-apply the hook again and push the tensioner in again.
- Be careful not to tear the O-ring as it is not serviceable separately.

b. Tighten the 2 nuts.

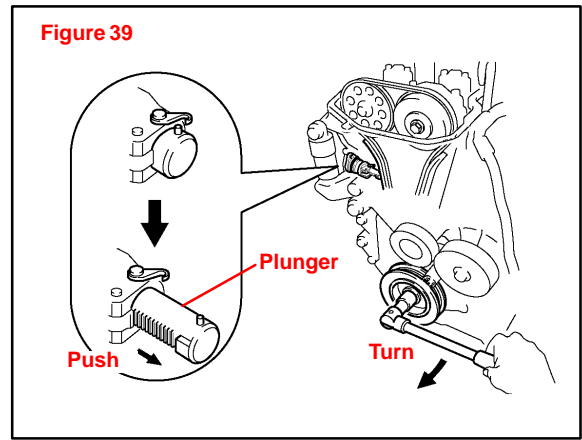
Torque: 9.0 N•m
(92 kgf•cm, 80 in.•lbf)

21. Set chain tension.
- A. Turn the crankshaft counterclockwise, and disconnect the knock pin plunger from the hook. (Figure 38.)

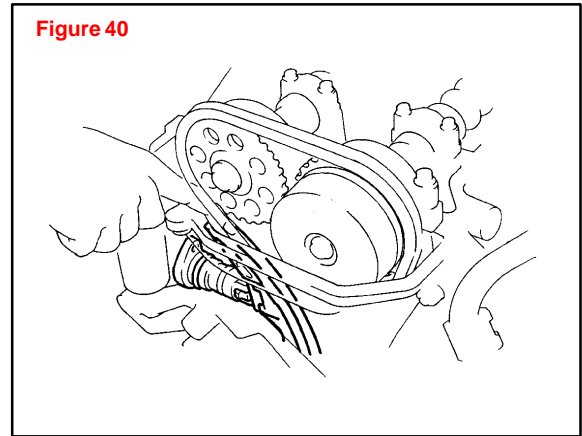


Repair Procedure
(Continued)

- B. Turn the crankshaft clockwise, and check that the slipper is pushed by the plunger. (Figure 39.)



HINT:
If the plunger does not spring out, press the slipper into the chain tensioner with a screwdriver or your finger so that the hook is released from the knock pin and the plunger springs out. (Figure 40.)

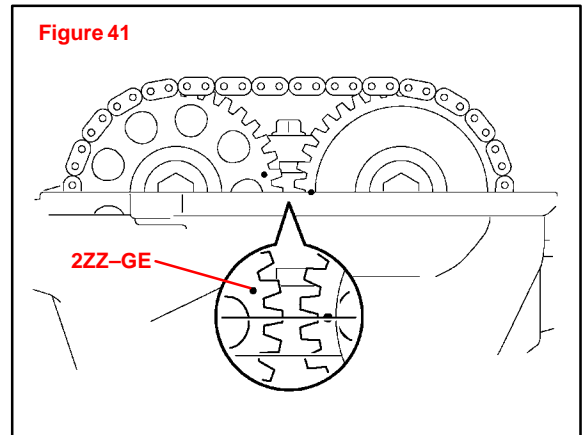


22. Check valve timing.

- A. Turn the crankshaft pulley, and align its groove with timing mark "0" of the timing chain cover.

NOTE:
Always turn the crankshaft clockwise unless otherwise directed.

- B. Check that the point marks of the camshaft timing sprockets are in a straight line on the timing chain cover surface as shown in Figure 41.
If not, turn the crankshaft one revolution (360°) and align the marks as explained above.



Repair Procedure
(Continued)

23. Install cylinder head cover.
 - A. Remove any old packing (FIPG) material.

HINT:

When FIPG on the head cover gasket side cannot be eliminated completely, replace the gasket.

- B. Apply seal packing (P/N 00295–00103 or equivalent) to 2 locations as shown in Figure 42.
- C. Install the gasket on the cylinder head cover.

HINT:

Part must be assembled within 3 minutes of application. Otherwise, the material must be removed and reapplied.

- D. Install a new O–ring on the cylinder head cover oil feed tube.
- E. Install the cylinder head cover with the 9 bolts. Uniformly tighten the bolts, in several passes. (Figure 43.)

**Torque: 10 N•m
(100 kgf•cm, 7 ft•lbf)**

- F. Connect the 2 PCV hoses to the cylinder head cover.

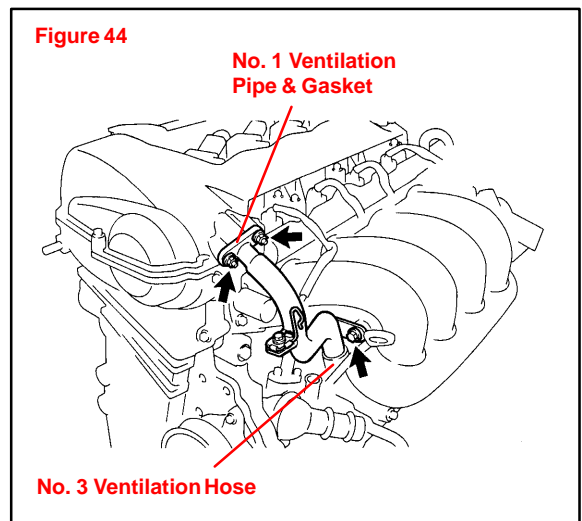
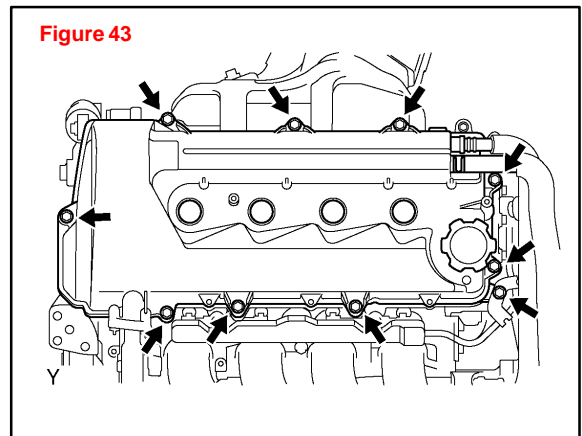
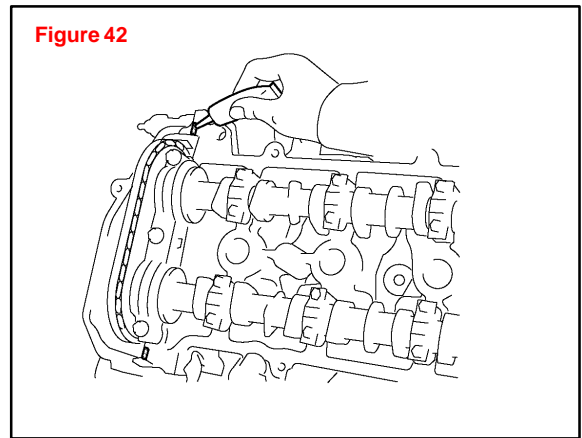
24. Install a new gasket and the No. 1 ventilation pipe with 2 nuts and bolt. (Figure 44.)

Torque:

**Nut: 10 N•m
(100 kgf•cm, 7 ft•lbf)**

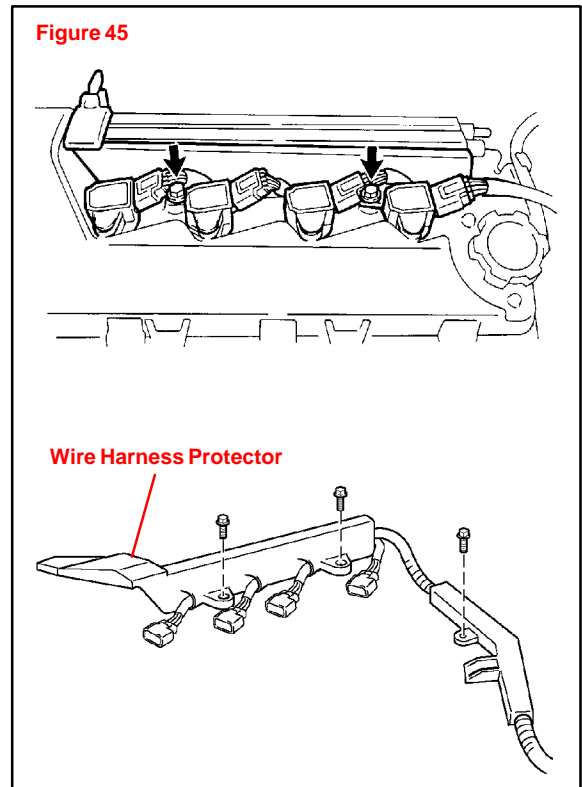
**Bolt: 25 N•m
(255 kgf•cm, 18 ft•lbf)**

25. Connect the No. 3 ventilation hose to the No. 1 ventilation pipe.



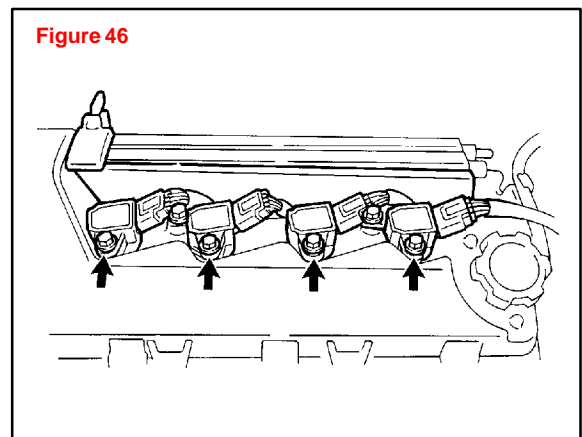
Repair Procedure
(Continued)

26. Install the 2 bolts and the wire harness protector. (Figure 45.)

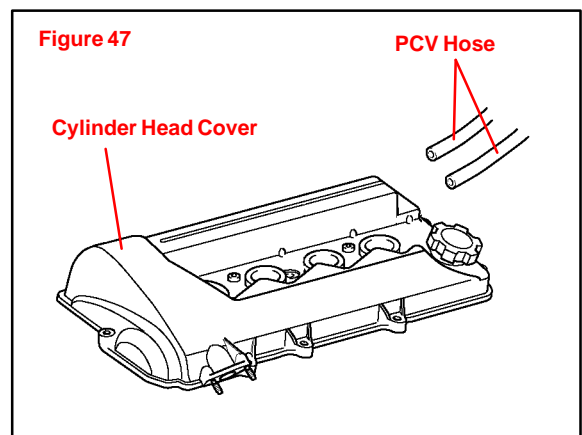


27. Install ignition coils (with igniter).
 A. Install the 4 bolts. (Figure 46.)
 B. Connect the 4 ignition coil connectors.

Torque: 9.0 N•m
(92 kgf•cm, 79 in.•lbf)

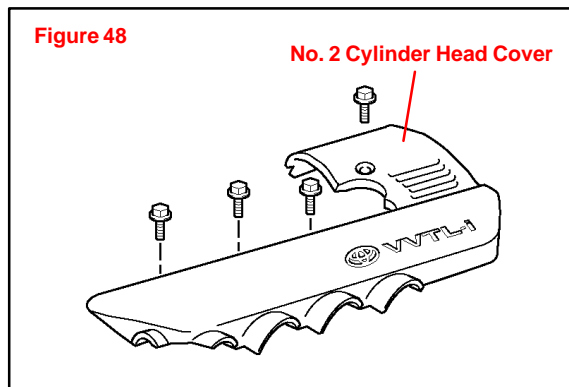


28. Install the 2 PCV hoses. (Figure 47.)



Repair Procedure
(Continued)

29. Install the No. 2 cylinder head cover with the 4 bolts. (Figure 48.)



30. Install the drive belt tensioner and belt. (Figure 49.)

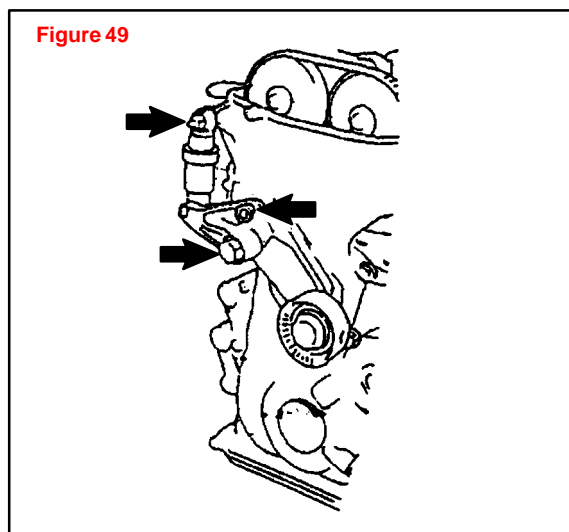
A. Re-attach the tensioner assembly.

After replacing the belt tensioner assembly:

B. Fit a wrench on the hexagonal portion of the belt tensioner swing arm.

C. Slowly move the belt tensioner at least 4 times through its full stroke. (It should take at least 3 seconds to work it through one full stroke.)

This will release any air from the tensioner assembly and prime it for proper operation.



31. Install the battery and tie-down.

32. Install the positive and then the negative battery cables.