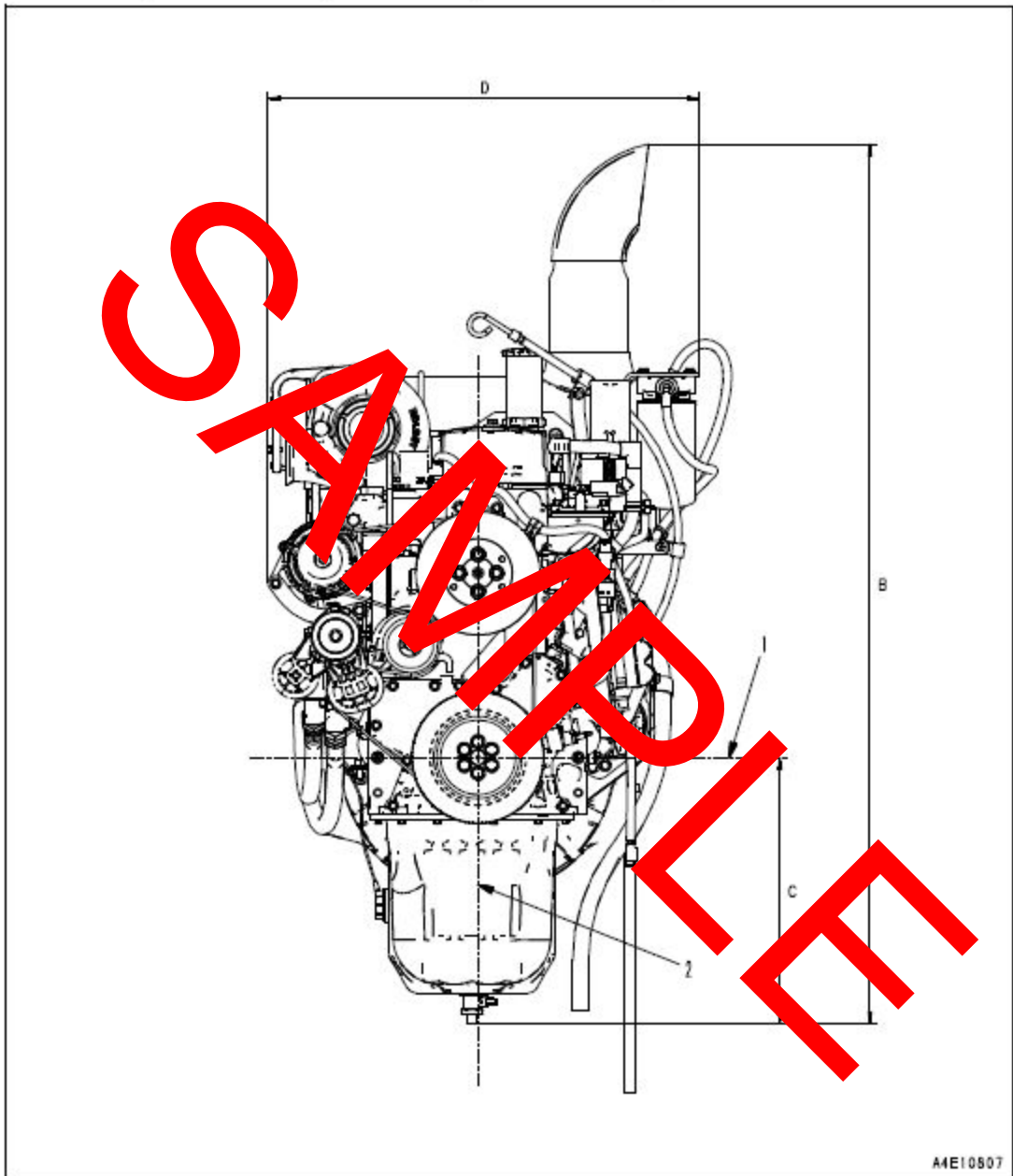


**SAA6D107E-1 (Front view of engine)**

Machine model:

PC200-8M0, PC200LC-8M0, PC220-8M0, PC220LC-8M0, PC240LC-8M0



★ The shape may differ according to the machine model.

1. Crankshaft center
2. Cylinder center

### General disassembly of engine

- ★ This disassembly manual is a general disassembly manual for the SAA4D107E-1 and SAA6D107E-1 engines. Since the shapes, numbers, locations, etc. of the parts depend on each applicable machine, check them before starting the work.
- ★ The photos and illustrations show the 6D107E-1, unless otherwise specified.

**1. Preparation work**

Before disassembling the engine, check its parts for cracking, damage, etc. and clean it generally and carefully. Accurate inspection of its parts and check disassembly and assembly.

- ★ Before cleaning the engine, carefully seal or remove the openings, electric parts, and wiring connectors so that water will not enter them.

- 1) Prepare stable 2 engine stands (Blocks [1]) for the right and left. Secure the engine assembly on them so that it will not tip over.
- 2) Remove oil gauge assembly (2)

<4D107E-1>



<6D107E-1>



**2. Installation to engine repair stand**

- 1) Install tool B to engine assembly (1).
  - Mounting bolt on engine side M12 x 1.75

⊞ Mounting bolt:  
77 ± 12 Nm {7.9 ± 1.2 kgm}

- 2) Sling engine assembly (1) and install it to tool A.

⊞ Engine assembly:  
Approx. 430 kg (4D107E-1)  
(Weight depends on each applicable machine)

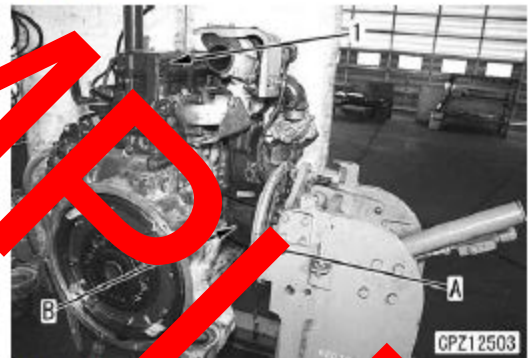
⊞ Engine assembly:  
Approx. 520 kg (6D107E-1)  
(Weight depends on each applicable machine)

- 3) Drain the engine coolant and engine oil.

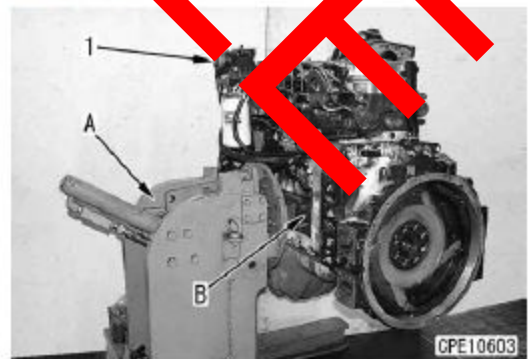
⊞ Engine oil:  
Approx. 16 ℓ (4D107E-1)

⊞ Engine oil:  
Approx. 23 ℓ (6D107E-1)

<4D107E-1>



<6D107E-1>



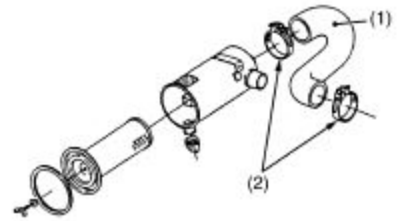
Checking Intake Air Line

1. Check to see if the intake air hose(s) and the breather tube (3) are properly fixed every 200 hours of operation.
2. If the clamp is loose, apply oil to the threads and retighten it securely.
3. The intake air hose(s) and the breather tube are made of rubber and tends to age. It must be changed every two years. Also change the clamp and tighten it securely.

■ **IMPORTANT**

- To prevent serious damage to the engine, keep out any dust inside the intake air line.

- (1) Intake Air Hose      (3) Breather Tube  
(2) Clamp



3EEABAB1P025A



3EEACAB0P002A

Replacing Oil Filter Cartridge⚠ **CAUTION**

- Be sure to stop the engine before replacing filter cartridge.
1. Remove the oil filter cartridge (1) with the filter wrench.
  2. Apply a slight coat of oil onto the new cartridge gasket.
  3. To install the new cartridge, screw it in by hand. Over tightening may cause deformation of rubber gasket.
  4. After the new cartridge has been replaced, the engine oil normally decreases a little. Thus see that the engine oil does not leak through the seal and be sure to read the oil level on the oil level gauge. Then, replenish the engine oil up to the specified level.

■ **IMPORTANT**

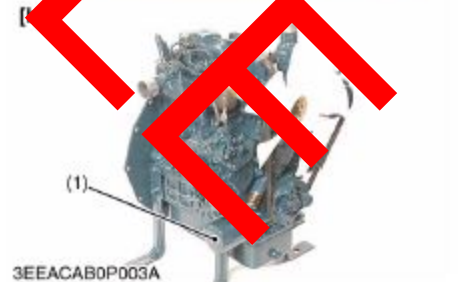
- To prevent serious damage to the engine, replacement element must be highly efficient.

- (1) Engine Oil Filter Cartridge

- [a] Standard Type      [b] One-side Maintenance Type



3EEACA0056B



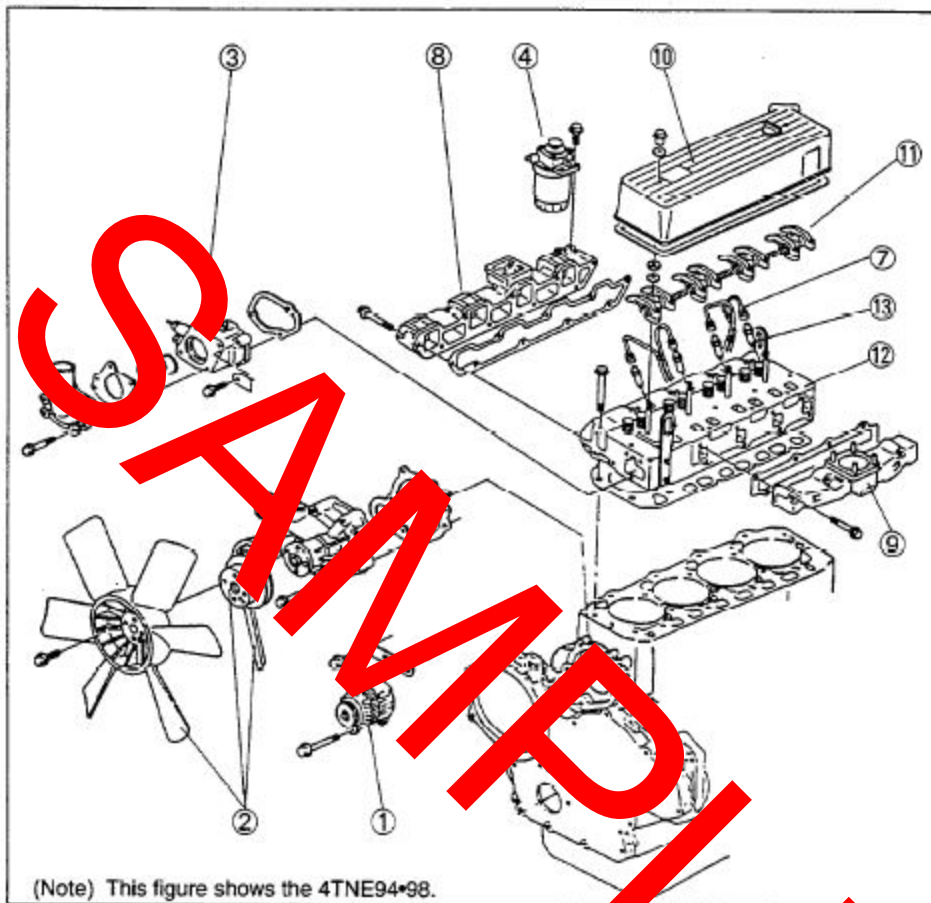
3EEACAB0P003A



## 4. Engine Body

### 4.2 Cylinder Head

#### (1) Components



#### (2) Disassembly procedure:

Disassemble in the order of the numbers shown in the illustration.

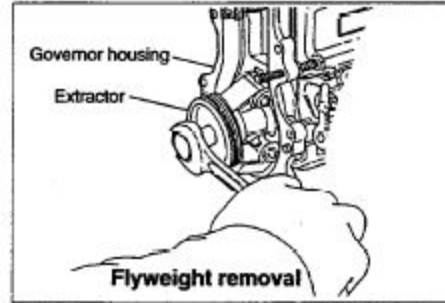
- ① Remove the alternator assy. **(Point 1)**
- ② Remove the fan, pulley and V belt.
- ③ Remove the thermostat case. **(Point 2)**
- ④ Remove the fuel filter and fuel oil piping. **(Point 3)**
- ⑤ Remove the oil level gage assy.
- ⑥ Remove the oil filter. **(Point 4)**
- ⑦ Remove the fuel injection pipes. **(Point 5)**
- ⑧ Remove the intake manifold assy.
- ⑨ Remove the exhaust manifold assy.
- ⑩ Remove the bonnet Assy.
- ⑪ Remove the rocker shaft assy, push rods and valve caps. **(Point 6)**
- ⑫ Remove the cylinder head assy and head gasket. **(Point 7)**
- ⑬ Remove the fuel injection valves and fuel return pipe. **(Point 8)**
- ⑭ Remove the intake/exhaust valves, stem seals and valve springs. **(Point 9)**
- ⑮ Remove the rocker arms from the rocker shaft.

## 7. Fuel Injection System/Governor

### Point 3

Disassemble:

- Governor housing removal (See 7.5(1) governor components.)
  - a) To remove the flyweight from the camshaft, first use the special wrench (157915-0100) and remove the camshaft nut and spring washer. Then, screw the extractor (157926-5110) into the flyweight holder threaded portion and remove the flyweight assy.
  - b) To remove the governor housing from the injection pump housing, insert the tappet holder (157931-2500) first between the tappet adjuster bolt and nut in the pump housing to disconnect the camshaft and tappet. Then remove seven bolts fastening the governor housing. Remove the governor housing by tapping it with a wooden or plastic hammer.



Reassemble:

- Flyweight mounting nut tightening torque: 53.9–63.7 Nm (5.5–6.5 kgf-m)
- Coat sealant (code No. 157771-01212) on the mating faces of the governor housing and pump housing.

### Point 4

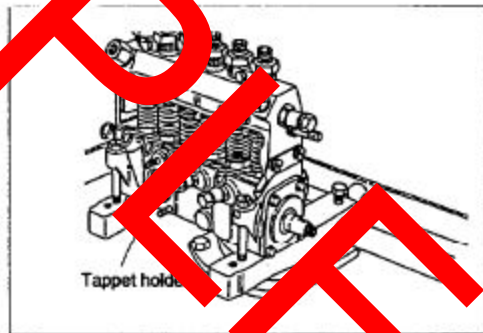
Disassemble-Reassemble:

- Remove the bottom screw from using a socket wrench handle.

### Point 5

Disassemble:

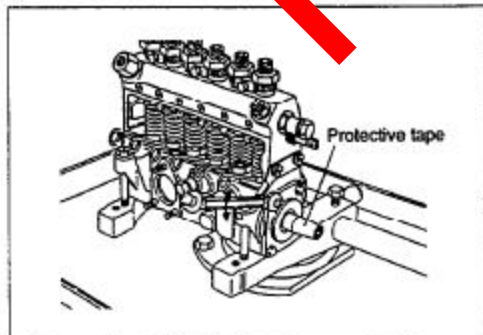
- To separate between the tappet and the cam, place the cam at the TDC and insert the special service tool (tappet holder) into the hole in the tappet. (Zexel's code No. 157931-2500)



### Point 6

Disassemble:

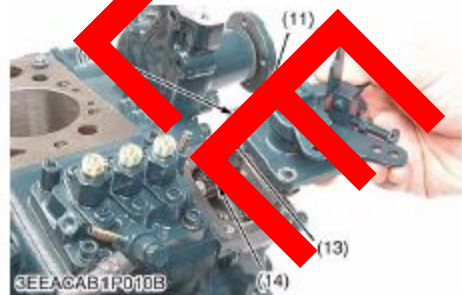
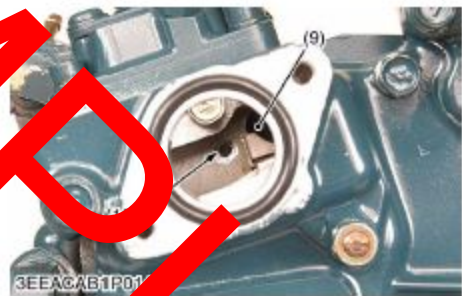
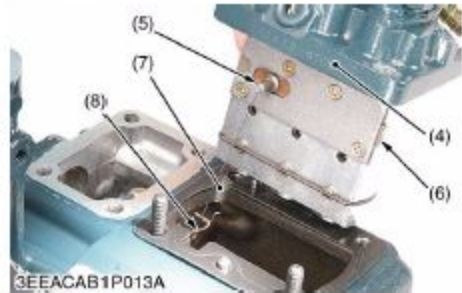
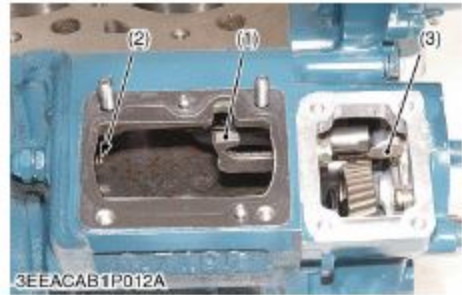
- When removing the bearing cover, wrap oil seal protecting tape on the key groove and thread. Take this action also at the time of assembly.
- Tap the camshaft from the opposite side.
- Insert a screwdriver into the gap and pry for removal.



Injection Pump, Fuel Feed Pump and Speed Control Plate  
 (for Energize to Run Type Engine Stop Solenoid) (Continue)

**(When reassembling)**

1. Move the fork lever (1) to the gear case side.
2. Hook the start spring (7) to the injection pump control rack pin (5).
3. Put the specific tool (8) through the fork lever hole of cylinder block (9) and hook the start spring (7).
4. Keep this spring slightly extended and install the injection pump (4). Make sure the control rod (6) should be pushed by the idling adjusting spring (2) and the idling (5) on the rod engages with the fork lever (1).
5. Hook the start spring (7) to the bracket (3) using the specific tool (8).
6. Hook the governor springs (small and large) (14) to the governor lever (13) using the specific tool (8) and install the speed control plate (11). Be sure to place two copper washers underneath two screws (12) in the upper of the speed control plate.
7. Install the stop solenoid rod (15) into the guide hole of cylinder block (10) and fix the stop solenoid (16) with socket head screws.



■ **NOTE**

- Be careful not to stretch the start spring (7) too long. Otherwise it may get deformed permanently.
- Make sure the start spring (7) is tight on the bracket (3).
- The sealant is applied to both sides of the soft metal gasket shim. The liquid gasket is not required for assembling.
- Addition or reduction of shim (0.05 mm) delays or advances the injection timing by approx. 0.5°.
- In disassembling and replacing, be sure to use the same number of new gasket shims with the same thickness.

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| (1) Fork Lever                      | (9) Fork Lever Hole of Cylinder Block |
| (2) Idling Adjusting Spring         | (10) Guide Hole of Cylinder Block     |
| (3) Bracket                         | (11) Speed Control Plate              |
| (4) Injection Pump                  | (12) Screw and Copper Washer          |
| (5) Injection Pump Control Rack Pin | (13) Governor Lever                   |
| (6) Injection Pump Control Rod      | (14) Governor Spring                  |
| (7) Start Spring                    | (15) Stop Solenoid Rod                |
| (8) Specific Tool                   | (16) Stop Solenoid                    |



## Troubleshooting by measuring compression pressure

Compression pressure drop is one of the major causes of increasing blow-by gas (engine oil contamination or increased engine oil consumption as a resultant phenomenon) or starting failure. The compression pressure is affected by the following factors:

1. Degree of clearance between the piston and cylinder
2. Degree of clearance of the intake / exhaust valve seat
3. Gas leak from the nozzle gasket or cylinder head gasket

The pressure will drop due to increased parts wear. Pressure drop reduces the stability of the engine.

A pressure drop may also be caused by a scratched cylinder or piston, damaged intake or dirty air cleaner element or a worn or broken piston ring. Measure the compression pressure to determine the condition of the engine.

### Compression pressure measurement method

1. Warm up the engine.
2. Stop the engine. Remove the high-pressure fuel injection lines as an assembly from the engine.

#### For engines with 2 valve cylinder heads

3. Remove the fuel injector from the cylinder to be measured. See Removal of fuel injectors on page 7-35.

#### For engines with 4 valve cylinder heads

4. Remove the valve cover assembly. See Removal of valve cover on page 6-51. Remove the fuel injector from the cylinder to be tested. See Removal of fuel injectors on page 7-35.
5. Turn off the fuel supply valve in the fuel supply line. Disconnect the fuel injection pump stop solenoid at the connector. This prevents the fuel injection pump from injecting fuel during compression testing.
6. Before installing the compression gauge ((Figure 15-1, (1)) 2 valve engine, (Figure 15-2, (1)) 4 valve engine) adapter, crank the engine with the stop solenoid disconnected for a few seconds to clear the cylinder of any residual fuel.
7. Install a nozzle seat at the tip end of the compression gauge adapter. Install the compression gauge and the compression gauge adapter at the cylinder to be measured.
8. Crank the engine until the compression gauge reading is stabilized.

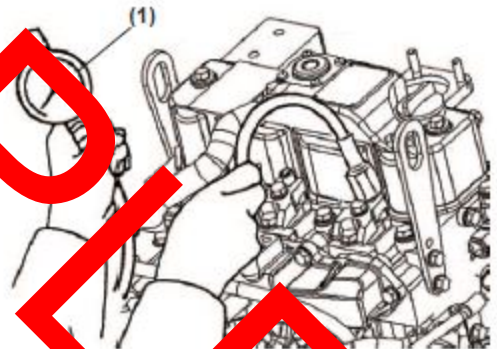


Figure 15-1

### CAUTION

Remove or install the high-pressure fuel injection lines as an assembly whenever possible. Disassembling the high-pressure fuel injection lines from the retainers or bending any of the fuel lines will make it difficult to reinstall the fuel lines.

000047en

### Disassembly of dynamo

1. Remove the rear cover (Figure 12-24, (1)).
2. Remove the nut (Figure 12-24, (2)), lock washer (Figure 12-24, (3)), and flat washer (Figure 12-24, (4)).

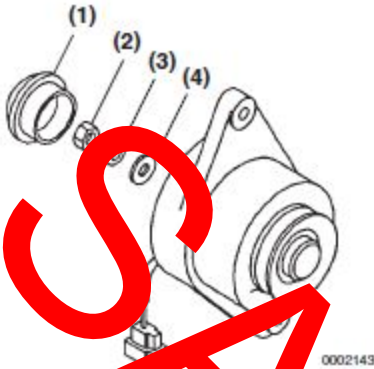


Figure 12-24

3. Remove the through bolt (Figure 12-25, (1)), pulley half (Figure 12-25, (2)), flywheel (Figure 12-25, (3)), flat washer (Figure 12-25, (4)), bearings (Figure 12-25, (5)), and spacer (Figure 12-25, (6)).

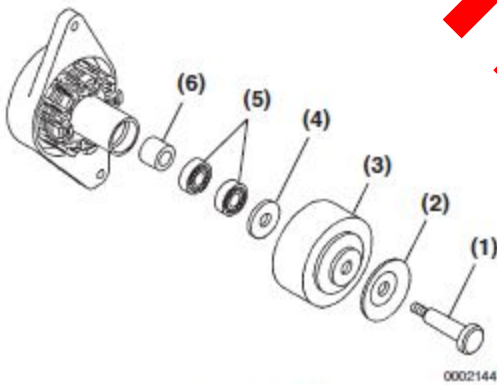


Figure 12-25

4. Remove the screws (Figure 12-26, (1)) and the stator assembly (Figure 12-26, (2)).
5. Remove the rear bearing (Figure 12-26, (3)).

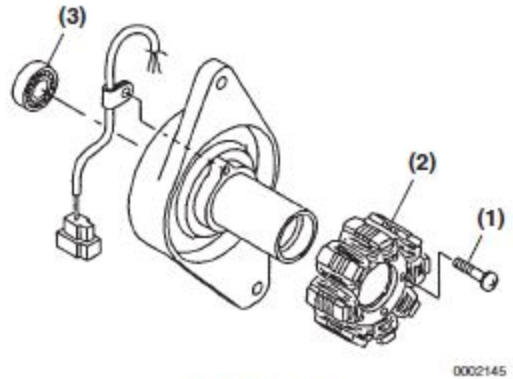


Figure 12-26

### Reassembly of dynamo

1. Reinstall the rear bearing (Figure 12-27, (3)).
2. Reinstall the stator (Figure 12-27, (2)) and screws.

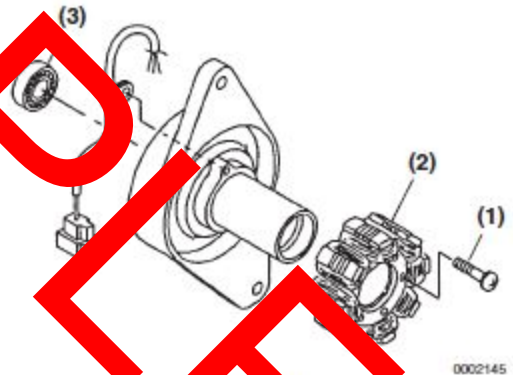


Figure 12-27