REPLACEMENT

1. **REMOVE INTERCOOLER PROTECTOR (SEE PAGE 13–18)**
2. **REMOVE INTERCOOLER ASSY (SEE PAGE 13–18)**
3. **CHECK ID CODE**

(a) Check that the ID codes registerd in the injector assy installed on each cylinder match the ones registered in the engine ECU (refer to ”CHECK ID CODE” on page 05–419).

(b) If they do not match, follow the procedures below to correct the registration details and recheck the symptom.

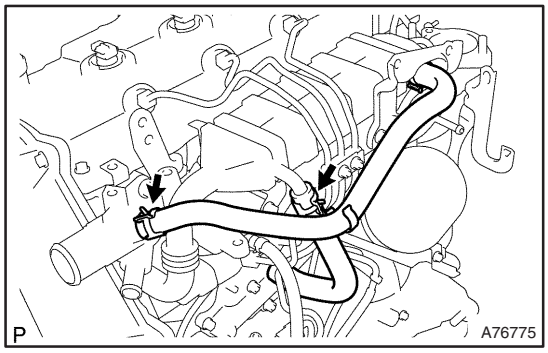
(1) Correct the registration details by following the procedures in ”REGISTER ID CODE (MANUAL)”.

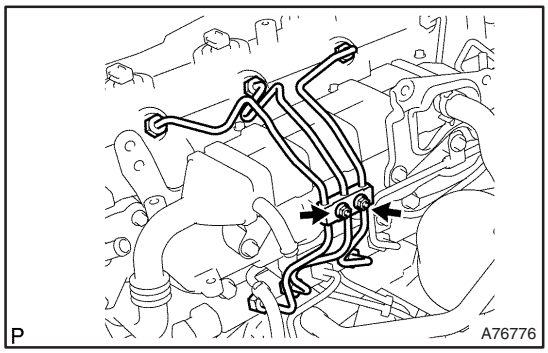
(2) After correcting the registration details, check if the same symptom occurs as when the vehicle was brought in.

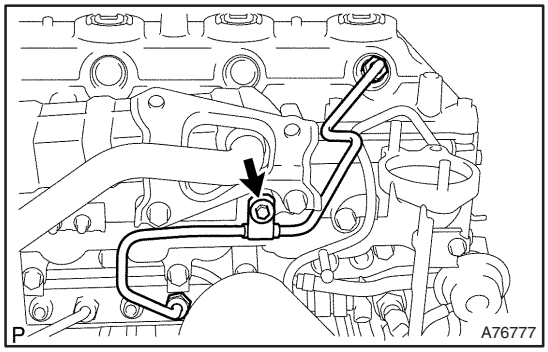
HINT:

If it does not occur, the symptom may be caused by errors in ID code registration.

4. **DRAIN ENGINE COOLANT (See Pub. No. RM990E, Page 16–50)**
5. **REMOVE DIESEL THROTTLE BODY ASSY (SEE PAGE 10–22)**
6. **REMOVE CYLINDER HEAD COVER SUB–ASSY NO.2 (SEE PAGE 14–218)**







7. **REMOVE INJECTION PIPE**

NOTICE:

- **After removing the fuel pipe, affix the packing tape to the outlets on the common rail in order to prevent dust from coming into them.**
- **After removing the fuel pipe, cover it with a plastic bag and rubber band to prevent intrusion of foreign objects from the injector inlets.**

(a) Remove the clip, then disconnect the water bypass hose No.3 and No.4.

(b) Remove the injection pipe No.1, No.2 and No.3.

(1) Remove the 2 nuts and injection pipe clamp No.3.

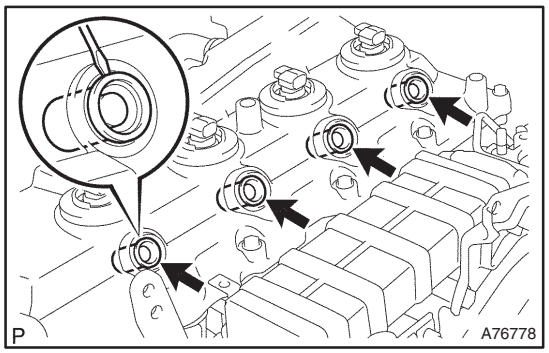
(2) Using SST, remove the injection pipe No.1, No.2, and No.3.

(c) Remove the injection pipe No.4.

(1) Remove the bolt, then disconnect the injection pipe clamp No.4 from the intake manifold.

(2) Using SST, remove the injection pipe No.4.

SST 09023–12701

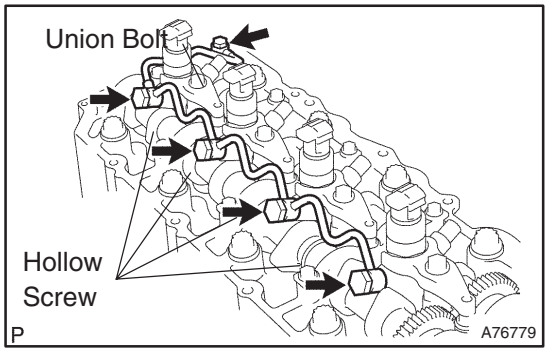


8. REMOVE CYLINDER HEAD COVER SUB–ASSY

(a) Using a screwdriver, remove the 4 nozzle holder seals.

(b) Disconnect the ventilation hose No.2 from the cylinder head cover.

(c) Remove the 10 bolts, 2 nuts and cylinder head cover.



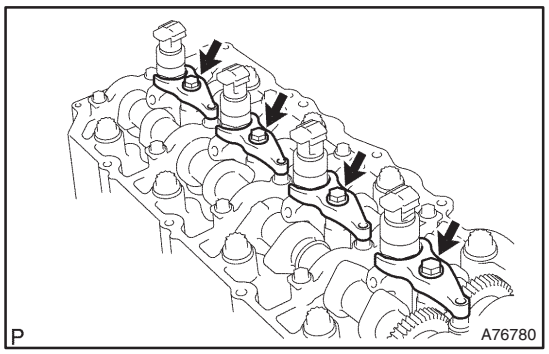
9. REMOVE INJECTOR ASSY

(a) Remove the nozzle leakage pipe assy.

(1) Remove the union bolt, 4 hollow screws and nozzle leakage pipe assy.

NOTICE:

- **Cover with a plastic bag to prevent intrusion of foreign objects to the injector.**
- **When removing the return pipe, place a shop rag or equivalent under the pipe.**
- **Pay attention not to deform or scratch the union seal surface.**



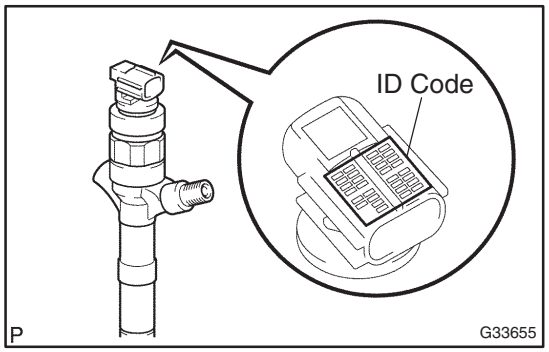
(b) Remove the nozzle holder clamp.

(1) Remove the 4 bolts, washers and 4 nozzle holder clamps.

(c) Remove the injectors.

NOTICE:

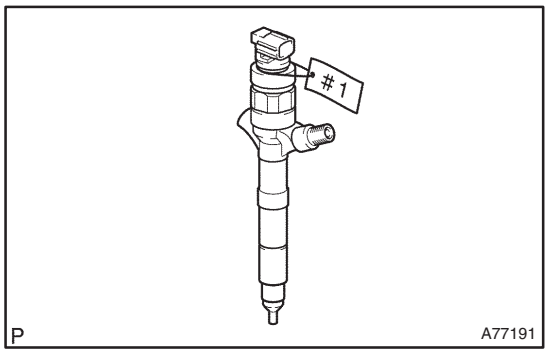
Be sure to keep separate the removed bolts, washers, and nozzle holder clamps for each cylinder.



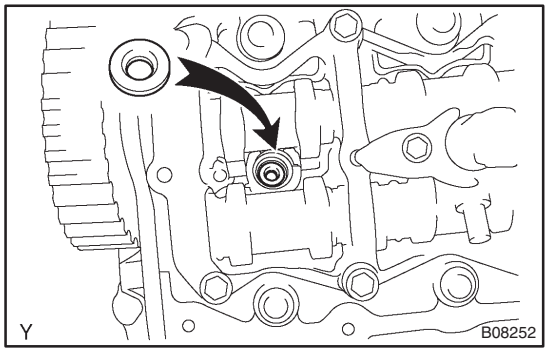
10. INSTALL INJECTOR ASSY

NOTICE:

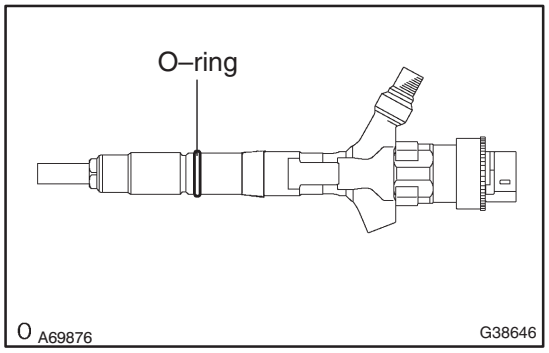
- **Be sure to install the injector, nozzle holder clamp, washer and bolt to the removed cylinder.**
- **It is necessary to register the ID code manually in the engine ECU using the intelligent tester, as each injector assy has a different injection characteristic.**



(a) Put tags with cylinder numbers (#1 to #4) onto the new injector assy in order to make sure of the right combinations with the right cylinders.
(b) Register the ID code manually.



(c) Install a new injection nozzle sheet to the cylinder head.



(d) Install a new O–ring

HINT:

Apply a light coat of engine oil to the O–ring.

(e) Install the injector assy to each cylinder referring to the tags with cylinder numbers (#1 to #4).

NOTICE:

If the wrong injector assy is installed on the cylinder, rough idling or noise may occur.

(f) Temporarily install the 4 injection pipes.

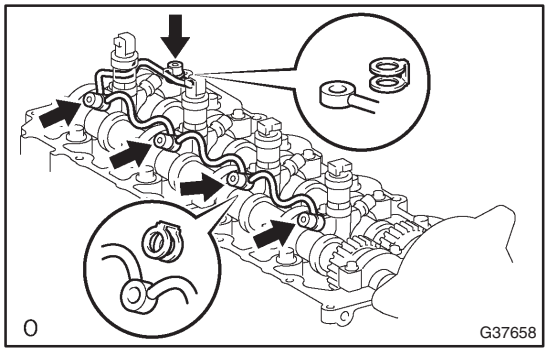
NOTICE:

In case of having replaced the injector, replace the injection pipe, too.

HINT:

Tighten the nut of the injection pipe by hand until it can not turn.

(g) Apply a light coat of engine oil to the 4 hollow screws and union bolt.



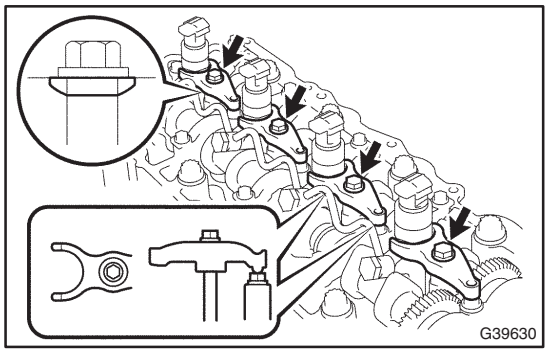
(h) Temporarily install a new gasket and nozzle leakage pipe assy with the 4 hollow screws and union bolt.

NOTICE:

- **At this time, insert the injector until it touches the nozzle sheet surface.**
- **When installing the injector to the cylinder head and in case that the injector comes to float up with the reaction of O–ring, pull out the injector once, and then install it again.**
- **Do not exchange the injector.**

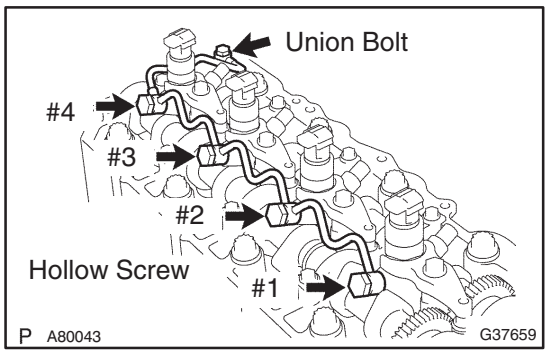
- **Make sure that the injector hollow screws and union bolt are not deformed.**

HINT:
Tighten the hollow screws and union bolt by hand until they can not turn.



(i) Set the springs to each injector as shown in the illustration.
(j) Set new washers on each nozzle holder clamp as shown in the illustration.
(k) Tighten the bolts.
Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)

NOTICE:
- **Clip the injector at the fork portion with a clamp which is set on the head of the cam cap bolt. At this time, check that the clamp does not hold the injector at the part where the spring is attached.**
- **Temporarily torque the clamp bolt by hand until the bearing surface of the bolt touches the washer, then tighten it by the specified torque.**
- **In case of tightening by the specified torque, pay attention not to tilt the bolt and the clamp.**
- **The washer can not be reused.**
- **In case of overtightening the washer, replace it with a new one.**

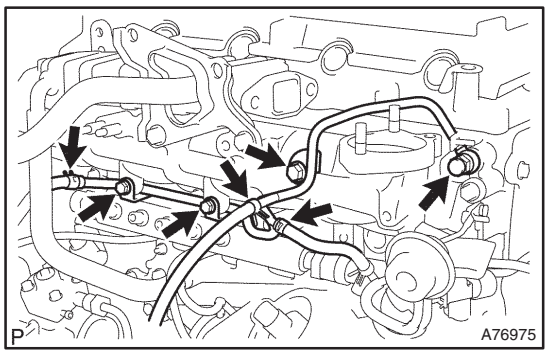


(l) Coat the 4 hollow screws with engine oil, and tighten the 4 hollow screws from #1 to #4 in order.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

NOTICE:
If the screws are overtightened, replace the nozzle leakage pipe assy with a new one.

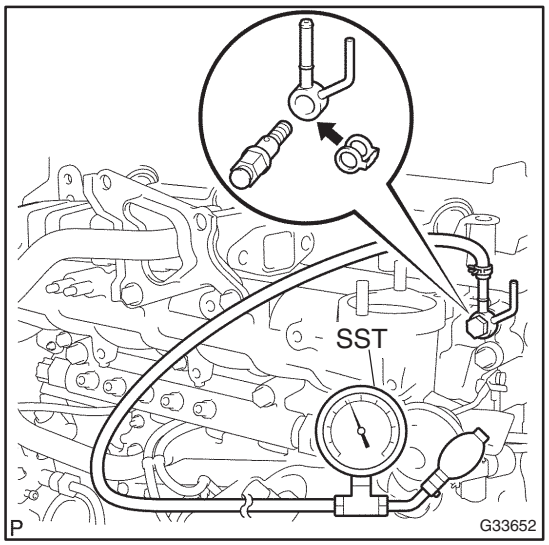
(m) Coat the union bolt with engine oil, and tighten the union bolt.
Torque: 13 N·m (127 kgf·cm, 9 ft·lbf)

NOTICE:
If the bolt is overtightened, replace the nozzle leakage pipe assy with a new one.



11. CHECK NOZLLE LEAKAGE PIPE LEAK

(a) Remove the nozzle leakage pipe assy No.2.
(1) Remove the oil filter.
(2) Disconnect the 3 fuel hoses.
(3) Remove the 3 bolts, check valve, gasket and nozzle leakage pipe assy No.2.



(b) Check that there are no leaks from the nozzle leakage pipe connection.

(1) Using SST, install the nozzle leakage pipe No.2 and a new gasket to the cylinder head.

SST 09280–00010

Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)

(2) Apply a light coat of engine oil (any fluid to detect fuel leakage) to the nozzle leakage pipe connection.

(3) Using SST (turbo charger pressure gauge), set the SST to the leakage pipe No.2 and maintain 250 kPa (2.5 kgf/cm^2, 37 psi) of pressure for 60 seconds to check that there are no leaks from the leakage pipe No.1.

SST 09992–00242

NOTICE:

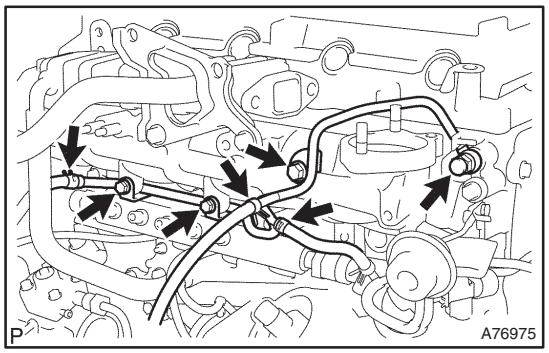
Be sure to keep specified pressure, preventing from leakage.

HINT:

- Apply a coat of engine oil to the leakage pipe connection, and check that no bubbles come from the leakage pipe connection or each nozzle leakage pipe connection.
- Check that the indication on the SST (turbo charger pressure gauge) does not go down while pressure is applied.

(4) After checking fuel leaks, wipe off engine oil from the leakage pipe connection.

(c) Remove the SST, union bolt, bolt and nozzle leakage pipe No.2.



(d) Install the nozzle leakage pipe assy No.2.

(1) Install a new gasket and 3 bolts to the leakage pipe assy No.2.

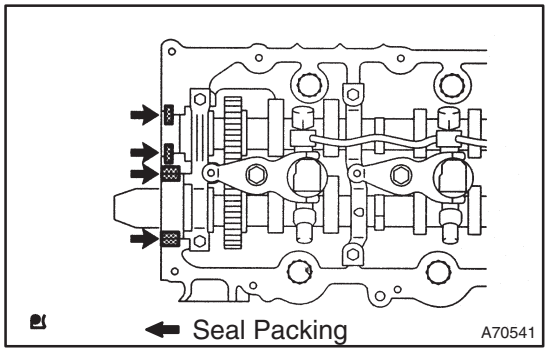
Torque:

Bolt: 13 N·m (129 kgf·cm, 9 ft·lbf)

Check Valve: 21 N·m (214 kgf·cm, 15 ft·lbf)

(2) Install the 3 fuel hoses.

(3) Install the oil filter.



12. INSTALL CYLINDER HEAD COVER SUB–ASSY

(a) Remove old seal packing (FIPG) from the cylinder head.

(b) Apply seal packing to the specific places described in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

NOTICE:

- **After applying the seal packing, parts must be assembled within 3 minutes, and then tighten them within 15 minutes.**
- **Otherwise the material must be removed and reapplied.**
- **Do not start the engine 2 hours after the installation.**

(c) Install the cylinder head cover with the 10 bolts and 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

(d) Install a new nozzle holder seal.

13. INSTALL INJECTION PIPE

NOTICE:

- **When replacing the injector, replace the injection pipe as well.**
- **Keep clean the joint of the injection pipe.**

(a) Install the injection pipe No.1, 2 and 3.
(1) Temporarily install the injection pipes.
(2) Install the injection pipe clamp No.3 with the 2 nuts.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
(3) Fasten the unions sequentially, from the injection pipe common rail to the injector, using SST.
SST 09023–12701
Torque:
32 N·m (326 kgf·cm, 24 ft·lbf) for use with SST
35 N·m (357 kgf·cm, 26 ft·lbf)

(b) Install the injection pipe No.4.
(1) Temporarily install the injection pipe.
(2) Install a new injection pipe clamp No.1.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

NOTICE:

- **Make sure that the inner–rubber fits inside the clamp.**
- **When installing the pipe, check that the inner–rubber and the clamp are on the proper positions.**

SST 09023–12701
(3) Fasten the unions sequentially, from the injection pipe common rail to the injector, using SST.
Torque:
32 N·m (326 kgf·cm, 24 ft·lbf) for use with SST
35 N·m (357 kgf·cm, 26 ft·lbf)

(c) Install the water bypass hose No.3 and No.4.

14. INSTALL CYLINDER HEAD COVER SUB–ASSY NO.2 (SEE PAGE 14–218)

15. INSTALL DIESEL THROTTLE BODY ASSY (SEE PAGE 10–22)

16. CHECK ID CODE

(a) Check that the ID codes registered in the injector assy installed on each cylinder match the ones registered in the engine control ECU.

17. INSTALL INTERCOOLER ASSY (SEE PAGE 13–18)

18. INSTALL INTERCOOLER PROTECTOR

(a) Install the intercooler protector with the 5 bolts.
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

19. ADD ENGINE COOLANT (See Pub. No. RM990E, Page 16–50)

20. CHECK FOR ENGINE COOLANT LEAKS (See Pub. No. RM990E, Page 16–38)

21. BLEED FUEL LINE

(a) Operate the priming pump of the fuel filter assy to fill the fuel system.

22. CHECK FUEL LEAK

(a) Using the intelligent tester II, perform the Active Test to check for fuel leaks.

(b) During the Active Test, apply constant fuel pressure for 60 seconds and check that there is no fuel leaking from the fuel system.