

ENGINE

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3-1 ENGINE**ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE**

The parts listed below can be removed and reinstalled without removing the engine from the frame. Refer to the page listed in each section for removal and reinstallation instructions.

ENGINE CENTER

	See page
Radiator	3- 4
Exhaust pipe/muffler	3- 5
Oil pressure switch	3-51
Oil hose	3-11
Oil filter	3-10
Oil cooler	3-10
Oil pan	3-17
Engine oil pressure regulator	3-50
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Cam chain tensioner	3-11 and 63
Cylinder head cover	3-10 and 65
Cylinder head breather cover	3-10
Camshafts	3-11 and 60
Cylinder head	3-12 and 59
Cylinder	3-12 and 59
Water pipe (Front side)	3-10 and 65
Water pipe (Rear side)	3-10 and 65
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Starter motor	3-13 and 57
Generator	3-13 and 57
Starter clutch cover	3-13 and 56
Starter idle gear	3-14 and 56
Starter clutch	3-14 and 56

ENGINE LEFT SIDE

	See page
Gearshift lever	3- 6
Engine sprocket cover	3- 6
Water pump	3-16
Engine sprocket and drive chain	3- 6
Neutral indicator switch body	3-16

ENGINE RIGHT SIDE

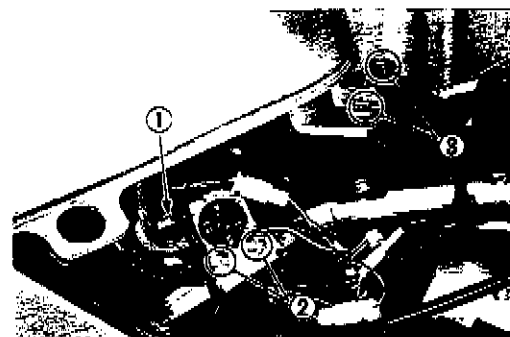
	See page
Clutch cover	3-14 and 54
Signal generator	3-14 and 55
Clutch pressure, drive and driven plates	3-15 and 53
Clutch sleeve hub	3-15 and 53
Oil pump driven gear	3-16 and 52
Generator/oil pump drive gears	3-15 and 53
Primary driven gear	3-15 and 53
Gearshift shaft	3-16 and 52
Gearshift cam shifter	3-16 and 47

ENGINE REMOVAL AND REINSTALLATION

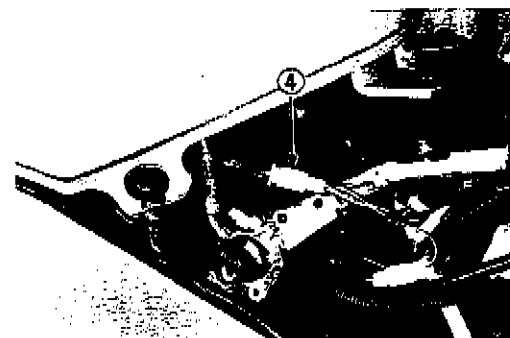
ENGINE REMOVAL

Before taking the engine out of the frame, wash the engine with a steam cleaner. The procedure of engine removal is sequentially explained in the following steps, and engine installation is effected by reversing the removal procedure.

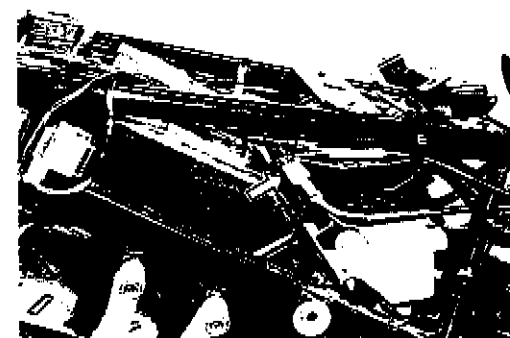
- Remove the oil drain plug to drain out engine oil.
- Remove the front and rear seats.
- Remove the frame cover assembly. (See page 7-5.)
- Remove the lower cowling assembly. (See page 7-2.)
- Turn the fuel cock to "OFF" position and disconnect the fuel hose ① from the fuel cock.
- Remove the fuel cock mounting screws ②.
- Remove the fuel tank mounting bolts ③.



- Disconnect the fuel level indicator switch lead wire coupler ④ and remove the fuel tank.



- Disconnect the battery ⊖ lead wire terminal and battery ⊖ lead wire coupler.



- Loosen the respective carburetor clamp screws (air cleaner side).
- Remove the air cleaner box by removing its mounting screws, left and right.

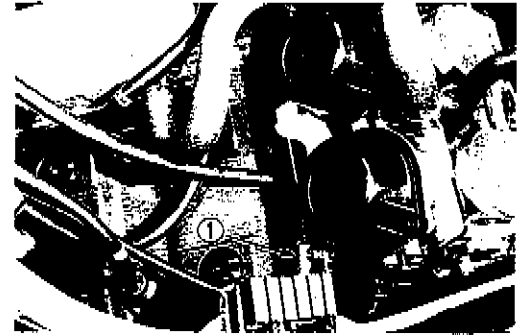


3-3 ENGINE

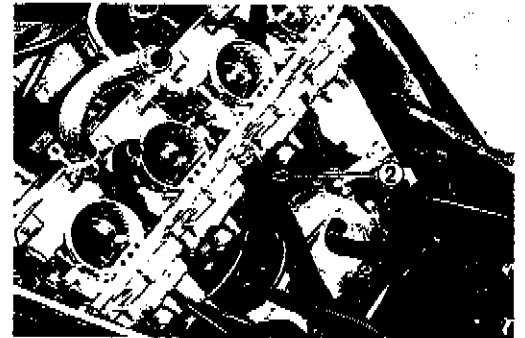
- Disconnect the throttle cables from the throttle grip.



- Disconnect the starter cable ① from the carburetor assembly.



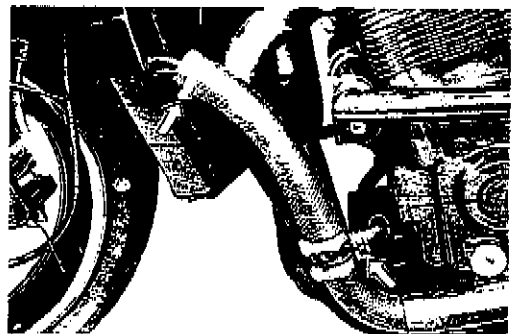
- Disconnect the fuel hose ② from the carburetor assembly.
- Loosen the respective carburetor clamp screws (engine side) and remove the carburetor assembly.

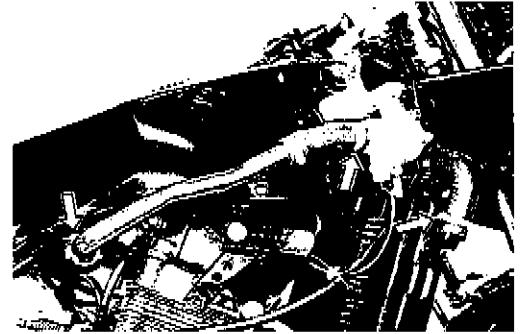


- Disconnect the water hose by loosening its clamp to drain out engine coolant.

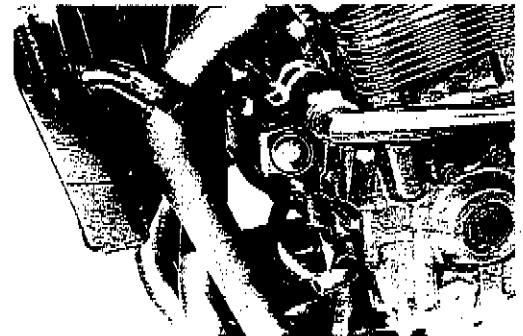
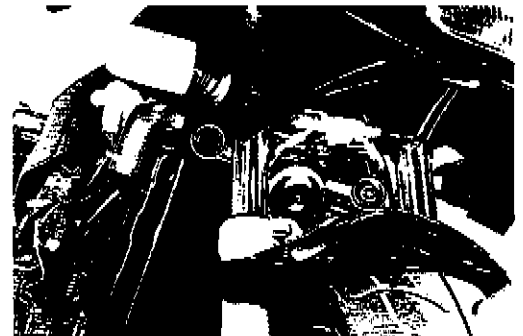


- Disconnect the water hoses by loosening their clamps.

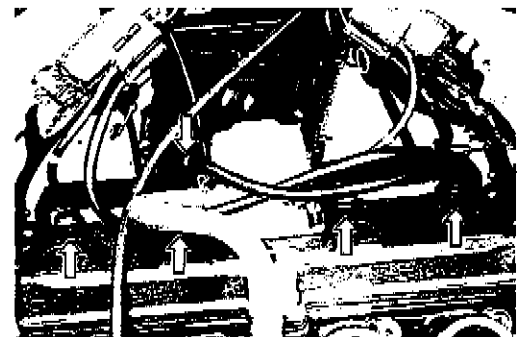




- Remove the radiator by removing its mounting bolts.



- Disconnect all the spark plug caps.
- Disconnect the breather hose.

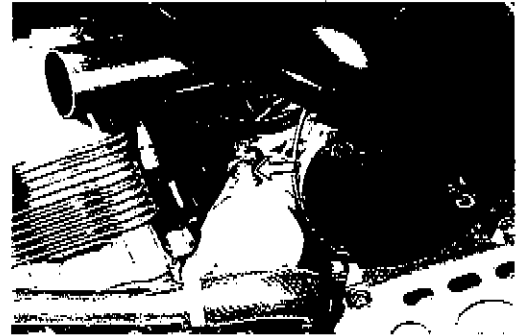


- Remove the clutch release lever and disconnect the clutch cable.



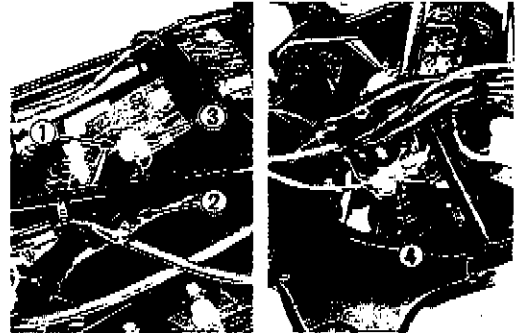
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- Disconnect the starter motor lead wire.

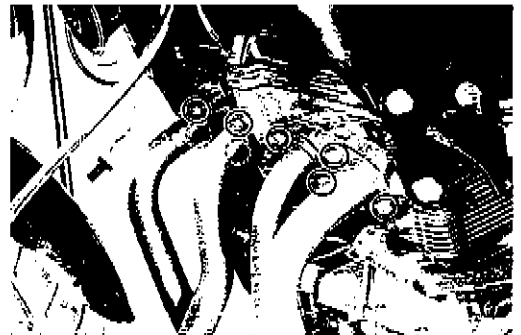


- Disconnect the various lead wires.

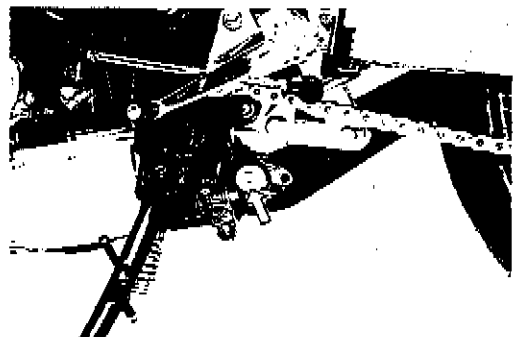
- ① Signal generator
- ② Generator
- ③ Oil pressure switch
- ④ Neutral switch



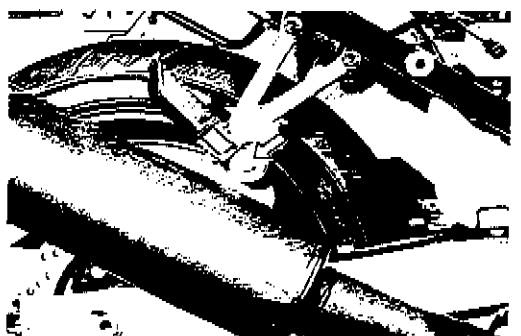
- Remove the eight exhaust pipe clamp bolts.



- Remove the muffler mounting bolts, then remove the exhaust pipe/muffler assembly.

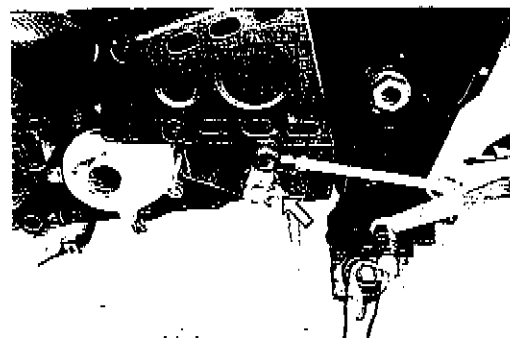
**NOTE:**

When installing a new exhaust pipe/muffler connector, clean any old dried sealer from the exhaust pipe and from inside the muffler and the exhaust gas sealer should be applied to both the inside and outside of the exhaust pipe/muffler connector.



EXHAUST GAS SEALER: PERMATEX 1372

- Remove the gearshift lever by removing its mounting bolt.



- Remove the engine sprocket cover by removing the bolts.

NOTE:

*When installing the engine sprocket cover bolts, apply a small quantity of the **THREAD LOCK "1342"** to their threads.*

99000-32050: THREAD LOCK "1342"

Tightening torque: 4–7 N·m

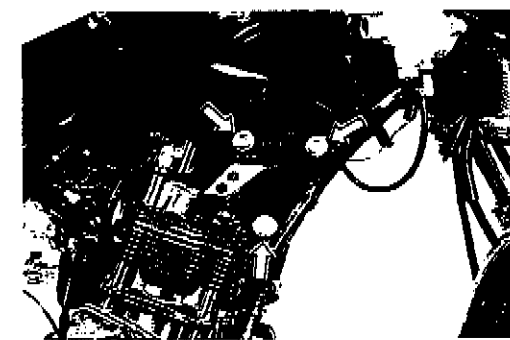
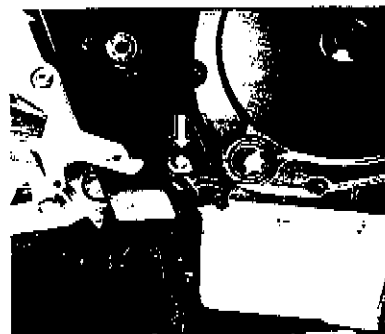
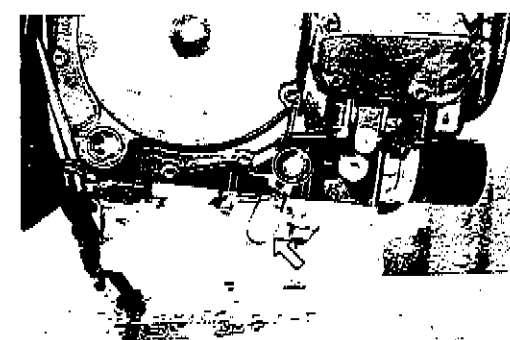
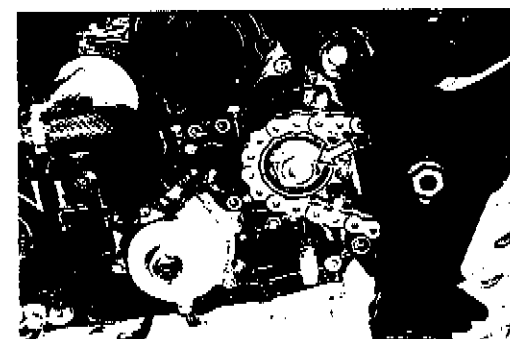
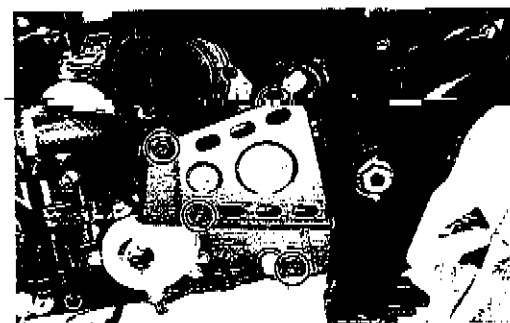
(0.4–0.7 kg-m, 3.0–5.0 lb-ft)

- Remove the engine sprocket nut while depressing the rear brake pedal.
- Remove the engine sprocket.

NOTE:

If it is difficult to remove the engine sprocket, loosen the axle nut and chain adjusting nuts to provide additional chain slack.

- Remove the lower cowling brackets, left and right.
- Support the engine with a proper engine jack.
- Remove the engine mounting bolts, nuts, spacers and brackets.
- Gradually lower the engine assembly.



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ENGINE REINSTALLATION

Reinstall the engine in the reverse order of engine removal.

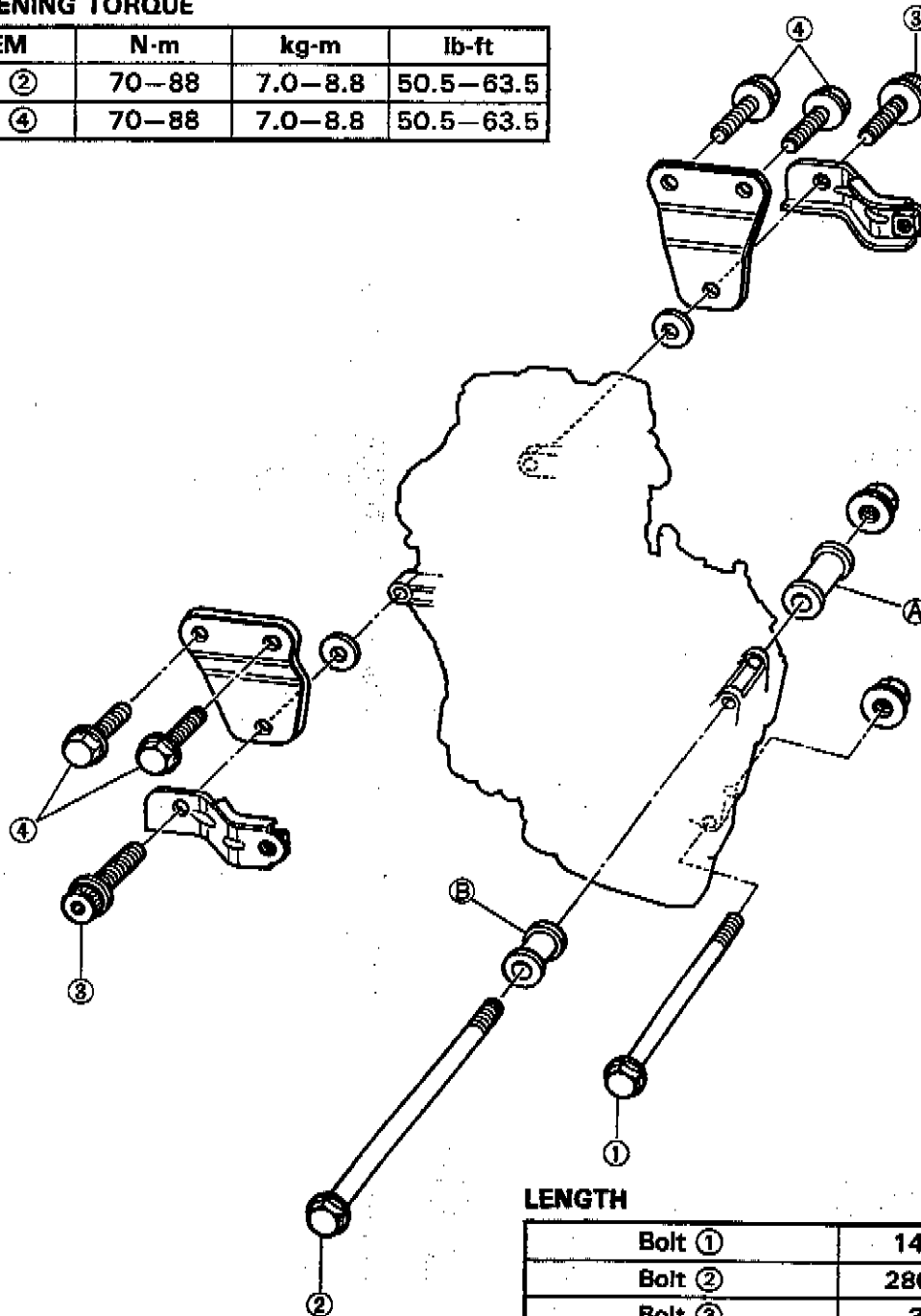
- Insert the two long bolts from left side. Install the brackets, spacers, bolts and nuts properly, as shown in the following illustration.

NOTE:

The engine mounting nuts are self-locking. Once the nut has been removed, it is no longer of any use. Be sure to use new nuts and tighten them to the specified torque.

TIGHTENING TORQUE

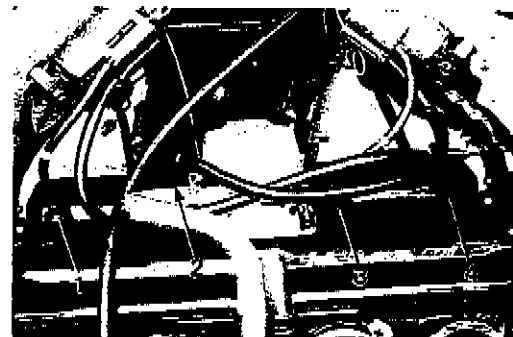
ITEM	N-m	kg-m	lb-ft
①, ②	70-88	7.0-8.8	50.5-63.5
③, ④	70-88	7.0-8.8	50.5-63.5



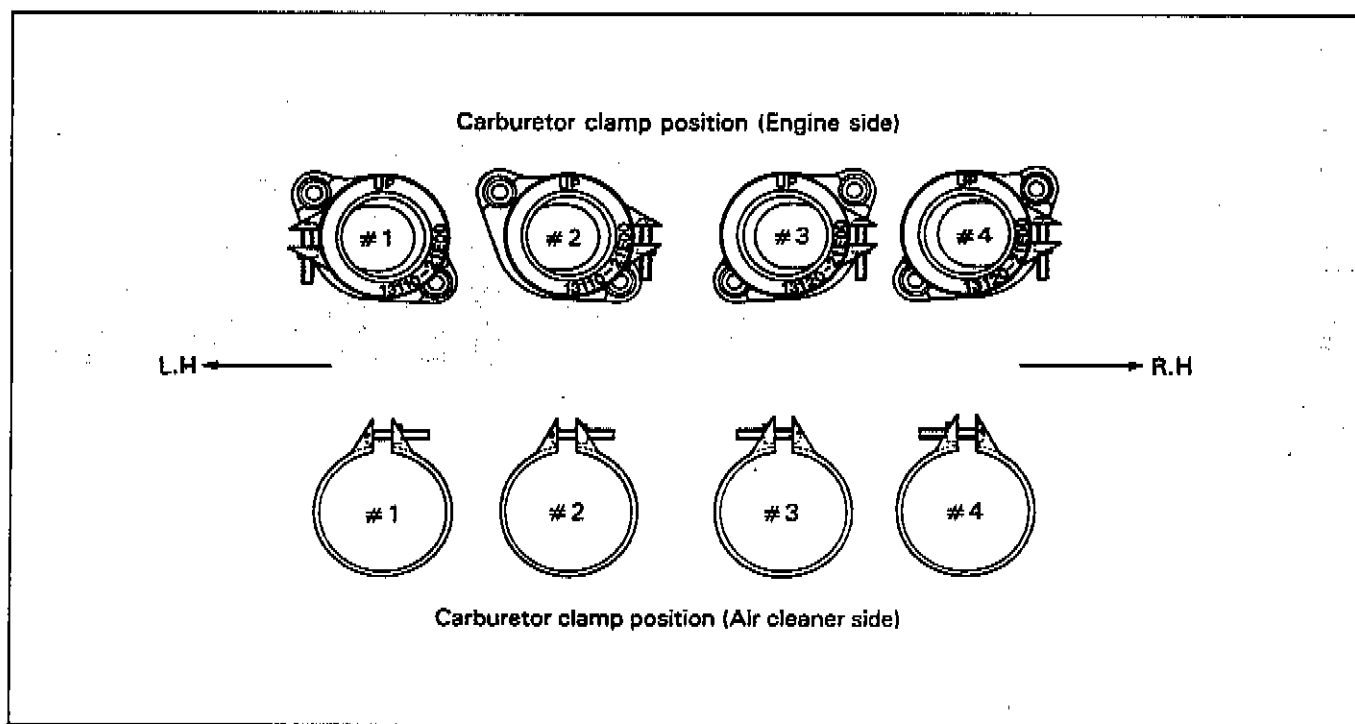
LENGTH

Bolt ①	140 mm (5.5 in)
Bolt ②	280 mm (11.0 in)
Bolt ③	30 mm (1.2 in)
Bolt ④	30 mm (1.2 in)
Spacer RH A	65 mm (2.6 in)
Spacer LH B	45 mm (1.8 in)

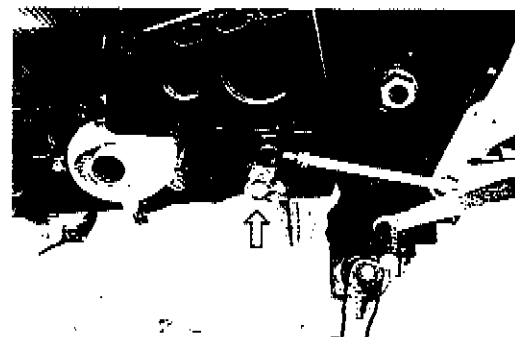
- Replace the plug caps on the spark plugs so that their code markings correspond to the cylinder numbers arranged in the order of 1, 2, 3, and 4 from the left hand.



- Locate the carburetor clamps, as shown in the illustration.



- Install the gearshift lever to the gearshift shaft in the correct position.



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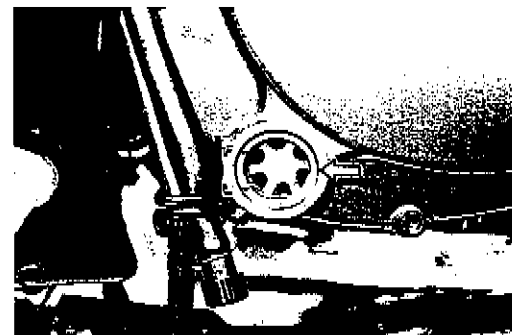
- After remounting the engine, route wiring harnesses, cables and hoses properly by referring to the sections, for wire routing, cable routing and hose routing. (See pages 8-12 through 22.)

- Adjust the following items to the specification.

	Page
* Filling engine coolant	2-13
* Clutch cable play	2-11
* Throttle cable play	2-10
* Idling adjustment	4-18
* Balancing carburetors	4-17
* Drive chain	2-11

- Pour 3.9 L (4.1/3.4 US/Imp qt) of engine oil SAE 10W/40 graded SE or SF into the engine after overhauling engine.
- Start up the engine and allow it run for several minutes at idle speed. About several minutes after stopping engine, check that the oil level remains between the marks of oil level inspection window.

Change	3000 ml (3.2/2.6 US/Imp qt)
Filter change	3300 ml (3.5/2.9 US/Imp qt)
Overhaul	3900 ml (4.1/3.4 US/Imp qt)



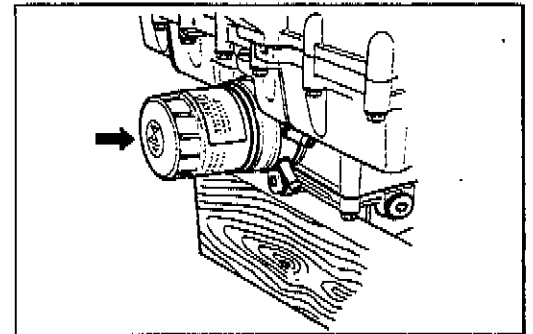
ENGINE DISASSEMBLY

- Remove the oil filter by using the special tool.

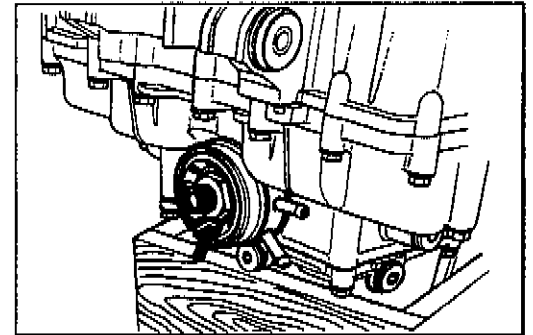
09915-40610: Oil filter wrench

NOTE:

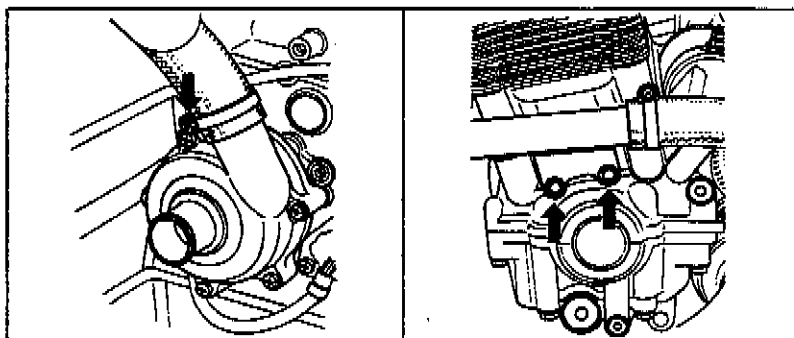
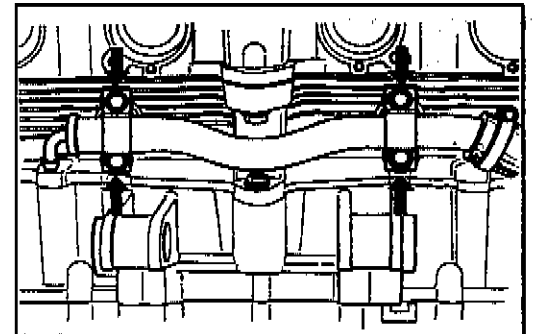
Refer to page 2-9 for installation procedures.



- Remove the oil cooler by removing its union bolt.



- Remove the inlet and outlet water pipes/hoses by removing the mounting bolts and clamp screws.

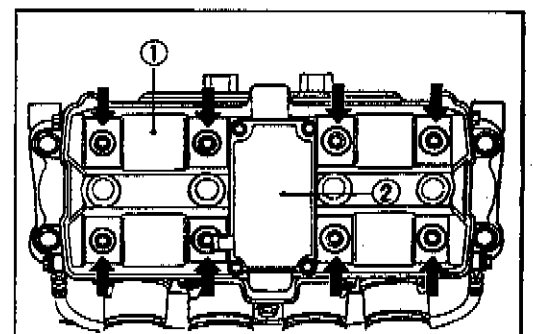
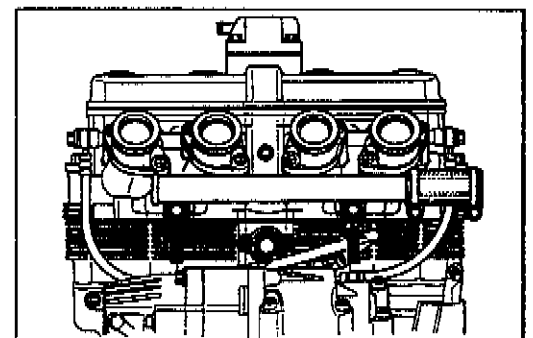


- Remove the cylinder head cover ① by removing the bolts.

NOTE:

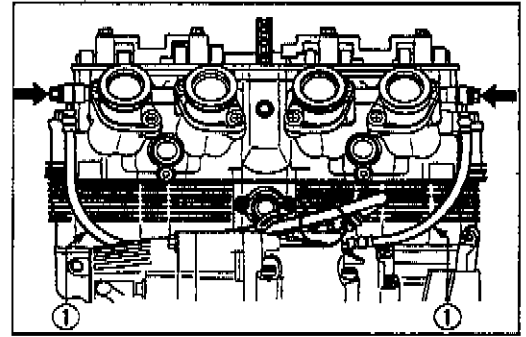
The cylinder head breather cover ② is to be removed only when replacing it or when removing the engine from the frame.

09914-25811: 6 mm "T" type hexagon wrench



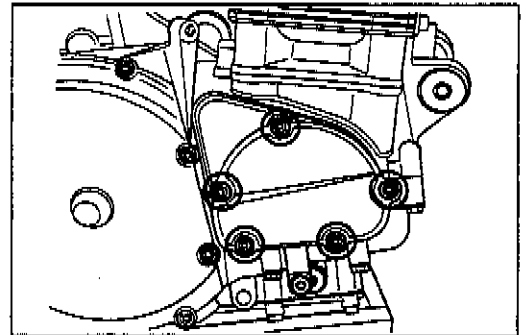
3-11 ENGINE

- Remove the left and right oil hoses ① by removing the union bolts.

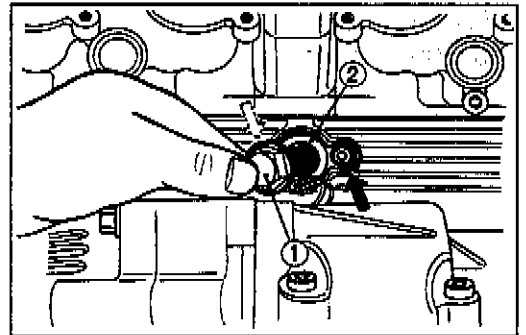


- Remove the signal generator cover by removing the bolts.

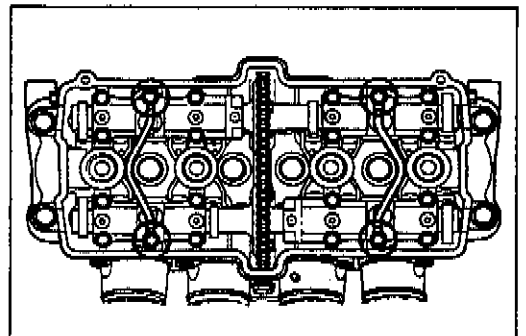
09911-73730: 5 mm "T" type hexagon wrench



- After removing the spring holder bolt ① and spring ②, remove the cam chain tensioner by removing the mounting bolts.



- Remove the left and right oil pipes by removing the bolts.

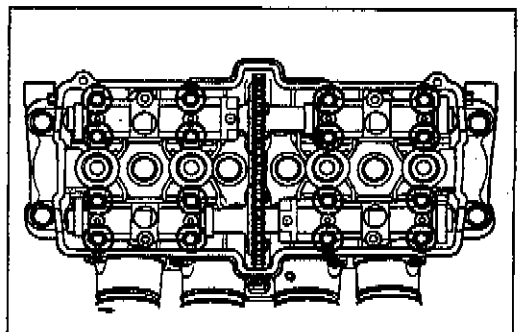


- Remove the four camshaft journal holders by removing the bolts.

NOTE:

Be sure to loosen camshaft journal holder bolts evenly by shifting the wrench diagonally.

- Remove the two camshafts, intake and exhaust.



- The cylinder head becomes free for removal when its one 6-mm bolt **A** and twelve 10-mm bolts are removed.

09911-74520: Long socket 12 mm

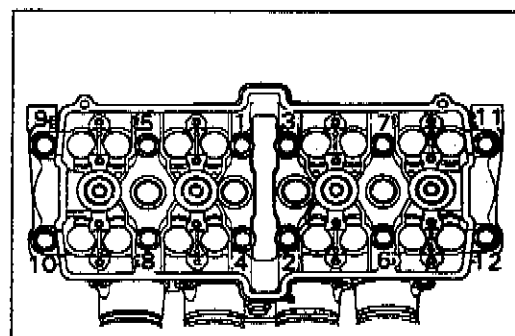
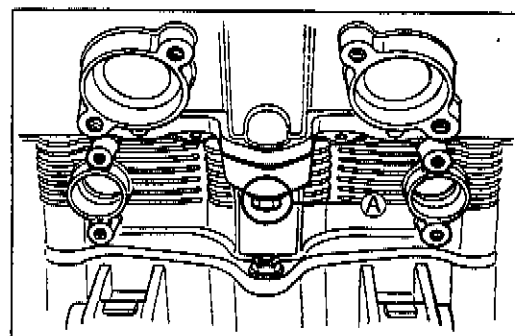
09914-24510: T-handle

NOTE:

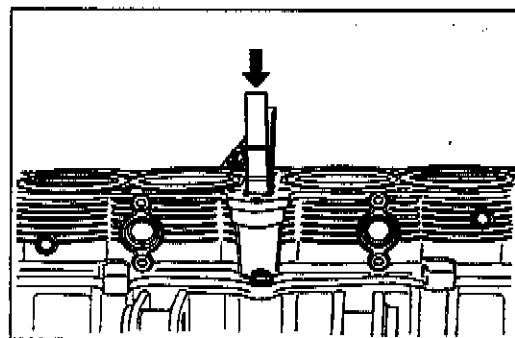
When loosening the cylinder head bolts, loosen each bolt little by little, in a descending order, according to the numbers.

CAUTION:

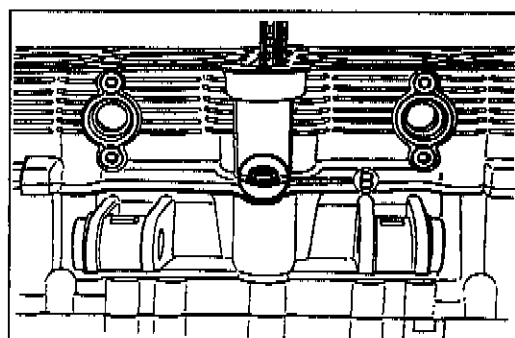
Be careful not to damage the fins when removing or handling the cylinder head. This precaution applies to the cylinder block also.



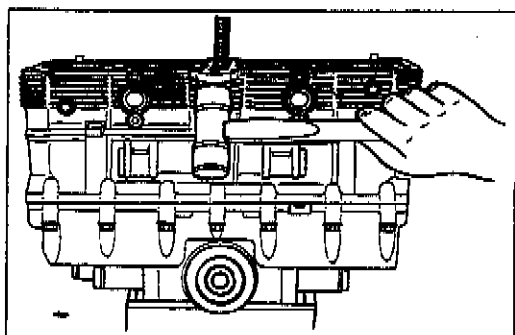
- Remove the cam chain guide.



- Remove the cylinder nut **B**.

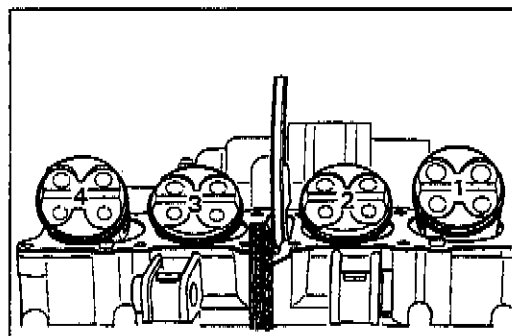


- Firmly grip the cylinder block at both ends, and lift it straight up. If the block does not come off, lightly tap on the finless portions of the block with a plastic mallet to make the gasketed joint loose.

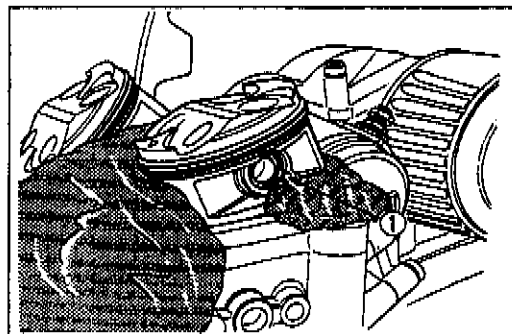


3-13 ENGINE

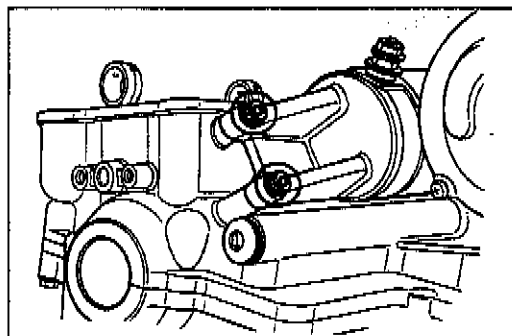
- Scribe the cylinder number on the head of the respective pistons.



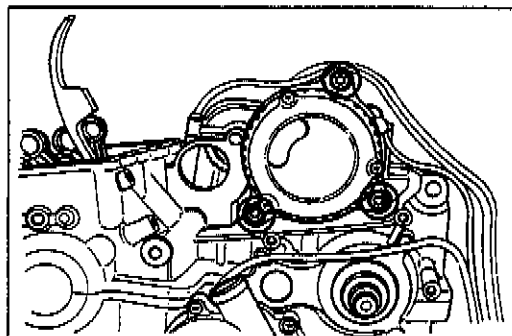
- Place a cloth beneath the piston so as not to drop any parts in the crankcase, and remove the circlip ① with long-nose pliers.
- Draw out the piston pin. Place each piston pin in the same piston as that it was removed from.



- Remove the starter motor by removing the bolts.

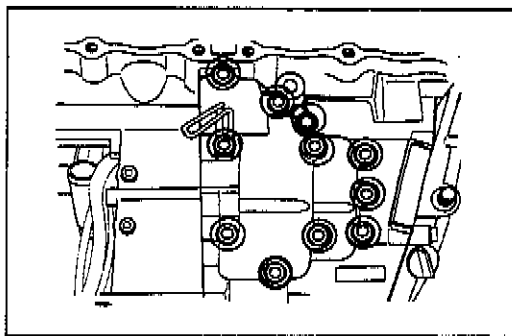


- Remove the generator by removing the bolts.

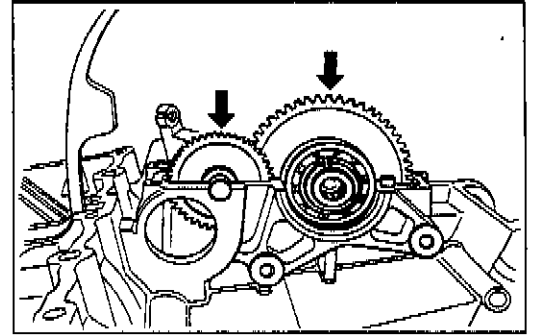


- Remove the starter clutch cover by removing the bolts.

09911-73730: 5 mm "T" type hexagon wrench

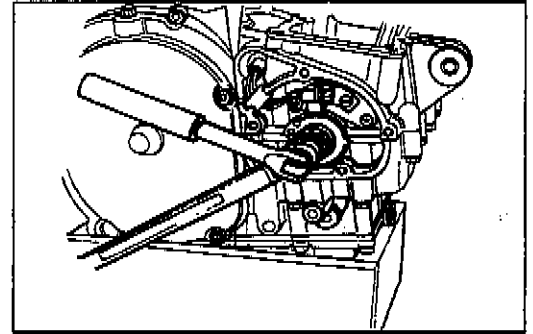


- Remove the starter idle gear and its shaft.
- Remove the starter clutch assembly.

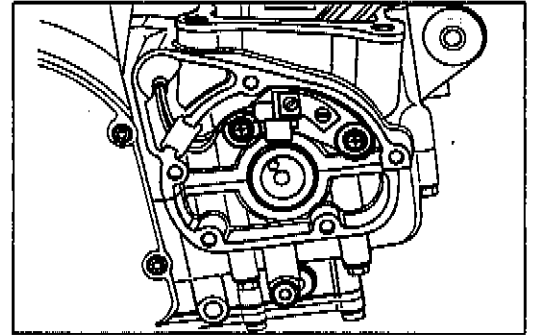


- Remove the signal generator rotor by removing the bolt.

09900-00410: Hexagon wrench set

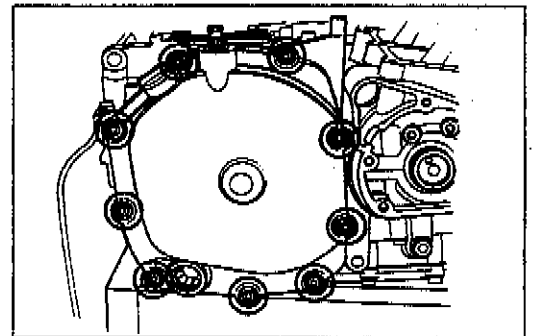


- Remove the signal generator stator by removing the two screws.



- Remove the clutch cover by removing the bolts.

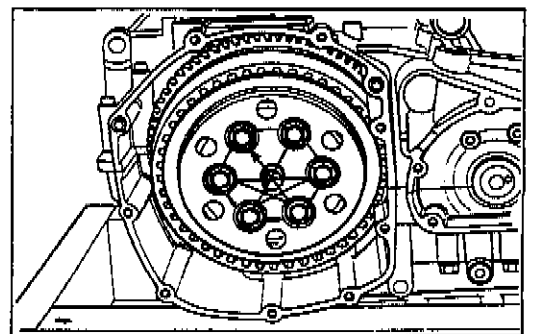
09911-73730: 5 mm "T" type hexagon wrench



- Remove the clutch spring set bolts diagonally while holding the conrod with the special tool.

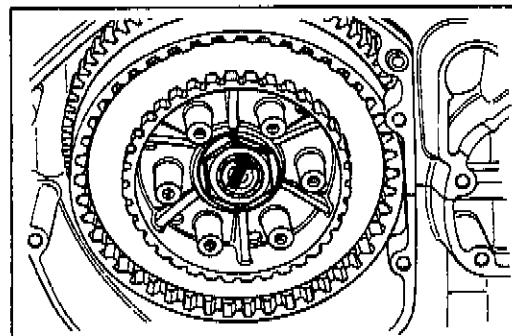
09910-20116: Conrod stopper

- Remove the clutch pressure plate along with its release bearing and rack.

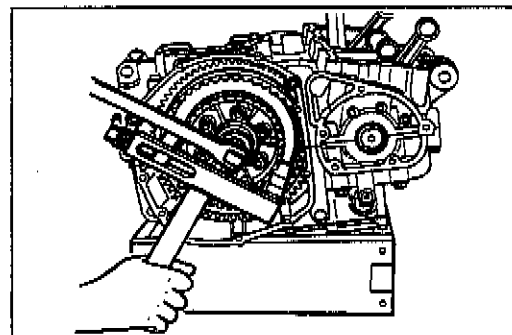


3-15 ENGINE

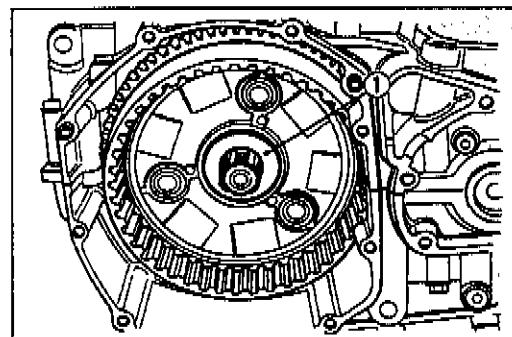
- Flatten the lock washer of the clutch sleeve nut.



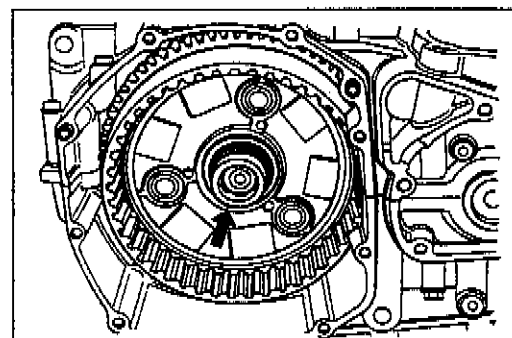
- After removing the several clutch plates, remove the clutch sleeve hub nut after firmly locking the clutch sleeve hub with a clutch sleeve hub holder, and then remove the remainder of clutch drive and driven plates along with the clutch sleeve hub.

09920-53740: Clutch sleeve hub holder

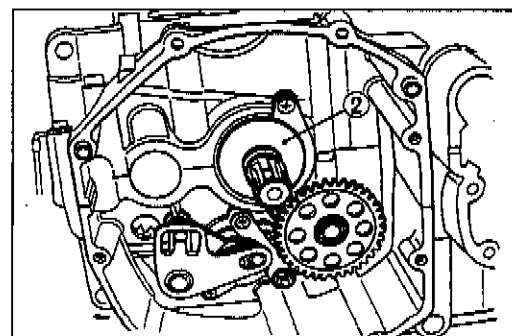
- Remove the thrust washer ① .



- With the spacer and bearing removed, the primary driven gear (integral with the clutch housing) is free to disengage from the primary drive gear.
- Remove the primary driven gear assembly with the generator/oil pump drive gears.



- Remove the thrust washer ② .

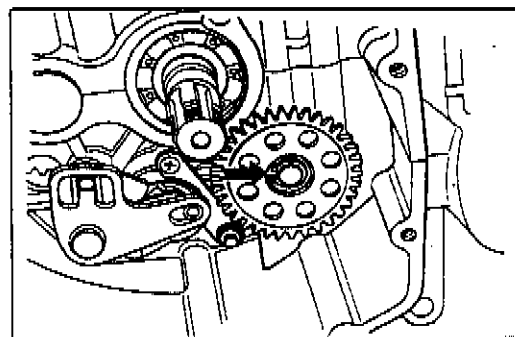


- Remove the oil pump driven gear by removing the circlip.

09900-06107: Snap ring pliers

NOTE:

Do not lose the circlip, pin and washers.



- Remove the circlip and washer from the gearshift shaft.

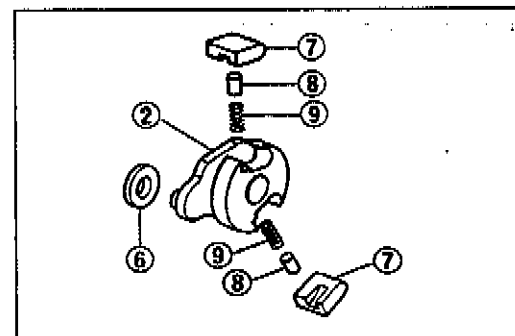
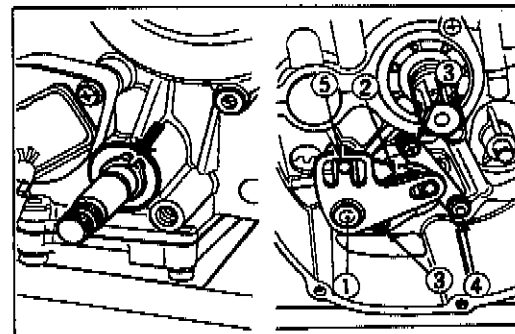
09900-06107: Snap ring pliers

- Draw out the gearshift shaft/gearshift arm ①, and then remove the cam shifter ② by removing the screws ③, nut ④ and arm stopper bolt ⑤.

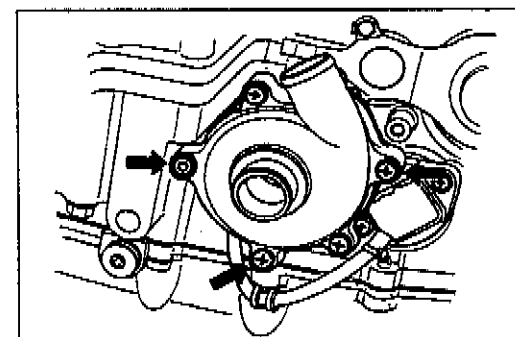
09900-09003: Impact driver set

NOTE:

When removing the cam shifter ②, do not lose the gear shifting roller ⑥, pawl ⑦, pin ⑧ and spring ⑨.



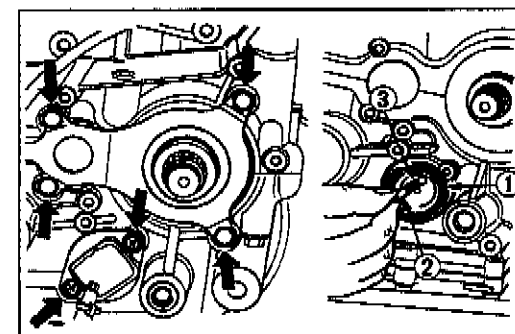
- Remove the water pump by removing the mounting screws and nut.



- Flatten the lock portions of the oil seal retainer and remove it by removing the four bolts.
- Remove the neutral position indicator switch by removing the screws.

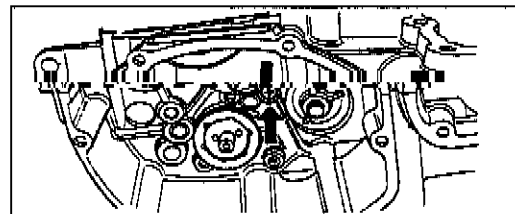
NOTE:

Do not lose the O-ring ①, switch contact ② and its spring ③.

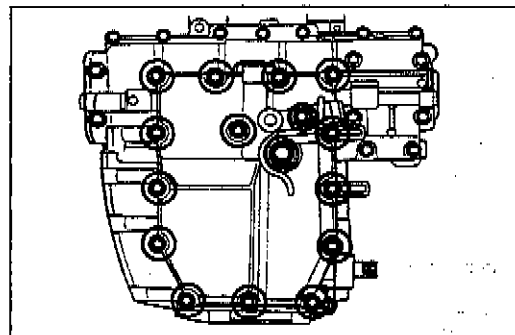


3-17 ENGINE

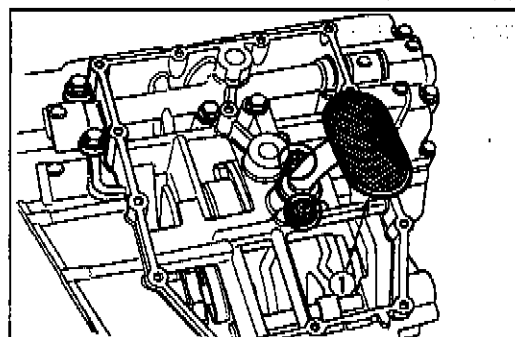
- Remove the countershaft bearing retainer by removing the two screws.



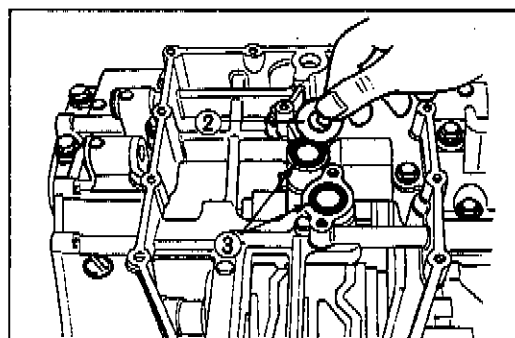
- Remove the oil pan by removing the bolts.



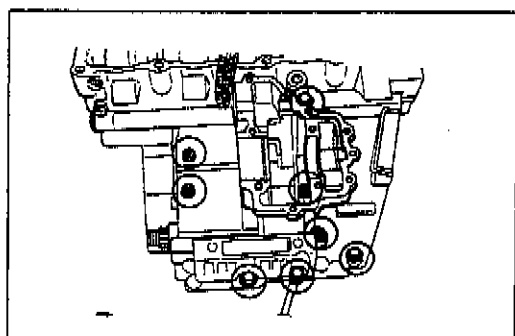
- Remove the oil sump filter ① by removing the two bolts.



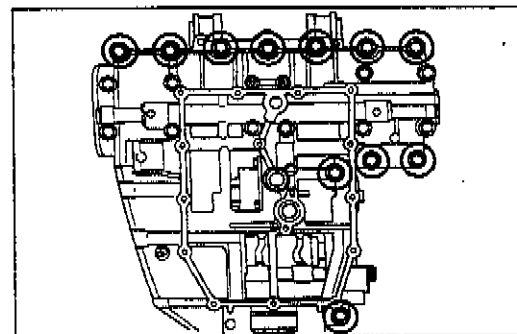
- Remove the shim ② and O-rings ③.



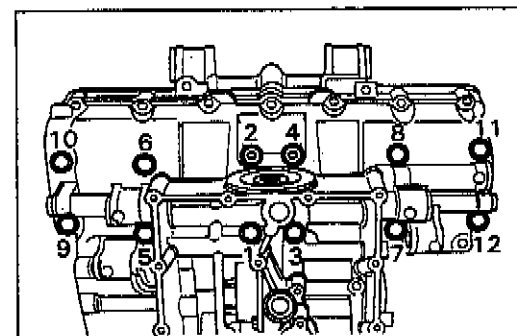
- Remove the upper crankcase tightening bolts.



- Remove the lower crankcase tightening bolts.



- When removing the crankshaft tightening bolts, loosen them in the descending order of numbers assigned to these bolts.
- Make sure that all bolts are removed without fail. Hammer lightly the lower crankcase side with a plastic hammer to separate the upper and lower crankcase halves and then lift the latter.



CAUTION:

Do not drop the crankshaft journal bearings from the lower crankcase.

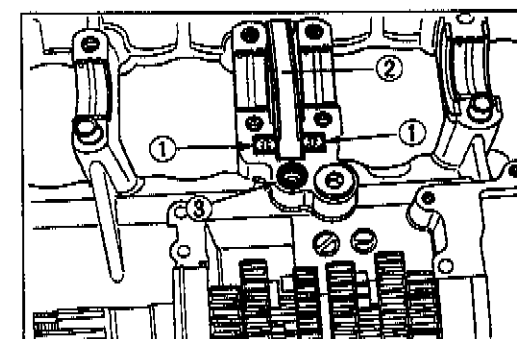
- Remove the crankshaft assembly from the upper crankcase.

NOTE:

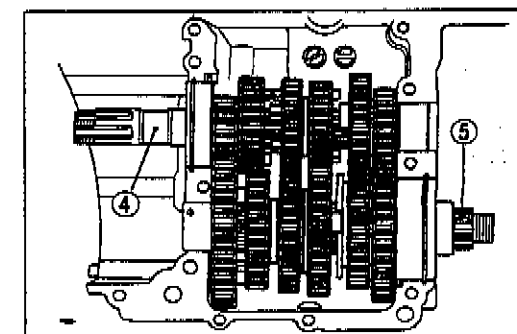
Bear in mind that the crankshaft thrust bearings (A) are located between the shaft and the case.



- Remove the two dampers (1) and cam chain guide (2).
- Remove the O-ring (3).

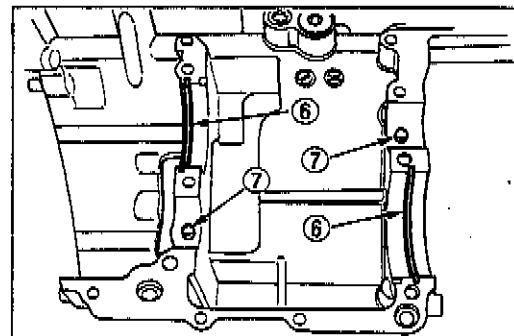


- Remove the countershaft assembly (4) and driveshaft assembly (5).

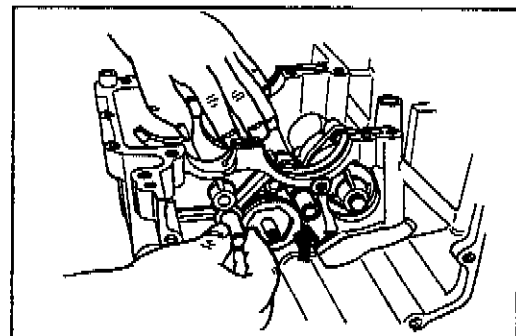


3-19 ENGINE**NOTE:**

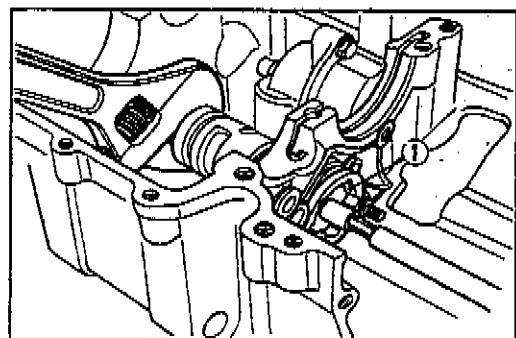
Do not lose the C-rings ⑥ and bearing pins ⑦ .



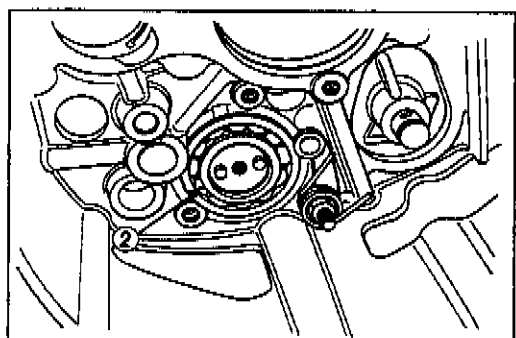
- Hold the gearshift forks by hand while drawing out the gearshift fork shafts from the lower crankcase.



- Remove the gearshift cam stopper plate ① by removing the bolt while holding the gearshift cam with an adjuster wrench.



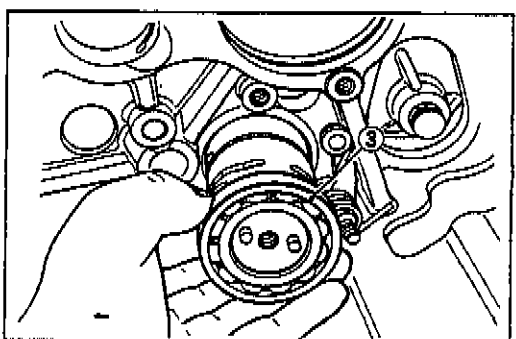
- Remove the washer ② .



- Draw out the gearshift cam with bearing from the lower crankcase.

NOTE:

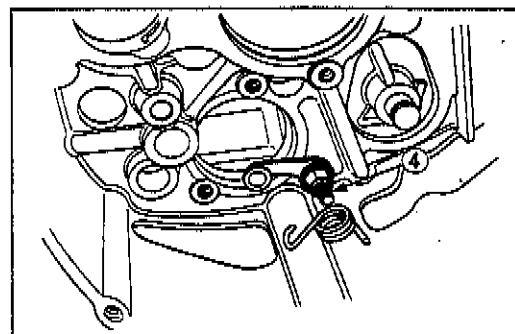
Rotate the bearing ③ on the gearshift cam by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



NOTE:

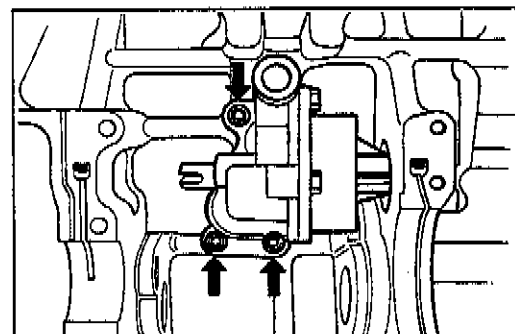
When replacing the gearshift cam stopper bolt ④, apply a small quantity of **THREAD LOCK "1342"** to the bolt.

99000-32050: THREAD LOCK "1342"

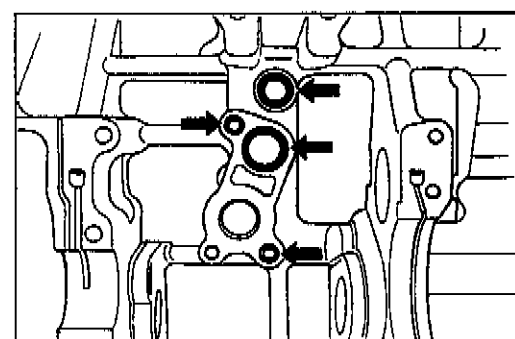
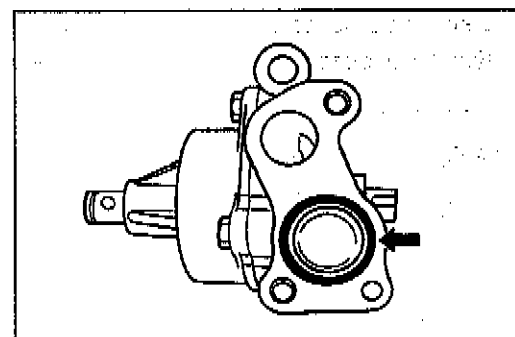


- Remove the oil pump by removing the mounting bolts.

09900-00410: Hexagon wrench set



- Remove the oil pump O-rings and dowel pins.



3-21 ENGINE

ENGINE COMPONENTS INSPECTION AND SERVICE

CYLINDER HEAD SERVICE

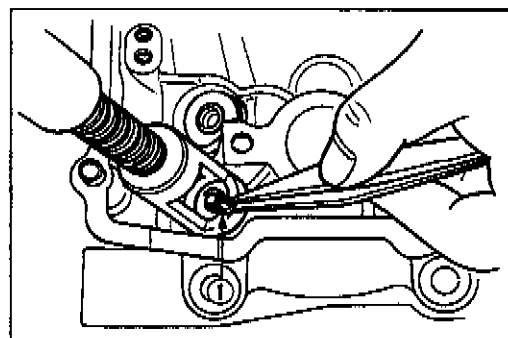
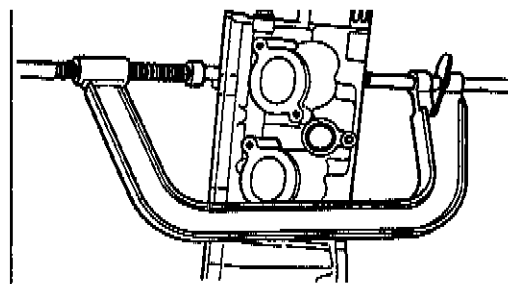
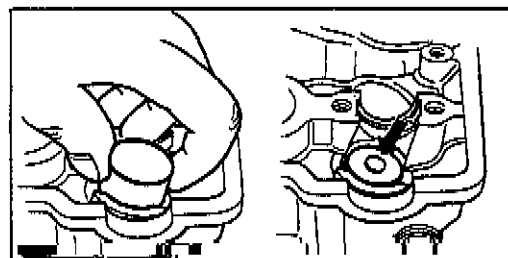
CAUTION:

Be sure to identify each removed part as to its location, and lay the parts out in groups designated as "No.1", "No.2", "Exhaust", "Inlet", so that each will be restored to the original location during assembly.

NOTE:

If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide servicing.

- Remove the tappets and shims by fingers or magnetic hand.

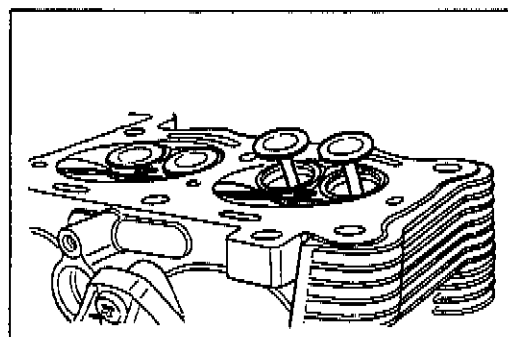


09916-14510: Valve lifter

09916-14520: Valve lifter attachment

09916-84511: Tweezers

- Remove the valve spring retainer, valve spring and valve spring seat.
- Pull out the valve from the other side.



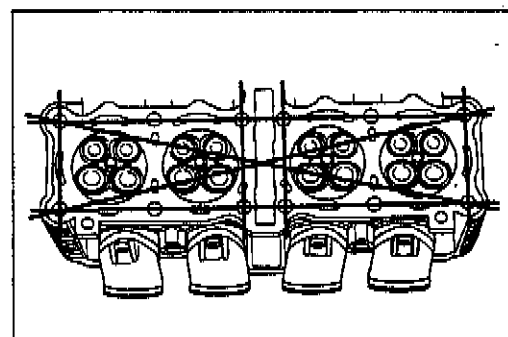
CYLINDER HEAD DISTORTION

Decarbonize the combustion chambers.

Check the gasketed surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.

09900-20803: Thickness gauge

Service Limit: 0.2 mm (0.008 in.)



VALVE STEM RUNOUT

Support the valve with "V" blocks, as shown, and check its runout with a dial gauge.

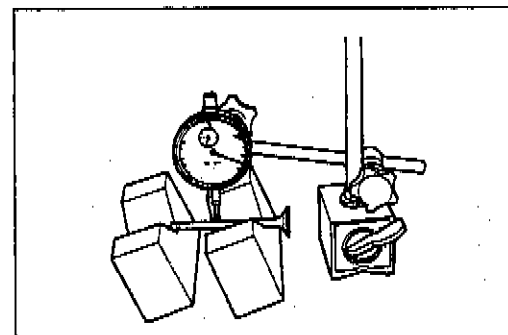
The valve must be replaced if the runout exceeds the limit.

09900-20606: Dial gauge (1/100 mm)

09900-20701: Magnetic stand

09900-21304: V-block (100 mm)

Service Limit: 0.05 mm (0.002 in)



VALVE HEAD RADIAL RUNOUT

Place the dial gauge at right angles to the valve head face, and measure the valve head radial runout.

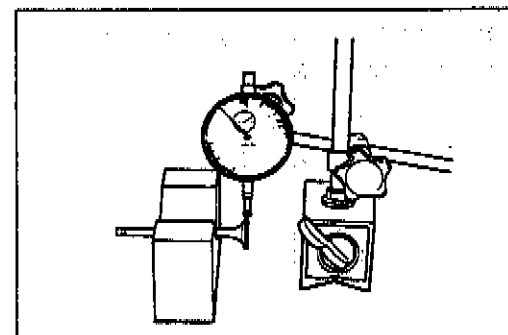
If it measures more than the limit, replace the valve.

09900-20606: Dial gauge (1/100 mm)

09900-20701: Magnetic stand

09900-21304: V-block (100 mm)

Service Limit: 0.03 mm (0.001 in.)

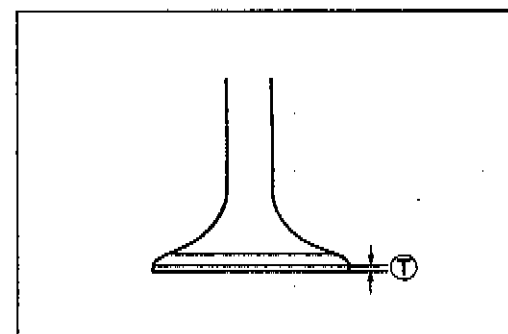


VALVE FACE WEAR

Visually inspect each valve for wear of its seating face. Replace any valve with an abnormally worn face. The thickness $\text{\textcircled{T}}$ decreases as the wear of the face advances. Measure the thickness and, if the thickness is found to have been reduced to the limit, replace it.

09900-20102: Vernier calipers

Service Limit $\text{\textcircled{T}}$: 0.5 mm (0.02 in)



VALVE STEM DEFLECTION

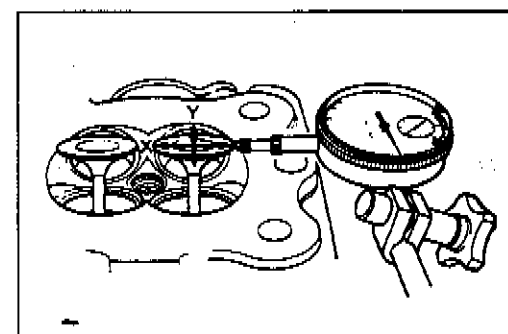
Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, "X" and "Y", perpendicular to each other, by positioning the dial gauge as shown. If the deflection measured exceeds the limit, (see below) then determine whether the valve or the guide should be replaced with a new one.

09900-20606: Dial gauge (1/100 mm)

09900-20701: Magnetic stand

Service Limit

Intake and exhaust valves: 0.35 mm (0.014 in)



3-23 ENGINE**VALVE STEM WEAR**

If the valve stem is worn down to the limit, as measured with a micrometer, where the clearance is found to be in excess of the limit indicated, replace the valve; if the stem is within the limit, then replace the guide. After replacing valve or guide, be sure to recheck the clearance.


09900-20205: Micrometer (0–25 mm)

Standard

Intake valves : 4.465–4.480 mm (0.1758–0.1764 in)

Exhaust valves: 4.455–4.470 mm (0.1754–0.1760 in)

VALVE GUIDE SERVICING

- Using the valve guide remover , drive the valve guide out toward the intake or exhaust camshaft side.

09916-43210: Valve guide remover/installer

NOTE:

- * *Discard the removed valve guide subassemblies.*
- * *Only oversized valve guides are available as replacement parts. (Part No. 11115-17E70)*

- Re-finish the valve guide holes in cylinder head with the reamer and handle.

09916-34580: Valve guide reamer

09916-34542: Reamer handle

- Oil the stem hole, too, of each valve guide and drive the guide into the guide hole with the valve guide installer and attachment.

09916-43210: Valve guide remover/installer

09916-43230: Attachment

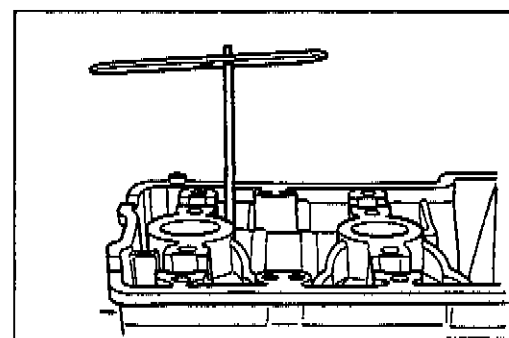
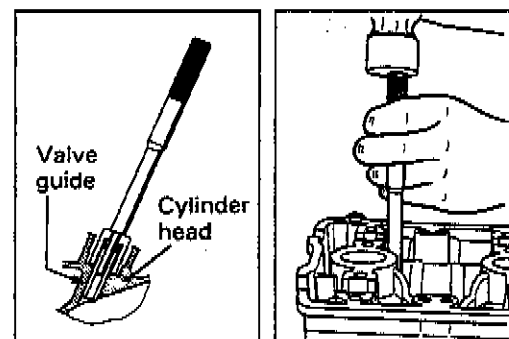
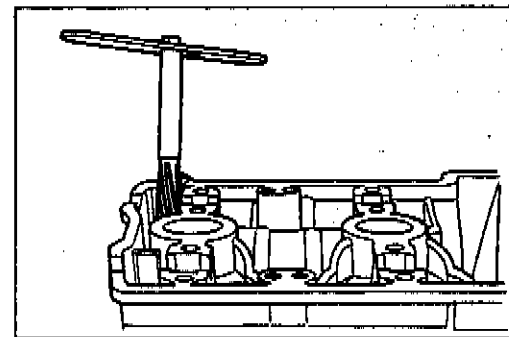
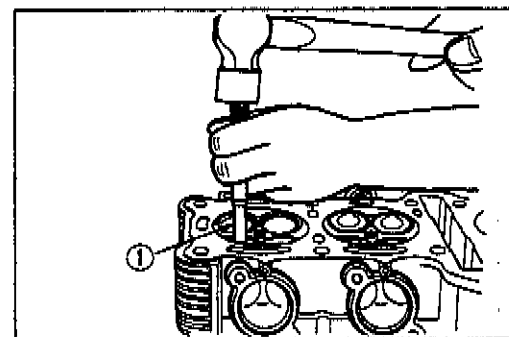
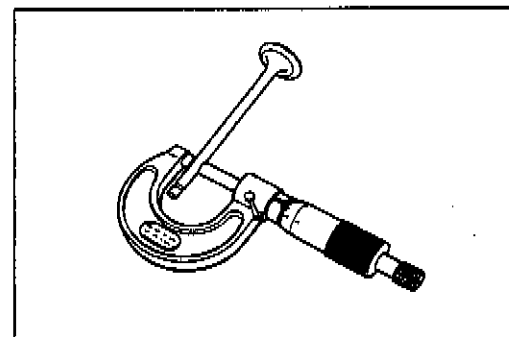
CAUTION:

Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

- After fitting the valve guides, re-finish their guiding bores with the reamer. Be sure to clean and oil the guides after reaming.

09916-33210: Valve guide reamer

09916-34542: Reamer handle



VALVE SEAT WIDTH

- Coat the valve seat uniformly with Prussian blue. Fit the valve and tap the coated seat with the valve face in a rotating manner, in order to obtain a clear impression of the seating contact. In this operation, use the valve lapper to hold the valve head.
- The ring-like dye impression left on the valve face must be continuous-without any break. In addition, the width of the dye ring, which is the visualized seat "width", must be within the following specification:

Standard

Valve seat width $\text{\textcircled{W}}$: 0.9–1.1 mm (0.035–0.043 in)

If either requirement is not met, correct the seat by servicing is as follows:

VALVE SEAT SERVICING

The valve seats for both intake and exhaust valves are machined to four different angles. (The seat contact surface is cut 45°.)

	INTAKE		EXHAUST
45°	N-116 or N-122	45°	N-116 or N-122
30°	N-126	15°	N-120 or N-121
60°	N-111		

Valve seat cutter: (N-111), (N-126), (N-121), (N-122), (N-116) and (N-120)

Solid pilot: (N-100-4.5)

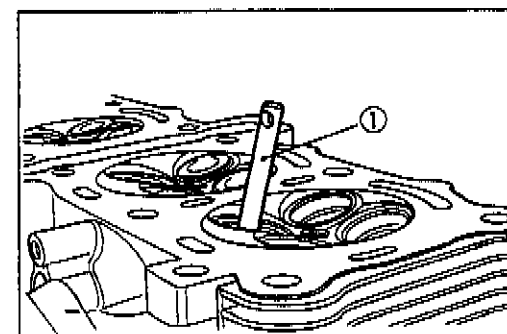
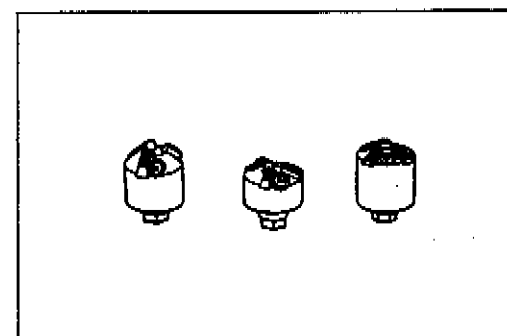
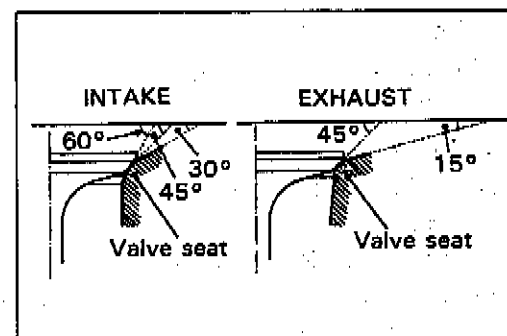
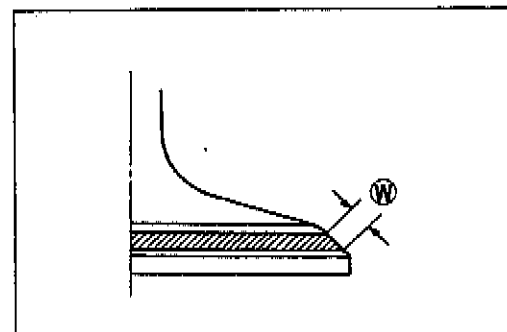
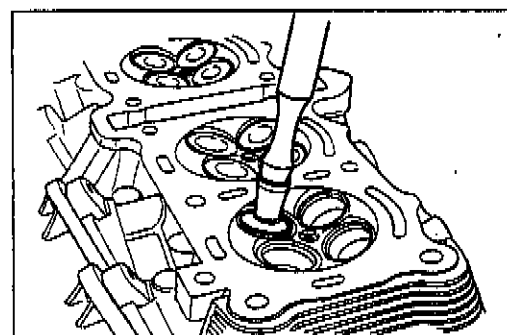
NOTE:

The valve seat contact area must be inspected after each cut.

- Insert the solid pilot $\text{\textcircled{1}}$ with a slight rotation. Seat the pilot snugly. Install the 45° cutter, attachment and T-handle.
- Using the 45° cutter, descale and clean up the seat with one or two turns.
- Inspect the seat by the previously described seat width measurement procedure. If the seat is pitted or burned, additional seat conditioning with the 45° cutter is required.

NOTE:

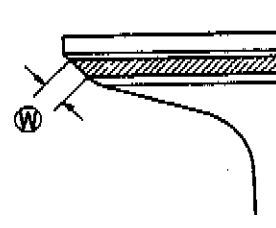
Cut only the minimum amount necessary from the seat to prevent the possibility of the tappet shim replacement.



3-25 ENGINE

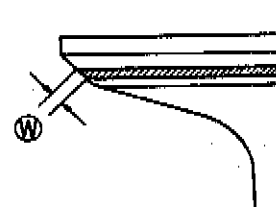
If the contact area is too high and too wide, use the 15° cutter (for exhaust side) and 30°/60° cutters (for intake side) to lower and narrow the contact area.

Contact area too high and too wide on face of valve



If the contact area is too low or too narrow, use the 45° cutter to raise and widen the contact area.

Contact area too low and too narrow on face of valve



- After the desired seat position and width is achieved, use the 45° cutter very lightly to clean up any burrs caused by the previous cutting operations.

CAUTION:

DO NOT use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish and not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.

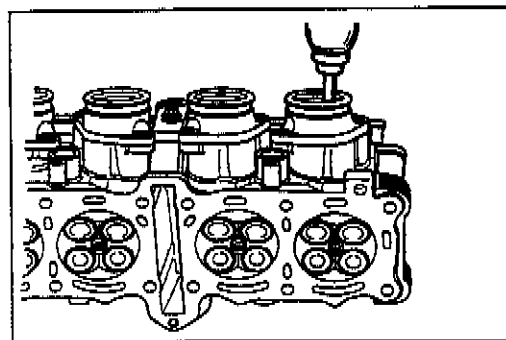
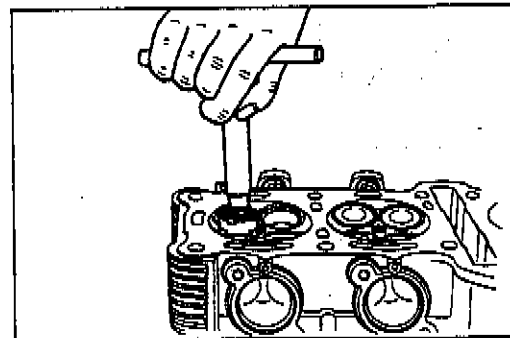
- Clean and assemble the head and valve components. Fill the intake and exhaust ports with gasoline to check for leaks. If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing.

WARNING:

Always use extreme caution when handling gasoline.

NOTE:

After servicing the valve seats, be sure to check the tappet clearance after the cylinder head has been reinstalled. (see page 2-4.)



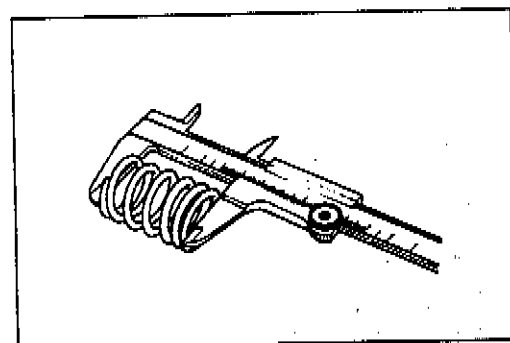
VALVE SPRING

The force of the coil spring keeps the valve seat tight. Weakened spring result in reduced engine power output, and often account for the chattering noise coming from the valve mechanism.

Check the valve spring for proper strength by measuring its free length and also by the force required to compress it. If the spring length is less than the service limit, or if the force required to compress the spring does not fall within the range specified, replace the spring.

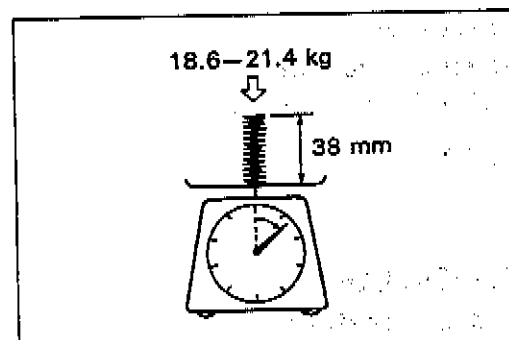
Valve spring free length

Service Limit: 43.0 mm (1.69 in)



Valve spring tension

Standard: 18.6–21.4 kg/38 mm (41.0–47.2 lbs/1.5 in)



REASSEMBLY

- Oil each oil seal, and press-fit them into position with the valve guide installer.

09916-43210: Valve guide remover/installer

CAUTION:

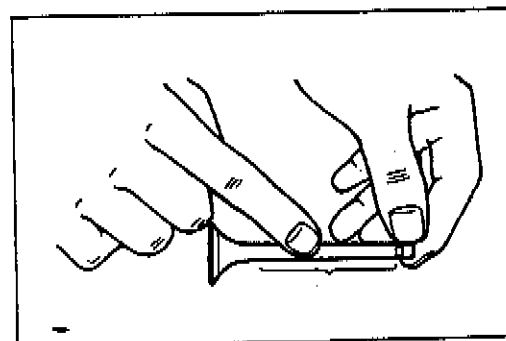
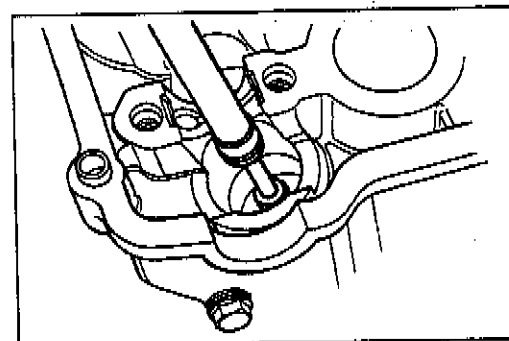
Do not reuse the oil seals.

- Install each valve spring seat.
- Insert the valves, with their stems coated with high quality molybdenum disulfide lubricant (SUZUKI MOLY PASTE) all around and along the full stem length without any break.

CAUTION:

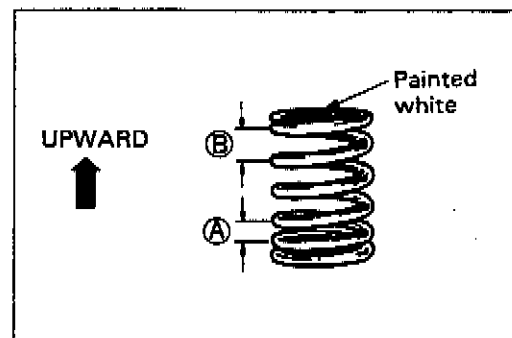
When inserting each valve, take care not to damage the lip of the oil seal.

99000-25140: SUZUKI MOLY PASTE

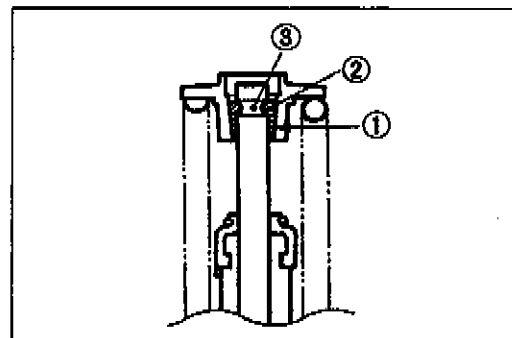


3-27 ENGINE

- Install the valve spring with the small-pitch portion **(A)** facing cylinder head. **(B)** Large-pitch portion.



- Put on the valve spring retainer and, using the valve lifter, press down the spring, fit the cotter halves to the stem end, and release the lifter to allow the cotter **(1)** to wedge in between retainer and stem. Be sure that the rounded lip **(2)** of the cotter fits snugly into the groove **(3)** in the stem end.



09916-14510: Valve lifter

09916-14520: Valve lifter attachment

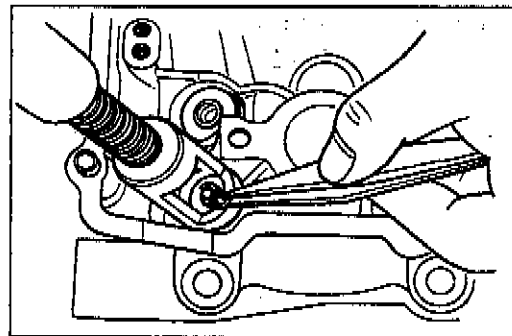
09916-84511: Tweezers

CAUTION:

Be sure to restore each spring, valve, shim and tappet to their original positions.

NOTE:

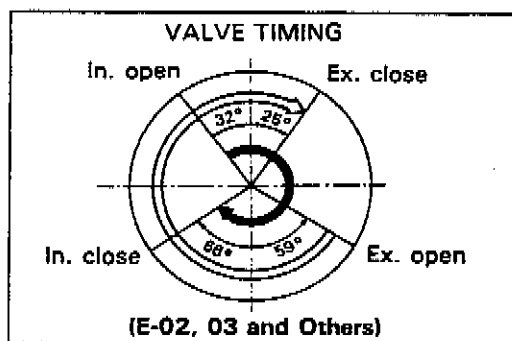
Apply engine oil to the shim and tappet before fitting them.



CAMSHAFT

Both camshafts should be checked for runout and also for wear of cams and journals if the engine has been noted as giving abnormal noise or vibration or lack power output. Any of these conditions may be caused by camshafts worn down or distorted to the service limit.

	In. open	In. close	Ex. open	Ex. close
E-04	36°	62°	55°	29°
E-18 and 33	9°	65°	59°	22°

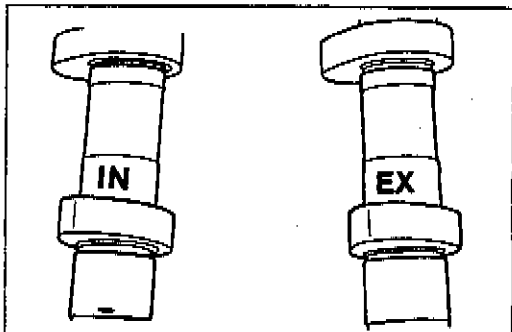
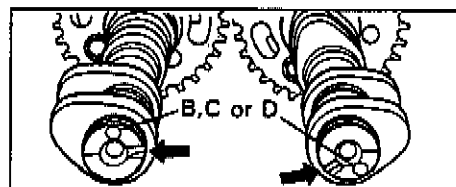


The exhaust camshaft can be distinguished from that of the intake by the embossed letters "EX" (for exhaust) as against letters "IN" (for intake).

Similarly, the right end can be distinguished by the notch from the left end.

I.D. code

	In.	Ex.
E-04	D	D
E-18 and 33	C	C
E-02,03 and others	B	B



CAM WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced power output.

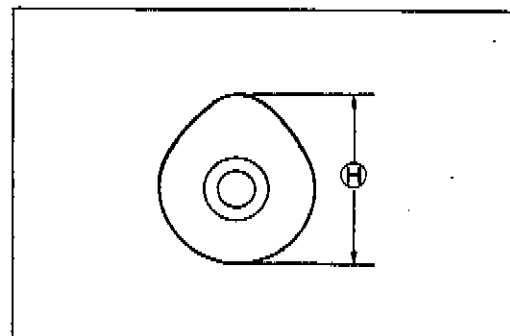
The limit of cam wear is specified for both intake and exhaust cams in terms of cam height H , which is to be measured with a micrometer. Replace camshafts if found worn down to the limit.

09900-20202: Micrometer (25–50 mm)

Cam height H

Service Limit

	Intake cams	Exhaust cams
E-02,03 and others	36.02 mm (1.418 in)	35.61 mm (1.402 in)
E-18 and 33	34.25 mm (1.348 in)	33.83 mm (1.332 in)
E-04	36.02 mm (1.418 in)	35.61 mm (1.402 in)



CAMSHAFT JOURNAL WEAR

Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place. Use the plastigauge ① to read the clearance at the widest portion, which is specified as follows:

Camshaft-Journal oil clearance (IN & EX)

Service Limit: 0.150 mm (0.0059 in)

09900-22301: Plastigauge

NOTE:

Install each holder to their original positions. (page 3-62.)

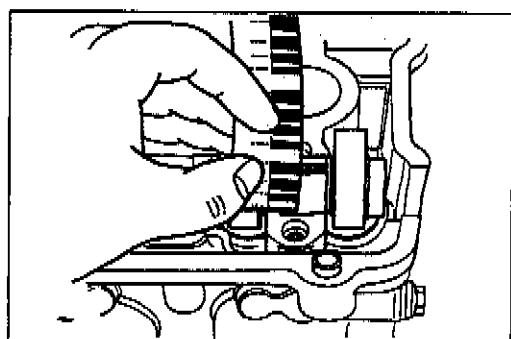
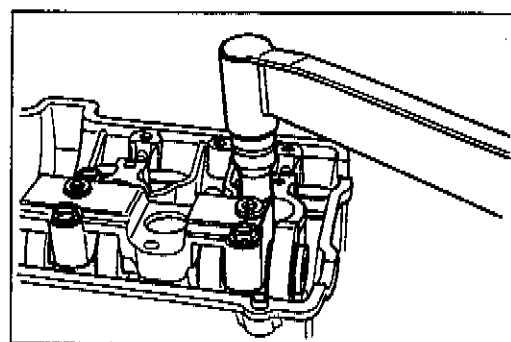
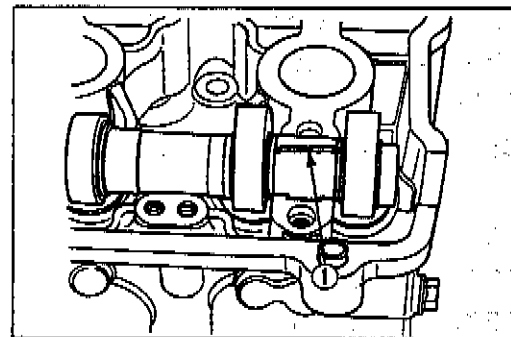
Tighten the camshaft holder bolts evenly and diagonally to the specified torque.

**Tightening torque: 8–12 N·m
(0.8–1.2 kg·m, 6.0–8.5 lb·ft)**

NOTE:

Do not rotate the camshafts with the plastigauge in place.

Remove the camshaft holders, and read the width of the compressed plastigauge with envelope scale. This measurement should be taken at the widest part.

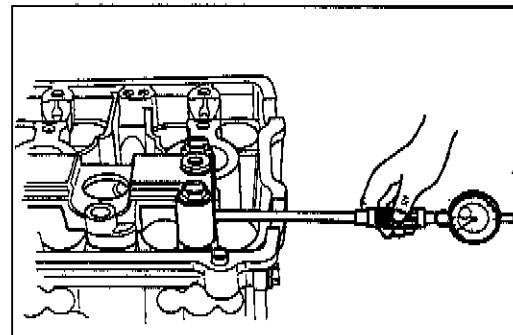


3-29 ENGINE

If the camshaft journal oil clearance measured exceeds the limit, measure the inside diameter of the camshaft journal holder and outside diameter of the camshaft journal. Replace the camshaft or the cylinder head depending upon which one exceeds the specification.

Standard

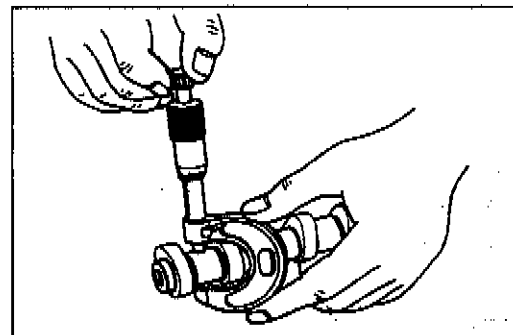
Journal holder I.D. (IN & EX): 22.012–22.025 mm
(0.8666–0.8671 in)



09900-20205: Micrometer (0–25 mm)

Standard

Camshaft journal O.D. (IN & EX): 21.959–21.980 mm
(0.8645–0.8654 in)



CAMSHAFT RUNOUT

Measure the runout with a dial gauge. Replace the camshaft if the runout exceeds the limit.

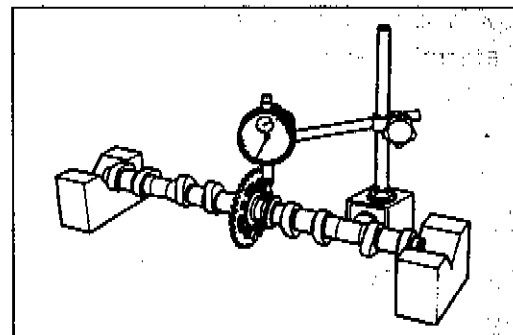
Camshaft runout (IN & EX)

Service Limit: 0.1 mm (0.004 in)

09900-20606: Dial gauge (1/100 mm, 10 mm)

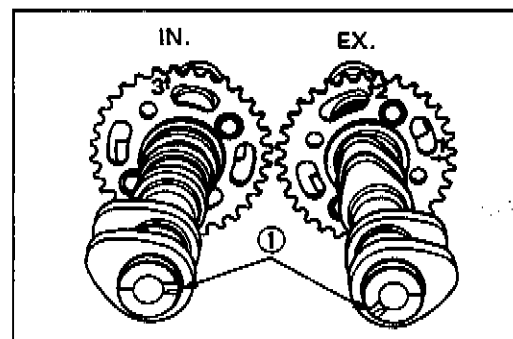
09900-20701: Magnetic stand

09900-21304: V-block (100 mm)



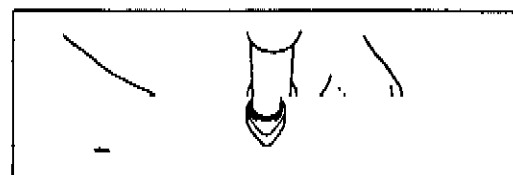
CAM SPROCKET

The fixed position of each cam sprocket on each camshaft is determined by arrow mark "3" (on INTAKE sprocket) or arrow marks "1" and "2" (on EXHAUST sprocket) located (as shown) in reference to the notch ① in the right end of each camshaft.



REASSEMBLY

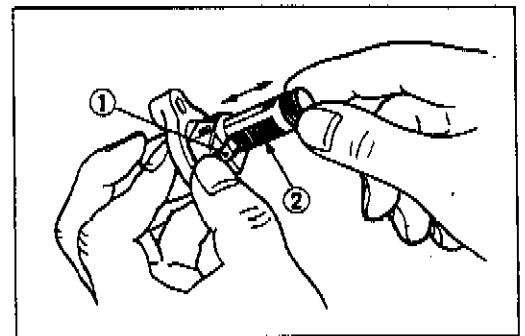
- Apply THREAD LOCK SUPER "1303" to the threads of
 (2.4–2.6 kg-m, 17.5–19.0 lb-ft)



CAM CHAIN TENSIONER

The cam chain tensioner is maintained at the proper tension by an automatically adjusted tensioner.

Unlock the ratchet mechanism ①, and move the push rod ② in place to see if it slides smoothly. If any stickiness is noted or ratchet mechanism is faulty, replace the cam chain tensioner assembly with a new one.



CAM CHAIN GUIDE

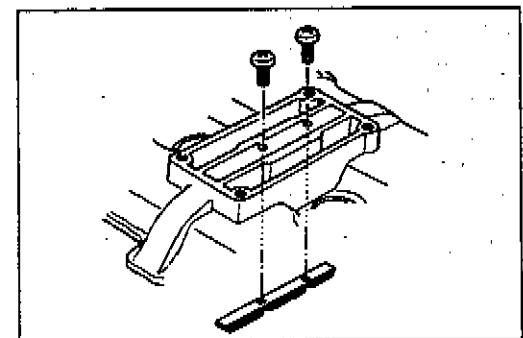
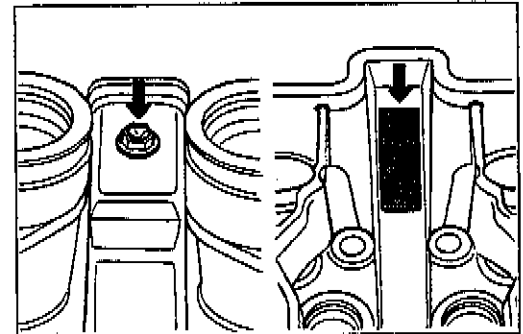
NOTE:

When replacing the cam chain guides, apply **SUZUKI THREAD LOCK SUPER "1303"** to threads of bolt and screws.

99000-32030: THREAD LOCK SUPER "1303"

Cam chain guide

mounting bolt: 4–7 N·m
(0.4–0.7 kg-m, 3.0–5.0 lb-ft)



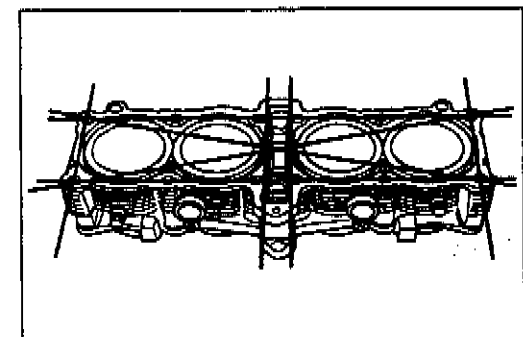
CYLINDER BLOCK DISTORTION

Check the gasketed surface of the cylinder block for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder block.

09900-20803: Thickness gauge

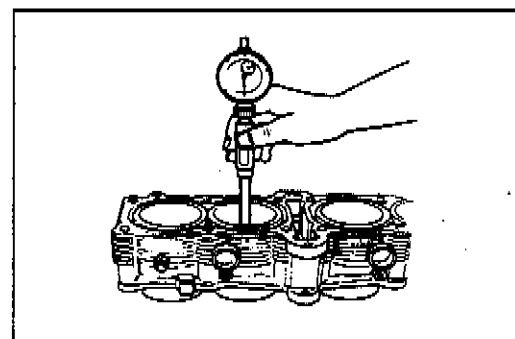
Cylinder distortion

Service Limit: 0.2 mm (0.008 in)



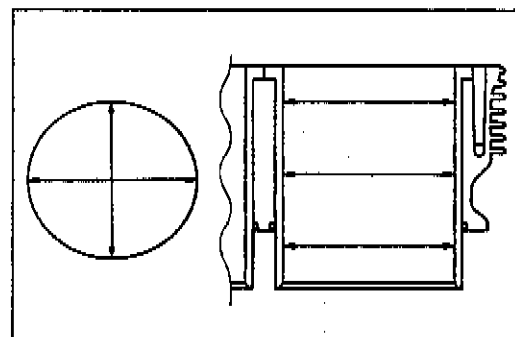
3-31 ENGINE**CYLINDER BORE**

Measure the cylinder bore diameter at six places. If any one of the measurements exceeds the limit, overhaul the cylinder and replace the piston with an oversize piston. The remaining cylinders must be also rebored accordingly. Otherwise, the imbalance might cause excess vibration.

**Cylinder bore**

Service Limit: 65.075 mm (2.5620 in)

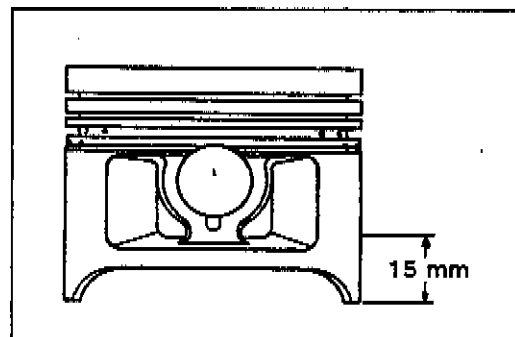
09900-20508: Cylinder gauge set

**PISTON DIAMETER**

Using a micrometer, measure the piston's outside diameter at the place shown in Fig. If the measurement is less than the limit, replace the piston.

Service Limit: 64.880 mm (2.5543 in)

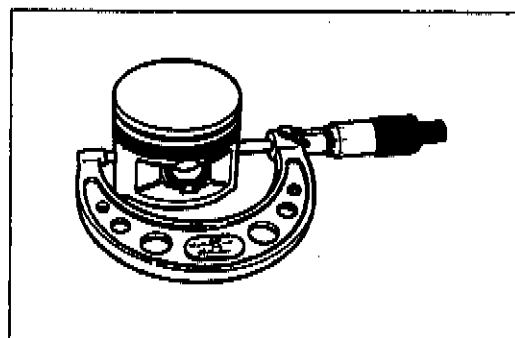
09900-20203: Micrometer (50–75 mm)

**PISTON-CYLINDER CLEARANCE**

As a result of the above measurement, if the piston clearance exceeds the following limit, overhaul the cylinder and use an oversize piston, or replace both cylinder and piston.

Service Limit: 0.12 mm (0.0047 in)

Piston oversize: 0.5, 1.0 mm

**PISTON RING-GROOVE CLEARANCE**

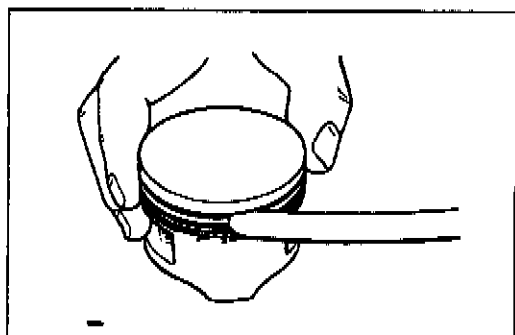
Using a thickness gauge, measure the side clearances of the 1st and 2nd rings. If any of the clearances exceeds the limit, replace both piston and piston rings.

09900-20803: Thickness gauge

Piston ring-groove clearance

Service Limit

1st & 2nd: 0.18 mm (0.007 in)

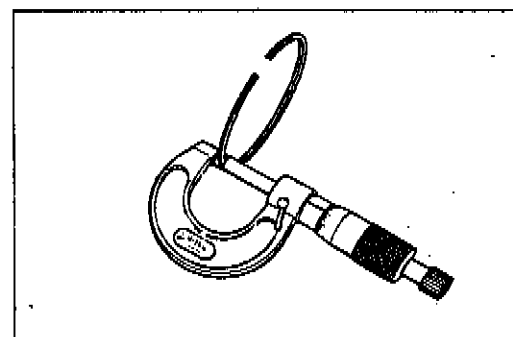


Piston ring groove width

1st : 0.83—0.85 mm (0.032—0.033 in)
 Standard 2nd: 0.82—0.84 mm (0.032—0.033 in)
 Oil : 1.51—1.53 mm (0.059—0.060 in)

Piston ring thickness**Standard**

1st & 2nd: 0.77—0.79 mm (0.030—0.031 in)

**PISTON RING FREE END GAP AND PISTON RING END GAP**

Before installing piston rings, measure the free end gap of each ring using vernier calipers. Next, fit the ring in the cylinder, and measure each ring end gap using a thickness gauge.

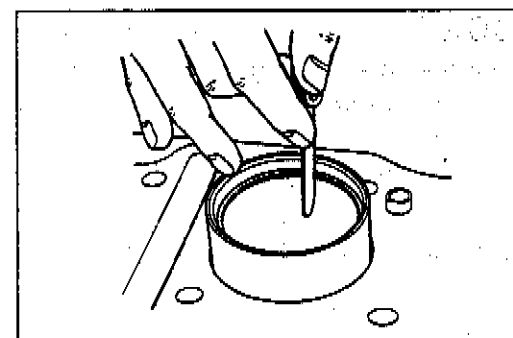
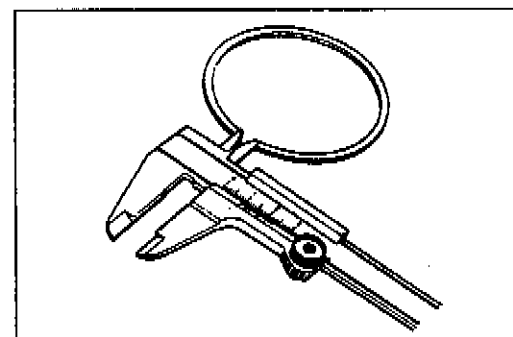
If any ring has an excess end gap, replace the ring.

Piston ring free end gap

Service Limit 1st : 6.0 mm (0.24 in)
 2nd: 6.4 mm (0.25 in)

09900-20102: Vernier calipers**Piston ring end gap****Service Limit**

1st & 2nd: 0.5 mm (0.02 in)

09900-20803: Thickness gauge**Oversize piston ring**

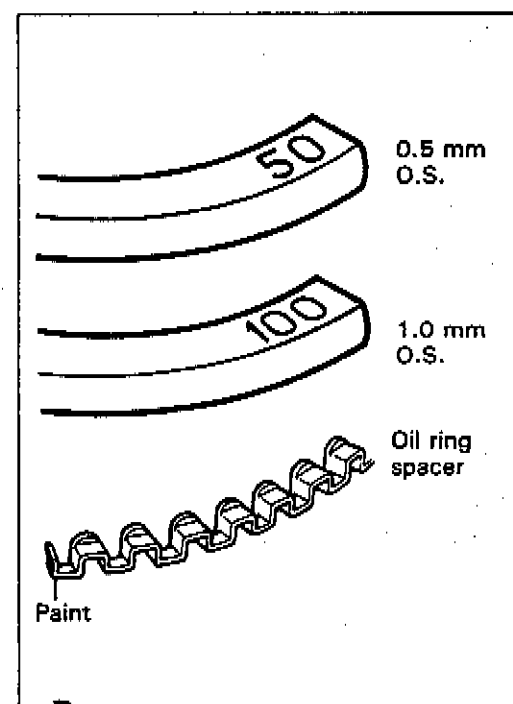
The following two types of oversize piston ring are used. They bear the following identification numbers.

	1st	2nd
0.5 mm	50	50
1.0 mm	100	100

Oversize oil ring

The following two types of oversize oil ring are available as optional parts. They bear the following identification marks.

SIZE	COLOR
STD	NIL
0.5 mm O.S.	Painted red
1.0 mm O.S.	Painted yellow

**Oversize side rail**

Just measure out side diameter to identify the size.

3-33 ENGINE**PISTON PIN AND PIN BORE**

Using a small bore gauge, measure the piston pin bore inside diameter, and using a micrometer, measure the piston pin outside diameter. If the difference between these two measurements is more than the limits, replace both piston and piston pin.

Piston pin bore I.D.

Service Limit: 16.030 mm (0.6311 in)

09900-20602: Dial gauge (1/1000 mm, 1 mm)

09900-22401: Small bore gauge (10–18 mm)

Using a micrometer, measure the piston pin outside diameter at three positions.

Piston pin O.D.

Service Limit: 15.980 mm (0.6291 in)

09900-20602: Micrometer (0–25 mm)

Using a small bore gauge, measure the conrod small end inside diameter.

09900-20602: Dial gauge (1/1000 mm, 1 mm)

09900-22401: Small bore gauge (10–18 mm)

Conrod small end I.D.

Service Limit: 16.040 mm (0.6315 in)

If the conrod small end inside diameter exceeds the above-mentioned limit, replace the conrod.

CONROD BIG END SIDE CLEARANCE

Check the conrod side clearance by using a thickness gauge. If the clearance exceeds the limit, replace conrod or crankshaft.

Service Limit: 0.3 mm (0.01 in)

09900-20803: Thickness gauge

Standard

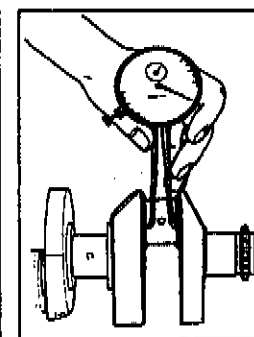
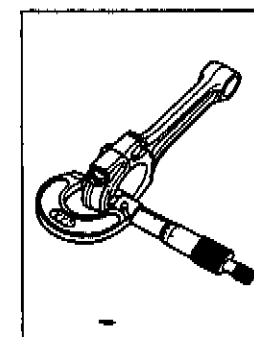
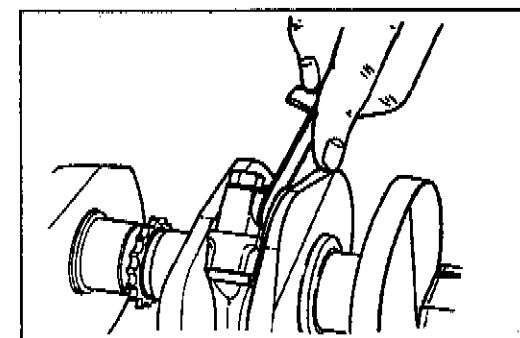
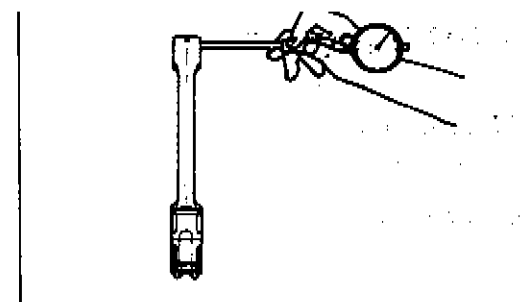
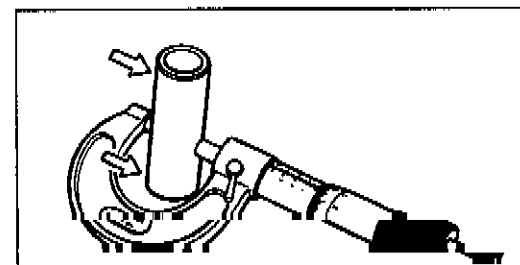
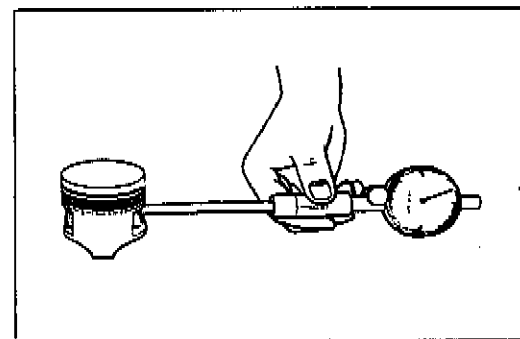
Big end width: 20.95–21.00 mm (0.825–0.827 in)

Standard

Crank pin width: 21.10–21.15 mm (0.831–0.833 in)

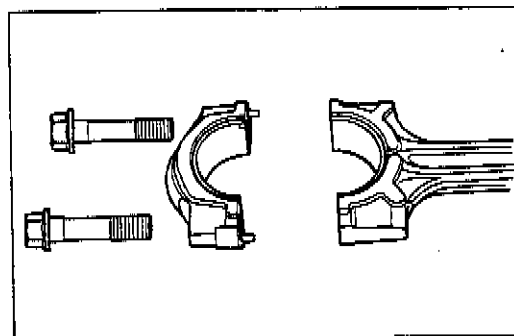
09900-20205: Micrometer (0–25 mm)

09900-20605: Dial calipers (10–34 mm)



CONROD-CRANK PIN BEARING SELECTION

- Remove the bearing cap bolts, and tap the bearing cap lightly with plastic hammer to remove the bearing cap.
- Remove the rods, and mark them to identify the cylinder position.
- Inspect the bearing surfaces for any sign of fusion, pitting, burn, or flaws. If any, replace them with a specified set of bearings.



- Place plastigauge axially on the crank pin avoiding the oil hole, at TDC or BDC side as shown.
- Tighten the bearing cap bolts with two-step torque values.

Initial tightening torque: 32–37 N·m

(3.2–3.7 kg·m, 23.0–27.0 lb·ft)

Final tightening torque: 65–68 N·m

(6.5–6.8 kg·m, 47.0–49.0 lb·ft)

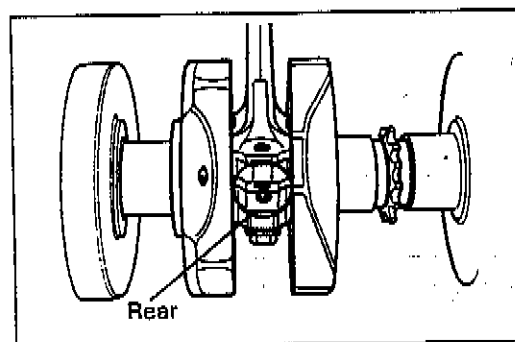
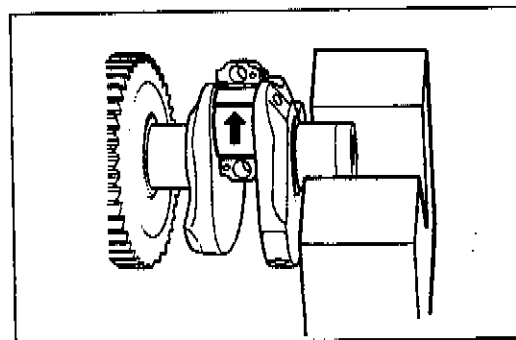
09900-22301: Plastigauge

NOTE:

When fitting bearing cap to crank pin, be sure to discriminate one end from the other, namely front and rear.

NOTE:

Never rotate the crankshaft or conrod when a piece of plastigauge is in the clearance.

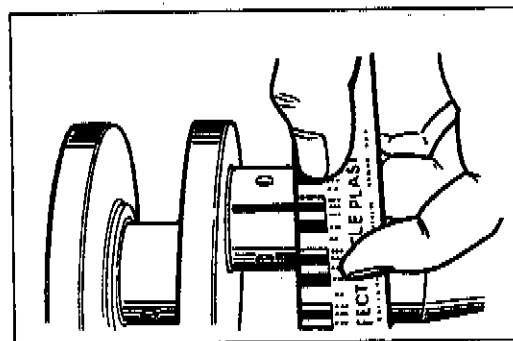


- Remove the caps, and measure the width of compressed plastigauge with envelope scale. This measurement should be taken at the widest part.

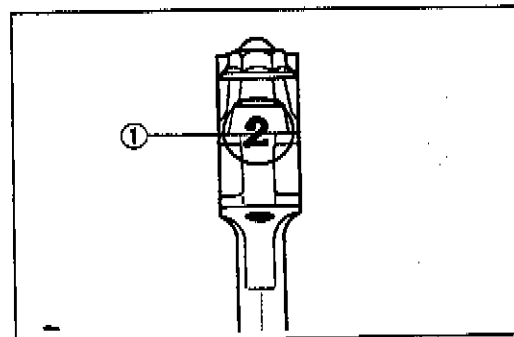
Crank pin bearing oil clearance

Standard: 0.032–0.056 mm (0.0013–0.0022 in)

Service Limit: 0.080 mm (0.0031 in)



- If oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.
- Check the corresponding conrod I.D. code number ①, "1" or "2".

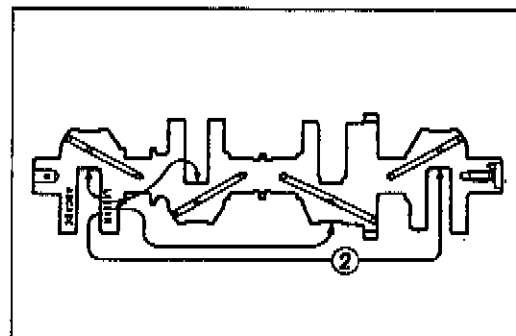


3-35 ENGINE

- Check the corresponding crank pin O.D. code number ②, "1", "2" or "3".

Bearing selection table

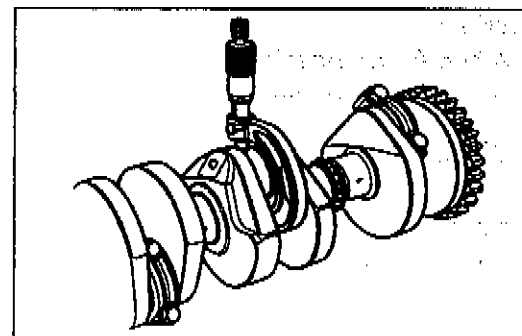
		Crank pin O.D. ②		
		1	2	3
Conrod I.D. ①	1	Green	Black	Brown
	2	Black	Brown	Yellow

**Conrod I.D. specification**

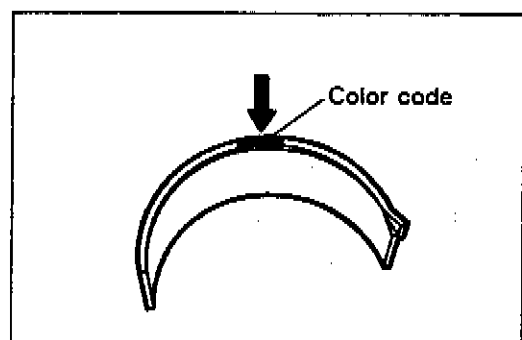
Code	I.D. specification
1	37.000–37.008 mm (1.4567–1.4570 in)
2	37.008–37.016 mm (1.4570–1.4573 in)

Crank pin O.D. specification

Code	O.D. specification
1	33.992–34.000 mm (1.3383–1.3386 in)
2	33.984–33.992 mm (1.3380–1.3383 in)
3	33.976–33.984 mm (1.3376–1.3380 in)

09900-20202: Micrometer (25–50 mm)**Bearing thickness**

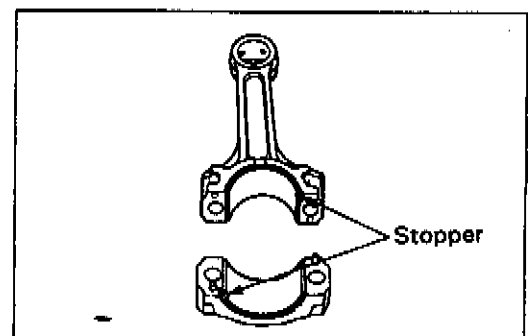
Color (Part No.)	Thickness
Green (12164-18E00-0A0)	1.480–1.484 mm (0.0583–0.0584 in)
Black (12164-18E00-0B0)	1.484–1.488 mm (0.0584–0.0586 in)
Brown (12164-18E00-0C0)	1.488–1.492 mm (0.0586–0.0587 in)
Yellow (12164-18E00-0D0)	1.492–1.496 mm (0.0587–0.0589 in)

**CAUTION:**

Bearing should be replaced as a set.

BEARING ASSEMBLY

- When fitting the bearings to the bearing cap and conrod, be sure to fix the stopper part first, and press in the other end.



- Apply engine oil or SUZUKI MOLY PASTE to the crank pin and bearing surface.

99000-25140: SUZUKI MOLY PASTE

- When mounting the conrod on the crankshaft, make sure that numeral figure ① of the conrod faces rearward.
- Tighten the bearing cap bolts with specified torque.

Initial tightening torque: 32–37 N·m
(3.2–3.7 kg·m, 23.0–27.0 lb-ft)

Final tightening torque : 65–68 N·m
(6.5–6.8 kg·m, 47.0–49.0 lb-ft)

- Check the conrod movement for smooth turning.

CRANKCASE-CRANKSHAFT BEARING SELECTION

- Inspect each bearing of upper and lower crankcases for any damage.

- Place the plastigauge on each crankshaft journal in the usual manner.

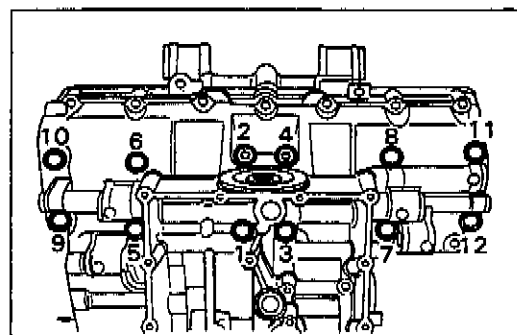
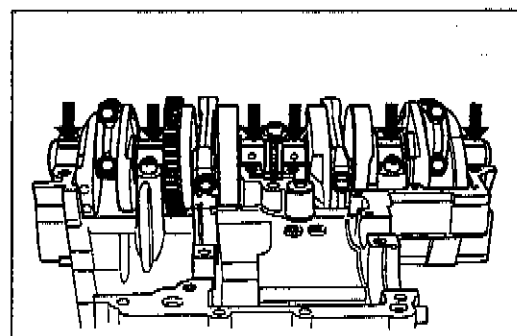
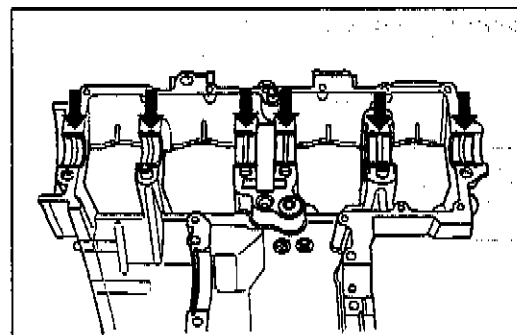
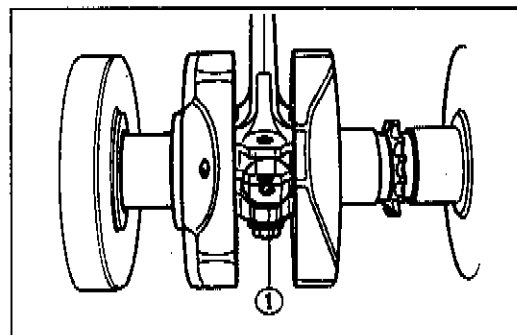
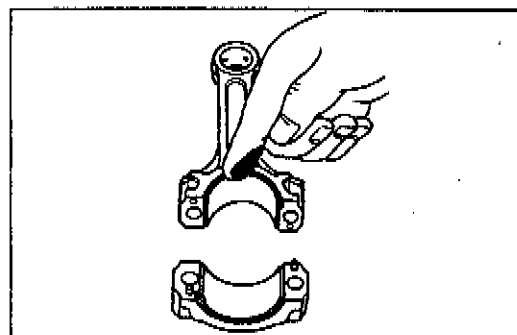
09900-22301: Plastigauge

NOTE:

Do not place the plastigauge on the oil hole, and do not rotate the shaft when plastigauge is in place.

- Mate the lower crankcase with the upper crankcase, and tighten the crankshaft tightening bolts with specified torque value in the indicated order.

Tightening torque	Initial Tightening	Final Tightening
9 mm bolt	13 N·m 1.3 kg·m 9.5 lb-ft	24–28 N·m 2.4–2.8 kg·m 17.5–20.0 lb-ft



3-37 ENGINE

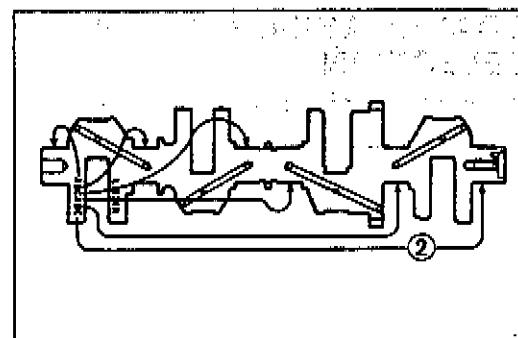
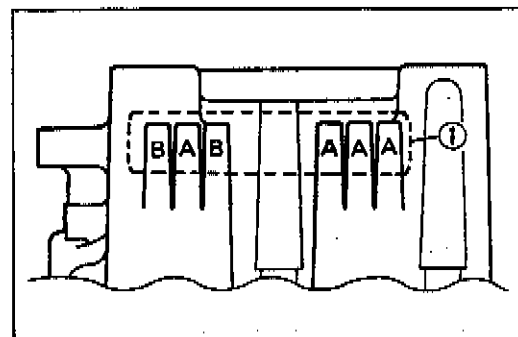
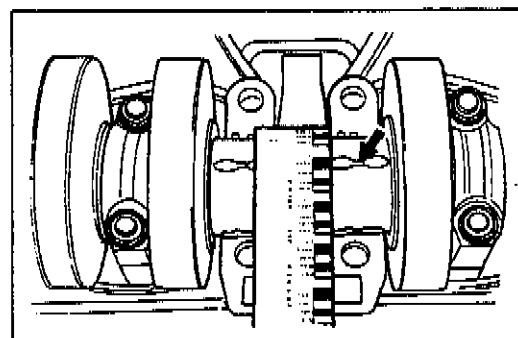
- Remove the lower crankcase, and measure the width of compressed plastigauge in the usual manner.

Crank journal bearing oil clearance

Standard: 0.020–0.044 mm (0.0008–0.0017 in)

Service Limit: 0.08 mm (0.0031 in)

- If the width at the widest part exceeds the limit, replace the set of bearings with new ones by referring to the selection table.
- Check the corresponding crankcase journal I.D. code number ①, "A" or "B" which are stamped on the rear of upper crankcase.
- Check the corresponding crankshaft journal O.D. code number ②, "A", "B" or "C" which are stamped on the crankshaft.

**Bearing selection table**

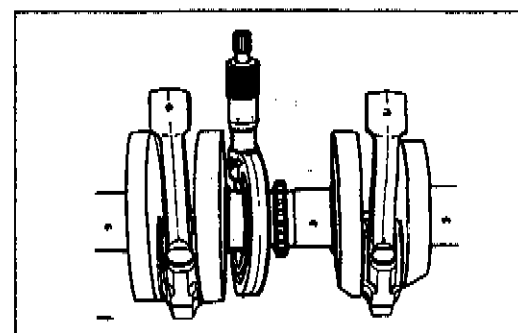
		Crankshaft O.D. ②		
		A	B	C
Crankcase I.D. ①	A	Green	Black	Brown
	B	Black	Brown	Yellow

Crankcase I.D. specification

Code	I.D. specification
A	37.000–37.008 mm (1.4567–1.4570 in)
B	37.008–37.016 mm (1.4570–1.4573 in)

Crankshaft journal O.D. specification

Code	O.D. specification
A	33.992–34.000 mm (1.3383–1.3386 in)
B	33.984–33.992 mm (1.3380–1.3383 in)
C	33.976–33.984 mm (1.3376–1.3380 in)



09900-20202: Micrometer (25–50 mm)

Bearing thickness specification (Grooved bearing with oil hole For lower case)

Color (Part No.)	Specification
Green (12229-17E00-0A0)	1.486—1.490 mm (0.0585—0.0587 in)
Black (12229-17E00-0B0)	1.490—1.494 mm (0.0587—0.0588 in)
Brown (12229-17E00-0C0)	1.494—1.498 mm (0.0588—0.0590 in)
Yellow (12229-17E00-0D0)	1.498—1.502 mm (0.0590—0.0591 in)

NOTE:

- * Grooved bearings have the same specification as the Grooved bearing with oil hole.
- * These parts numbers are shown as follows.
12229-17E10-XXX. (Grooved bearing)

CRANKSHAFT THRUST CLEARANCE

- With the crankshaft, right-side thrust bearing and left-side thrust bearing inserted in the upper crankcase, use a thickness gauge to measure the thrust clearance on the left-side.
 - Ⓔ: Right-side thrust bearing
 - Ⓛ: Left-side thrust bearing

NOTE:

Push the crankshaft to the left-side, so that there is no clearance on the right-side thrust bearing.

Thrust clearance

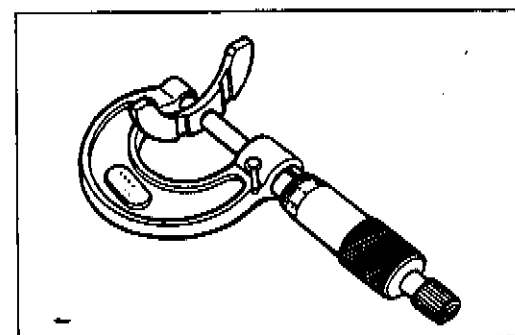
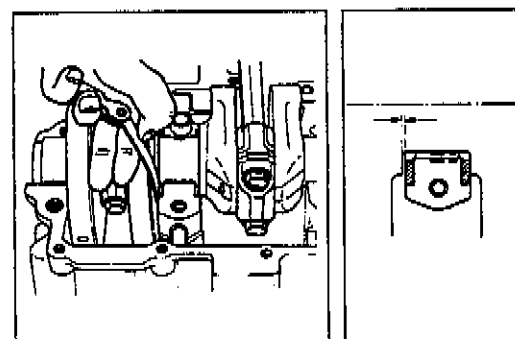
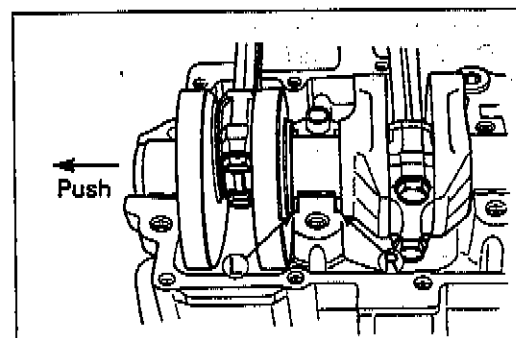
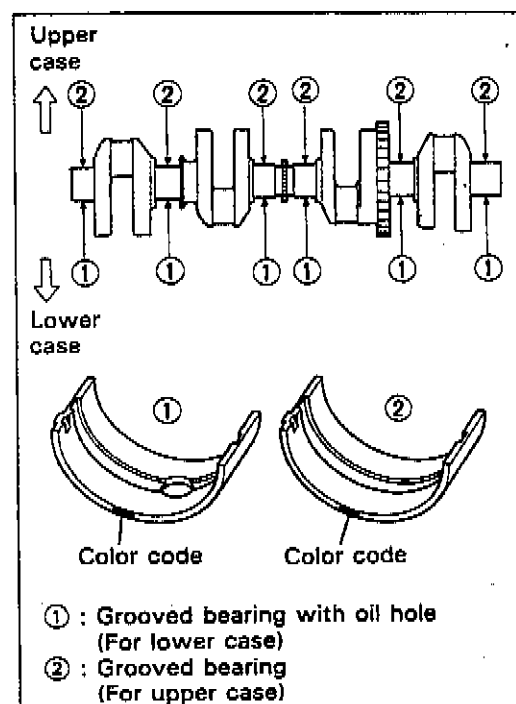
Standard: 0.055—0.110 mm (0.0022—0.0043 in)

If the thrust clearance exceeds the standard range, adjust the thrust clearance by the following procedures:

- Remove the right-side thrust bearing and measure its thickness with a micrometer. If the thickness of the right-side thrust bearing is below standard, replace with a new bearing and once again perform the thrust clearance measurement listed above, checking to make sure it is within standard.

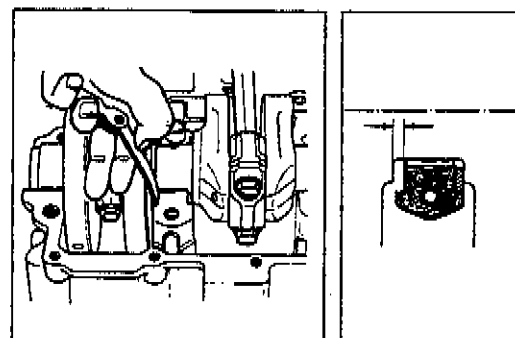
Right-side thrust bearing thickness

Standard: 2.425—2.450 mm (0.0955—0.0965 in)



3-39 ENGINE

- If the right-side thrust bearing is within the standard range, reinsert the right-side thrust bearing and remove the left-side thrust bearing.
- As shown in the illustration, use a thickness gauge to measure the clearance before inserting of the left-side thrust bearing, and select a left-side thrust bearing from the selection table.

**Thrust bearing selection table**

Clearance before inserting left-side thrust bearing	Color (Part No.)	Thrust bearing thickness	Thrust clearance
2.560—2.585 mm (0.1008—0.1018 in)	White (12228-17E00-0F0)	2.475—2.500 mm (0.0974—0.0984 in)	0.060—0.110 mm (0.0024—0.0043 in)
2.535—2.560 mm (0.0998—0.1008 in)	Yellow (12228-17E00-0E0)	2.450—2.475 mm (0.0965—0.0974 in)	0.060—0.110 mm (0.0024—0.0043 in)
2.510—2.535 mm (0.0988—0.0998 in)	Green (12228-17E00-0D0)	2.425—2.450 mm (0.0955—0.0965 in)	0.060—0.110 mm (0.0024—0.0043 in)
2.485—2.510 mm (0.0978—0.0988 in)	Blue (12228-17E00-0C0)	2.400—2.425 mm (0.0945—0.0955 in)	0.060—0.110 mm (0.0024—0.0043 in)
2.460—2.485 mm (0.0969—0.0978 in)	Black (12228-17E00-0B0)	2.375—2.400 mm (0.0935—0.0945 in)	0.060—0.110 mm (0.0024—0.0043 in)
2.430—2.460 mm (0.0957—0.0969 in)	Red (12228-17E00-0A0)	2.350—2.375 mm (0.0925—0.0935 in)	0.055—0.110 mm (0.0022—0.0043 in)

- After selecting a left-side thrust bearing, insert it and again perform the thrust clearance measurement to make sure it falls within the standard range.

NOTE:

Right-side thrust bearing has the same specification as the GREEN (12228-17E00-0D0) of left-side thrust bearing.

CRANKSHAFT RUNOUT

Support the crankshaft with "V" blocks as shown, with the two end journals resting on the blocks. Set up the dial gauge, as shown, and rotate the crankshaft slowly to read the runout. Replace the crankshaft if the runout is greater than the limit.

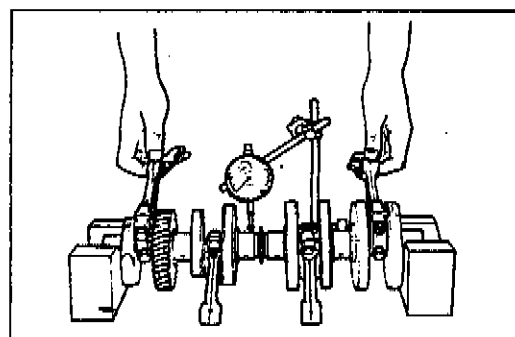
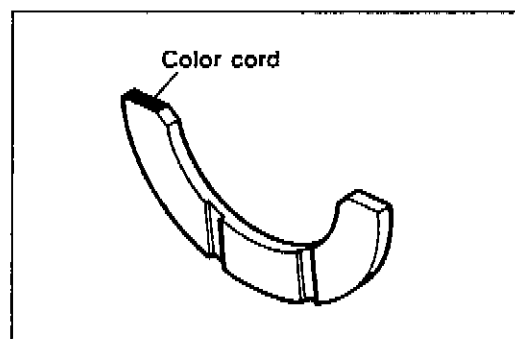
09900-20606: Dial gauge (1/100 mm, 10 mm)

09900-20701: Magnetic stand

09900-21304: V-block (100 mm)

Crankshaft runout

Service Limit: 0.05 mm (0.002 in)



CLUTCH DRIVE AND DRIVEN PLATES

These plates are expendable: they are meant to be replaced when found worn down or distorted to the respective limit: use a vernier calipers to check thickness and a thickness gauge and surface plate to check distortion.

09900-20102: Vernier calipers (200 mm)

09900-20803: Thickness gauge

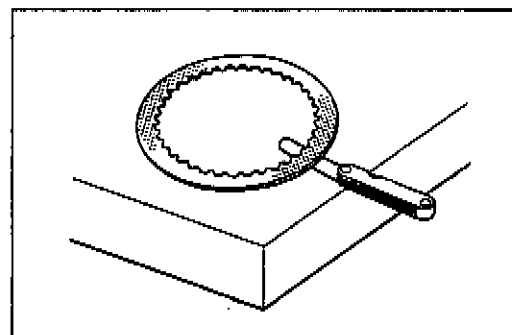
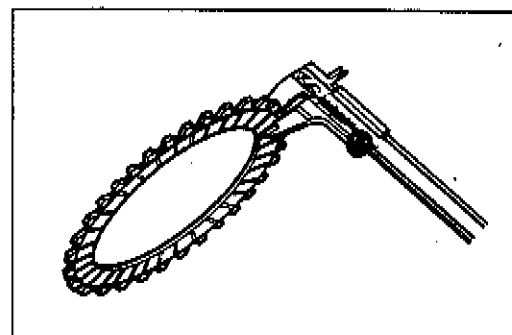
Drive plate thickness

Standard: 2.12–2.28 mm (0.083–0.090 in)

Service Limit: 1.82 mm (0.072 in)

Driven plate distortion

Service Limit: 0.10 mm (0.004 in)



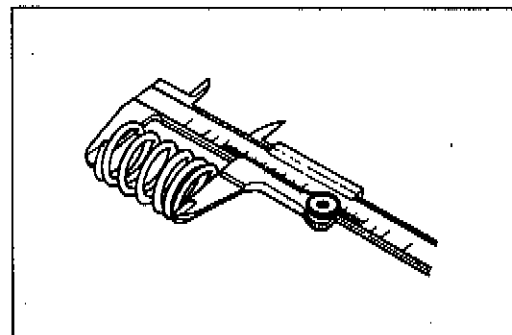
CLUTCH SPRING FREE LENGTH

Measure the free length of each coil spring with vernier calipers, and compare the elastic strength of each with the specified limit. Replace all the springs if any one of springs is not within the limit.

09900-20102: Vernier calipers (200 mm)

Clutch spring free length

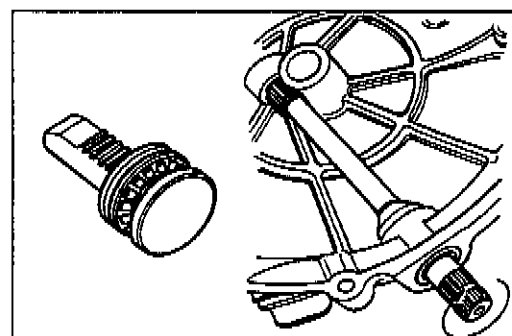
Service Limit: 47.5 mm (1.87 in)



CLUTCH RELEASE BEARING

Inspect the clutch release bearing for any abnormality to decide whether it can be reused or should be replaced.

Smooth engagement and disengagement of the clutch depends much on the condition of this bearing.



CLUTCH RELEASE PINION AND RACK

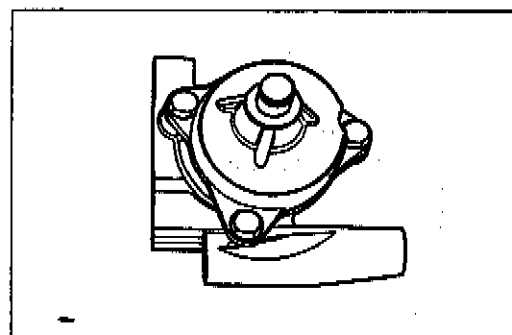
Rotate the clutch release pinion by hand to inspect for a smooth rotation. If a large resistance is felt to rotation, inspect the pinion and rack for damage or wear. If the defect is found, replace them as a set.

OIL PUMP

CAUTION:

Do not attempt to disassemble the oil pump assembly.

The oil pump is available only as an assembly.



REASSEMBLY

Assemble the countershaft and driveshaft in the reverse order of disassembly. Pay attention to the following points:

NOTE:

- * Before installing the gears, rotate the bearing by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.
- * Before installing the gears, lightly coat moly paste or engine oil to the driveshaft and countershaft.
- * Before installing the oil seal, apply grease to the oil seal lip.

99000-25140: SUZUKI MOLY PASTE

99000-25030: SUZUKI SUPER GREASE "A"

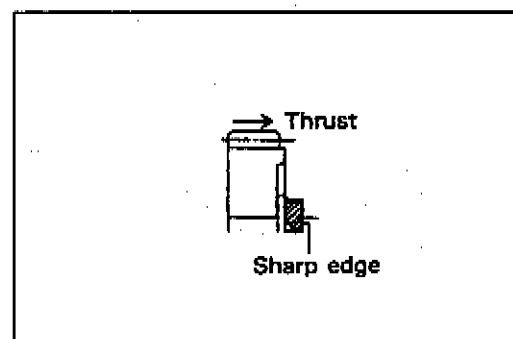
CAUTION:

- * Never reuse a circlip. After a circlip has been removed from a shaft, it should be discarded, a new circlip must be installed.
- * When installing a new circlip, care must be taken not to expand the end gap larger than required to slip the circlip over the shaft.
- * After installing a circlip, always insure that it is completely seated in its groove and securely fitted.

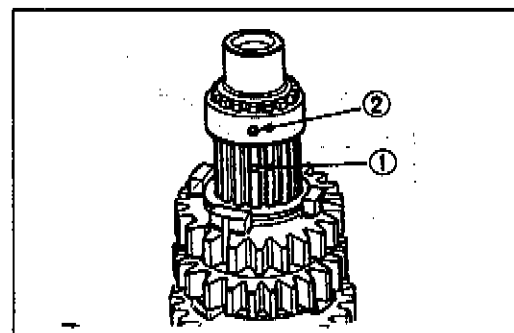
NOTE:

In reassembling the transmission, attention must be given to the locations and positions of washers and circlips. The cross sectional view given here will serve as a reference for correctly mounting the gears, washers and circlips. (Refer to page 3-43.)

- When installing a new circlip, pay attention to the direction of the circlip. Fit it to the side where the thrust is as shown in the illustration.

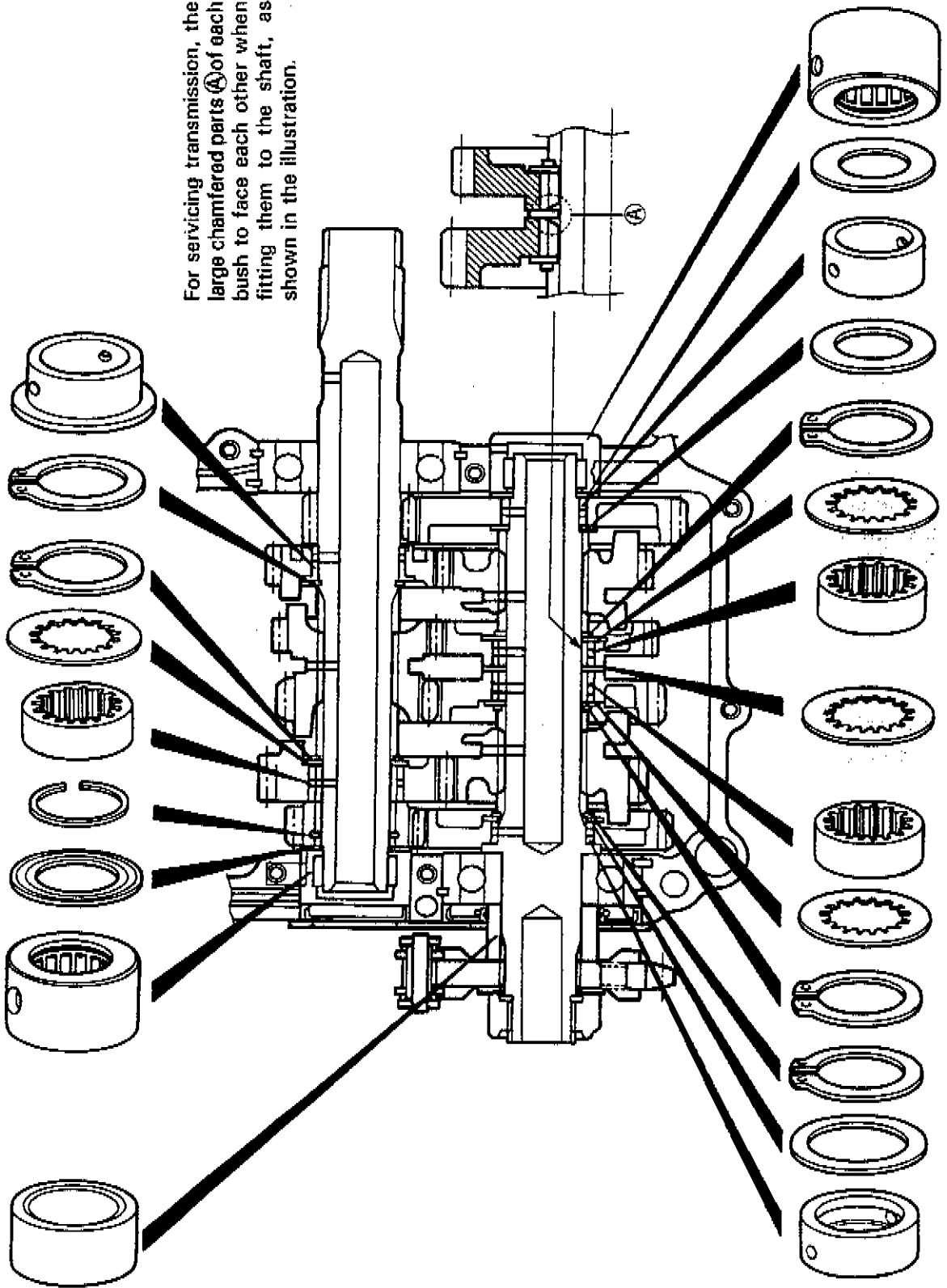


- When installing the gear bushing onto the shaft, align the shaft oil hole ① with the bushing oil hole ②.



3-43 ENGINE

For servicing transmission, the large chamfered parts (A) of each bush to face each other when fitting them to the shaft, as shown in the illustration.



GEARSHIFT FORK-GROOVE CLEARANCE

Using a thickness gauge, check the gearshift fork clearance in the groove of its gear.

The clearance for each of the three gearshift forks plays an important role in the smoothness and positiveness of the shifting action.

Gearshift fork-Groove clearance

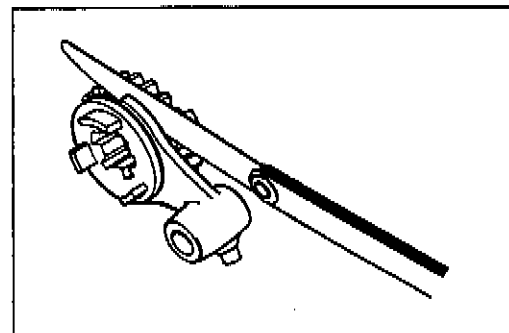
Standard : 0.10—0.30 mm (0.004—0.012 in)

Service Limit: 0.50 mm (0.020 in)

If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

09900-20803: Thickness gauge

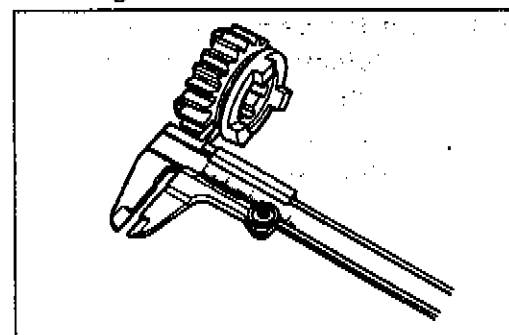
09900-20102: Vernier calipers



Checking clearance

Shift fork groove width

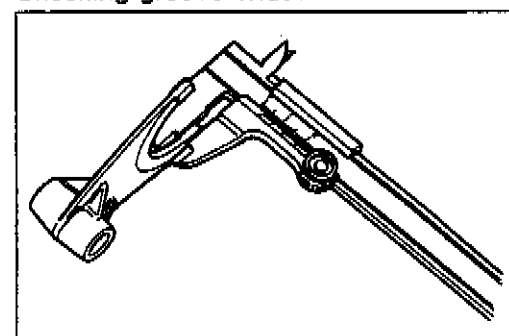
Standard: 5.00—5.10 mm (0.197—0.201 in)



Checking groove width

Shift fork thickness

Standard: 4.80—4.90 mm (0.189—0.193 in)



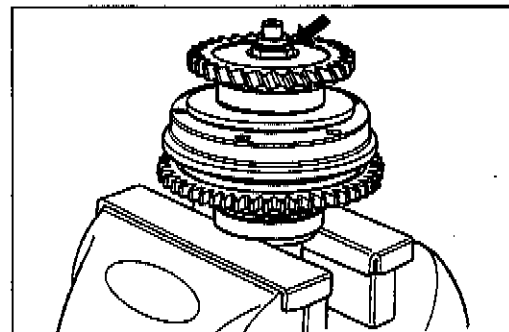
Checking thickness

3-45 ENGINE**STARTER CLUTCH****DISASSEMBLY AND INSPECTION**

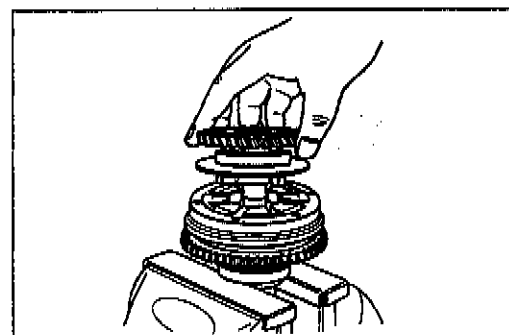
- Hold the starter clutch shaft to use a vise and appropriate pieces of soft metals, and remove the nut as shown in the Fig.

CAUTION:

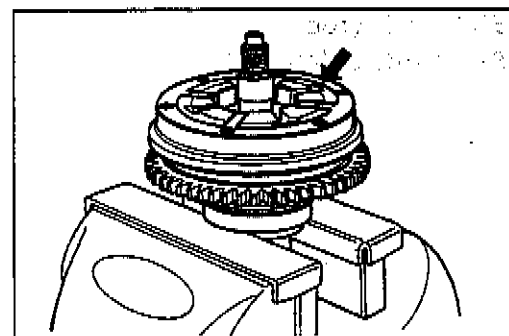
This is a left-hand thread nut.



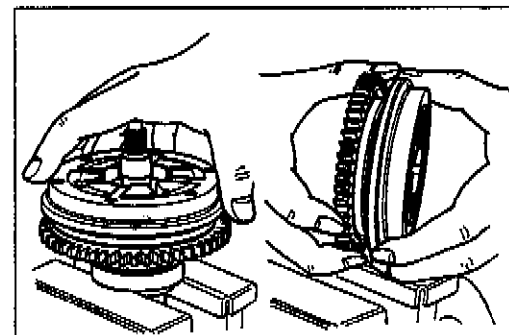
- Remove the generator driven gear assembly.



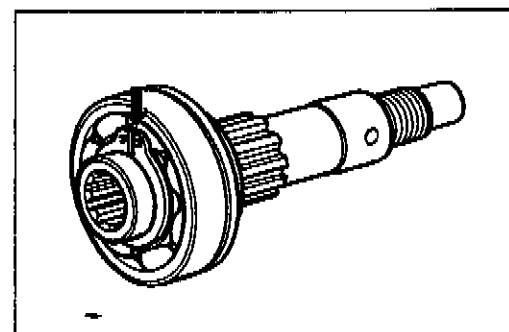
- Inspect the dampers for wear and damage. If any defects are found, replace the dampers as a set.
- Inspect the starter clutch and its contacting surface of the starter driven gear for wear or damage. If they are found to be damaged, replace them with new ones.



- Remove the starter clutch and its driven gear.
- Remove the driven gear from the starter clutch.



- Remove the circlip from the starter clutch shaft.
09900-06107: Snap ring pliers



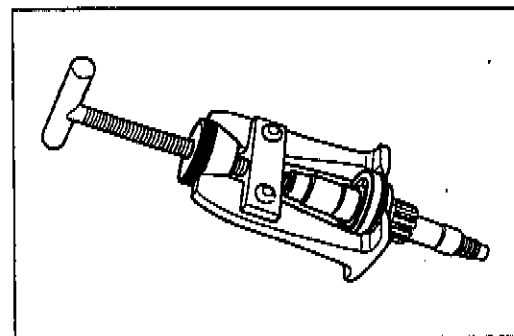
- Remove the bearing with a bearing puller.

NOTE:

Before removing the bearing, rotate the outer race by hand to inspect for abnormal noise and smooth rotation.

CAUTION:

The removed bearing should be replaced with a new one.

**REASSEMBLY**

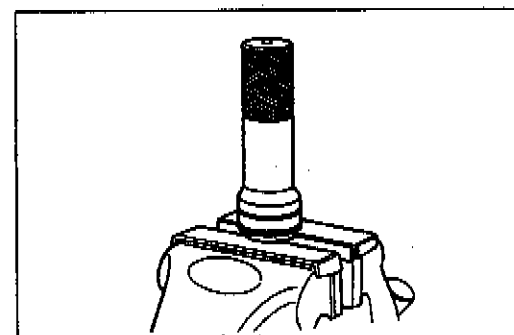
Assemble the starter clutch in the reverse order of disassembly. Pay attention to the following points:

NOTE:

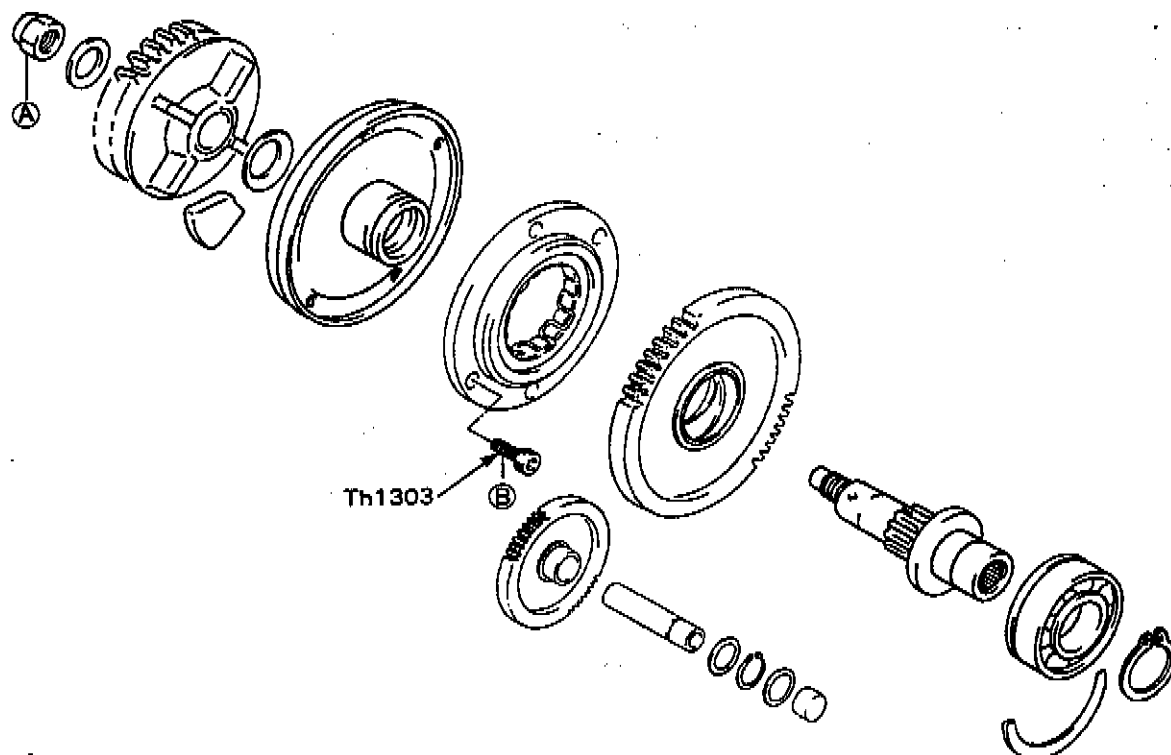
Apply engine oil to each starter clutch part before reassembling.

- Install the bearing with a bearing installer.

09951-16080: Bearing installer



Th1303: Apply THREAD LOCK SUPER "1303".

**Tightening torque**

ITEM	N-m	kg-m	lb-ft
Ⓐ	40-60	4.0-6.0	29.0-43.5
Ⓑ	8-12	0.8-1.2	6.0-8.5

3-47 ENGINE**ENGINE REASSEMBLY**

The engine is reassembled by carrying out the steps of disassembly in the reversed order, but there are a number of steps which demand special descriptions or precautionary measures.

NOTE:

Apply engine oil to each running and sliding part before reassembling.

- Fit the O-rings (① , ② and ③) and dowel pins (④) to the correct positions, as shown in the Figs.

CAUTION:

Replace the O-rings with new ones to prevent oil leakage.

- Install the oil pump to the lower crankcase with three bolts and tighten them to the specified torque.

NOTE:

Apply a small quantity of THREAD LOCK "1342" to the bolts.

99000-32050: THREAD LOCK "1342"

Tightening torque: 8–12 N·m

(0.8–1.2 kg·m, 6.0–8.5 lb·ft)

NOTE:

Check the oil jets (⑤ and ⑥) fitted on the lower crankcase for clogging.

Each oil jet can be distinguished by the numbers and colors.

- ⑤ Oil jet Number 12, Yellow
- ⑥ Oil jet Number 14, White

- Install the gearshift cam related parts.

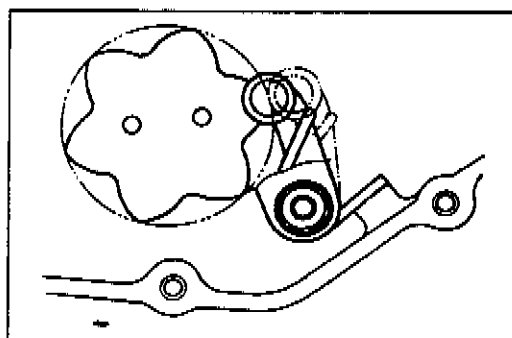
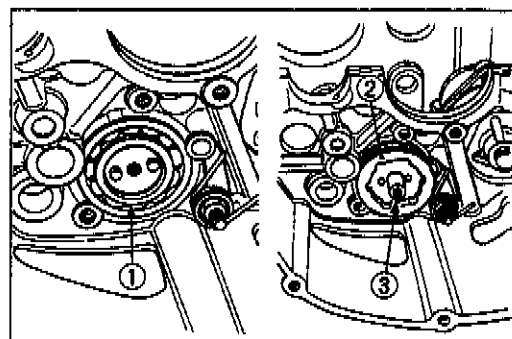
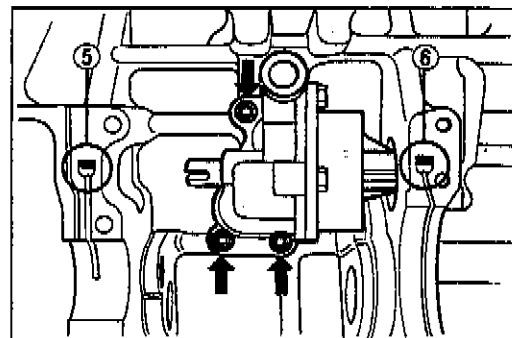
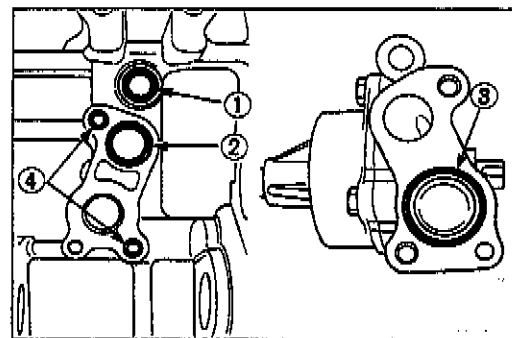
- ① Washer
- ② Gearshift cam stopper plate
- ③ Bolt

NOTE:

When installing the gearshift cam stopper plate (②), apply a small quantity of THREAD LOCK "1342" to its bolt (③).

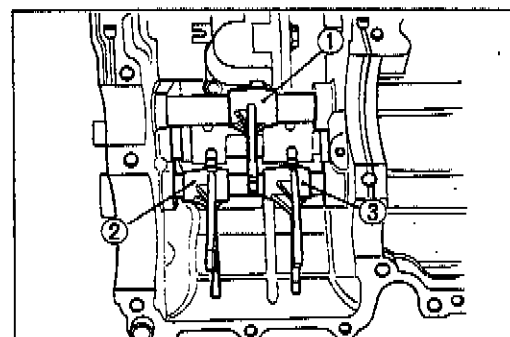
99000-32050: THREAD LOCK "1342"

- Position the gearshift cam as shown in Fig. so that the gearshift forks and transmission can be installed easily.

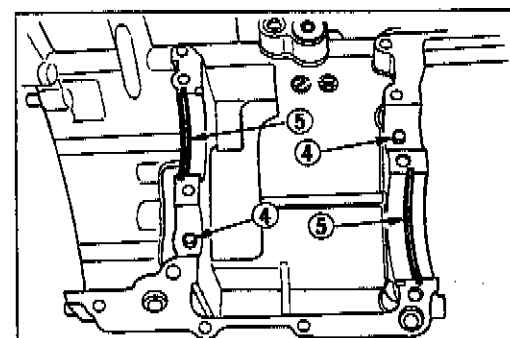


- Install the gearshift forks to the crankcase in the correct positions and directions.

- ① For 3rd/4th drive gears
- ② For Top driven gear
- ③ For 5th driven gear



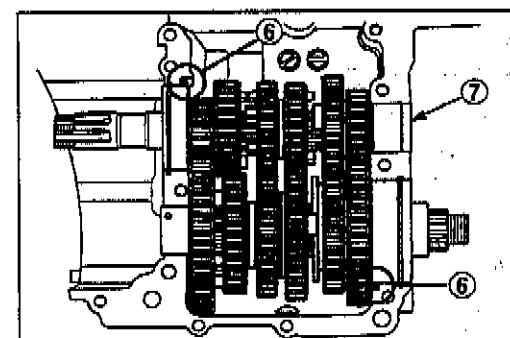
- Fit the bearing pins ④ and C-rings ⑤ on the upper crankcase.



- Install the countershaft assembly and driveshaft assembly on the upper crankcase.

NOTE:

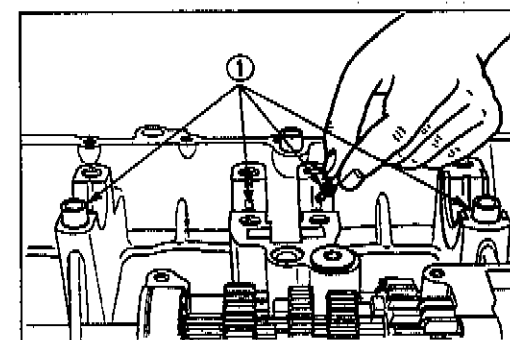
- * Be sure to install the bearing dowel pins ⑥ in the respective positions.
- * Install the countershaft end cap to the position ⑦ .
- * Make sure that the countershaft turns freely while holding the driveshaft. If not, shift the gear which is engaged to the neutral position.



NOTE:

Before fitting the crankshaft journal bearings, check the nozzles ① fitted on the upper crankcase for clogging.

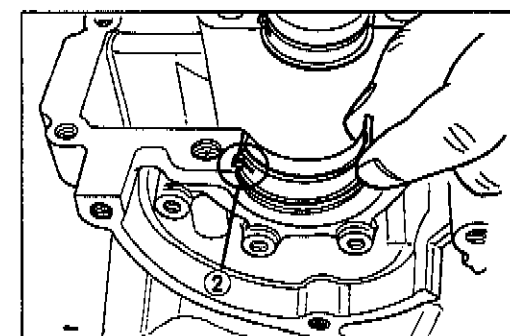
- ① Nozzle (4 pcs) For upper case



- When fitting the crankshaft journal bearings to the upper and lower crankcases, be sure to fix the stopper part ② first and press the other end. (Refer to page 3-38.)

CAUTION:

Do not touch the bearing surfaces with your hands. Grasp by the edge of the bearing shell.



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- Install the cam chain guide ① and two dampers ② properly.

NOTE:

Be sure to face the arrow mark on the damper to the front and rear, not to the left and right.

- Fit the O-ring ③ .

CAUTION:

Replace the O-ring with a new one to prevent oil leakage.

- Before installing the crankshaft, apply SUZUKI MOLY PASTE to each journal bearing lightly.

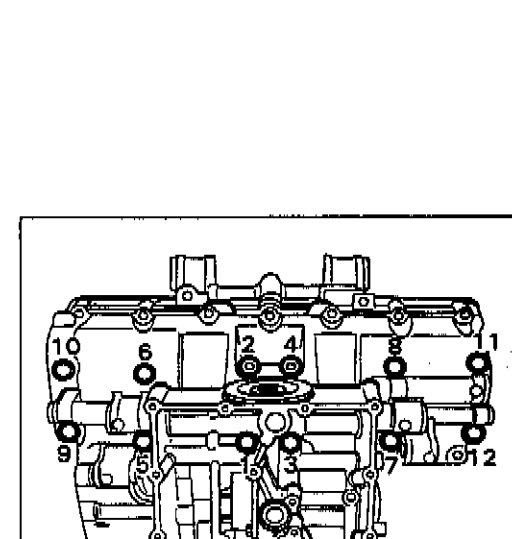
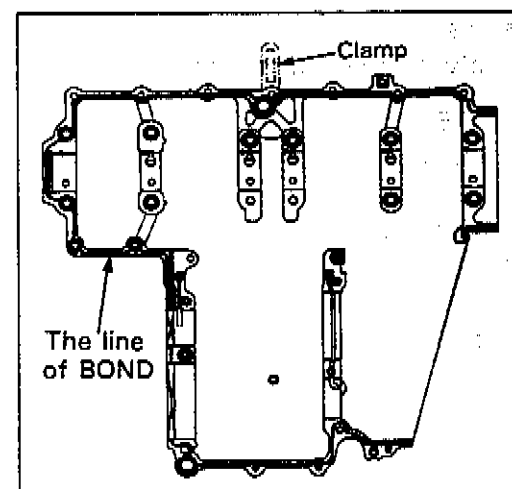
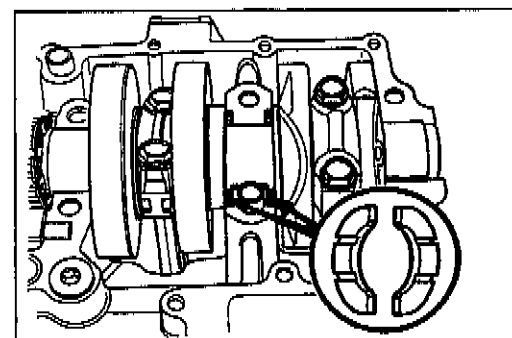
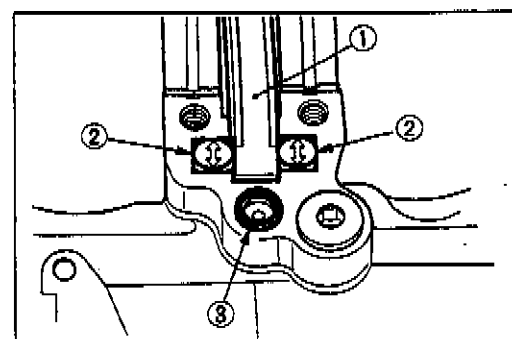
99000-25140: SUZUKI MOLY PASTE

- Install the crankshaft with the cam chain to the upper crankcase.
- Insert the right and left-thrust bearings with oil grooved facing the crank web. (Refer to page 3-38.)
- Clean the mating surfaces of the crankcases before matching the upper and lower ones.
- Install the dowel pins to the upper crankcase.
- Apply SUZUKI BOND NO. 1207B to the mating surface of the lower crankcase and crankshaft left end cap in the following procedure.

99104-31140: SUZUKI BOND NO. 1207B**NOTE:**

Use of SUZUKI BOND NO. 1207B is as follows:

- * *Make surfaces free from moisture, oil, dust and other foreign materials.*
- * *Spread on surfaces thinly to form an even layer, and assemble the cases within few minutes.*
- * *Take extreme care not to apply any BOND NO. 1207B to the bearing surfaces.*
- * *Apply to cornered surface as it forms a comparatively thick film.*
- Tighten the crankshaft tightening 9-mm bolts in ascending order of numbers assigned to these bolts, tightening each bolt a little at a time to equalize the pressure. Tighten the lower and upper crankcase tightening bolts to the specified torque values.



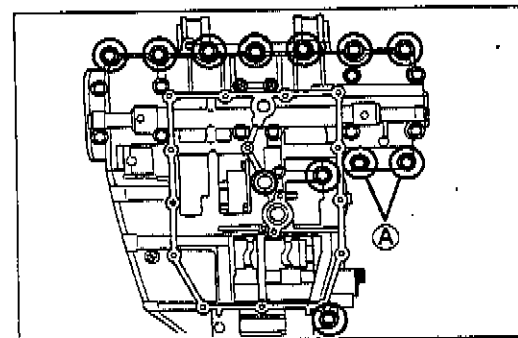
Tightening torque	Initial tightening			Final tightening		
	N·m	kg·m	lb·ft	N·m	kg·m	lb·ft
6 mm bolt	6	0.6	4.5	13	1.3	9.5
8 mm bolt	13	1.3	9.5	26	2.6	19.0
9 mm bolt	13	1.3	9.5	26	2.6	19.0

- Fit the new gaskets to the lower crankcase bolts **(A)** correctly as shown in the Fig.

CAUTION:

Use a new gasket to prevent oil leakage.

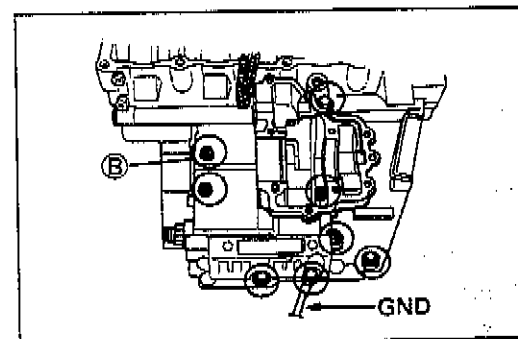
09900-00410: Hexagon bit wrench set



- Fit the engine ground wire to the correct position as shown in the Fig.
- Fit a new gasket to the upper crankcase bolt **(B)** correctly as shown in the Fig.

CAUTION:

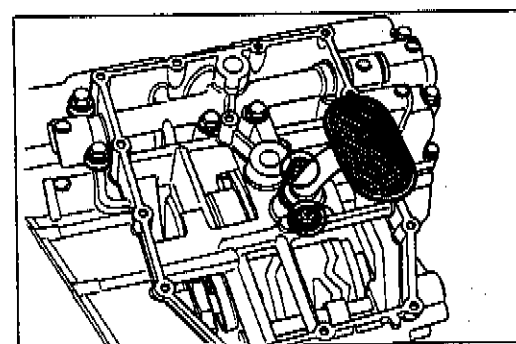
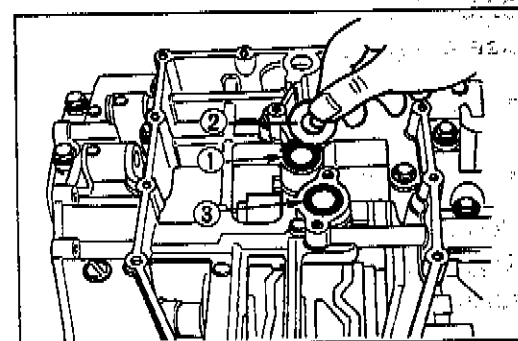
Use a new gasket to prevent oil leakage.



- Fit a new O-ring **(1)** and shim **(2)**.
- Fit a new O-ring **(3)** and install the oil sump filter to the lower crankcase.

CAUTION:

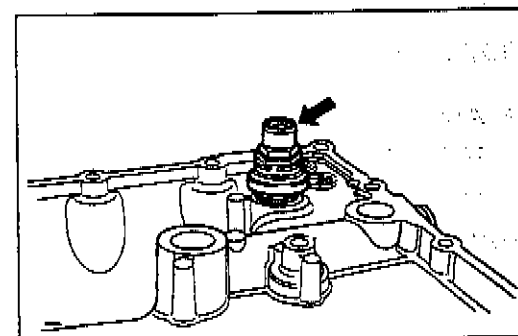
Replace the O-rings with new ones to prevent oil leakage.



- Seat the washer and install the oil pressure regulator to the oil pan and tighten it to the specified torque.

Tightening torque: 25–30 N·m

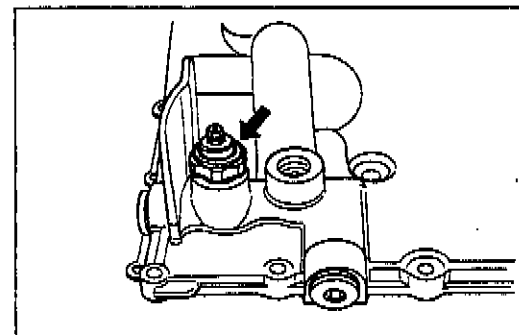
(2.5–3.0 kg-m, 18.0–21.5 lb-ft)



3-51 ENGINE**NOTE:**

When replacing the oil pressure switch, apply **SUZUKI BOND NO. 1207B** to its thread lightly.

99104-31140: SUZUKI BOND NO. 1207B

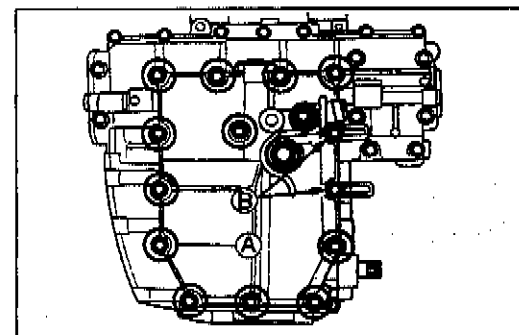


- Fit the gasket and install the oil pan. Tighten the oil pan bolts to the specified torque.

Tightening torque: 12–16 N·m
(1.2–1.6 kg-m, 8.5–11.5 lb-ft)

NOTE:

- * Fit a new gasket to the oil pan bolt **(A)** correctly as shown in the Fig.
- * Fit the lead wire clamps to the oil pan bolts **(B)** correctly as shown in the Fig.

**CAUTION:**

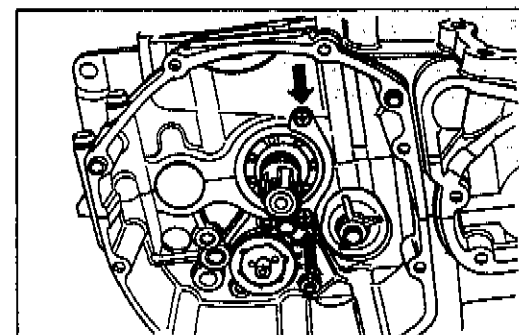
Use a new gasket to prevent oil leakage.

- Tighten the engine oil drain plug to the specified torque. (Refer to page 8-29.)
- Install the countershaft bearing retainer with two screws.

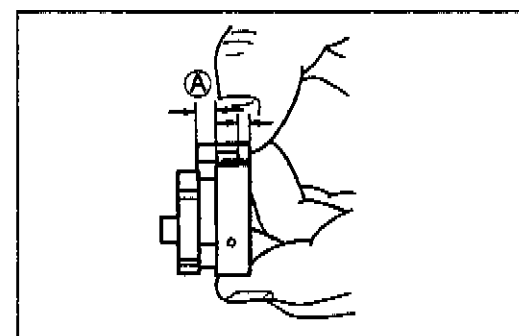
NOTE:

Apply a small quantity of **THREAD LOCK "1342"** to the two screws.

99000-32050: THREAD LOCK "1342"



- Install each gear shifting pawl into the cam shifter. The large shoulder **(A)** must face to the outside as shown.



- Apply a small quantity of **THREAD LOCK "1342"** to the screws **(1)** and nut **(2)**.

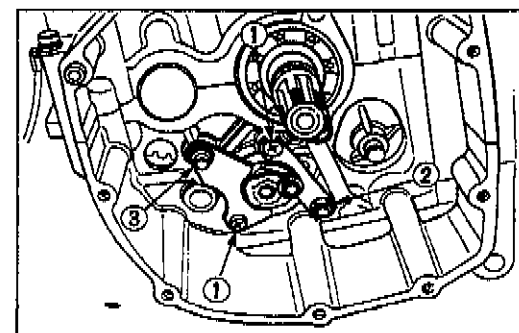
99000-32050: THREAD LOCK "1342"

09900-09003: Impact driver set

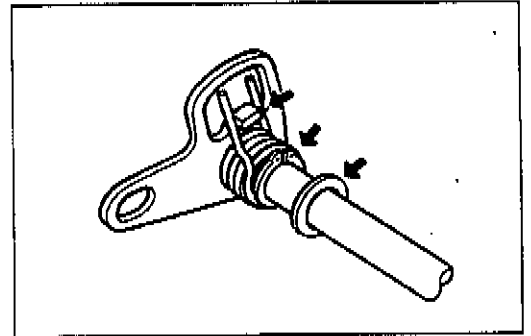
- Apply a small quantity of **THREAD LOCK SUPER "1303"** to the gearshift arm stopper bolt **(3)** and tighten it to the specified torque.

99000-32030: THREAD LOCK SUPER "1303"

Tightening torque: 15–23 N·m
(1.5–2.3 kg-m, 11.0–16.5 lb-ft)



- Install the gearshift shaft return spring, circlip and washer onto the gearshift shaft properly.

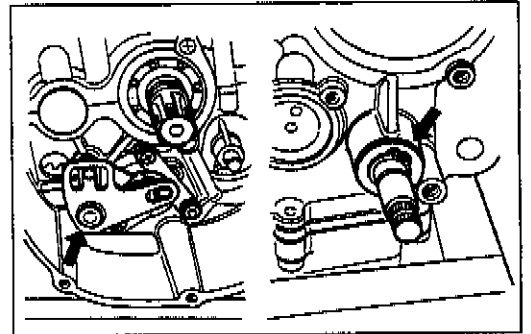


- Install the gearshift shaft and washer.
- Fix the gearshift shaft with the circlip.

09900-06107: Snap ring pliers

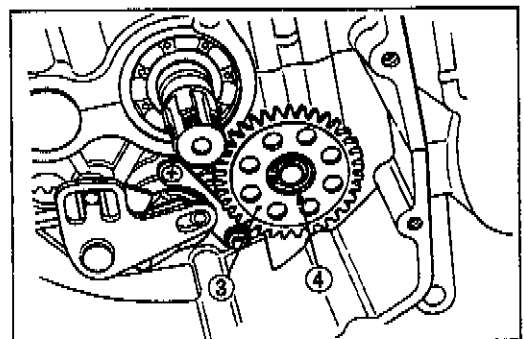
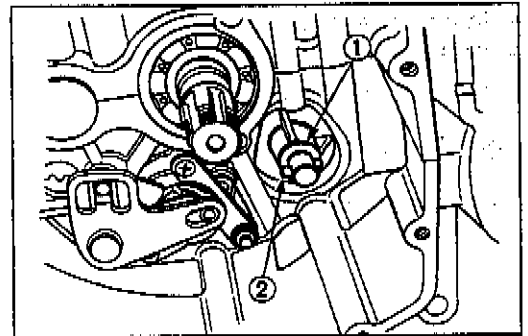
CAUTION:

Replace the gearshift shaft oil seal with a new one.



- Install the washer ①, pin ②, oil pump driven gear ③ and washer ④.
- Fix the oil pump driven gear with the circlip.

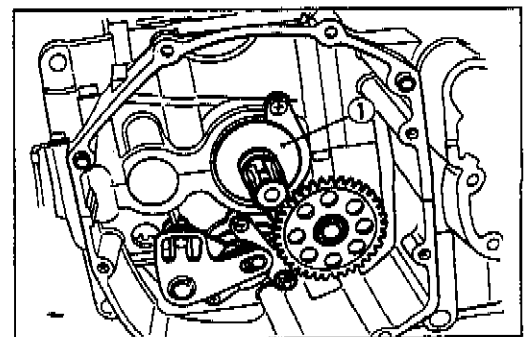
09900-06107: Snap ring pliers



- Install the thrust washer ① onto the countershaft.

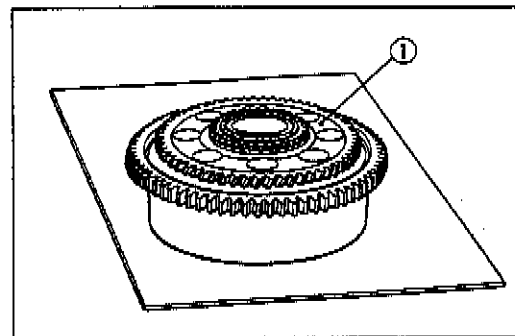
NOTE:

Flat surface of washer is positioned outside.

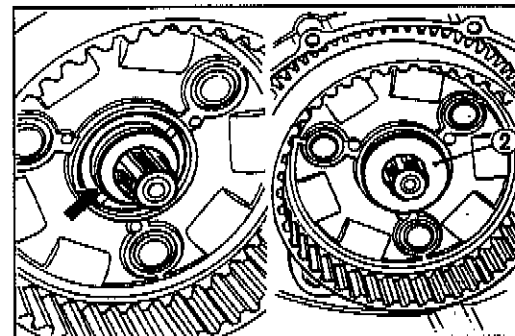


3-53 ENGINE

- Install the generator/oil pump drive gears ① onto the primary driven gear.



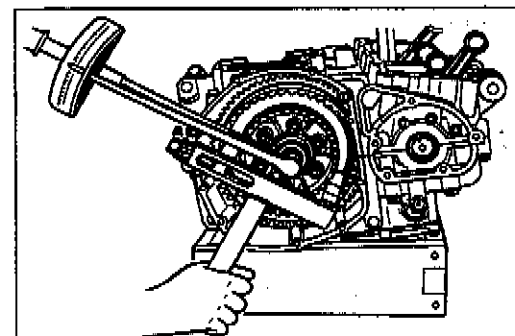
- Install the primary driven gear assembly onto the countershaft, and apply engine oil to the needle bearing and spacer.
- Install the thrust washer ② onto the countershaft.



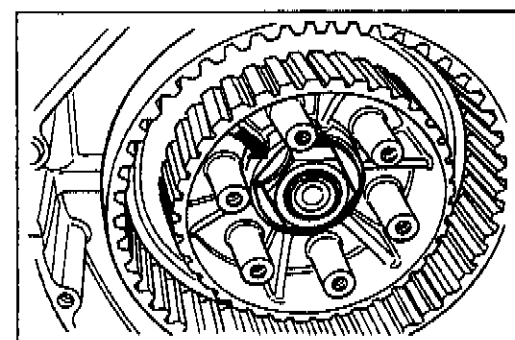
- Install the clutch sleeve hub onto the countershaft.
- Tighten the clutch sleeve hub nut to the specified torque by using the torque wrench and clutch sleeve hub holder.

09920-53740: Clutch sleeve hub holder

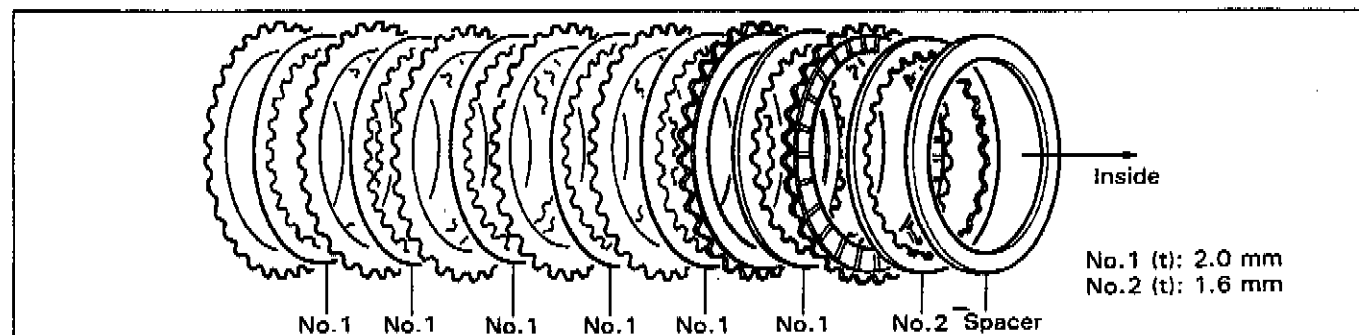
**Tightening torque: 80–100 N·m
(8.0–10.0 kg·m, 58.0–72.5 lb·ft)**



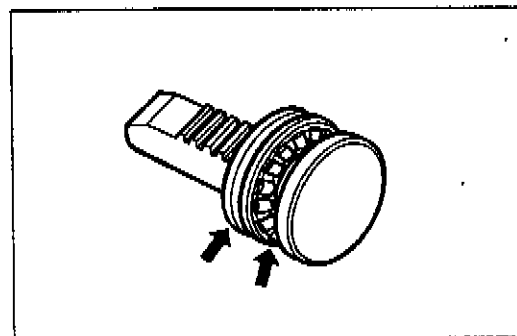
- After tightening the clutch sleeve hub nut, be sure to lock the nut by firmly bending the tongue of lock washer.



- Insert the clutch driven plates and drive plates one by one into the clutch sleeve hub in the prescribed order, driven plate first.
No.1 and No.2 driven plates can be distinguished by the thickness.



- Set the clutch release bearing and washer onto the clutch release rack.



- Put the clutch pressure plate onto the clutch sleeve hub.
- Put the clutch spring set bolts onto the clutch pressure plate properly.
- Tighten the clutch spring set bolts in the order.

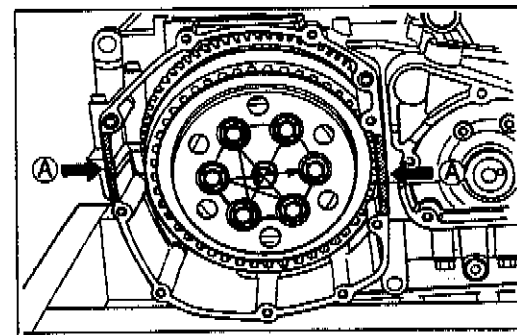
NOTE:

Tighten the clutch spring set bolts in the manner indicated, tightening them by degrees until they attain a uniform tightness.

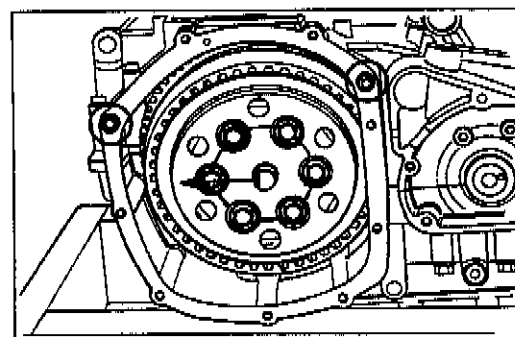
**Clutch spring set bolt: 11 – 13 N·m
(1.1 – 1.3 kg·m, 8.0 – 9.5 lb·ft)**

- Coat SUZUKI BOND NO. 1207B lightly to the mating surfaces (A) between upper and lower crankcases as shown in the Fig.

99104-31140: SUZUKI BOND NO. 1207B



- Install the dowel pins, a new gasket and clutch cover.
- Face the clutch release rack to the rear side so that the clutch release rack and pinion can be engaged easily.



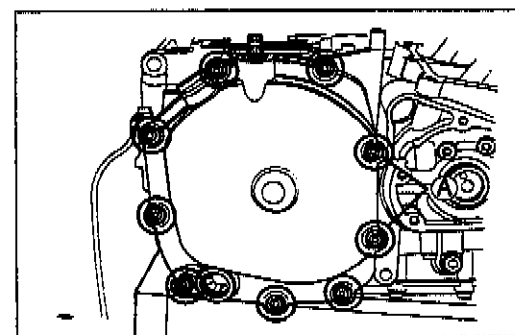
- Tighten the cover bolts securely.

NOTE:

Fit the two gaskets to the clutch cover bolts (A) correctly as shown in the Fig.

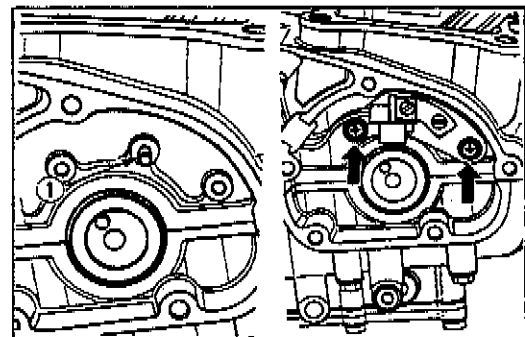
CAUTION:

Use only new gasket to prevent oil leakage.



3-55 ENGINE

- Put the signal generator dowel pin ① to the crankcase.
- Install the signal generator stator with two screws.

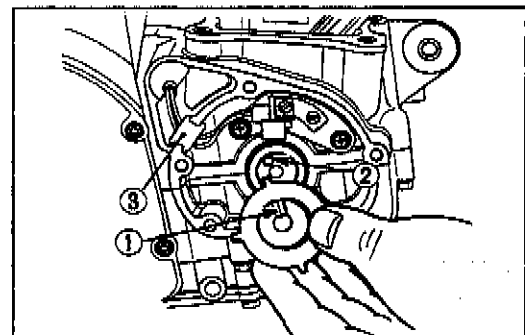


- Make sure to fit the slot ① on the back surface of the signal generator rotor over the locating pin ② at the end of crankshaft.

NOTE:

BOND NO. 1207B should be applied to the groove of the signal generator lead wire grommet ③.

99104-31140: SUZUKI BOND NO. 1207B

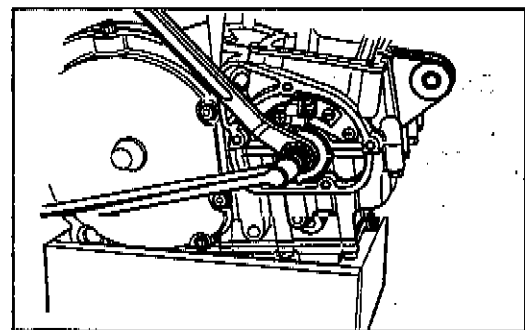


- Hold the crankshaft turning nut and tighten the rotor bolt to the specified torque using 6-mm hexagon wrench.

09900-00410: Hexagon wrench set

Tightening torque: 23–26 N·m

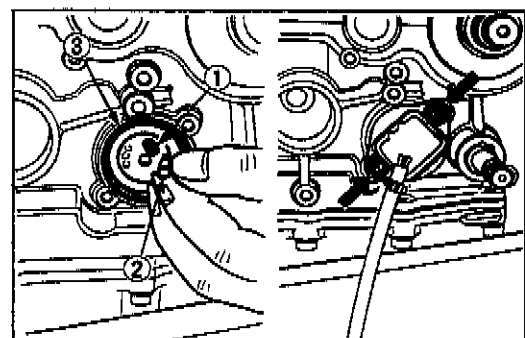
(2.3–2.6 kg-m, 16.5–19.0 lb-ft)



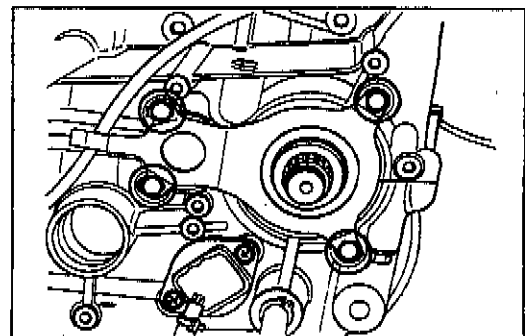
- Install the neutral position indicator switch with two screws.

NOTE:

When installing the neutral position indicator switch, be sure to locate the spring ①, switch contact ② and O-ring ③.



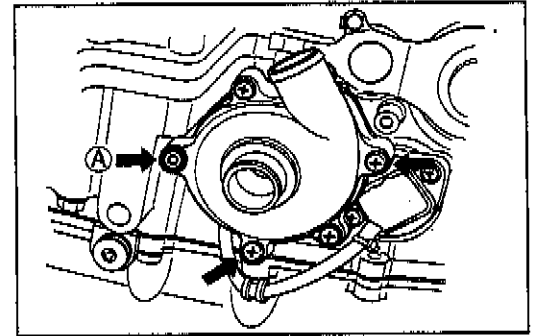
- Install the oil seal retainer with four bolts, and positively bend the lock portion of the retainer.



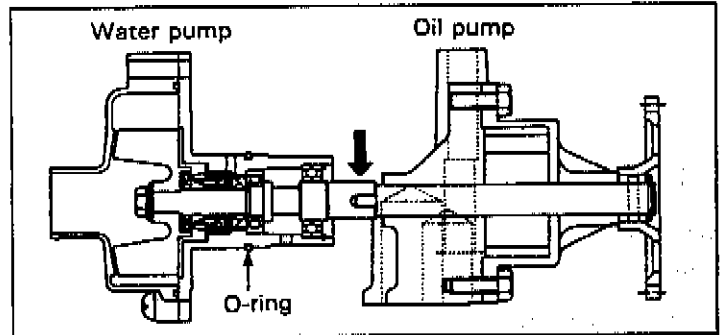
- Install the water pump with screws and nut.

NOTE:

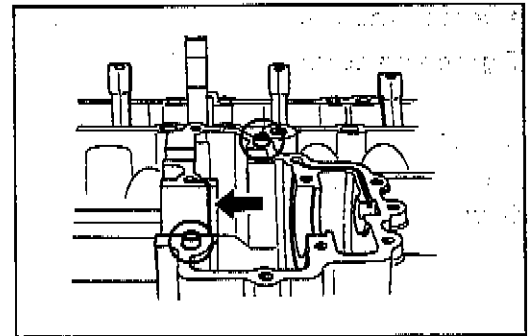
- * Apply **SUZUKI SUPER GREASE "A"** to the water pump O-ring.
- * Set the water pump shaft to the oil pump shaft.
- * When replacing the stud bolt which is located at the position ④, apply **SUZUKI BOND NO. 1207B** to its threads to prevent oil leakage.



99000-25030: SUZUKI SUPER GREASE "A"
99104-31140: SUZUKI BOND NO. 1207B



- Install the two dowel pins and C-ring.



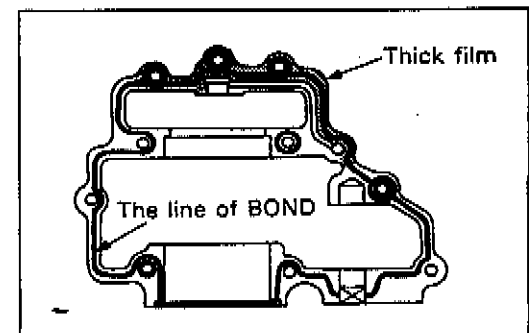
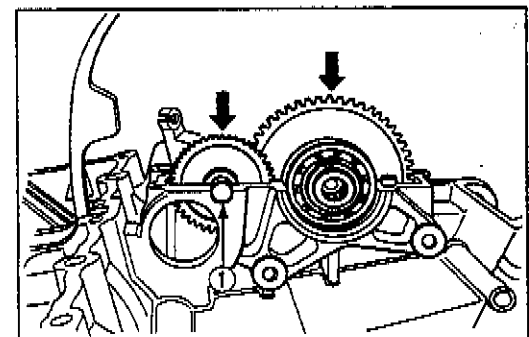
- Install the starter clutch assembly.
- Install the starter idle gear and its shaft.
- Install the shaft end cap to the position ①.
- Clean the mating surfaces of the upper crankcase and starter clutch cover.
- Apply **SUZUKI BOND NO. 1207B** to the mating surface of the starter clutch cover.

99104-31140: SUZUKI BOND NO. 1207B

NOTE:

Use of SUZUKI BOND NO. 1207B is as follows:

- * *Make surfaces free from moisture, oil, dust and other foreign materials.*
- * *Spread on surfaces thinly to form an even layer, and assemble the cover within few minutes.*
- * *Take extreme care not to apply any BOND NO. 1207B to the bearing surfaces.*
- * *Apply to cornered surface as it forms a comparatively thick film.*



3-57 ENGINE

- Place the starter clutch cover and tighten its bolts to the specified torque.

Tightening torque: 8–12 N·m
(0.8–1.2 kg-m, 6.0–8.5 lb-ft)

NOTE:

- Fit the gaskets to the starter clutch cover bolt (A) and bolts (B) correctly as shown in the Fig.
- Fit the oil hose clamp to the starter clutch cover bolt (C) correctly as shown in the Fig.

Bolt (A): Copper washer gasket

Bolt (B): Steel washer with rubber gasket

CAUTION:

Use a new gasket to prevent oil leakage.

- Install the generator with three bolts.

Tightening torque: 21–29 N·m
(2.1–2.9 kg-m, 15.0–21.0 lb-ft)

NOTE:

Apply **SUZUKI SUPER GREASE "A"** to the generator O-ring.

99000-25030: SUZUKI SUPER GREASE "A"

- Install the starter motor with two bolts.

Tightening torque: 4.0–7.0 N·m
(0.4–0.7 kg-m, 3.0–5.0 lb-ft)

NOTE:

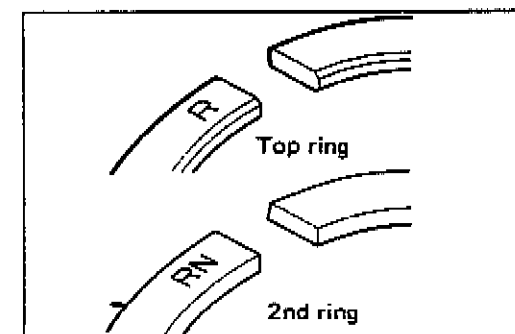
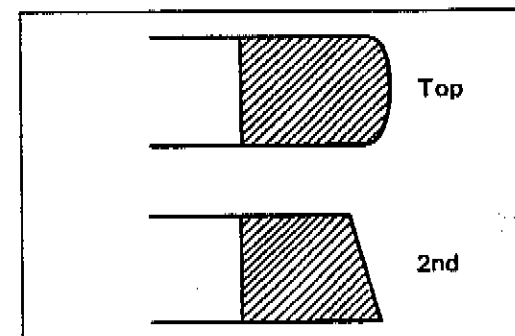
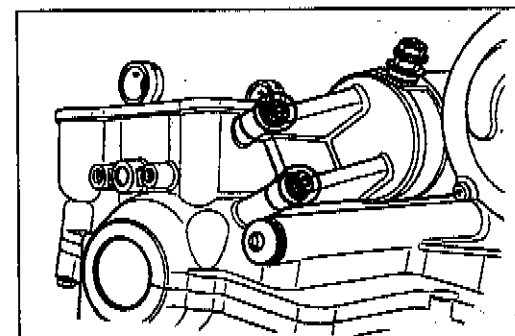
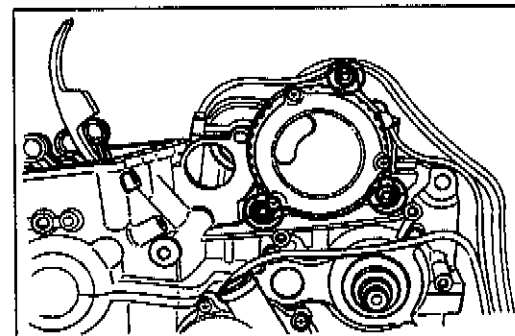
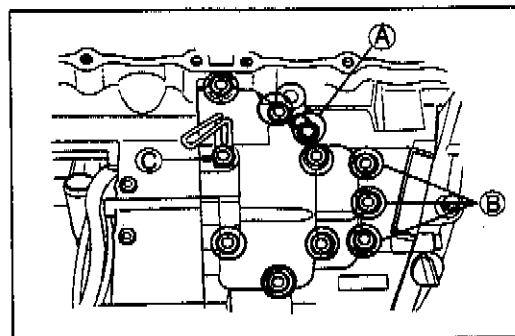
Apply **SUZUKI SUPER GREASE "A"** to the starter motor O-ring.

- Install the piston rings in the order of oil ring, 2nd ring and top ring.

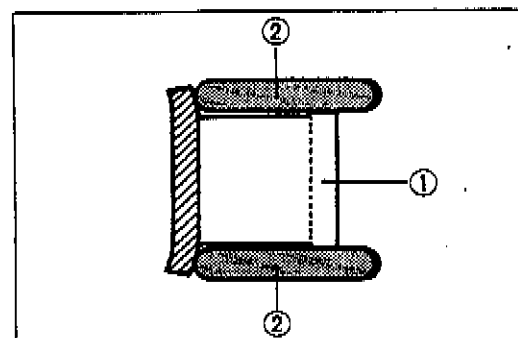
NOTE:

Top ring and 2nd ring differ in the shape of the ring face.

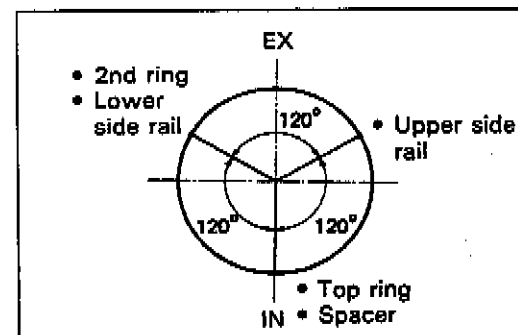
- Top and 2nd rings have a letter "R" or "RN" marked on the side. Be sure to bring the marked side to the top when fitting them to the piston.



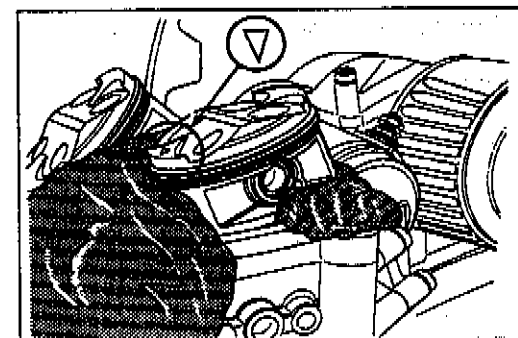
- The first member to go into the oil ring groove is a spacer ① . After placing the spacer, fit the two side rails ② . Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.



- Position the gaps of the three rings as shown. Before inserting each piston into the cylinder, check that the gaps are so located.

**NOTE:**

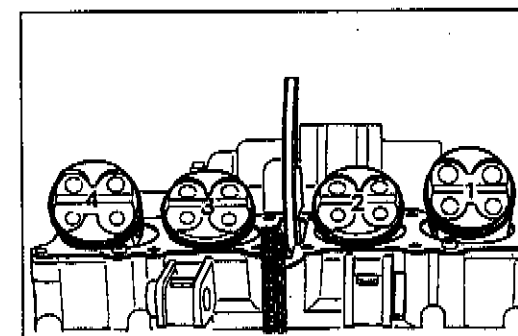
When fitting the piston, turn the triangle mark on the piston head to exhaust side.



- Be sure to install the pistons in the cylinder from which they were removed in disassembly, refer to the letter mark, "1" through "4", scribed on the piston.
- Have each piston pin moly paste oiled lightly before installing it.
- Place a cloth beneath the piston, and install the circlips.

NOTE:

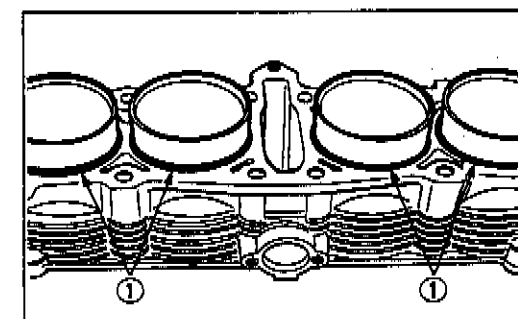
Be sure to use new circlips.



- Before putting on the cylinder block, oil the big and small ends of each conrod and also the sliding surface of each piston.
- Place the new O-rings ① to each cylinder sleeve correctly as shown in the Fig.

CAUTION:

Use a new O-ring to prevent water leakage.



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- Place the dowel pins and new cylinder gasket on the crankcase.

CAUTION:

Use a new gasket to prevent oil leakage.

NOTE:

Be sure to identify the top surface by "UP" mark on the cylinder gasket as shown in the Fig.

- Install piston ring holders in the indicated manner. Some light resistance must be overcome to lower the cylinder block.
- With No.2 and No.3 pistons in place, install No.1 and No.4 pistons, and insert them into the cylinder.

09916-74521: Holder body

09916-74540: Band

NOTE:

Do not overtighten the special tool bands or the pistons entry into the cylinders will be difficult.

- Tighten the cylinder nut **A** to the specified torque.

Tightening torque: 7–11 N·m

(0.7–1.1 kg-m, 5.0–8.0 lb-ft)

- Install the cam chain guide **①** properly.
- Place the dowel pins and new cylinder head gasket on the cylinder.

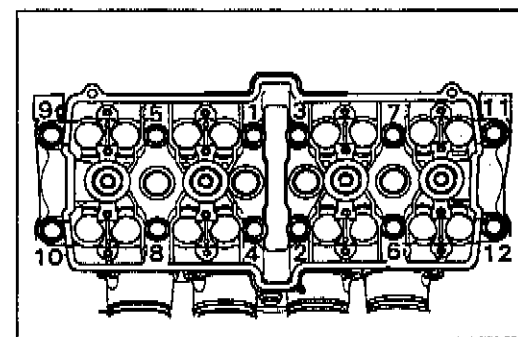
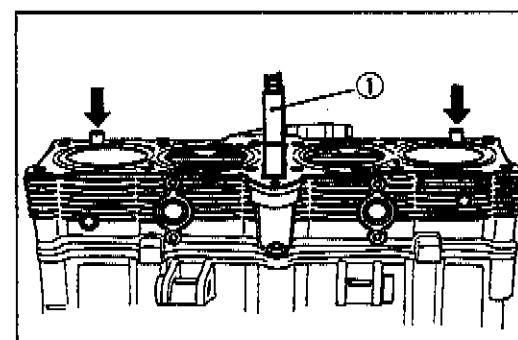
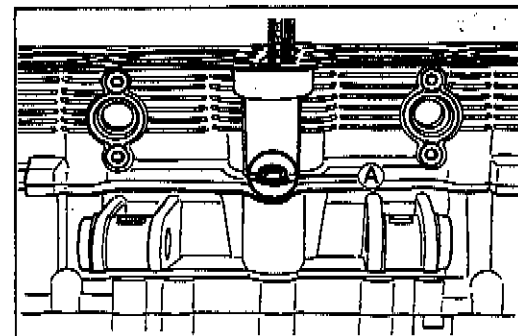
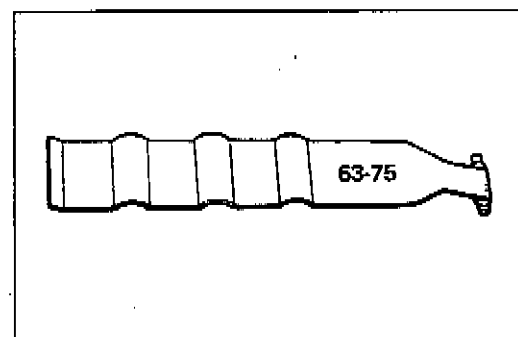
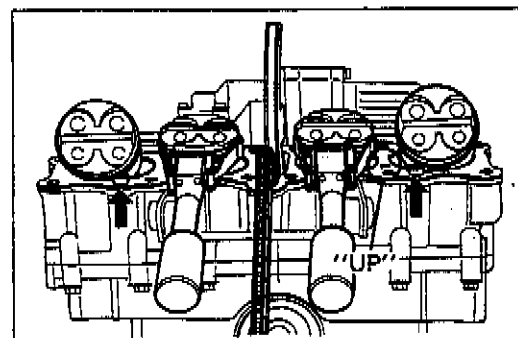
CAUTION:

Use a new gasket to prevent gas leakage.

- Place the cylinder head on the cylinder block.
- Tighten the twelve 10-mm bolts to the specified torque with a torque wrench sequentially in the ascending order of numbers.

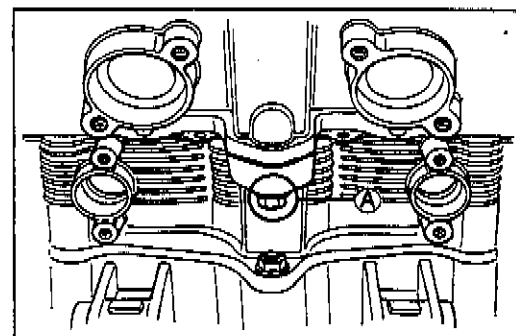
Tightening torque: 40–45 N·m

(4.0–4.5 kg-m, 29.0–32.5 lb-ft)



- After firmly tightening the twelve 10-mm bolts, install one 6-mm bolt (A) and tighten it to the specified torque.

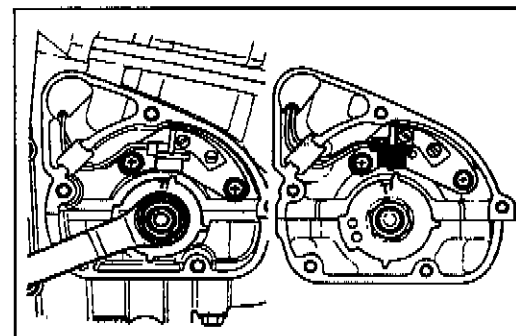
Tightening torque: 8–12 N·m
(0.8–1.2 kg·m, 6.0–8.5 lb·ft)



- While holding down the cam chain, rotate the crankshaft in normal direction to bring the "T" mark on the rotor to the center of pick-up coil.

CAUTION:

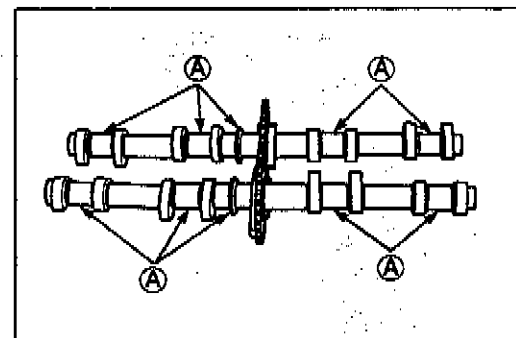
To turn over crankshaft, torque nut with a 19 mm wrench. Never try to rotate crankshaft by putting a 6 mm T-type wrench over the bolt.



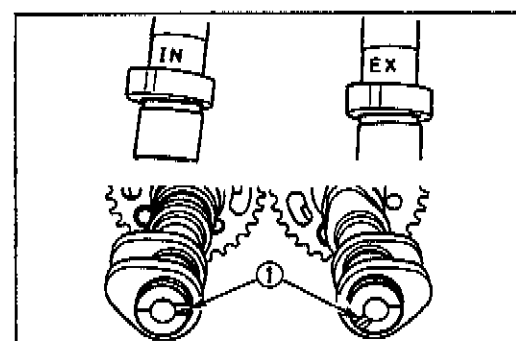
NOTE:

Just before placing the camshaft on the cylinder head, apply SUZUKI MOLY PASTE to its journals, fully coating each journal (A) with the paste, taking care not to leave any dry spot. Apply engine oil to the camshaft journal holders.

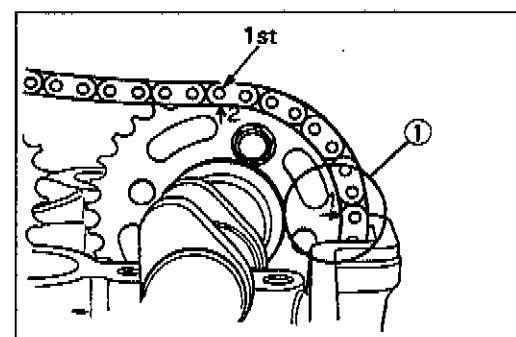
99000-25140: SUZUKI MOLY PASTE



- The exhaust camshaft can be distinguished from that of the intake by the embossed letters "EX" (for exhaust) as against letters "IN" (for intake). Similarly, the right end can be distinguished by the notch (1) at the right end.



- With "T" mark accurately lined up with the timing mark, hold the camshaft steady and lightly pull up the chain to remove the slack between the crank sprocket and exhaust sprocket.
- The exhaust sprocket bears an arrow marked "1" indicated as (1). Turn over the exhaust camshaft so that the arrow points flush with the gasketed surface of the cylinder head. Engage the cam chain with this sprocket.

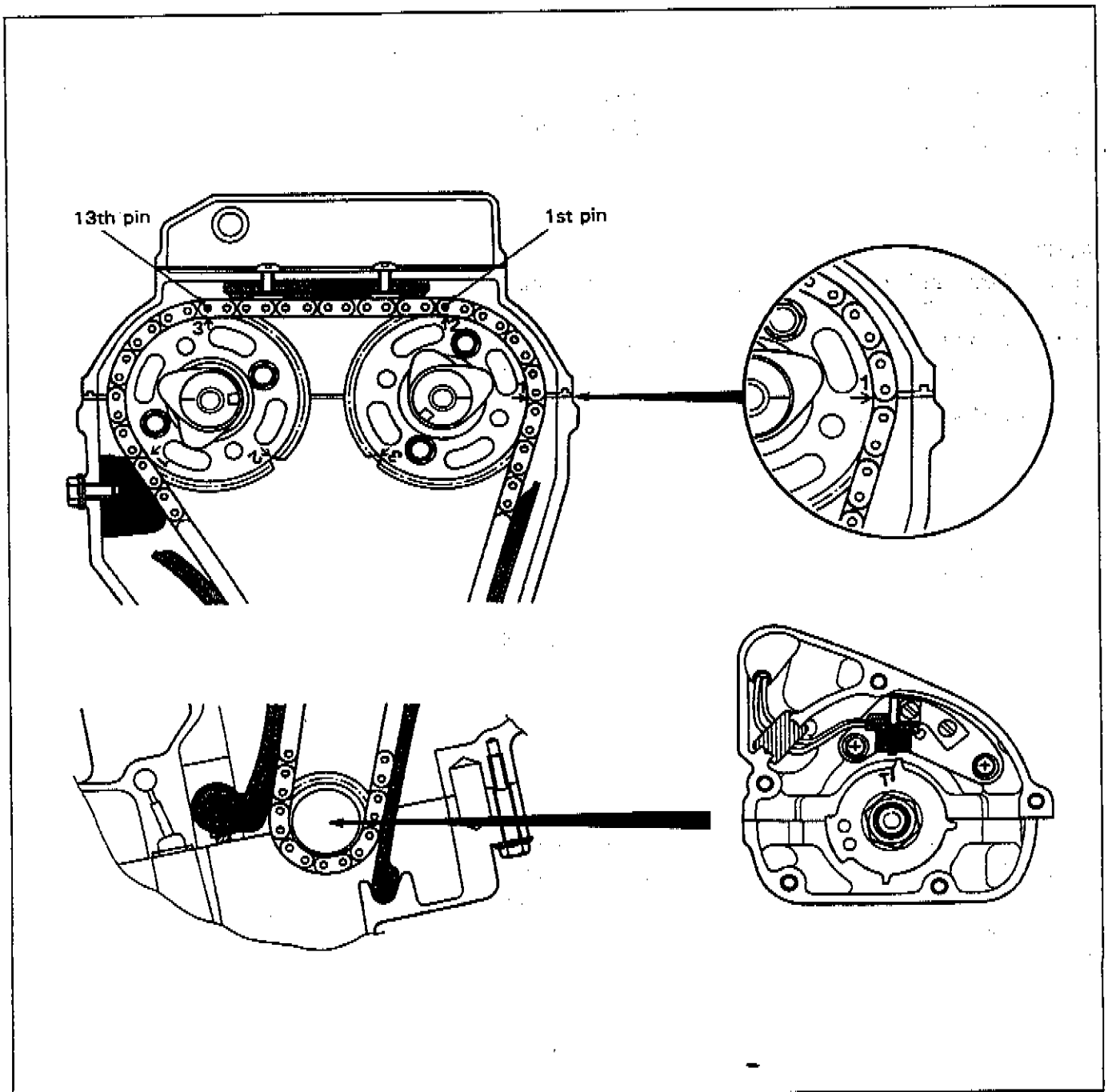
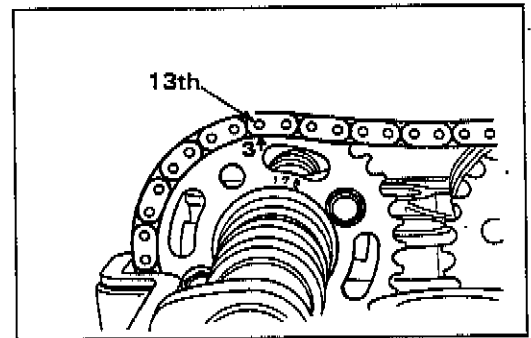


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- The other arrow marked "2" is now pointing straight upward. Count the chain roller pins toward the intake camshaft, starting from the roller pin directly above this arrow marked "2" and ending with the 13th roller pin. Engage the cam chain with intake sprocket, locating the 13th pin at the above the arrow marked "3" on the intake sprocket.

NOTE:

The cam chain is now riding on all three sprockets. Be careful not to disturb the crankshaft until the camshaft journal holders and cam chain tensioner are secured.



- Each camshaft journal holder is identified with a cast-on letter. Install the dowel pins to each camshaft journal holder.
- Fasten the camshaft journal holders evenly by tightening the camshaft journal holder bolts sequentially in the ascending order of numbers. (Try to equalize the pressure by shifting the wrench in this above manner, to fasten the shafts evenly.)

NOTE:

Damage to head or camshaft journal holder thrust surfaces may result if the camshaft journal holders are not drawn down evenly.

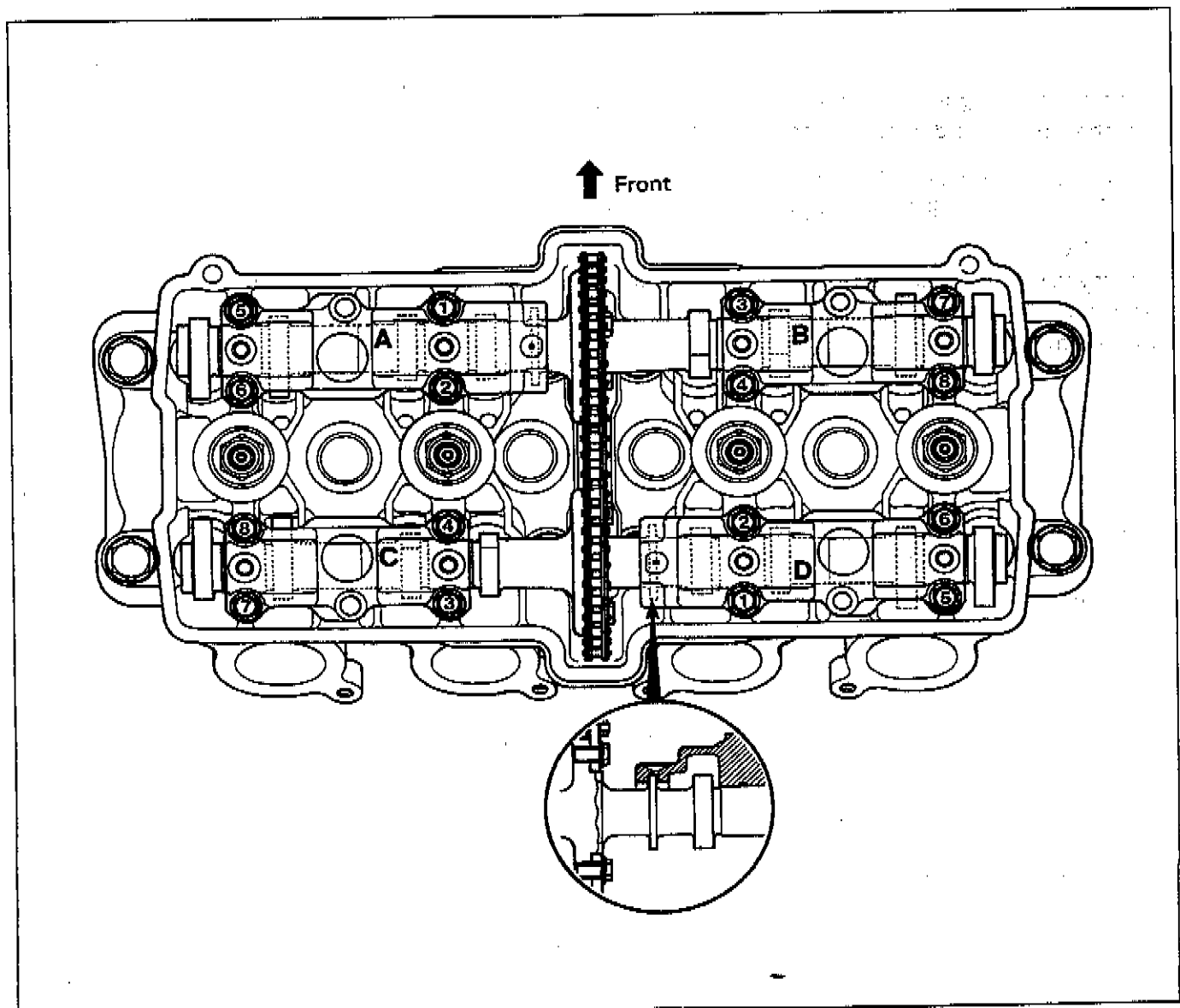
- Tighten the camshaft journal holder bolts to the specified torque.

Tightening torque: 8–12 N·m (0.8–1.2 kg·m, 6.0–8.5 lb-ft)

CAUTION:

The camshaft journal holder bolts are made of a special material and much superior in strength, compared with other types of high strength bolts.

Take special care not to use other types of bolts instead of these special bolts. To identify these bolts, each of them has a figure "9" on its head.

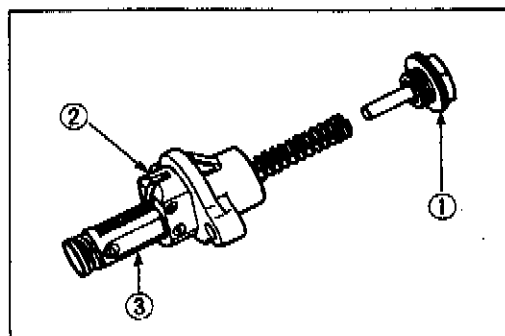


3-63 ENGINE

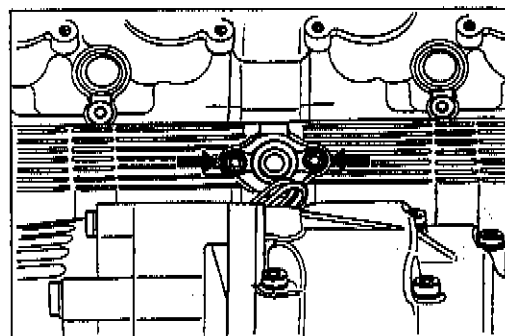
- After removing the spring holder bolt ① and spring, unlock the ratchet mechanism ② and push in the push rod ③ all the way.

NOTE:

Before installing the cam chain tensioner, turn the crankshaft clockwise to remove the cam chain slack between the crank sprocket and exhaust sprocket.



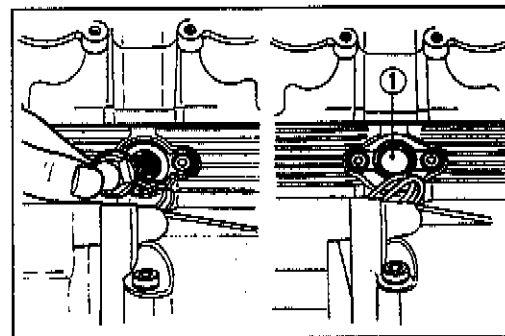
- Install a new gasket and the cam chain tensioner to the cylinder block with two bolts and tighten them to the specified torque.



Tightening torque: 6–8 N·m

(0.6–0.8 kg-m, 4.5–6.0 lb-ft)

- Insert the spring into the cam chain tensioner and tighten the spring holder bolt ① to the specified torque.



Tightening torque: 30–45 N·m

(3.0–4.5 kg-m, 21.5–32.5 lb-ft)

CAUTION:

After installing the cam chain tensioner, check to be sure that the tensioner work properly by checking the slack of cam chain.

- Pour about 50 ml of engine oil in each oil pocket in the head.

NOTE:

Turn the crankshaft and check that all the moving parts such as cam follower, camshaft, work properly.

CAUTION:

Be sure to check the tappet clearance. (Refer to page 2-4.)

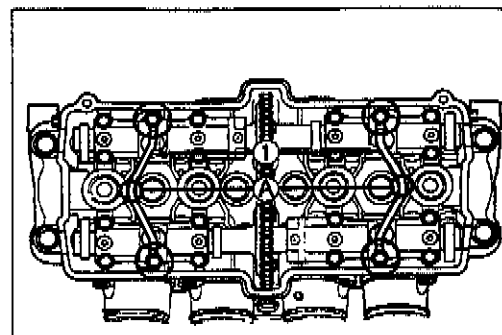
- Place the oil pipes ① to the camshaft journal holders as shown in the Fig.

NOTE:

Be sure to bring the white painted side (A) on the oil pipes to the top when installing them to the camshaft journal holders.

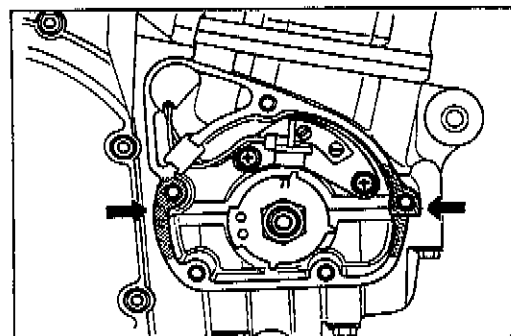
Tightening torque: 8–12 N·m

(0.8–1.2 kg-m, 6.0–8.5 lb-ft)



- Coat SUZUKI BOND NO. 1207B lightly to the mating surfaces between upper and lower crankcases as shown in the Fig.

99104-31140: SUZUKI BOND NO. 1207B



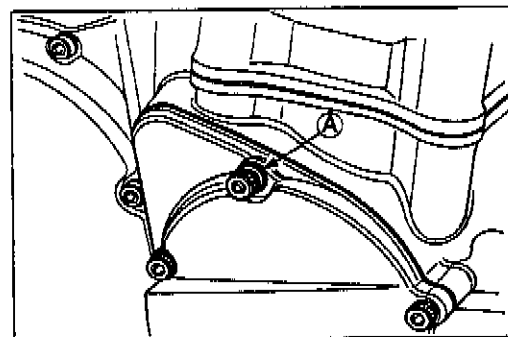
- Install a new gasket and the signal generator cover with five bolts.

NOTE:

Fit a gasket to the signal generator cover bolt (A) correctly as shown in the Fig.

CAUTION:

Use a new gasket to prevent oil leakage.



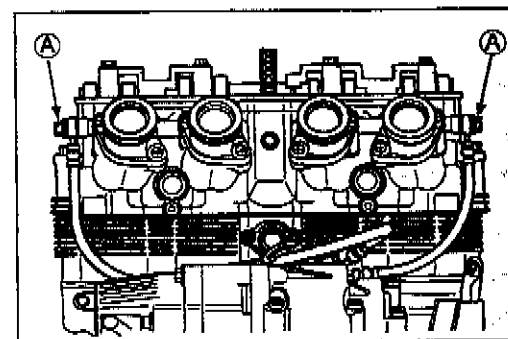
- Place the left and right oil hoses as shown in the Fig.

NOTE:

- * Install the new gaskets to both sides of the union bolt.
- * Be sure to bring the green painted side (1) on the oil hoses to the top when installing them. Refer to page 8-17.

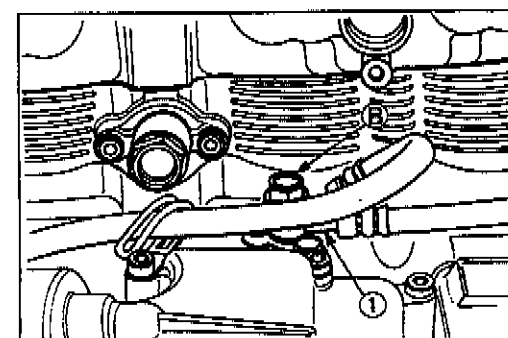
CAUTION:

Replace the gaskets with new ones to prevent oil leakage.



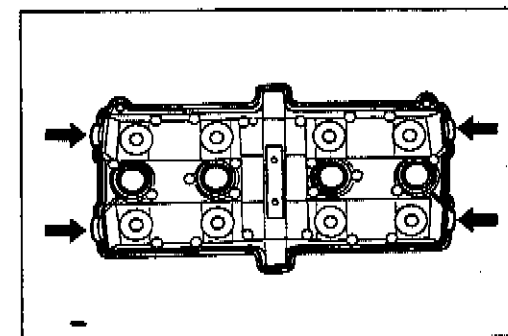
Tightening torque

- Upper side (A) : 20—23 N·m
(2.0—2.3 kg·m, 14.5—16.5 lb-ft)
- Lower side (B) : 25—29 N·m
(2.5—2.9 kg·m, 18.0—21.0 lb-ft)



- Before installing the cylinder head cover gaskets on the cylinder head cover, apply SUZUKI BOND NO. 1207B to the grooves of the head cover.
- Apply SUZUKI BOND NO. 1207B to the four cam end caps of the gasket and shown in the Fig.

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- Place the cylinder head cover on the cylinder head.
- Fit the eight gaskets to each head cover bolt.

NOTE:

Be sure to face the arrow mark on the cylinder head cover to the front side.

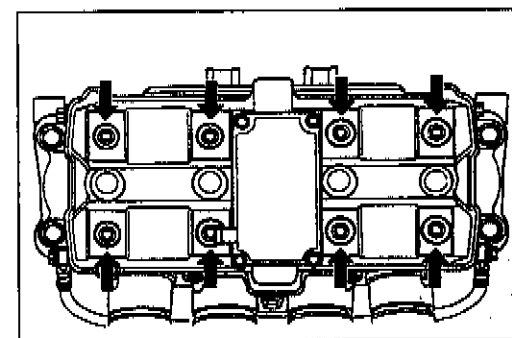
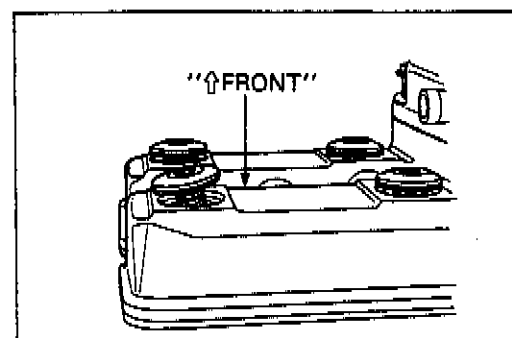
CAUTION:

Replace the gaskets with new ones to prevent oil leakage.

Tightening torque

Head cover bolt: 13–15 N·m

(1.3–1.5 kg-m, 9.5–11.0 lb-ft)



- Fit the new O-rings ① to the inlet and outlet water pipes.

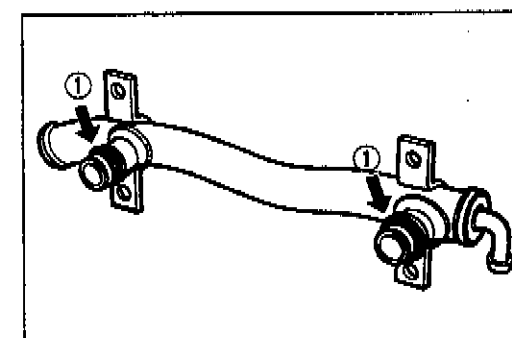
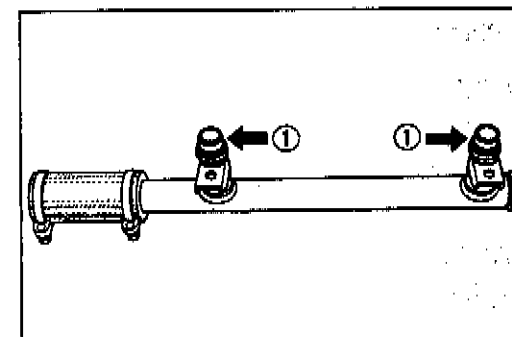
NOTE:

Before installing the water pipes to the cylinder block, apply engine oil lightly to each O-ring.

- Install the inlet and outlet water pipes to the cylinder block.

NOTE:

When installing the inlet water pipe ② to the cylinder block, apply a small quantity of the SUZUKI BOND NO. 1207B to the inlet water pipe mounting bolts ③.

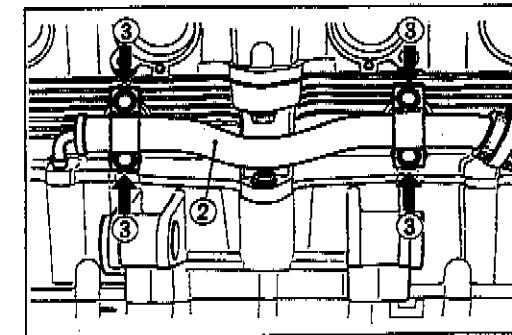
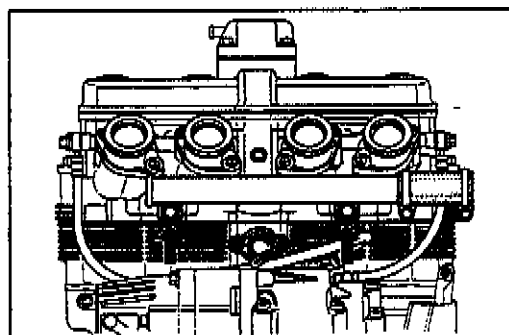
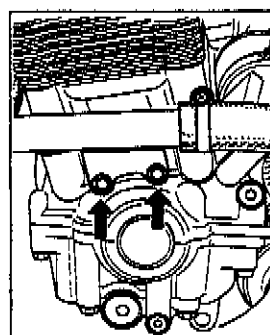


99104-31140: SUZUKI BOND NO. 1207B

- Tighten the water pipe mounting bolts to the specified torque.

Tightening torque: 8–12 N·m

(0.8–1.2 kg-m, 6.0–8.5 lb-ft)



NOTE:

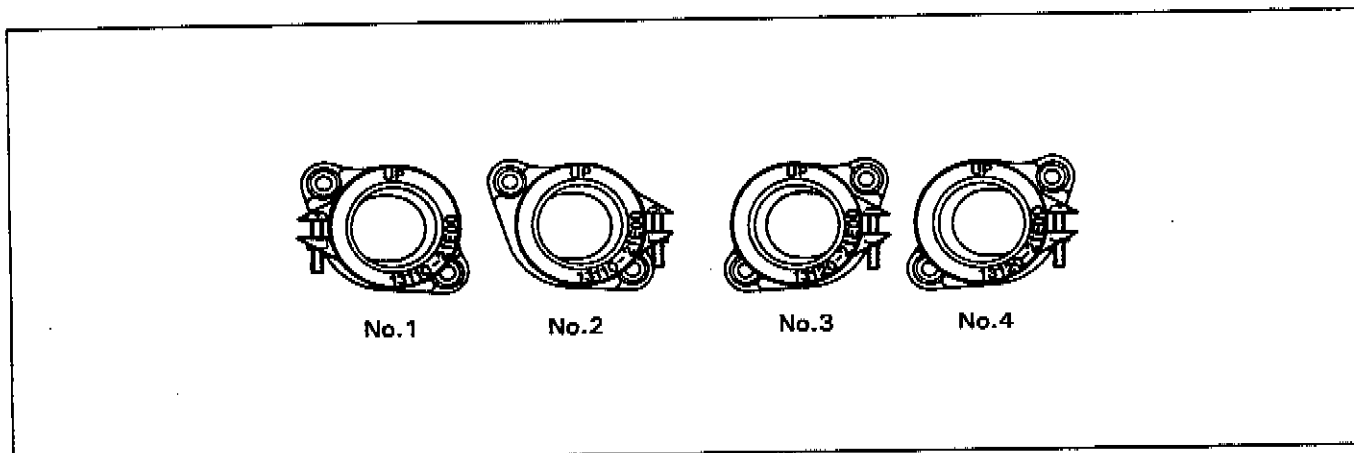
When replacing the intake pipes, identify the different intake pipes according to each I.D. code.

(13110-21E00 for No.1 cylinder)

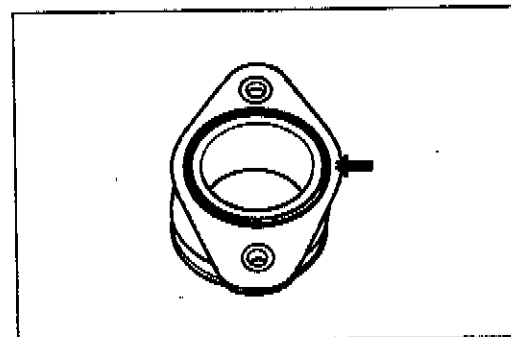
(13110-21E00 for No.2 cylinder)

(13120-21E00 for No.3 cylinder)

(13120-21E00 for No.4 cylinder)

**CAUTION:**

Use a new O-ring to prevent sucking air from the joint.

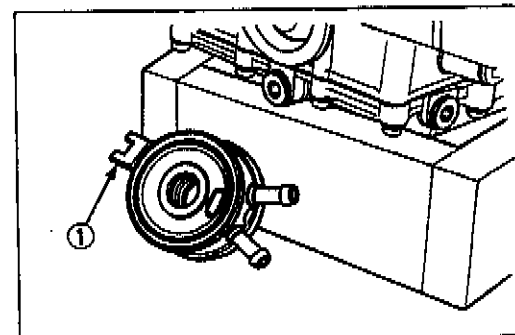


- Install the oil cooler and tighten its mounting bolt to the specified torque.

NOTE:

- * Before installing the oil cooler, apply engine oil lightly to its O-ring.
- * Set the lug ① of the oil cooler to the recess of the crankcase.

Tightening torque: 53–64 N·m
(5.3–6.4 kg·m, 38.5–46.5 lb·ft)



- Install the oil filter turning it by hand until you feel that the filter gasket contacts the mounting surface. Then tighten it 2 turns by using the special tool.

09915-40610: Oil filter wrench

NOTE:

Before installing the oil filter, apply engine oil lightly to its O-ring.

