

This section contains the procedures for removal and installation of the various auxiliaries of an off-vehicle engine. The procedures are systematically described, presuming that the engine is to be overhauled.

Since the removal and installation procedures are described on a system-classified basis, their sequence may not always be consistent. Some changes may be made to the sequence when operations are performed.

6-1 PREPARATIONS

6-1-1 Preliminary Inspection of Engine

Before the engine is overhauled, check the cylinder compression pressure, engine oil consumption, startability, exhaust gas condition, diesel knocking and other noises, and keep records of all data. After disassembly, correction and reassembly, refer to the data as necessary.

To determine a time to overhaul the engine, refer to "Group 4 Determining Time to Overhaul."

6-1-2 Cleaning of Engine

The engine removed from a vehicle has oil, grease, dust and dirt deposits. Clean them from the engine, using a steam cleaner, etc.

When the engine is to be cleaned, the electrical devices(alternator, starter, etc.), V-belt, rubber hose, wiring, etc. should be removed beforehand.

NOTE : Before disassembly and cleaning, isolate symptoms and possible causes of problem which are not easily detected after disassembly and cleaning.



6-2 REMOVAL AND INSTALLATION

6-2-1 Electrical

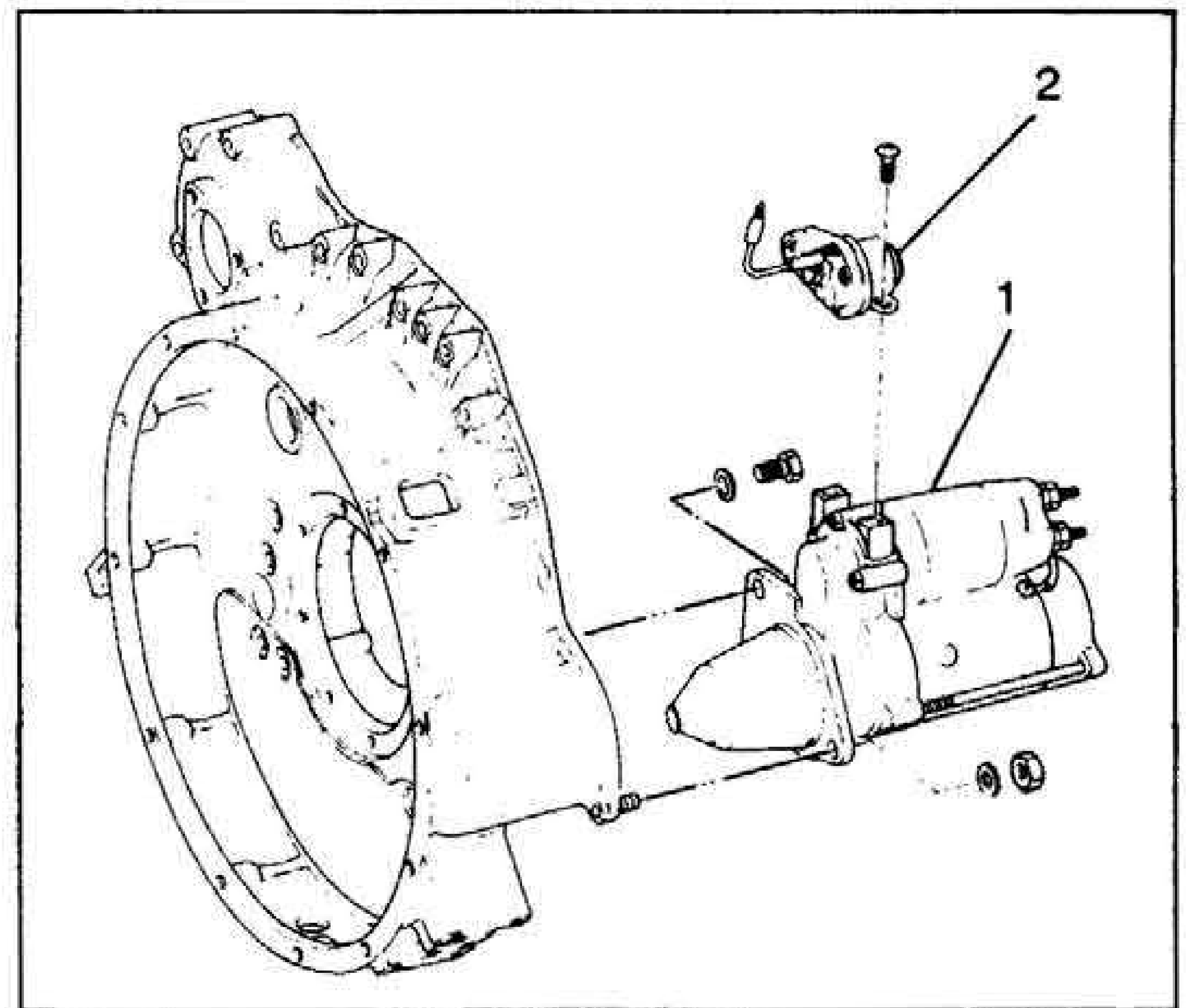
When there is a need for removal of vehicle-borne and installed electrical parts, first disconnect the negative battery cable.

(1) Harness

When removing the terminals of engine harness, make alignment marks on the clamps to prevent misconnections at reinstallation.

(2) Starter

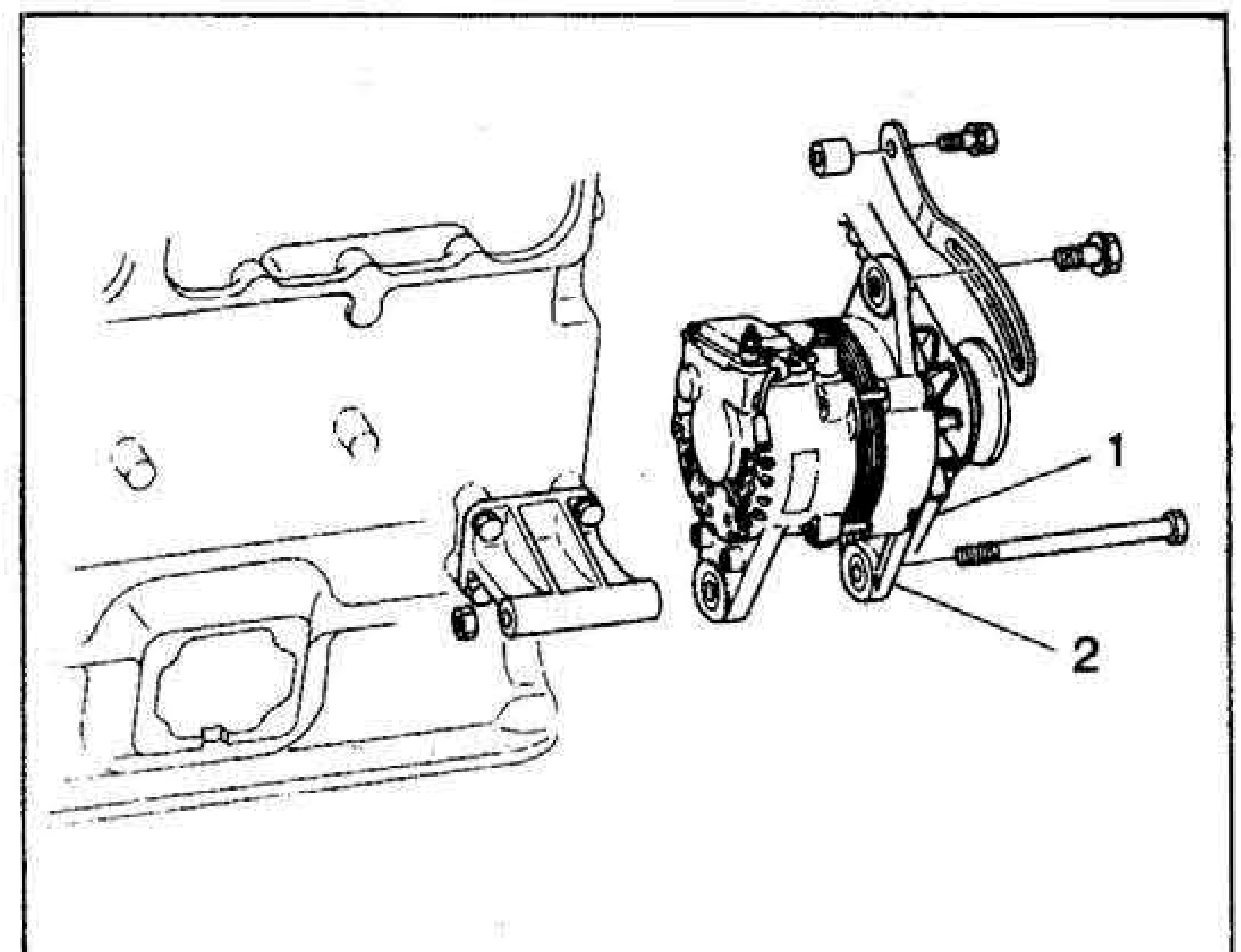
- 1 Starter
- 2 Starter relay



(3) Alternator

- 1 V-belt
- 2 Alternator

NOTE : After the alternator has been installed, adjust tension of the V-belt. (Refer to Item 5-1-5.)

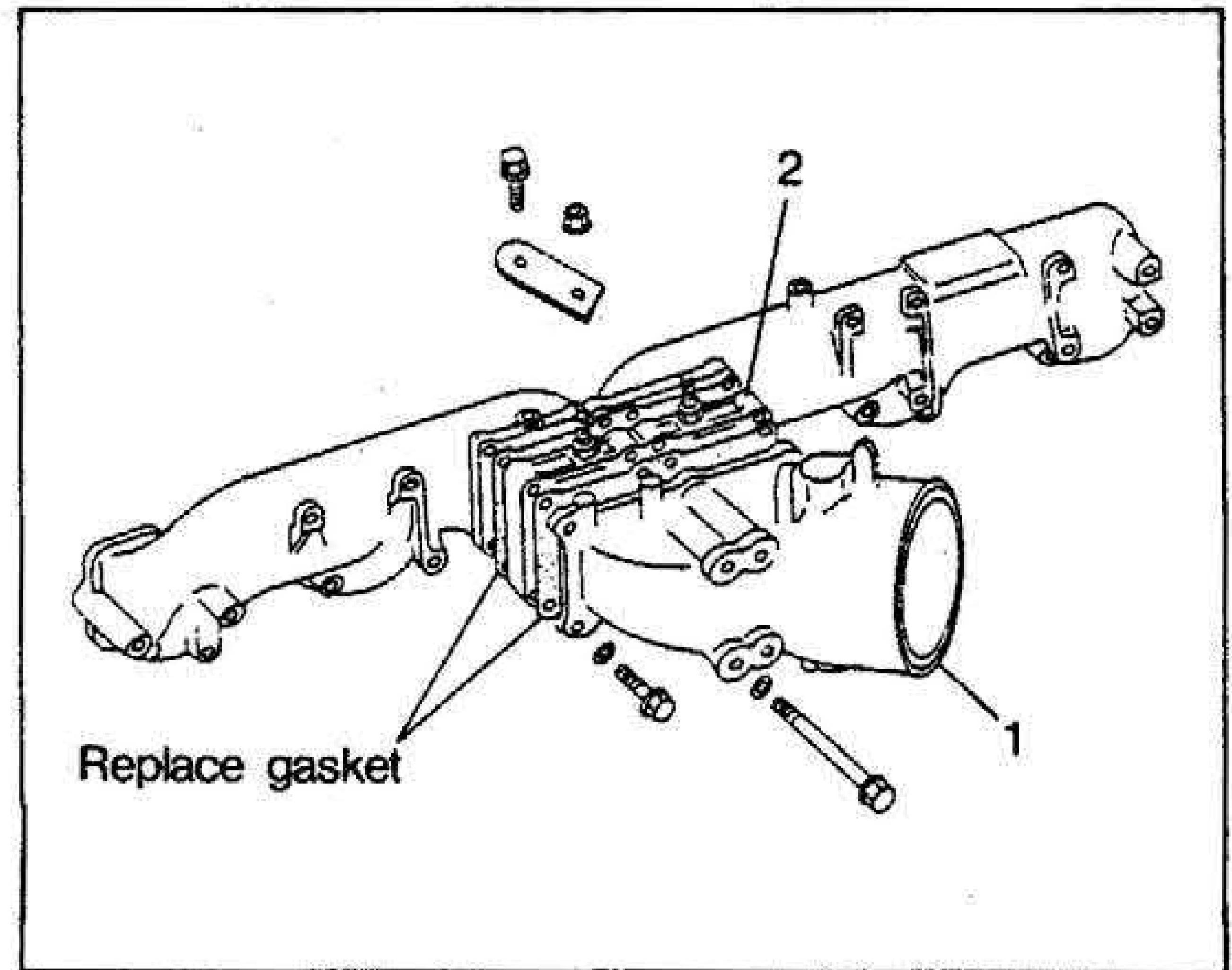


(2) Intake Air Heater

[Model D6AU]

1 Coupler

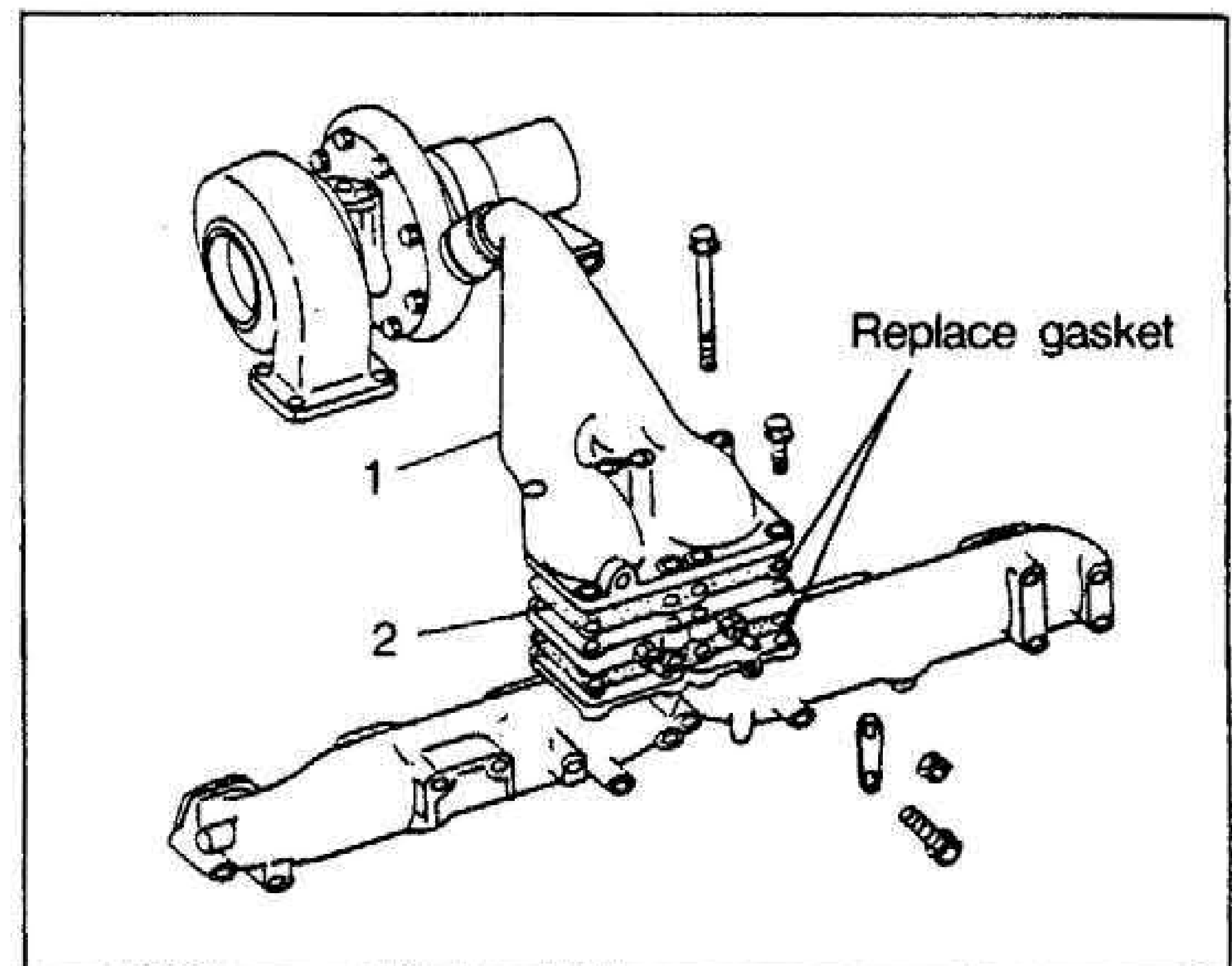
2 Air heater



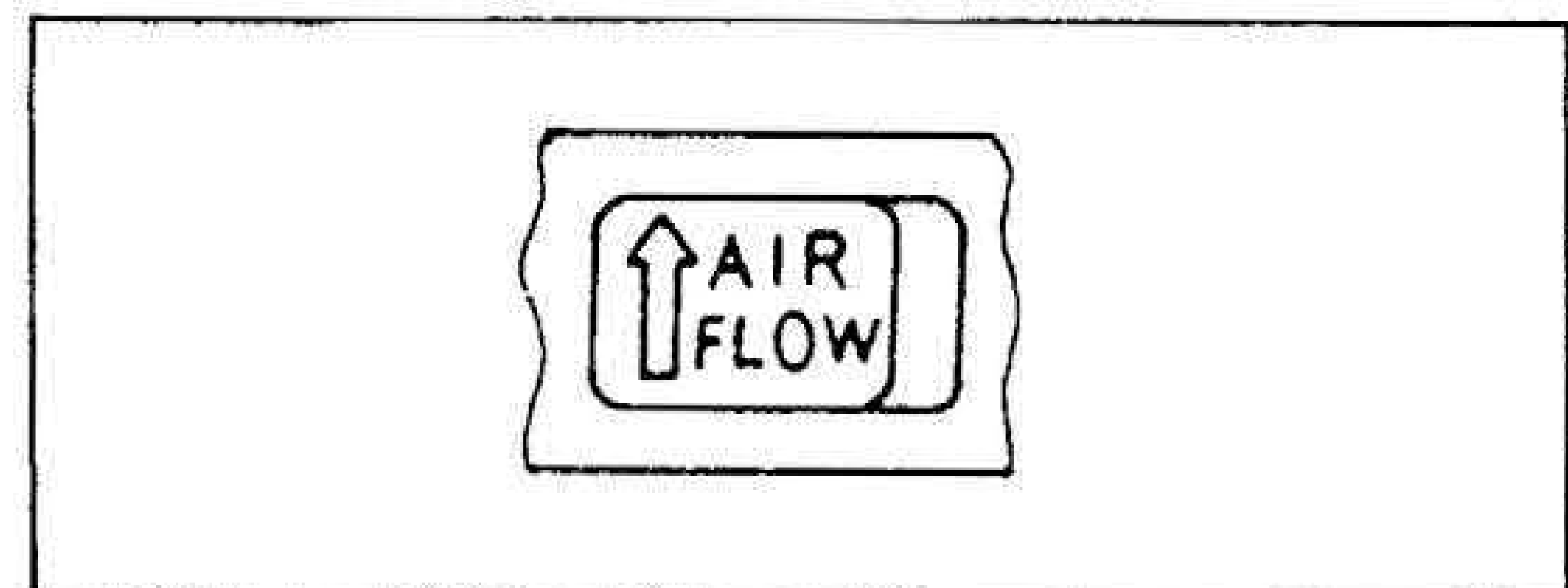
[Model D6AZ]

1 Inlet pipe

2 Air heater

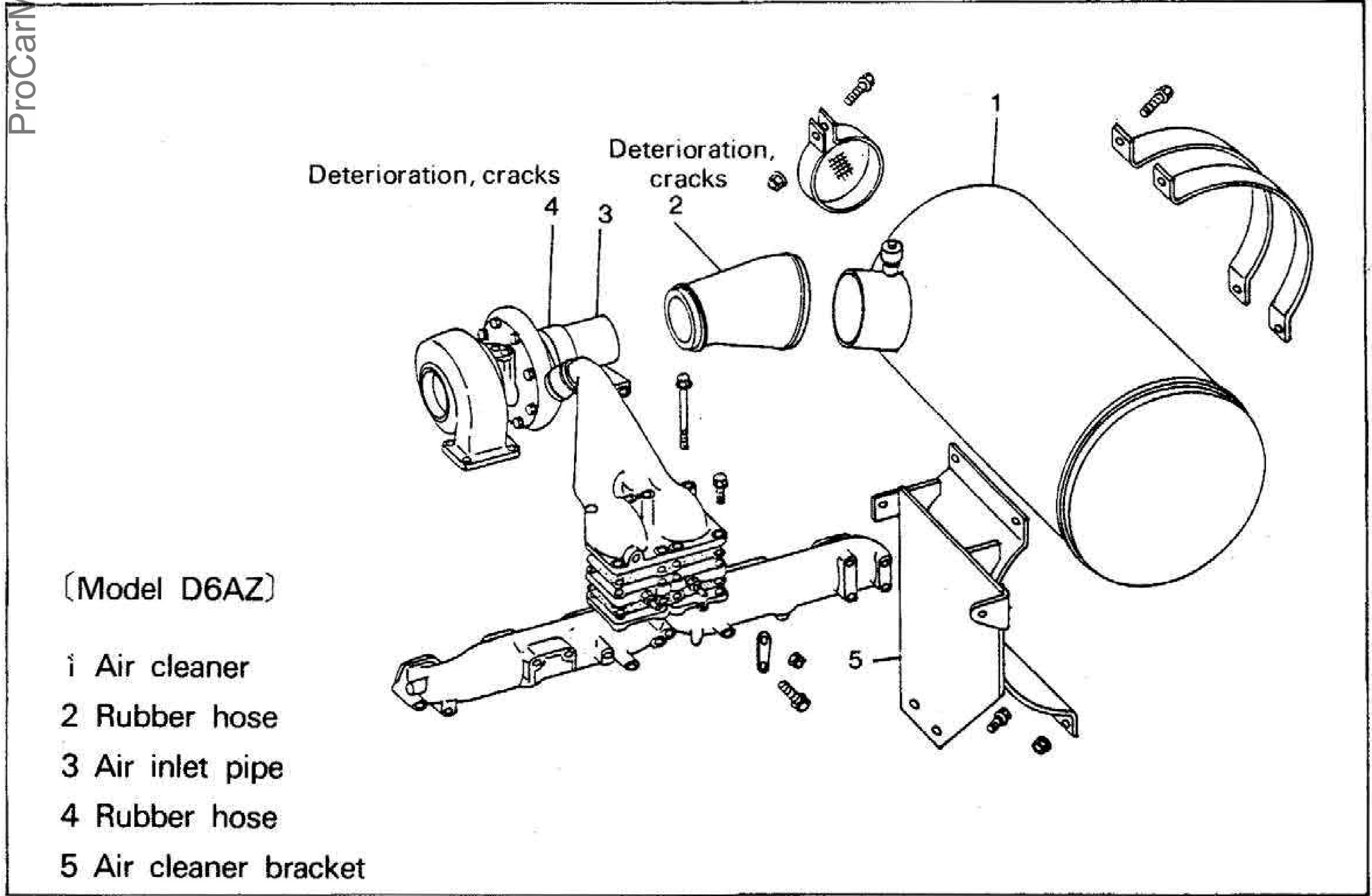
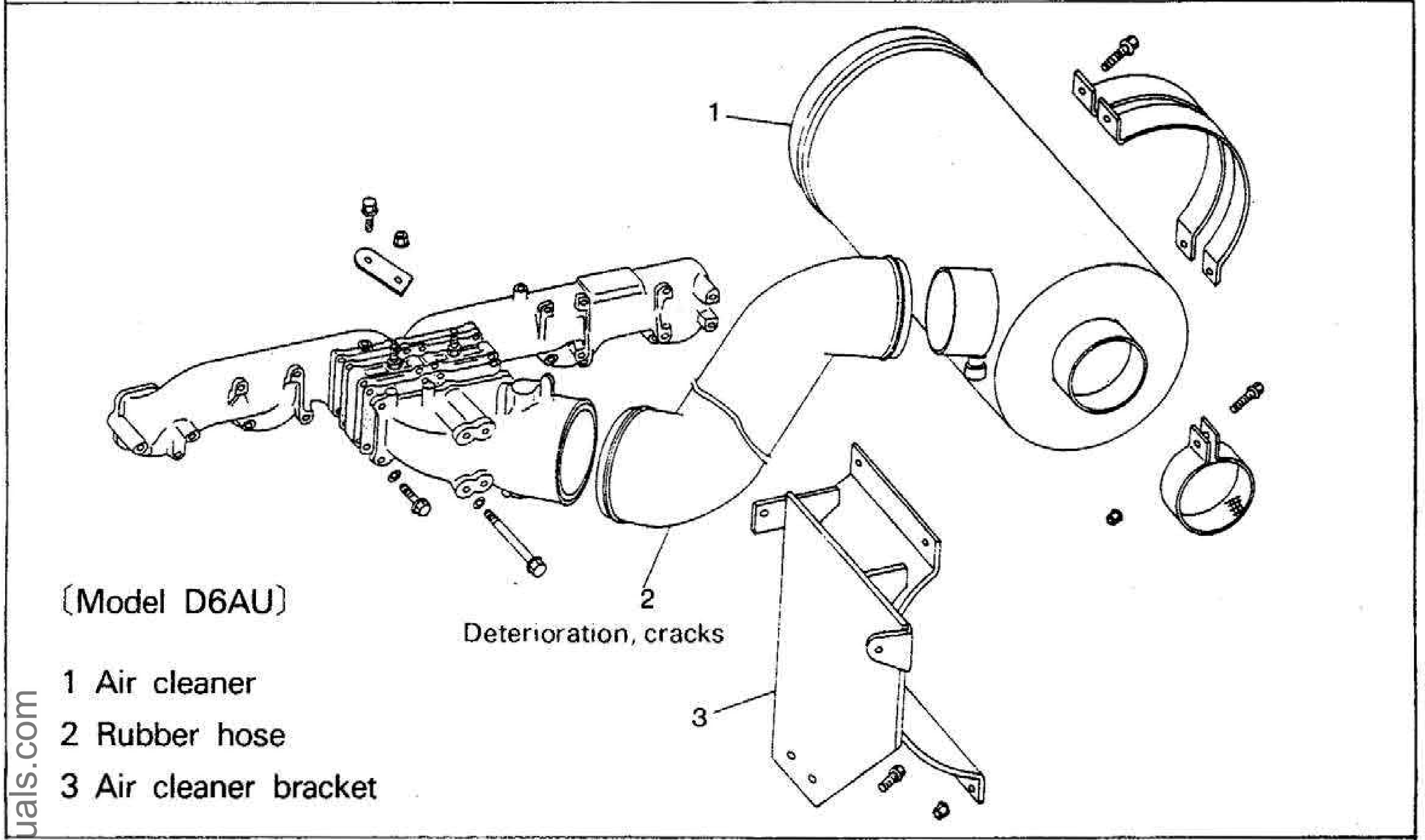


NOTE : When the air heater is installed, make sure that the embossed arrow mark of the air heater is directed toward the inlet manifold.



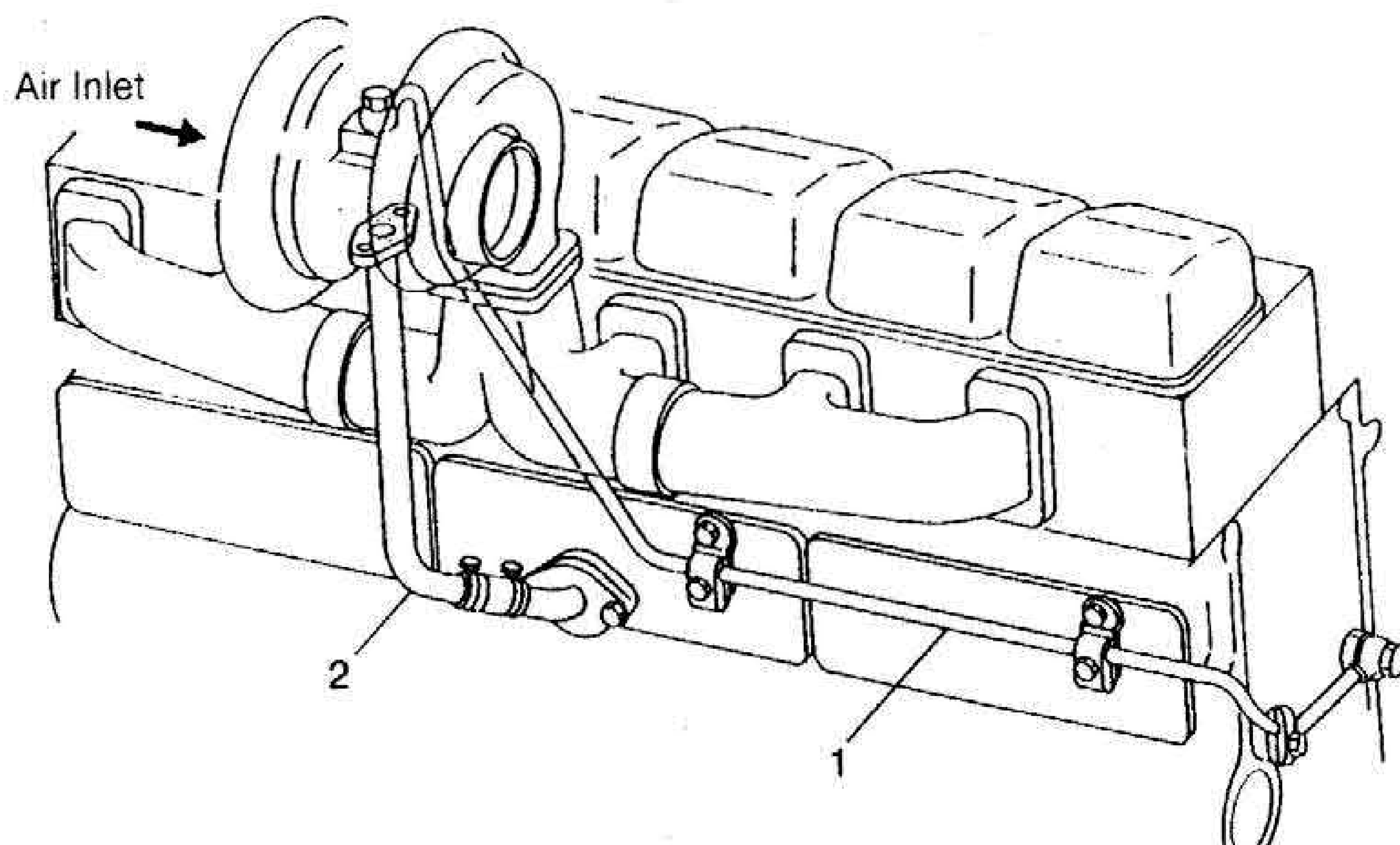
6-2-2 Inlet and Exhaust

(1) Air Cleaner

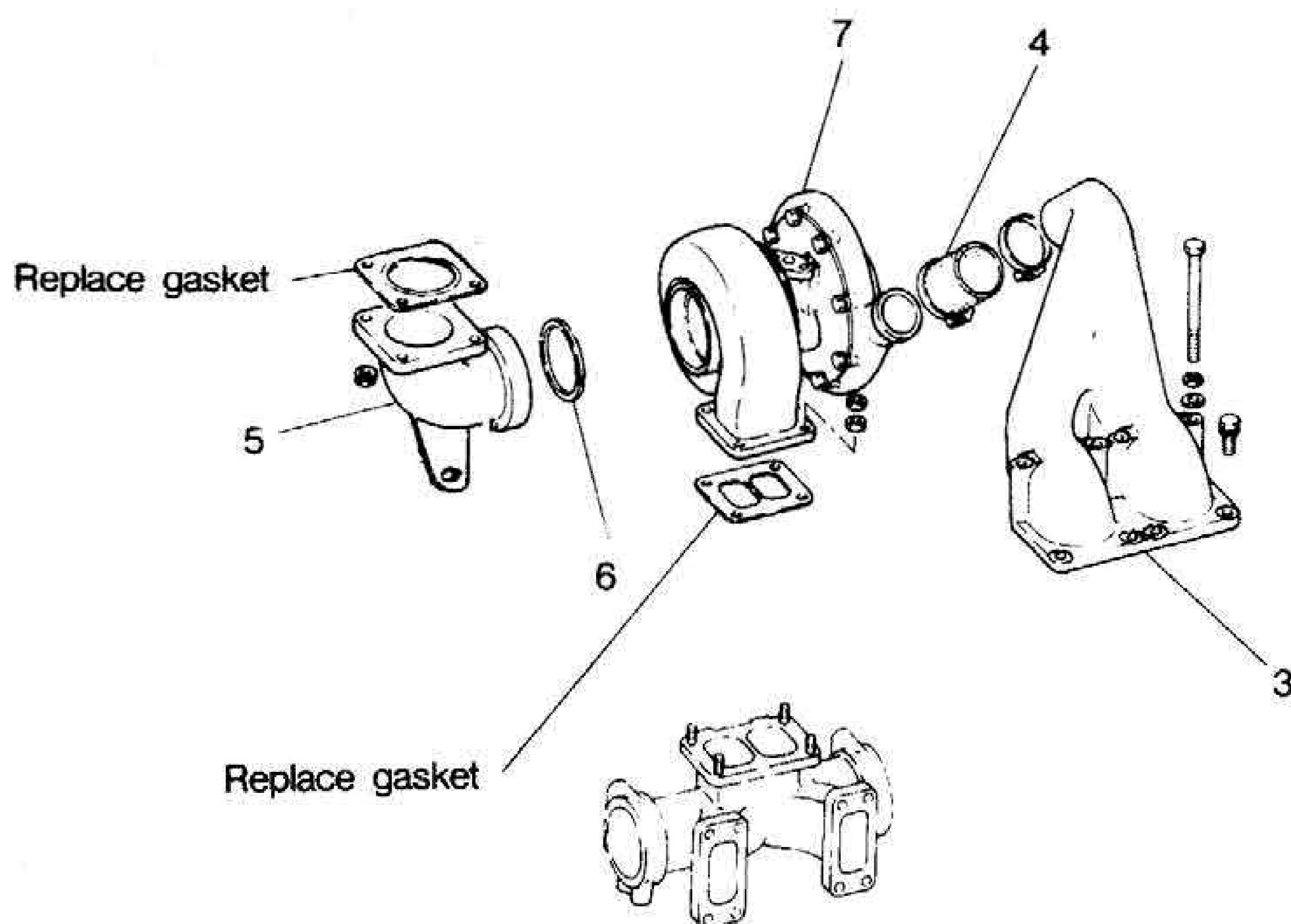


(2) Turbocharger

- 1 Oil inlet pipe
- 2 Oil outlet pipe



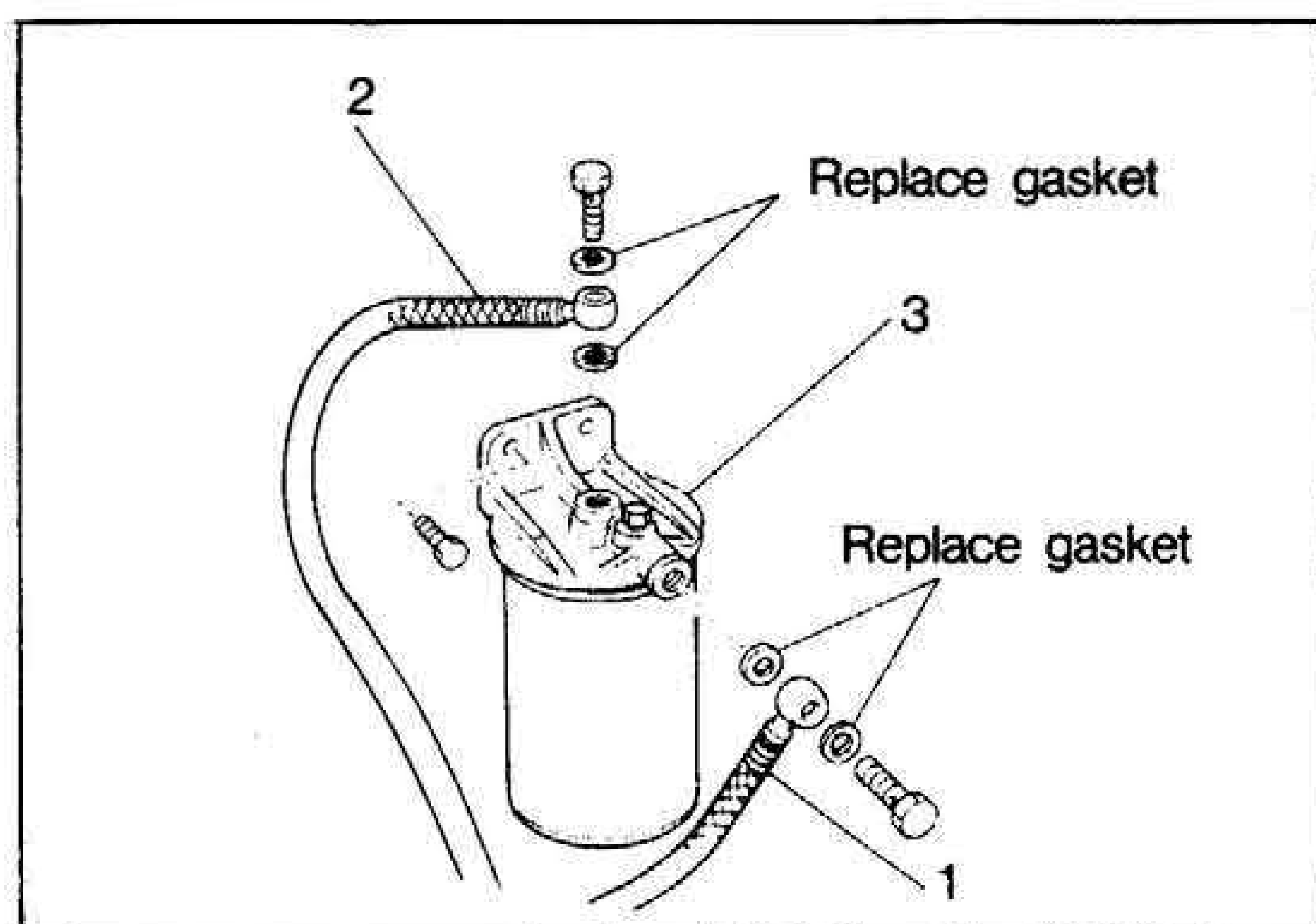
- 3 Inlet pipe
- 4 Rubber hose
- 5 Exhaust elbow
- 6 Ring
- 7 Turbocharger



6-2-3 Fuel

(1) Fuel Filter

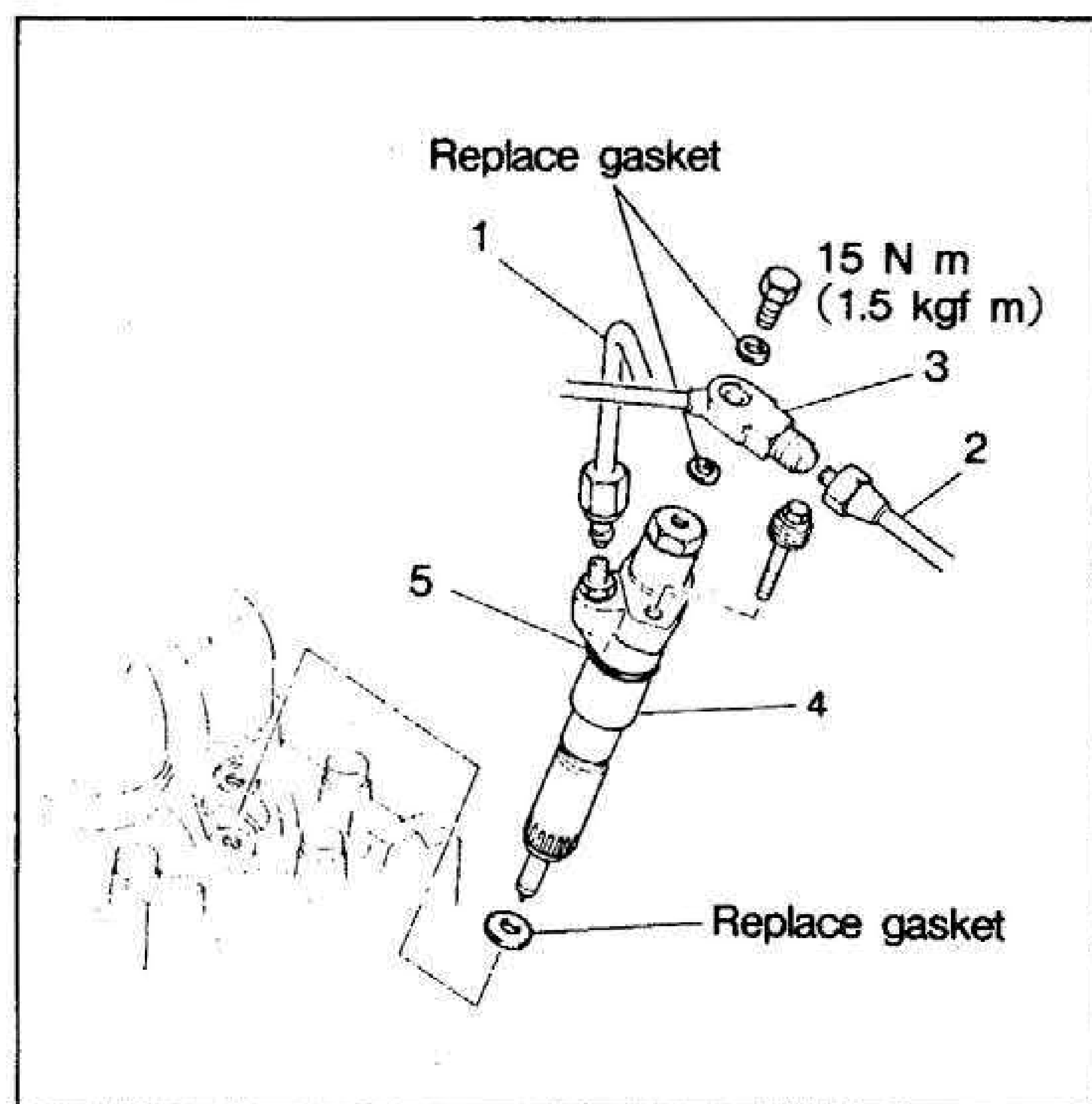
- 1 Inlet feed hose
- 2 Outlet feed hose
- 3 Fuel filter



(2) Injection Nozzle

- 1 Injection pipe
- 2 Fuel return pipe
- 3 Fuel leak-off pipe
- 4 Injection nozzle
- 5 Dust seal

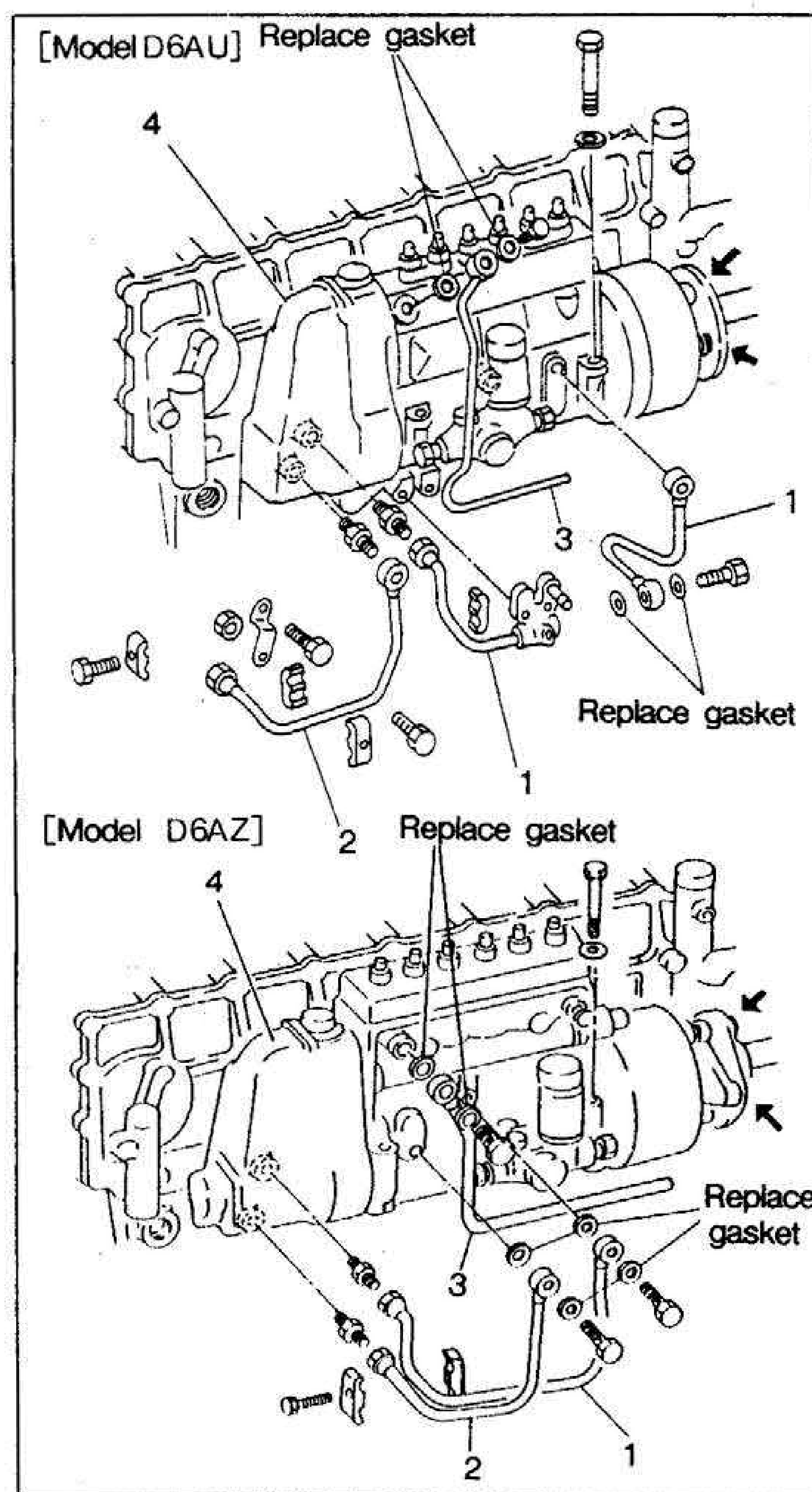
NOTE : Store the pipes, injection nozzles and injection pipe in such a way as to prevent entry of dust and dirt.



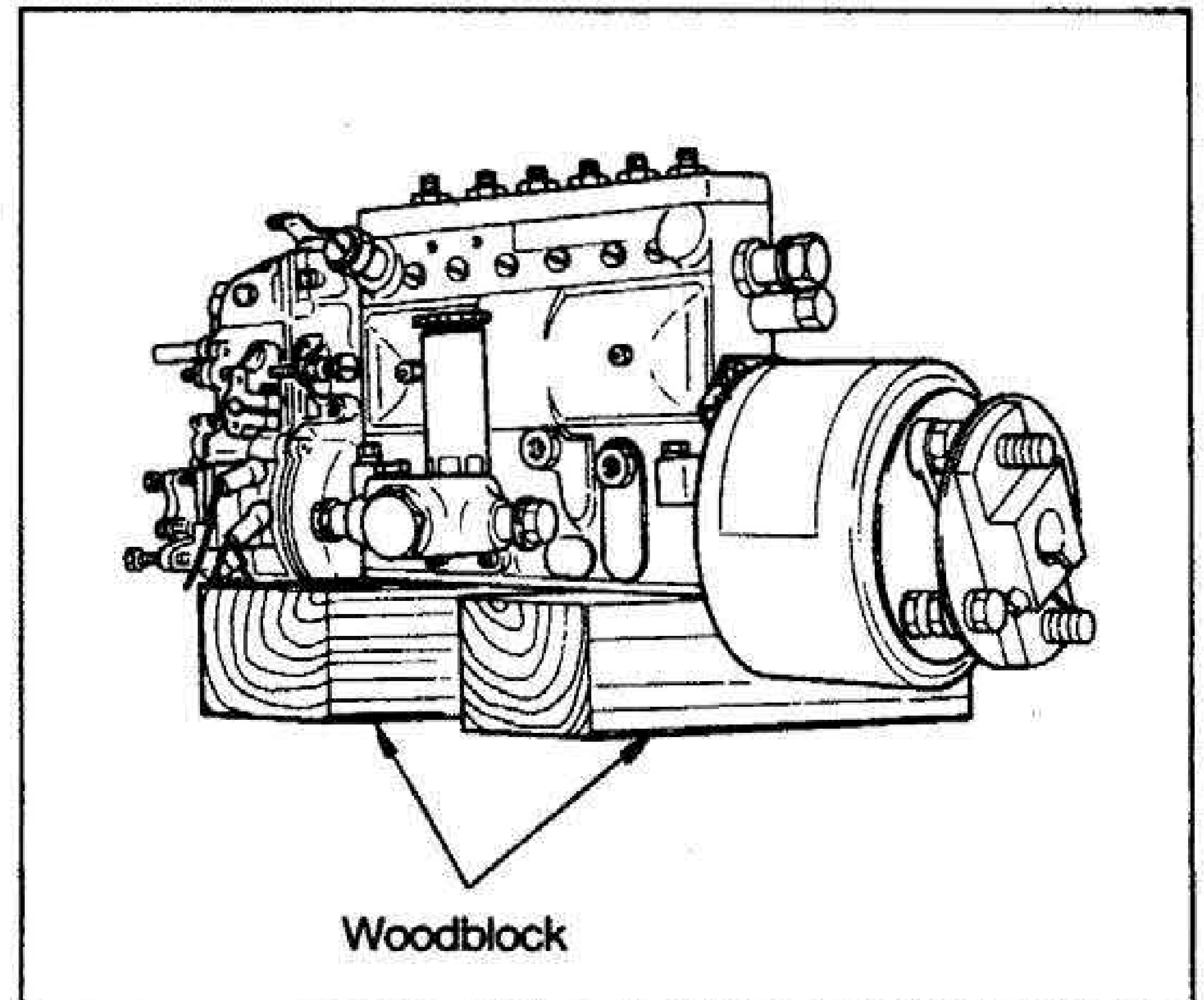
(3) Injection Pump

- 1 Inlet oil pipe
- 2 Outlet oil pipe
- 3 Overflow pipe
- 4 Injection pump

NOTE : To remove the injection pump, remove the bolts indicated by arrow in illustration from the coupling.



NOTE : The injection pump should be stored on woodblocks to prevent application of undue force to the timer section.

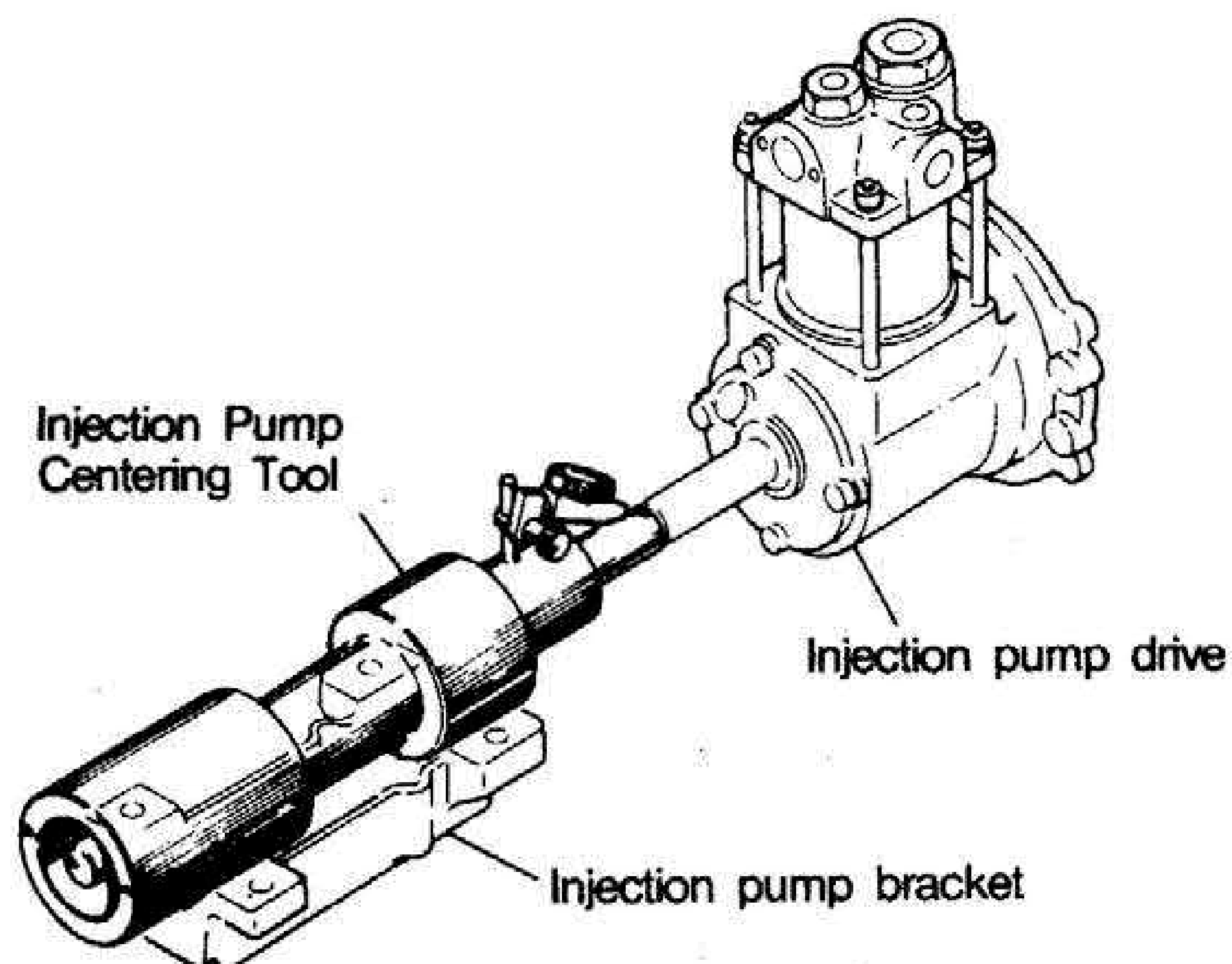


Installation Procedures

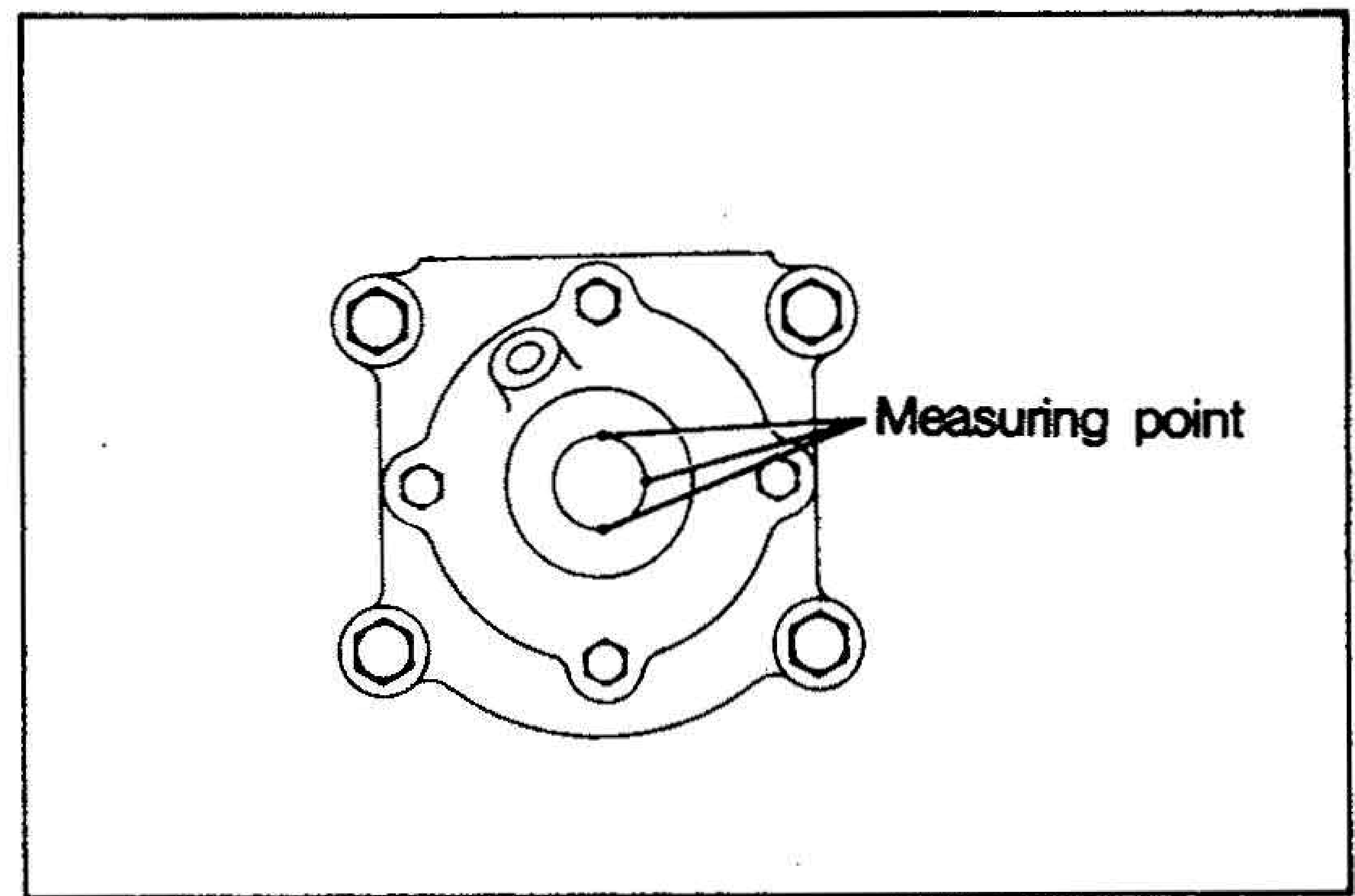
(a) Adjustment of injection pump bracket

- 1) Center the injection pump bracket by the following procedures.

Place Injection Pump Centering Tool(special tool) on the injection pump bracket, hold a dial indicator to the mandrel of the centering tool, and perform O-point adjustment.



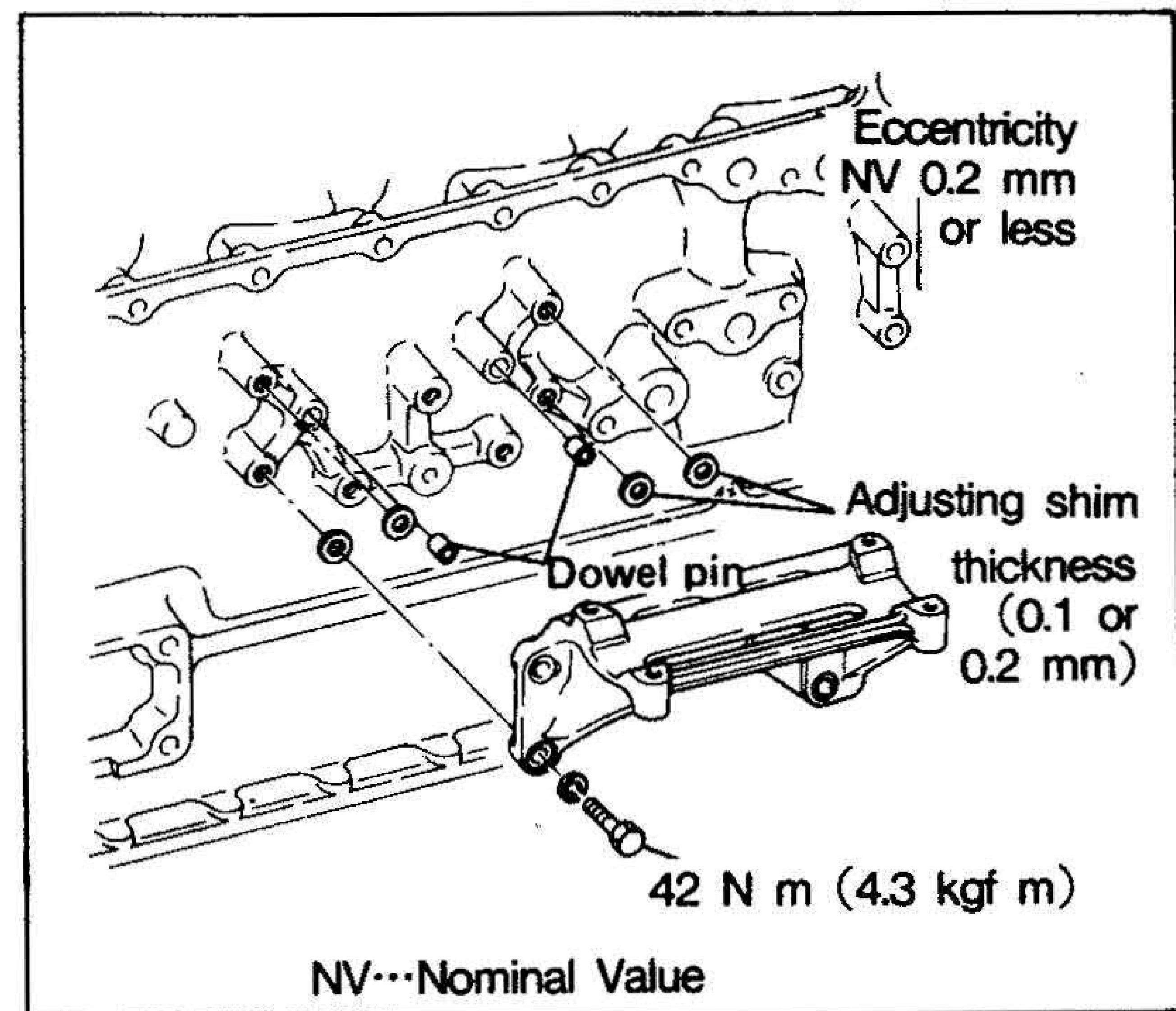
- 2) Slide the dial indicator of the centering tool toward the injection pump drive and measure the positions of the injection pump drive shaft shown in the illustration with the dial indicator.



- 3) If the eccentricity between the mandrel and injection pump drive shaft is in excess of the nominal dimension, adjust by adding or removing injection pump bracket shims.

Shim Inserting Condition

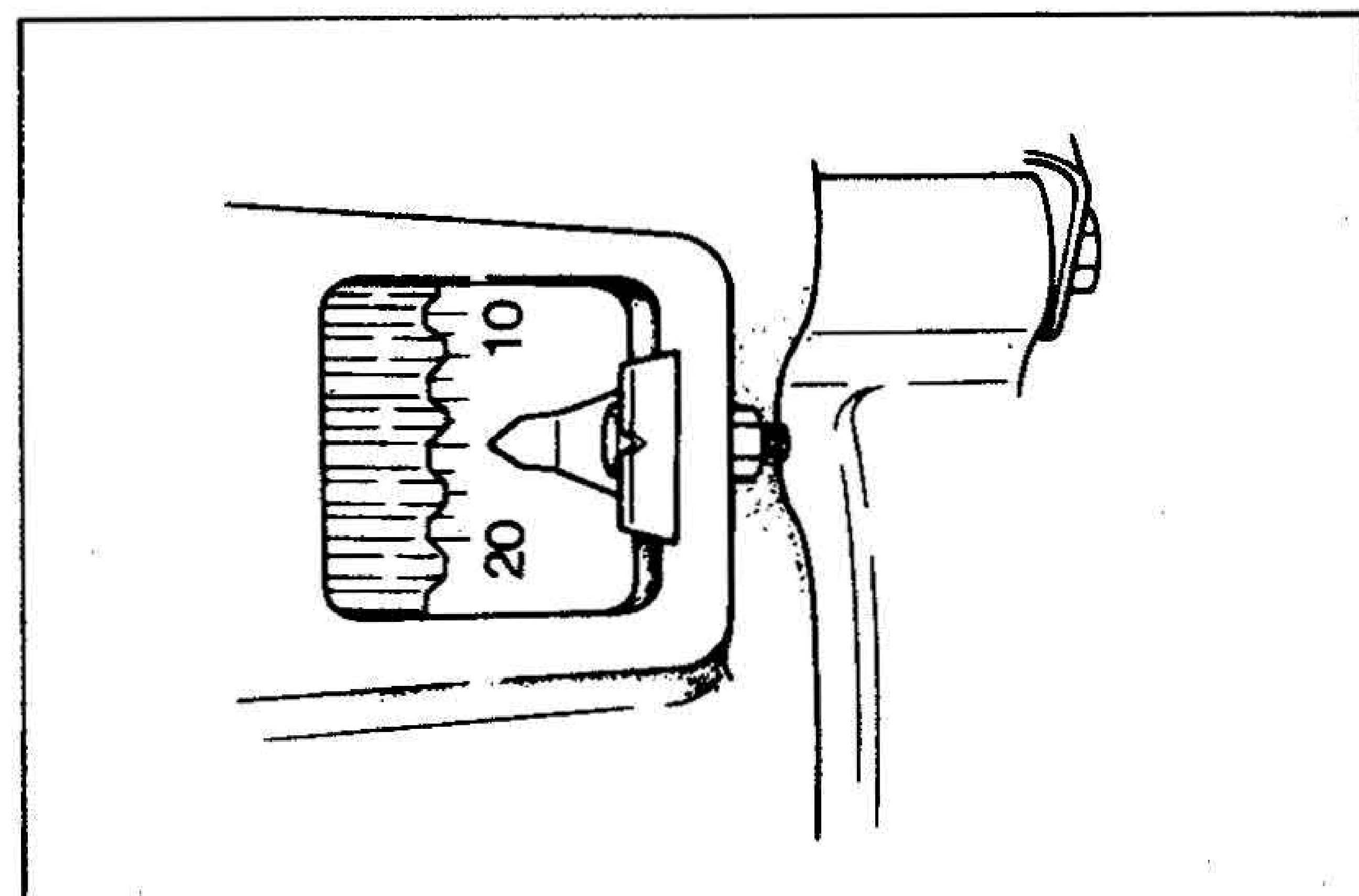
- The number of shims inserted into a single point must not exceed three.
- The front and rear shims must be equal in number.
- The difference in number between the top and bottom shims must not exceed one.



- 4) After adjustment, tighten the tightening bolts to the specified torque before confirmation.

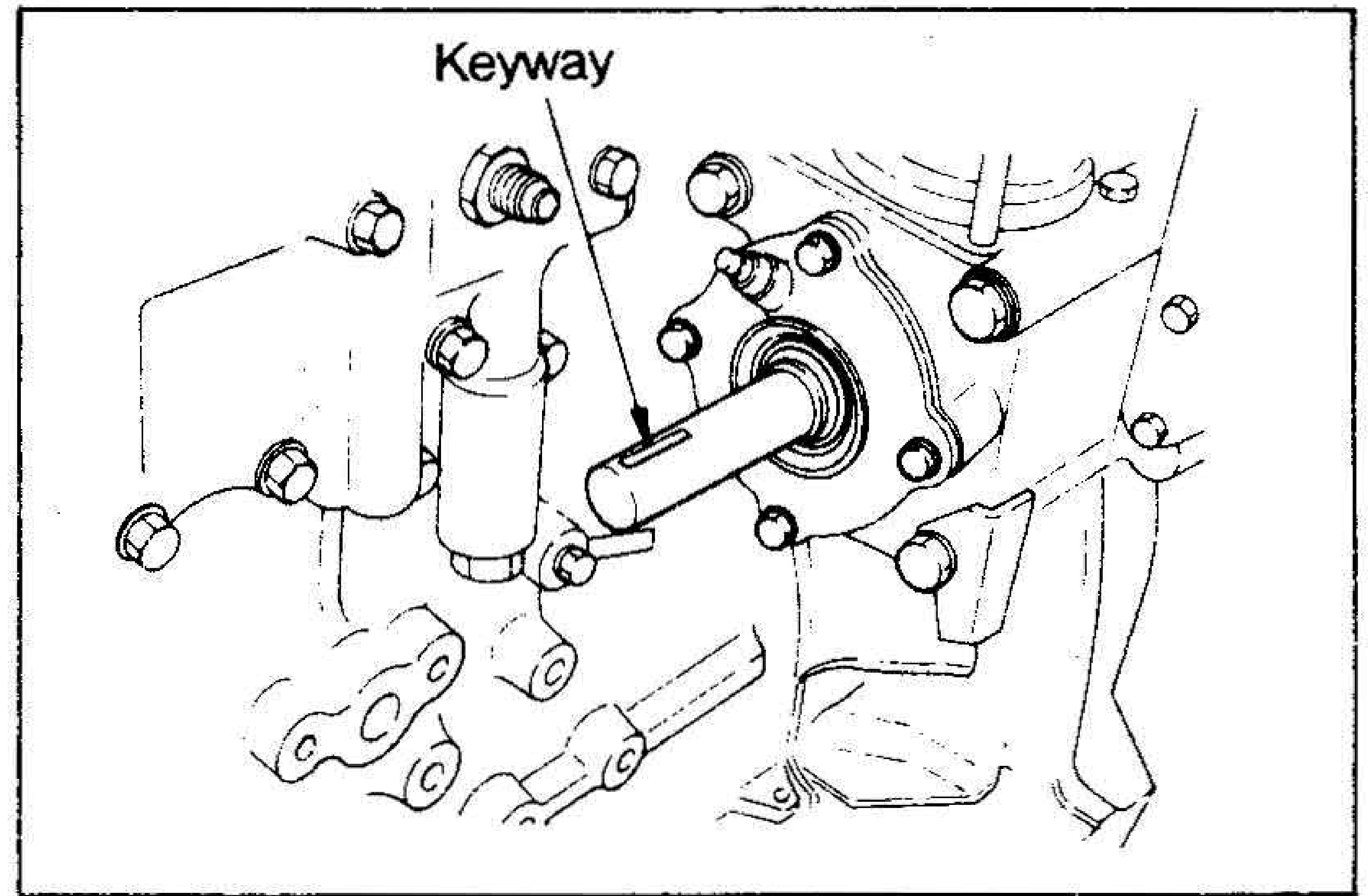
(b) Installation of injection pump

- 1) Crank the engine to adjust the No. 1 cylinder to the fuel injection timing. For this purpose, align the angle scale inscribed on the outer periphery of the flywheel with the pointer of the inspection window of the flywheel housing.

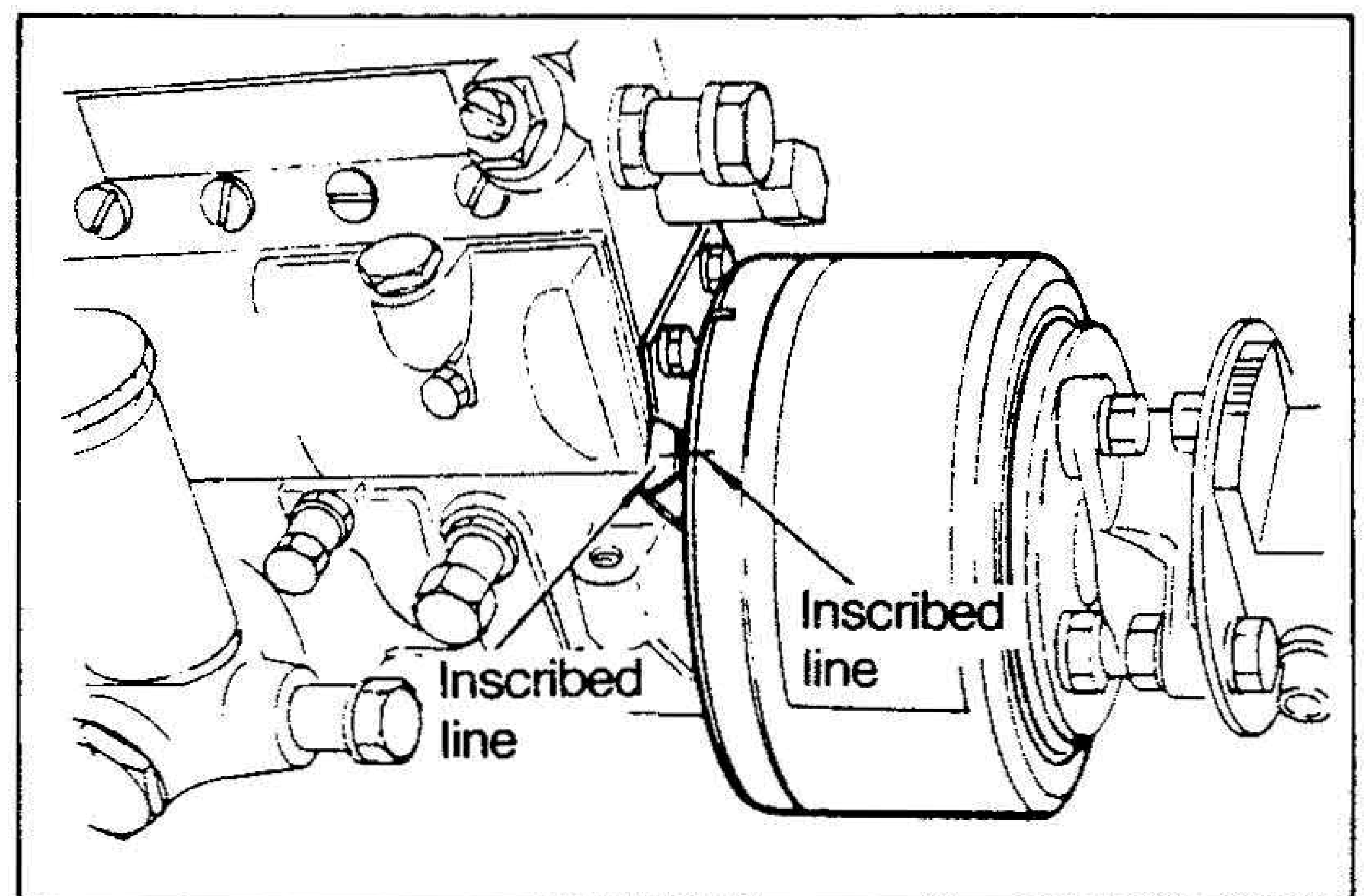


- 2) At this point, check to ensure that the keyway of the crankshaft of the injection pump drive is in the uppermost position.

If the keyway is not in the uppermost position, turn the engine crankshaft.

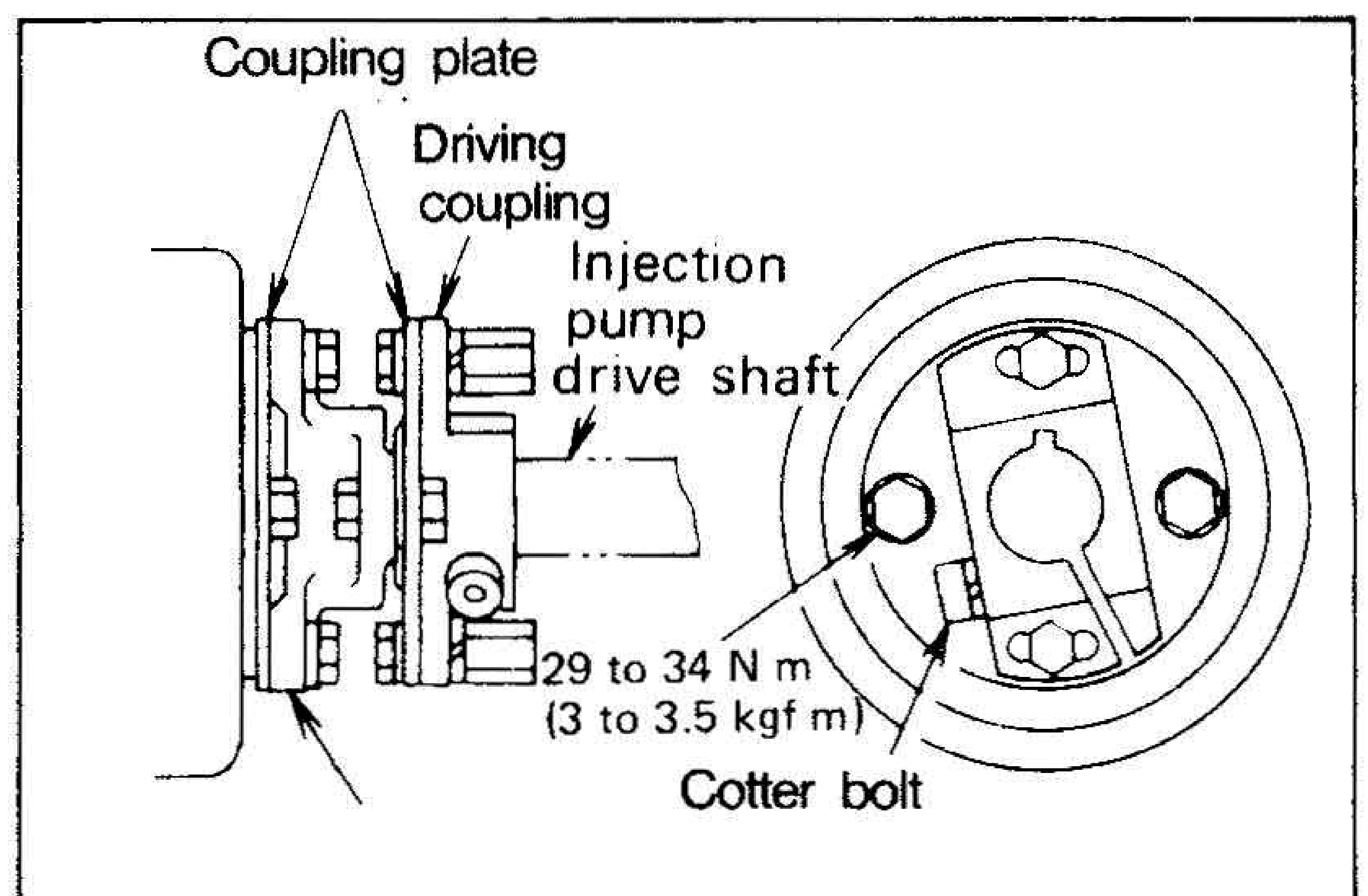


- 3) Align the pointer of the injection pump and the inscribed mark of the auto timer. (On engines with no auto timer, align the inscribed mark on the pump bearing cover with that on the pump side coupling.)



- 4) Install the driving coupling together with the coupling plate on the injection pump drive shaft.

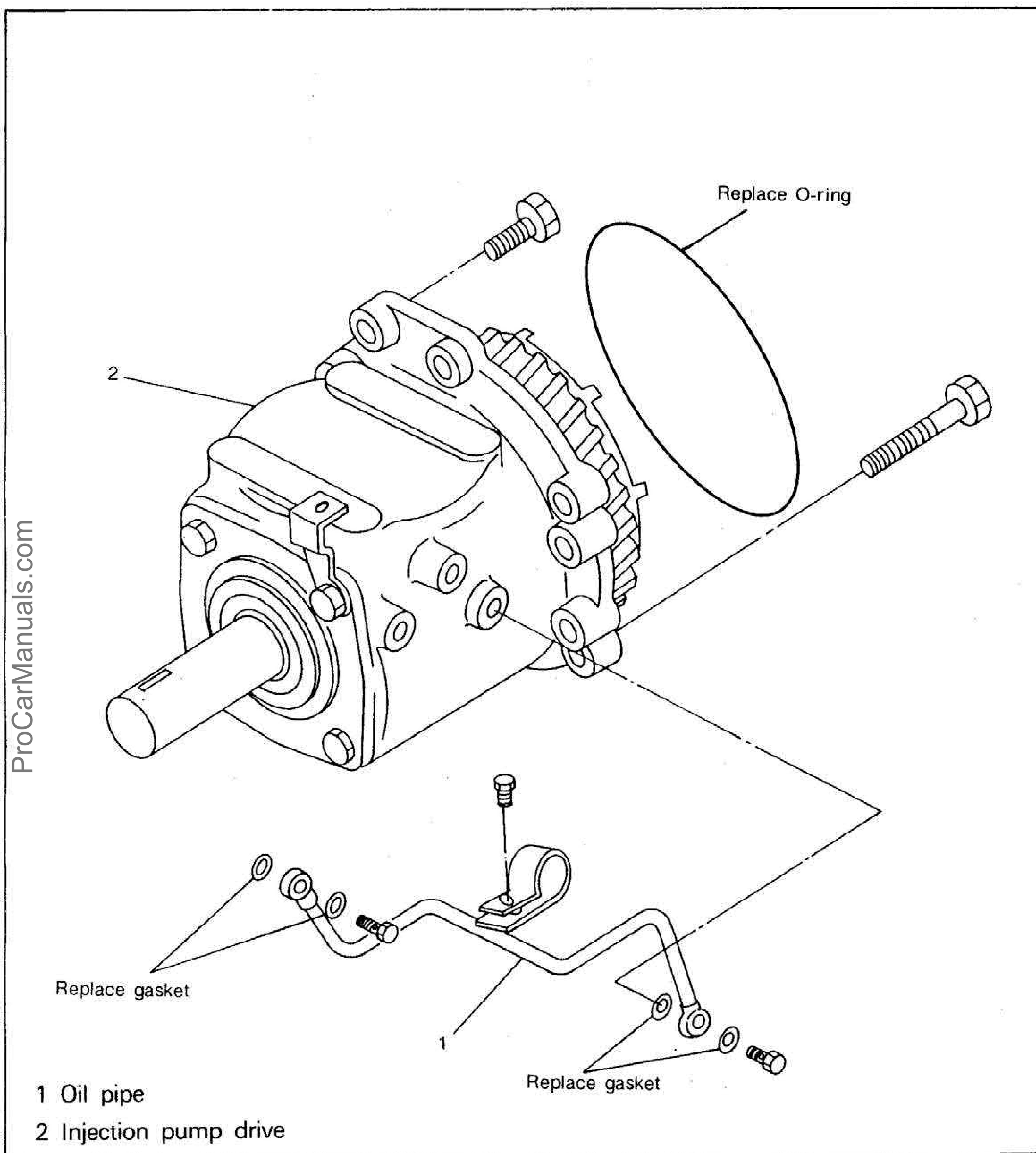
Install the injection pump to the bracket. Move the driving coupling toward the cross coupling and tighten the coupling plate and cross coupling to the specified torque.



Then tighten the cotter bolt to the specified torque.

NOTE : After the injection pump has been installed, be sure to check and adjust the fuel injection timing. (Refer to 5-1-3).

6-2-4 INJECTION PUMP DRIVE



The injection pump gear mounted to the Injection pump drive must be put in correct mesh when the Injection pump drive is installed.

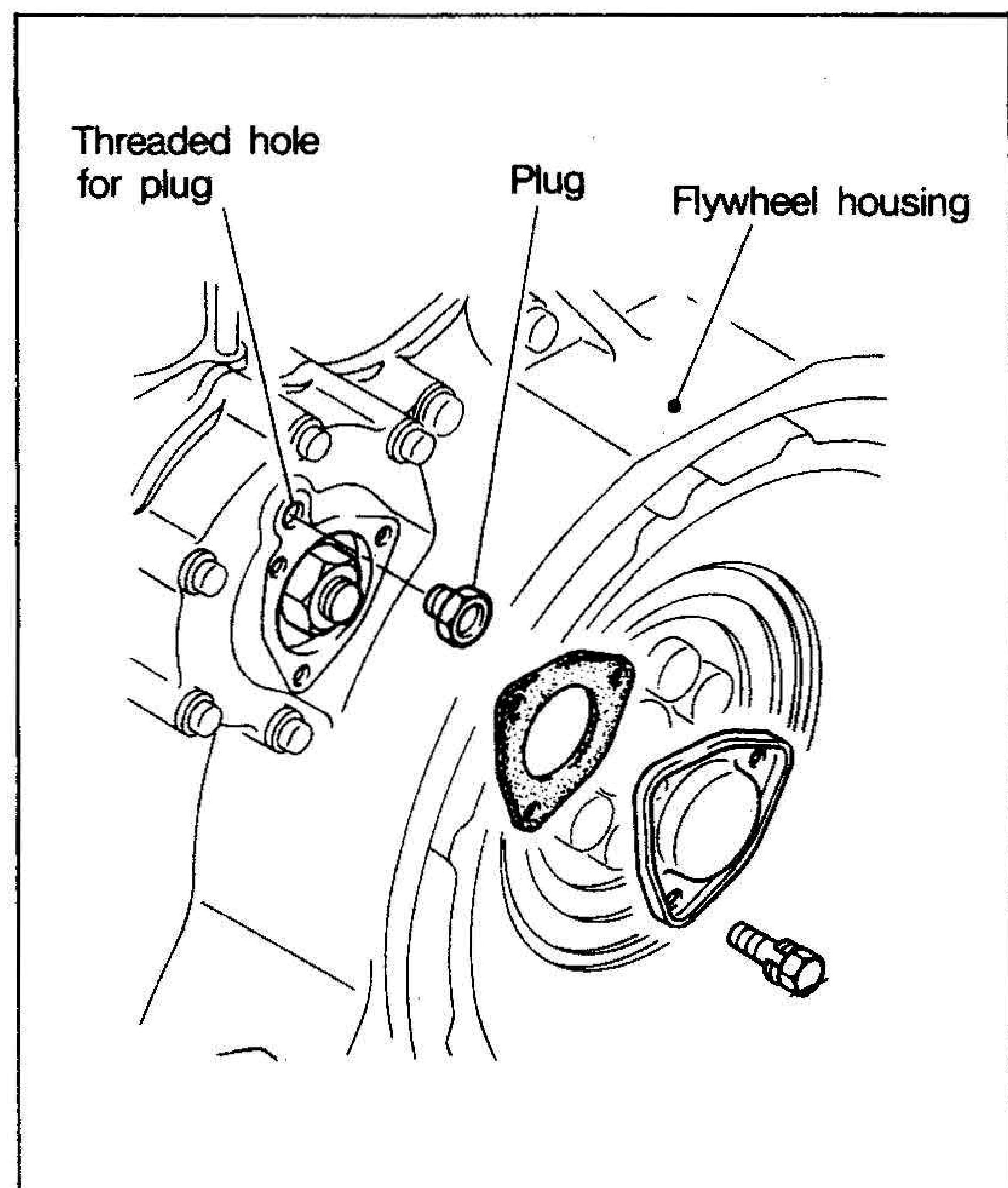
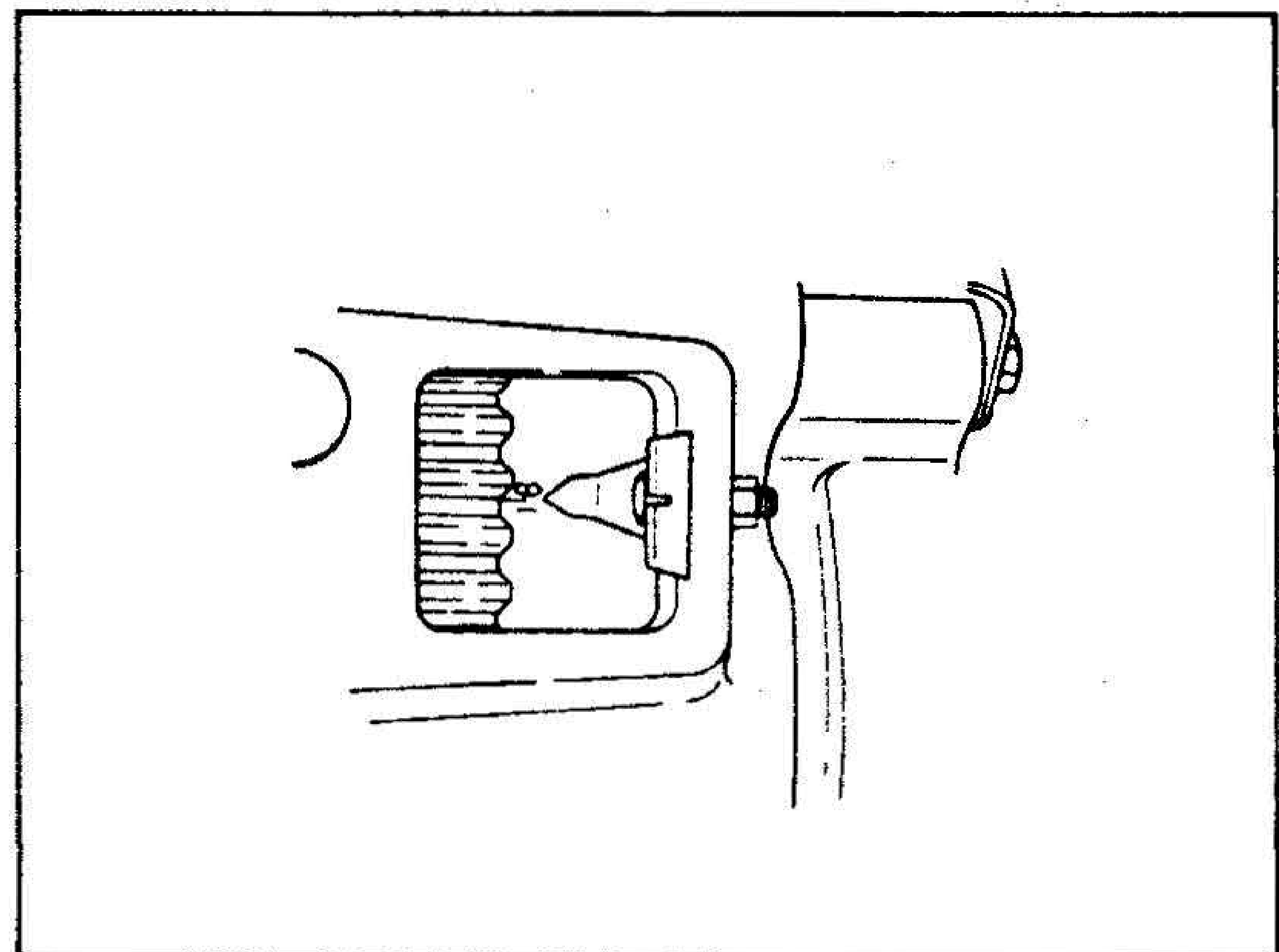
Install the Injection pump drive by the following procedure.

Injection pump drive Installation Procedure

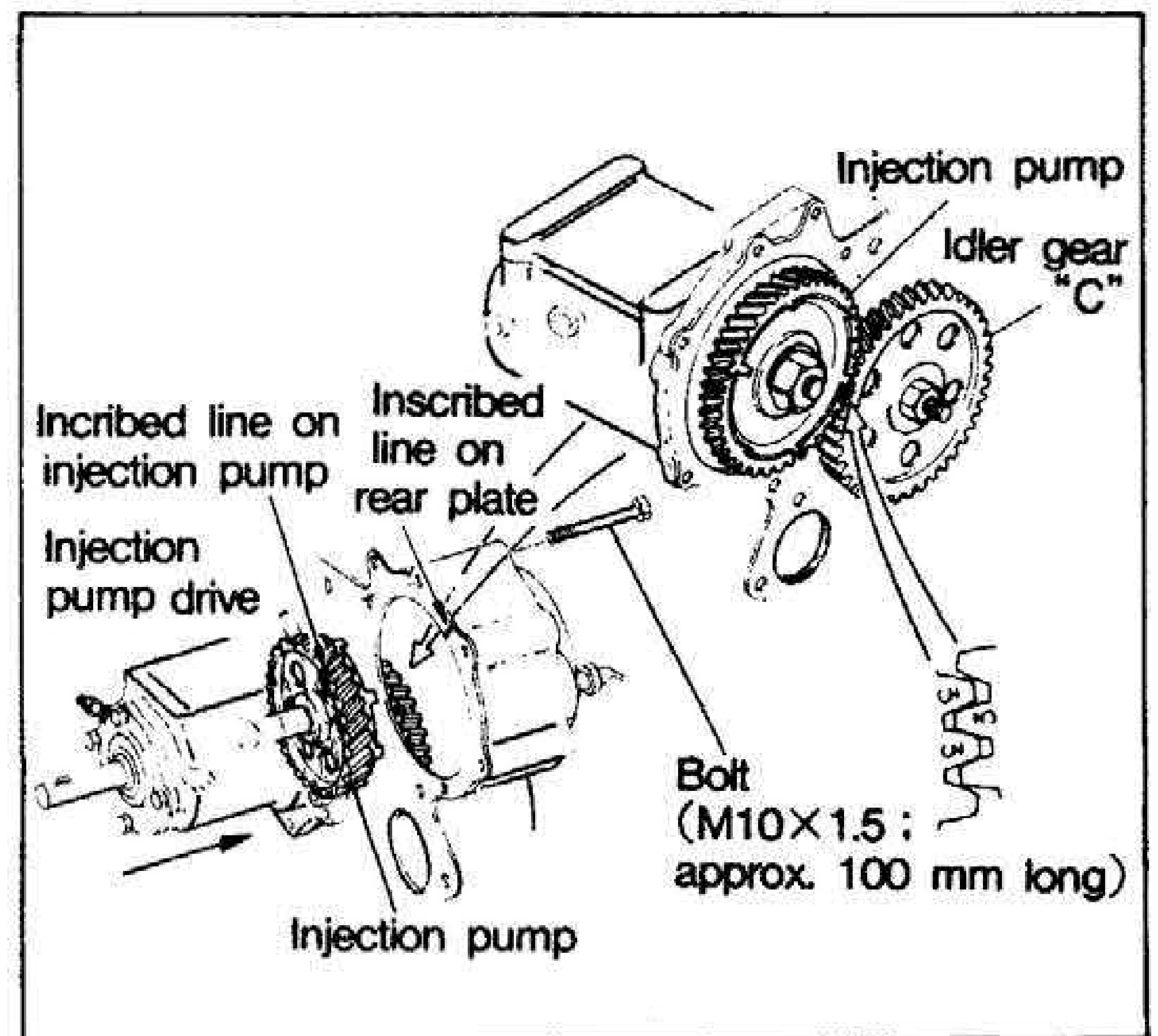
- (1) Crank the engine to align the stamped mark "1, 6" on the periphery of the flywheel with the pointer of the inspection window in the flywheel housing and put the piston in the No. 1 cylinder of the engine at top dead center on the compression stroke.

If the piston in the No. 1 cylinder is at top dead center on the compression stroke, the No. 1 cylinder will have a valve clearance. If both inlet and exhaust valves have no valve clearance, the piston in the No. 6 cylinder will be at top dead center on the compression stroke. So let the engine rotate 360°

- (2) Remove the plug from the flywheel housing.



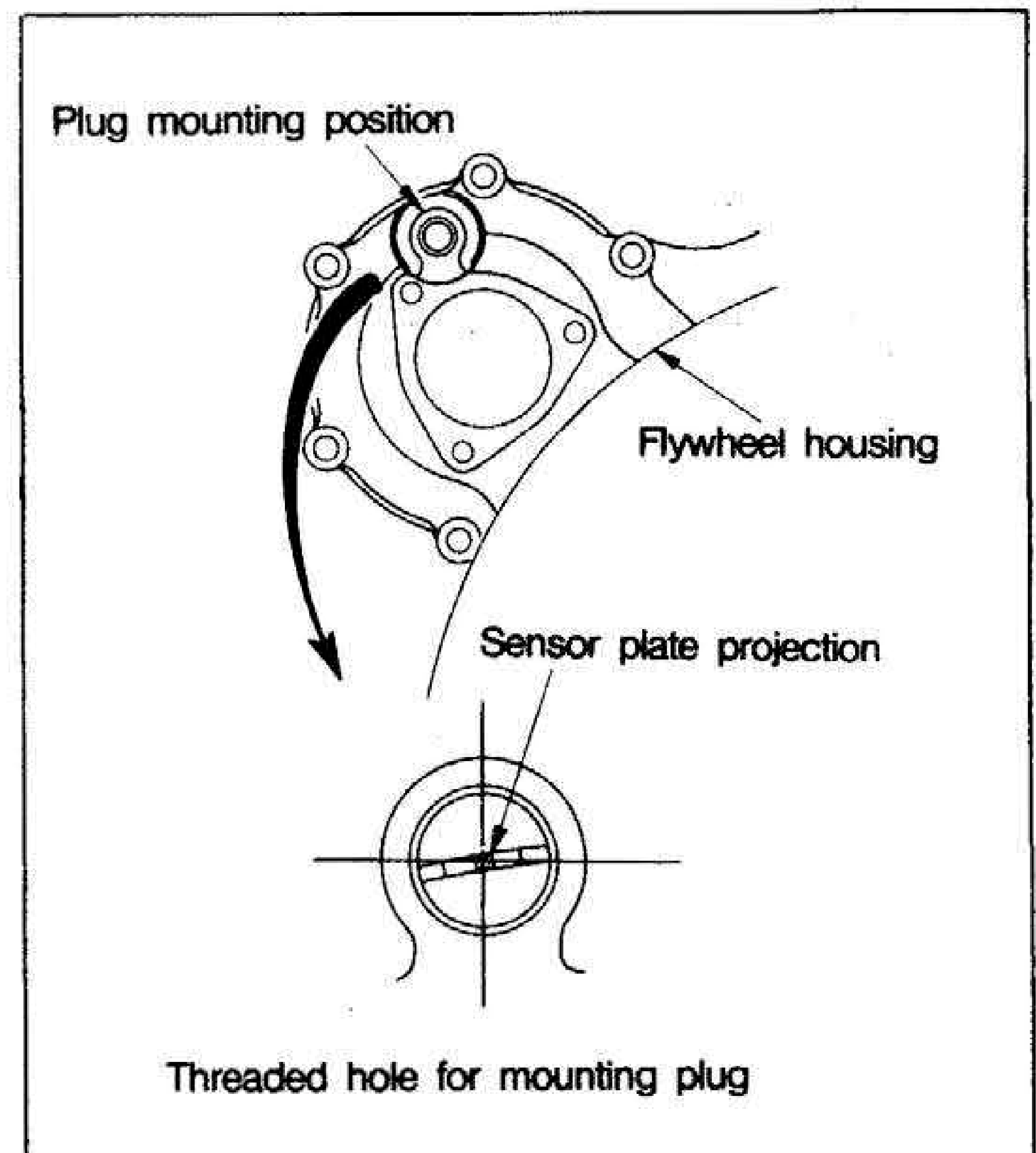
(3) Insert the bolt (M10×1.5 about 100 mm long) from the rear end of the flywheel housing to support the injection pump drive. Using the bolt as a guide, insert the injection pump drive into the mounting hole of the flywheel housing. At the position where both ends of the injection pump gear and idler gear C have touched each other, align the inscribed line on the rear plate with that on the injection pump gear tooth surface, and then push the injection pump drive.



(4) Look through the plug hole to confirm that the projection on the sensor plate is positioned at the center of the plug hole, and then secure the injection pump drive. If the projection on the sensor plate is not positioned at the center of the plug hole, remove the injection pump drive and perform Item(3) again.

After the injection pump drive has been installed, install the plug.

NOTE : If the injection pump gear and idler gear C are misaligned a tooth, about half of the projection on the sensor plate will be hidden from the plug hole.

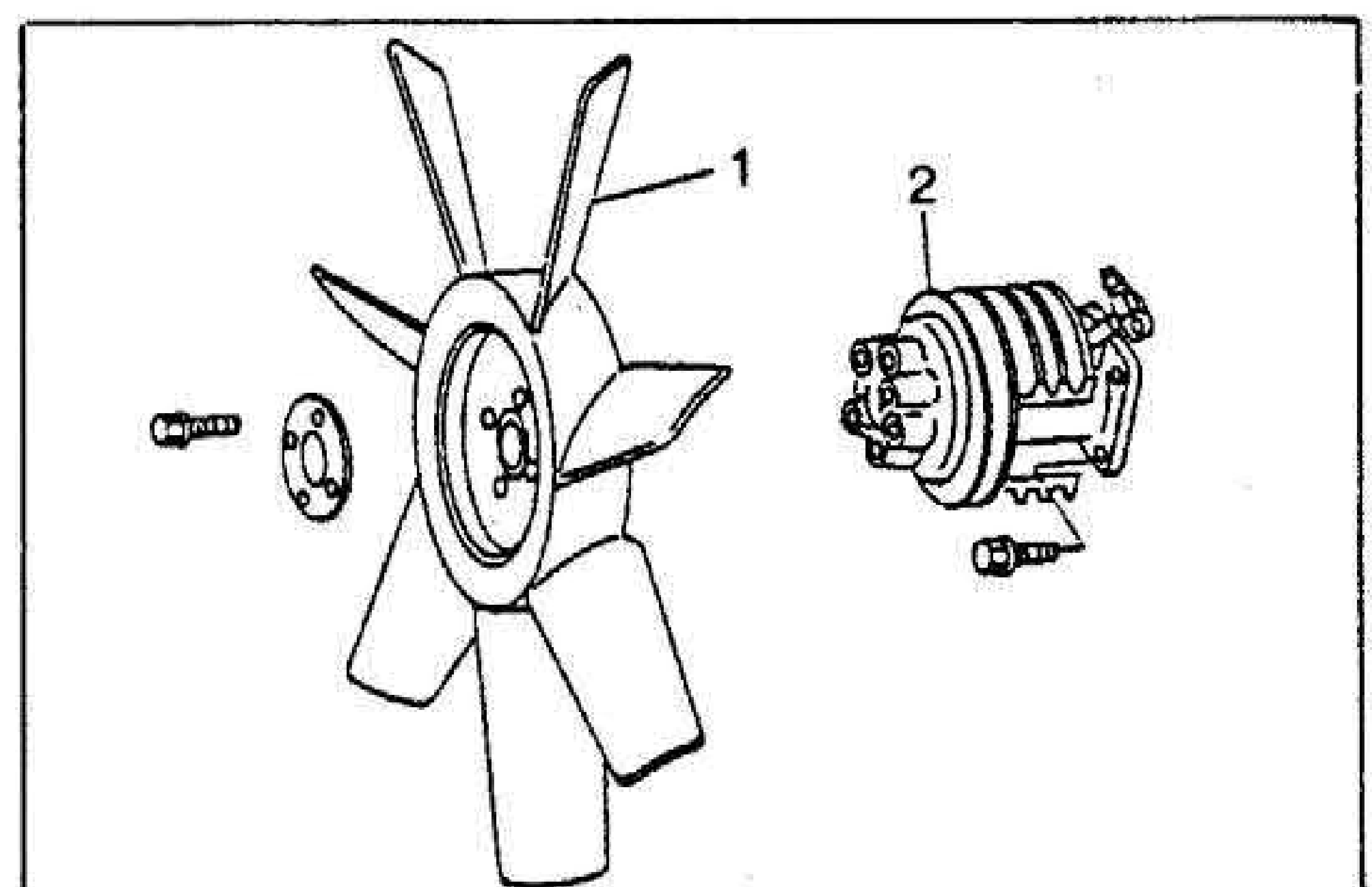


6-2-5 Cooling

(1) Fan and Fan Drive

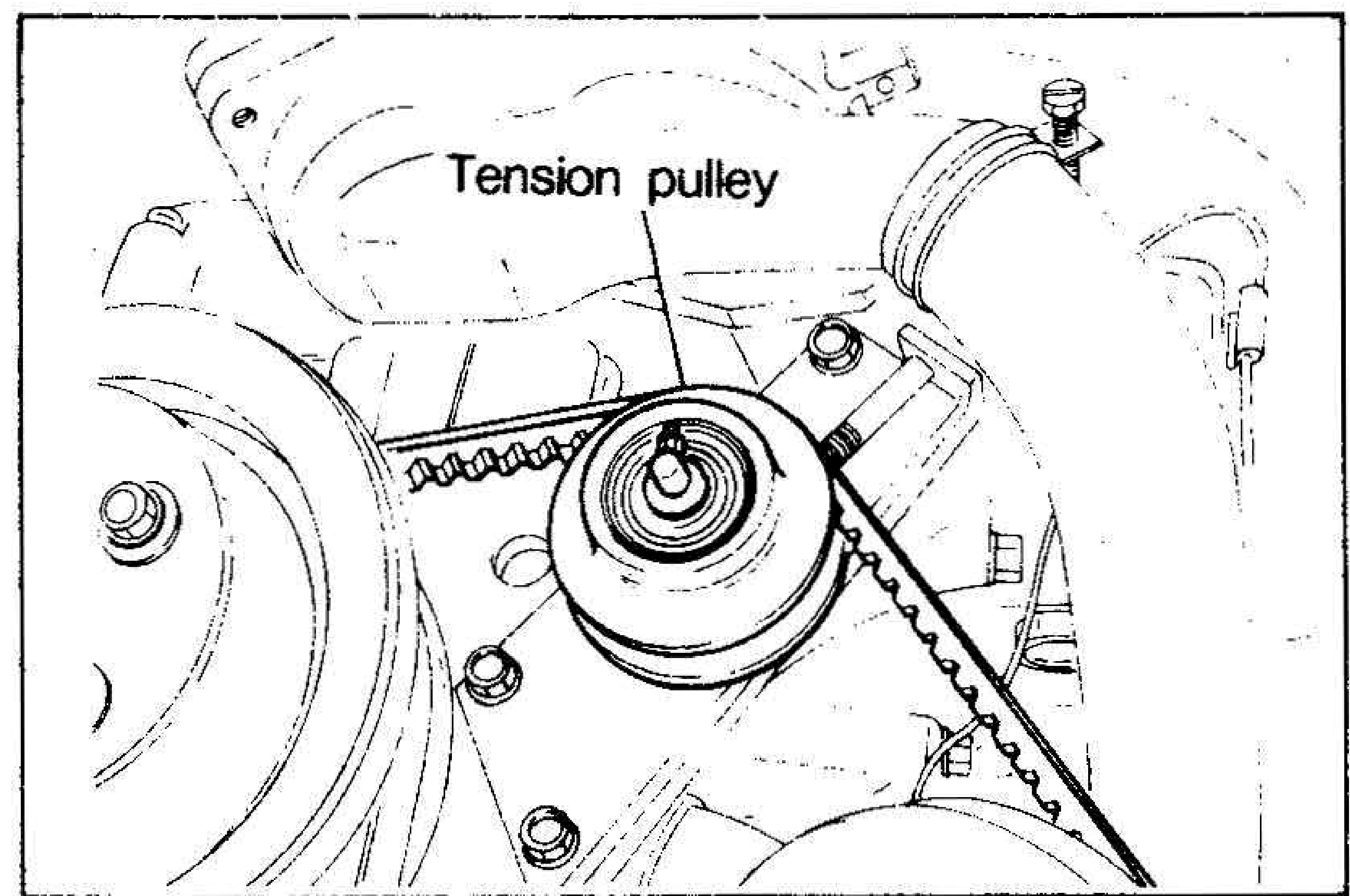
1 Fan

2 Fan drive



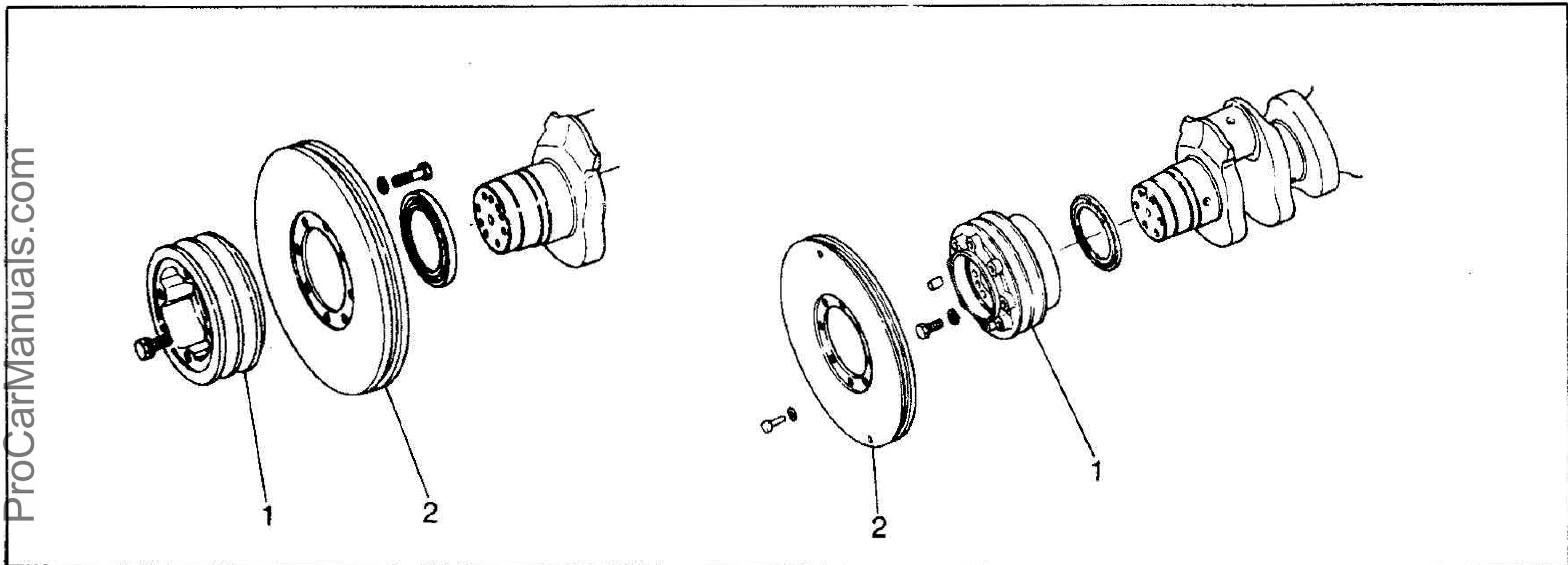
NOTE : Remove or install the fan drive by operating the tension pulley.

After installation, adjust the tension of the V-belt.
(Refer to 5-1-5.)



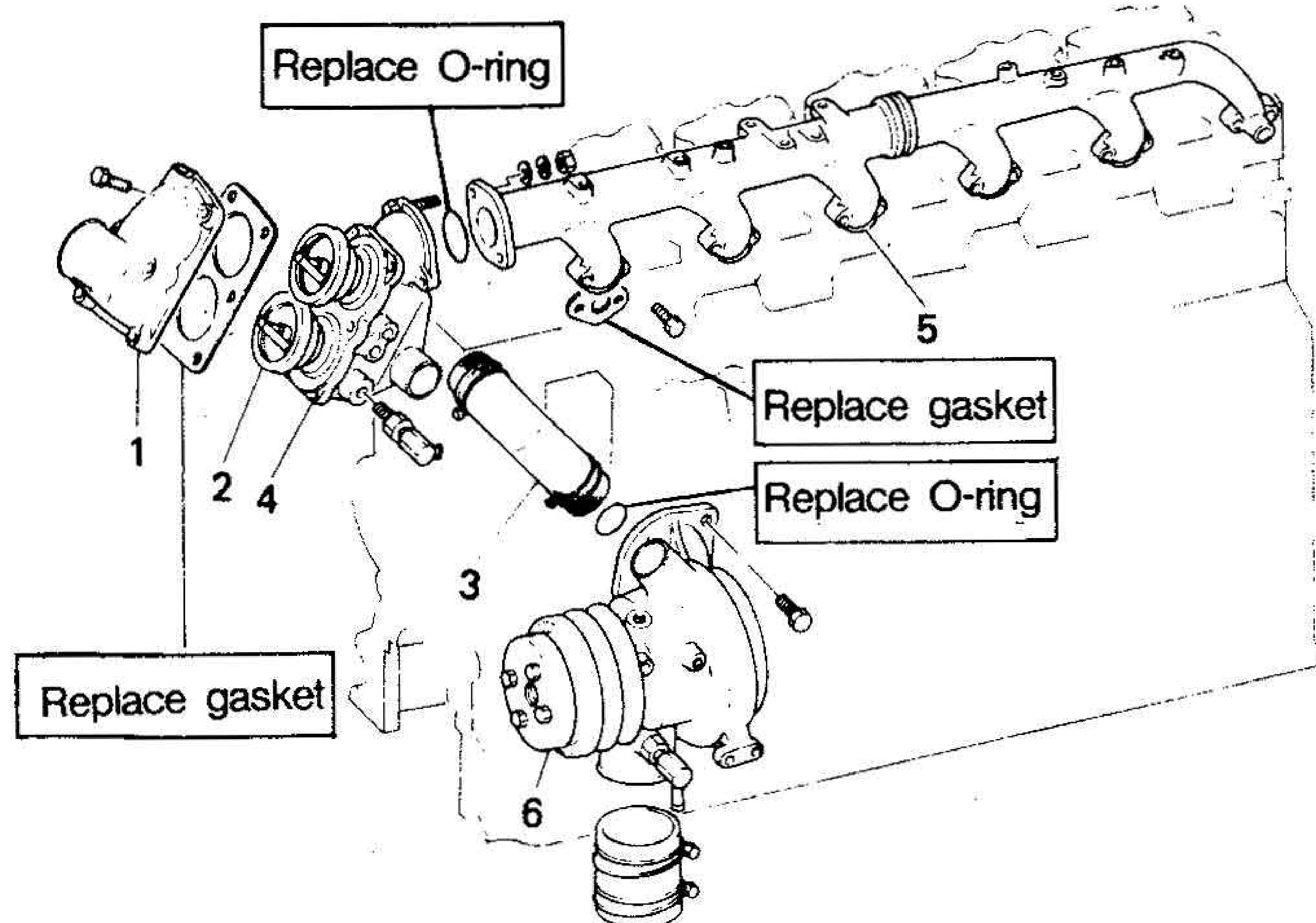
(2) Fan Drive Pulley and Torsional Damper

- 1 Fan drive pulley
- 2 Torsional damper



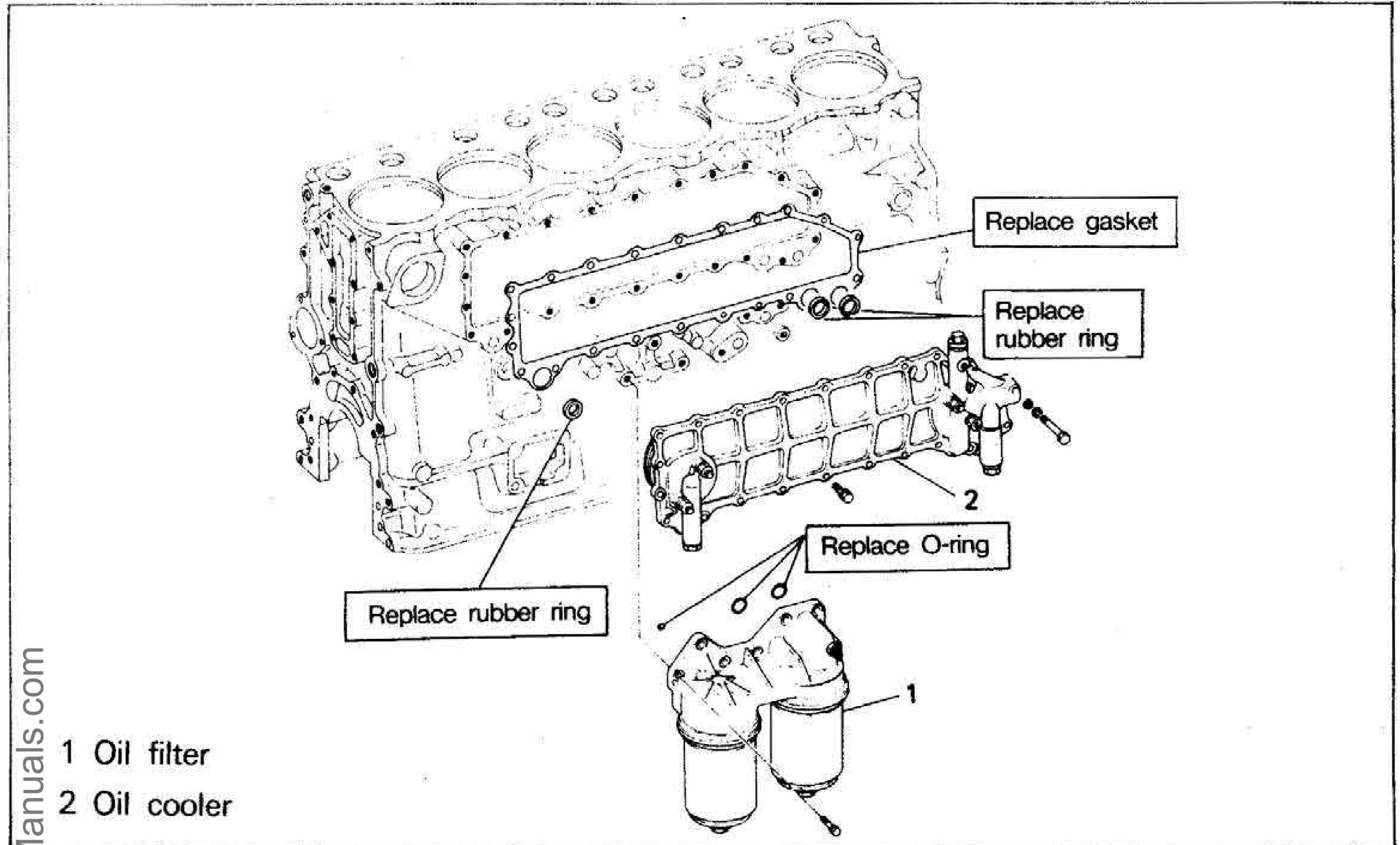
(3) Thermostat and Water Pump

- 1 Thermostat cover
- 2 Thermostat
- 3 Bypass hose
- 4 Thermostat case
- 5 Water outlet pipe
- 6 Water pump



6-2-6 Lubrication

(1) Oil Filter and Oil Cooler



(2) Oil Pump and Oil Strainer

- | | |
|----------------|------------|
| 1 Oil pan | 3 Oil pipe |
| 2 Oil strainer | 4 Oil pump |

NOTE : 1. Before the oil pump is removed, measure the backlash.

- The oil strainer and oil pipe should be removed as assembled with the oil pump, unless abnormal condition is evident.
- After the oil pump has been installed, measure the backlash to confirm that the backlash is within the nominal values.

