

SERVICE MANUAL



**MITSUBISHI
DIESEL ENGINE**

DO4FD-TAA

for HYUNDAI HEAVY INDUSTRIES CO.,LTD.

November 2006



INTRODUCTION

This service manual describes the specifications, maintenance and service procedures for Mitsubishi diesel engines.

To maintain the performance of the engine for many years and to ensure safe operation, it is important to use the engine correctly and conduct regular inspection and maintenance, and also to take necessary measures which involves the disassembly, inspection, repair and reassembly of the engine and engine parts.

Read this manual carefully and understand the work procedures fully before disassembling, inspecting, repairing or reassembling the engine.

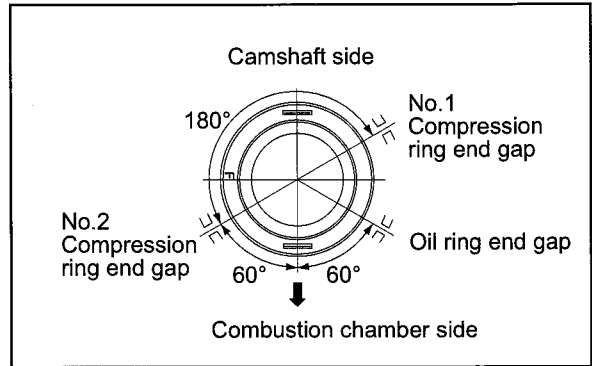
The contents of the manual are based on the engine models that are being produced at the time of publication. Due to improvements made thereafter, the actual engine that you work on may differ partially from the one described in this manual.

1.12 Installing Pistons

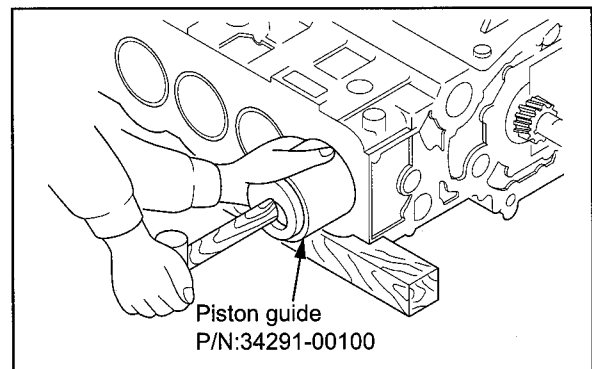
CAUTION

Do not forcefully insert the piston. It may cause damage to the piston rings and crank pin.

- (1) Apply engine oil to the circumference of the piston and piston rings.
- (2) Orient the ring end gaps diagonally opposite each other avoiding the piston pin direction and its right angle direction.
- (3) Turn the crankshaft to bring the crank pin of the cylinder to the top dead center.
- (4) Orient the front mark on the top of piston toward engine front.
- (5) Using a piston guide, insert the piston from the top face of crankcase into the cylinder sleeve.



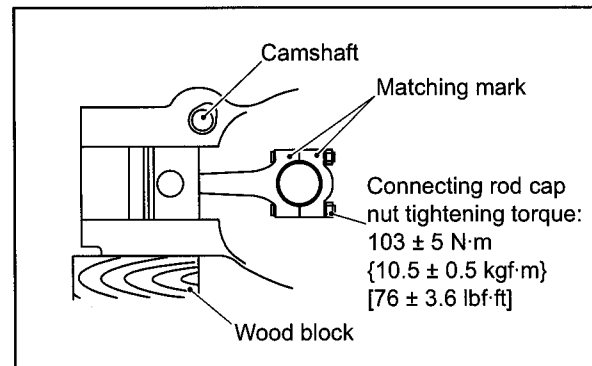
Orientation of piston ring end gap



Installing piston

1.13 Installing connecting rod cap

- (1) When the big end of the connecting rod comes into contact with the crank pin, turn the crankshaft 180° while pressing the piston head.
- (2) Install the connecting rod cap with its match mark facing on the same side as the match mark on the connecting rod.
- (3) Tighten the connecting rod cap nuts evenly and progressively to the specified torque.
- (4) Inspect end play of the connecting rod. Loosen the cap nuts and retighten them if end play is small.

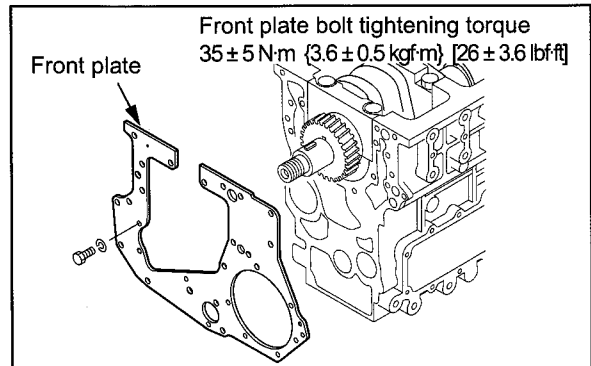


Installing connecting rod cap

2. Reassembling timing gear and camshaft

2.1 Installing front plate

- (1) Clean the mounting surface of the gasket.
- (2) Apply sealant to the gasket to prevent falling.
- (3) Install the gasket.
- (4) Install the front plate, and secure it with mounting bolts.



Installing front plate

2.2 Installing tappet

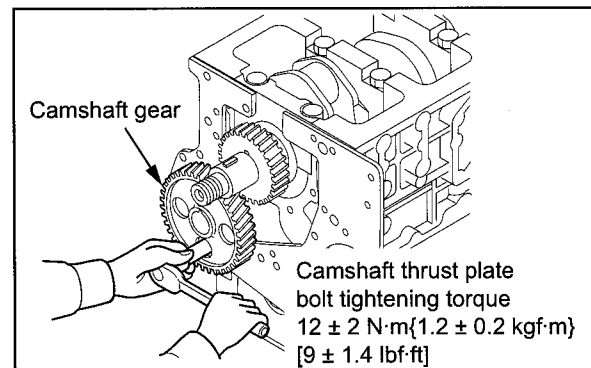
Coat the periphery of tappets with engine oil, insert them into the tappet holes and place them gently on the camshafts.

2.3 Installing camshaft

CAUTION

Be careful not to damage camshaft journals, cams and camshaft holes during insertion.

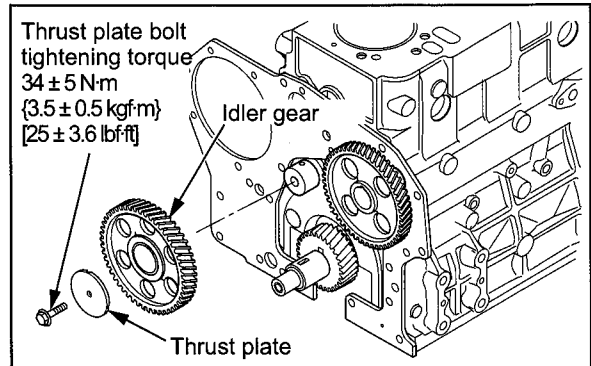
- (1) Apply engine oil to the camshaft journals and cams.
- (2) Slowly insert the camshaft assembly.
- (3) Tighten the thrust plate bolt to the specified torque.
- (4) Make sure that the camshaft rotates lightly. Move the camshaft gear back and forth, and make sure there is end play.



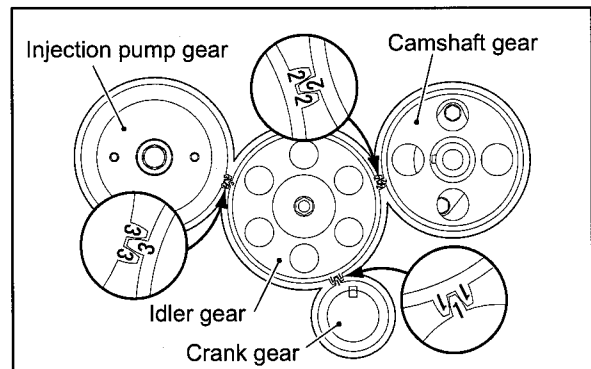
Installing camshaft

2.4 Installing idler gear

- (1) Apply engine oil to the idler gear shaft evenly.
- (2) Install the idler gear with its match marks aligned with the marks on the crankshaft and camshaft gears.
- (3) Install the thrust plate to the idler gear, and tighten the mounting bolt to the specified torque.



Installing idler gear



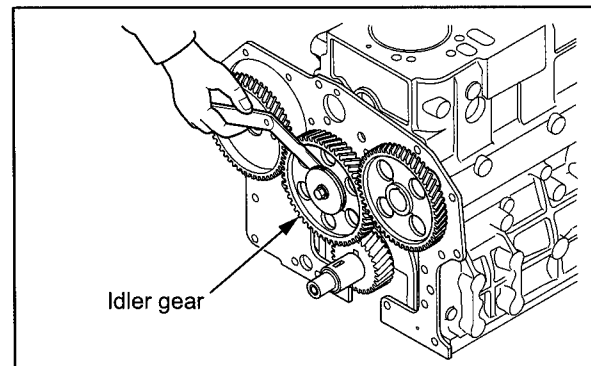
Timing gear train

2.5 Inspecting and adjusting timing gear after installation

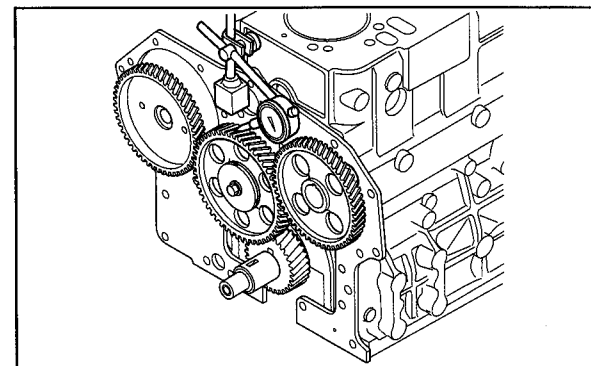
Be sure to inspect and adjust the timing gear when the timing gear has been reassembled.

2.5.1 Inspecting backlash and end play

After installing the timing gears, be sure to inspect and adjust the backlash and end play between gears.



Measuring idler gear end play



Measuring backlash of timing gear