TOYOTA Service Bulletin

Section :	Engine
Ref. No. :	EG−0013
Date :	Oct., 2000
Page :	1 of 26

Area Application : Europe

Model Name : CELICA

Model Code : ZZT−231

Subject : SUPPLEMENTAL FOR REPAIR MANUAL

This is to inform you of 2ZZ−GE engine service data for ZZT−231.

The attached pages are to be used with the following repair manual.

Pub. No.	Publication Name
RM733E	1ZZ−FE, 2ZZ−GE Engine Repair Manual

Production Effective :

VIN	Production Date
−−−	From Aug. 2000

PREPARATION

ENGINE MECHANICAL PP–1
EMISSION CONTROL PP–2

ENGINE MECHANICAL

EQUIPMENT

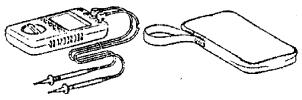
PP3NE–01

Torque wrench	

EMISSION CONTROL

RECOMMENDED TOOLS

PP3NF–01

	09082–00040 TOYOTA Electrical Tester.	

PP3NG–01

EQUIPMENT

Torque wrench	

SERVICE SPECIFICATIONS

ENGINE MECHANICAL SS–1
EMISSION CONTROL SS–2

ENGINE MECHANICAL

TORQUE SPECIFICATION

SS1J0–01

Part tightened		N·m	kgf·cm	ft·lbf
RH engine mounting insulator		52	530	38
PS pump x Engine		36	370	27
Exhaust manifold		43	440	32
Upper heat insulator x Exhaust manifold		20	204	15
Lower heat insulator x Exhaust manifold		20	204	15
Exhaust manifold x Cylinder head		50	510	37
Exhaust manifold stay		50	510	37
Intake manifold x Cylinder head (See page EM–6)	Bolt A	27	275	20
	Bolt B	46	469	34

EMISSION CONTROL

TORQUE SPECIFICATION

SS1J1–01

Part tightened	N·m	kgf·cm	ft·lbf
ASV x Bracket	8	82	71
Air pump assembly	8	82	71

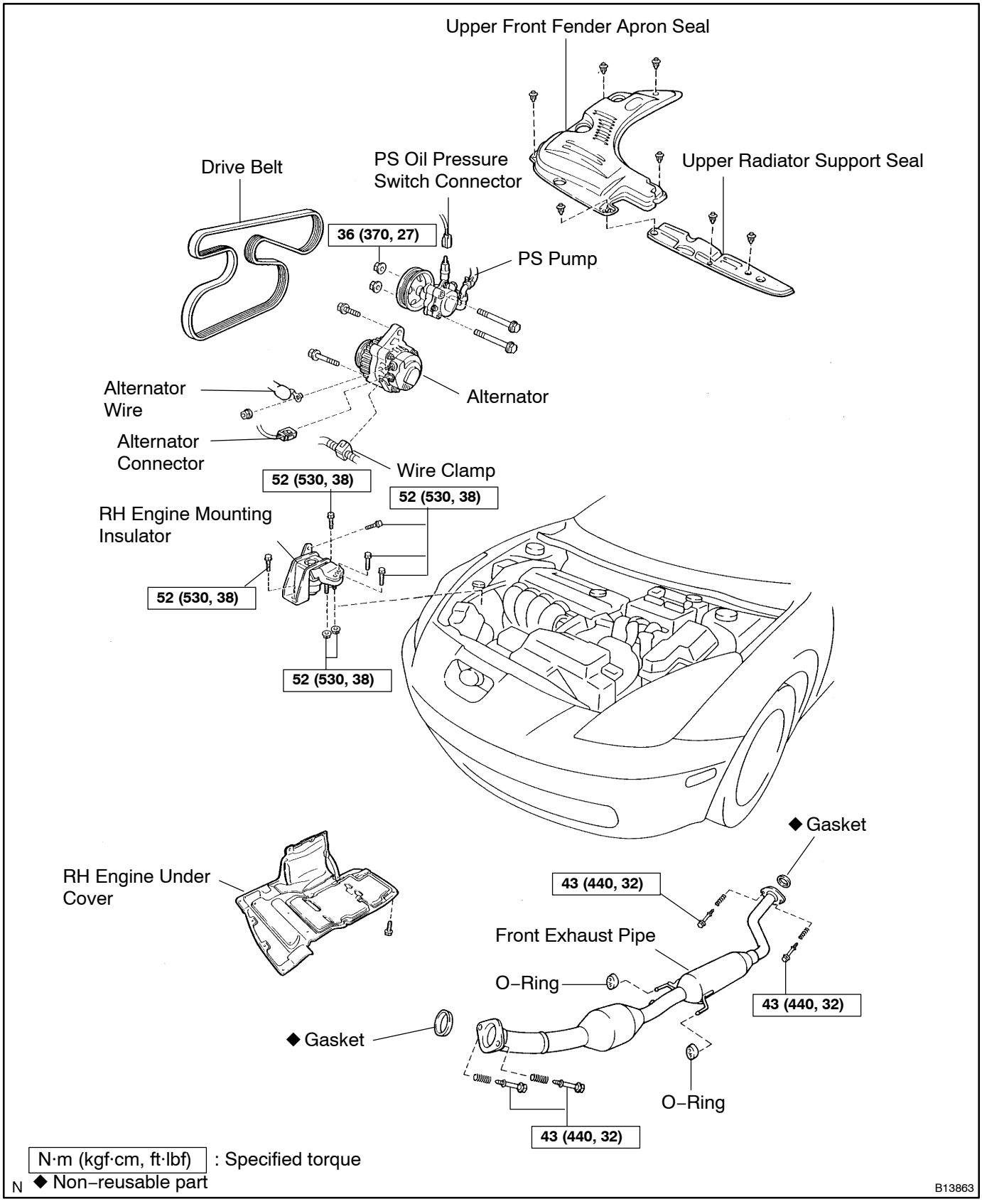
ENGINE MECHANICAL

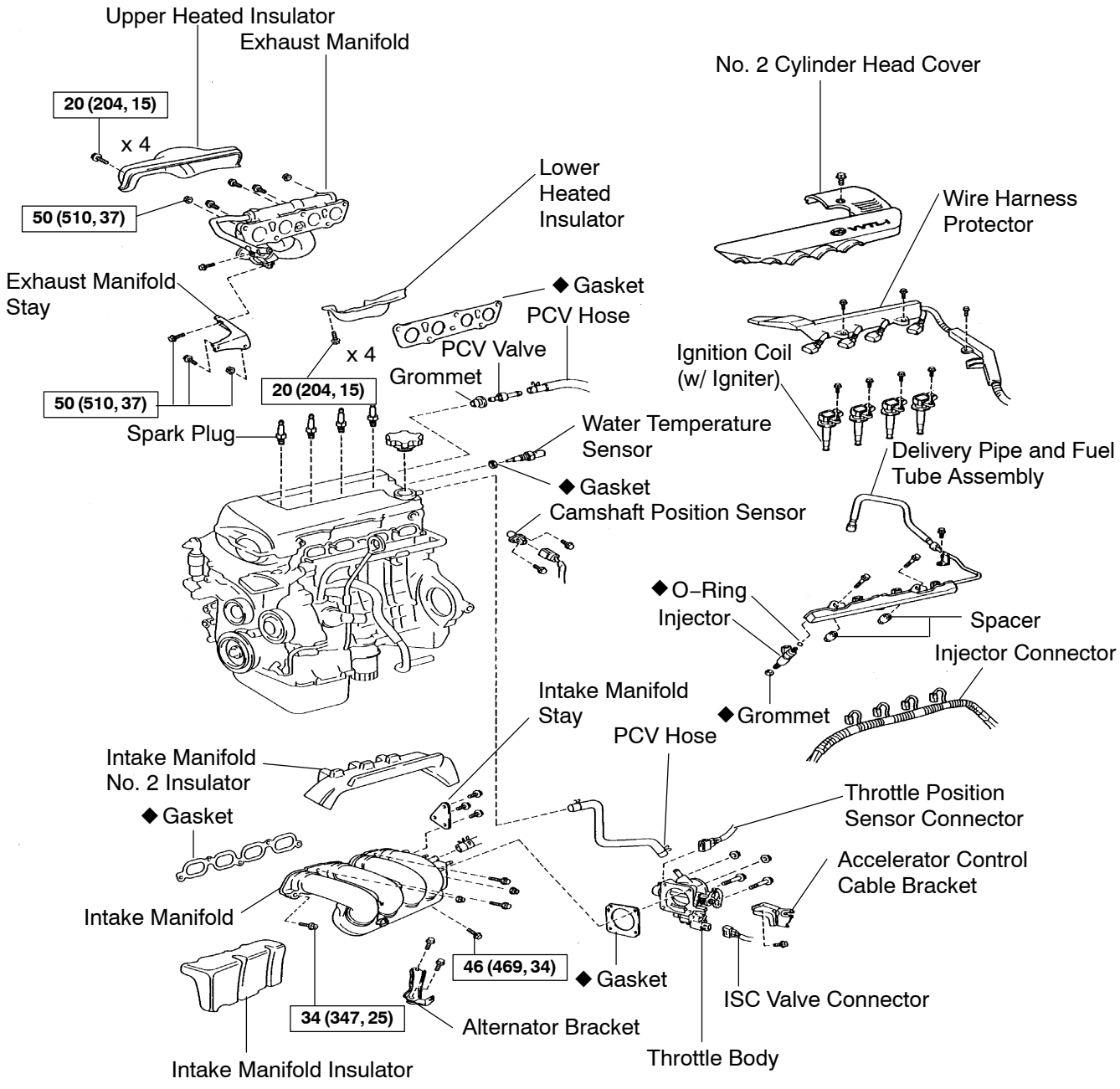
CYLINDER HEAD EM–1

CYLINDER HEAD

COMPONENTS

EM1Q9–01





N

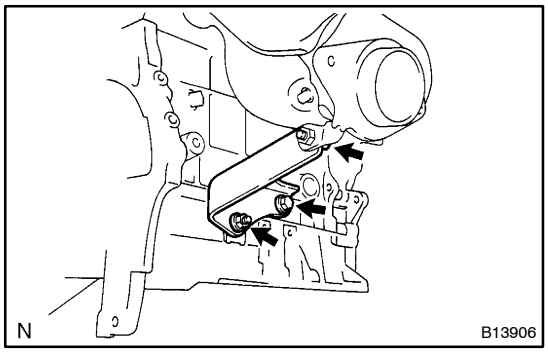
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

B13858

EM1QA–01

REMOVAL

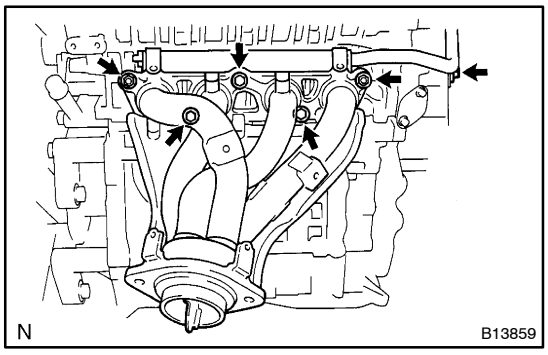
1. **REMOVE BATTERY**
2. **REMOVE ENGINE ECU BOX**
3. **DRAIN ENGINE COOLANT**
4. **DISCONNECT ENGINE COOLANT RESERVOIR**
5. **REMOVE AIR CLEANER ASSEMBLY**
6. **DISCONNECT ACCELERATOR CABLE**
7. **REMOVE DRIVE BELT AND ALTERNATOR (See Pub. No. RM733E on page CH–5)**
8. **REMOVE EXHAUST PIPE**



9. **REMOVE EXHAUST MANIFOLD**

(a) Remove the 2 bolts, nut and exhaust manifold stay.

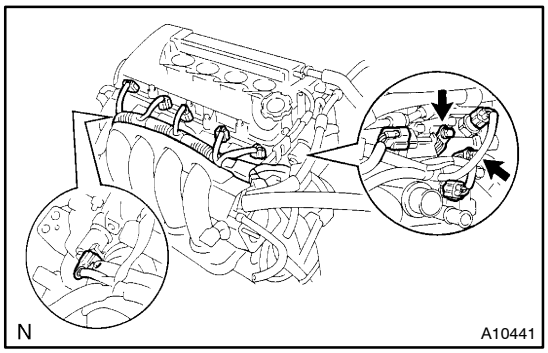
(b) Remove the 4 bolts and upper heat insulator.



(c) Remove the 4 bolts, 2 nuts, exhaust manifold and gasket.

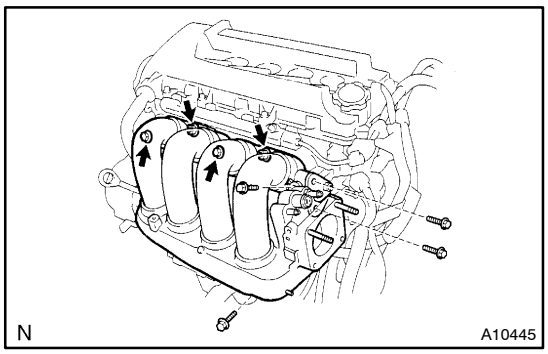
(d) Remove the 4 bolts and lower heat insulator.

10. **REMOVE IGNITION COIL (See Pub. No. RM733E on page IG–6)**
11. **REMOVE SPARK PLUG (See Pub. No. RM733E on page IG–1)**
12. **REMOVE PCV HOSES**
13. **REMOVE THROTTLE BODY (See Pub. No. RM733E on page FI–33)**
14. **REMOVE INJECTOR (See Pub. No. RM733E on page FI–21)**



15. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD

(a) Disconnect the ECT sensor connector.
(b) Disconnect the camshaft position sensor connector.
(c) Disconnect the oil control valve for VVT connectors.
(d) Disconnect the oil control valve for VVTL connectors.
(e) Disconnect the oil pressure switch connector.
(f) Disconnect the 2 ground wires.
(g) Remove the 2 bolts, and disconnect the engine wire.
(h) Remove the intake manifold No. 2 insulator.



16. REMOVE INTAKE MANIFOLD

(a) Disconnect the EVAP hose for ORVR.
(b) Disconnect the brake booster vacuum hose.
(c) Remove the bolt and disconnect the No. 1 ventilation pipe and oil dipstick and guide.
(d) Remove the 2 bolts, nut and stay.
(e) Remove the 4 bolts, 2 nuts, intake manifold and gasket.
(f) Remove the intake manifold insulator.

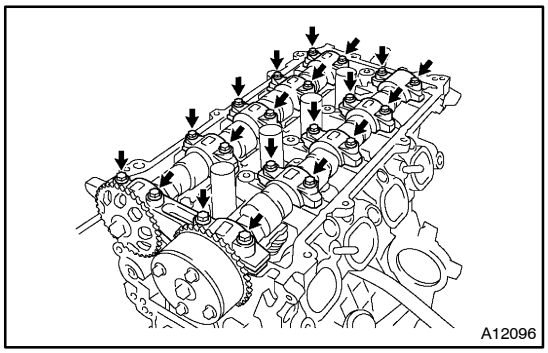
17. REMOVE CAMSHAFT POSITION SENSOR

18. REMOVE WATER TEMPERATURE SENSOR

19. REMOVE PCV VALVE AND GROMMET

20. REMOVE OIL FILLER CAP

21. REMOVE CAMSHAFT TIMING SPROCKETS
(See Pub. No. RM733E on page IG–9)

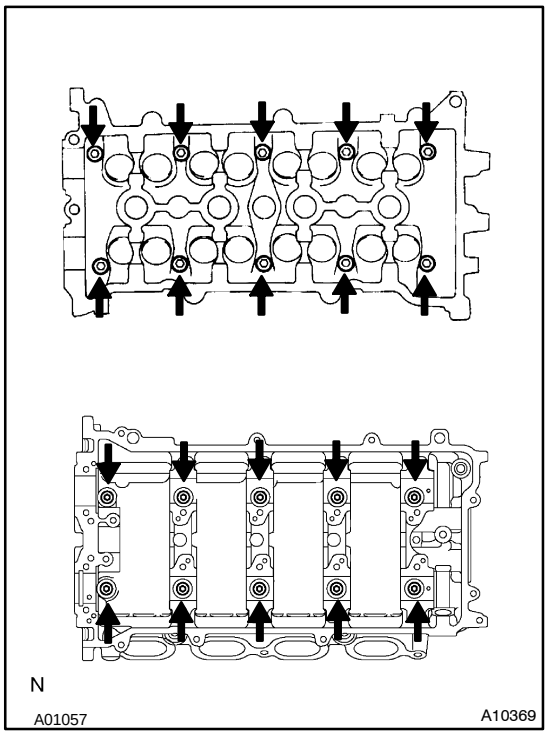


22. REMOVE CAMSHAFT

Uniformly loosen and remove the 20 bearing cap bolts, in several passes, in the sequence shown, and remove the 9 bearing caps intake and exhaust camshaft.

23. REMOVE CYLINDER HEAD

(a) Disconnect the upper radiator hoses from the water hose union.
(b) Disconnect the heater water hose from the water hose union.

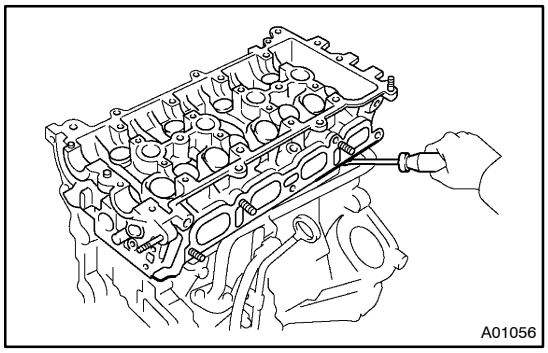


(c) Using a 12 mm bi–hexagon wrench, uniformly loosen and remove the 10 cylinder head bolts, in several passes, in the sequence shown. Remove the 10 cylinder head bolts and plate washers.

NOTICE:

Head warpage or cracking could result from removing bolts in an incorrect order.

(d) Remove the bolt holding the water bypass pipe to the cylinder head.



(e) Lift the cylinder from the dowels on the cylinder block and replace the cylinder head on wooden blocks on a bench.

HINT:

If the cylinder head is difficult to lift off, pry between the cylinder head and cylinder block with a screwdriver.

NOTICE:

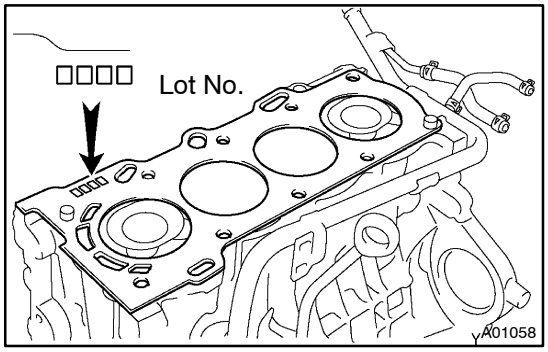
Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

EM1QB–01

INSTALLATION

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



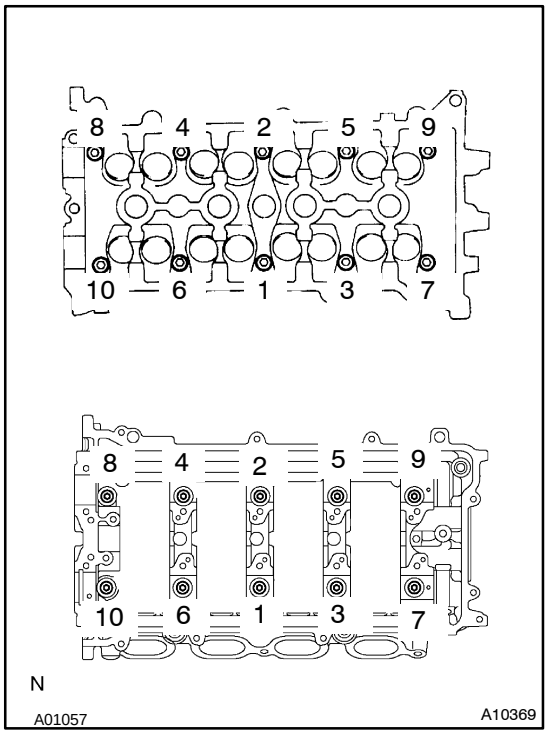
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

(a) Place a new cylinder head gasket on the cylinder block surface with the Lot No. stamp upward.

NOTICE:

Be careful of the installation direction.

(b) Place the cylinder head quietly in order not to damage the gasket with the bottom part of the head.



2. INSTALL CYLINDER HEAD BOLTS

HINT:

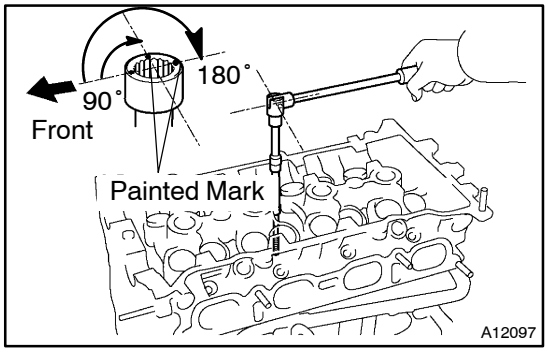
- The cylinder head bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any cylinder head bolt is broken or deformed, replace it.

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

(b) Using a 12 mm bi–hexagon wrench, install and uniformly tighten the 10 cylinder head bolts and plate washers, in several passes, in the sequence shown.

Torque: 35 N·m (375 kgf·cm, 26 ft·lbf)

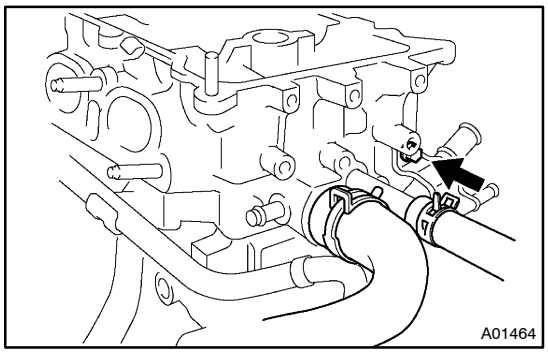
If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



(c) Mark the front of the cylinder head bolt with paint.

(d) Retighten the cylinder head bolts 180° in the numerical order shown.

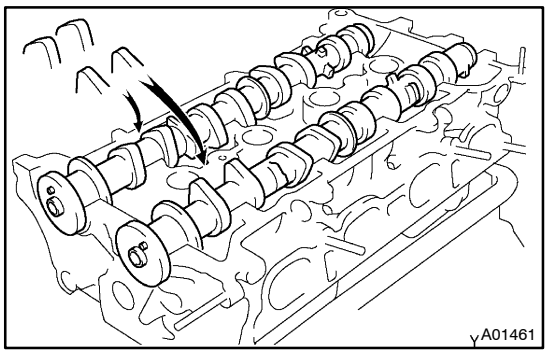
(e) Check that the paint mark is not at a 180° angle to the front.



(f) Install the bolt holding the water bypass pipe to the cylinder head.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

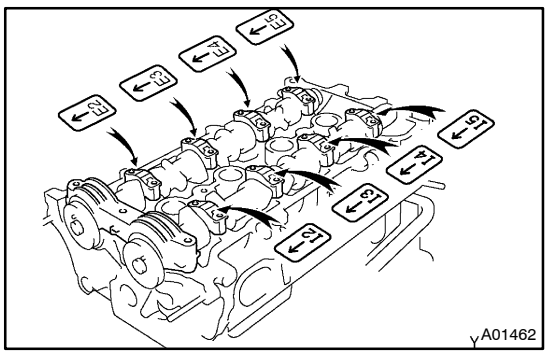
(g) Connect the upper radiator hose to the water hose unions.

(h) Connect the heater hose to the water hose unions.



3. INSTALL CAMSHAFTS

(a) Place the 2 camshafts on the cylinder head with the No. 1 cam lobes facing as shown the illustration.

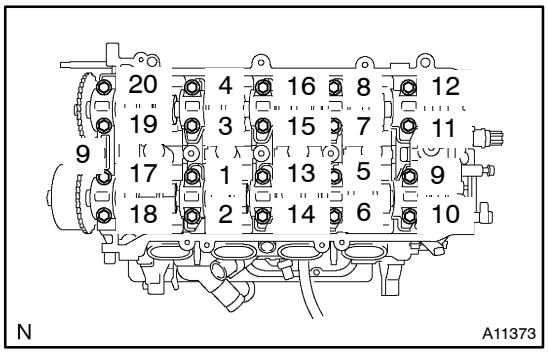


(b) Install the bearing caps in their proper locations.

HINT:

- No. 2, No.3 camshaft bearing cap has a number and front mark.

(c) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.



(d) Install and uniformly tighten the 20 bearing cap bolts. After tightening the No. 1 camshaft bearing cap, tighten then in several passes, in the sequence shown.
Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)

4. CHECK AND ADJUST VALVE CLEARANCE
(See Pub. No. RM733E on page EM–4)

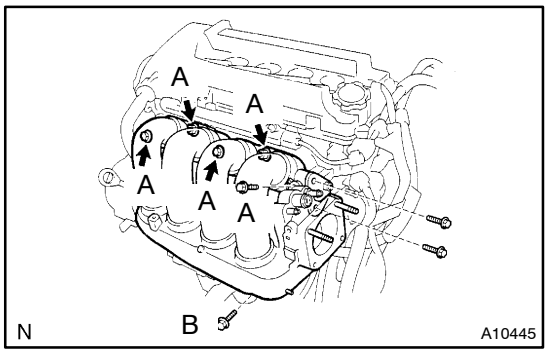
5. INSTALL CAMSHAFT TIMING SPROCKETS AND VALVE TIMING CONTROLLER ASSEMBLY
(See Pub. No. RM733E on page EM–25)

6. INSTALL OIL FILTER CAP

7. INSTALL GROMMET AND PCV VALVE

8. INSTALL WATER TEMPERATURE SENSOR
(See Pub. No. RM733E on page FI–54)

9. INSTALL CAMSHAFT POSITION SENSOR
(See Pub. No. RM733E on page IG–10)



10. INSTALL INTAKE MANIFOLD

(a) Install the intake manifold insulator to the cylinder block.

(b) Install a new gasket, the intake manifold with the 4 bolts and 2 nuts.

Torque:
A: 27 N·m (275 kgf·cm, 20 ft·lbf)
B: 46 N·m (469 kgf·cm, 34 ft·lbf)

(c) Install the stay with the 2 bolts and nut.

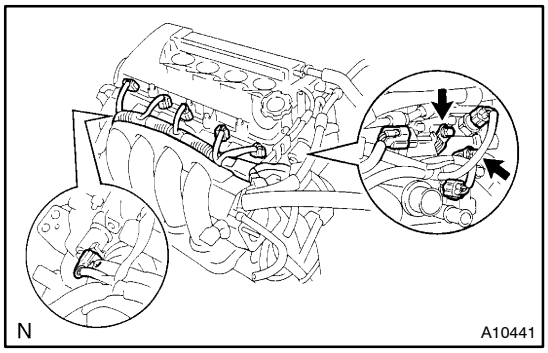
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

(d) Install the oil dipstick and guide with the bolt.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

(e) Connect the brake booster vacuum hose.

(f) Connect the EVAP hose for ORVR.



11. CONNECT ENGINE WIRE TO CYLINDER HEAD

(a) Install the intake manifold insulator No. 2.

(b) Connect the 2 ground cables.

(c) Connect the oil pressure switch connector.

(d) Connect the oil control valve for VVT connector.

(e) Connect the oil control valve for VVTL connector.

(f) Connect the camshaft position sensor connector.

(g) Connect the ECT sensor connector.

(h) Install the accelerator cable bracket with the 2 bolts.

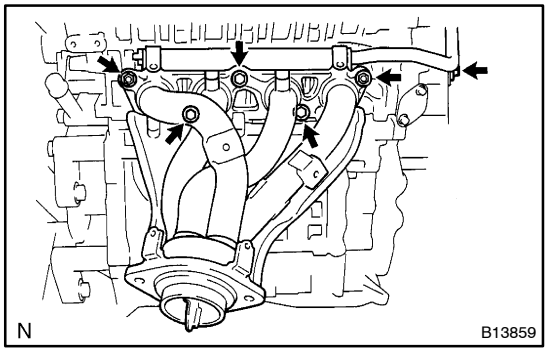
12. INSTALL INJECTORS (See Pub. No. RM733E on page FI–24)

13. INSTALL THROTTLE BODY (See Pub. No. RM733E on page FI–36)

14. INSTAL PCV HOSES

15. INSTALL SPARK PLUGS (See Pub. No. RM733E on page IG–1)

16. INSTALL IGNITION COIL (See Pub. No. RM733E on page IG–7)



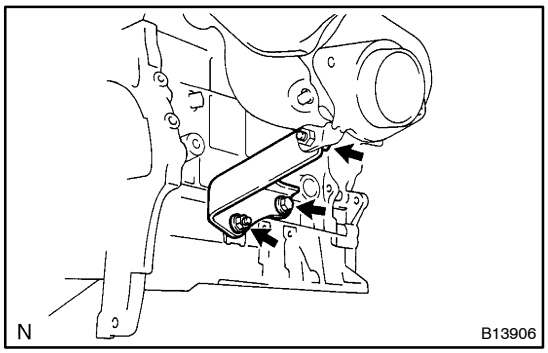
17. INSTALL EXHAUST MANIFOLD

(a) Install the lower heat insulator with the 4 bolts.

Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

(b) Install the exhaust manifold with the 4 bolts and 2 nuts.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)



(c) Install the upper heat insulator with the 5 bolts.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

(d) Install the exhaust manifold stay with the 2 bolts and nut.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

18. INSTALL EXHAUST PIPE

19. INSTALL ALTERNATOR AND DRIVE BELT (See Pub. No. RM733E on page CH–5)

20. CONNECT ACCELERATOR CABLE

21. INSTALL AIR CLEANER ASSEMBLY

22. INSTALL ENGINE ECU BOX

23. INSTALL BATTERY

24. FILL WITH ENGINE COOLANT (See Pub. No. RM733E on page CO–2)

25. START ENGINE AND CHECK FOR LEAKS

26. RECHECK ENGINE COOLANT LEVEL AND OIL LEVEL

EMISSION CONTROL

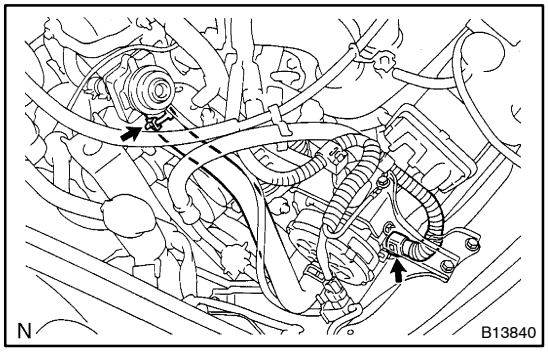
AIR PUMP SYSTEM EC–1

AIR PUMP SYSTEM

EC0KC–01

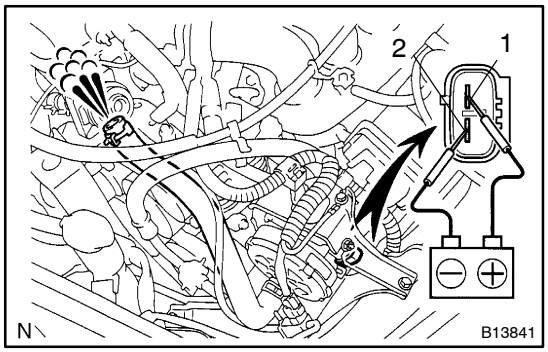
ON–VEHICLE INSPECTION

1. **REMOVE UPPER FRONT FENDER APRON SEAL**
2. **REMOVE UPPER RADIATOR SUPPORT SEAL**
3. **DISCONNECT HOSE**



4. CHECK OPERATION AIR PUMP ASSEMBLY

(a) Using a plier, grip the claws of the hose clip and slide the clip along the hose.
(b) Disconnect the hose.
(c) Disconnect the connector.

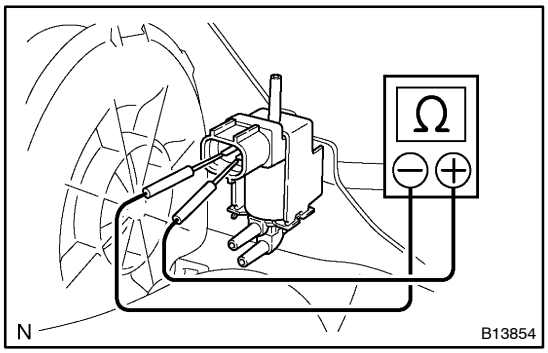


Test conditions:

- Water temperature: –15 – 45 ˚C (5 ˚F – 113 ˚F)
- Engine running: Below 7,100 rpm
- Battery voltage: Above 10.5 V
- DTC: No displayed

(d) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2 than check that air flow

If operation is not as specified, replace the air pump assembly.



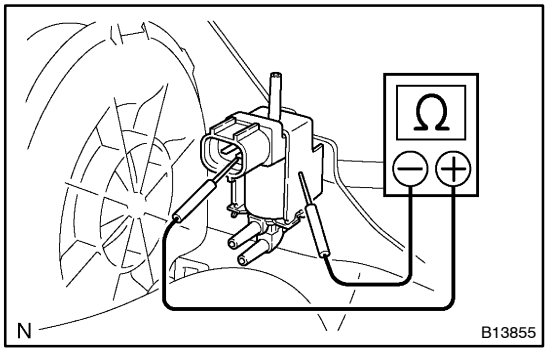
5. INSPECT VSV FOR OPEN CIRCUIT

(a) Disconnect the 3 hoses.
(b) Remove the screw and VSV for air pump.

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 37 – 44 Ω at 20 ˚C (68 ˚F)

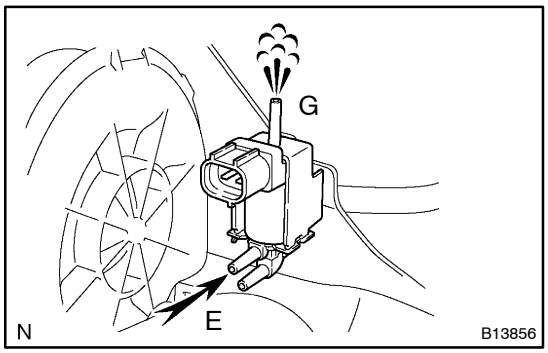
If there is no continuity, replace the VSV.



6. INSPECT VSV FOR GROUND

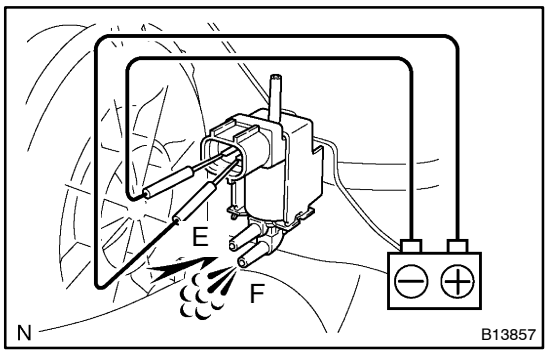
Using an ohmmeter, check that there is no continuity between each termianl and the body.

If there is continuity, replace the VSV.



7. INSPECT VSV OPERATION

(a) Check that air flows from ports E to G.



(b) Apply battery positive voltage across the terminals.

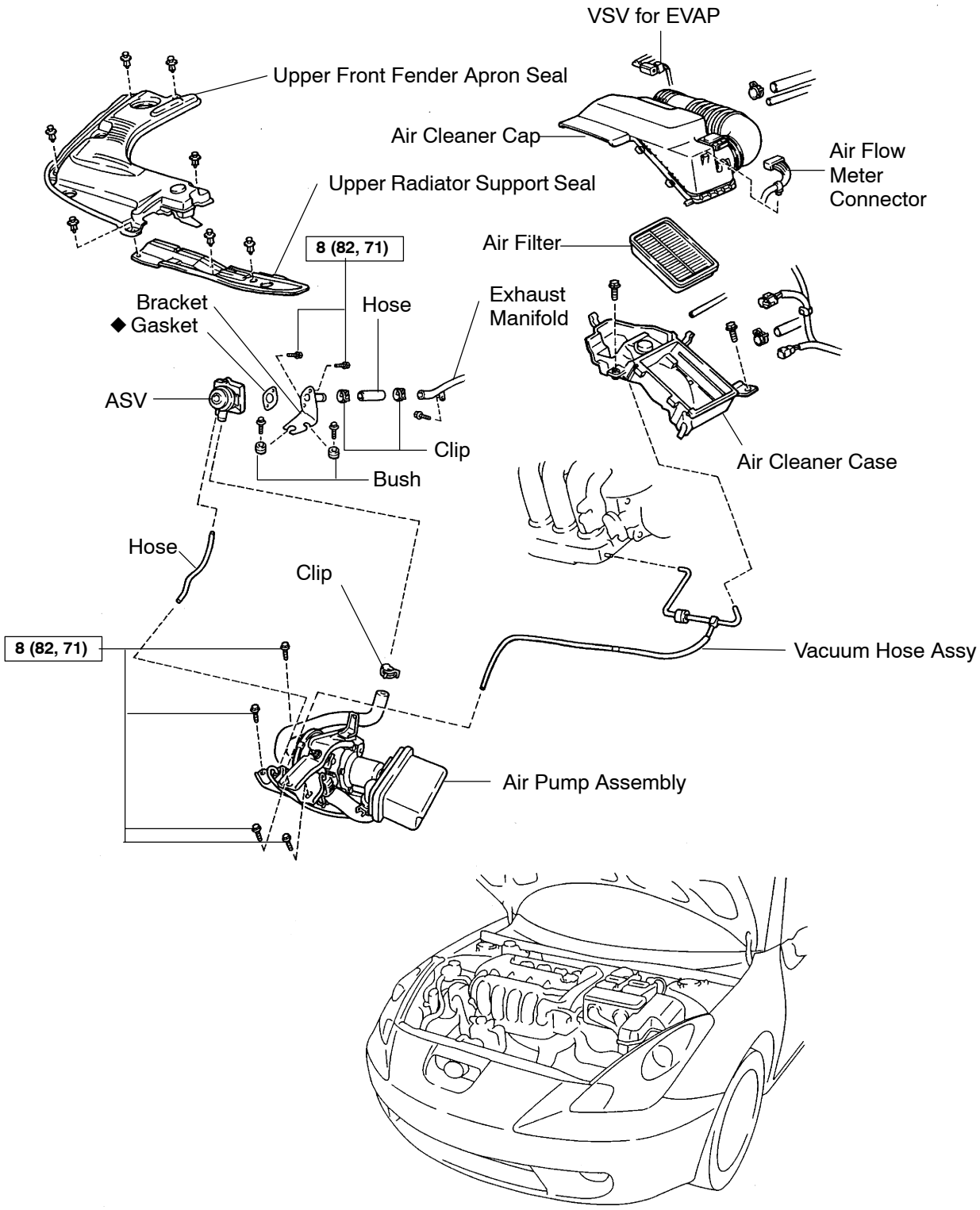
(c) Check that air flows from ports E to F.

If operation is not as specified, replace the air cleanter w/ air pump.

8. INSTALL VSV

EC0KD–01

COMPONENTS



N·m (kgf·cm, in.·lbf) : Specified torque
◆ Non–reusable part

N

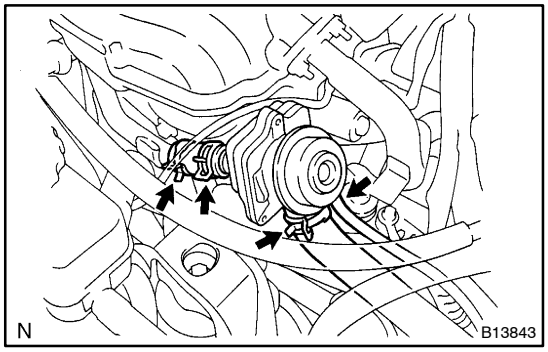
B13842

EC0KE–01

REMOVAL

1. REMOVE UPPER FRONT FENDER APRON SEAL

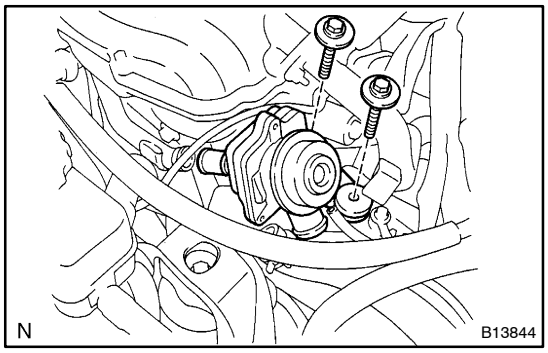
2. REMOVE UPPER RADIATOR SUPPORT SEAL



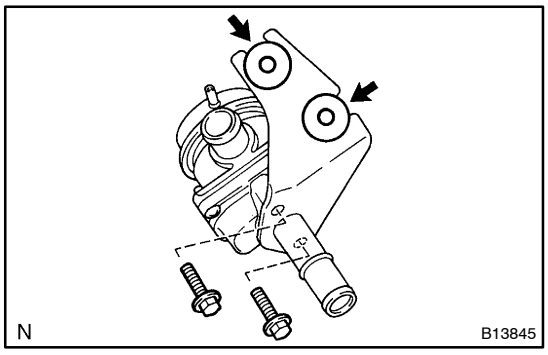
3. REMOVE ASV

(a) Using a plier, grip the claws of the hose clip and slide the clip along the hose.

(b) Disconnect the 3 hoses.

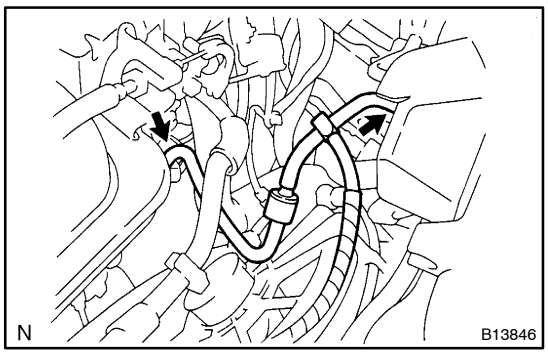


(c) Remove the 2 bolts and ASV.



(d) Remove the 2 bolts and bracket.
Torque: 8 N·m (82 kgf·cm, 71 in.·lbf)

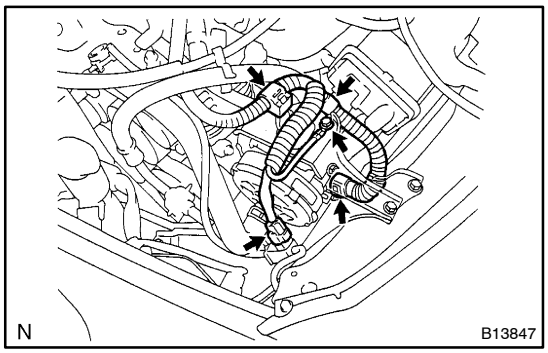
(e) Remove the 2 bushes.



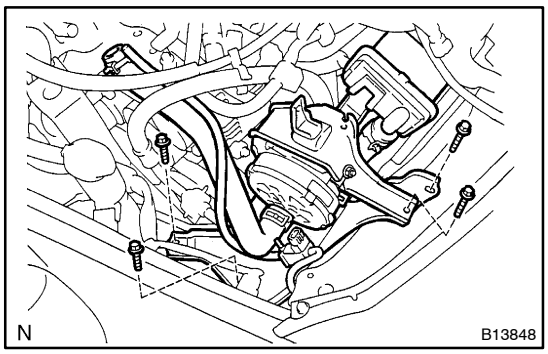
4. REMOVE AIR PUMP ASSEMBLY

(a) Remove the air cleaner case assembly.

(b) Disconnect the vacuum hose assembly from air cleaner case assembly and intake manifold.

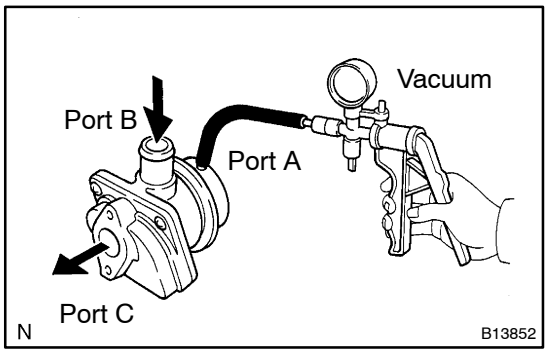


(c) Disconnect the connectors.
(d) Disconnect the hose clamps



(e) Remove the 4 bolts and air pump assembly.
Torque: 8 N·m (82 kgf·cm, 71 in.·lbf)

EC0KF–01



INSPECTION

1. INSPECT ASV

(a) Apply vacuum (45 kPa (459 gf/cm^2, 6.53 psi) to port A, blow air into port B and check that air is discharged from port C.

EC0KG–01

INSTALLATION

Installation is in the reverse order of removal (See page EC–4).