

CHAPTER 14

DISASSEMBLY AND REASSEMBLY (Direct Sea-Water Cooling Engine)

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DISASSEMBLY AND REASSEMBLY

This chapter covers the most efficient method of disassembling and reassembling the engine. Some parts may not have to be removed, depending on the maintenance and inspection objective. In this case, removal is unnecessary and disassembling in accordance with this section is not required.

However, if you follow the disassembly and reassembly procedures, adjustment methods, and precautions described in this chapter, you should be able to prevent subsequent troubles and a loss in engine performance after reassembly. The engine must be test-run to confirm that the engine is functioning properly and delivering full performance. Since this chapter does not cover detailed disassembly and reassembly procedures for each part, refer to pertinent chapters for details.

1. Disassembly and Reassembly Precautions

- (1) Record the parts that require replacement, and replace them with new parts during reassembly.
Be careful not to reassemble with the old parts.
- (2) Do not forget adhesives and packing agents for sealing during reassembly.
Packing of the specified quality and packing agents matched to the packing material must be used.
- (3) Arrange the disassembled parts into groups, such as individual cylinders, intake and exhaust, etc.
Cylinder No. is indicated No. 1, No. 2 and/or No. 3 cylinder from Flywheel side.
- (4) The prescribed tightening torque must be observed when tightening bolts and nuts. Moreover, since the strength of the bolts and nuts depends on their material, be sure to use the correct bolts and nuts at their proper places.

Special bolts, nuts Head cover, rod bolts, flywheel, etc.

Strong bolts Bolts marked (7) (JIS.7T)

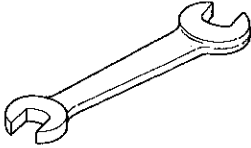
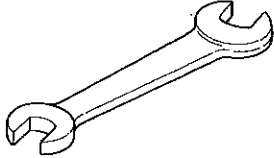
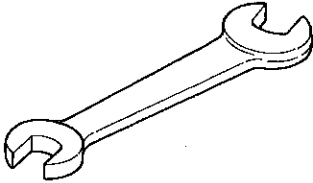
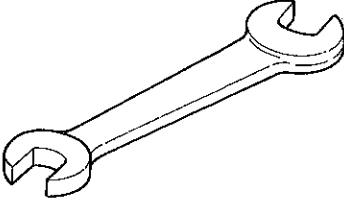
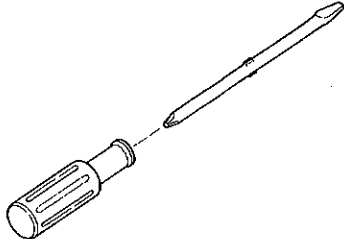
Common bolts, nuts Unmarked (JIS.4T)

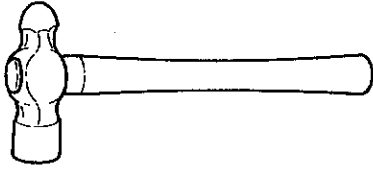
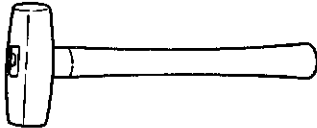
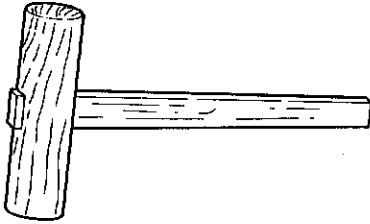
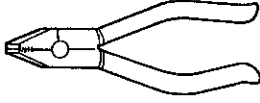
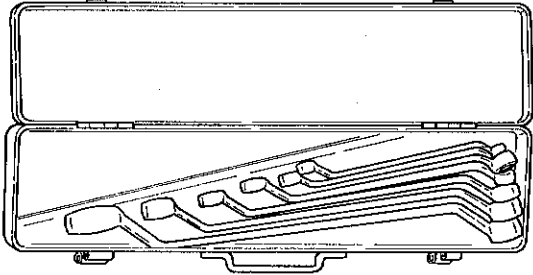
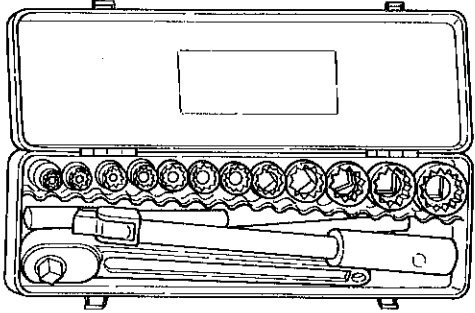
In addition, check the disassembly and reassembly precautions for each engine model.

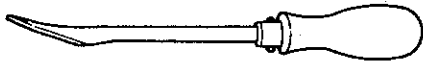
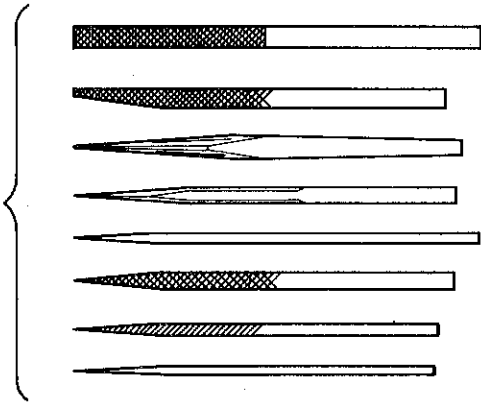
2. Disassembly and Reassembly Tools

The following tools are necessary when disassembling and reassembling the engine. These tools must be used according to disassembly process and location.

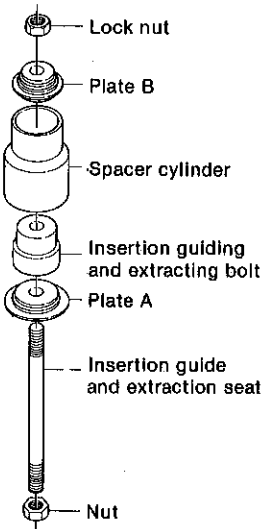
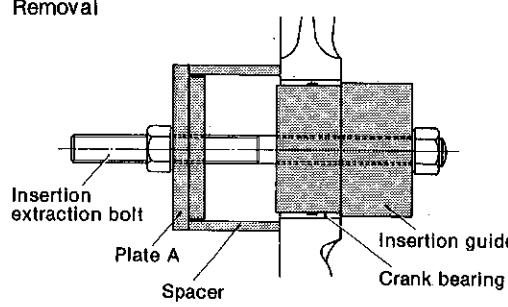
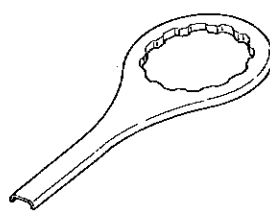
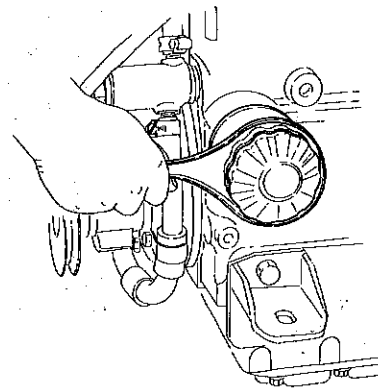
2-1. General handtools

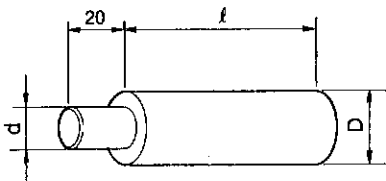
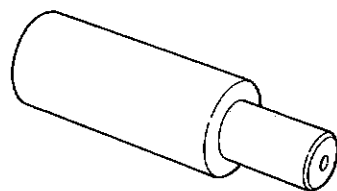
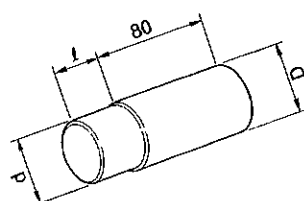
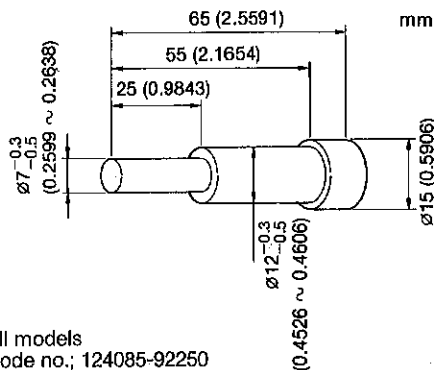
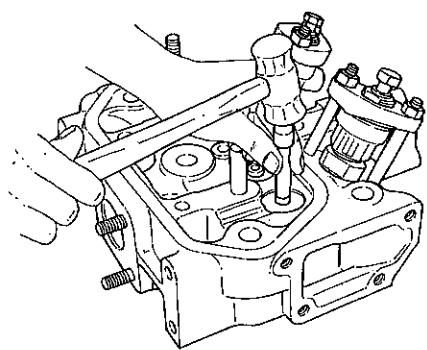
Name of tool	Illustration	Remarks
Wrench		YANMAR standard Code no.; 28110-100130 Size; 10 x 13
Wrench		YANMAR standard Code no.; 28110-120140 Size; 12 x 14
Wrench		YANMAR standard Code no.; 28110-170190 Size; 17 x 19
Wrench		YANMAR standard Code no.; 28110-220240 Size; 22 x 24
Screwdriver		YANMAR standard Code no.; 104200-92350

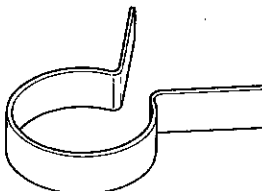
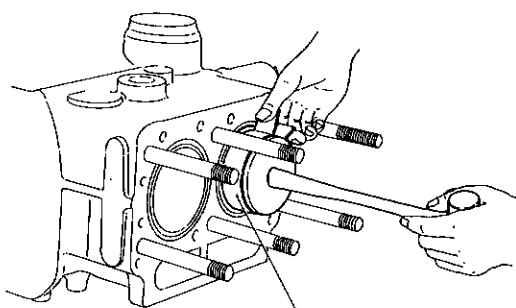
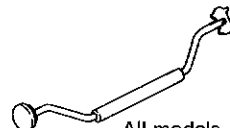
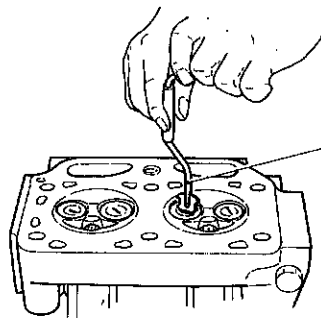
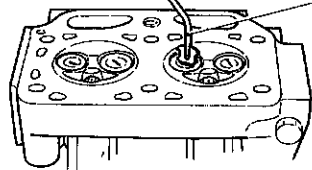
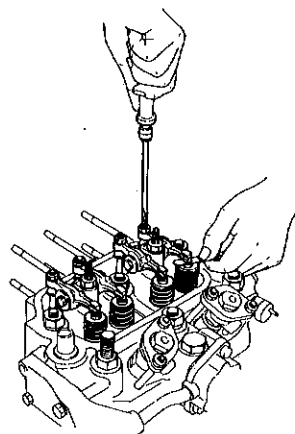
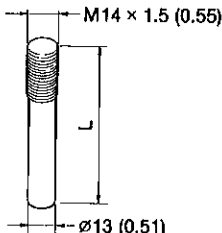
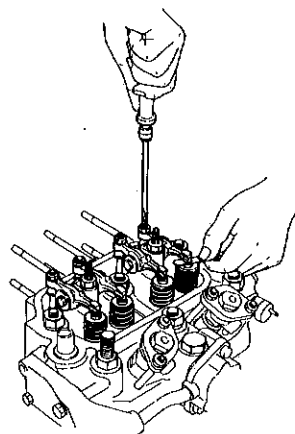
Name of tool	Illustration	Remarks
Steel hammer		Local supply
Copper hammer		Local supply
Mallet		Local supply
Nippers		Local supply
Pliers		Local supply
Offset wrench		Local supply 1 set
Box spanner		Local supply 1 set

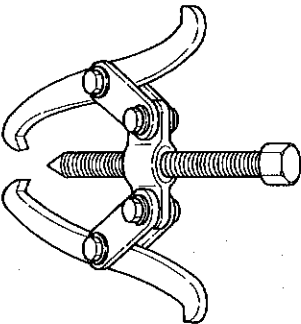
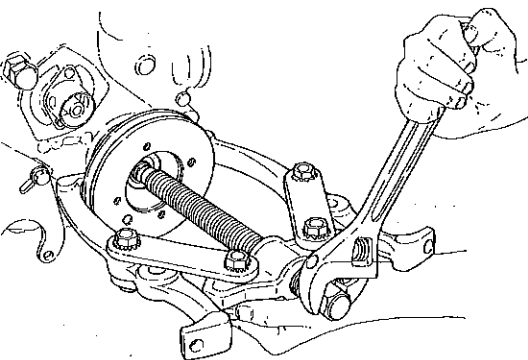
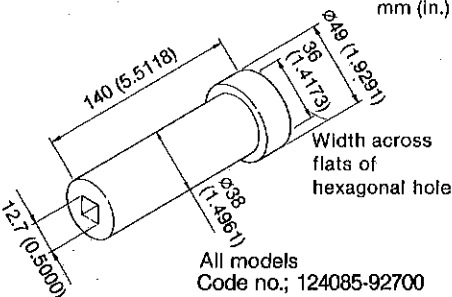
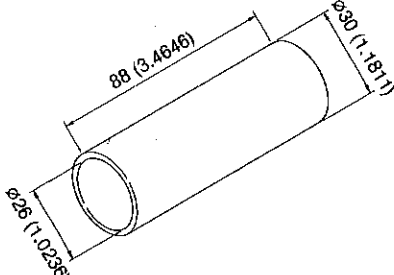
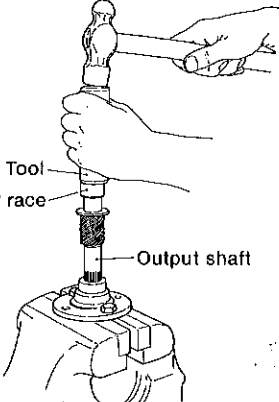
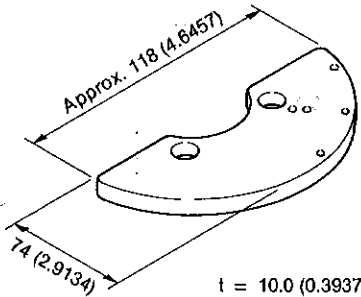
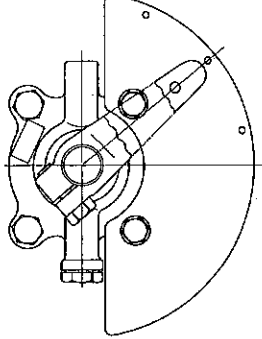
Name of tool	Illustration	Remarks
Scraper		Local supply
Lead rod		Local supply
File		Local supply 1 set
Rod spanner for hexagon socket head screws		Local supply Size: 4mm (0.1575in.) 5mm (0.1969in.)

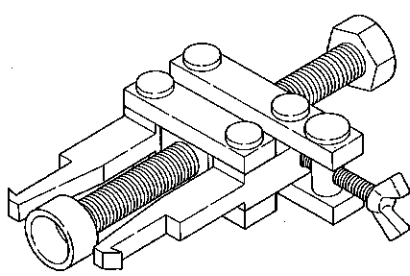
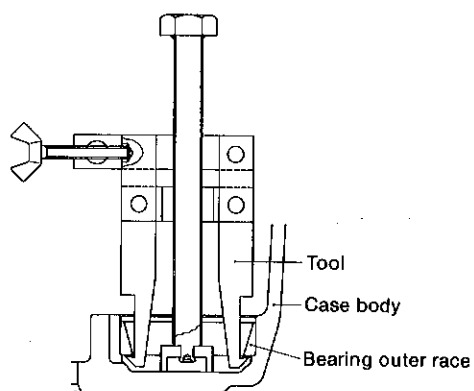
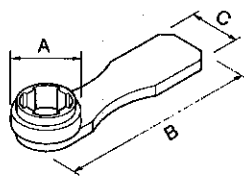
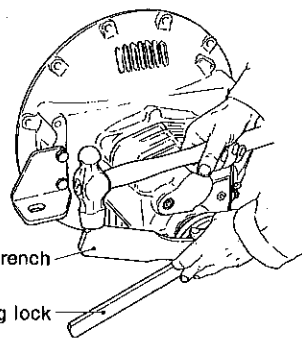
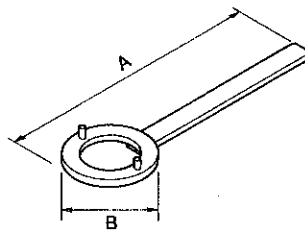
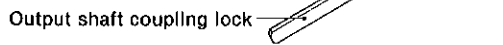
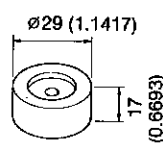
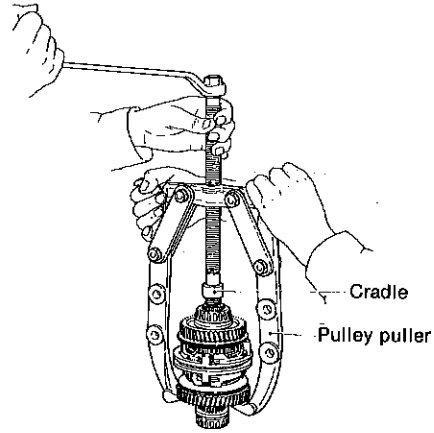
2-2 Special handtools

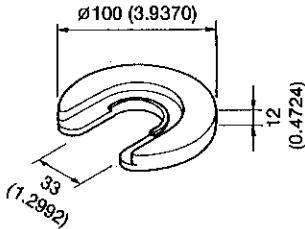
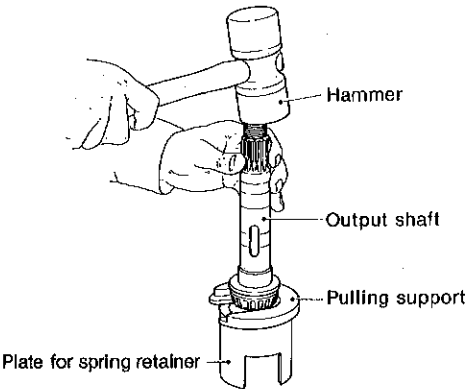
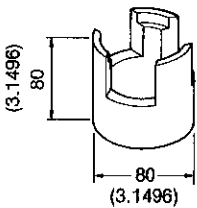
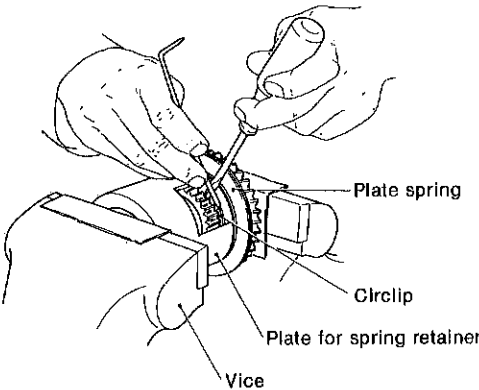
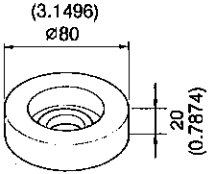
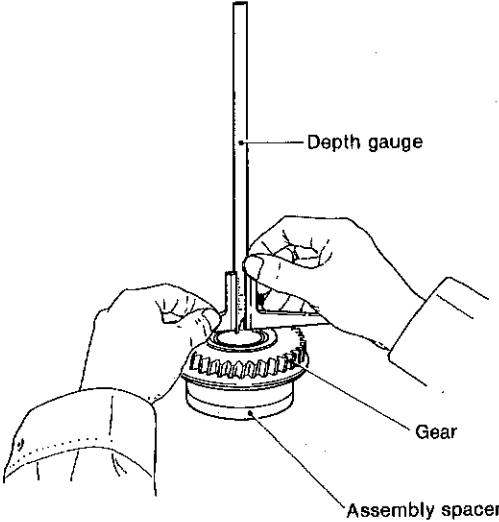
Name of tool	Shape and size	Application					
Main bearing replacer		Removal 					
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Model	Assembly code no.						
1GM10(C), 2GM20(F)(C), 3GM30(F)(C)	124085-92400						
3HM35(F)(C)	128670-92400						
Lubricating oil No. 2 filter case remover							

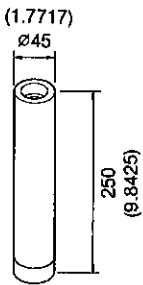
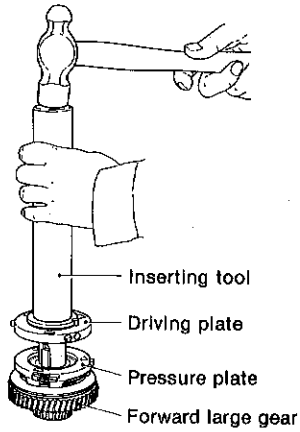
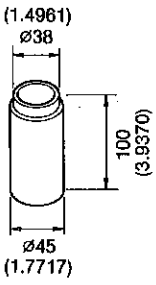
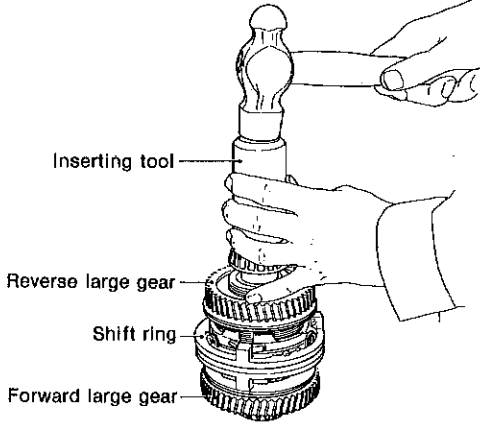
Name of tool	Shape and size	Application																								
	mm (in.)																									
Piston pin insertion/ extraction tool		 Piston pin extractor																								
	<table><tr><th>Model</th><th>d</th><th>D</th><th>l</th><th>Code No.</th></tr><tr><td>1GM10 (C)</td><td></td><td>$\phi 20_{-0.15}^{+0.15}$</td><td>97</td><td>124085</td></tr><tr><td>2GM20 (F)(C)</td><td>$\phi 9.5 \pm 0.1$ (0.3700 ~ 0.3780)</td><td>$\phi 20_{-0.25}^{+0.15}$ (0.7776 ~ 0.7815)</td><td>(3.8189)</td><td>-92260</td></tr><tr><td>3GM30 (F)(C)</td><td></td><td></td><td></td><td></td></tr><tr><td>3HM35 (F)(C)</td><td>$\phi 12$ (0.4724)</td><td>$\phi 22$ (0.8661)</td><td>80 (3.1496)</td><td>128670 -92260</td></tr></table>	Model	d	D	l	Code No.	1GM10 (C)		$\phi 20_{-0.15}^{+0.15}$	97	124085	2GM20 (F)(C)	$\phi 9.5 \pm 0.1$ (0.3700 ~ 0.3780)	$\phi 20_{-0.25}^{+0.15}$ (0.7776 ~ 0.7815)	(3.8189)	-92260	3GM30 (F)(C)					3HM35 (F)(C)	$\phi 12$ (0.4724)	$\phi 22$ (0.8661)	80 (3.1496)	128670 -92260
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3HM35 (F)(C)	$\phi 12$ (0.4724)	$\phi 22$ (0.8661)	80 (3.1496)	128670 -92260																						
Connecting rod small end bushing insertion/ extraction tool	mm (in.) 																									
	<table><tr><th>Model</th><th>d</th><th>D</th><th>l</th><th>Code No.</th></tr><tr><td>1GM10 (C)</td><td></td><td>$\phi 22_{-0.3}^{+0.3}$</td><td>20</td><td>124085</td></tr><tr><td>2GM20 (F)(C)</td><td>$\phi 20_{-1.0}^{+0.3}$ (0.7480 ~ 0.7756)</td><td>$\phi 22_{-0.0}^{+0.3}$ (0.8268 ~ 0.8543)</td><td>(0.7874)</td><td>-92270</td></tr><tr><td>3GM30 (F)(C)</td><td></td><td></td><td></td><td></td></tr><tr><td>3HM35 (F)(C)</td><td>$\phi 23_{-0.6}^{+0.3}$ (0.8819 ~ 0.8937)</td><td>$\phi 25_{-0.6}^{+0.3}$ (0.9606 ~ 0.9724)</td><td>3.0 (1.1811)</td><td>128670 -92270</td></tr></table>	Model	d	D	l	Code No.	1GM10 (C)		$\phi 22_{-0.3}^{+0.3}$	20	124085	2GM20 (F)(C)	$\phi 20_{-1.0}^{+0.3}$ (0.7480 ~ 0.7756)	$\phi 22_{-0.0}^{+0.3}$ (0.8268 ~ 0.8543)	(0.7874)	-92270	3GM30 (F)(C)					3HM35 (F)(C)	$\phi 23_{-0.6}^{+0.3}$ (0.8819 ~ 0.8937)	$\phi 25_{-0.6}^{+0.3}$ (0.9606 ~ 0.9724)	3.0 (1.1811)	128670 -92270
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Intake and exhaust valve insertion/ extraction tool	mm (in.) 																									
	All models Code no.: 124085-92250																									

Name of tool	Shape and size	Application						
Piston ring compressor	 <table><tr><th>Model</th><th>Code No.</th></tr><tr><td>3GM35(F)(C)</td><td>102700-92140</td></tr><tr><td>1GM10(C), 2GM20(F)(C), 3GM30(F)(C)</td><td>101200-92140</td></tr></table>	Model	Code No.	3GM35(F)(C)	102700-92140	1GM10(C), 2GM20(F)(C), 3GM30(F)(C)	101200-92140	 Piston insertion guide
Model	Code No.							
3GM35(F)(C)	102700-92140							
1GM10(C), 2GM20(F)(C), 3GM30(F)(C)	101200-92140							
Valve lapping handle	 All models Code no.; 28210-000031	 Lapping tool						
Valve lapping powder	 All models Code no.; 28210-000070							
Feeler gauge 0.2mm (0.0079)	 All models Code no.; 28312-200750							
Fuel injection valve replacer	 All models Code no.; 101104-92180	mm (in.) 						

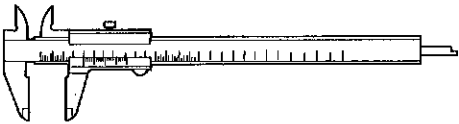
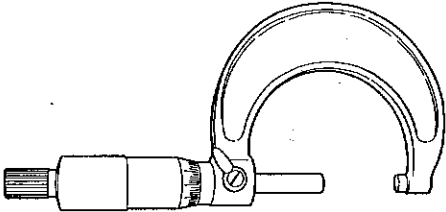
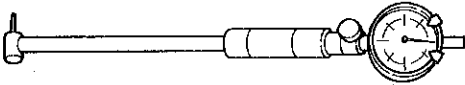
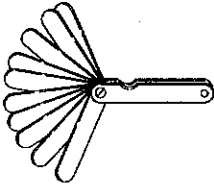
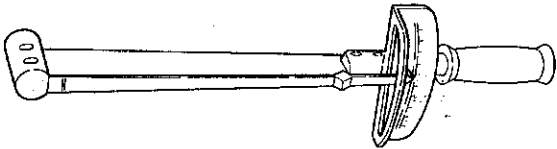
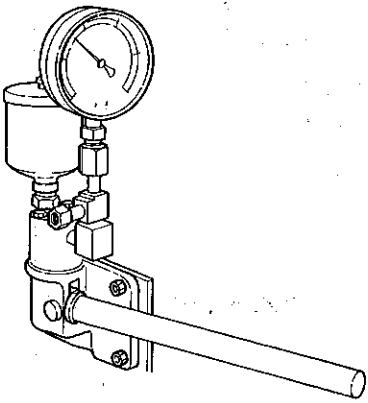
Name of tool	Shape and size	Application
Pulley puller	 Rocal supply	 Removing the coupling
Tool for turning crankshaft gear nut Tightening the crankshaft gear nut	 mm (in.) Width across flats of hexagonal hole All models Code no.; 124085-92700	
Driving tool for bearing inner race (for models 1GM10, 2GM20(F), 3GM30(F))	 mm (in.) Code no.; 177088-09150	 Tool Bearing inner race Output shaft The bearing inner race of the drive output shaft.
Operation lever locating jig [for models 1GM10 2GM20(F) and 3GM30(F)]	 mm (in.) t = 10.0 (0.3937) Code no.; 177088-09160	 Adjusting the operation lever

Name of tool	Shape and size	Application								
Extractor tool for the bearing outer race (for models 1GM10, 2GM20(F), 3GM30(F))	 Code no.; 177088-09160	 Extracting the bearing outer race from the housing.								
Output shaft nut wrench for 3HM35(F)	 <table><thead><tr><th>A</th><th>B</th><th>C</th><th>Code No.</th></tr></thead><tbody><tr><td>ø55 (2.1654)</td><td>230 (9.0551)</td><td>45 (1.7717)</td><td>177099-09010</td></tr></tbody></table>	A	B	C	Code No.	ø55 (2.1654)	230 (9.0551)	45 (1.7717)	177099-09010	 Output shaft nut wrench
A	B	C	Code No.							
ø55 (2.1654)	230 (9.0551)	45 (1.7717)	177099-09010							
Output shaft coupling lock for 3HM35(F)	 <table><thead><tr><th>A</th><th>B</th><th>Code No.</th></tr></thead><tbody><tr><td>290 (11.4173)</td><td>ø100 (3.9370)</td><td>177099-09020</td></tr></tbody></table>	A	B	Code No.	290 (11.4173)	ø100 (3.9370)	177099-09020	 Output shaft coupling lock For removing and tightening the output shaft nut.		
A	B	Code No.								
290 (11.4173)	ø100 (3.9370)	177099-09020								
Puller cradle for 3HM35(F)	 Code no.; 177095-09170	 For removing the output shaft when using a pulley puller.								

Name of tool	Shape and size	Application
Pulling support for 3HM35(F)	mm (in.)  Code no.; 177099-09030	 Hammer Output shaft Pulling support Plate for spring retainer For removing the needle bearing inner race, thrust collar and thrust bearing of the output shaft (forward gear side).
Plate for spring retainer for 3HM35(F)	mm (in.)  Code no.; 177095-09070	 Plate spring Circlip Plate for spring retainer Vice For removing and installing the plate spring, retainer and circlip of the large gears (forward and reverse).
Assembly spacer for 3HM35(F)	mm (in.)  Code no.; 177090-09010	 Depth gauge Gear Assembly spacer For determining the thickness of the adjusting plate.

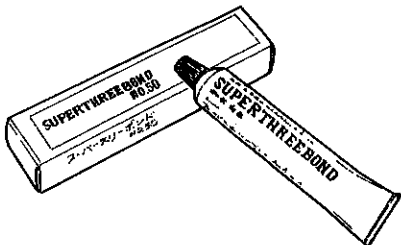
Name of tool	Shape and size	Application
Inserting tool for 3HM35(F)	mm (in.)  Code no.; 177095-09020	 For installing the spacer and needle bearing inner race of the output shaft. (reverse small gear side).
Inserting tool for 3HM35(F)	mm (in.)  Code no.; 177099-09040	 For installing the thrust bearing and thrust collar (reverse large gear side).

2-3 Measuring instruments

Nomenclature		Accuracy and range
Vernier calipers		1/20 mm, 0 ~ 150 mm,
Micrometer		1/100 mm, 0 ~ 25 mm, 25 ~ 50 mm, 50 ~ 75 mm, 75 ~ 100 mm,
Cylinder gauge		1/100 mm, 18 ~ 35 mm, 35 ~ 60 mm, 50 ~ 100 mm,
Thickness gauge		0.05 ~ 2mm (0.0020 ~ 0.0787 in.)
Torque wrench		0 ~ 13 kg-m. (0 ~ 94 ft-lb)
Nozzle tester		0 ~ 500 kg/cm ² (0 ~ 7111.7 lb/in. ²)

3. Others

Supplementary packing agent



Type	Use
"Three Bond 3B8-005"	White. Since "Three Bond 3B8-005" is a nonorganic solvent, it does not penetrate asbestos sheets made principally or completely of asbestos. Always use it with grey asbestos sheet packing for complete oil tightness. When "Three Bond 3B8-005" is difficult to obtain, use silicone nonsolvent type "Three Bond No. 50."
"Three Bond No. 50"	Grey. Silicone nonsolvent type liquid packing. Semidry type packing agent coated on mating faces to prevent oil and gas leakage. Does not penetrate asbestos sheet and assures complete oil tightness.
"Three Bond No. 1"	Reddish brown. Paste type wet viscous liquid packing. Ideal for mating faces which are removed but reinstalled. Particularly used to prevent water leakage and to prevent seizing of bolts and nuts.

The surface to be coated must be thoroughly cleaned with thinner or benzene and completely dry. Moreover, coating must be thin and uniform.

Products of Three Bond Co., Ltd.

Paint



Color spray

Metallic Ecote Silver is used entirely on this engine.

Wipe off the surface to be painted with thinner or benzene, shake the spray can well, push the button at the top of the can and spray the paint onto the surface from a distance of 30 ~ 40 cm.

Paint

Type

White paint
(Mixed oil paint)

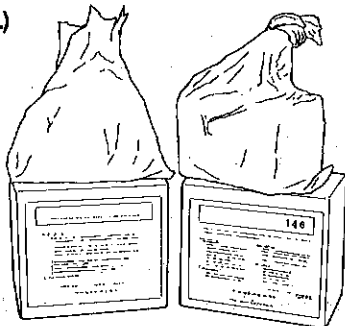
Usage point

Cylinder liner
insertion hole

Use

Paint parts that contact the cylinder body when inserting the cylinder liner to prevent rusting and water leakage.

Yanmar cleaner (Ref.)



Cooling passage cleaner is made by adding one part "Unicon 146" to about 16 parts water (specific gravity ratio). To use, drain the water from the cooling system, fill the system with cleaner, allowing it to stand overnight (10 ~ 15 hours). Then drain out the cleaner, fill the system with water, and operate the engine for at least one hour.

NEJI LOCK SUPER 203M: a locking agent for screws (Ref.)



For coating on screws and bolts to prevent loosening, rusting, and leaking. To use, wipe off all oil and water on the threads of studs, coat the threads with screw lock, tighten the stud bolt, and allow to stand until the screw lock hardens. Use screw lock on the oil intake pipe threads, oil pressure switch threads, fuel injection timing shim faces, and front axle bracket mounting bolts.

4. Disassembly

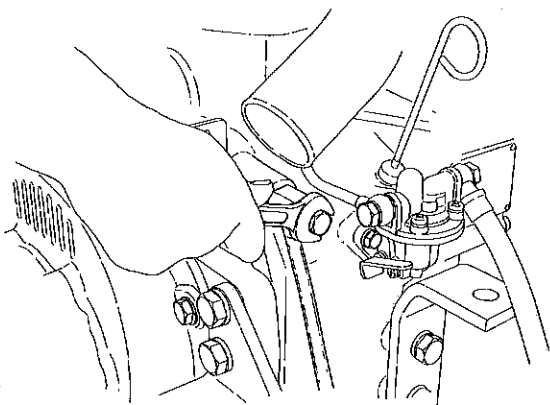
4-1. General Precautions

Maintenance and inspection should be done as effectively as possible, avoiding unnecessary disassembling except for general overhauls.

At the time of disassembly, record the presence of parts which require repair or replacement, and make arrangements beforehand for procurement of such parts so that problems will not occur during the reassembling operation.

4-2. Dismantling engine model 1GM10(C)

4-2.1 Open the cooling water drain cock and drain the cooling water

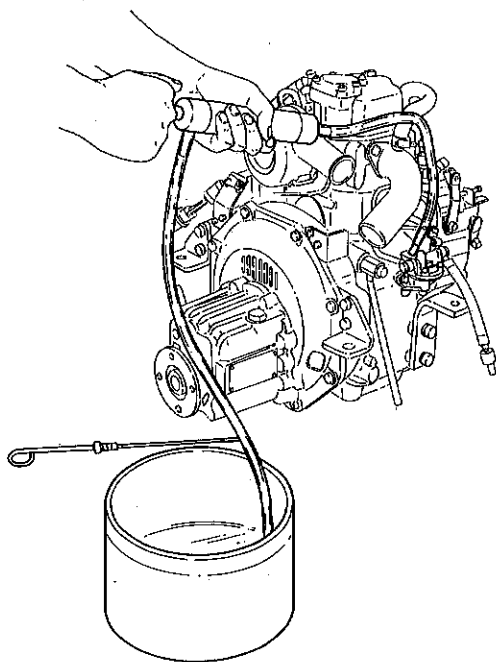


4-2.2 Drain the lubricating oil

(1) Engine side

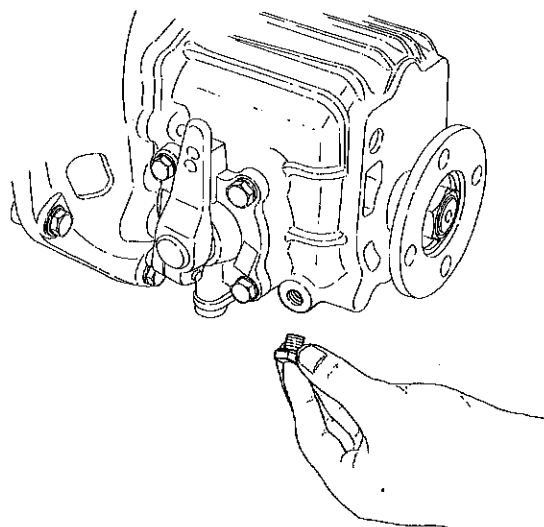
Insert a suction tube into the dipstick hole and pump out the oil with a waste oil pump (option).

Alternatively remove the plug of oil pan and oil intake pipe, and drain the oil.



(2) Clutch side

Pump out the oil from the filler/dipstick hole using a waste oil pump or remove the drain plug at the bottom stern side of the clutch case and drain the oil.

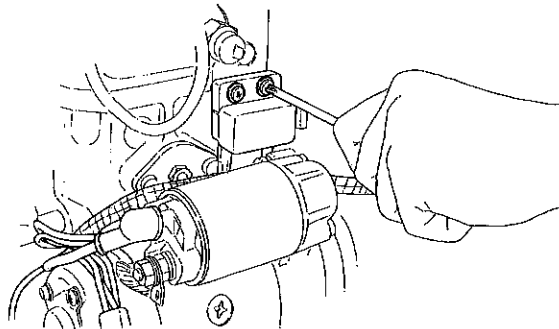


4-2.3 Disconnect the remote control cables

- (1) Clutch remote control cable and bracket
- (2) Speed remote control cable and bracket
- (3) Engine stop remote control cable and bracket
- (4) Decompression remote control cable

4-2.4 Disconnect the electrical wiring

- (1) Alternator wiring
- (2) Starter motor wiring
- (3) Water temperature switch wiring
- (4) Oil pressure switch wiring
- (5) Tachometer sender wiring

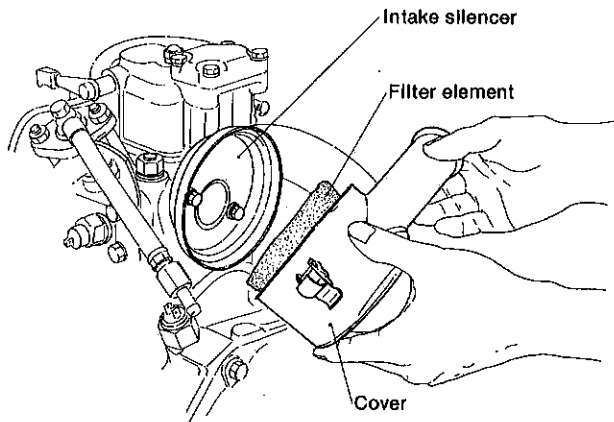


4-2.5 Disconnect the cooling water inlet pipe

NOTE: Always close the Kingston cock.

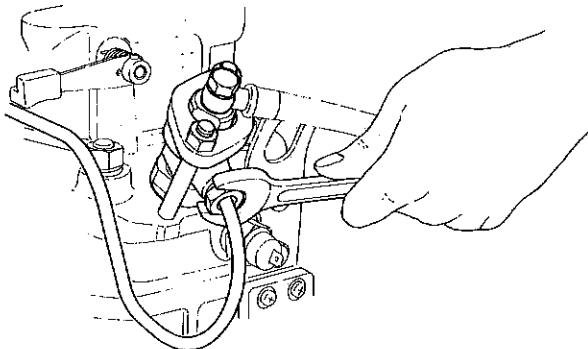
4-2.6 Remove the air intake silencer

Remove the intake silencer clip and the filter element. Then remove the set screw and the cover.

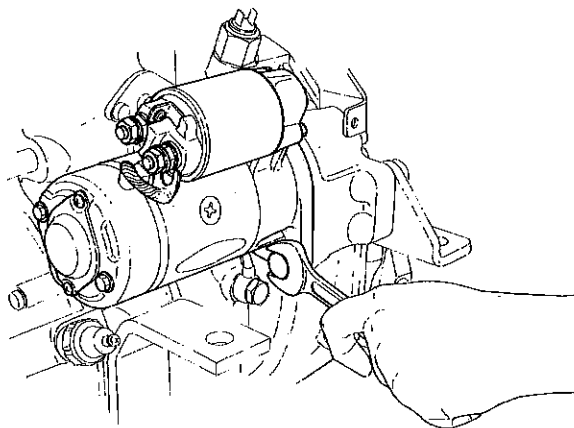


4-2.7 Disconnect the fuel piping

- (1) Fuel tank to feed pump
- (2) Feed pump to fuel filter
- (3) Fuel filter to fuel injection pump
- (4) Fuel high pressure pipe
- (5) Fuel return pipe

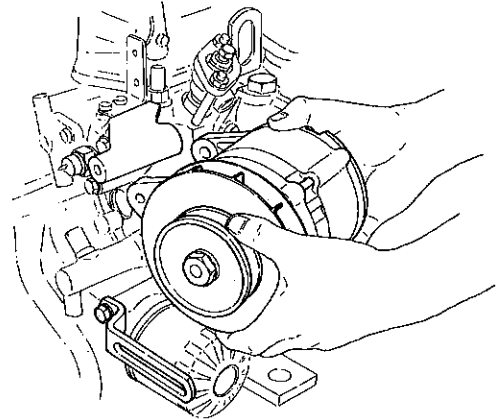


4-2.8 Remove the starter motor



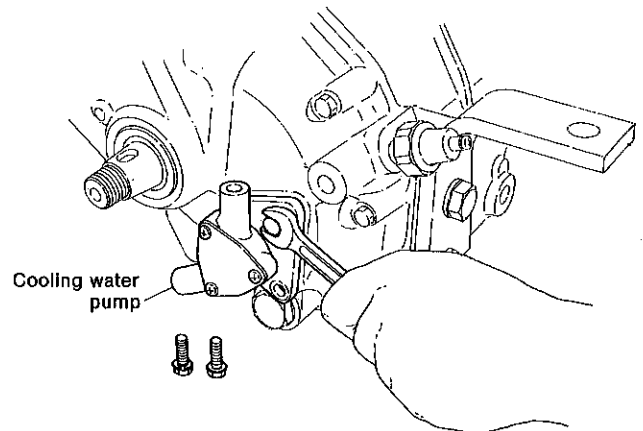
4-2.9 Remove the alternator

- (1) Loosen the adjusting bolt and remove the V-belt
- (2) Remove the alternator and bracket



4-2.10 Remove the water pump

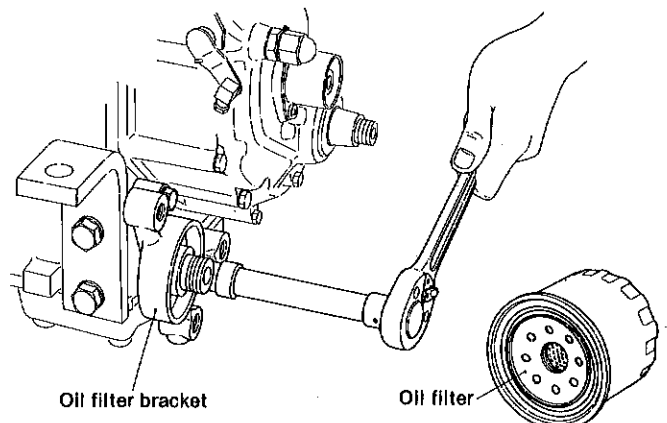
- (1) Disconnect the hose between the water pump and cooling water cylinder inlet joint.



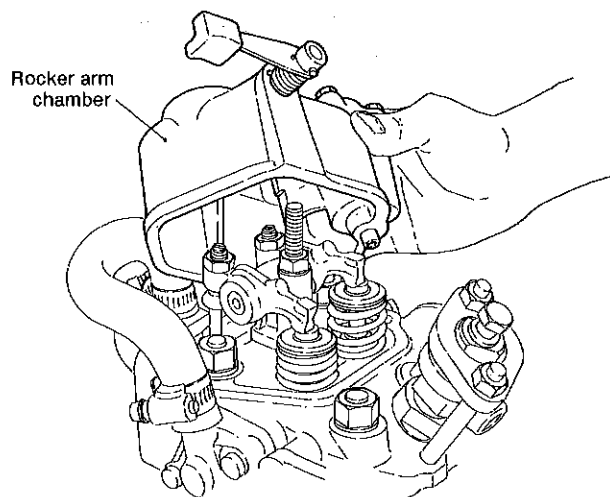
- (2) Loosen the water pump mounting bolts and remove the water pump.

4-2.11 Remove the oil filter and bracket.

- (1) Remove the oil filter using the remover.
- (2) Loosen the joint bolts and remove the oil pipes.
- (3) Remove the oil filter bracket.

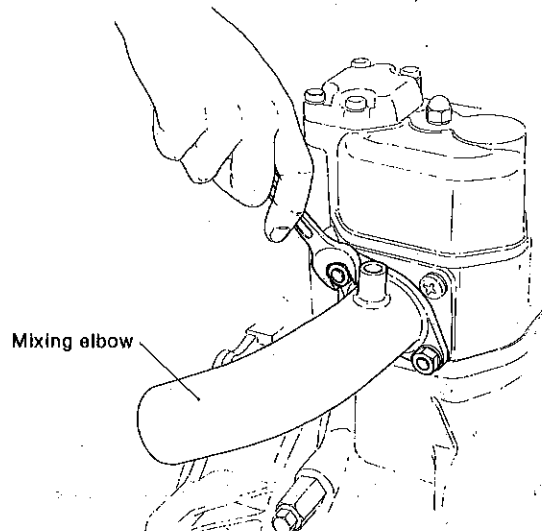


4-2.12 Remove the rocker arm chamber



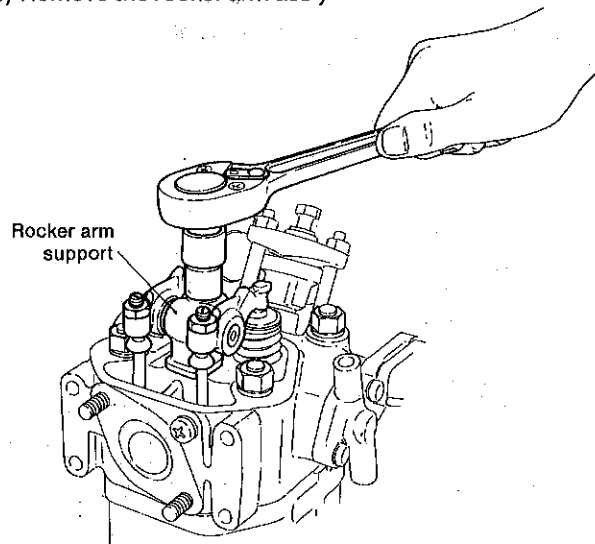
4-2.13 Remove the mixing elbow

- (1) Disconnect the cooling water bypass hose
- (2) Remove the mixing elbow



4-2.14 Remove the rocker arms

- (1) Remove the rocker arm ass'y

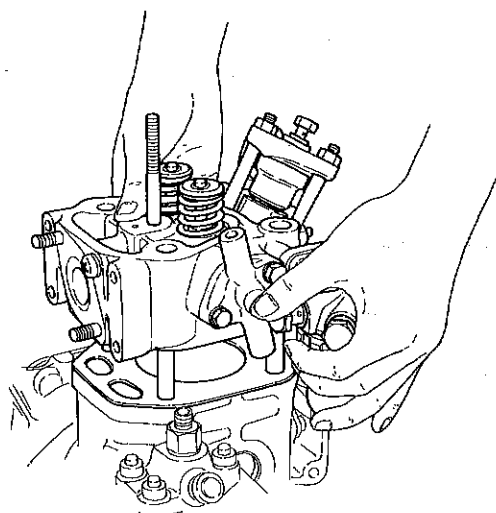


- (2) Pull the push rods
- (3) Remove the cotter pins of the intake and exhaust valve springs.

NOTE: Arrange parts by intake and exhaust.

4-2.15 Remove the cylinder head

- (1) Disconnect the lubricating oil pipe located at the cylinder block and the cylinder head.
- (2) Remove the cylinder head nuts in the prescribed order, and remove the cylinder head.

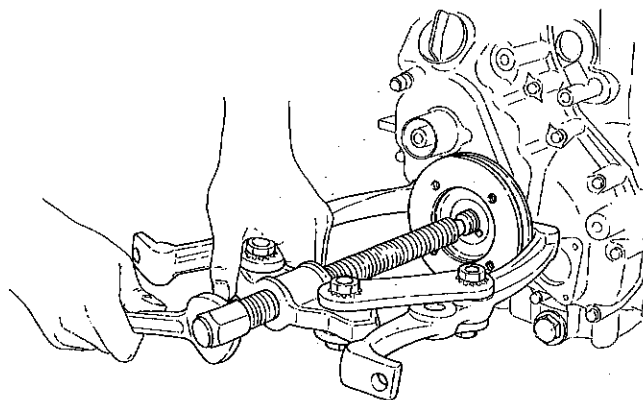


- (3) Remove the gasket packing

NOTE: Clearly identify the front and back of the gasket packing.

4-2.16 Remove the crankshaft pulley

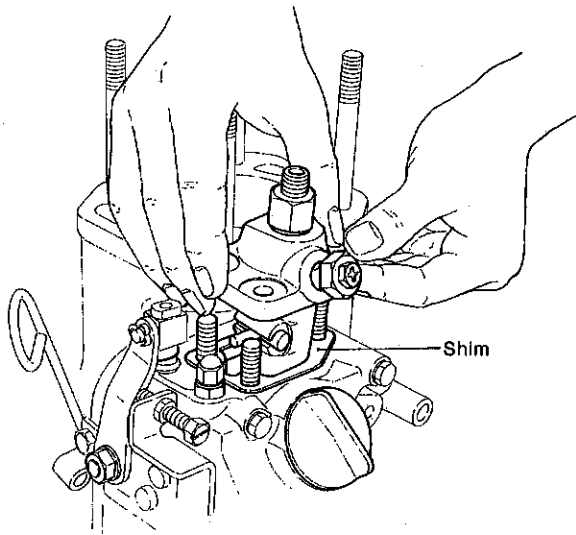
Remove the crankshaft pulley end nut and remove the V-pulley and key.



4-2.17 Remove the injection pump

- (1) Remove the fixing nut of the fuel injection pump
- (2) Open the oil supply hole, move the governor lever 2, and take out the fuel injection pump by matching the control rack with the cut-off part of the gear case.

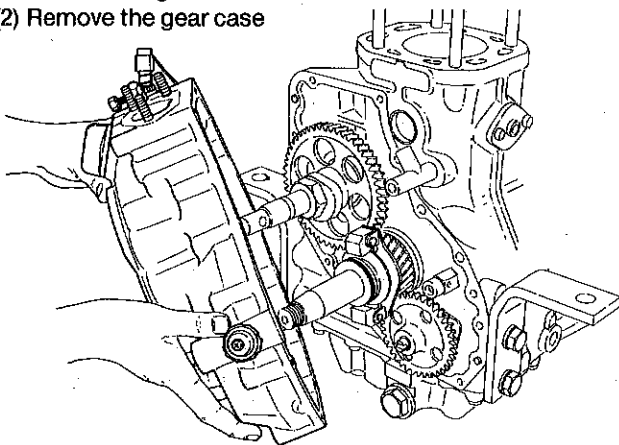
- (3) Remove the injection timing adjustment shims



CAUTION: Note the number and total thickness of the timing adjustment shims.

4-2.18 Remove the timing gear case

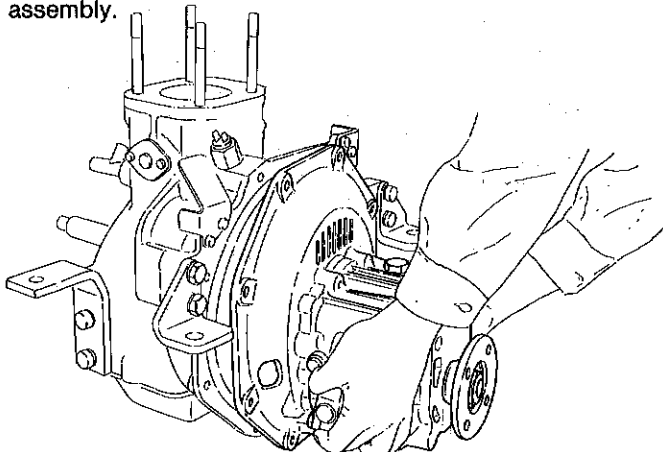
- (1) Remove the starting shaft cover, loosen the bolt with the hexagonal socket head, and withdraw the pin for handle fitting.
(2) Remove the gear case



- (3) Remove the thrust collar, thrust needle bearing, and governor sleeve.

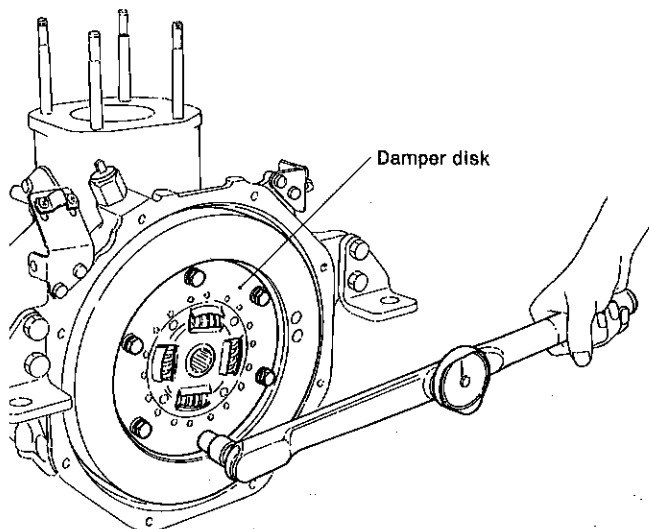
4-2.19 Remove the clutch assembly

Loosen the mounting flange bolts and remove the clutch assembly.



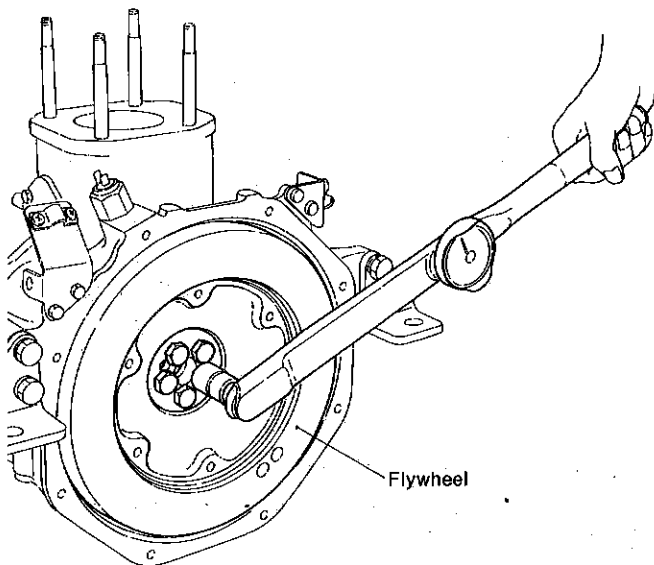
4-2.20 Remove the flywheel

- (1) Remove the clutch disk

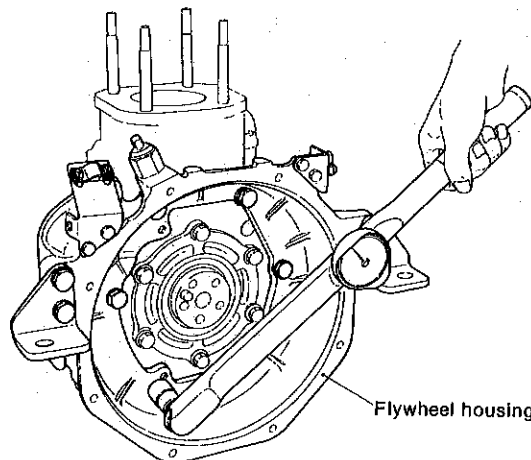


- (2) Remove the flywheel

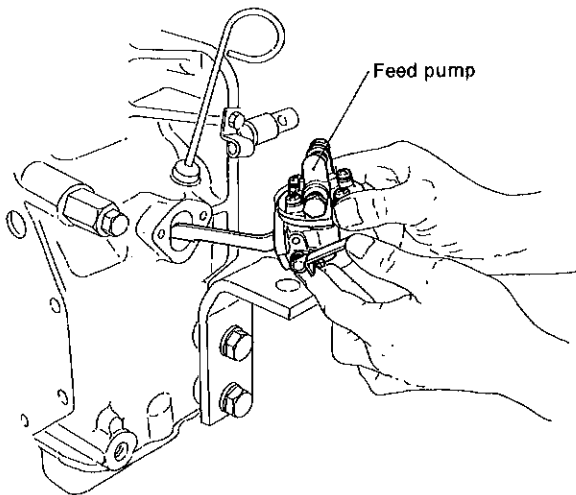
Screw-in the two bolts for securing the clutch disc (slightly to the left and right sides of the flywheel) and remove it by pulling on the bolts.



4-2.21 Remove the flywheel housing



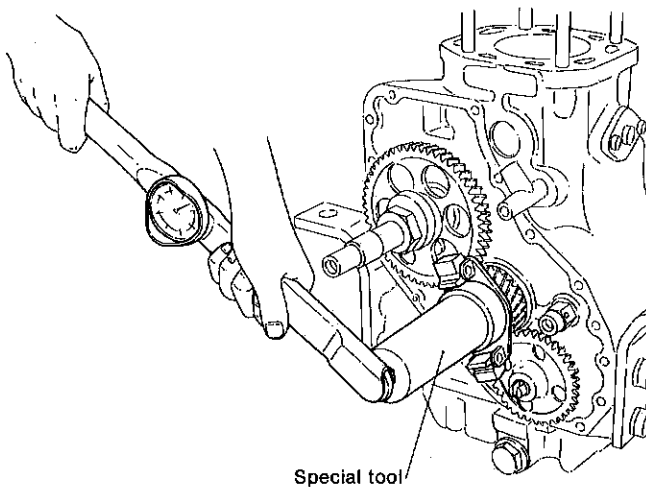
4-2.22 Remove the feed pump



4-2.23 Remove the lubricating oil dipstick

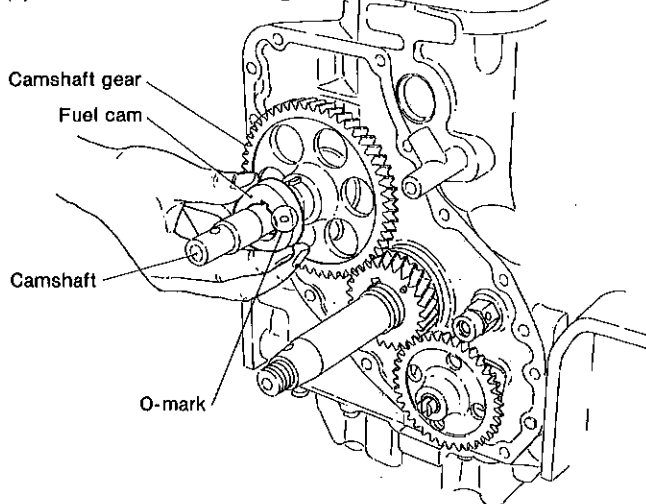
4-2.24 Remove the governor weight assembly

Remove the crankshaft end nut and remove the governor weight assembly.



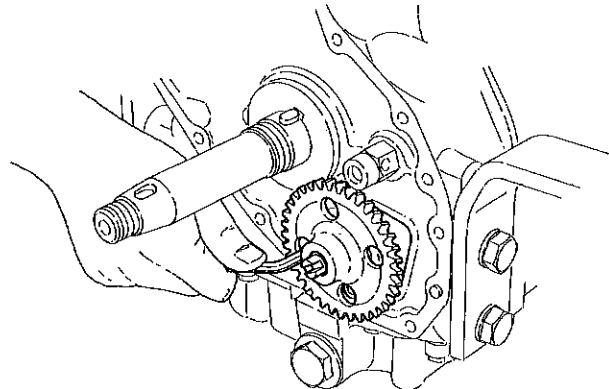
4-2.25 Remove the camshaft gear

- (1) Remove the camshaft end nut and remove the fuel cam
- (2) Remove the camshaft gear

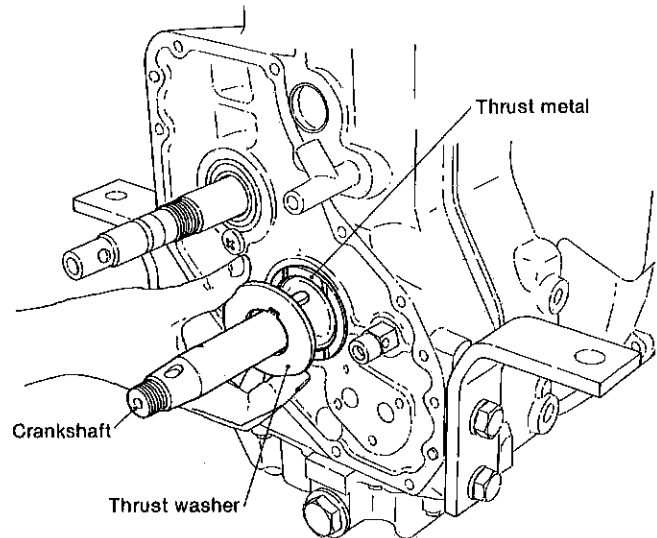


4-2.26 Remove the crankshaft gear and the lubricating oil pump

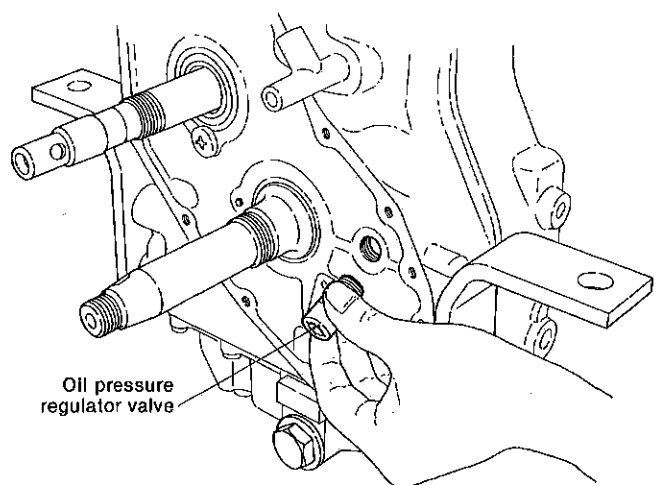
- (1) Remove the crankshaft gear
- (2) Remove the lubricating oil pump and gear assembly



- (3) Remove the thrust metal and the thrust washer from the crankshaft.

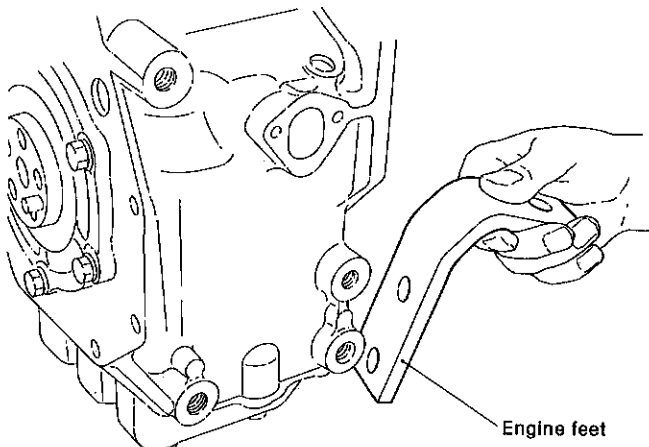


- (4) Remove the lubricating oil pressure control valve.

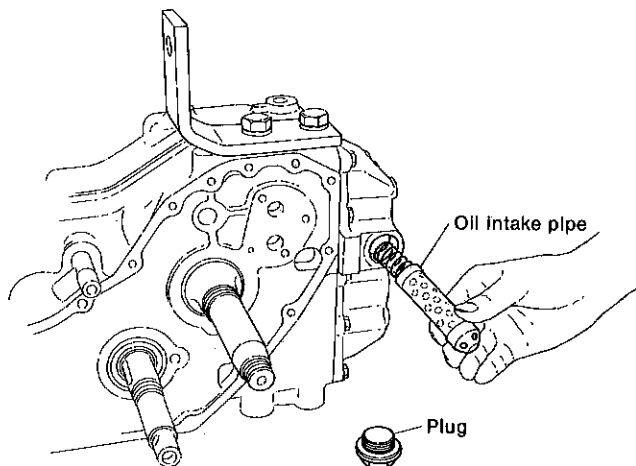


4-2.27 Turn the engine onto its side

- (1) Remove the engine feet of the camshaft side
- (2) Turn the cylinder block over so that the camshaft side is on the bottom.

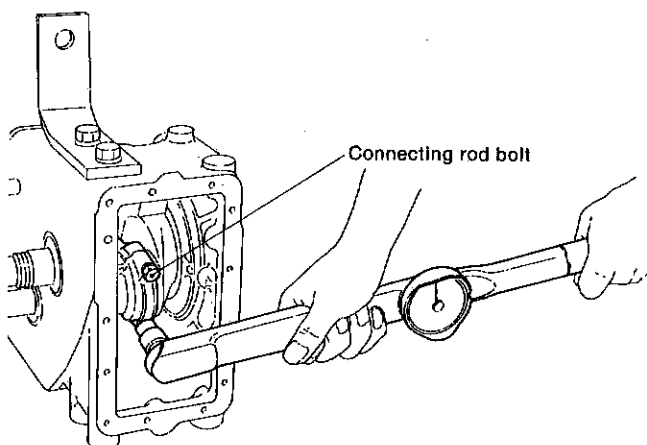


4-2.28 Remove the oil pan and the oil intake pipe

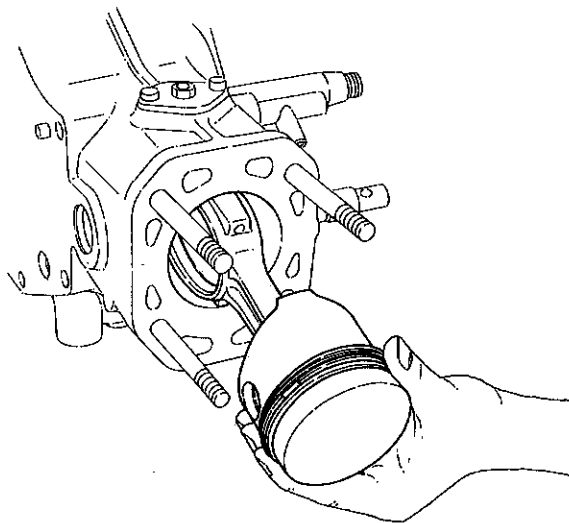


4-2.29 Remove the piston connecting rod assembly

- (1) Set the piston to bottom dead center and remove the connecting rod bolts.

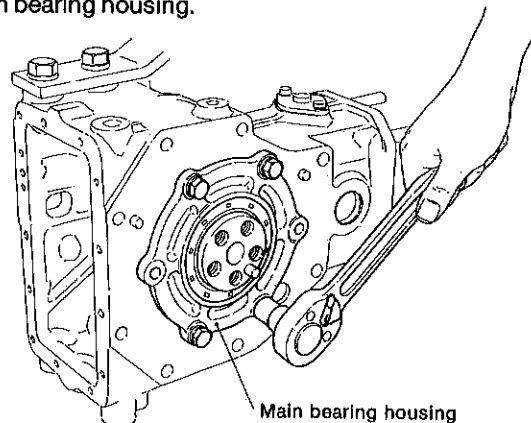


- (2) Set the piston to top dead center, turning the crankshaft so that the connecting rod does not separate from the crank pin. Pull out the piston connecting rod assembly by pushing the large end of the rod with a pusher.



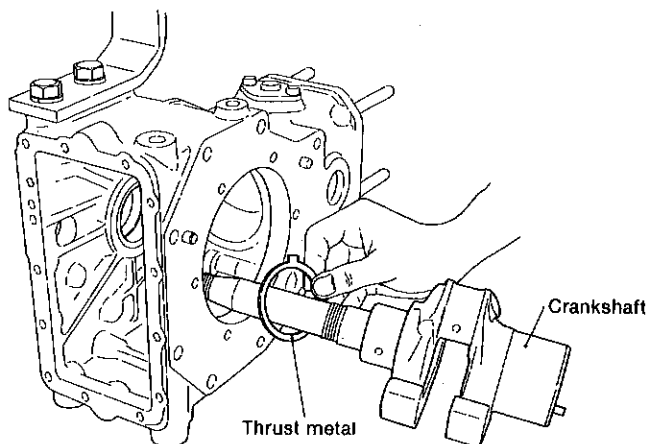
4-2.30 Remove the main bearing housing

Remove the main bearing housing bolt and remove the main bearing housing.



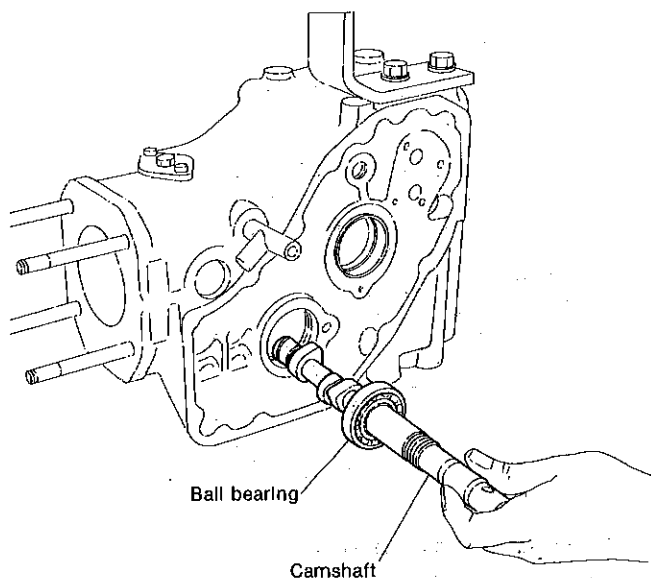
4-2.31 Pull the crankshaft

- (1) Pull the crankshaft
- (2) Remove the thrust metal



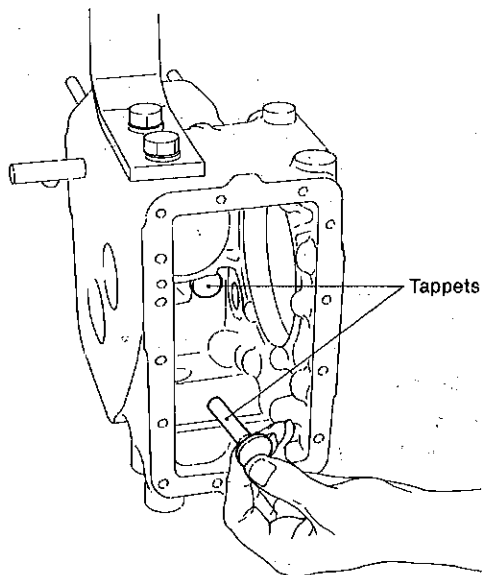
4-2.32 Remove the camshaft

- (1) Remove the camshaft bearing set screw
- (2) Check that all the tappets are separated from the cam, and pull the camshaft out.



4-2.33 Remove the tappets

NOTE: Arrange the removed tappets by intake and exhaust.

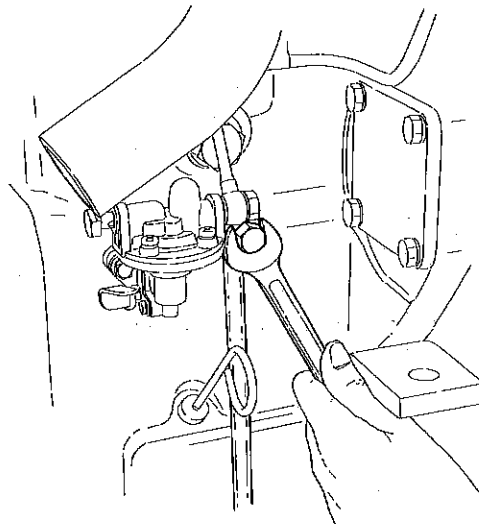


4.3 Dismantling engine models 2GM20(C) and 3GM30(C)

For the model 3HM35 engine, refer to the model 3GM30(C) instructions as the procedure is almost the same for both engine models.

4-3.1 Open the cooling water drain cocks and drain the cooling water

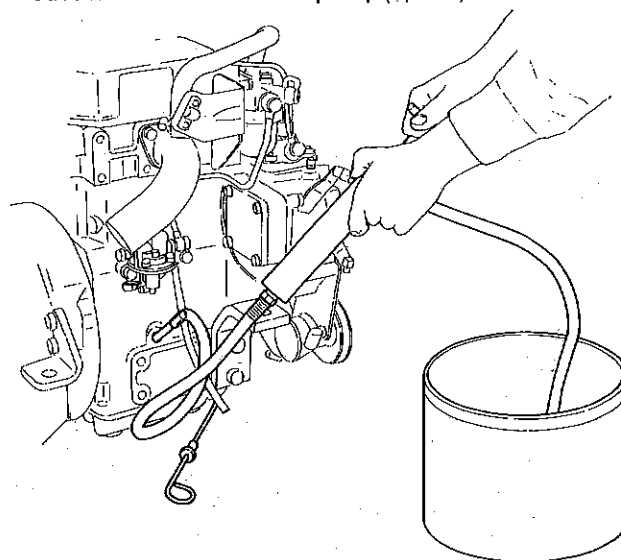
- (1) Cylinder body water drain cock



- (2) Exhaust pipe water drain cock [only for model 3GM30(C)]

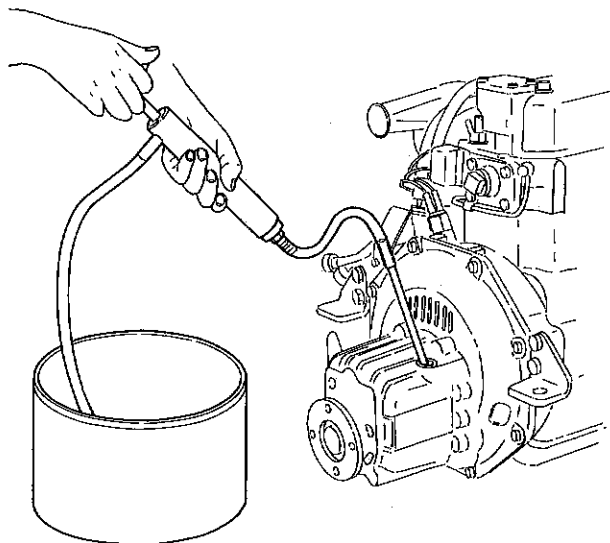
4-3.2 Drain the lubricating oil

- (1) Engine side
Insert a suction tube into the dipstick hole and pump out the oil with a waste oil pump (option).

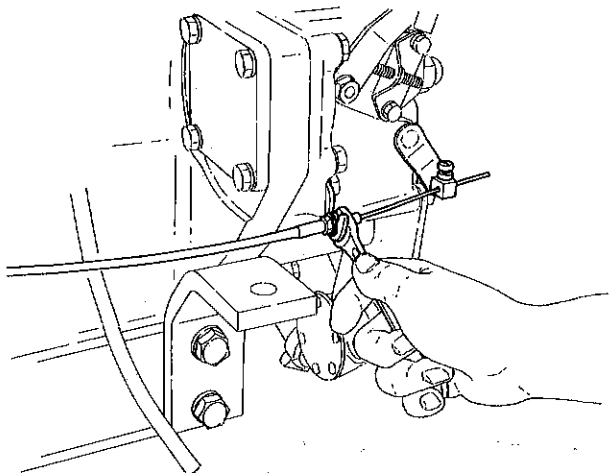


(2) Clutch side

Pump out the oil from the filler/dipstick hole using a waste oil pump or remove the drain plug at the bottom stern side of the clutch case and drain the oil.

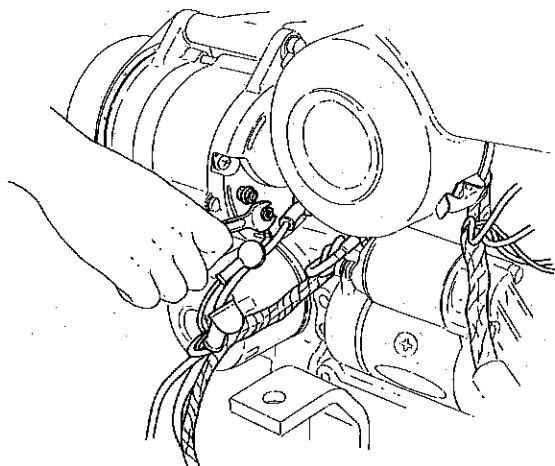


4-3.3 Disconnect the remote control cables



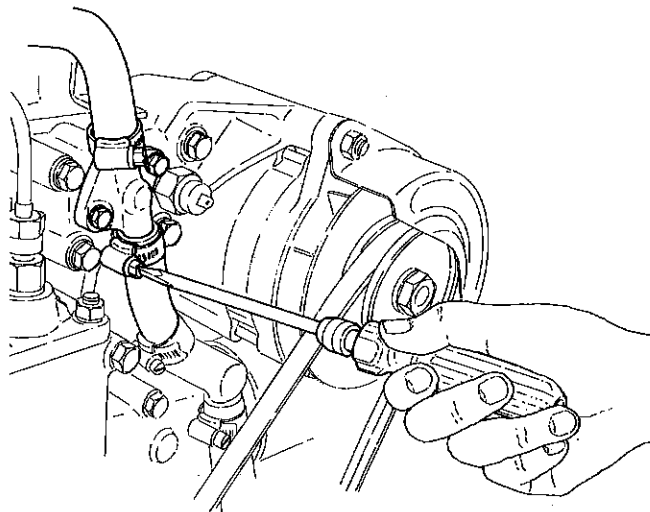
- (1) Clutch remote control cable and bracket
- (2) Speed remote control cable and bracket
- (3) Engine stop remote control cable and bracket
- (4) Decompression remote control cable

4-3.4 Disconnect the electrical wiring



- (1) Alternator wiring
- (2) Starter motor wiring
- (4) Water temperature switch wiring
- (4) Oil pressure switch wiring
- (5) Tachometer sender wiring

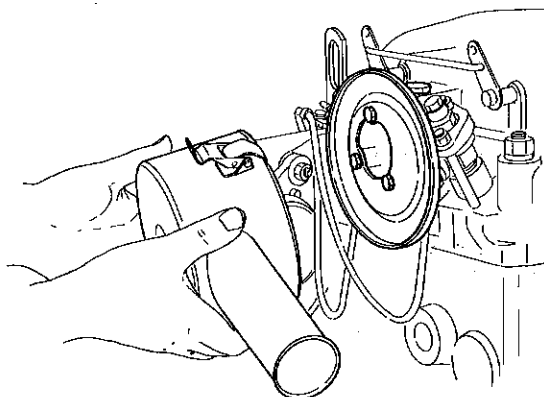
4-3.5 Disconnect the cooling water inlet pipe and bilge pipe



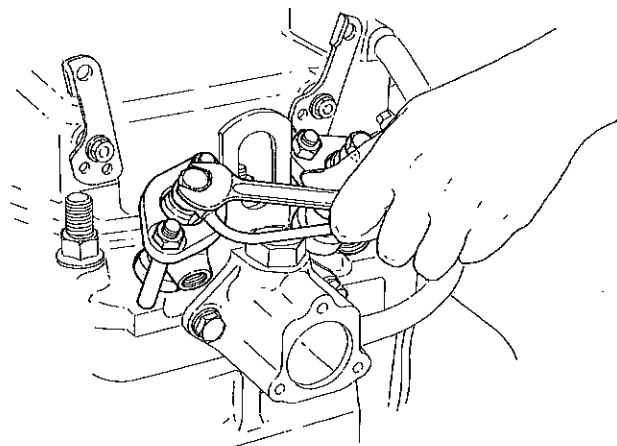
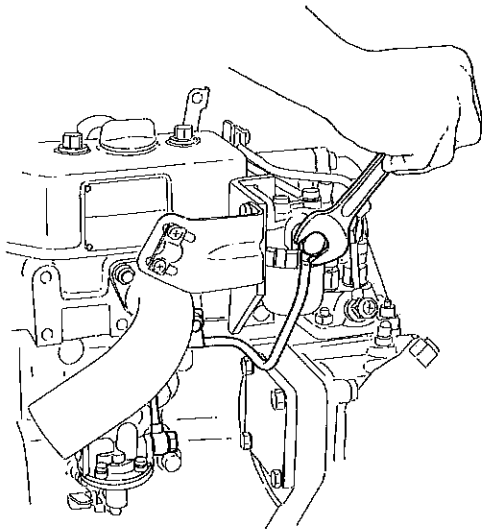
NOTE: Always close the Kingston cock

4-3.6 Remove the air intake silencer

Remove the intake silencer clip and the filter element. Then remove the set screw and the cover.

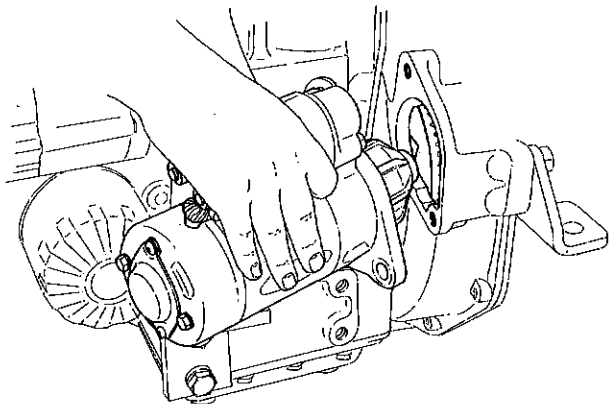


4-3.7 Disconnect the fuel piping



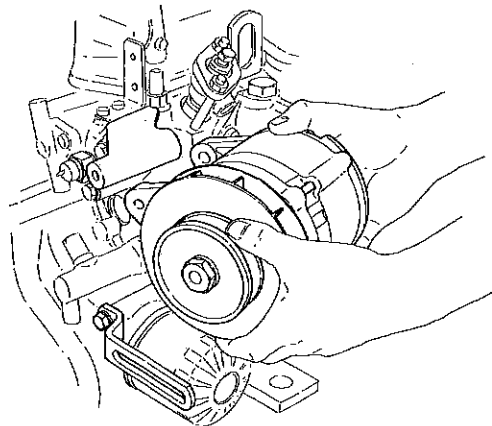
- (1) Fuel tank to feed pump
- (2) Feed pump to fuel filter
- (3) Fuel filter to fuel injection pump
- (4) Fuel high pressure pipe
- (5) Fuel return pipe

4-3.8 Remove the starter motor

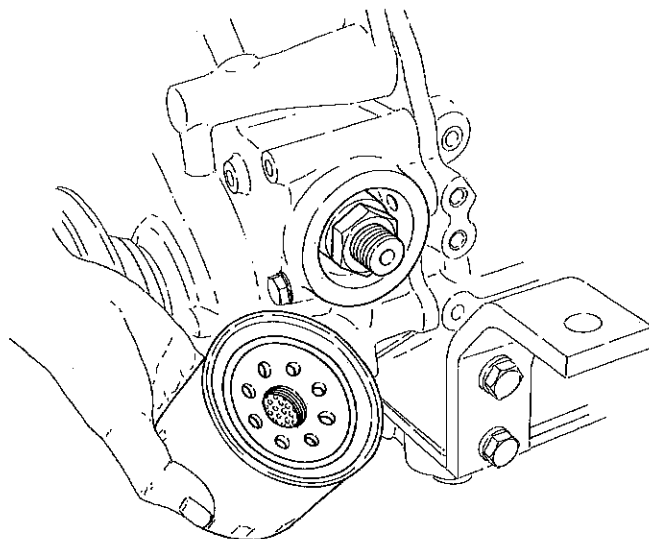


4-3.9 Remove the alternator

- (1) Loosen the adjusting bolt and remove the V-belt
- (2) Remove the alternator and bracket

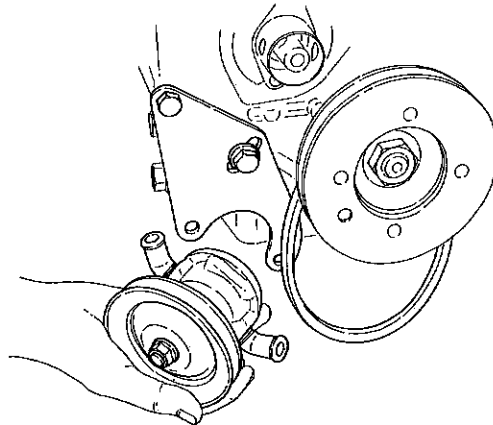


4-3.10 Remove the oil filter



4-3.11 Remove the water pump

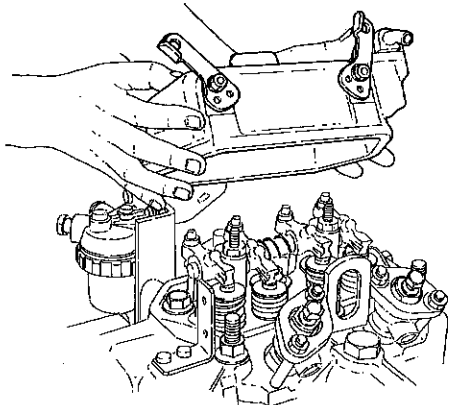
- (1) Disconnect the hose between the water pump and cooling water cylinder inlet joint.



- (2) Loosen the water pump mounting bolts, remove the V-belt by sliding it toward the crankshaft side, and remove the water pump.

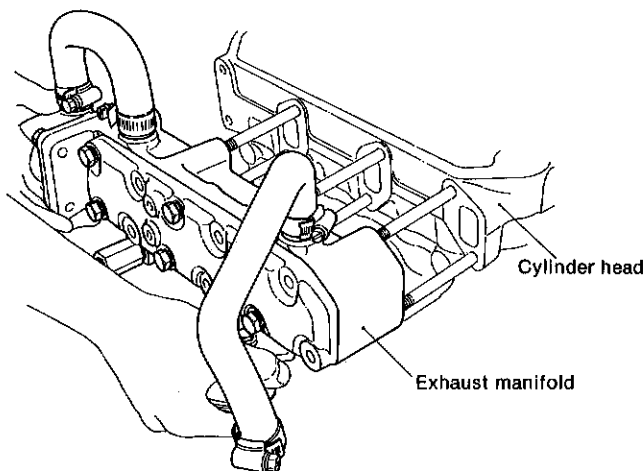
4-3.12 Remove the rocker arm chamber

- (1) Remove the breather pipe at the side of the intake pipe [intake manifold for model 3GM30(C)].
- (2) Remove the rocker arm chamber



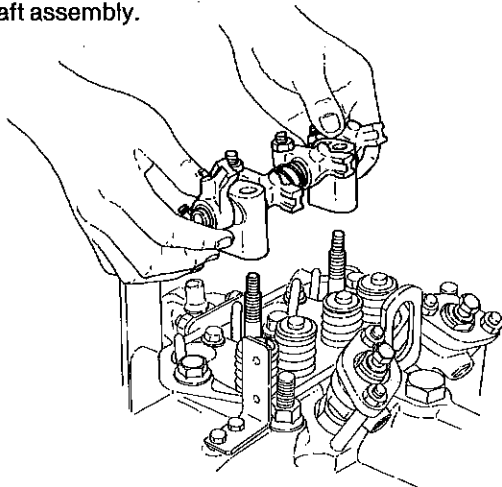
4-3.13 Remove the exhaust manifold [only for model 3GM30(C)] and the mixing elbow

- (1) Disconnect the cooling water bypass hose at the thermostat cover side.
- (2) Remove the mixing elbow [2GM20(C)].
- (3) Remove the exhaust manifold together with the fuel filter and mixing elbow [3GM30(C)].

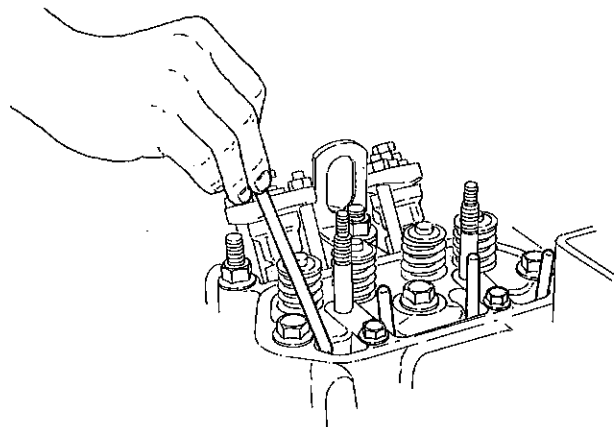


4-3.14 Remove the rocker arms

- (1) Remove the mounting nut and remove the rocker arm shaft assembly.



- (2) Pull the push rods.

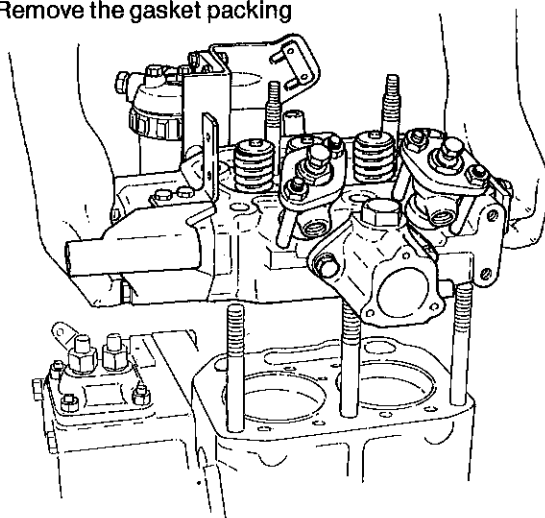


- (3) Remove the cotter pins of the intake and exhaust valve springs.

NOTE: Arrange the parts by cylinder no., intake and exhaust.

4-3.15 Remove the cylinder head

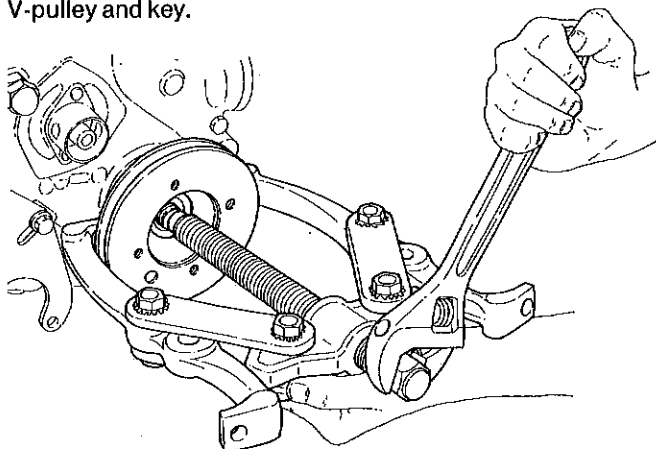
- (1) Disconnect the lubricating oil pipe.
- (2) Remove the cylinder head nuts in the prescribed order, and remove the cylinder head.
- (3) Remove the gasket packing



NOTE: Clearly identify the front and back of the gasket packing.

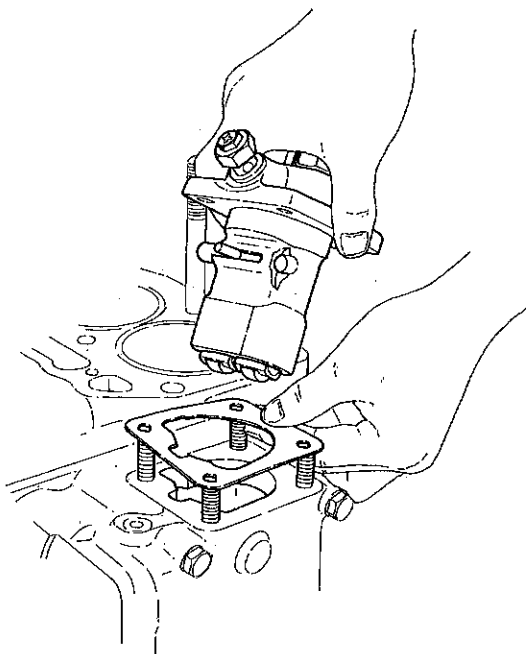
4-3.16 Remove the crankshaft pulley

Remove the crankshaft pulley end nut and remove the V-pulley and key.



4-3.17 Remove the injection pump

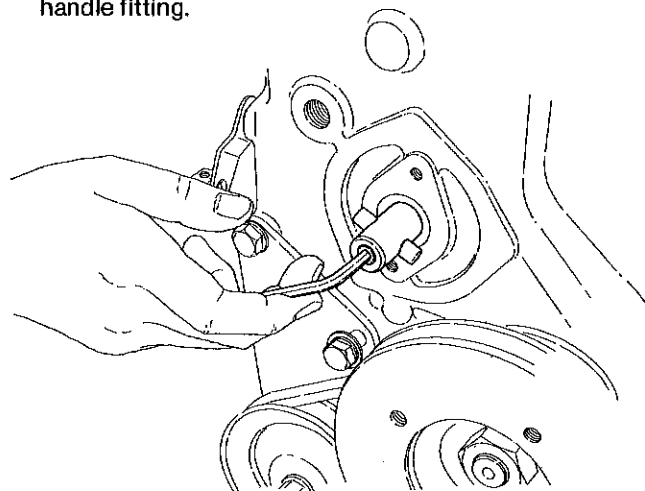
- (1) Remove the injection pump nut.
- (2) Remove the gear case side cover, move the governor lever 2, take out the fuel injection pump by matching the control rack with the cut-off part of the gear case.



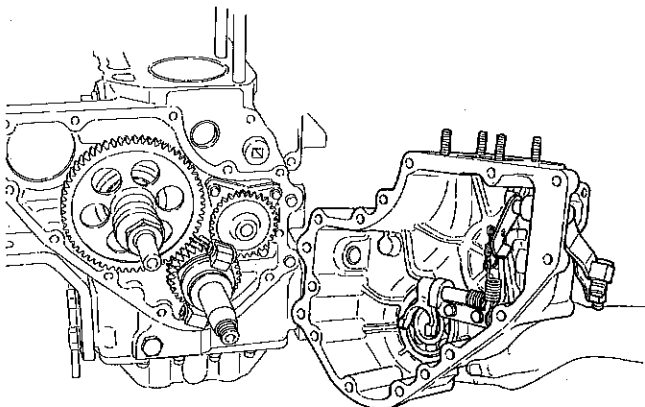
- (3) Remove the injection timing adjustment shims.
- CAUTION:** Note the number and total thickness to the timing adjustment shims.

4-3.18 Remove the timing gear case

- (1) Remove the starting shaft cover, loosen the bolt with the hexagonal socket head, and withdraw the pin for handle fitting.



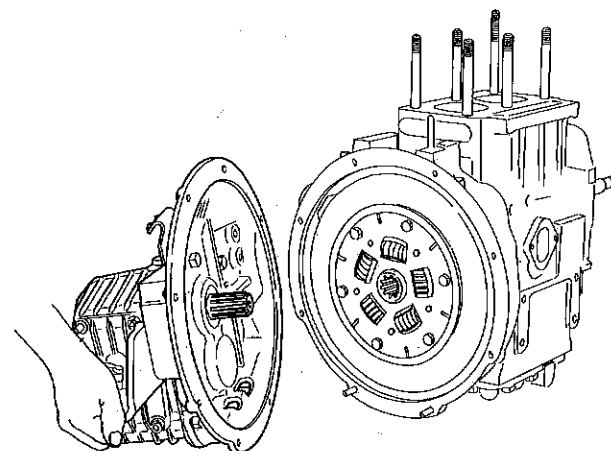
- (2) Remove the gear case



- (3) Remove the thrust collar, thrust needle bearing, and governor sleeve.

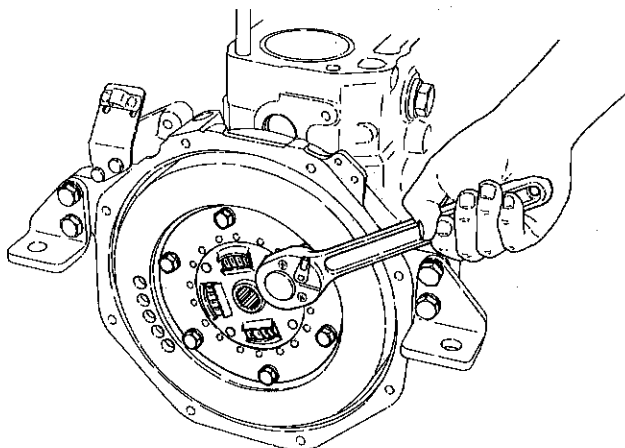
4-3.19 Remove the clutch assembly

Loosen the mounting flange bolts and remove the clutch assembly.



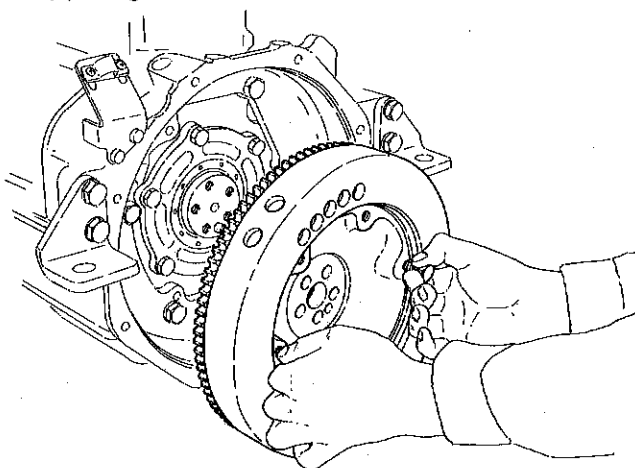
4-3.20 Remove the flywheel

(1) Remove the damper disk

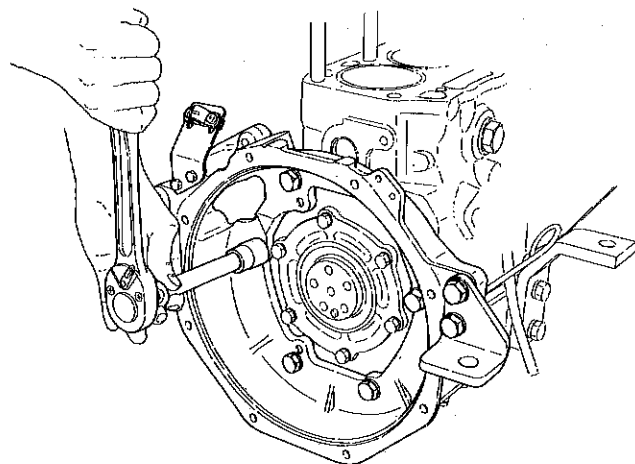


(2) Remove the flywheel

Screw-in the two bolts to secure the clutch disk (slightly to the left and right sides of the flywheel) and remove it by pulling on the bolts.

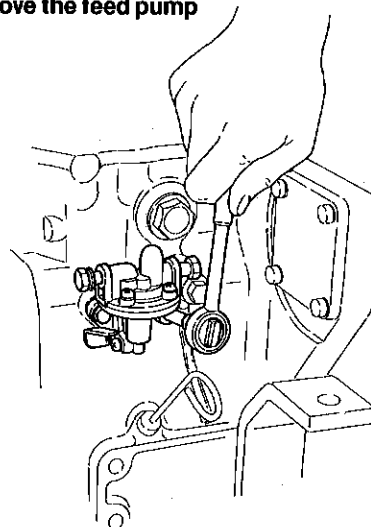


4-3.21 Remove the flywheel housing



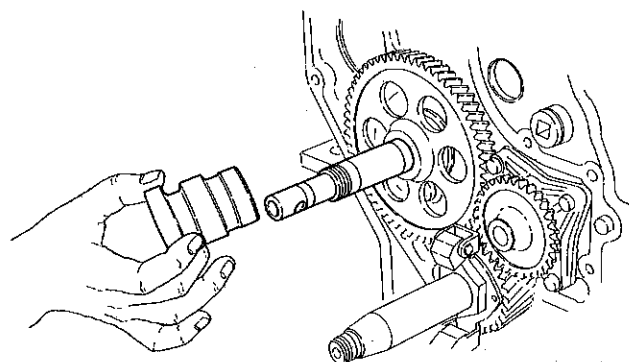
4-3.22 Remove the lubricating oil dipstick

4-3.23 Remove the feed pump

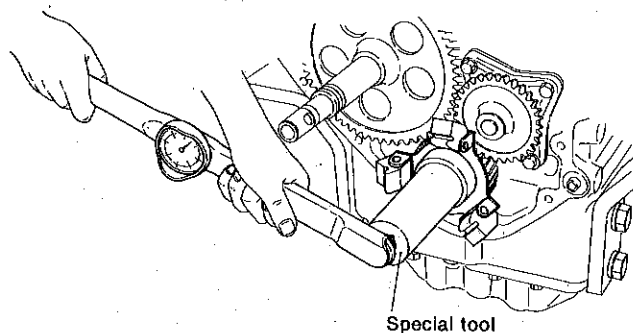


4-3.24 Remove the fuel cam

Remove the camshaft end nut and remove the fuel cam



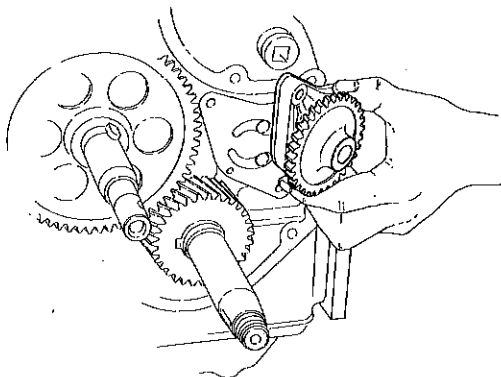
4-3.25 Remove the governor weight assembly



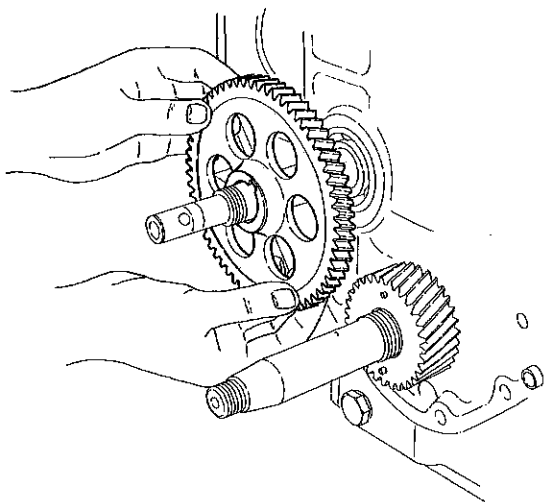
Special tool

Remove the crankshaft end nut and remove the governor weight assembly.

4-3.26 Remove the lubricating oil pump and driving gear assembly



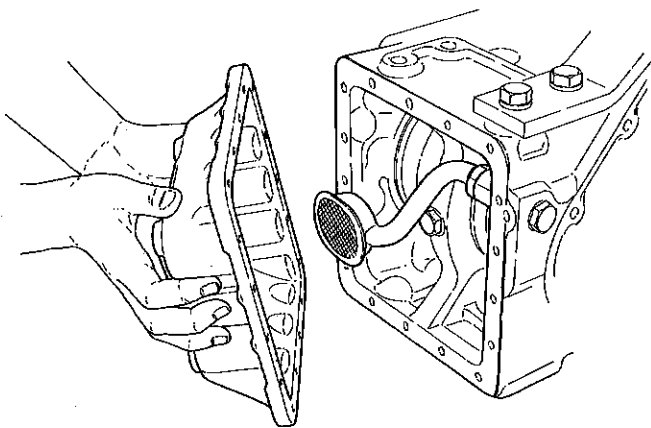
4-3.27 Remove the camshaft gear and the crankshaft gear



4-3.28 Turn the engine onto its side

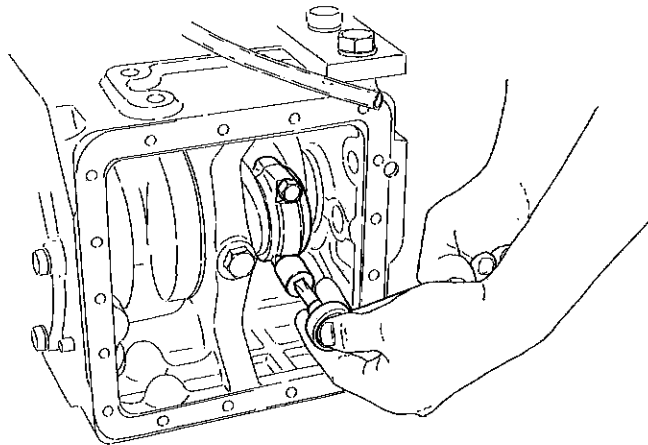
- (1) Remove the engine feet of the crankshaft side
- (2) Turn the cylinder block over so that the crankshaft side is on the bottom.

4-3.29 Remove the oil pan and the oil intake pipe

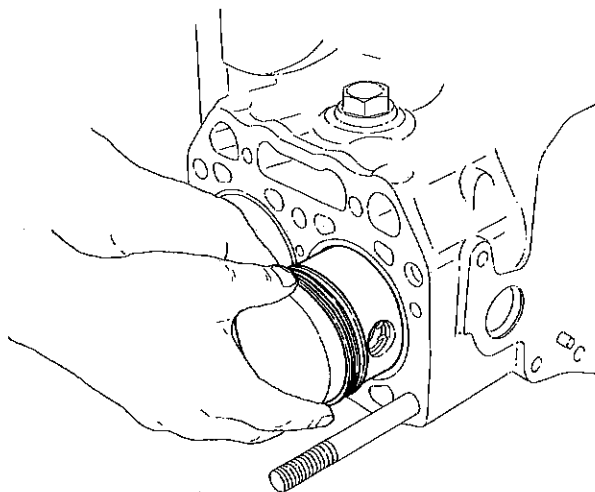


4-3.30 Remove the piston connecting rod assembly

- (1) Set the piston to bottom dead center and remove the connecting rod bolts.

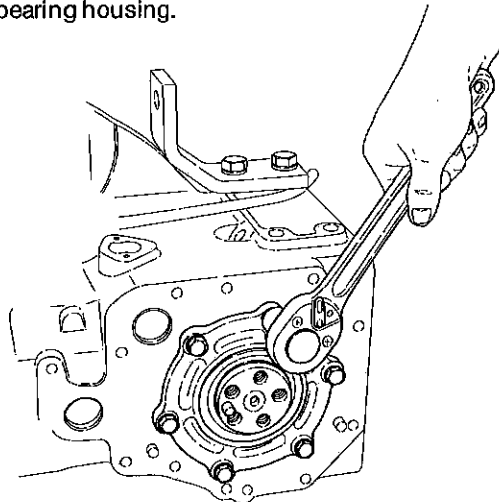


- (2) Set the piston to top dead center, turning the crankshaft so that the connecting rod does not separate from the crank pin. Pull out the piston connecting rod assembly by pushing the large end of the rod with a pusher.

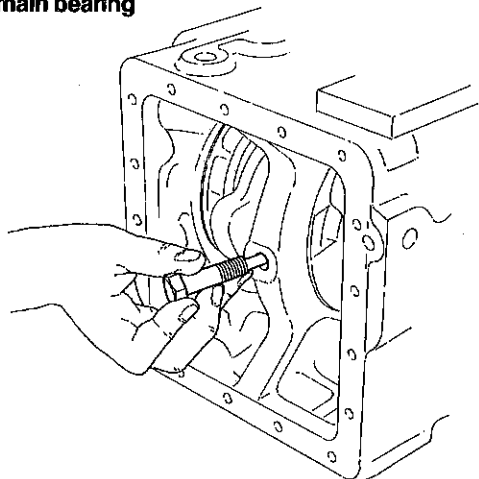


4-3.31 Remove the main bearing housing

- Remove the main bearing housing bolt and remove the main bearing housing.

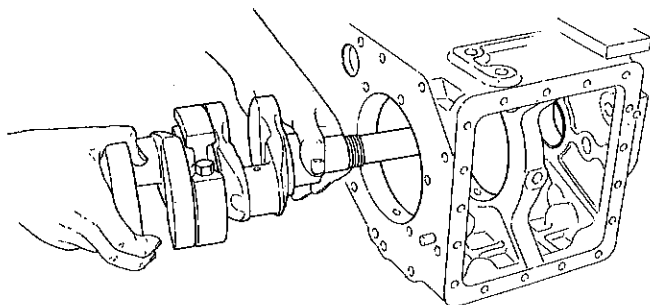


4-3.32 Remove the mounting bolt of the intermediate main bearing



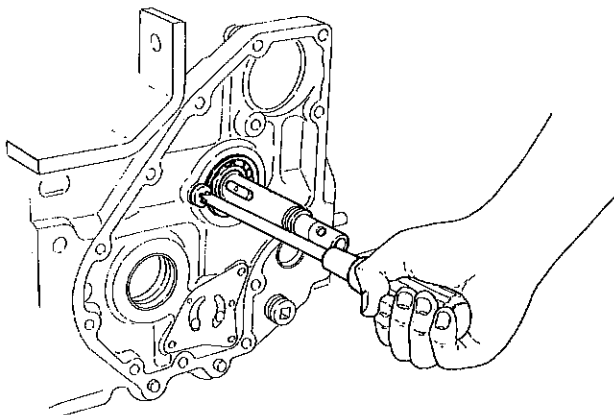
Two intermediate main bearings, viz. No.1 and No.2, for engine model 3GM30(C).

4-3.33 Pull the crankshaft

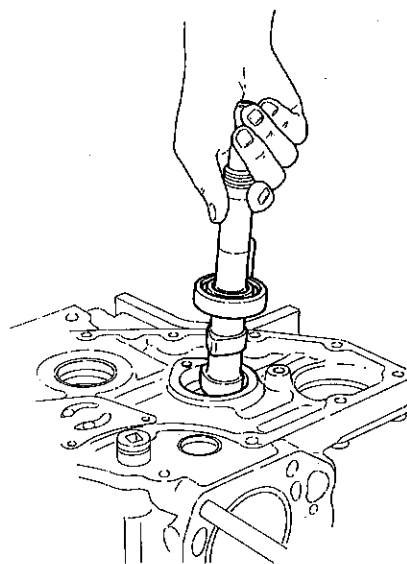


4-3.34 Remove the camshaft

(1) Remove the camshaft bearing set screw.

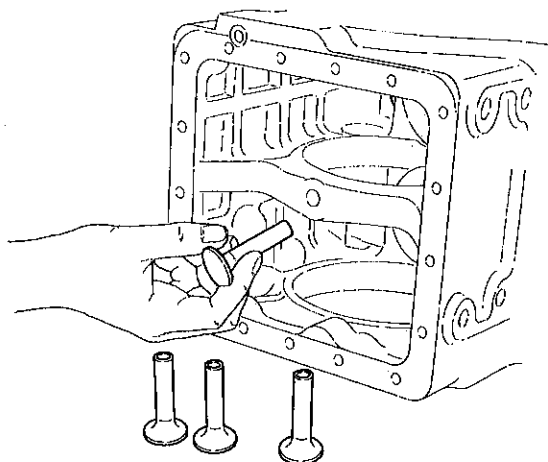


(2) Place the cylinder block upside down or raise the cylinder block by inserting a plate beneath it in order to prevent contact between the tappet and the cam.



(3) Check that all the tappets are separated from the cam, and pull the camshaft out.

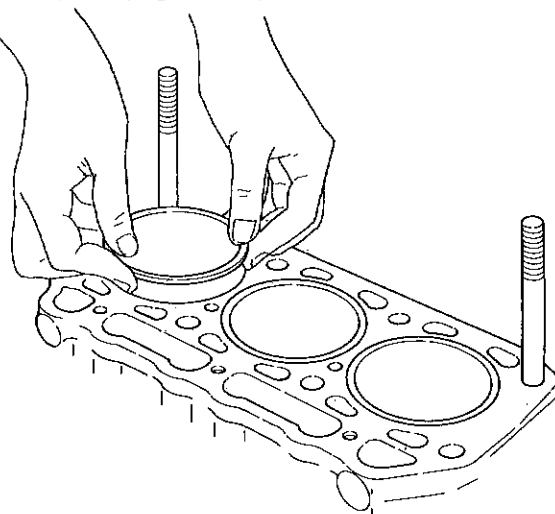
4-3.35 Remove the tappets



NOTE: Arrange the removed tappets by cylinder no. and intake and exhaust groups.

4-3.36 Remove the liners

Set the engine upright and pull the liners with a liner puller.



5. Reassembly

5.1 General Precautions

Warped washers and packings must necessarily be replaced with new ones.

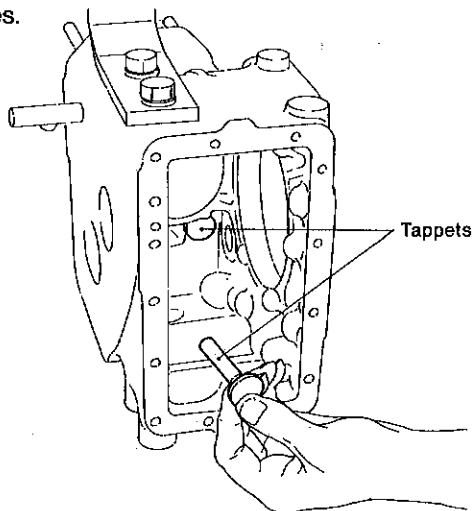
In assembling, sealing must be applied to all designated parts. Omission may cause serious trouble during a trial running of the engine after completion of reassembly. Adjustments should be performed in accordance with the instructions given.

After completion of engine reassembly, recheck any deficiencies which might have appeared during maintenance and inspection, conduct a trial running of the engine and then submit it to the user.

5.2 Reassembly of engine model 1GM10(C)

5-2.1 Insert the tappets

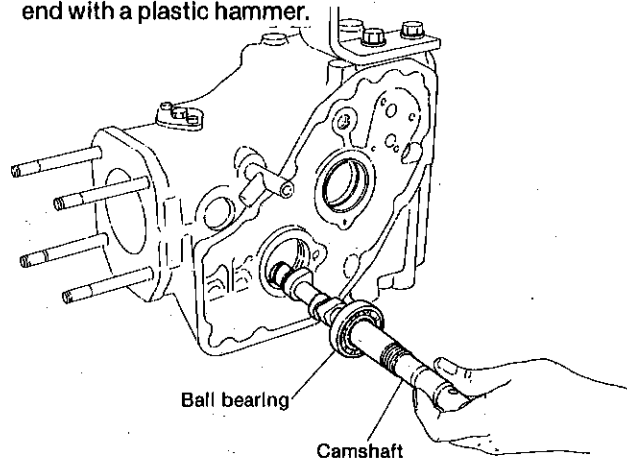
- (1) Turn the cylinder block over or turn it upside down.
- (2) Coat the tappets with oil and insert into the tappet holes.



NOTE: Assemble the tappets at their original positions, paying careful attention to intake and exhaust.

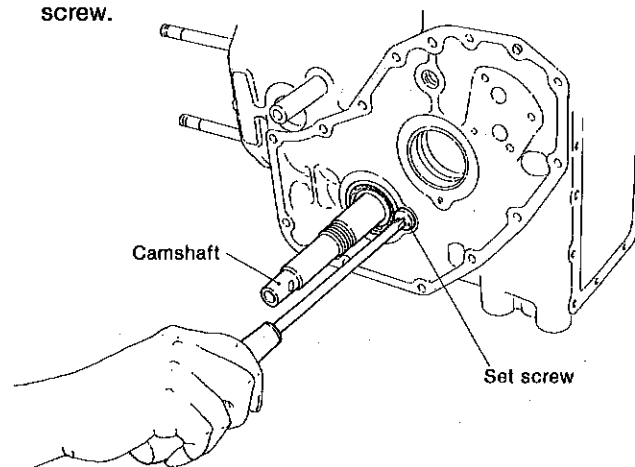
5-2.2 Insert the camshaft

- (1) Coat the camshaft bearing section with oil and insert the camshaft into the cylinder block tapping the shaft end with a plastic hammer.



NOTE: Be careful not to damage the groove in the end of the shaft.

- (2) After inserting the camshaft, check that it rotates smoothly before tightening the camshaft bearing set screw.

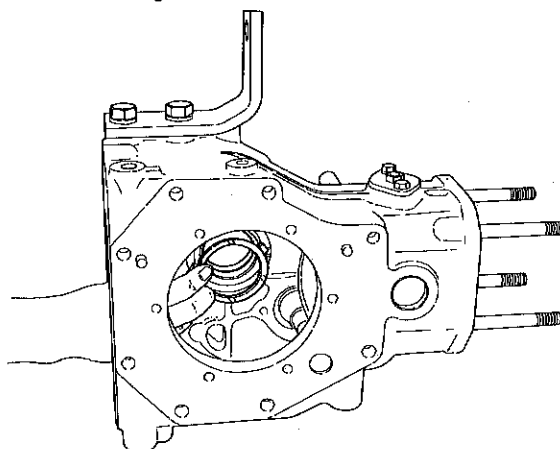


Tightening torque

2 kg-m (14.5 ft-lb)

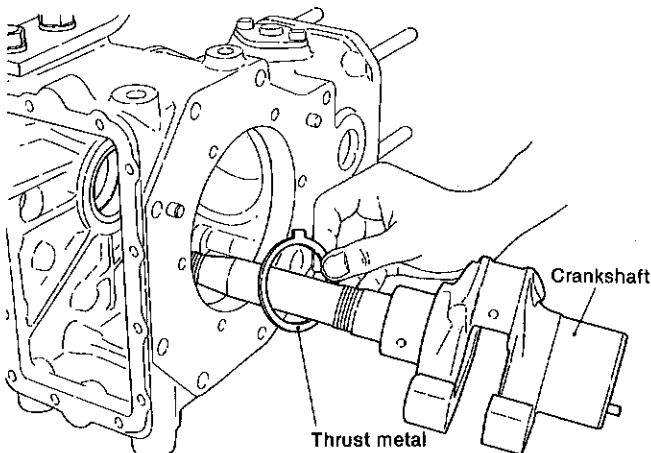
5-2.3 Install the crankshaft

- (1) Coat the cam gear side thrust metal with oil and install.



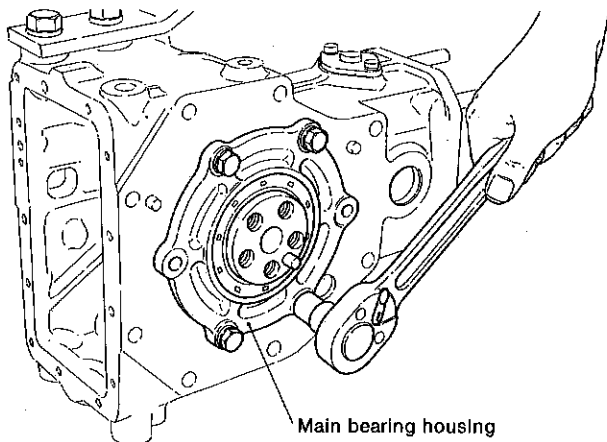
CAUTION: Install so that the thrust metal oil groove is at the crankcase side, being careful not to damage the tab.

(2) Insert the crankshaft



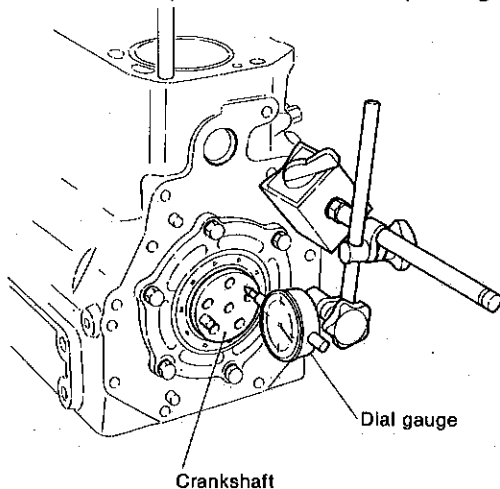
5-2.4 Install the main bearing housing

- (1) Coat the oil seal section with oil
- (2) Insert the main bearing housing and tighten.



Tightening torque	2.5 kg-m (18 ft-lb)
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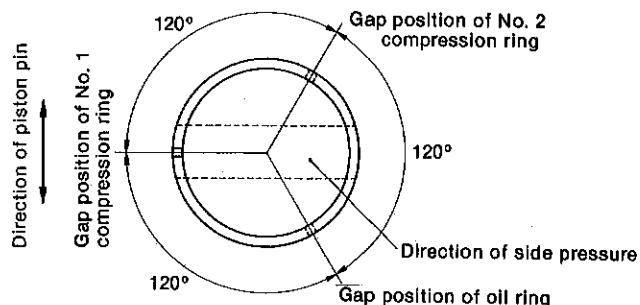
- (3) Check that the crankshaft rotates smoothly
- (4) Measure the crankshaft side gap, and adjust it to the prescribed value by the thickness of the packing.



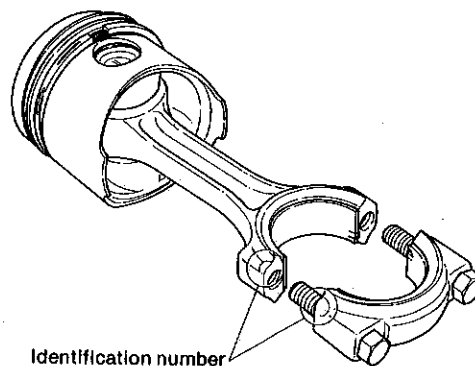
Crankshaft side gap	0.06 ~ 0.19mm (0.0024 ~ 0.0075in.)
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5-2.5 Assemble the piston and connecting rod assembly

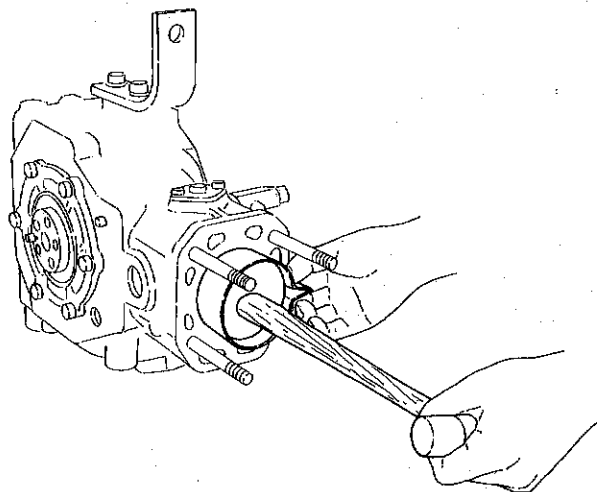
- (1) Coat the crankpin section with oil and position so that the crank is at the top.
- (2) Coat the piston and crankpin bearing with oil.
- (3) Position the piston rings so that the gaps are 120° apart, being sure that there is no gap at the side pressure section.



- (4) Insert the piston connecting rod assembly so that the side of the connecting rod big end with the identification number is on the camshaft side. Install the piston rings with a piston ring inserter.



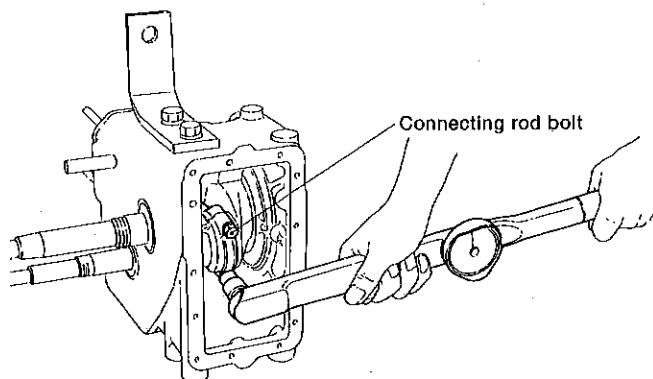
- (5) After the connecting rod large end contacts the crankpin, push the piston crown down slowly to turn the crankshaft to bottom dead center.



- (6) Align the connecting rod cap and connecting rod large end matching mark and tighten the connecting rod bolts.

CAUTION: 1. Be careful to tighten the connecting rod bolts evenly.

2. Coat the bolt threads and washer face with oil.



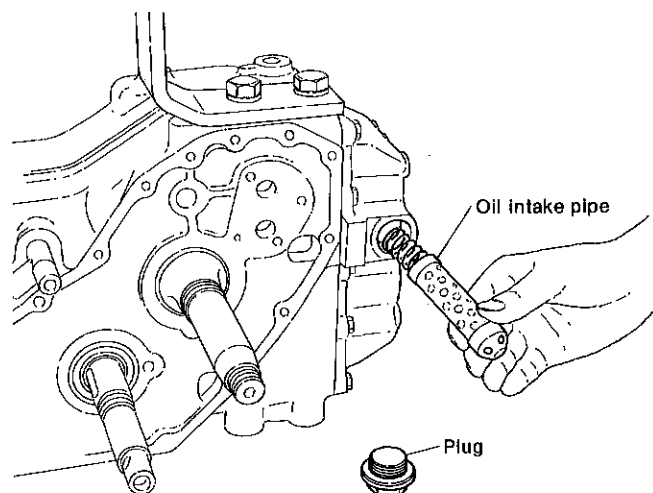
Tightening torque	2.5 kg-m (18.1 ft-lb)
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- (7) Measure the side clearance.

Side clearance	0.2 ~ 0.4mm (0.0079 ~ 0.0157in.)
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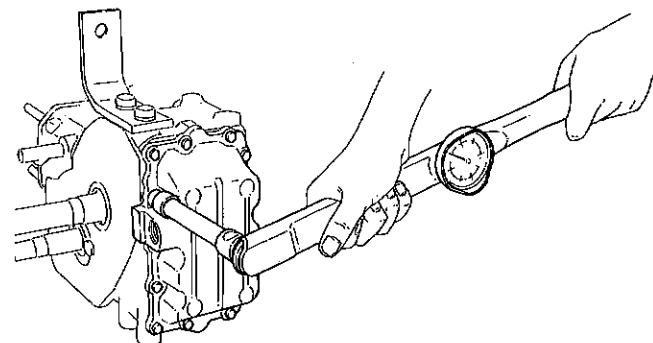
- (8) Check that the crankshaft rotates smoothly.

5-2.6 Install the lubricating oil intake pipe to the oil pan



5-2.7 Install the engine bottom cover (oil pan)

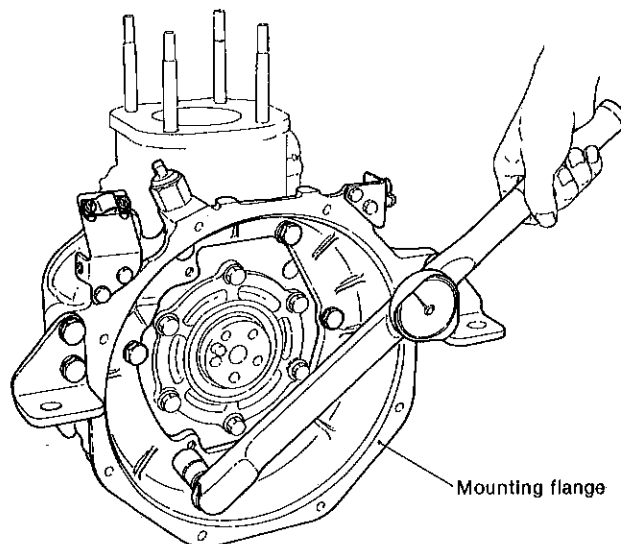
- (1) Change the packing.
(2) Install the bottom cover.



Tightening torque	0.9 kg-m (6.5 ft-lb)
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5-2.8 Install the mounting flange

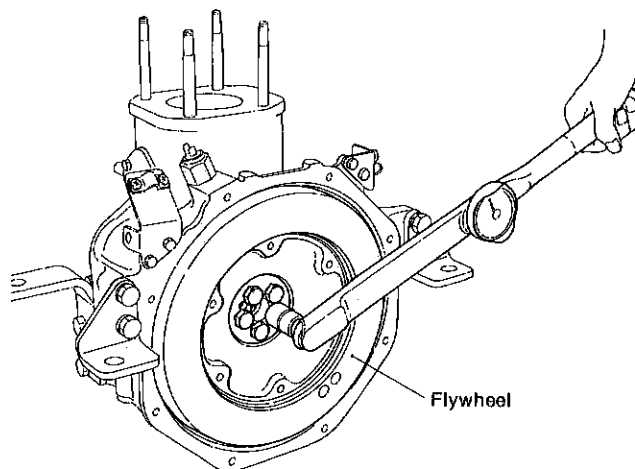
- (1) Set the engine upright.
(2) Align the positioning pins and tighten the flange.



Tightening torque	4.5 kg-m (32.5 ft-lb)
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5-2.9 Install the flywheel

- (1) Align the reference pins
(2) Install the flywheel



Tightening torque	6.5 ~ 7.0 kg-m (47 ~ 50.6 ft-lb)
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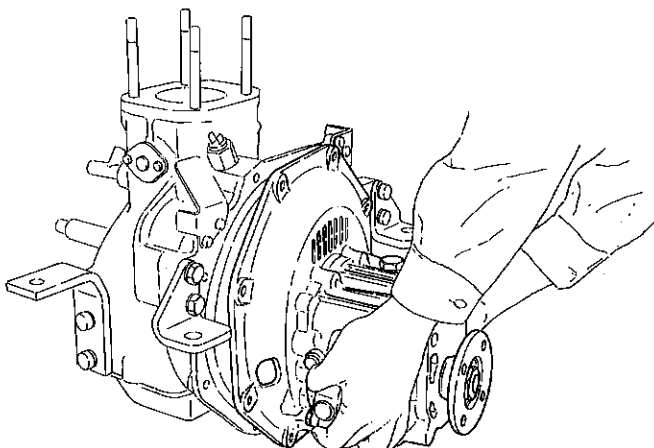
NOTE: After tightening, check the end run-out

5-2.10 Install the clutch assembly

- (1) Install the clutch disc on the flywheel

Tightening torque	2.5 kg-m (18 ft-lb)
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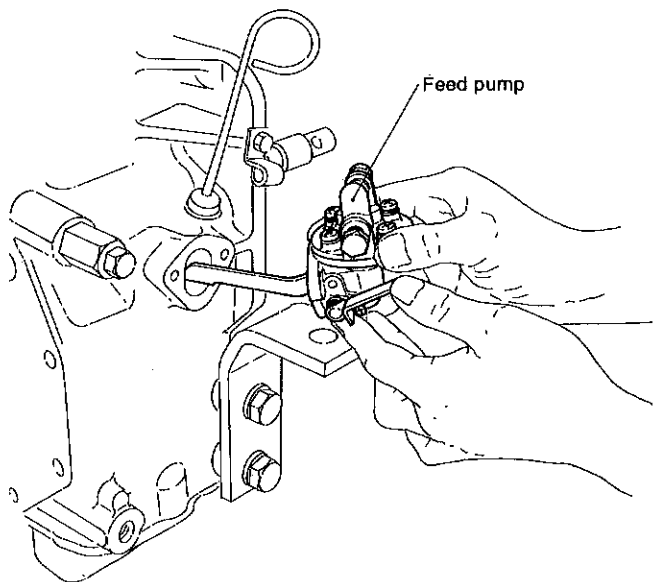
- (2) Align the disk and input shaft spline, and install the clutch assembly on the mounting flange.



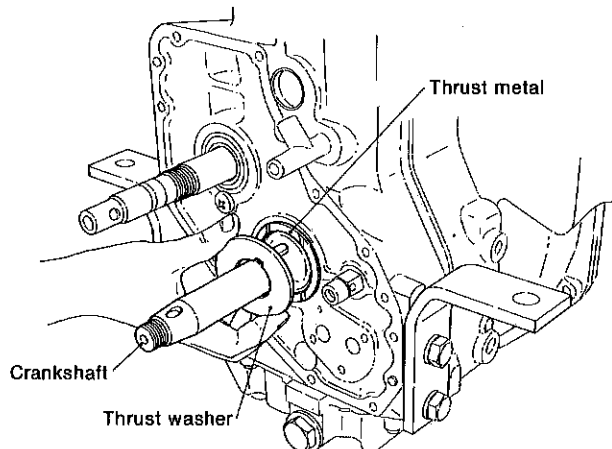
Tightening torque	2 ~ 2.5 kg-m (14.5 ~ 18 ft-lb)
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5-2.11 Install the engine feet and set the engine in position

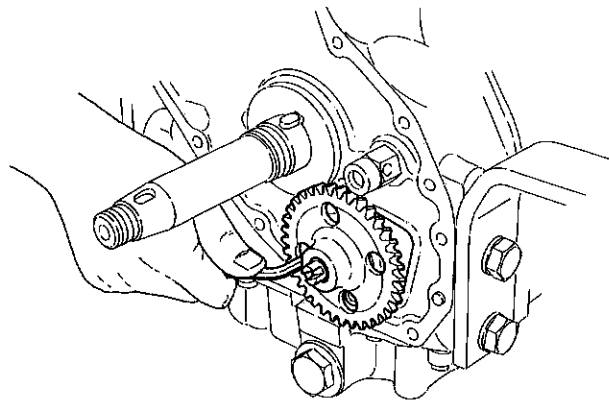
- (1) Dipstick
- (2) Fuel feed pump



5-2.12 Assemble the thrust metal and thrust washer



5-2.13 Install the lubricating oil pump and gear assembly

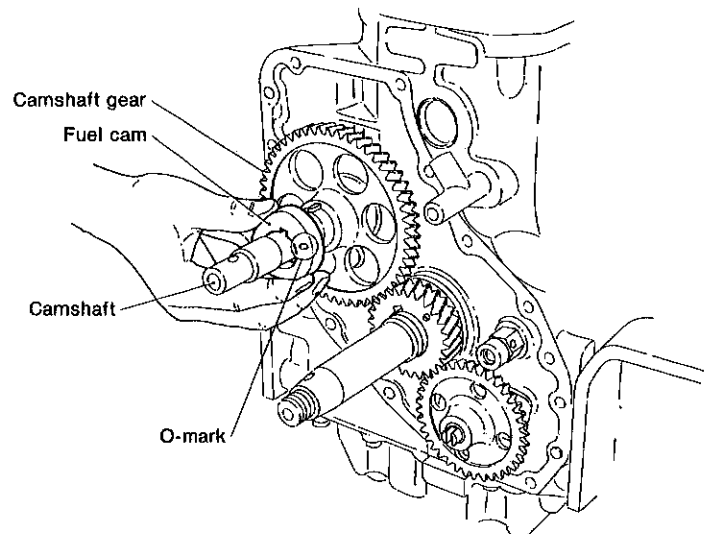


Lube pump body mounting bolt	0.9 kg-m (6.5 ft-lb)
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5-2.14 Assemble the crankshaft gears

- (1) Coat the crankshaft section and the inside of the gear with oil.
- (2) Insert the crankshaft gear

5-2.15 Assemble the camshaft gear and fuel cam

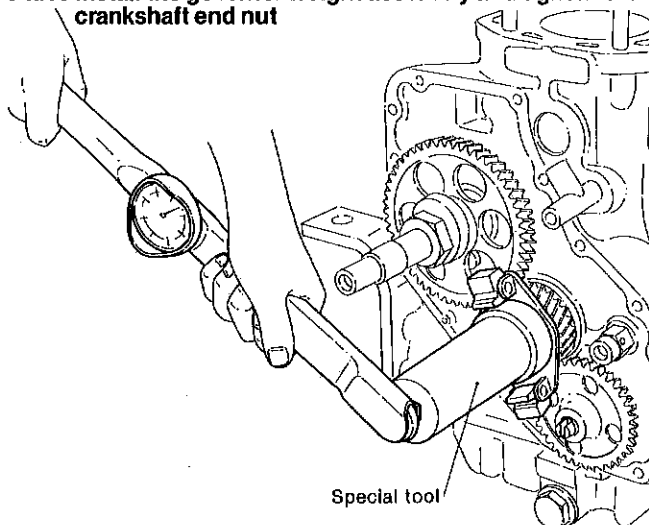


- (1) Coat the shaft hole of the camshaft gear with oil, and align the matching marks of the camshaft gear and the crankshaft gear and insert the camshaft gear.
- (2) Coat the fuel cam with oil and insert the cam by aligning the "O" mark opposite the camshaft gear.
- (3) Tighten the camshaft end nut

Tightening torque	7 ~ 8 kg-m (50.6 ~ 57.9 ft-lb)
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(4) Check the backlash

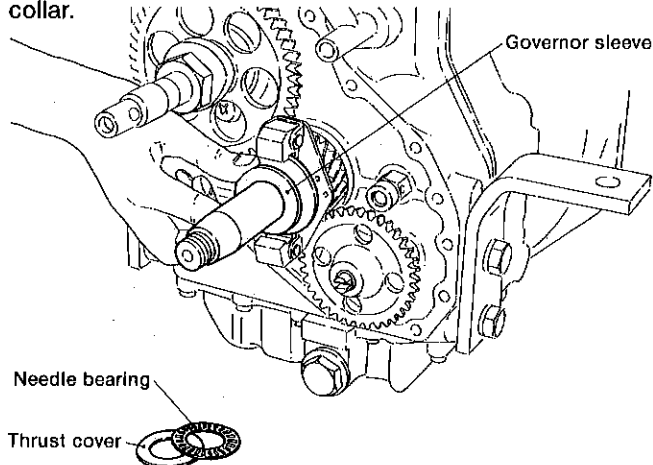
	mm (in.)	
	Maintenance standard	Wear limit
Crankshaft gear and camshaft gear backlash		
Crankshaft gear and lubrication oil pump driven gear backlash	0.05 ~ 0.13 (0.0020 ~ 0.0051)	0.3 (0.0118)
Camshaft gear and fuel feed pump driven gear backlash		

5-2.16 Install the governor weight assembly and tighten the crankshaft end nut

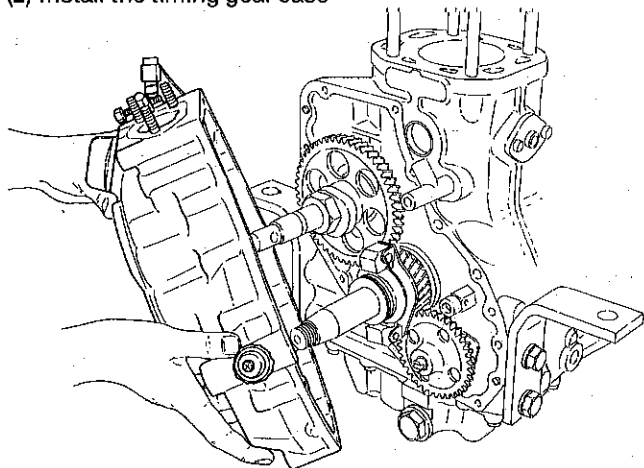
Tightening torque	8 ~ 10 kg-m (57.9 ~ 72.3 ft-lb)
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5-2.17 Install the governor sleeve

Install the governor sleeve, thrust needle bearing and thrust collar.

**5-2.18 Install the timing gear case**

- (1) Coat both sides of the new packing with "Three Bond 3B8-005" and install.
- (2) Install the timing gear case

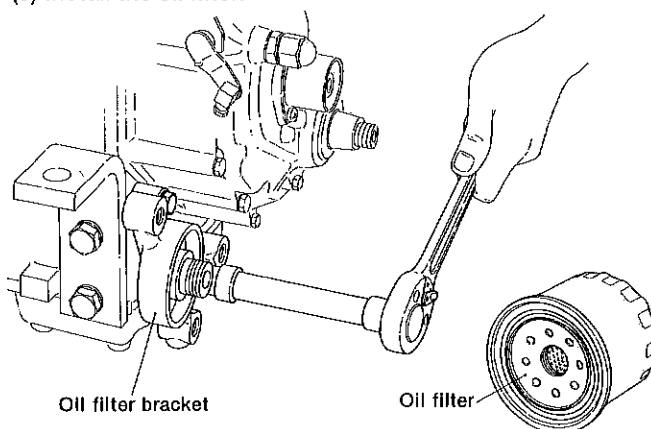


Tightening torque	0.9 kg-m (6.5 ft-lb)
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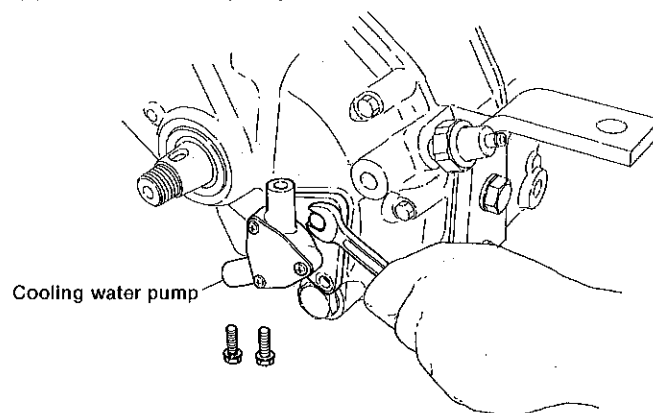
- (3) Insert the pin for fitting the handle into the camshaft and fix it by means of the bolt with the hexagonal socket head, then fit the starting shaft cover.

5-2.19 Install the oil filter and bracket

- (1) Install the oil filter bracket on the gear side of the cylinder block.
- (2) Install the oil pipes.
- (3) Install the oil filter.

**5-2.20 Install the water pump**

- (1) Install the water pump



Tightening torque	0.9 kg-m (6.5 ft-lb)
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- (2) Install the water pipe (pump to cylinder inlet joint)

5-2.21 Install the crankshaft V-pulley

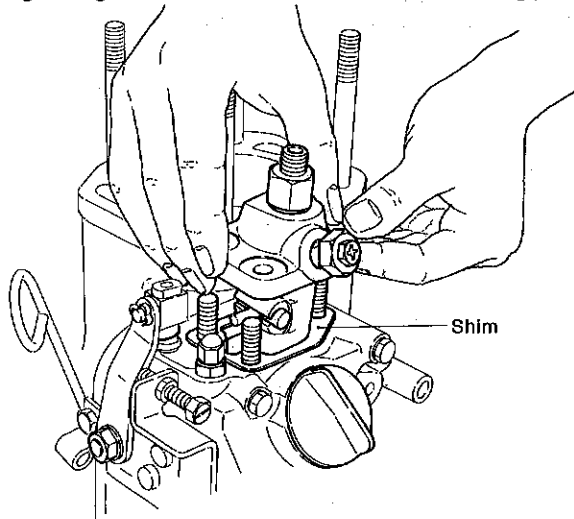
- (1) Install the crankshaft key
- (2) Coat the crankshaft V-pulley and the inside of the oil seal with oil.
- (3) Insert and tighten the V-pulley, making sure that the lip of the oil seal is not distorted.

Tightening torque	10 kg-m (72.3 ft-lb)
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5-2.22 Install the fuel injection pump

- (1) Remove grease from both sides of the fuel injection timing adjustment shims with thinner, and coat the shims with "Screw Lock Super 203M."

- (2) Insert the pump by looking through the oil filler and align the governor No.2 lever and rack connecting part.



- (3) Tighten the fuel pump

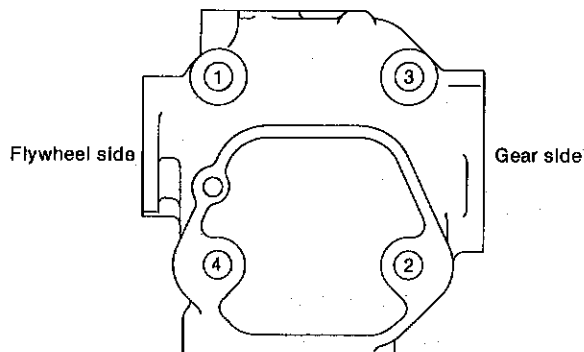
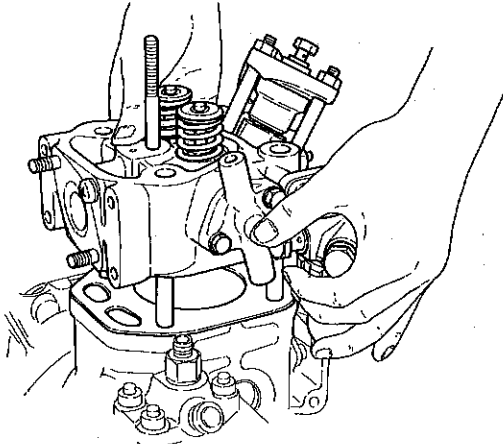
Tightening torque	2.5 kg-m (18 ft-lb)
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5-2.23 Install the cylinder head

- (1) Install the gasket packing

CAUTION: Take particular note of the fitting surfaces. Fit the side with the recessed part of the cooling water passage to the cylinder block side.

- (2) Insert the cylinder head, being careful not to damage the threads of the tightening bolts, and tighten the nuts in the tightening sequence.

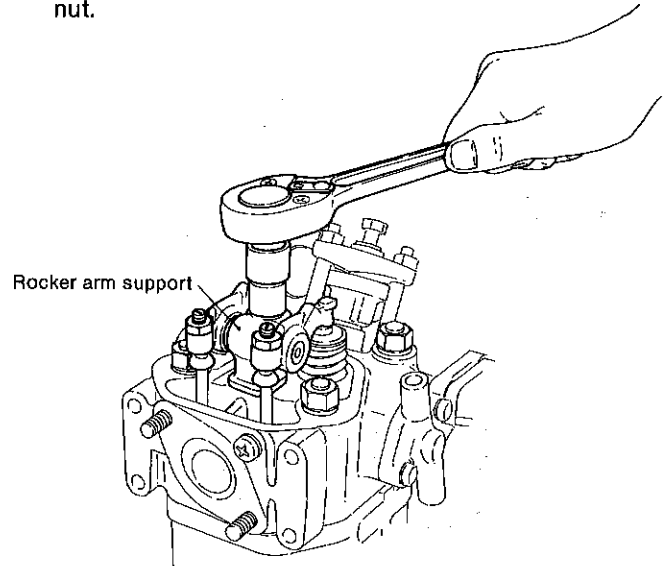


Tightening torque	7.5 kg-m (54.2 ft-lb)
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- (3) Install the water pipe
(from the thermostat cover to the cylinder inlet joint)

5-2.24 Install the rocker arms

- (1) Install the push rods on the tappets
(2) Coat the inside of valve spring retainer with oil.
(3) Install the rocker arm shaft assembly and tighten the nut.



Tightening torque	3.7 kg-m (27 ft-lb)
-------------------	---------------------

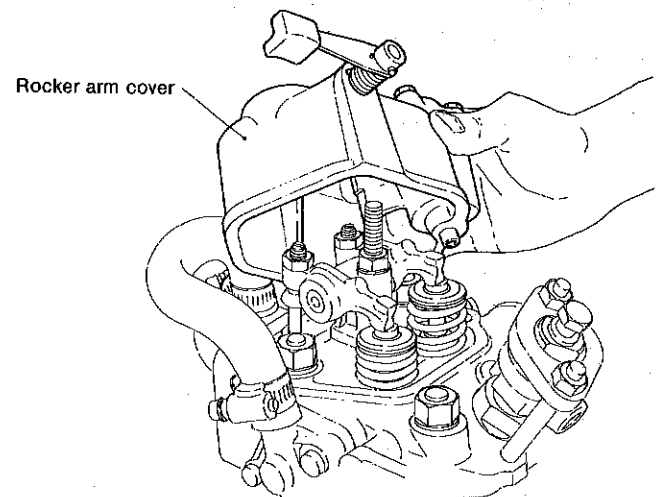
CAUTION: 1. Loosen the valve head clearance adjusting screw in advance.

2. Check that the arm moves smoothly.

- (4) Adjust the intake and exhaust valve head clearance and lock with the nut.

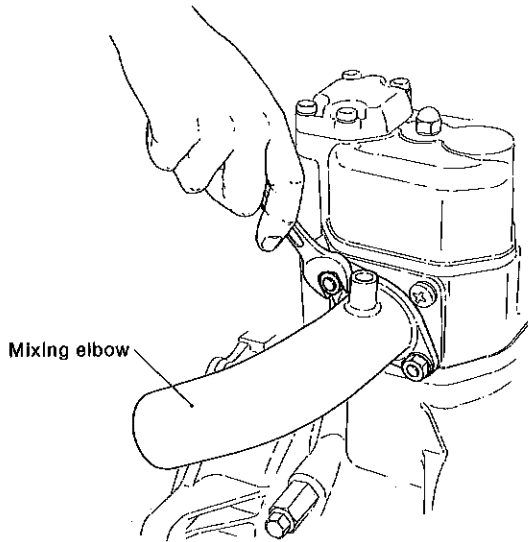
Intake and exhaust valve head clearance (engine cold):	0.2mm (0.008in.)
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5-2.25 Install the rocker arm cover



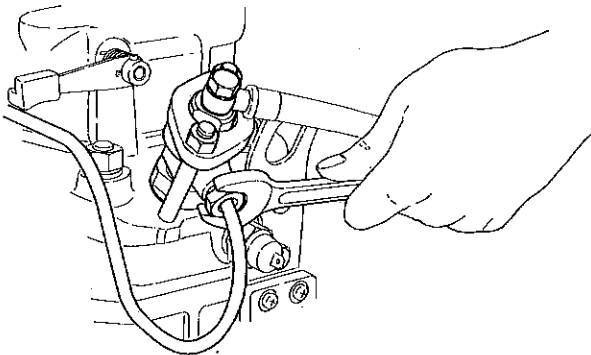
5-2.26 Install the mixing elbow

- (1) Install the mixing elbow



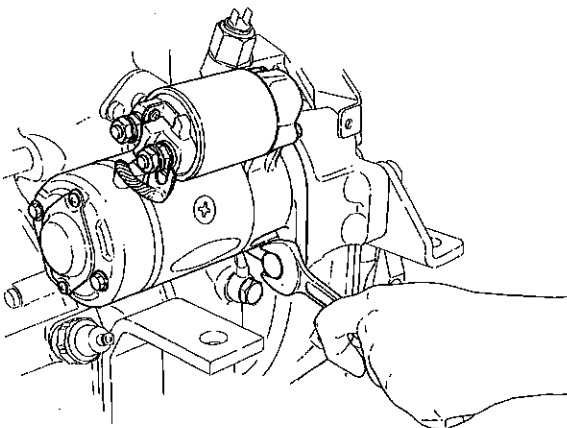
- (2) Install the cooling water bypass hose
(from the mixing elbow to the thermostat cover)

5-2.27 Install the fuel pipe



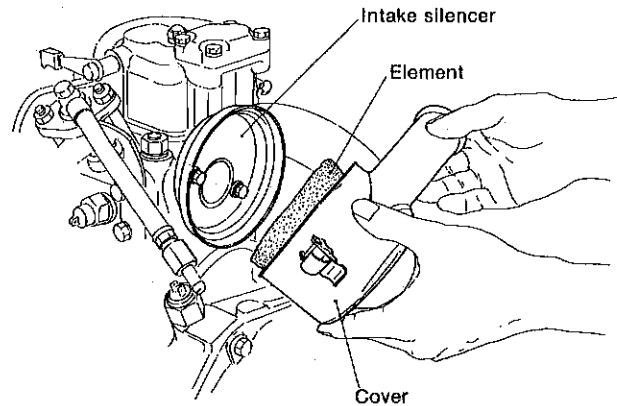
- (1) Install the feed pump to fuel filter pipe
- (2) Install the fuel filter to fuel injection pump pipe
- (3) Install the fuel high pressure pipe
- (4) Install the fuel return pipe

5-2.28 Install the starter motor



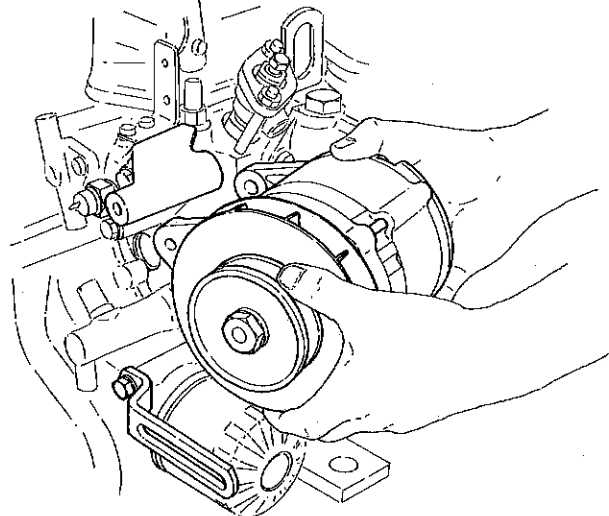
5-2.29 Install the intake silencer

- (1) Install the intake silencer cover to the intake port.
- (2) Install the intake silencer and tighten it with the clip.



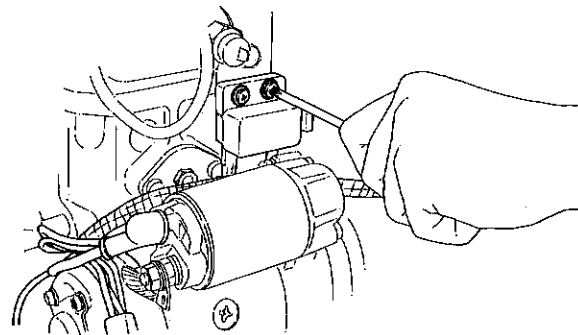
5-2.30 Install the alternator

- (1) Install the alternator to the bracket.



- (2) Install the V-belt and tighten the adjusting bolt while adjusting the V-belt tension.

5-2.31 Connect the electrical wiring



5-2.32 Install the remote control cables

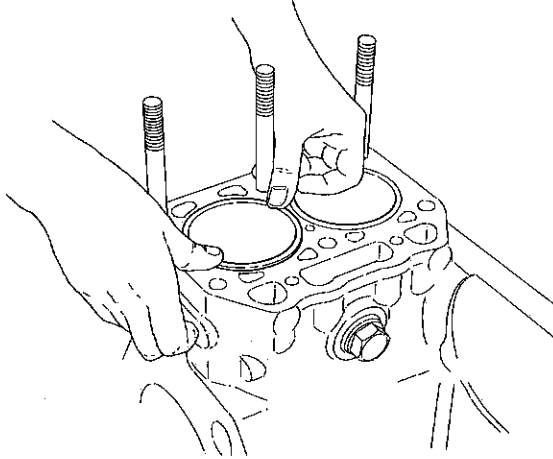
5-2.33 Connect the interior piping

5.3 Reassembly of engine models 2GM20(C) and 3GM30(C)

Refer to the model 3GM30(C) instructions, as the models 3HM35(C) and 3GM30(C) are almost the same.

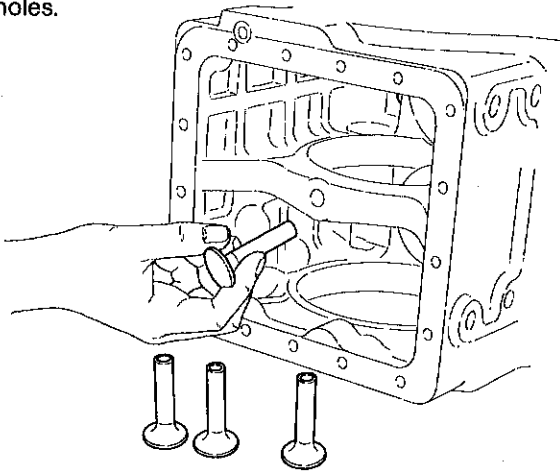
5-3.1 Assemble the cylinder liners

- (1) Remove any rust from the cylinder block where it contacts the cylinder liners.
- (2) Coat the outside periphery of the liners with waterproofing paint.
- (3) Insert the liners into the cylinder block, making sure to check that the cylinder liner protrusion is correct.



5-3.2 Insert the tappets

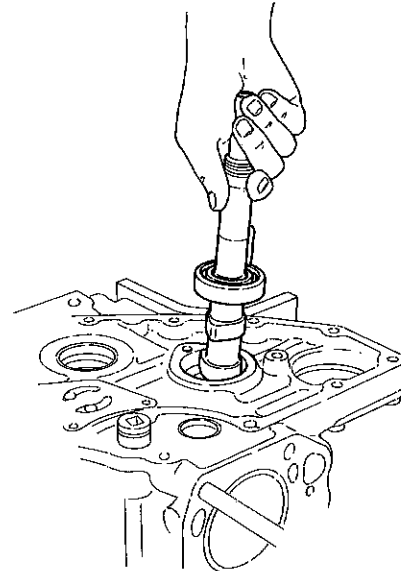
- (1) Turn the cylinder block over or turn it upside down.
- (2) Coat the tappets with oil and insert into the tappet holes.



NOTE: Assemble the tappets in their original positions, paying careful attention to the cylinder numbers and intake and exhaust groupings.

5-3.3 Insert the camshaft

- (1) Coat the camshaft bearing section with oil and insert the camshaft into the cylinder block by tapping the shaft end with a plastic hammer.

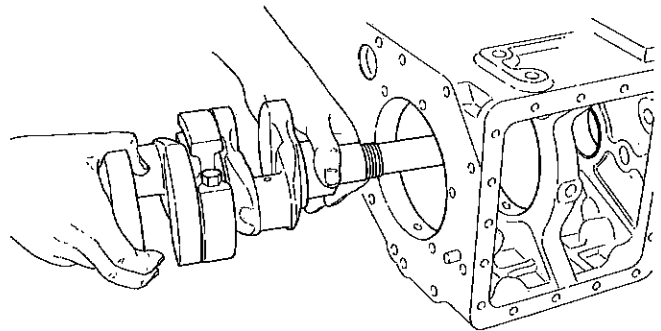


NOTE: Be careful not to damage the groove in the end of the shaft.

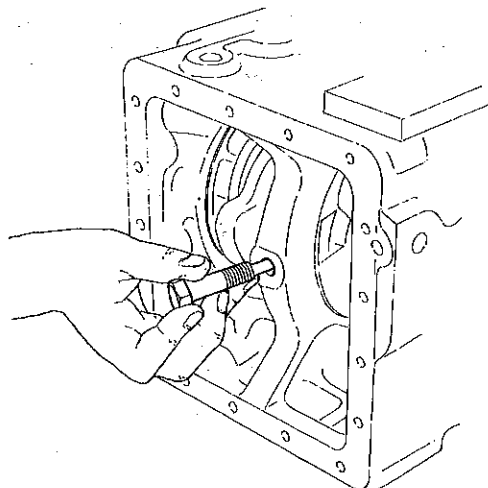
- (2) After inserting the camshaft, check that it rotates smoothly before tightening the camshaft bearing set screw.

Tightening torque	2 kg-m (14.5 ft-lb)
-------------------	---------------------

5-3.4 Install the crankshaft



5-3.5 Tighten the set bolt of the intermediate main bearing

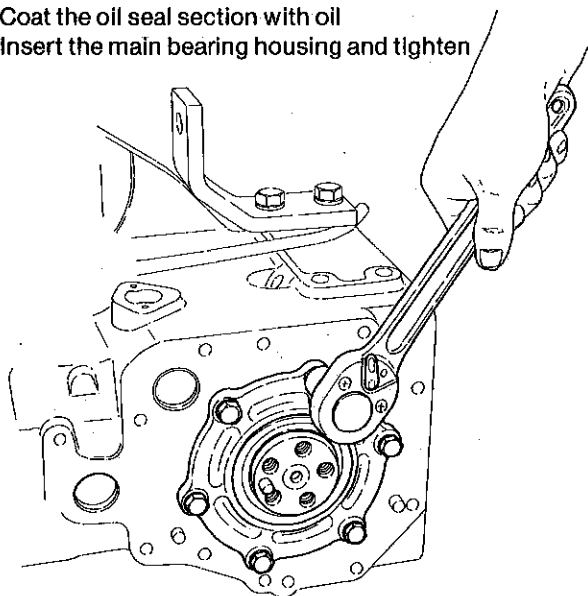


The two intermediate main bearings, viz No.1 and No.2, for model 3GM30(C).

	2GM20(C), 3GM30(C)	3HM35(C)
Tighten torque	4.5 ~ 5.0 (32.5 ~ 36.2)	7.0 ~ 7.5 (50.6 ~ 54.2)

5-3.6 Install the main bearing housing

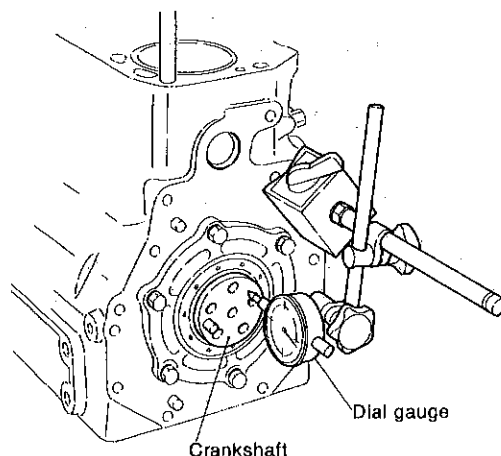
- (1) Coat the oil seal section with oil
- (2) Insert the main bearing housing and tighten



Tightening torque	2.5 kg-m (18 ft-lb)
-------------------	---------------------

- (3) Check that the crankshaft rotates smoothly

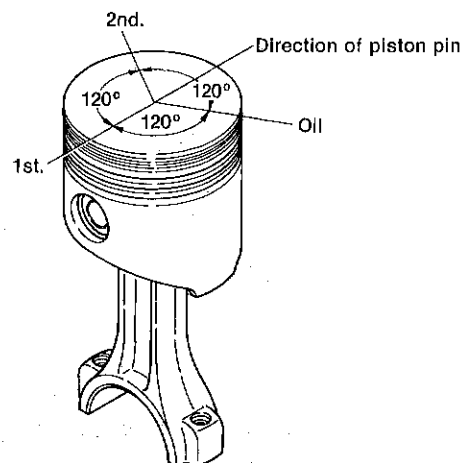
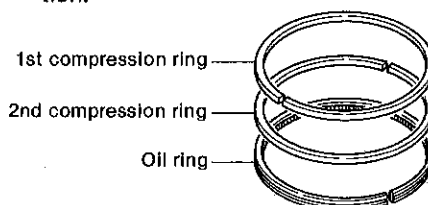
- (4) Measure the crankshaft side gap, and adjust it to the prescribed value by the thickness of the packing.



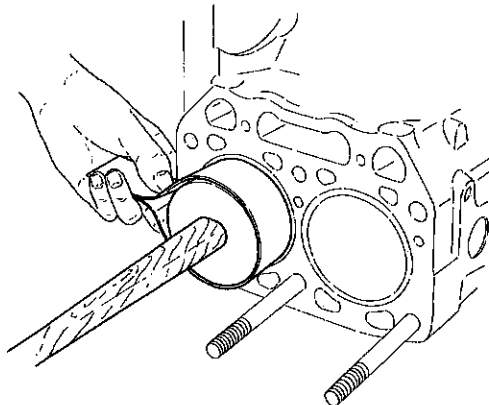
Crankshaft side gap	0.09 ~ 0.18mm (0.035 ~ 0.0071in.)
---------------------	--------------------------------------

5-3.7 Assemble the piston and connecting rod assembly

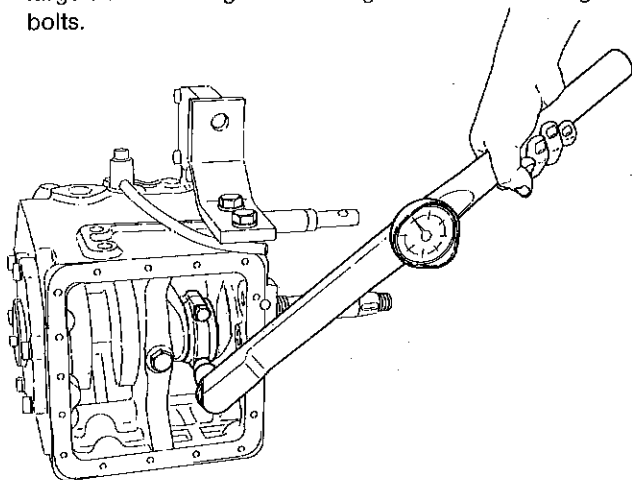
- (1) Coat the crankpin section with oil and position so that the insertion side crank is at the top.
- (2) Coat the piston and crankpin bearing with oil.
- (3) Position the piston rings so that the gaps are 120° apart, being sure that there is no gap at the side pressure section.



- (4) Insert the piston connecting rod assembly so that the side of the connecting rod big end with the identification number is on the exhaust side.
Install the piston rings with a piston ring inserter.



- (5) After the connecting rod large end contacts with the crankpin, push the piston crown down slowly to turn the crankshaft to bottom dead center.
(6) Align the connecting rod cap and the connecting rod large end matching mark and tighten the connecting rod bolts.



CAUTION: 1. Be careful to tighten the connecting rod bolts evenly.

2. Coat the bolt threads and washer face with oil.

	kg-m (ft-lb)	
	2GM20(C), 3GM30(C)	3HM35(F)
Tightening torque	2.5(18.1)	4.5(32.5)

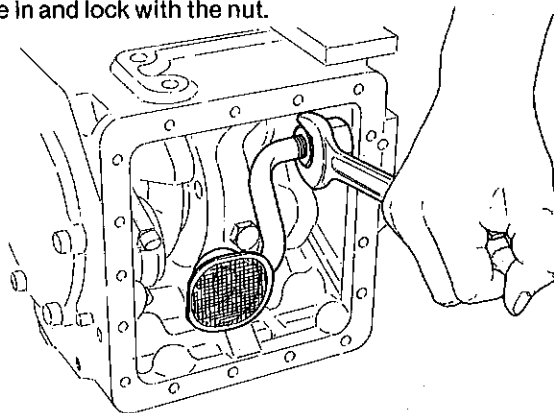
- (7) Measure the side clearance

Side clearance	0.2 ~ 0.4mm (0.0079 ~ 0.0157in.)
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- (8) Check that the crankshaft rotates smoothly

5-3.8 Install the lubricating oil intake pipe

Coat the threads with "Screw Lock Super 203M", screw the pipe in and lock with the nut.

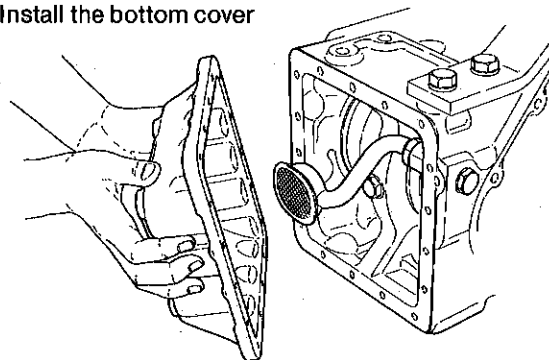


Screw-in distance

8 ~ 10mm (about 6 turns)
(0.3149 ~ 0.3937in.)

5-3.9 Install the engine bottom cover (oil pan)

- (1) Change the packing
(2) Install the bottom cover

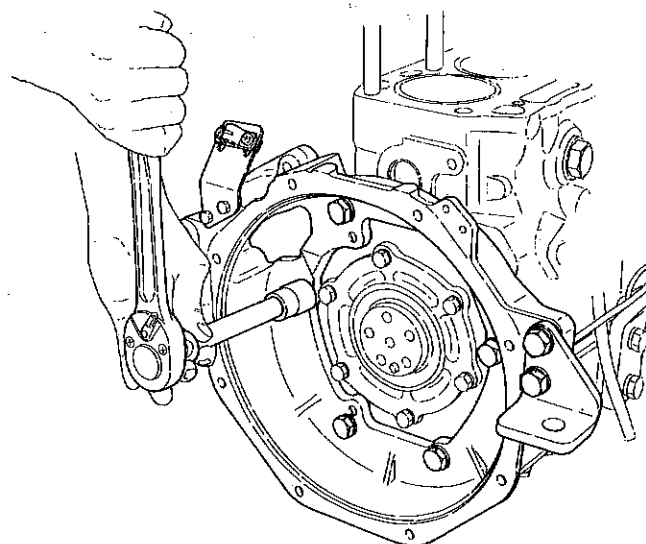


Tightening torque

0.9 kg-m (6.5 ft-lb)

5-3.10 Install the mounting flange

- (1) Set the engine upright
(2) Align the positioning pins and tighten the flange

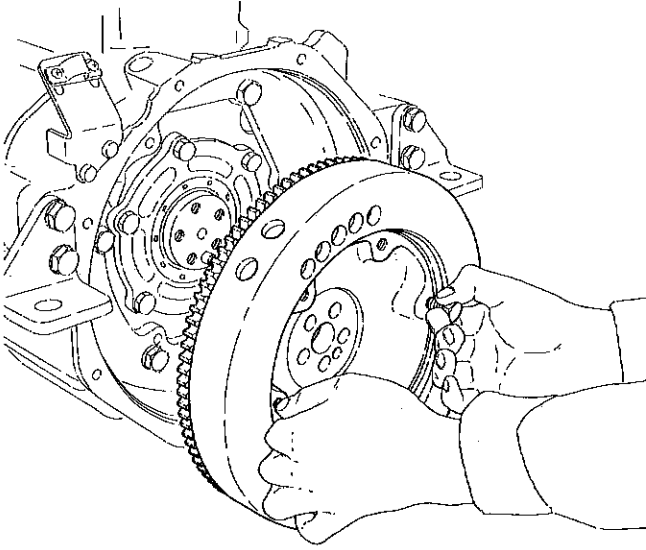


Tightening torque

4.5 kg-m (32.5 ft-lb)

5-3.11 Install the flywheel

- (1) Align the reference pins
- (2) Install the flywheel

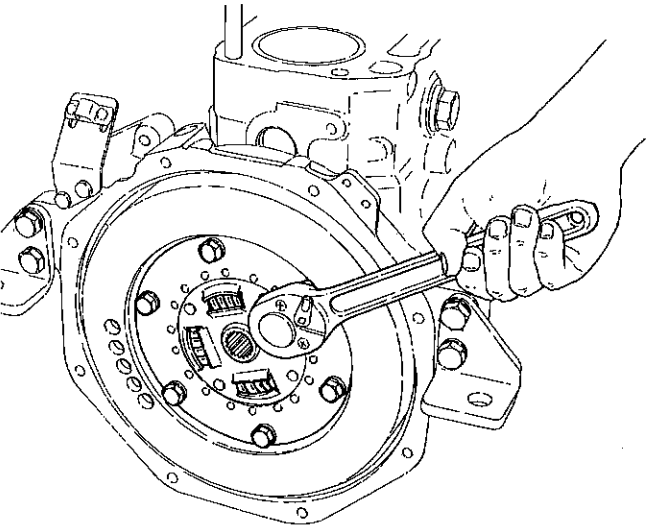


Tightening torque	6.5 ~ 7.0 kg-m (47 ~ 50.6 ft-lb)
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NOTE: After tightening, check the end run-out

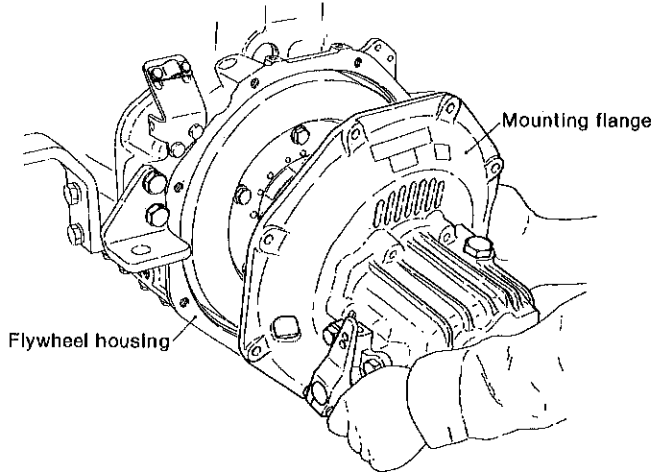
5-3.12 Install the clutch assembly

- (1) Install the clutch disc on the flywheel



Tightening torque	2.5 kg-m (18 ft-lb)
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- (2) Align the disc and input shaft spline, and install the clutch assembly on the mounting flange.



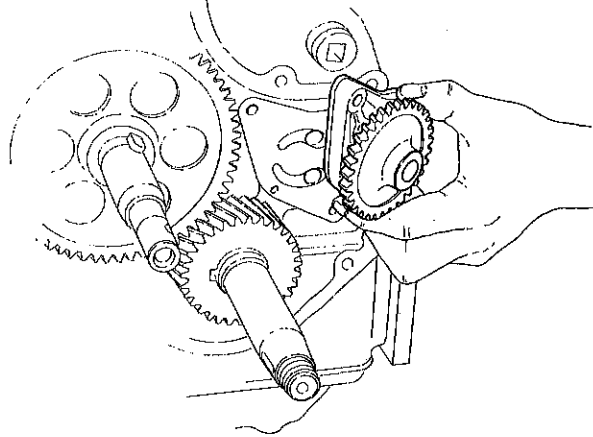
Tightening torque	2.0 ~ 2.5 kg-m (14.5 ~ 18.1 ft-lb)
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5-3.13 Install the engine feet and set the engine in position

- (1) Dipstick flange and dipstick
- (2) Fuel pump

5-3.14 Install the lubricating oil pump

Install the lubricating oil pump and driving gear assembly.

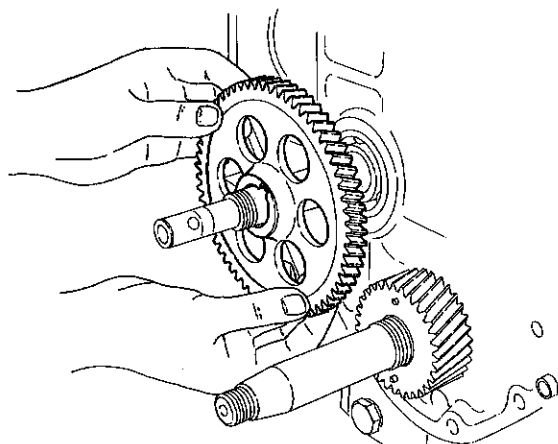


Lube pump body mounting bolt	0.9 kg-m (6.5 ft-lb)
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5-3.15 Assemble the camshaft gear and fuel cam

- (1) Coat the shaft hole of the camshaft gear with oil and insert the gear.

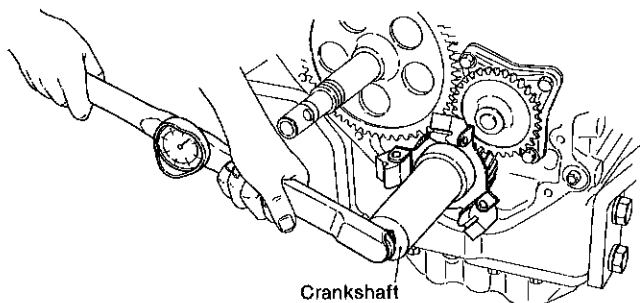
- (2) Coat the fuel cam with oil and insert the cam by aligning the "0" mark opposite the camshaft gear.



- (3) Tighten the camshaft end nut.

Tightening torque	7 ~ 8 kg-m (50.6 ~ 57.9 ft-lb)
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5-3.16 Assemble the crankshaft gears



- (1) Coat the crankshaft section and the inside of the gear with oil.
(2) Align the matching marks of the camshaft gear and the crankshaft gear and insert the crankshaft gear.
(3) After inserting the crankshaft gear, check the backlash.

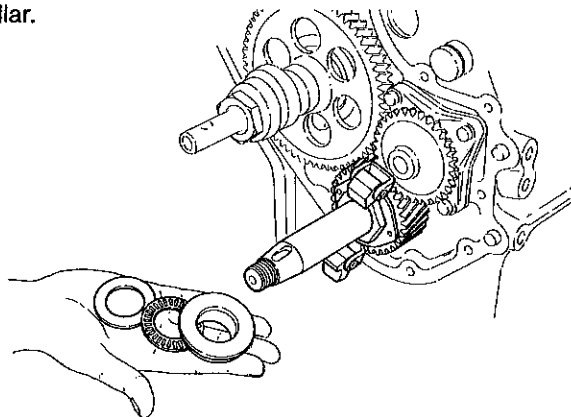
Backlash	0.05 ~ 0.13mm (0.0020 ~ 0.0051in.)
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- (4) Install the governor weight assembly and tighten the crankshaft end nut.

Tightening torque	8 ~ 10 kg-m (57.9 ~ 72.3 ft-lb)
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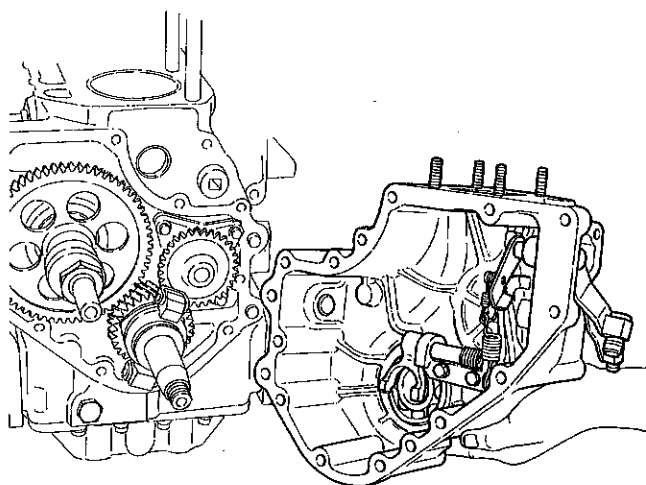
5-3.17 Install the governor sleeve

Install the governor sleeve, thrust needle bearing and thrust collar.



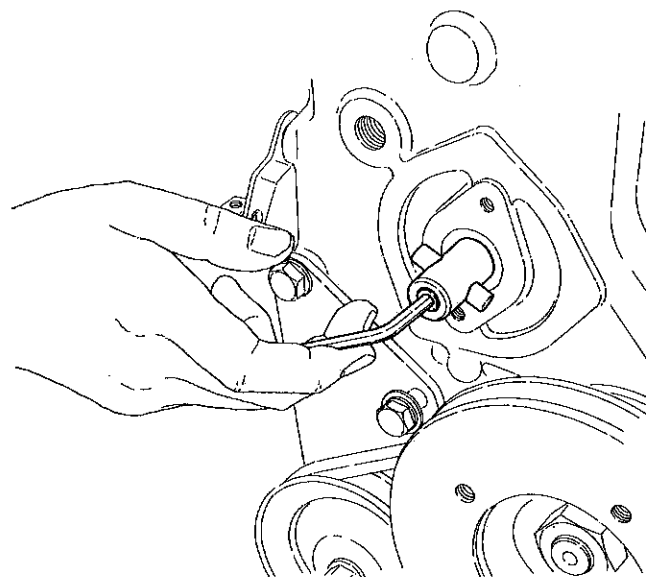
5-3.18 Install the timing gear case

- (1) Coat both sides of the new packing with "Three Bond 3B8-005" and install.
(2) Install the timing gear case



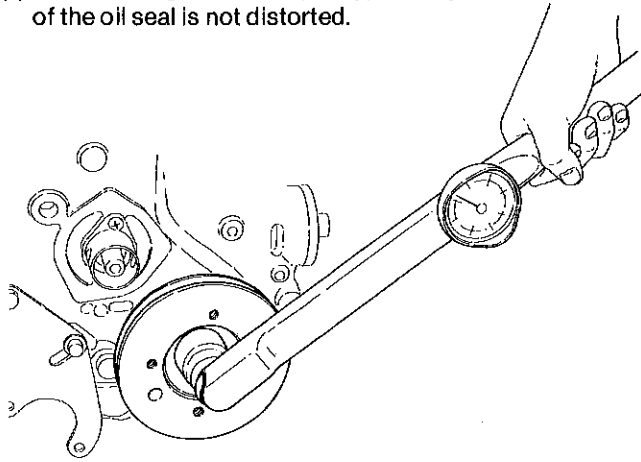
Tightening torque	2.5 kg-m (18 ft-lb)
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- (3) Insert the pin for fitting the handle into the camshaft and fix it by means of the bolt with the hexagonal socket head, then fit the starting shaft cover.



5-3.19 Install the crankshaft V-pulley

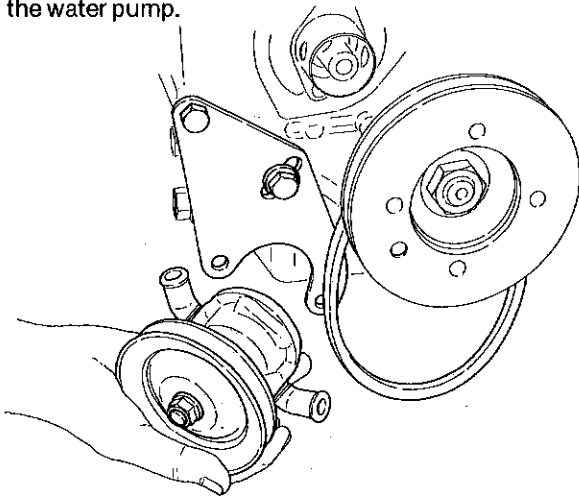
- (1) Install the crankshaft key
- (2) Coat the crankshaft V-pulley and the inside of the oil seal with oil.
- (3) Insert and tighten the V-pulley, making sure that the lip of the oil seal is not distorted.



Tightening torque	10 kg-m (72.3 ft-lb)
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5-3.20 Install the water pump

- (1) Install the V-belt to the crankshaft V-pulley and install the water pump.



- (2) Tighten while adjusting the V-belt tension

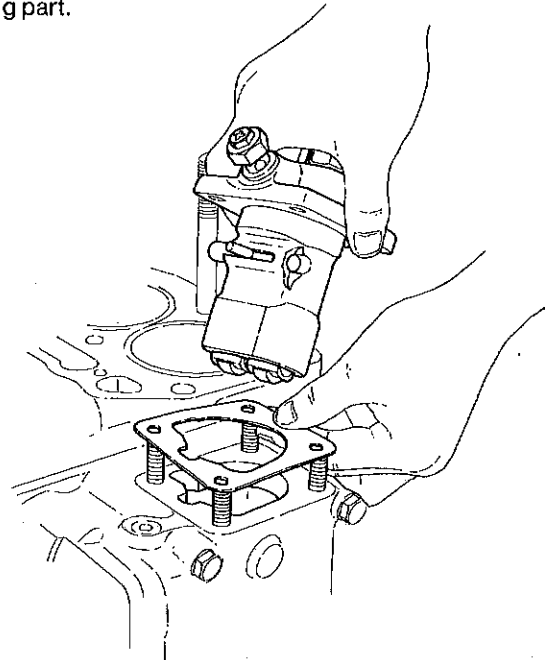
Tightening torque	2.5 kg-m (18 ft-lb)
-------------------	---------------------

- (3) Install the water pipe (pump to cylinder inlet joint)

5-3.21 Install the fuel injection pump

- (1) Remove grease from both sides of the fuel injection timing adjustment shims with thinner, and coat the shims with "Screw Lock Super 203M."

- (2) Insert the pump by looking through the gear case side cover, and align the governor No.2 lever and rack connecting part.



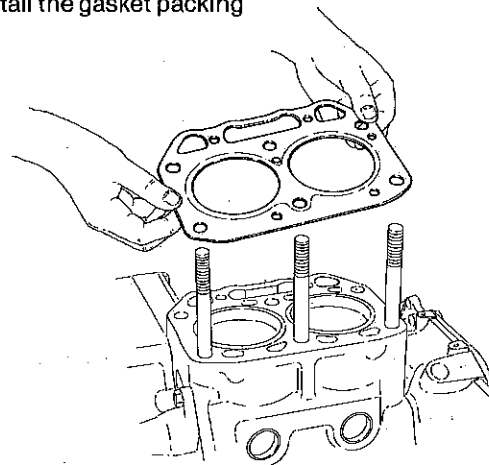
- (3) Tighten the fuel pump

Tightening torque	2.5 kg-m (18 ft-lb)
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- (4) Install the gear case side cover

5-3.22 Install the cylinder head

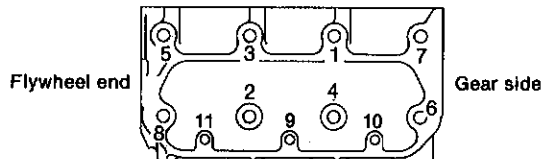
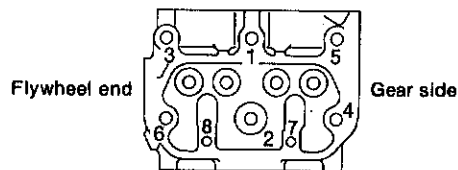
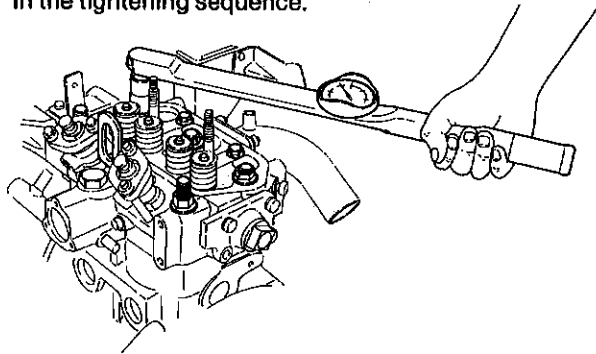
- (1) Install the gasket packing



CAUTION: Take particular notice of the surfaces to be fitted.

Fit it keeping the TOP mark to the cylinder head side.

- (2) Insert the cylinder head, being careful not to damage the threads of the tightening bolts, and tighten the nuts in the tightening sequence.

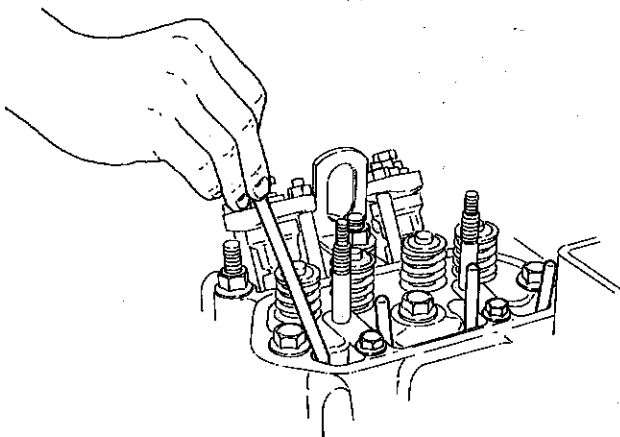


		kg-m (ft-lb)	
Tightening torque	Main(M12)	2GM20(C),3GM30(C)	3HM35(C)
	Sub(M8)	12.0(86.8)	13(94.0)
		3.0(21.7)	3(21.7)

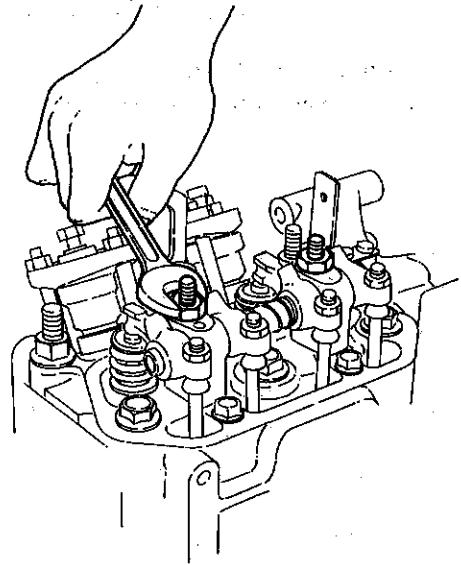
- (3) Install the water pipe
(from the thermostat cover to the cylinder inlet joint)

5-3.23 Install the rocker arms

- (1) Install the push rods on the tappets



- (2) Coat the inside of valve spring retainer with oil
(3) Install the rocker arm shaft assembly and tighten the nut.



Tightening torque	3.7 kg-m (27 ft-lb)
-------------------	---------------------

CAUTION: 1. Loosen the valve head clearance adjusting screw in advance.

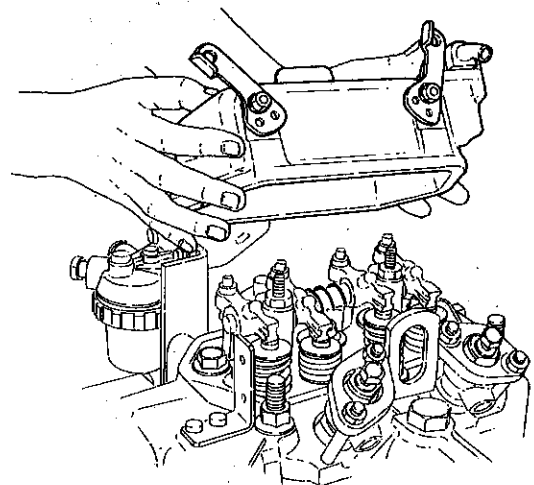
2. Check that the arm moves smoothly.

- (4) Adjust the intake and exhaust valve head clearance and lock with the nut.

Intake and exhaust valve head clearance (engine cold)	0.2mm (0.008in.)
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5-3.24 Install the rocker arm cover

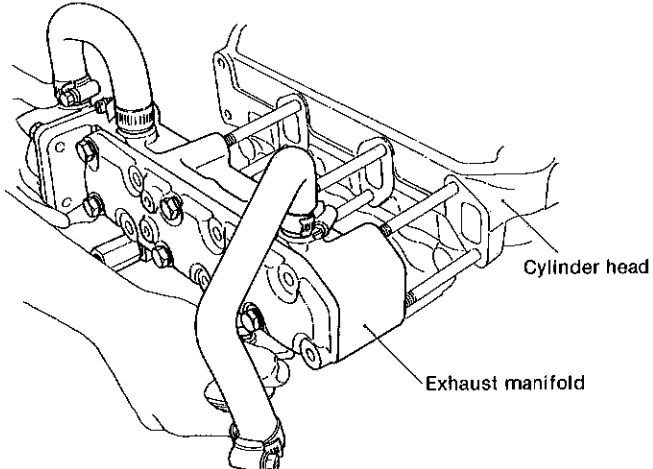
- (1) Install the rocker arm cover



- (2) Install the breather pipe to the air intake pipe [intake manifold ... 3GM30(C).]

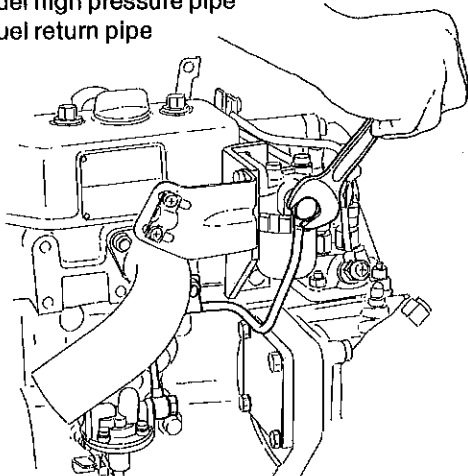
5-3.25 Install the exhaust manifold (only for 3-cylinder engine) and the mixing elbow

- (1) Install the exhaust manifold with mixing elbow [3GM30(C)].
- (2) Install the mixing elbow. [2GM20(C)].
- (3) Install the cooling water bypass hose to the thermostat cover.

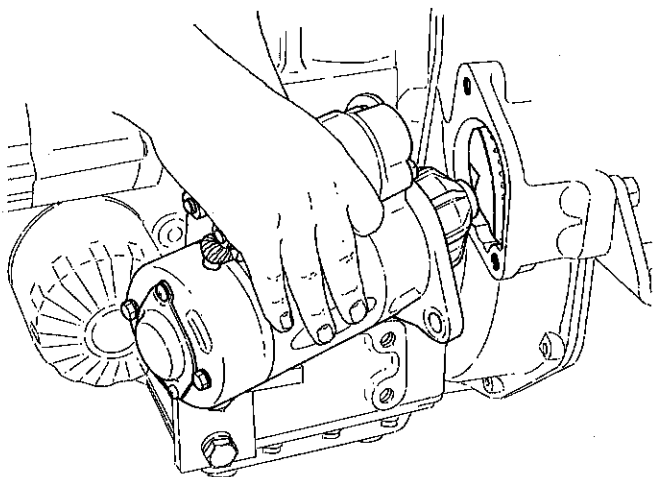


5-3.26 Install the fuel pipe

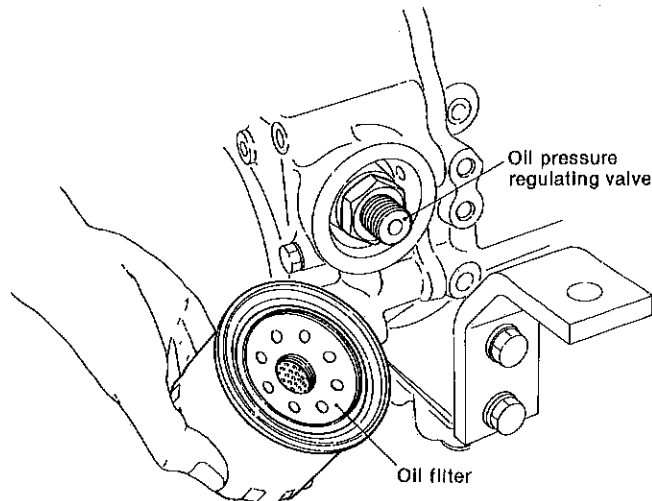
- (1) Install the feed pump to fuel filter pipe
- (2) Install the fuel filter to fuel injection pump pipe
- (3) Install the fuel high pressure pipe
- (4) Install the fuel return pipe



5-3.27 Install the starter motor

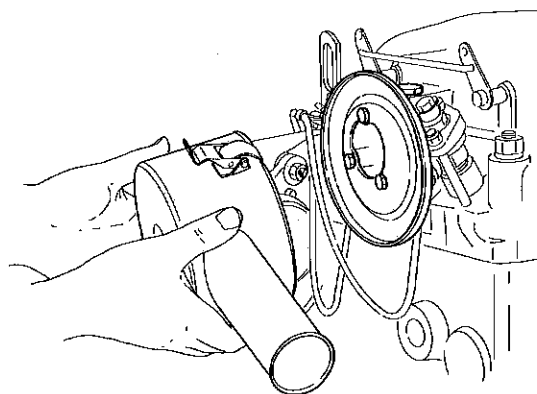


5-3.28 Install the oil filter



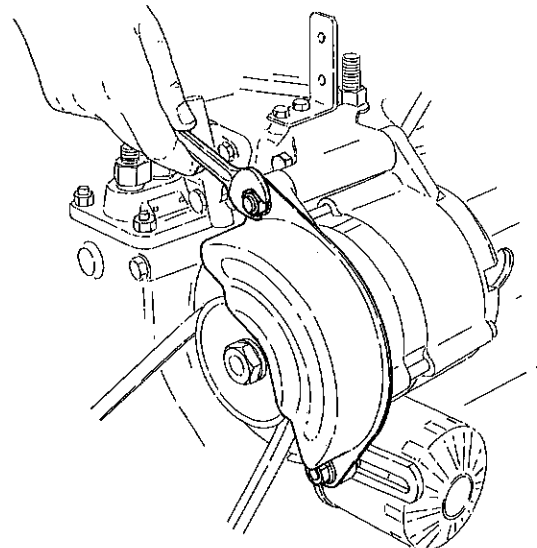
5-3.29 Install the intake silencer

- (1) Install the intake silencer cover to the air intake pipe. [intake manifold . . . 3GM30(C)].
- (2) Install the intake silencer and tighten it with the clip



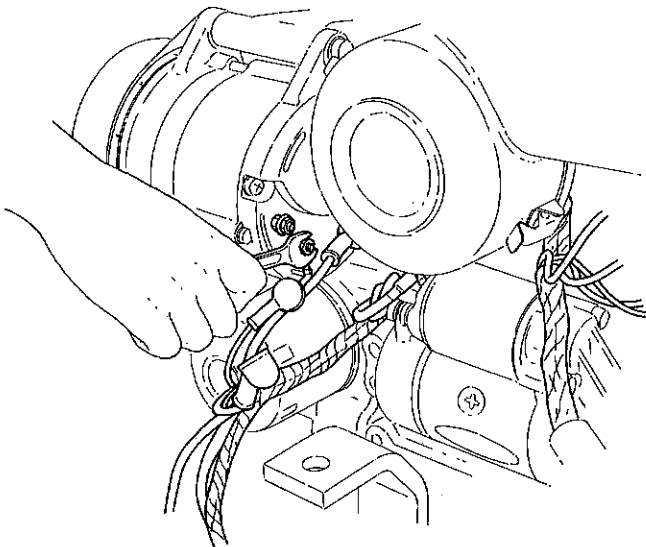
5-3.30 Install the alternator

- (1) Install the alternator to the bracket

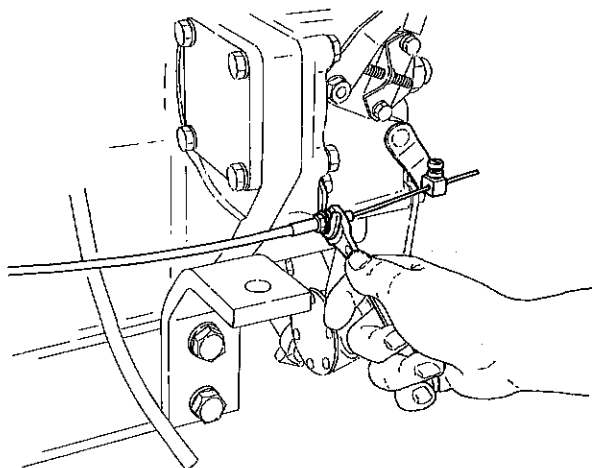


- (2) Install the V-belt and tighten the adjusting bolt while adjusting the V-belt tension.

5-3.31 Connect the electrical wiring



5-3.32 Install the remote control cables



5-3.33 Connect the interior piping

