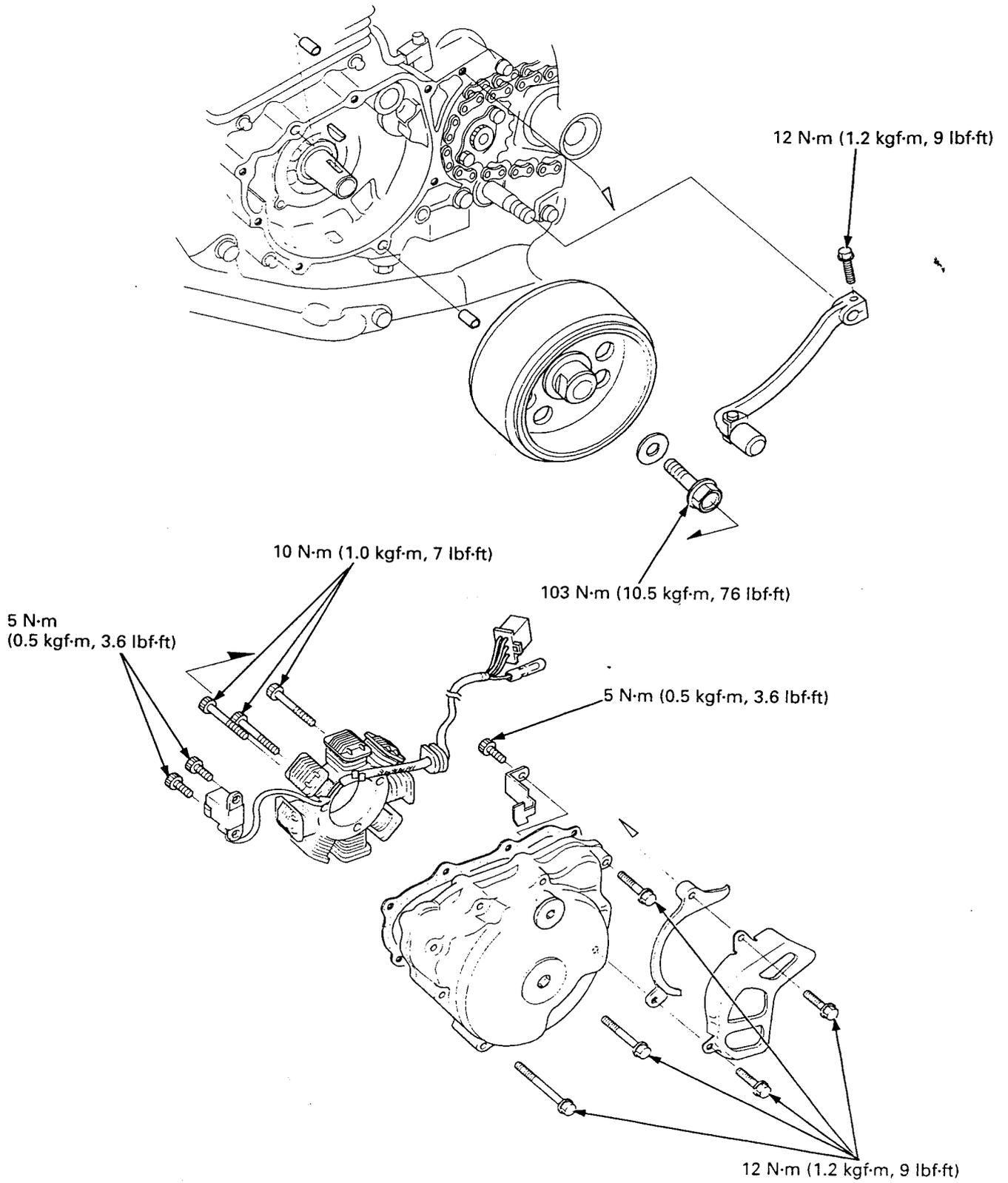

MEMO

ALTERNATOR



10. ALTERNATOR

SERVICE INFORMATION	10-1	FLYWHEEL INSTALLATION	10-3
LEFT CRANKCASE COVER REMOVAL	10-2	LEFT CRANKCASE COVER INSTALLATION	10-4
FLYWHEEL REMOVAL	10-3		

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the alternator. This service can be done with the engine installed in the frame.
- For alternator inspection, refer to section 16.

TORQUE VALUES

Left crankcase cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Flywheel bolt	103 N·m (10.5 kgf·m, 76 lbf·ft) Apply oil to the threads and flange surface.
Stator bolt	10 N·m (1.0 kgf·m, 7 lbf·ft) Apply a locking agent to the threads.
Ignition pulse generator bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft) Apply a locking agent to the threads.
Alternator wire clamp bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft) Apply a locking agent to the threads.
Drive sprocket cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Gearshift pedal bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

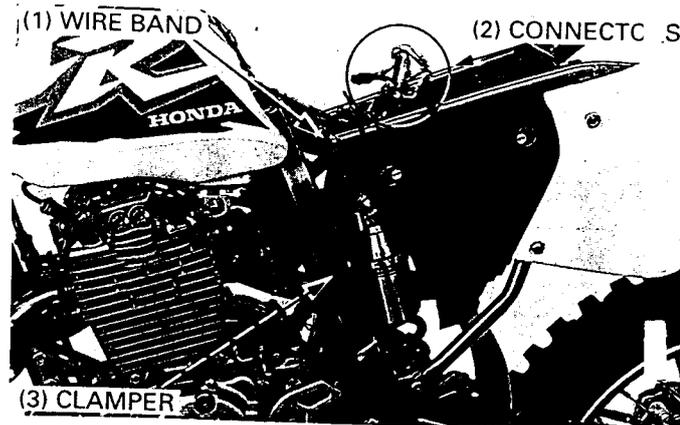
TOOLS

Common	
Flywheel holder	07725 - 0040000

ALTERNATOR

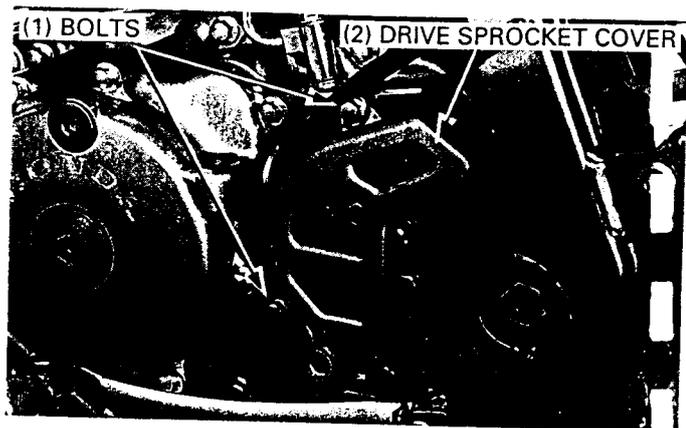
LEFT CRANKCASE COVER REMOVAL

Remove the seat (page 2-2).
Disconnect the alternator connectors and ignition pulse generator connector.
Remove the wire from the wire clamp and wire band.

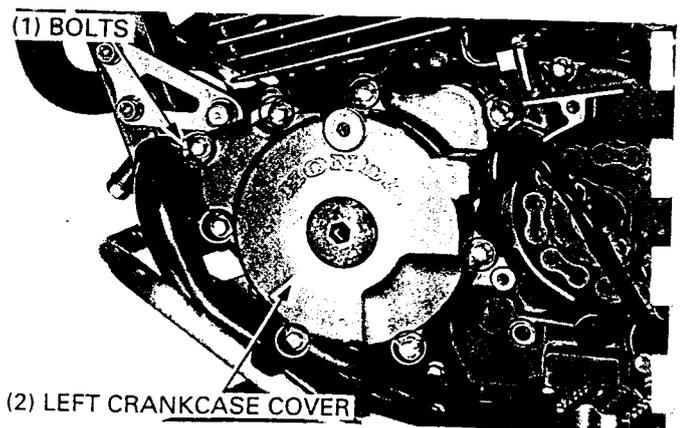


Remove the following:

- Gearshift pedal
- Drive sprocket cover
- Drive chain protector



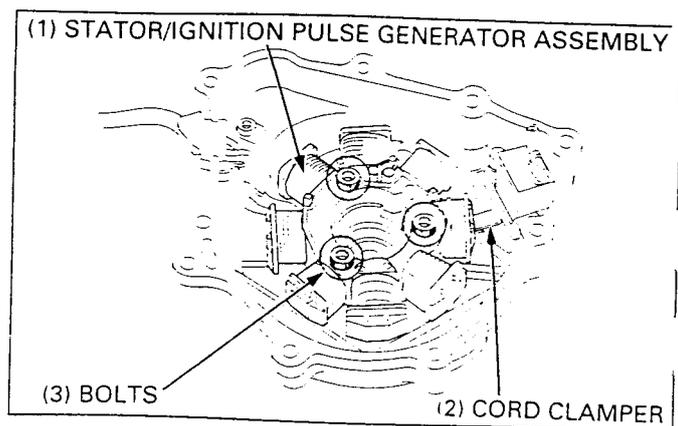
- Left crankcase cover bolts
- Left crankcase cover
- Dowel pins
- Gasket



STATOR/IGNITION PULSE GENERATOR REMOVAL

Remove the following:

- STATOR bolts
- Ignition pulse generator bolts
- Wire clamp
- STATOR/ignition pulse generator assembly

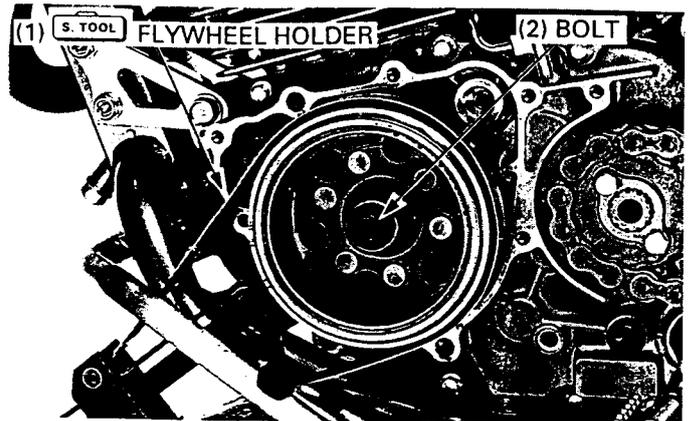


FLYWHEEL REMOVAL

Hold the flywheel with the flywheel holder.
Remove the flywheel bolt.

TOOL:

Flywheel holder 07725 - 0040000

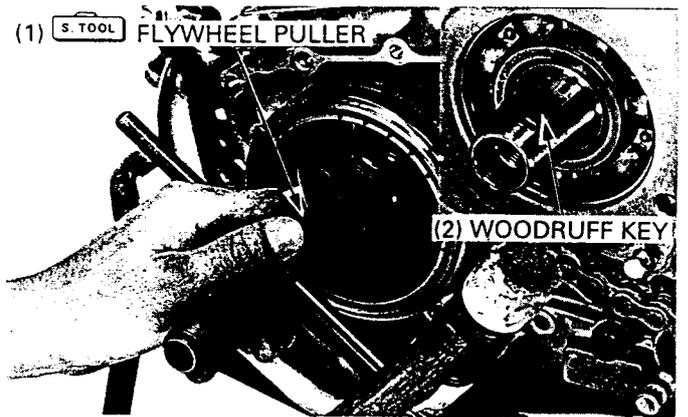


Remove the flywheel using the flywheel puller.

TOOL:

Flywheel puller 07733 - 0020001

Remove the woodruff key from the crankshaft.



FLYWHEEL INSTALLATION

Clean the crankshaft tapered area.
Install the woodruff key on the crankshaft.

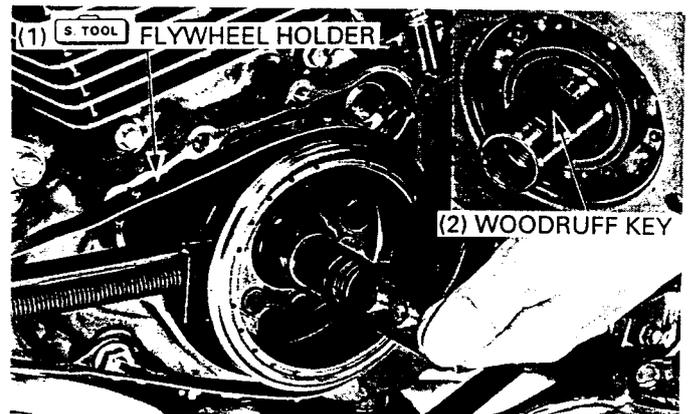
Install the flywheel by aligning the woodruff key on the crankshaft with the flywheel keyway.

Apply the engine oil to the flywheel bolt threads and seating surface.
Hold the flywheel with the flywheel holder and tighten the flywheel bolt.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

TOOL:

Flywheel holder 07725 - 0040000



ALTERNATOR

LEFT CRANKCASE COVER INSTALLATION

Apply locking agent to the bolt threads of the stator bolts, ignition pulse generator bolt and alternator wire clamp bolt.

Install the following to the left crankcase cover:

- Stator/ignition pulse generator assembly
- Wire clamp/bolt

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

- Ignition pulse generator bolts

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

- Stator bolts

TORQUE: 10 N·m (1.0 kgf·m, 7.2 lbf·ft)

- Grommet

Install the following to the left crankcase:

- Dowel pins
- New gasket

- Left crankcase cover
- Left crankcase cover bolts

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

NOTE

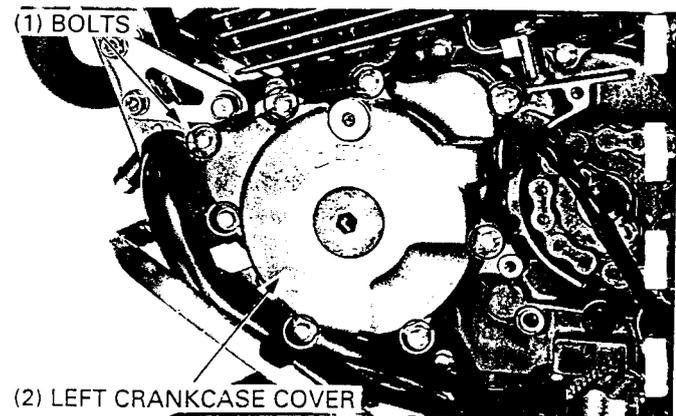
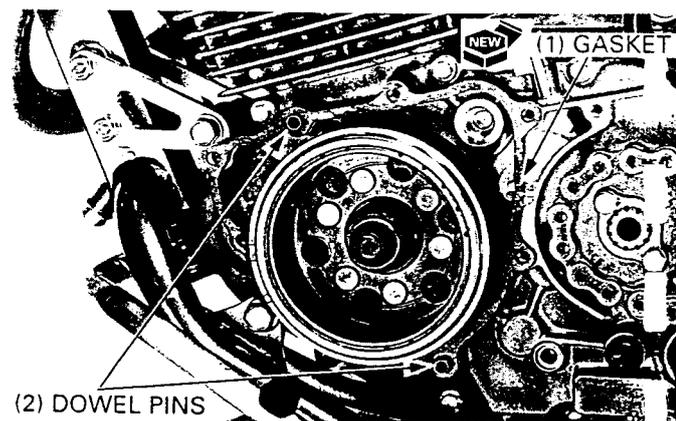
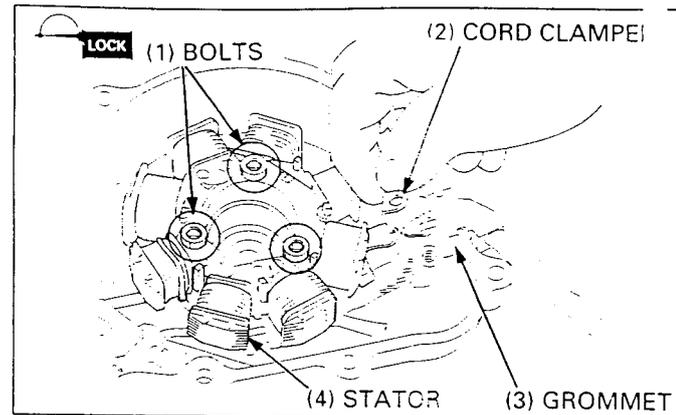
- Tighten the bolts in a crisscross pattern in 2-3 steps.

- Drive chain protector
- Drive sprocket cover
- Drive sprocket cover bolts

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

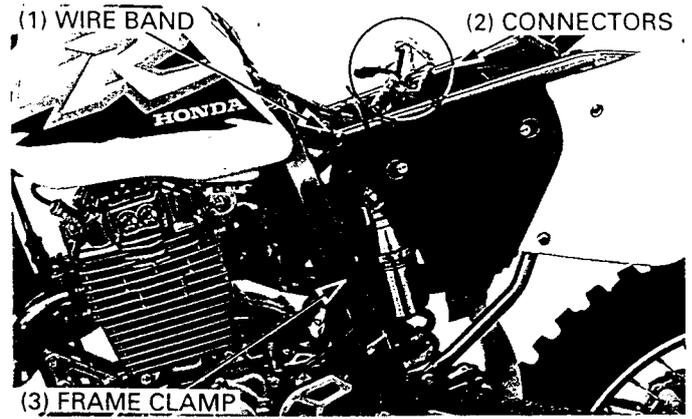
- Gearshift pedal
- Gearshift pedal bolt

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

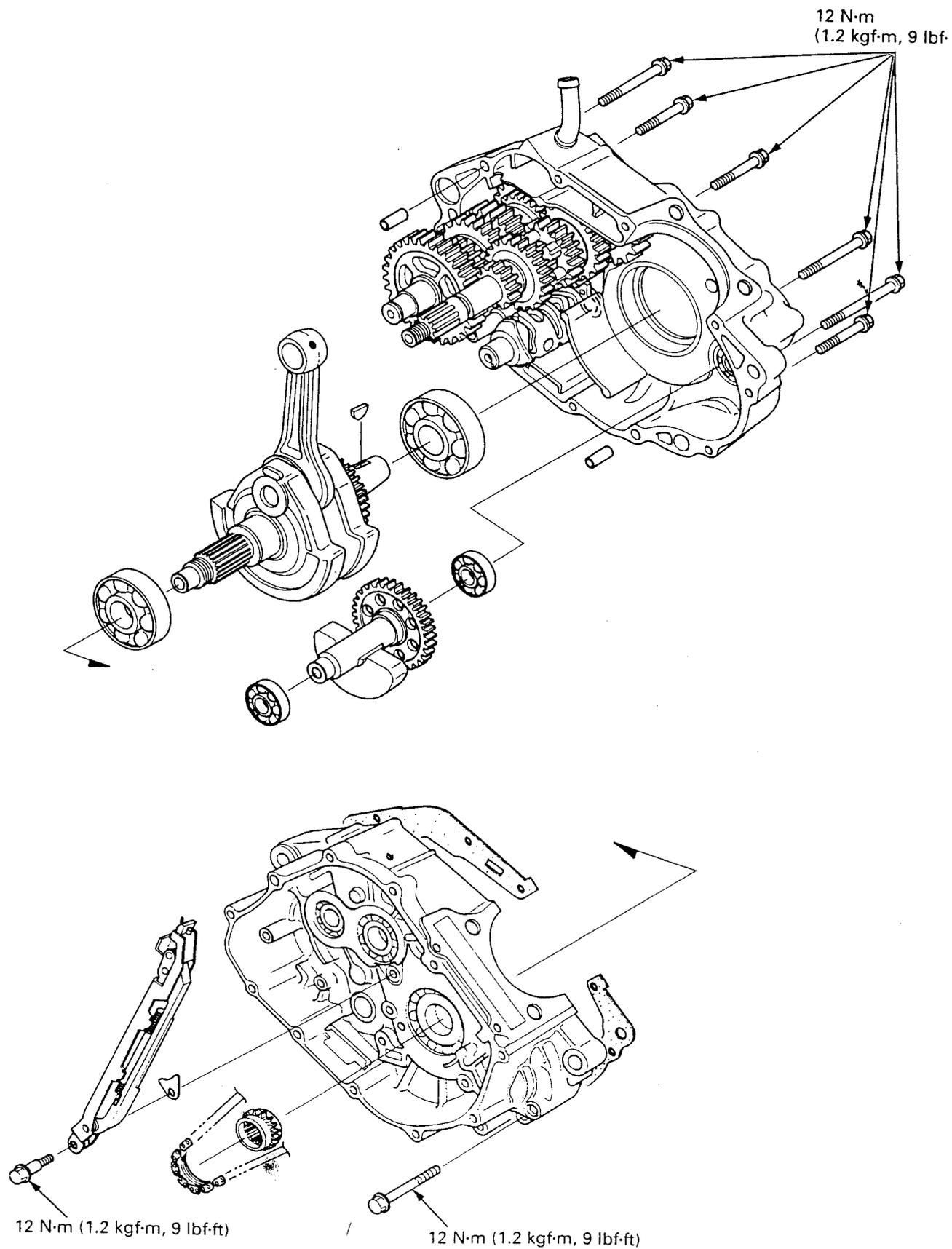


ALTERNATOR

Connect the alternator connectors and ignition pulse generator connector.
Secure the wire with the frame clamp and wire band.



CRANKCASE/CRANKSHAFT/BALANCER



11. CRANKCASE/CRANKSHAFT/BALANCER

SERVICE INFORMATION	11-1	CRANKCASE BEARING REPLACEMENT	11-6
TROUBLESHOOTING	11-2	BALANCER/CRANKSHAFT INSTALLATION	11-9
CRANKCASE SEPARATION	11-3	CRANKCASE ASSEMBLY	11-11
BALANCER/CRANKSHAFT REMOVAL	11-4		

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to repair the crankshaft, connecting rod, transmission and balancer.
- Remove the following parts before separating the crankcase.
 - ENGINE REMOVAL Section 6
 - CYLINDER HEAD Section 7
 - CYLINDER/PISTON Section 8
 - CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE Section 9
 - OIL PUMP Section 4
 - ALTERNATOR Section 10

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankshaft, Connecting rod	Connecting rod big end side clearance	0.050 – 0.500 (0.0019 – 0.0197)	0.80 (0.031)
	Crankshaft runout	—	0.05 (0.002)

TORQUE VALUES

- Crankcase bolt 12 N·m (1.2 kgf·m, 9 lbf·ft)
 Cam chain tensioner bolt 12 N·m (1.2 kgf·m, 9 lbf·ft) Apply a locking agent to the threads.

CRANKCASE/CRANKSHAFT/BALANCER

TOOLS

Special

Bearing remover head, 13 mm	07LMC - KZ10100
Bearing remover set, 15 mm	07936 - KC10000
— remover head, 15 mm	07936 - KC10200
— remover shaft, 15 mm	07936 - KC10100
— remover weight	07741 - 0010201
Bearing remover shaft	07936 - 1660120
Bearing remover weight	07741 - 0010201
Crankcase assembly tool	07965 - VM00000
— assembly collar	07965 - VM00100
— assembly shaft	07965 - VM00200
— thread adapter	07965 - VM00300

Common

Attachment, 32 x 35 mm	07746 - 0010100
Attachment, 37 x 40 mm	07746 - 0010200
Attachment, 42 x 47 mm	07746 - 0010300
Attachment, 52 x 55 mm	07746 - 0010400
Attachment, 72 x 75 mm	07746 - 0010600
Driver	07749 - 0010000
Pilot, 15 mm	07746 - 0040300
Pilot, 17 mm	07746 - 0040400
Pilot, 20 mm	07746 - 0040500
Pilot, 22 mm	07746 - 0041000
Pilot, 28 mm	07746 - 0041100
Universal bearing puller	07631 - 0010000

TROUBLESHOOTING

Excessive noise

- Crankshaft
 - Worn connecting rod bearings
 - Bent connecting rod
 - Worn crankshaft bearings

- Balancer
 - Improper installation

Abnormal vibration

- Improper balancer timing

CRANKCASE/CRANKSHAFT/BALANCER

CRANKCASE SEPARATION

Remove the engine from the frame (page 6-3).
Remove the following from the engine.

- Cylinder head (page 7-7)
- Cylinder (page 8-3)
- Piston (page 8-4)
- Alternator (page 10-2)
- Clutch (page 9-5)
- Kickstarter (page 9-12)
- Oil pump (page 4-3)
- Gearshift cam (page 9-16)
- Primary drive gear (page 9-8)

Remove the cam chain tensioner bolt.
Remove the cam chain tensioner and bearing set plate.
Remove the cam chain and cam chain drive sprocket.

Remove the right crankcase bolt.

Remove the left crankcase bolts.

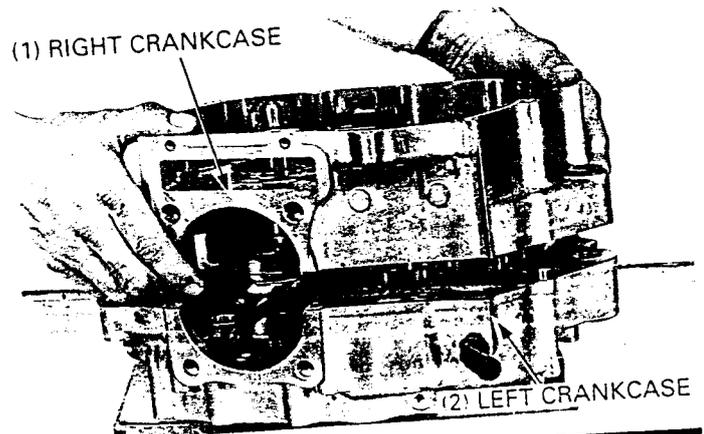
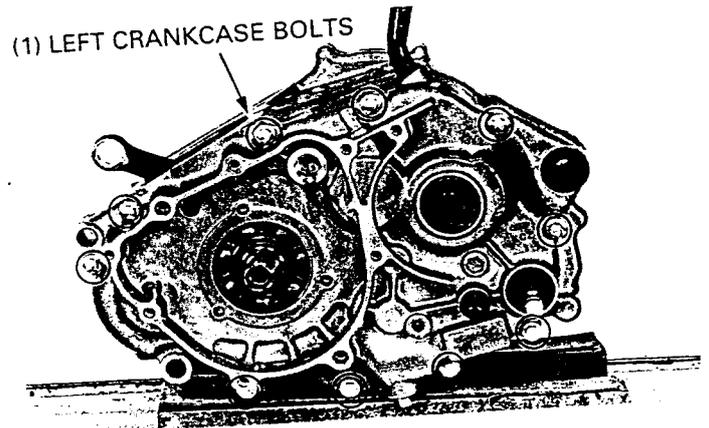
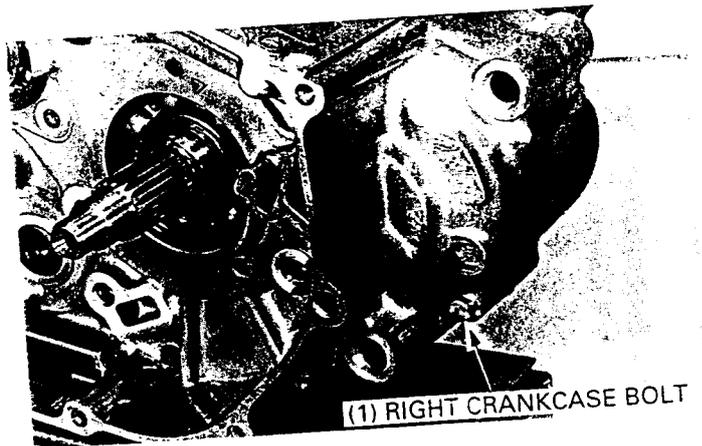
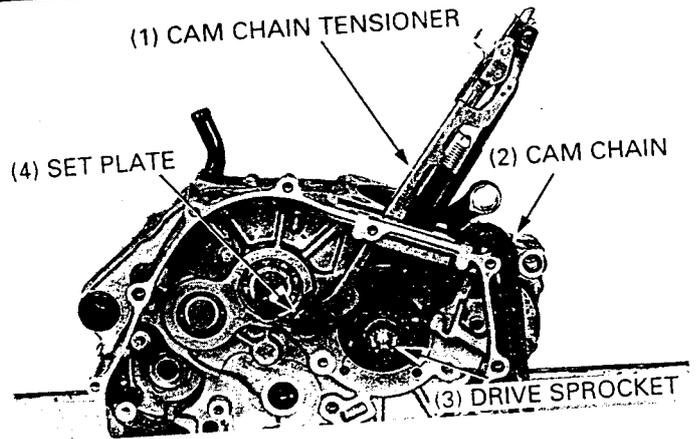
NOTE

- Loosen the bolts in a crisscross pattern in 2-3 steps.

Place the left crankcase side down and separate the right crankcase from the left crankcase while tapping them at several locations with a soft hammer.

CAUTION

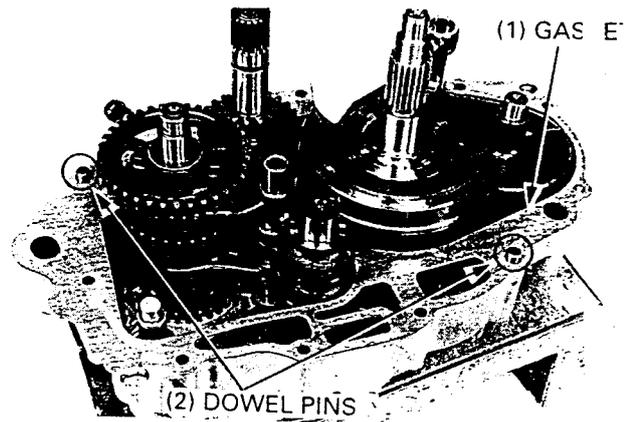
- Do not pry the left and right crankcase apart.



CRANKCASE/CRANKSHAFT/BALANCER

BALANCER/CRANKSHAFT REMOVAL

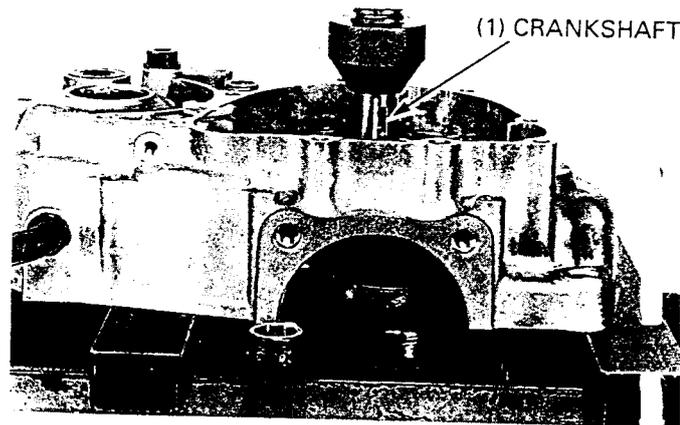
Remove the gasket and dowel pins.
Remove the transmission (page 12-3).



Remove the crankshaft and balancer from the left crankcase with a press.

CAUTION

- *Be careful not to damage the crankcase gasket surface.*



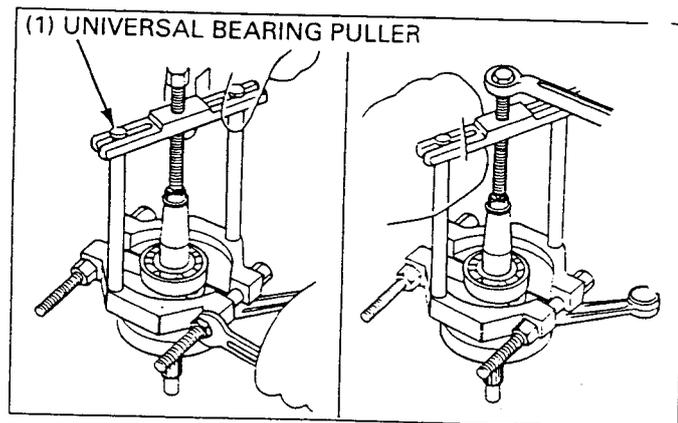
Remove the left crankshaft bearing with a bearing puller if it comes out with the crankshaft. Discard the bearing.

TOOL:

Universal bearing puller 07631 - 001000

CAUTION

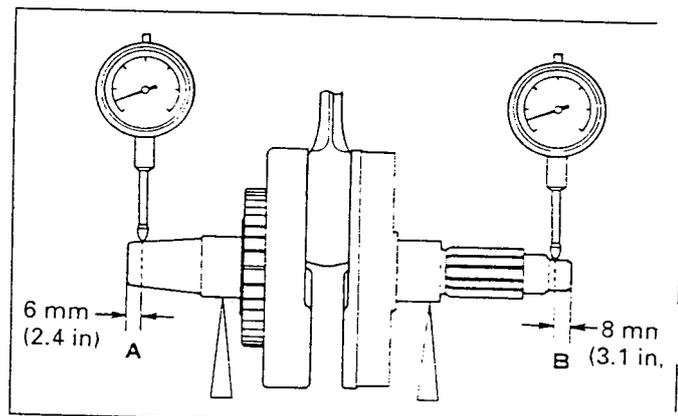
- *Always replace the left bearing with a new one if it comes out with the crankshaft.*



CRANKSHAFT INSPECTION

Set the crankshaft on a turning stand or V blocks and measure the runout using a dial indicator.

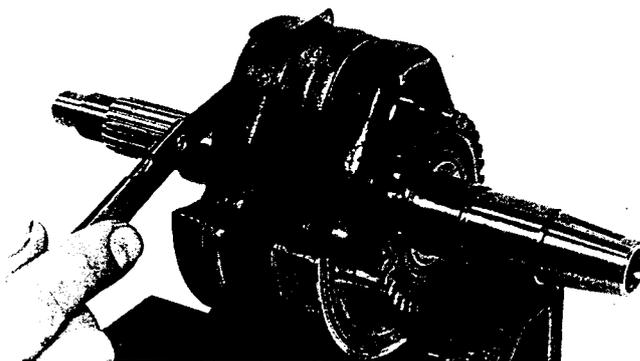
SERVICE LIMIT: 0.05 mm (0.002 in)



CRANKCASE/CRANKSHAFT/BALANCER

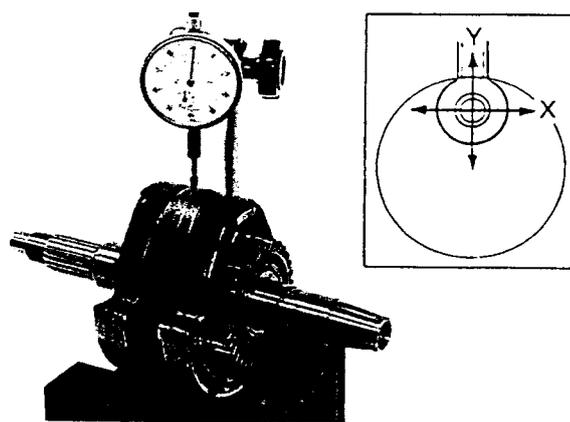
Measure the connecting rod big end side clearance with a feeler gauge.

SERVICE LIMIT: 0.08 mm (0.031 in)



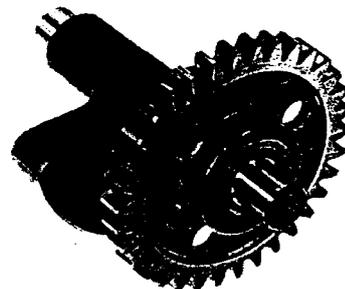
Measure the connecting rod big end radial clearance.

SERVICE LIMIT: 0.05 mm (0.002 in)



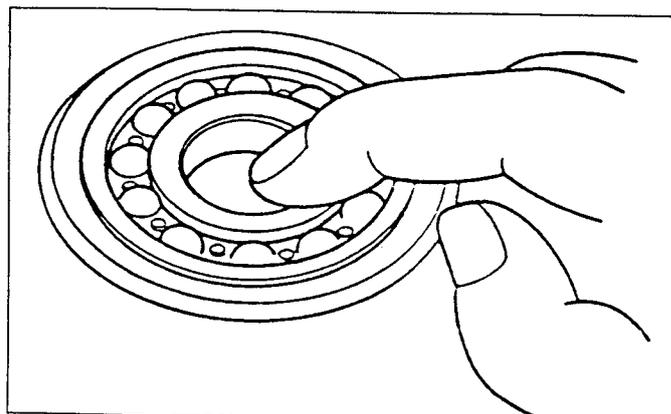
BALANCER GEAR INSPECTION

Check the balancer gear for wear or damage.



CRANKSHAFT BEARING/TRANSMISSION BEARING INSPECTION

Turn the inner race of bearings with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the crank-case.



CRANKCASE/CRANKSHAFT/BALANCER

CRANKCASE BEARING REPLACEMENT

CRANKSHAFT BEARING REPLACEMENT

Remove the crankshaft bearing from the right crankcase.

Remove the left crankshaft bearing if it is left in the crankcase.

Drive new crankshaft bearings into both cases using the special tools.

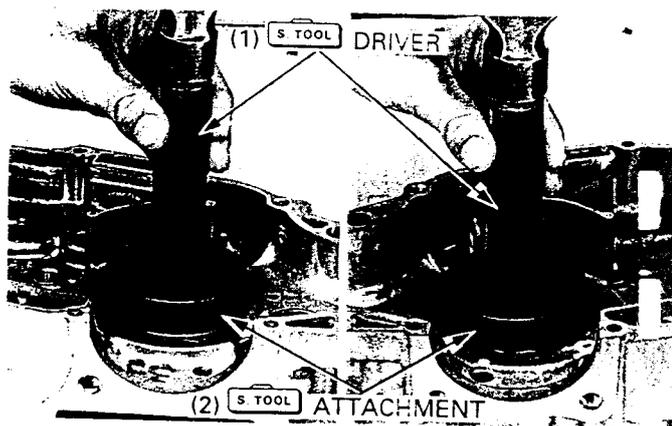
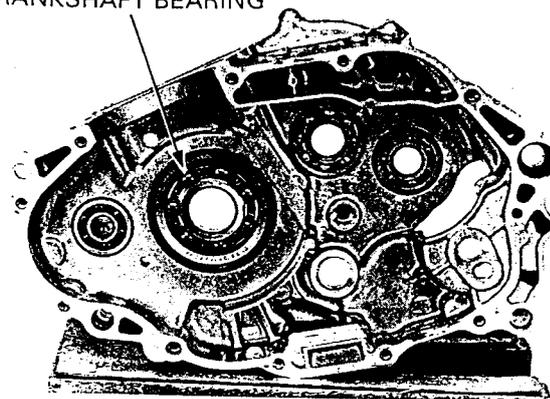
TOOL:

Attachment, 72 x 75 mm	07746 - 0010600
Driver	07749 - 0010000
Pilot, 28 mm	07746 - 0041100

NOTE

- Install the bearings with the seal side facing toward the outside of the crankcase.

(1) CRANKSHAFT BEARING



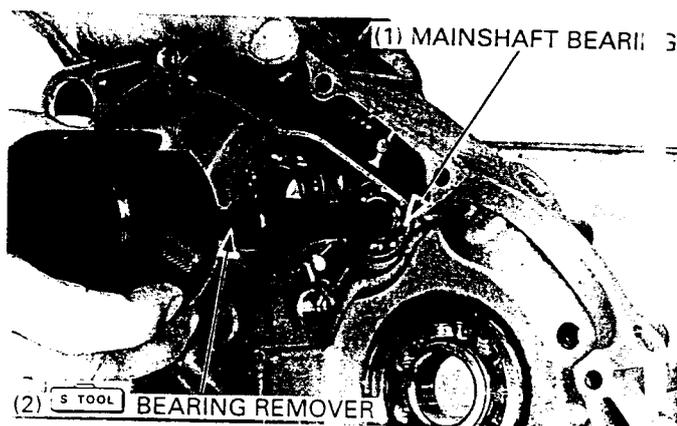
TRANSMISSION BEARING REPLACEMENT

Left crankcase bearings

Remove the left mainshaft bearing using the special tools.

TOOL:

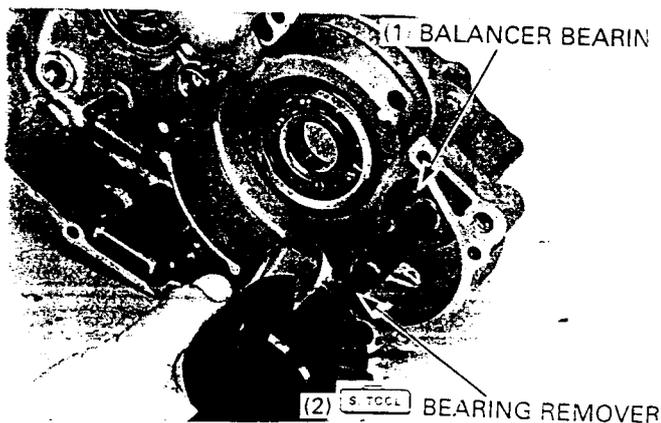
Bearing remover set, 15 mm	07936 - KC10000
— remover head, 15 mm	07936 - KC10200
— remover shaft, 15 mm	07936 - KC10100
— remover weight	07741 - 0010201



Remove the balancer bearing.

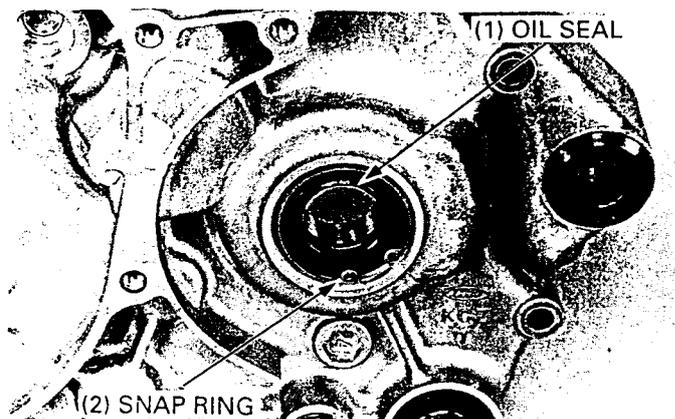
TOOL:

Bearing remover head, 13 mm	07LMC - KZ10100
Bearing remover shaft	07936 - 1660120
Bearing remover weight	07741 - 0010201



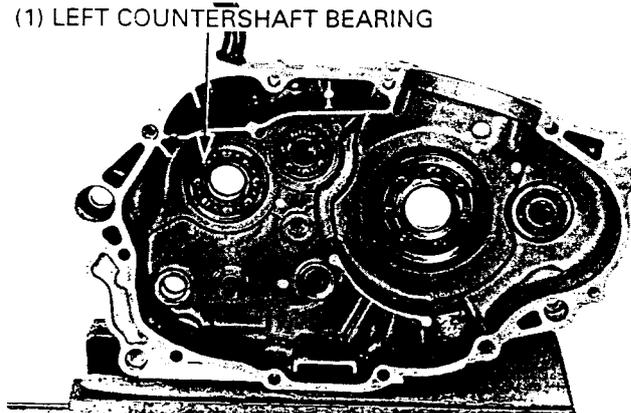
CRANKCASE/CRANKSHAFT/BALANCER

Remove the snap ring.
Remove the countershaft oil seal.



Remove the left countershaft bearing.

(1) LEFT COUNTERSHAFT BEARING



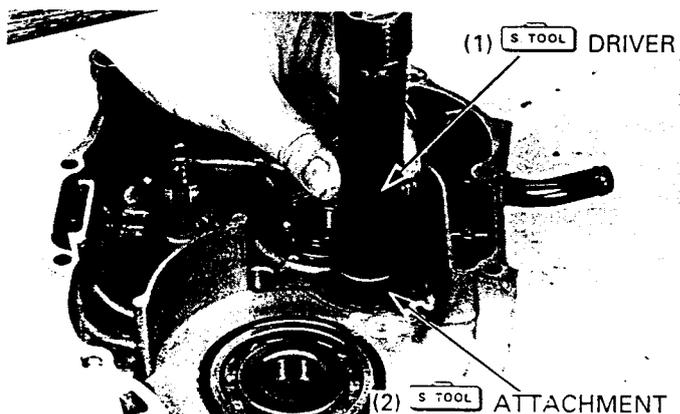
Install a new left main shaft bearing.

NOTE

- Install the bearing with the seal side facing toward the outside of the crankcase.

TOOL:

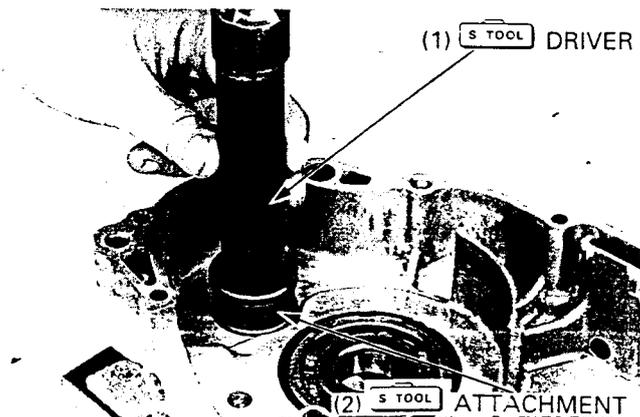
Attachment, 32 x 35 mm	07746 - 0010100
Driver	07749 - 0010000
Pilot, 15 mm	07746 - 0040300



Install a new left balancer shaft bearing.

TOOL:

Attachment, 37 x 40 mm	07746 - 0010200
Driver	07749 - 0010000



CRANKCASE/CRANKSHAFT/BALANCER

Install a new countershaft bearing.

TOOL:

Attachment, 52 x 55 mm

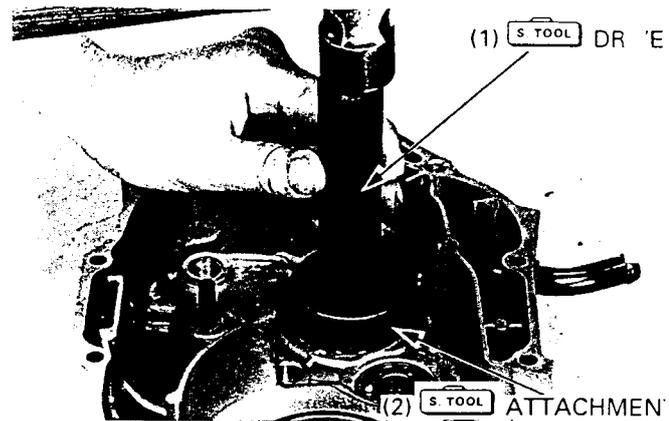
Driver

Pilot, 22 mm

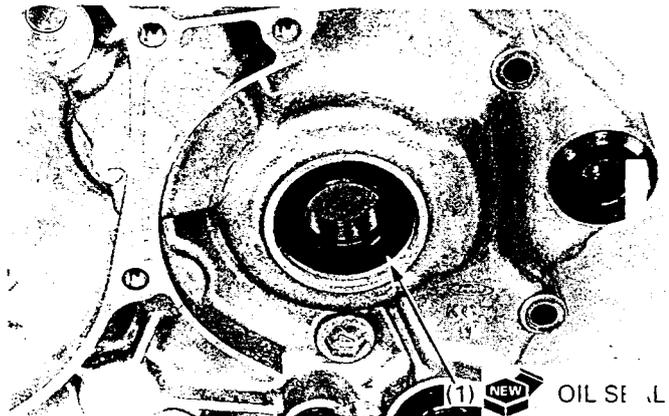
07746 - 0010400

07749 - 0010000

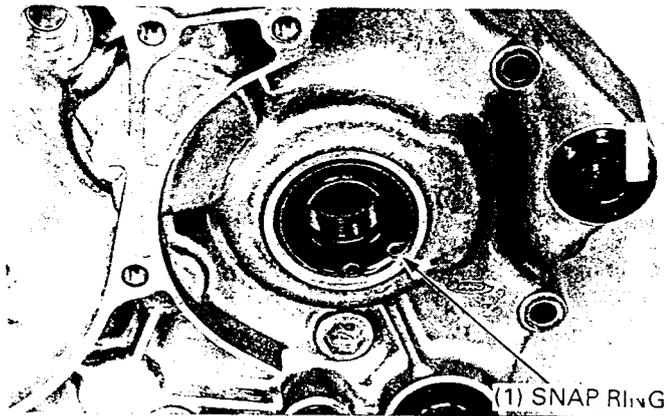
07746 - 0041000



Install a new left countershaft oil seal.



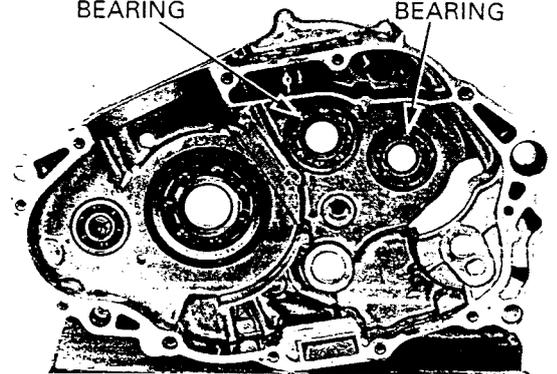
Install the snap ring.



Right crankcase bearings

Remove the countershaft bearing and mainshaft bearing.

(1) MAINSHAFT BEARING (2) COUNTERSHAFT BEARING

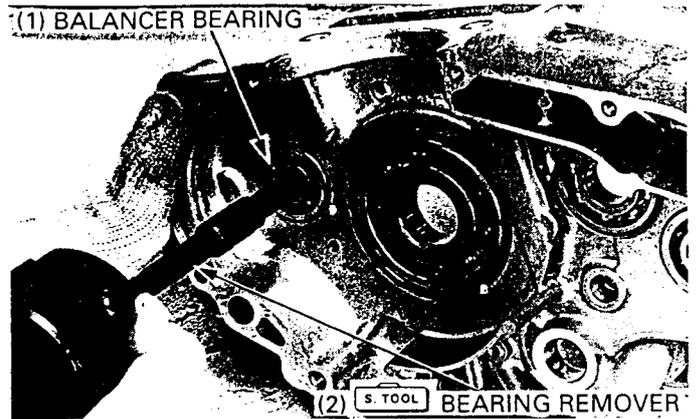


CRANKCASE/CRANKSHAFT/BALANCER

Remove the balancer bearing.

TOOL:

Bearing remover head, 13 mm	07LMC - KZ10100
Bearing remover shaft	07936 - 1660120
Bearing remover weight	07741 - 0010201



Install a new right countershaft bearing.

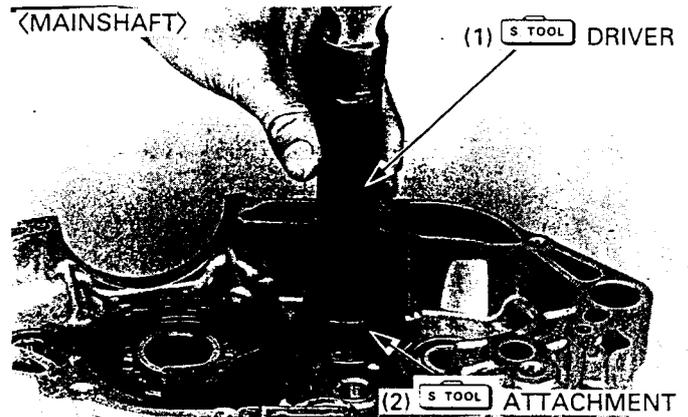
TOOL:

Attachment, 42 x 47 mm	07746 - 0010300
Driver	07749 - 0010000
Pilot, 17 mm	07746 - 0040400

Install a new right mainshaft bearing.

TOOL:

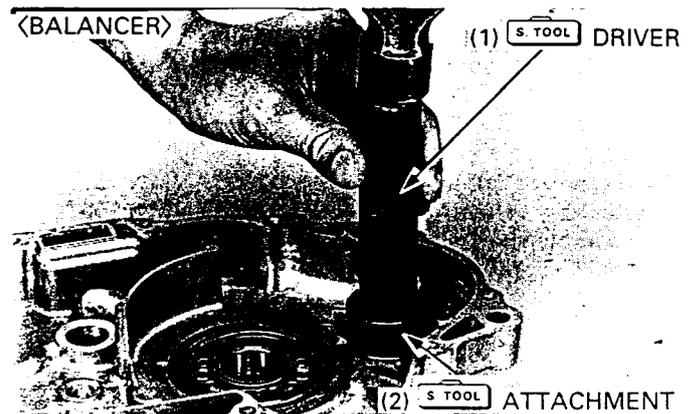
Attachment, 42 x 47 mm	07746 - 0010300
Driver	07749 - 0010000
Pilot, 20 mm	07746 - 0040500



Install a new left balancer bearing.

TOOL:

Attachment, 37 x 40 mm	07746 - 0010200
Driver	07749 - 0010000

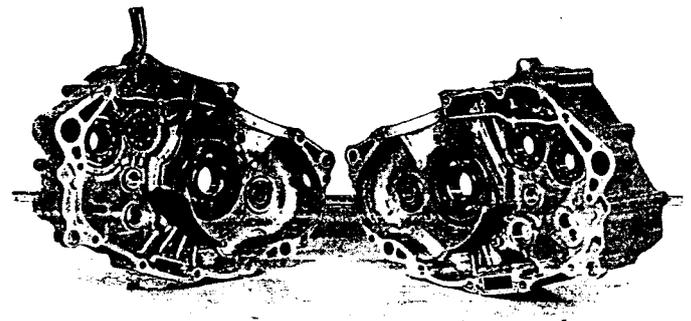


BALANCER/CRANKSHAFT INSTALLATION

Clean the crankcase mating surfaces before assembling and check for wear or damage.

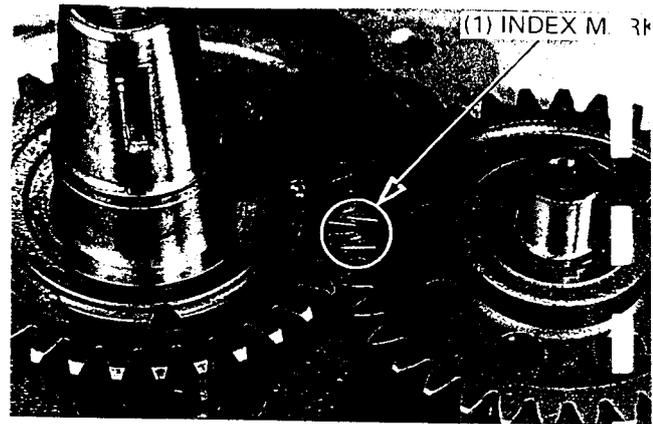
NOTE

- If there is minor roughness or irregularities on the crankcase mating surfaces, dress them with an oil stone.
- After cleaning, lubricate the crankshaft bearings, balancer bearings and connecting rod big end with clean engine oil.



CRANKCASE/CRANKSHAFT/BALANCER

Align the index mark on the crankshaft gear with the index marks on the balancer gear as shown.
Temporarily install the crankshaft with the balancer into the right crankcase.

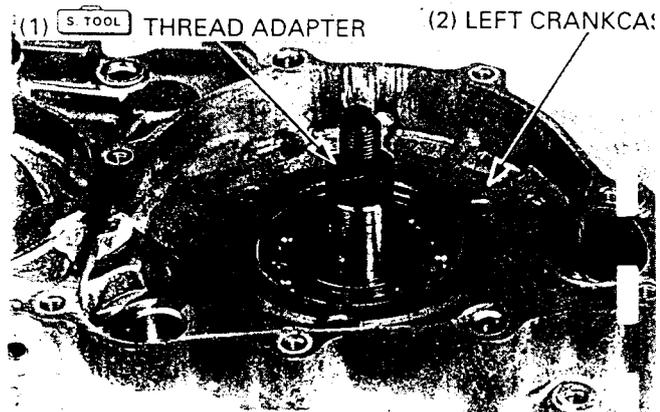


Place the left crankcase onto the right crankcase and install the thread adapter onto the crankshaft.

TOOL:

Thread adapter

07965 - VM00300



Temporarily assemble the crankcase halves using the crankcase assembly tool to draw the crankshaft into the left crankcase.

TOOL:

Crankcase assembly tool

— assembly collar

— assembly shaft

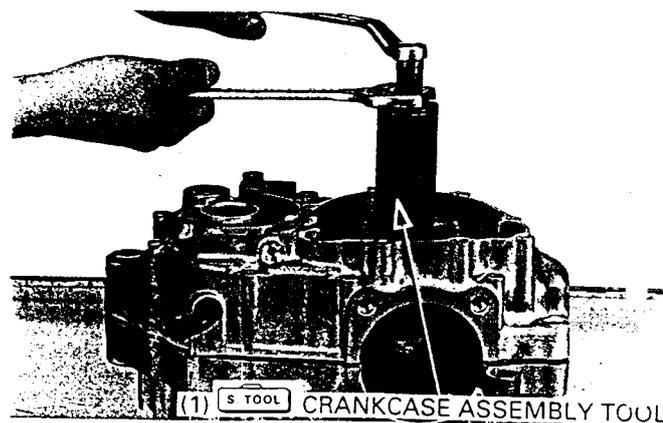
— thread adapter

07965 - VM00000

07965 - VM00100

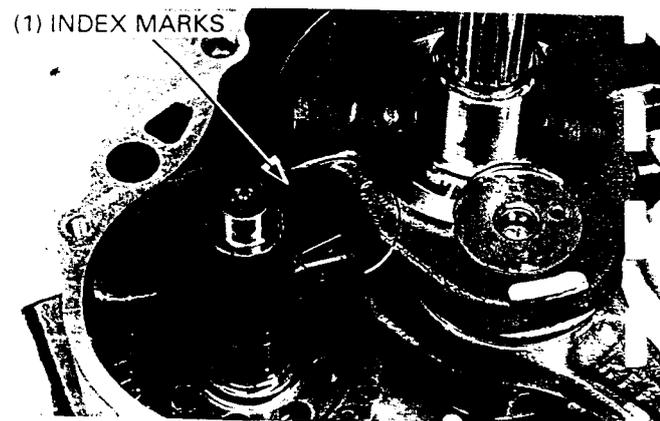
07965 - VM00200

07965 - VM00300



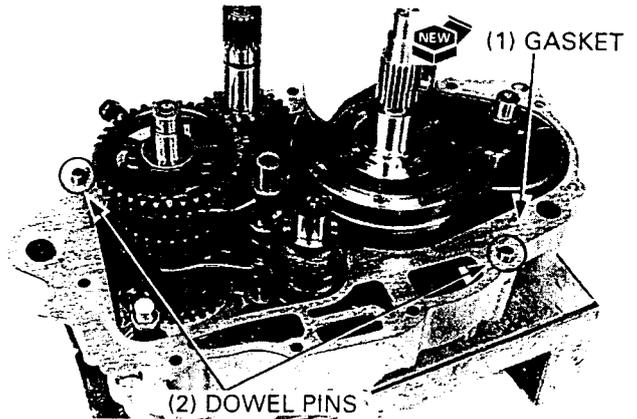
Remove the tool and attachment.
Remove the right crankcase.

Make sure that the line on the crankshaft weight is aligned with the balancer shaft weight line.



CRANKCASE ASSEMBLY

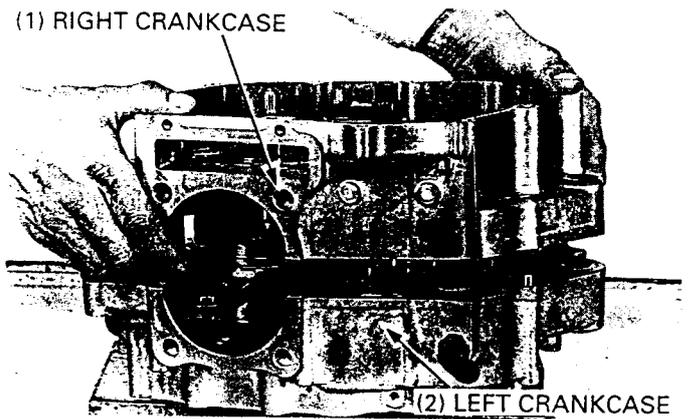
Install the transmission (page 12-6).
Install the dowel pins and new gasket.



Assemble the right and left crankcase being careful to align the dowel pins and shafts.

CAUTION

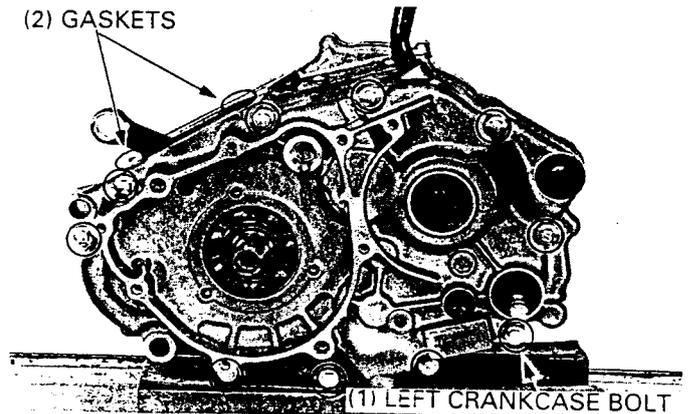
- *Do not force the crankcase halves together; if there is excessive force required, something is wrong. Remove the right crankcase and check for misaligned parts.*



Install and tighten the left crankcase bolts in a crisscross pattern in 2-3 steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

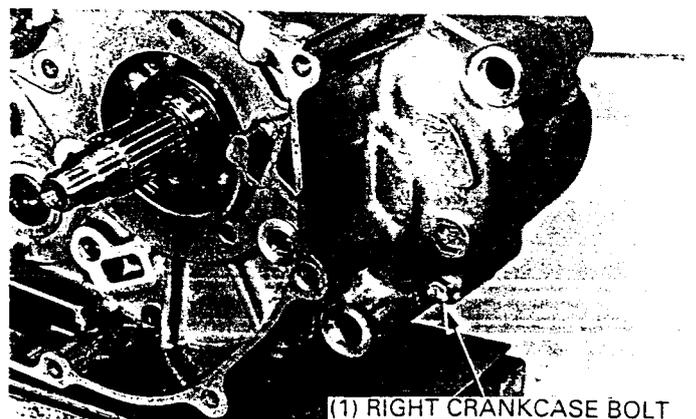
Cut the gaskets along the cylinder mating surfaces.



Install and tighten the right crankcase bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

After installation, check the rotation of the crankshaft, mainshaft and countershaft.

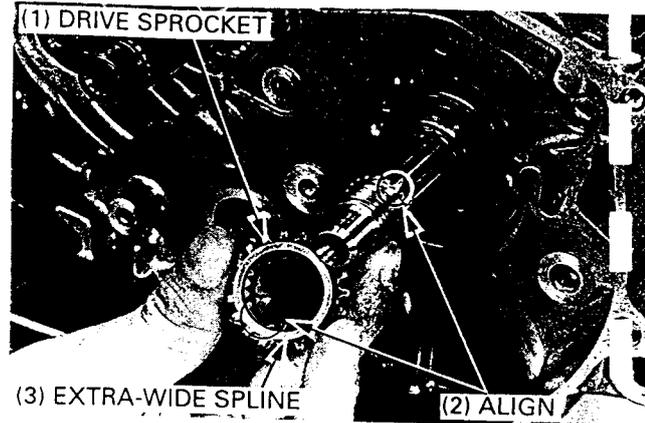


CRANKCASE/CRANKSHAFT/BALANCER

Install the cam chain drive sprocket.

NOTE

- The cam chain drive sprocket goes on only one way because of an extra-wide aligning spline.



Install the bearing set plate and cam chain tensioner. Apply thread lock to the cam chain tensioner set plate bolt. Install and tighten the cam chain tensioner set plate bolt.

TORQUE: 12 N-m (1.2 kgf-m, 9 lbf-ft)

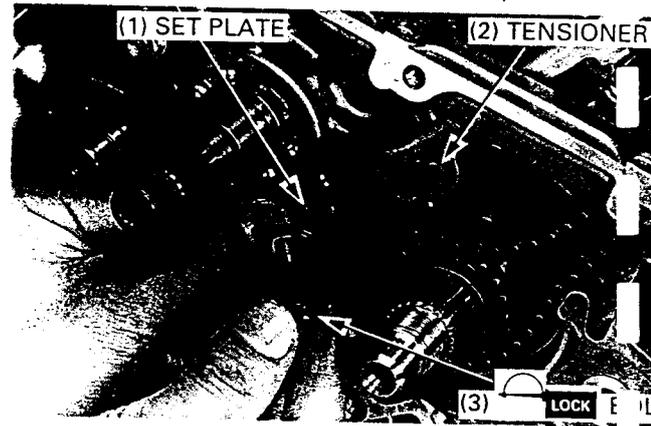
Install and tighten the cam chain tensioner bolt. Install the cam chain to the cam chain drive sprocket. Install the following:

- Piston (page 8-6)
- Cylinder (page 8-7)
- Cylinder head (page 7-15)

Install the engine into the frame (page 6-5).

Reinstall the following:

- Primary drive gear (page 9-9)
- Gearshift cam (page 9-17)
- Oil pump (page 4-7)
- Kickstarter (page 9-14)
- Clutch (page 9-10)
- Alternator (page 10-4)



MEMO

TRANSMISSION

