REPAIR INSTRUCTION FOR ENGINE REPAIR MANUAL

0110Q–02

PRECAUTION

1. TO PREVENT ENTERING OF FOREIGN SUBSTANCES.

(a) When foreign substances such as dust, grain of sand or metallic dust enter the engine, it often causes functional failure of the engine.

(1) Precaution before disassembly.

- Remove adequately all sand and mud adhering to the outside of the engine .

(2) Precaution at reassembly.

- Protect disassembled parts from dust by using vinyl sheet to cover.

2. TO PREVENT SCRATCHES ON THE PARTS.

(a) The existence of scratches on the contact and revolving surfaces often causes oil leak and seisure.

(1) Precautions at disassembly and reassembly.

- When disassemble the contact surface of the parts, use a plastic hummer to strike lightly (Do not pry out by a screwdriver).
- When holding parts in a vise, do not directly catch it in the vise. Fix the parts through aluminum plates.

3. TO CLEAN AND WASH THE PARTS.

(a) Each part needs to be well cleaned, washed, and dried by air, and apply specified oil before reassembly.

(1) Cleaning and washing by alkaline solvent is prohibited:

- Parts made of aluminum and rubber. (ex. cylinder head cover gasket etc.)

(2) Cleaning and washing by flushing oil (ex. kerosene, white gasoline etc.) is prohibited:

- Parts made of rubber. (ex. cylinder head cover gasket etc.)

4. POSITION AND DIRECTION OF EACH PART.

(a) Each part needs to be reassembled as the same position and direction as it was.

(1) Precautions at disassembly and reassembly.

- Follow the directions when the manual instructs to mark the matchmark and/or direction mark.
- Disassembled parts needs to be put in order as disassembled. Do not change position and/or direction.
- Follow the directions when the manual instructs the position and direction.

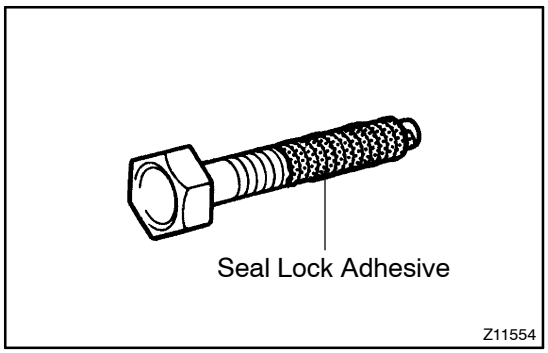
5. INSTALL ENGINE ASSEMBLY TO OVERHAUL STAND WHEN OVERHAULING THE ENGINE.

6. PUT THE DISASSEMBLED PARTS IN ORDER AS THEY DISASSEMBLED.

7. APPLY ENGINE OIL TO THE SLIDING AND ROTATING SURFACES.

8. NON–REUSABLE PARTS SUCH AS GASKET AND SEAL NEED TO BE CHANGED TO NEW PARTS.

9. BASIC REPAIR HINT



(a) Pre–coat bolt

(1) Pre–coat bolt

- A pre–coat bolt is a bolt whose threads are coated with seal–lock.

(2) Seal–lock reapplication is necessary when any of the following conditions occur:

- A pre–coat bolt is removed.
- A pre–coat bolt is loosened or tightened during a tightening torque check.

NOTICE:

Be sure to use the minimum value within the allowable range of tightening torque in a torque check.

(3) Reuse of a pre–coat bolt

- Remove seal–lock on the bolt and bolt hole, and degrease them with white gasoline.

NOTICE:

Be sure to clean the bolt hole when replacing the bolt.

- **Dry the bolt sufficiently with compressed air, etc.**
- **Apply the specified seal–lock to the threads of the bolt.**
- **Tighten the bolt to the specified torque.**

HINT:

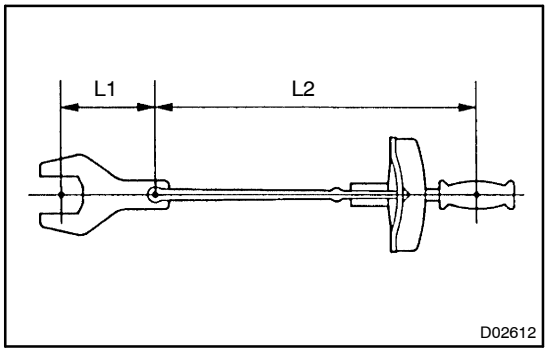
Leaving the bolt for the specified time until the seal–lock becomes hardened may be required depending on the type of seal–lock.

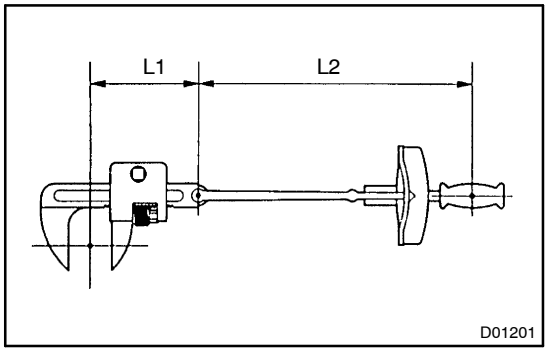
(b) Gaskets:

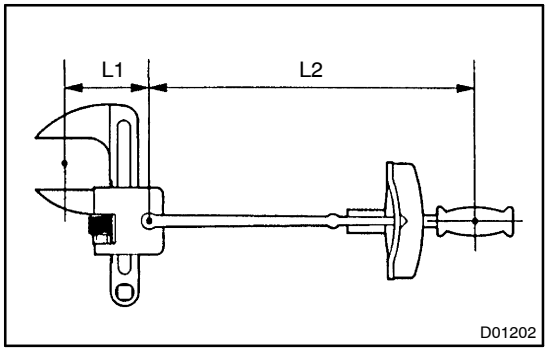
When necessary, use a sealer on gaskets to prevent leaks.

(c) Bolts, Nuts and Screws:

Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.







(d) Torque When Using Extension Tool with Torque Wrench:

(1) In case of tightening by extending the entire length of the torque wrench combined with SST or tool, if you tighten until the reading of the torque wrench reached the specified torque value, the actual torque becomes excessive.

(2) In this text, only the specified torque is described. In case of using SST or extension tool, find the reading of the torque wrench by the formula.

(3) Formula T' = T x L2/(L1 + L2)

T'	Reading of torque wrench {N·m (kgf·cm, ft·lbf)}
T	Torque {N·m (kgf·cm, ft·lbf)}
L1	Length of SST or tool (cm)
L2	Length of torque wrench (cm)

10. Plastic region bolt

(a) Plastic region bolt

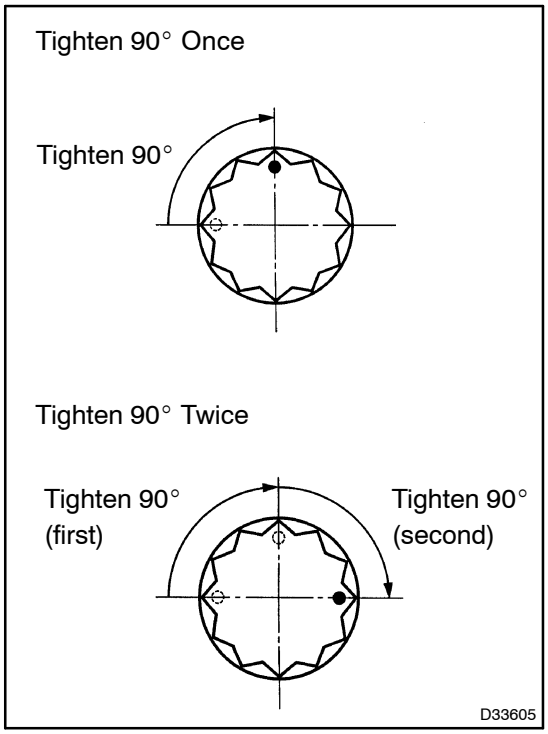
(1) A general bolt is tightened into the elastic region whereas a plastic region bolt is tightened beyond the elastic region into the plastic region to stabilize the axial tension (tension in the bolt axis direction).

(b) Parts which plastic region bolts are used in

(1) Plastic region bolts may be used in the cylinder head bolt of the engine, bearing cap bolts, ring gear set bolt of the rear differential, flywheel set bolt, etc.

(c) Tightening procedure

(1) The tightening procedure is different from that of the standard bolt. Since there are 2 different procedures according to the type of plastic region bolt, tighten the bolt by following the indicated procedure.



HINT:

- There are 2 ways to tighten a plastic region bolt: one is to retighten the bolt 90° further after tightening to the specified torque, and the other is to retighten the bolt 90° further after tightening to the specified torque twice, in total 180°.
- Whether the plastic region bolt can be reused or not depends on the bolt type, so follow the instruction in the text.

11. REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

(a) Place for Removing and Installing Fuel System Parts:

(1) Place with good air ventilation and without anything flammable such as welder, grinder, drill, electric motor or stove in the surroundings.

(2) Never work in a place like a pit or nearby pit as there is a possibility that vaporized fuel fills those places.

(b) Removing and Installing of Fuel System Parts:

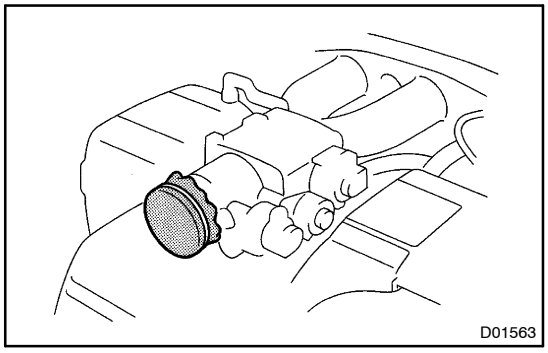
(1) Prepare a fire extinguisher before starting the operation.

(2) For prevention of the static electricity, install a ground on the fuel changer, vehicle and fuel tank, and do not spray much water so as to prevent slipping.

(3) Never use any electric equipment like an electric motor or a working light as they may cause spark or high temperature.

(4) Never use an iron hammer as it may cause spark.

(5) Dispose the shop lag separately from any fuel deposit.

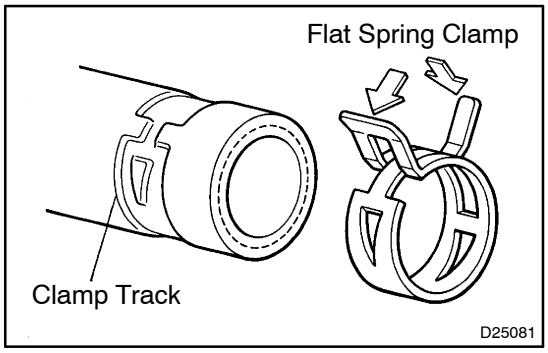


12. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

(a) If any metal tip is mixed in the inlet pass, that may give a bad effect to the engine and turbo charger.

(b) When removing and installing the inlet system parts, close the opening of the removed inlet system parts and the engine with a clean shop lag or gummed tape.

(c) When installing the inlet system parts, check that there is no mixing of a metal tip.



13. HANDLING OF HOSE CLAMPS

(a) Before removing the hose, check the depth of inserting portion and the clamp position to restore it surely.

(b) Change a deformed or dented part into a new one.

(c) In case of reusing the hose, install the clamp on the hose where it has a clamp track.

(d) For a flat spring type clamp, adjust it by adding force in the arrow mark direction after the installation.