Crankshaft/Transmission

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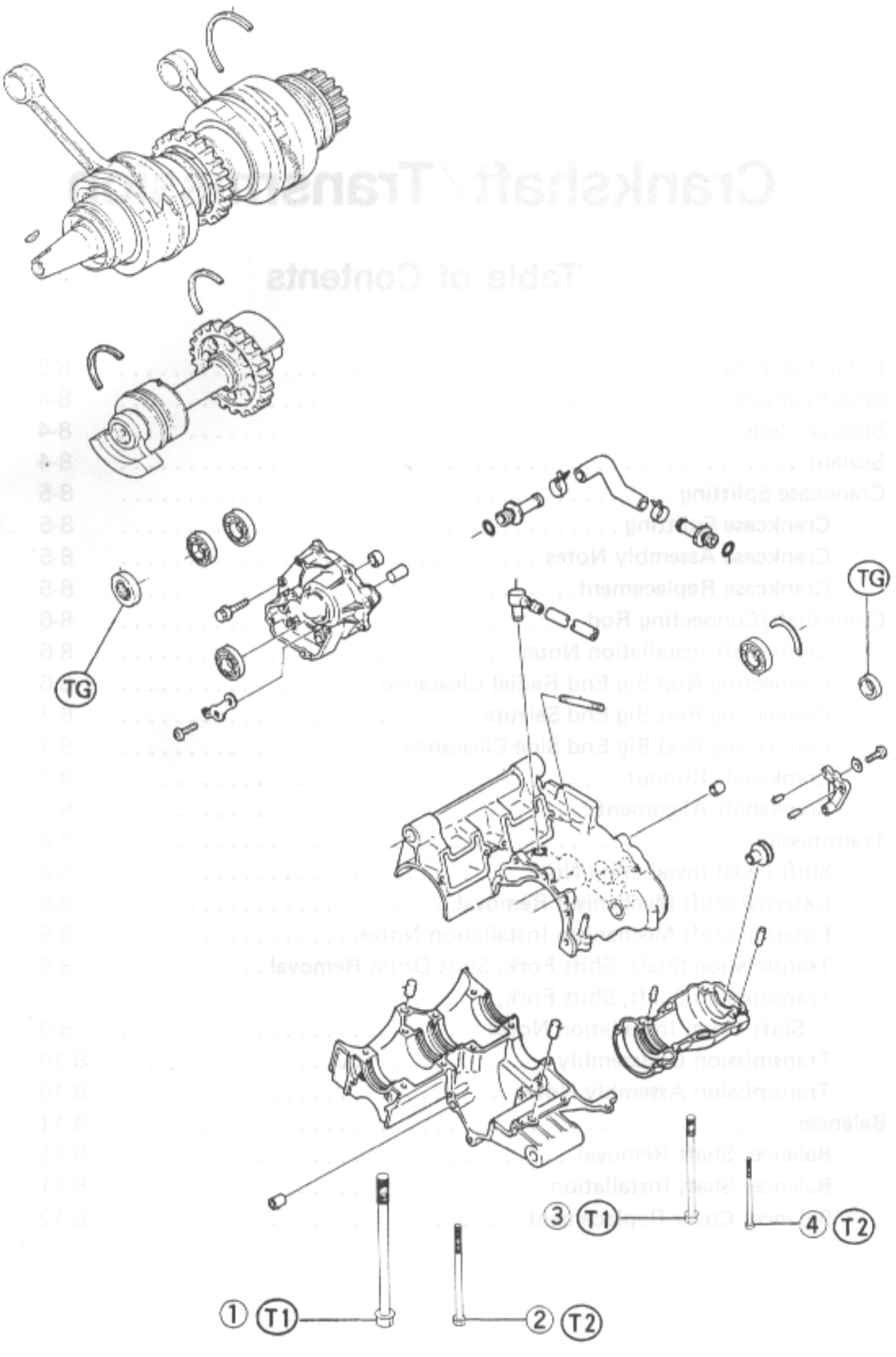
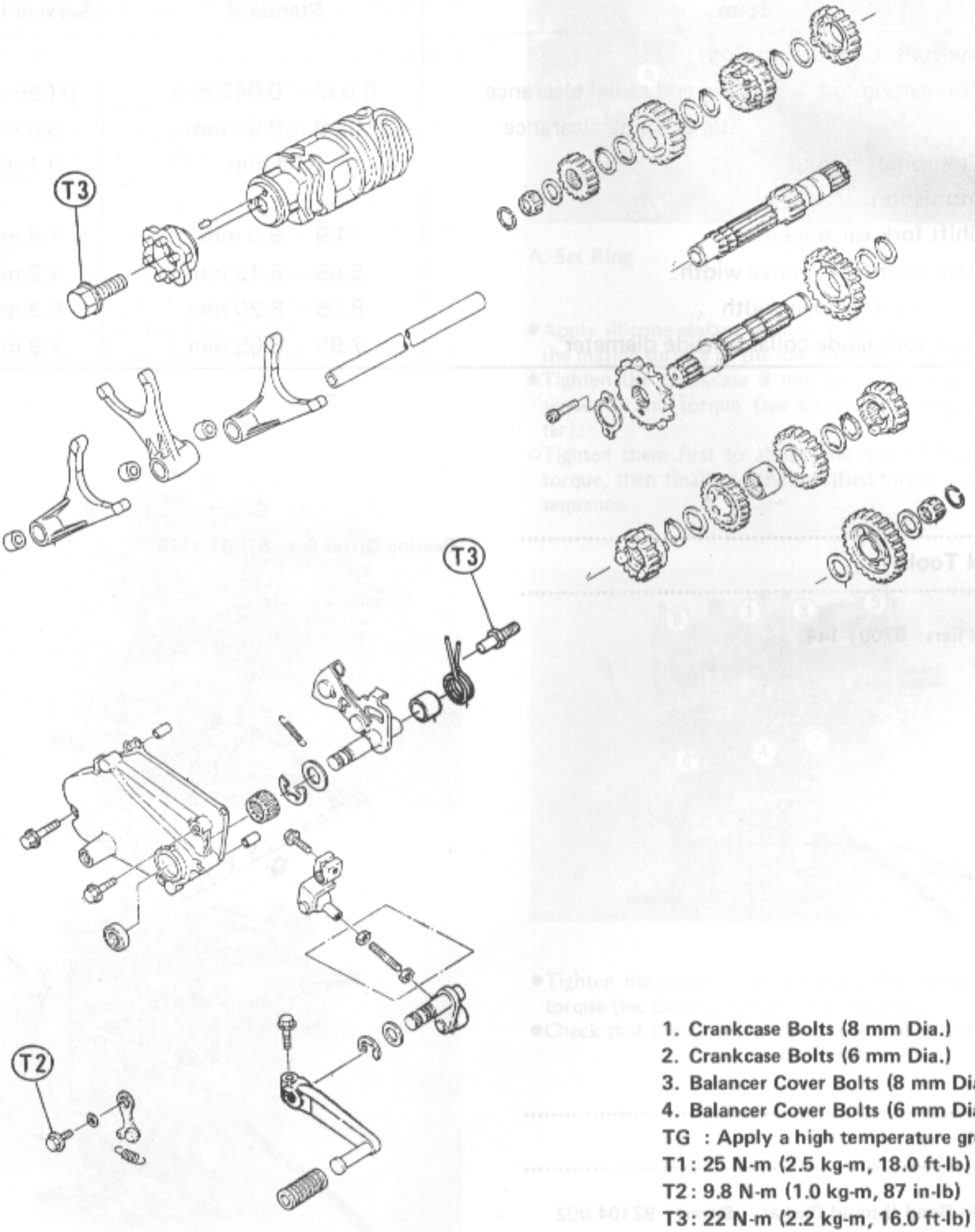
Exploded View





1. Crankcase Bolts (8 mm Dia.)
2. Crankcase Bolts (6 mm Dia.)
3. Balancer Cover Bolts (8 mm Dia.)
4. Balancer Cover Bolts (6 mm Dia.)

TG : Apply a high temperature grease.
T1 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T3 : 22 N-m (2.2 kg-m, 16.0 ft-lb)

Specifications

Item		Standard	Service Limit
Crankshaft, Connecting Rod:			
Connecting rod	Big end radial clearance	0.032 – 0.045 mm	0.095 mm
	Big end side clearance	0.50 – 0.60 mm	0.8 mm
Crankshaft runout		0.04 mm	0.1 mm
Transmission:			
Shift fork ear thickness		4.9 – 5.0 mm	4.8 mm
Gear shift fork groove width		5.05 – 5.15 mm	5.2 mm
Shift drum groove width		8.05 – 8.20 mm	8.3 mm
Shift fork guide collar outside diameter		7.95 – 8.05 mm	7.9 mm

Special Tools

Circlip Pliers: 57001-144

Bearing Driver Set: 57001-1129

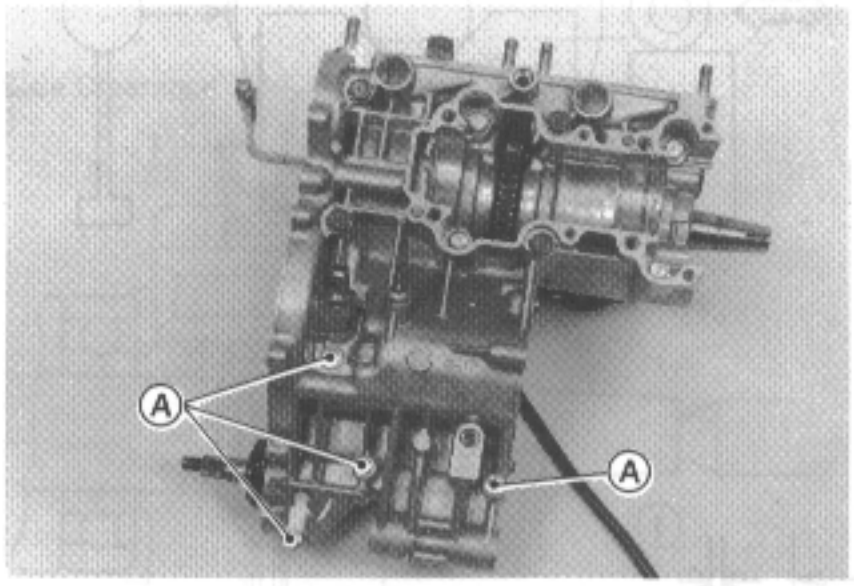
Sealant

Kawasaki Bond (Liquid Gasket – Silver): 92104-002

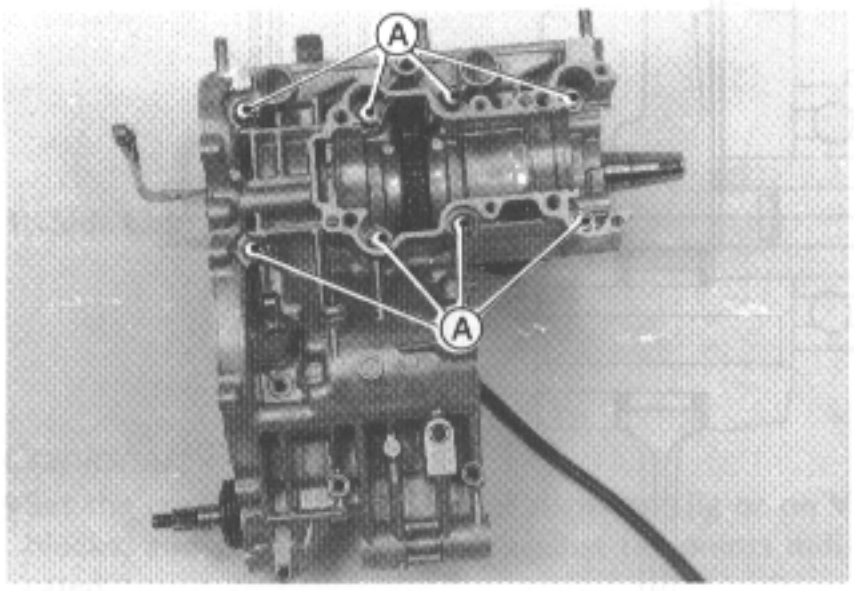
Crankcase Splitting

Crankcase Splitting

- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove the following.
  Right Engine Cover (see Engine Right Side chapter)
  Clutch (see Engine Right Side chapter)
  Transmission Shaft
  Magneto Base (see Electrical System chapter)
- ★Remove the following if the crankshaft is to be removed.
  Cylinder Head (see Engine Top End chapter)
  Cylinder (see Engine Top End chapter)
  Piston (see Engine Top End chapter)
- Turn the engine up side down and remove the following.
  Balancer Shaft



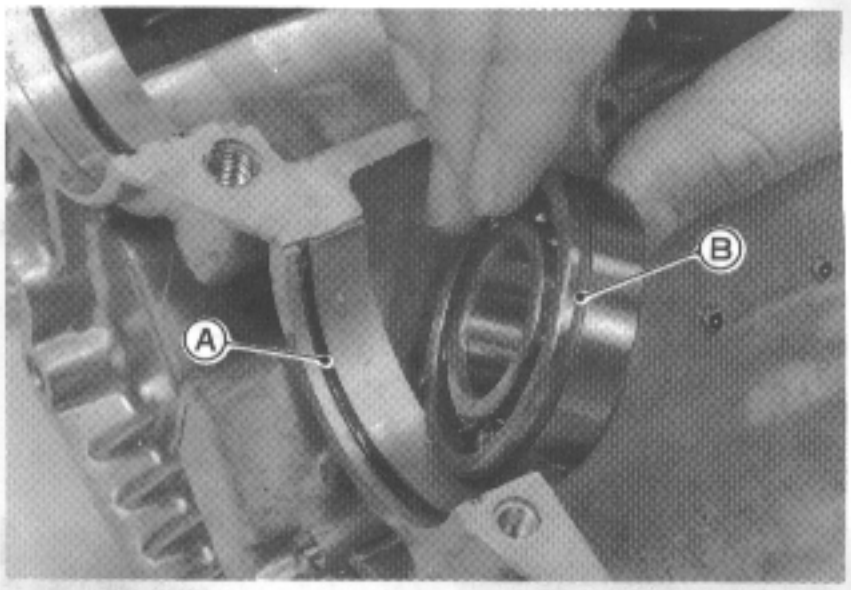
Mounting Bolts (6 mm dia.)



A. Mounting Bolts (8 mm dia.)

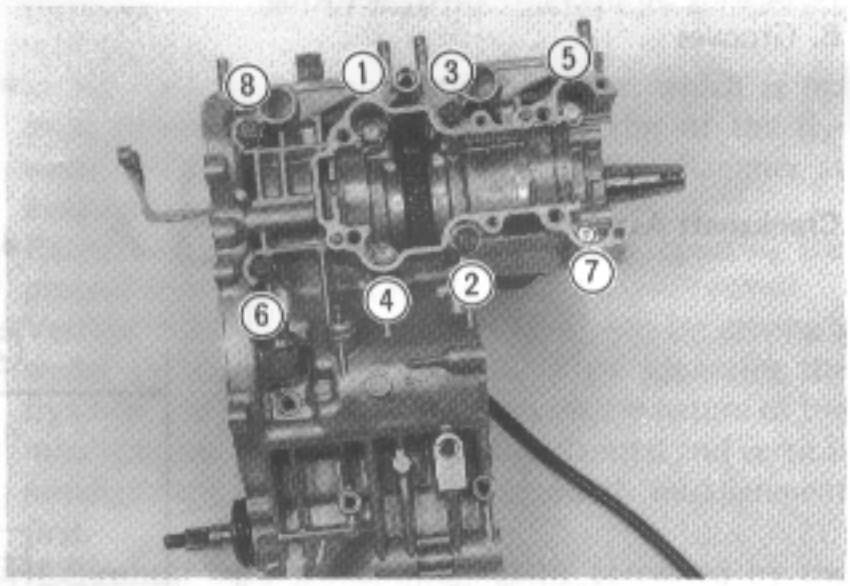
Crankcase Assembly Notes

- Install the set rings, and fit the grooves on the bearing to the set rings.



A. Set Ring B. Groove

- Apply silicone sealant (Kawasaki Bond: 56019-120) to the mating surface of the lower crankcase half.
- Tighten the crankcase 8 mm dia. bolts with specified sequence and torque (see General Information chapter).
- ○Tighten them first to about one half of the specified torque, then finally to the specified torque in the same sequence.



- Tighten the crankcase 6 mm dia. bolts to the specified torque (see General Information chapter).
- Check that the drive shaft and output shaft turn freely.

Crankcase Replacement

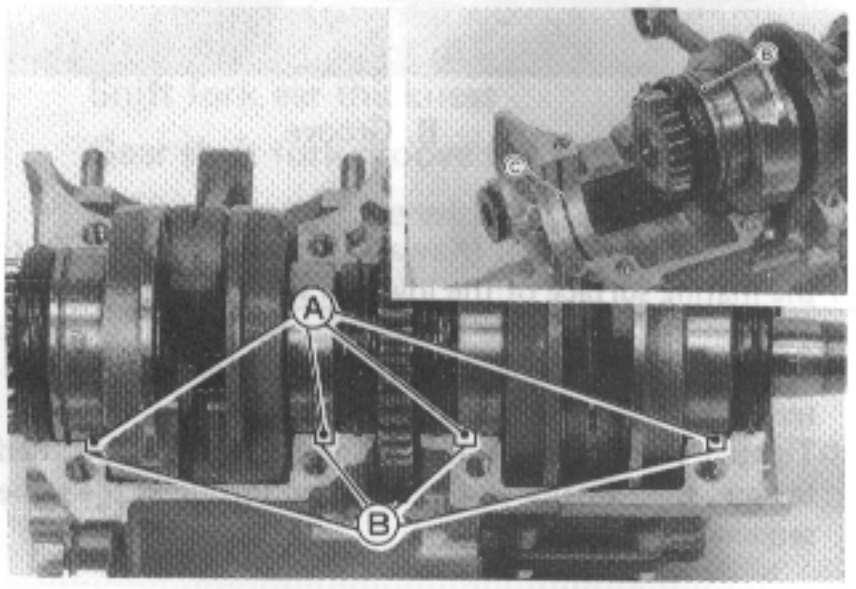
CAUTION

○**The upper and lower crankcase halves and balancer cover are machined at the factory in the assembled state, so the crankcase halves and balancer cover must be replaced as a set.**

Crankshaft/Connecting Rod

Crankshaft Installation Notes

- Install the set rings, and fit the grooves on the bearing to the set rings.
- Fit the bearing stoppers to the grooves on the crankcase.



A. Bearing Stoppers
B. Grooves
C. Set Ring

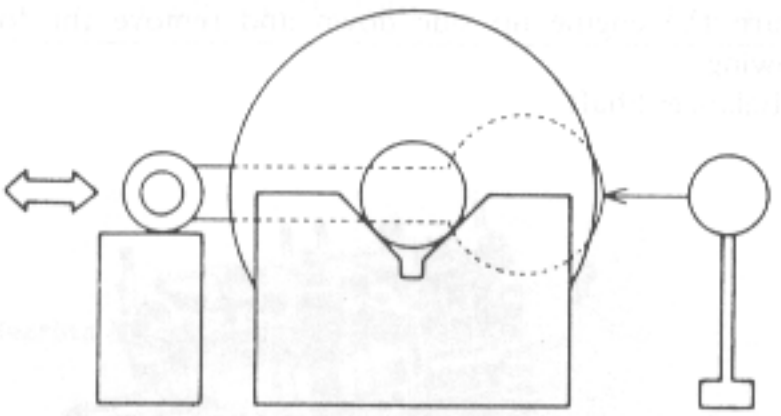
Connecting Rod Big End Radial Clearance

- Set the crankshaft in flywheel alignment jig or on V blocks, and place a dial gauge against the big end of the connecting rod.
- Push the connecting rod first towards the gauge and then in the opposite direction. The difference between the two gauge readings is the radial clearance.

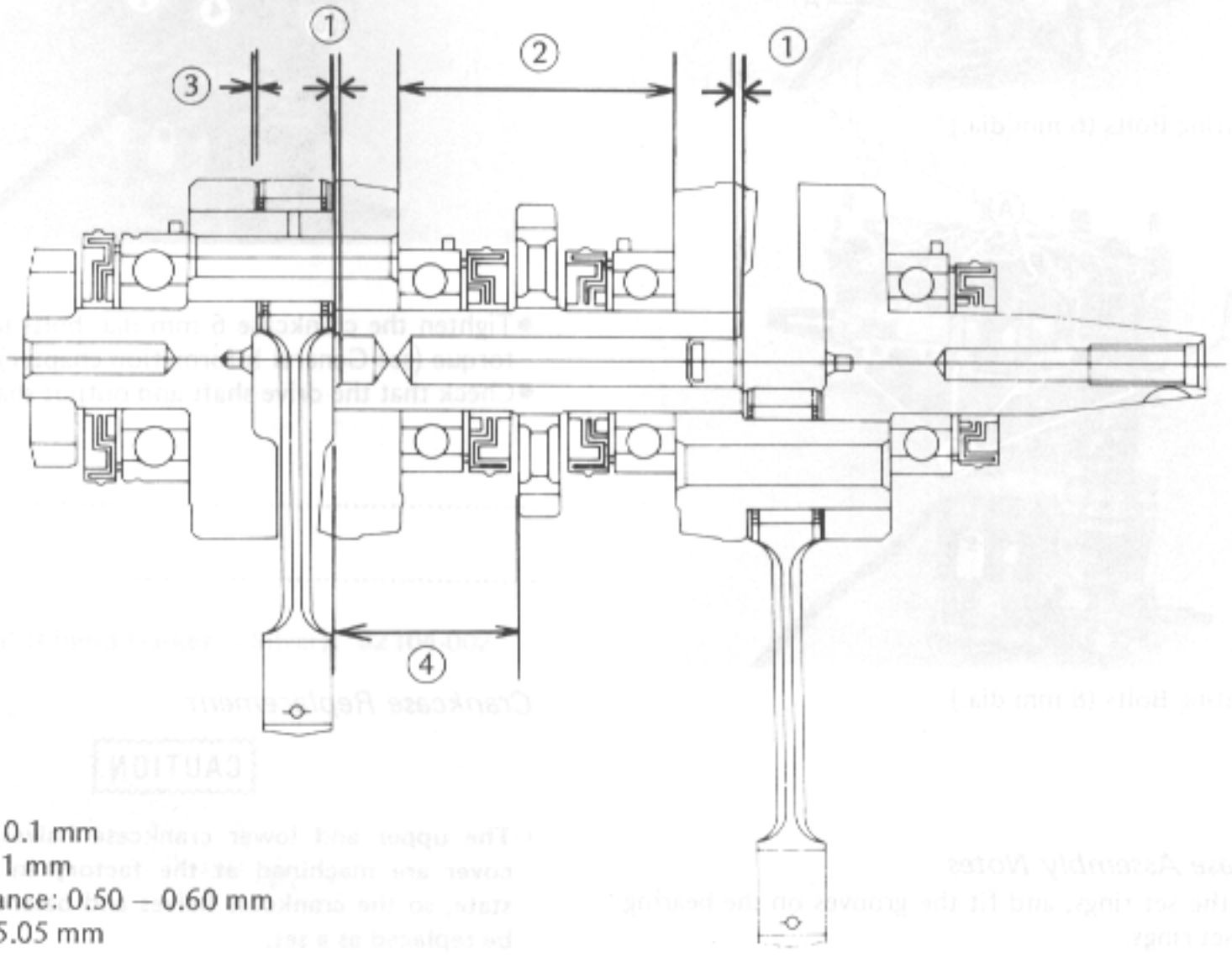
★If the radial clearance exceeds the service limit, the crankshaft should be either replaced or disassembled and the crankpin, needle bearing, and connecting rod big end examined for wear.

Connecting Rod Big End Radial Clearance

Standard:	**0.032 – 0.045 mm**
Service Limit:	**0.095 mm**



Crankshaft Assembly



1. more than 0.1 mm
2. 66.9 – 67.1 mm
3. Side Clearance: 0.50 – 0.60 mm
4. 44.85 – 45.05 mm

Connecting Rod Big End Seizure

★If case of serious seizure with damaged flywheels, the crankshaft must be replaced.

★In case of less serious damage, disassemble the crankshaft and replace the crankpin, needle bearing, side washers, and connecting rod.

Connecting Rod Big End Side Clearance

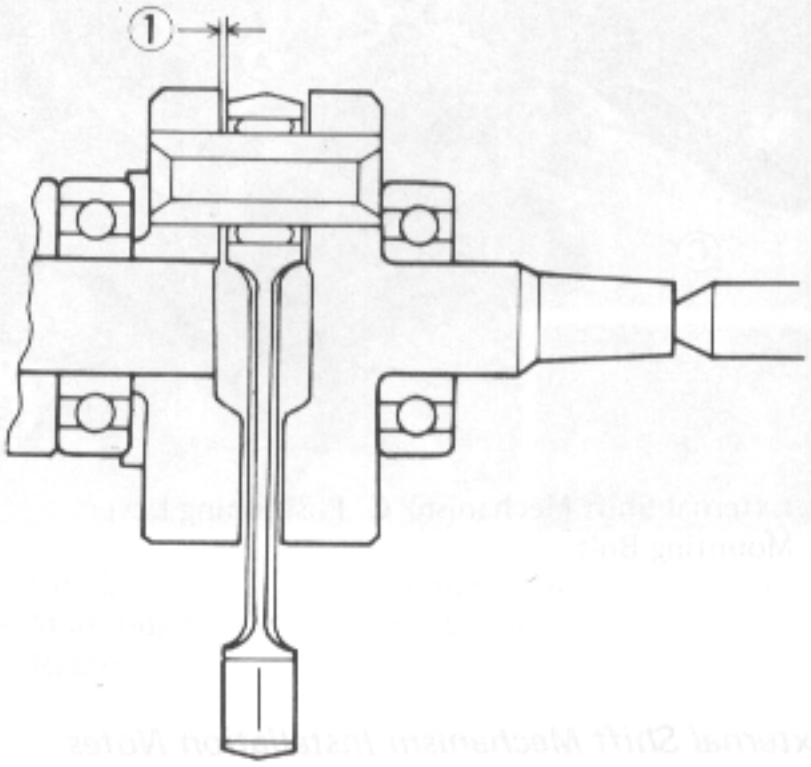
●Measure the side clearance of the connecting rod with a thickness gauge.

★If the clearance exceeds the service limit, replace the crankshaft.

Connecting Rod Big End Side Clearance

Standard:	**0.50 – 0.60 mm**
Service Limit:	**0.8 mm**

Side Clearance



1. Side Clearance

Crankshaft Runout

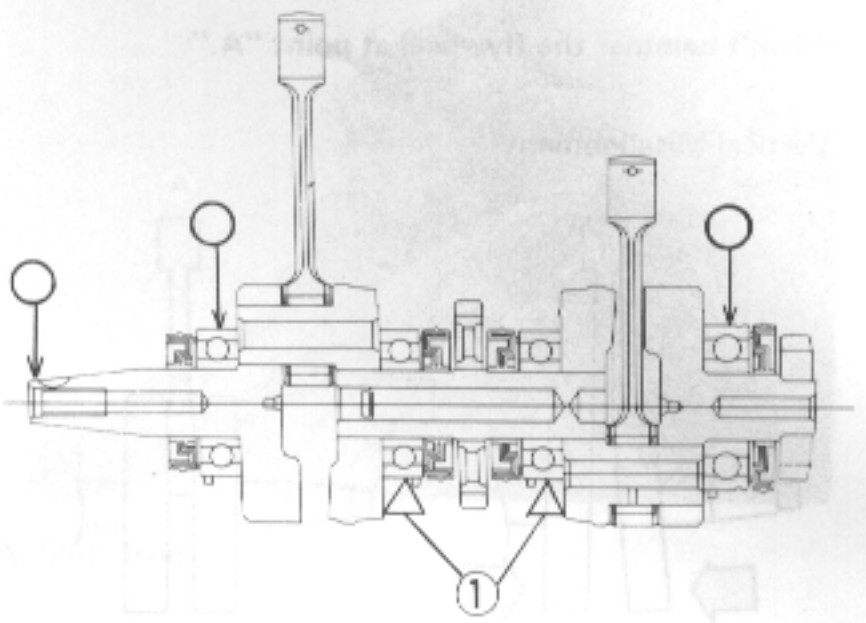
●Set the crankshaft in a flywheel alignment jig or on V blocks, and place a dial gauge against the points indicated.

●Turn the crankshaft slowly. The maximum difference in gauge readings is the crankshaft runout.

Crankshaft Runout

Standard:	**0.04 mm**
Service Limit:	**0.1 mm**

Crankshaft Runout



Crankshaft Alignment

★If the runout at either point exceeds the service limit, align the flywheels so that the runout falls within the service limit.

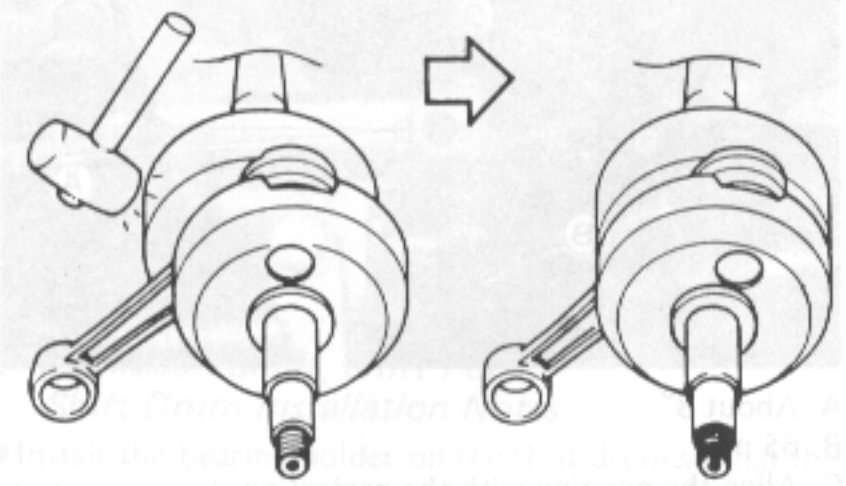
●In the case of horizontal misalignment, which is the most common, strike the projecting rim of the flywheel with a plastic, soft lead, or brass hammer as indicated in the figure.

●Recheck the runout with a dial gauge, repeating the process until the runout falls within the service limit.

○Vertical misalignment is corrected either by driving a wedge in between the flywheels or by squeezing the flywheel rims in a vise, depending on the nature of the misalignment. In both cases of horizontal and vertical misalignment, correct the horizontal misalignment first.

★If flywheel misalignment cannot be corrected by the above method, replace the crankpin or the crankshaft itself.

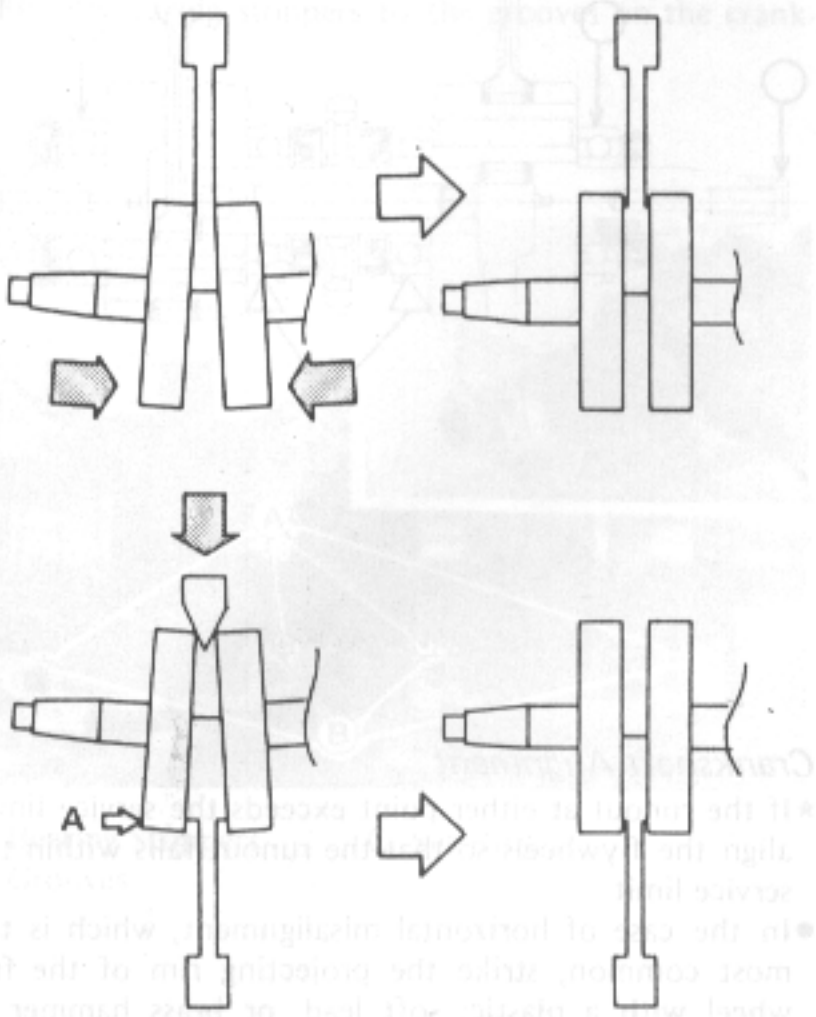
Horizontal Misalignment



CAUTION

○**Don't hammer the flywheel at point "A."**

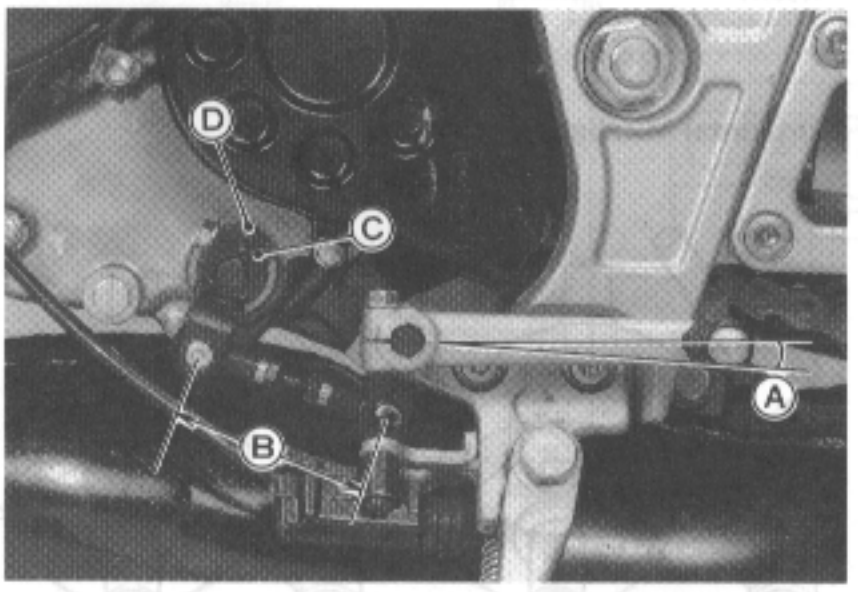
Vertical Misalignment



Transmission

Shift Pedal Installation Note

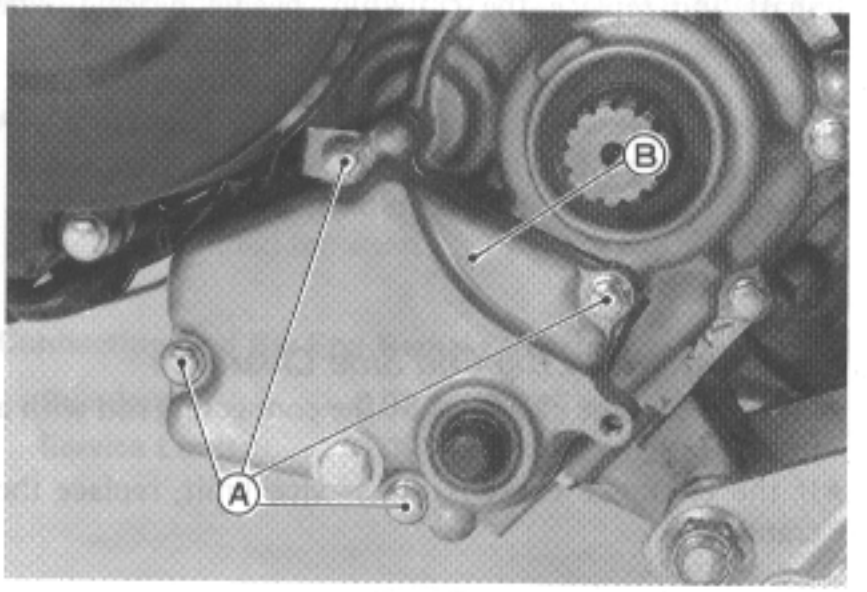
●Install the shift pedal as shown.



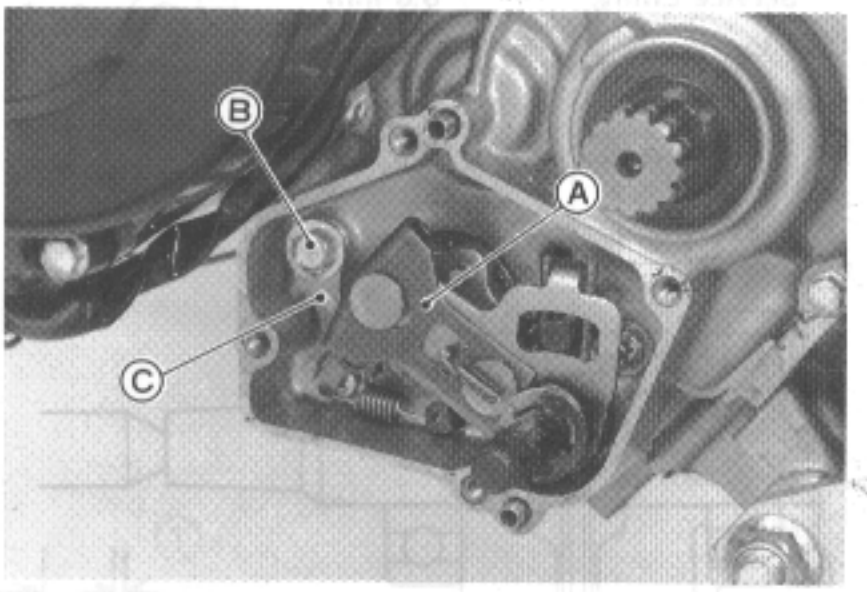
A. About 8°
B. 65 mm
C. Align the opening with the projection.
D. Projection

External Shift Mechanism Removal

●Remove the following.
Engine Sprocket (see Final Drive chapter)



A. Mounting Bolts
B. External Shift Mechanism Cover



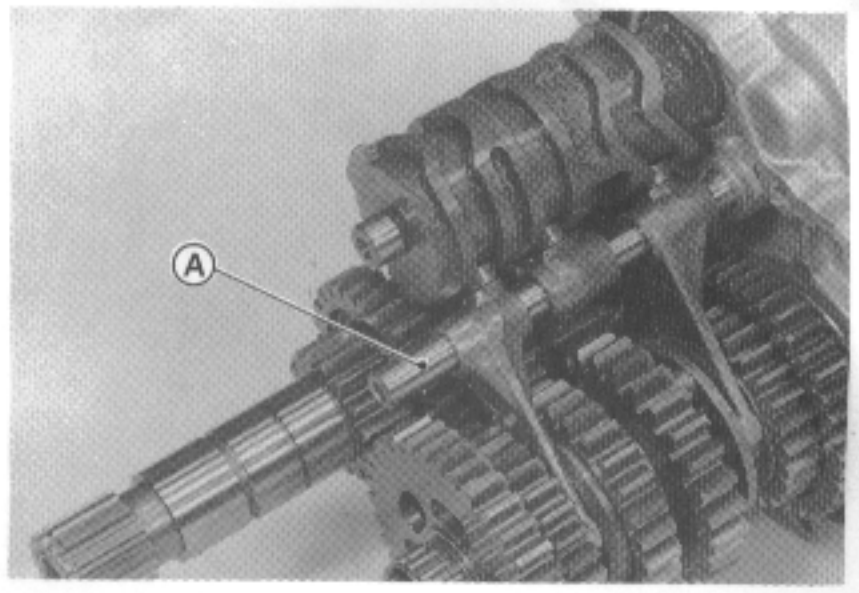
A. External Shift Mechanism C. Positioning Lever
B. Mounting Bolt

External Shift Mechanism Installation Notes

●Tighten the shift drum positioning lever mounting bolt to the specified torque (see General Information chapter).
●Apply a high temperature grease to the lip of the oil seal on the external shift mechanism cover.
●Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
●Visually inspect the rear axle nut clip, and replace it if necessary.
●Tighten the following to the specified torque (see General Information chapter).
Engine Sprocket Mounting Bolts
Rear Axle Nut
Side Stand Bracket Mounting Bolts
●Check and adjust the following items (see Final Drive chapter).
Drive Chain Slack
Wheel Alignment

WARNING

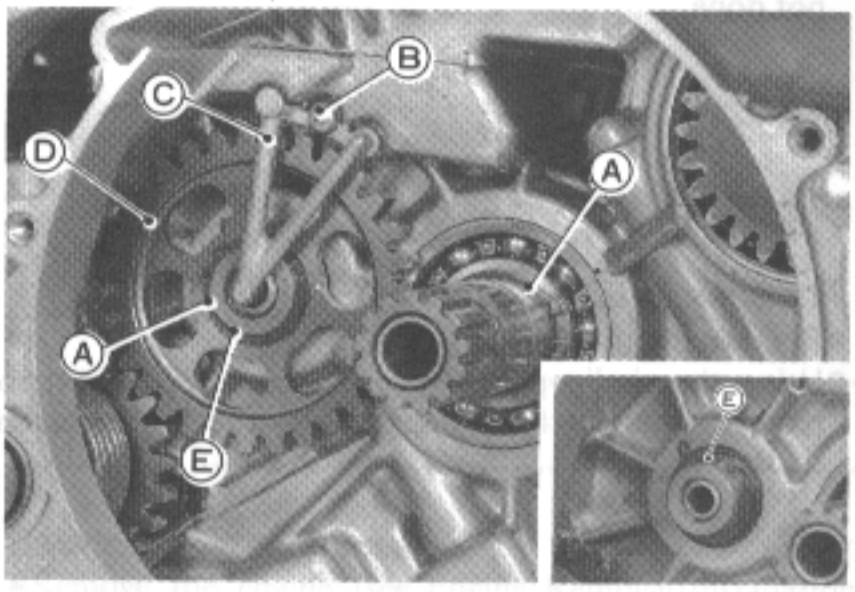
○Do not attempt to drive the motorcycle until a full brake pedal is obtained by pumping the brake pedal until the pads are against the disc. The brake will not function on the first application of the pedal if this is not done.



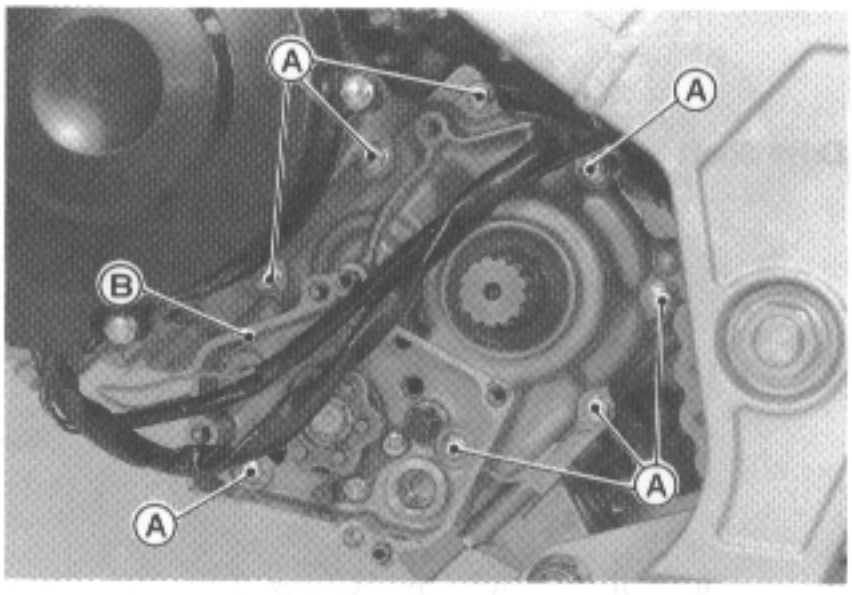
A. Shift Rod

Transmission Shaft, Shift Fork, Shift Drum Removal

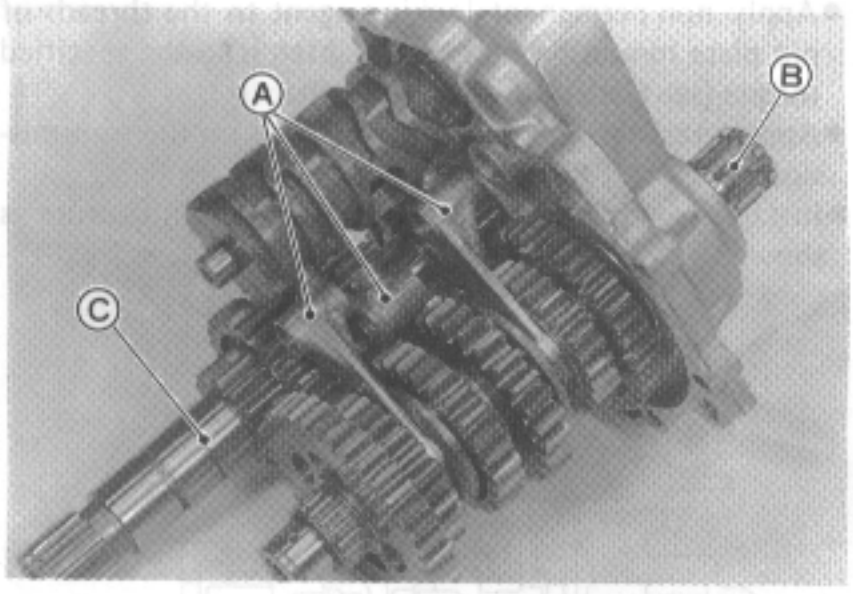
● Remove the following.
External Shift Mechanism
Clutch (see Engine Right Side chapter)



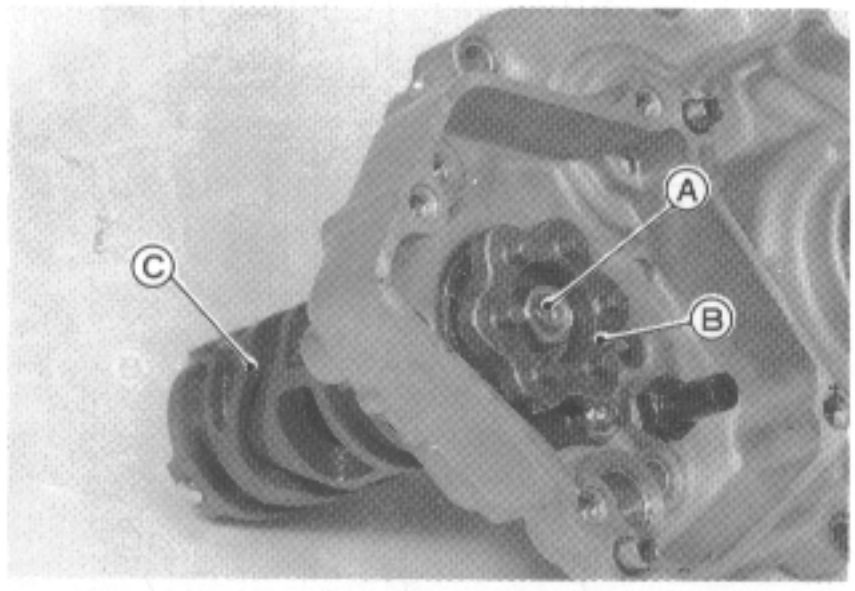
A. Circlip
B. Mounting Screw
C. Retainer
D. Idle Gear
E. Washers



A. Mounting Bolts and Screw
B. Transmission Case



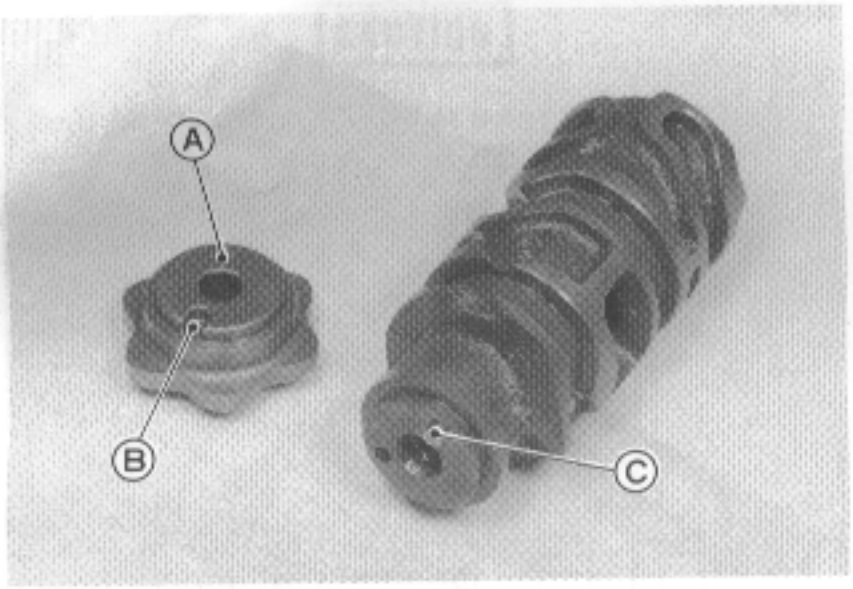
A. Shift Forks
B. Output Shaft
C. Drive Shaft



A. Mounting Bolt
B. Pin Plate
C. Shift Drum

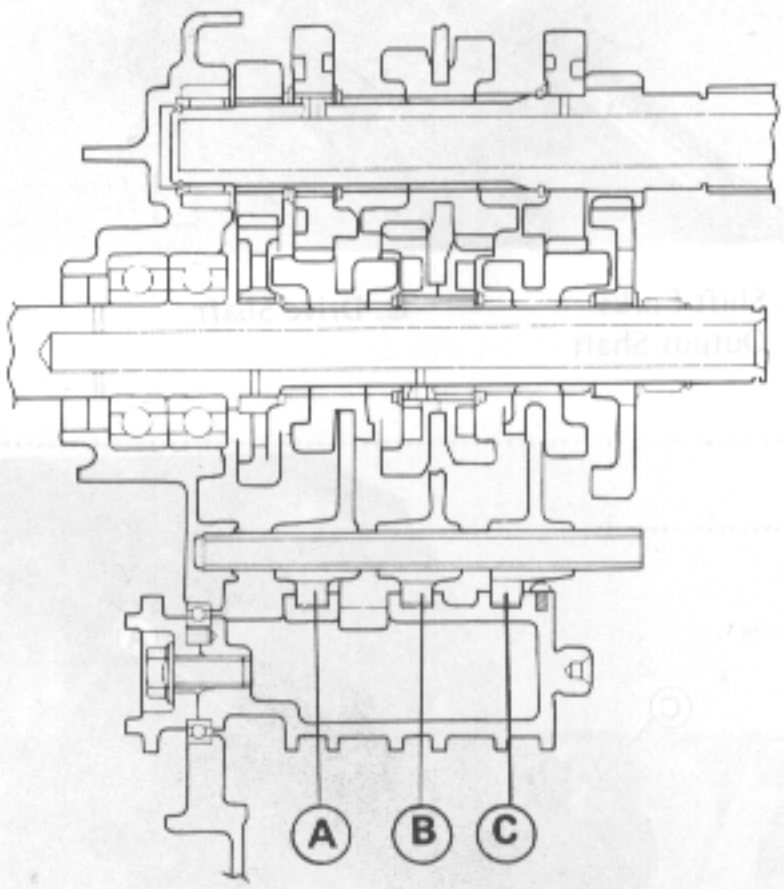
Transmission Shaft, Shift Fork, Shift Drum Installation Notes

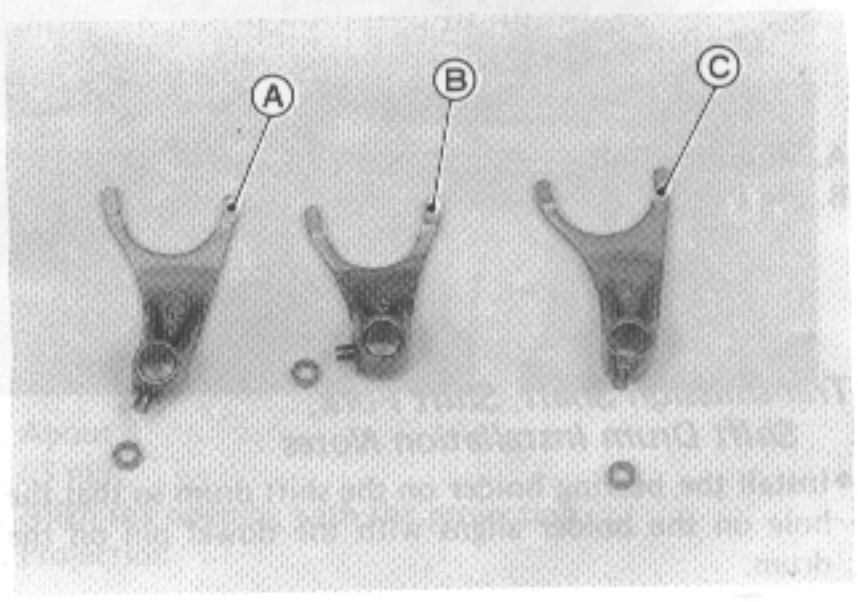
● Install the bearing holder on the shift drum so that the hole on the holder aligns with the dowel pin on the drum.



A. Bearing Holder
B. Hole
C. Dowel Pin

- Apply non-permanent locking agent to the threads of pin plate mounting bolt, and tighten it to the specified torque (see General Information chapter).
- Apply grease to the lips of the oil seals on the transmission case.
- Install the transmission shaft, shift forks, shift drum as shown.





- Apply silicone sealant (Kawasaki Bond: 56019-120) to the mating surface of the lower crankcase half.
- Tighten the shift drum positioning bolt to the specified torque (see General Information chapter).
- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
- Visually inspect the rear axle nut clip, and replace it if necessary.
- Tighten the following to the specified torque (see General Information chapter).
  Engine Sprocket Mounting Bolts
  Rear Axle Nut
  Side Stand Bracket Mounting Bolts
- Check and adjust the following items (see Final Drive chapter).
  Drive Chain Slack
  Wheel Alignment

WARNING

○Do not attempt to drive the motorcycle until a full brake pedal is obtained by pumping the brake pedal until the pads are against the disc. The brake will not function on the first application of the pedal if this is not done.

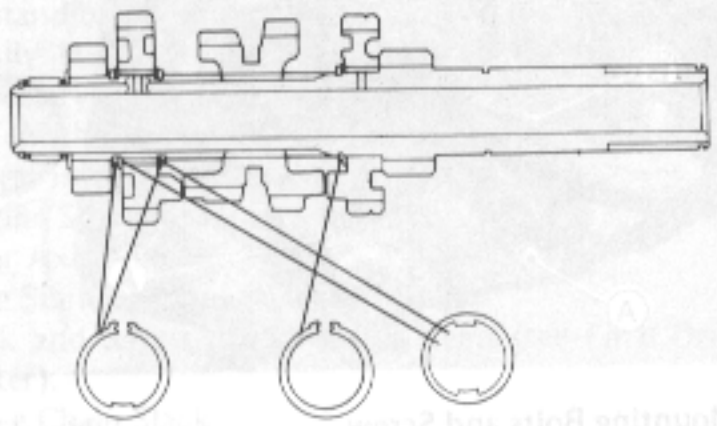
Transmission Disassembly

- Remove the transmission shaft.
- Using the circlip pliers (special tool: 57001-144) to remove the circlips, disassemble the transmission shafts.

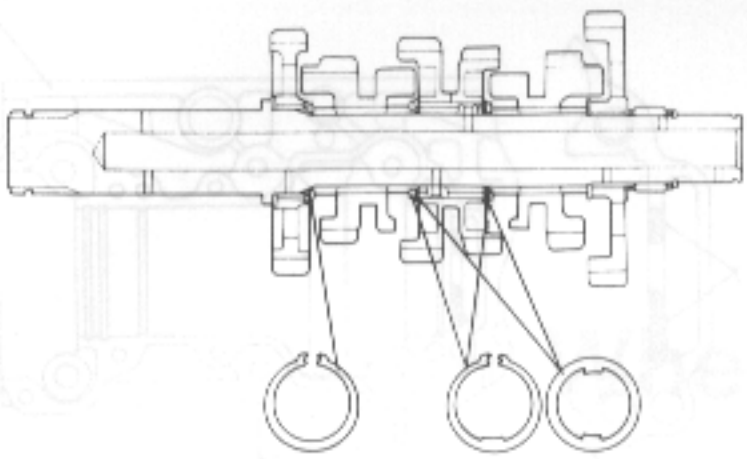
Transmission Assembly Notes

- Replace any circlip that were removed.
- Assemble the transmission shaft as shown.

Drive Shaft



Output Shaft

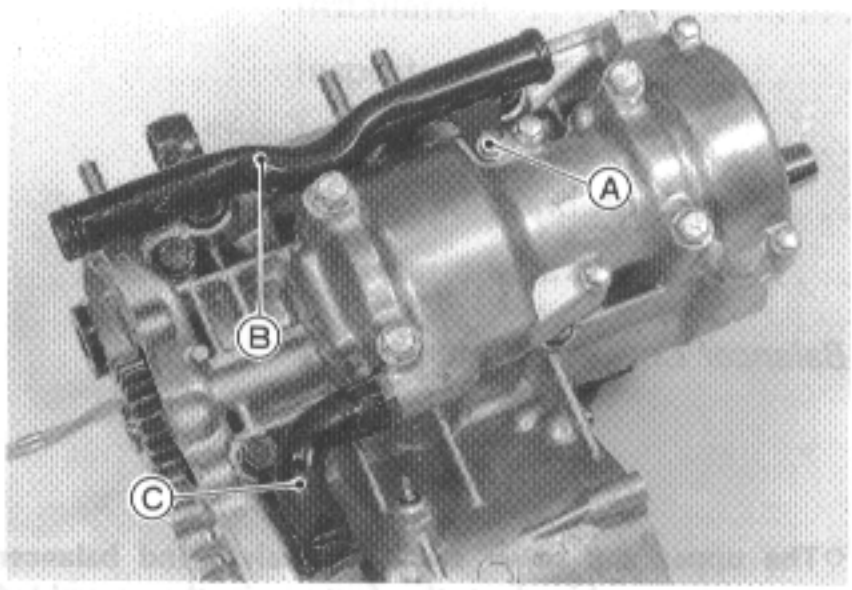


Balancer

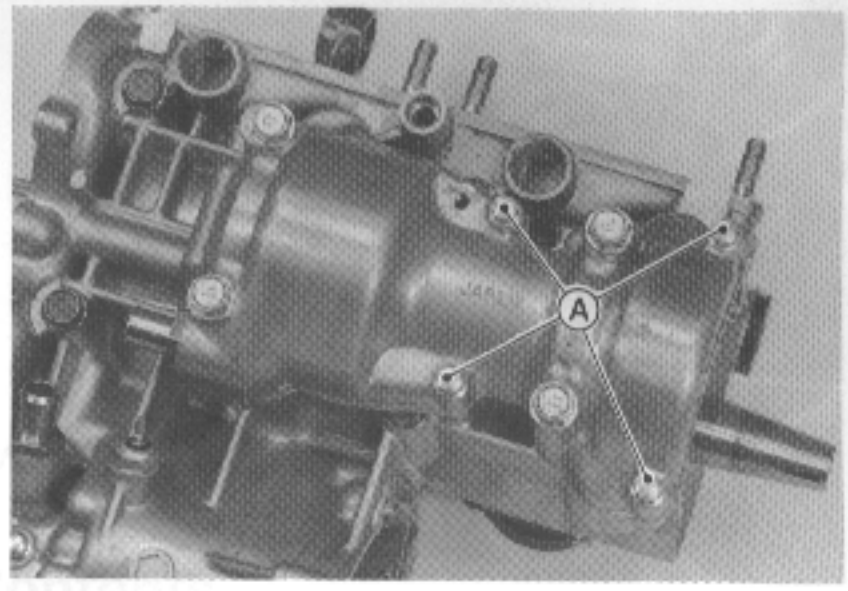
Balancer Shaft Removal

- Remove the engine (see Engine Removal/Installation chapter).
- Remove the following.

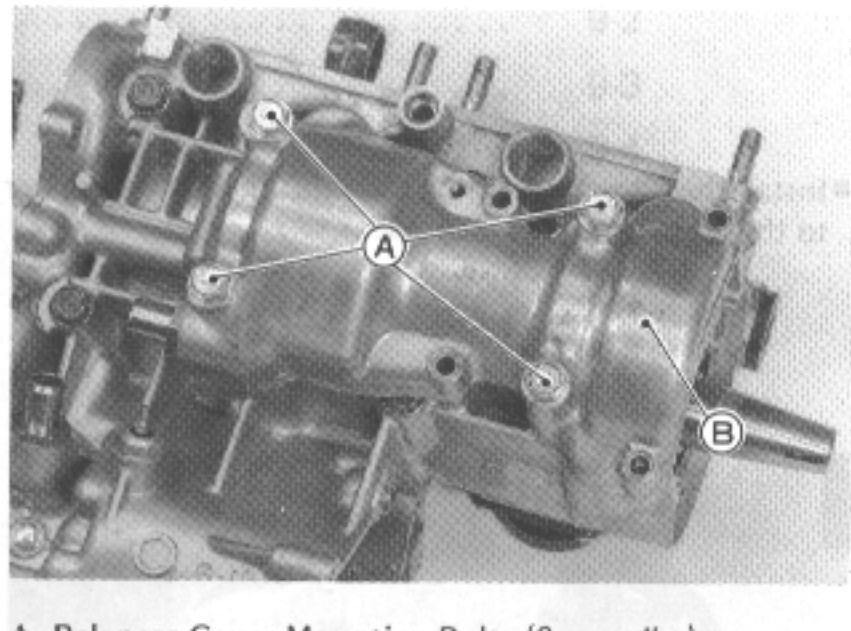
Right Engine Cover (see Engine Right Side chapter)



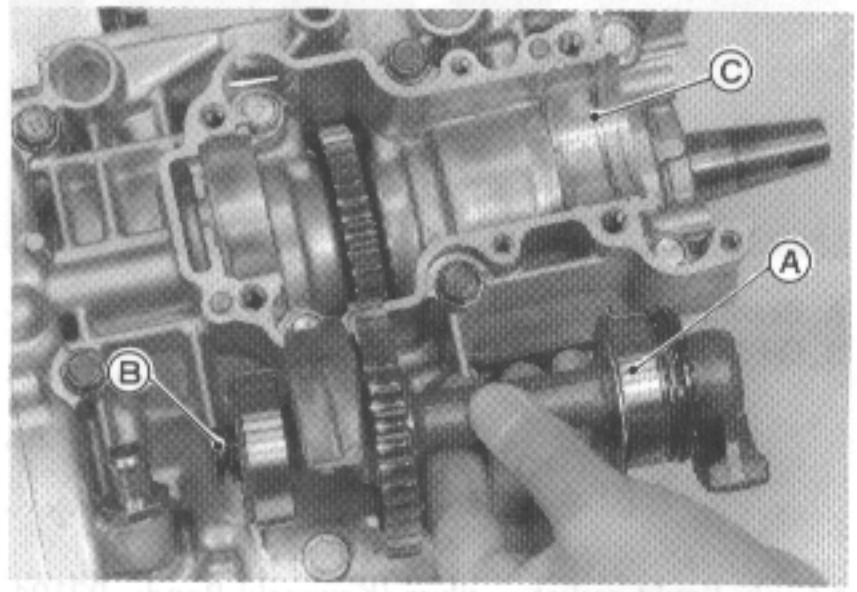
A. Mounting Bolt
B. Water Pipe
C. Transmission Oil Hose



A. Balancer Cover Mounting Bolts (6 mm dia.)



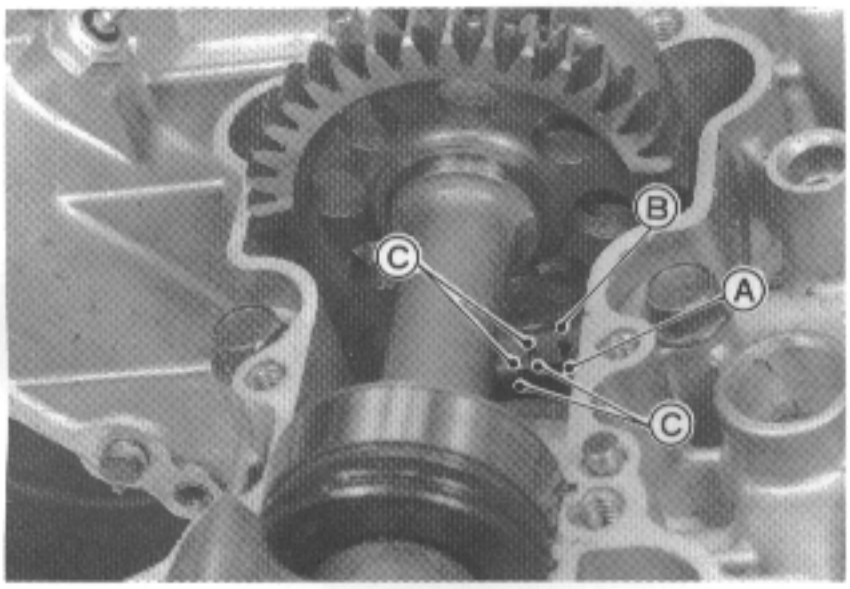
A. Balancer Cover Mounting Bolts (8 mm dia.)
B. Balancer Cover



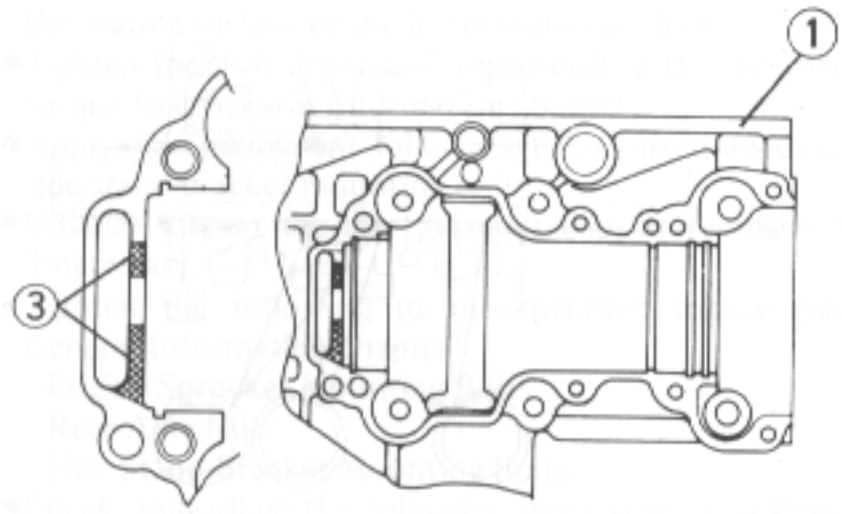
A. Balancer Shaft
B. Plug
C. Set Ring

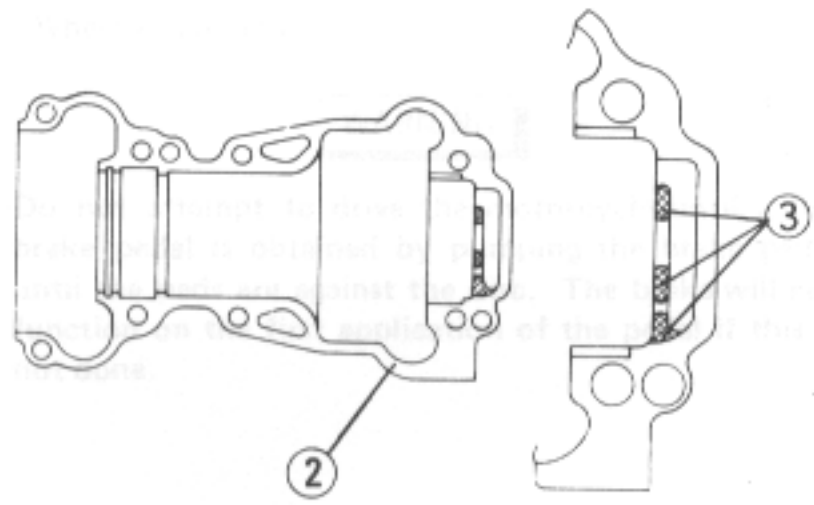
Balancer Shaft Installation

- Align the punch marks on the balancer gear and crankshaft gear.



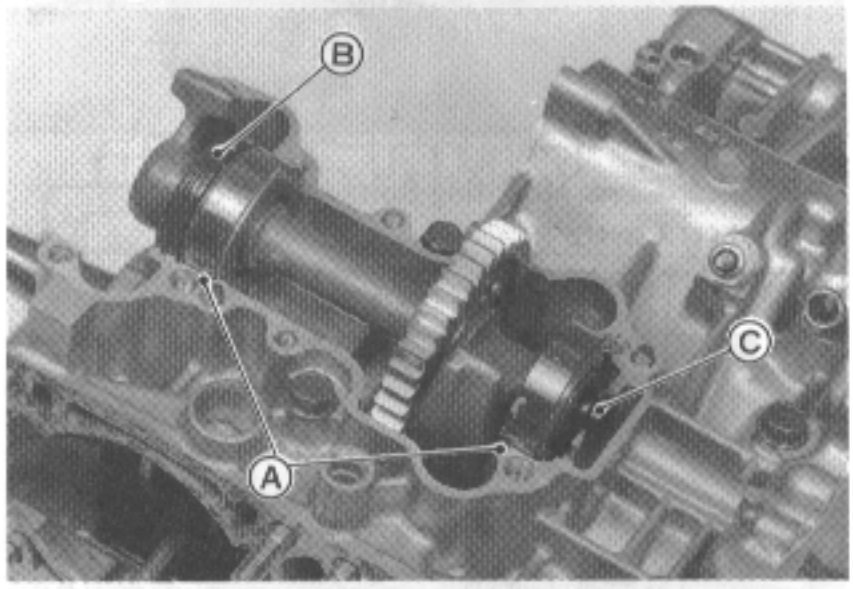
A. Crankshaft Gear
B. Balancer Gear
C. Punch Mark





1. Crankcase
2. Balancer Cover
3. Do not apply here.

● Install the oil seal and plug, then fit the bearing stopper to the groove on the crankcase.



A. Bearing Stopper
B. Oil Seal
C. Plug

● Tighten the balancer cover mounting bolts to the specified torque (see General Information chapter).

● Apply liquid gasket – silver (Kawasaki Bond: 92104-002) to the mating surface of the balancer cover.

Balancer Cover Replacement

CAUTION

○Do not apply liquid gasket – silver (Kawasaki Bond: 92104-002) to the areas indicated below.

CAUTION

○The upper and lower crankcase halves and balancer cover are machined at the factory in the assembled state, so the crankcase halves and balancer cover must be replaced as a set.