

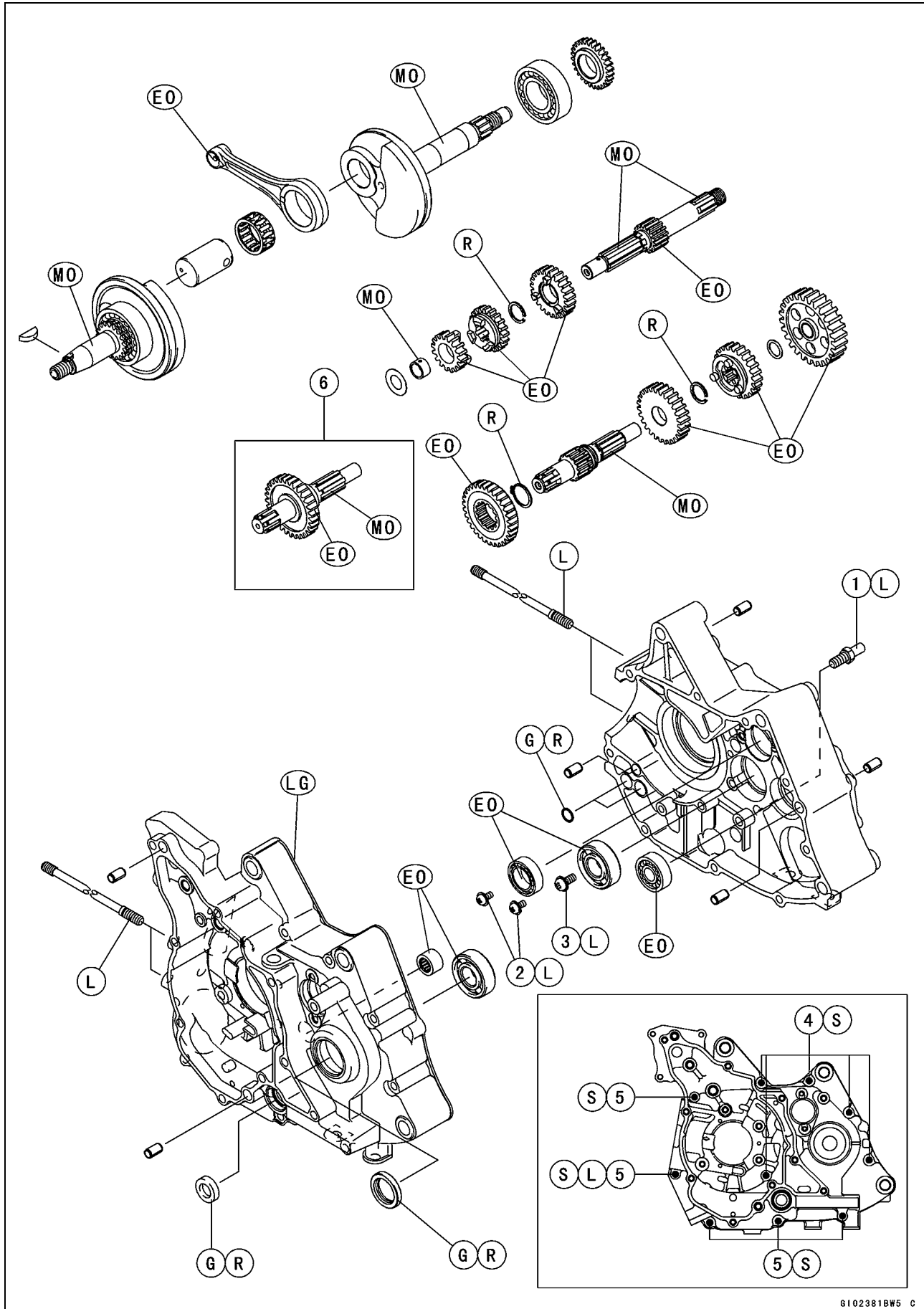
Crankshaft/Transmission

Table of Contents

Exploded View	8-2
Specifications	8-6
Special Tools & Sealant	8-7
Crankcase	8-8
Crankcase Splitting	8-8
Crankcase Assembly	8-9
Crankshaft, Connecting Rod	8-12
Crankshaft Disassembly	8-12
Crankshaft Assembly	8-12
Connecting Rod Big End Seizure Inspection	8-13
Connecting Rod Big End Radial Clearance Inspection	8-13
Connecting Rod Big End Side Clearance Inspection	8-13
Crankshaft Runout Inspection	8-13
Crankshaft Alignment	8-14
Crankshaft Main Bearing Wear Inspection	8-14
External Shift Mechanism	8-15
Shift Pedal Removal	8-15
Shift Pedal Installation	8-15
External Shift Mechanism Removal	8-15
External Shift Mechanism Installation	8-15
External Shift Mechanism Inspection	8-16
Transmission	8-17
Shift Drum Removal	8-17
Shift Drum Installation	8-17
Transmission Removal	8-17
Transmission Installation	8-17
Transmission Shaft Disassembly	8-18
Transmission Shaft Assembly	8-18
Shift Fork Bending Inspection	8-19
Shift Fork Ear/Gear Shift Fork Groove Wear Inspection	8-20
Shift Fork Guide Pin/Shift Drum Groove Wear Inspection	8-20
Gear Dog/Gear Dog Hole Damage Inspection	8-20
Ball Bearing, Needle Bearing, and Oil Seal	8-21
Ball and Needle Bearing Wear Inspection	8-21
Oil Seal Inspection	8-21
Kickstarter	8-22
Kick Pedal Removal	8-22
Kick Pedal Installation	8-22
Kick Shaft Removal	8-22
Kick Shaft Installation	8-22
Kick Shaft Disassembly/Assembly	8-22
Kick Shaft Inspection	8-23

8-2 CRANKSHAFT/TRANSMISSION

Exploded View



CRANKSHAFT/TRANSMISSION 8-3

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Shift Return Spring Pin (Bolt)	22	2.2	16	L
2	Shift Drum Bearing Retaining Screws	2.5	0.25	22 in·lb	L
3	Drive Shaft Bearing Retaining Screw	5.2	0.53	46 in·lb	L
4	Crankcase Bolts (L = 50)	9.8	1.0	87 in·lb	S
5	Crankcase Bolts (L = 75)	9.8	1.0	87 in·lb	S, L (1)

6. KLX110CA ~ CC, KLX110DA ~ DC

EO: Apply engine oil.

G: Apply grease.

L: Apply a non-permanent locking agent.

LG: Apply liquid gasket (Liquid Gasket, TB1215: 92104-1065).

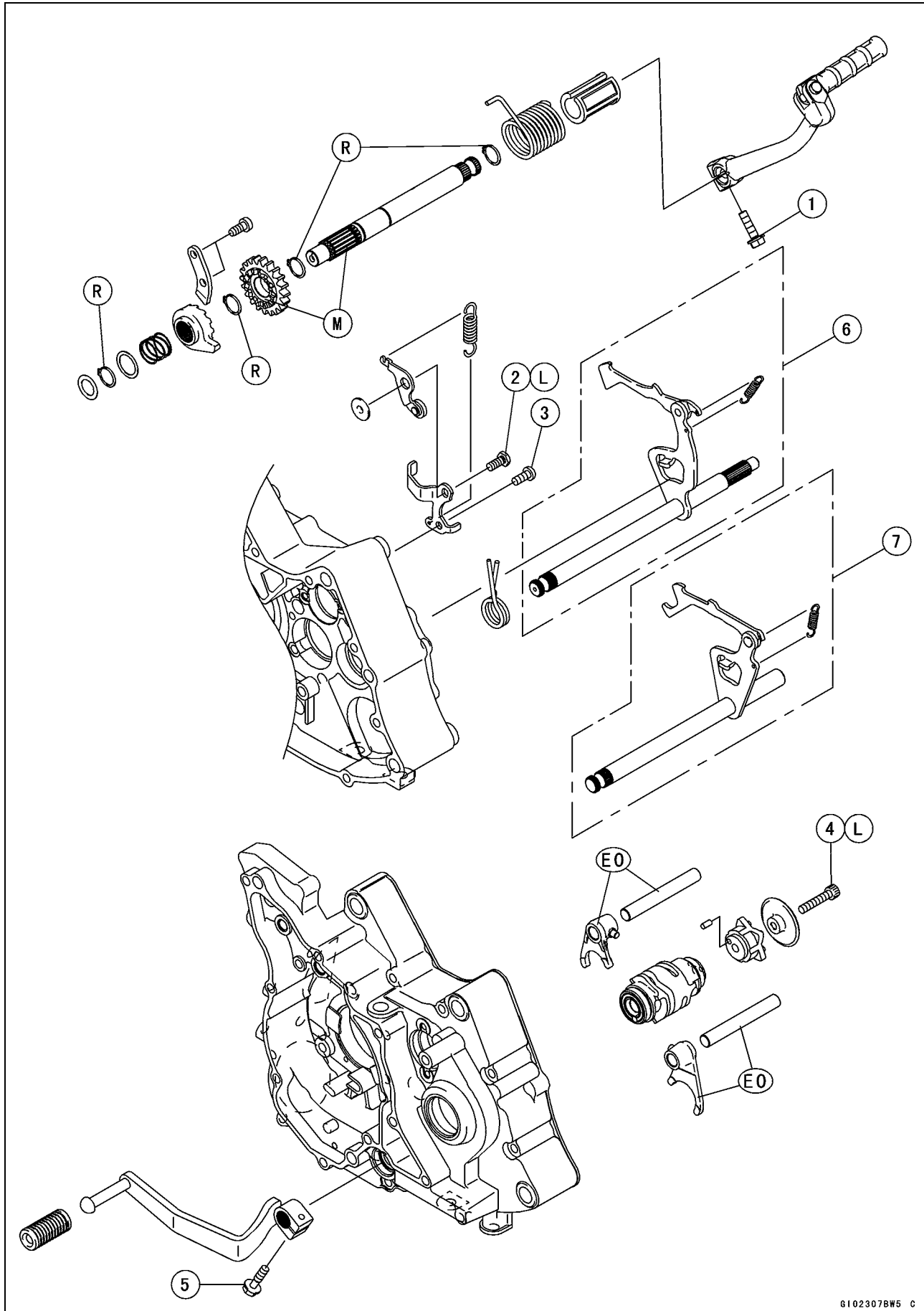
MO: Apply molybdenum disulfide oil (mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1).

R: Replacement Parts

S: Follow the specific tightening sequence.

8-4 CRANKSHAFT/TRANSMISSION

Exploded View



CRANKSHAFT/TRANSMISSION 8-5

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Kick Pedal Bolt	8.8	0.90	78 in·lb	
2	Shift Drum Position Lever Pivot Bolt	5.2	0.53	46 in·lb	L
3	Shift Drum Position Plate Screw	5.2	0.53	46 in·lb	
4	Shift Drum Cam Bolt	5.2	0.53	46 in·lb	L
5	Shift Pedal Bolt	5.2	0.53	46 in·lb	

6. KLX110C Models

7. KLX110D Models

EO: Apply engine oil.

L: Apply a non-permanent locking agent.

M: Apply molybdenum disulfide grease.

R: Replacement Parts

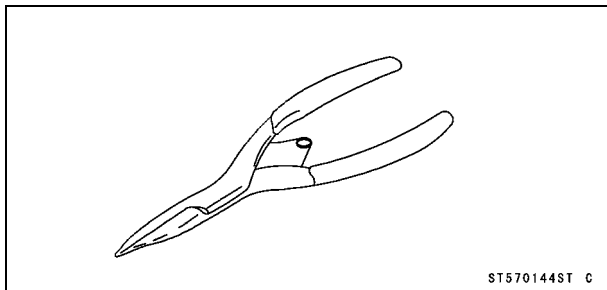
8-6 CRANKSHAFT/TRANSMISSION

Specifications

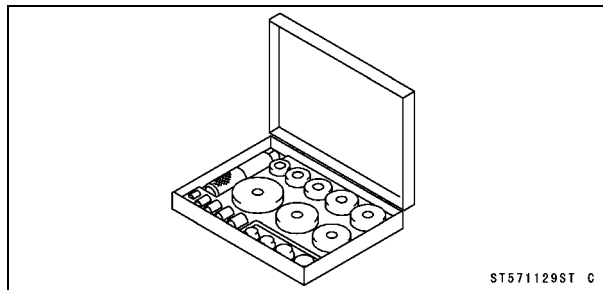
Item	Standard	Service Limit
Crankshaft, Connecting Rods		
Connecting Rod:		
Big End Radial Clearance	0.005 ~ 0.025 mm (0.0002 ~ 0.0010 in.)	0.07 mm (0.0028 in.)
Big End Side Clearance	0.1 ~ 0.2 mm (0.004 ~ 0.008 in.)	0.4 mm (0.016 in.)
Crankshaft Runout	TIR 0.03 mm (0.001 in.) or less	TIR 0.08 mm (0.003 in.)
Transmission		
Shift Fork Ear Thickness	3.9 ~ 4.0 mm (0.154 ~ 0.157 in.)	3.8 mm (0.150 in.)
Gear Shift Fork Groove Width	4.05 ~ 4.15 mm (0.159 ~ 0.163 in.)	4.3 mm (0.17 in.)
Shift Fork Guide Pin Diameter	4.9 ~ 5.0 mm (0.193 ~ 0.197 in.)	4.8 mm (0.189 in.)
Shift Drum Groove Width	5.05 ~ 5.20 mm (0.199 ~ 0.205 in.)	5.3 mm (0.21 in.)
Kick Shaft		
Kick Shaft Diameter	15.941 ~ 15.968 mm (0.62760 ~ 0.62866 in.)	15.91 mm (0.6264 in.)
Kick Gear Inside Diameter	16.000 ~ 16.018 mm (0.62992 ~ 0.63063 in.)	16.04 mm (0.6315 in.)

Special Tools & Sealant

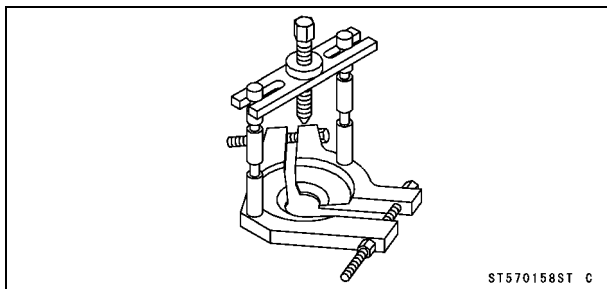
Outside Circlip Pliers:
57001-144



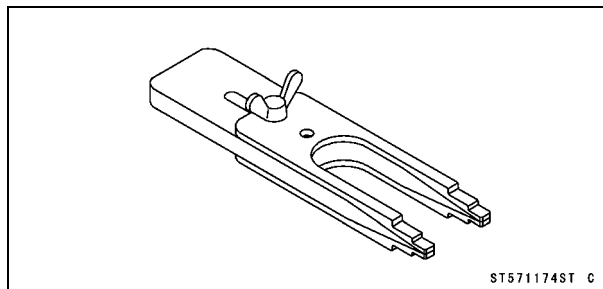
Bearing Driver Set:
57001-1129



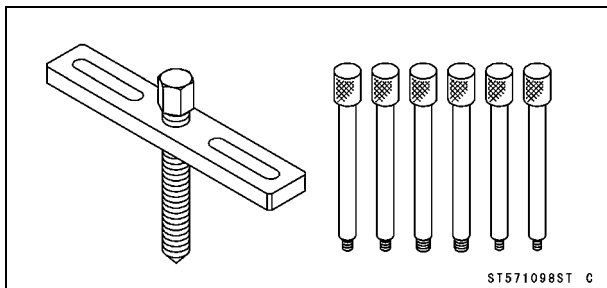
Bearing Puller:
57001-158



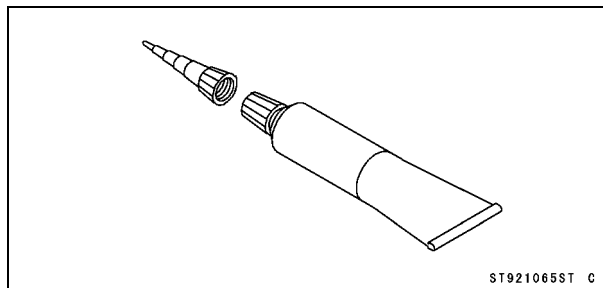
Crankshaft Jig:
57001-1174



Crankcase Splitting Tool Assembly:
57001-1098



Liquid Gasket, TB1215:
92104-1065



8-8 CRANKSHAFT/TRANSMISSION

Crankcase

Crankcase Splitting

- Remove the engine (see Engine Removal in the Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove:
 - Cylinder Head (see Cylinder Head Removal in the Engine Top End chapter)
 - Cylinder (see Cylinder Removal in the Engine Top End chapter)
 - Piston (see Piston Removal in the Engine Top End chapter)
 - Clutch Cover (see Clutch Cover Removal in the Clutch chapter)
 - Clutch (see Clutch Removal (KLX110C/D) in the Clutch chapter)
 - Kick Shaft (see Kick Shaft Removal)
 - Oil Filter and Oil Pump (see Oil Filter Replacement in the Periodic Maintenance chapter and Oil Pump Removal in the Engine Lubrication System chapter)
 - External Shift Mechanism (see External Shift Mechanism Removal)
 - Alternator Rotor (see Alternator Rotor Removal in the Electrical System chapter)
 - Starter Motor (see Starter Motor Removal in the Electrical System chapter)
 - Gear Position Switch (see Gear Position Switch Removal in the Electrical System chapter)
 - Crankcase Bolts [A]

- Screw the crankcase splitting tool [A] into the left side of the crankcase [B]. Be certain to screw the adapters in all the way.

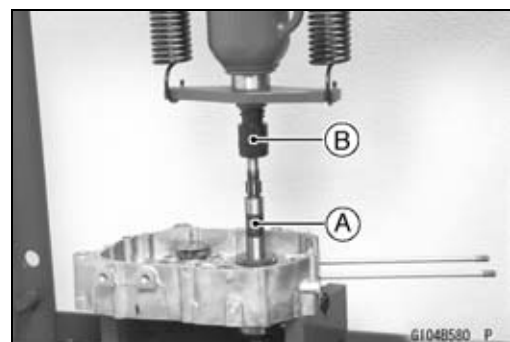
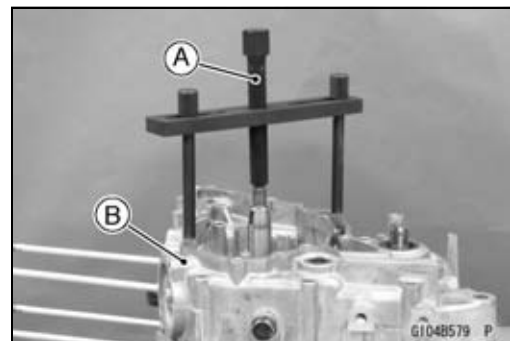
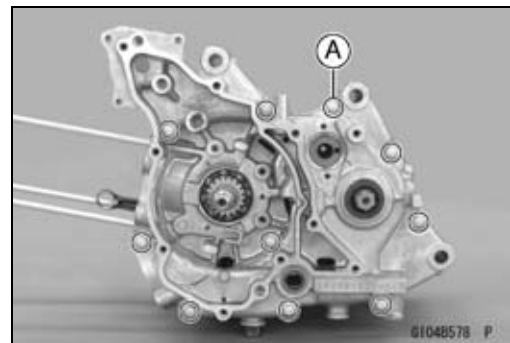
Special Tool - Crankcase Splitting Tool Assembly: 57001-1098

- Tighten the center bolt of the crankcase splitting tool to split the crankcase.
- Once the crankcase is split, remove the crankcase splitting tool and separate the crankcase halves.
- Remove the crankshaft [A] from the right crankcase half using a press [B].

NOTICE

Do not remove the ball, needle bearings and the oil seals unless it is necessary. Removal may damage them.

- Press the bearing out of the crankcase half if the bearing remains on the crankcase half.



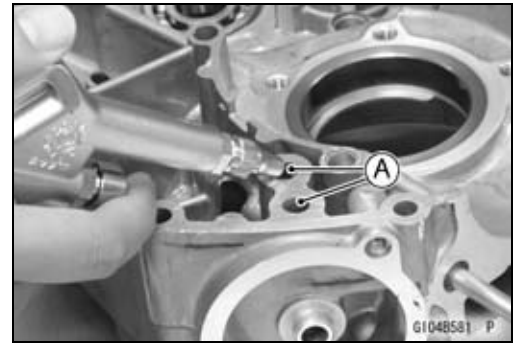
Crankcase

Crankcase Assembly

NOTICE

Right and left crankcase halves are machined at the factory in the assembled state, so the crankcase halves must be replaced as a set.

- Chip off the old gasket from the mating surfaces of the crankcase halves.
- Using compressed air, blow out the oil passages [A] in the crankcase halves and the crankshaft.
- With high flash-point solvent, clean off the mating surfaces of the crankcase halves and wipe dry.



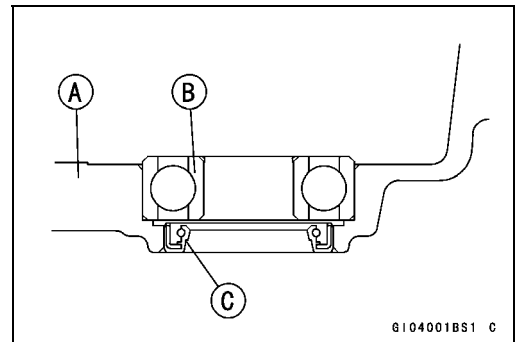
⚠ WARNING

Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. Clean the engine parts in a well-ventilated area, and take care that there is no spark or flame anywhere near the working areas. Do not use gasoline or low flash-point solvents to clean parts.

- Using a press and the bearing driver set, install new bearings until they bottoms out.
- Press the output shaft bearing [B] in the left crankcase half [A].

Special Tool - Bearing Driver Set: 57001-1129

- Replace the oil seals [C] with new ones.
- Apply high-temperature grease to the lips of the oil seals.
- Press in the oil seals of the left crankcase half so that the seal surface is flush with the end of the hole.

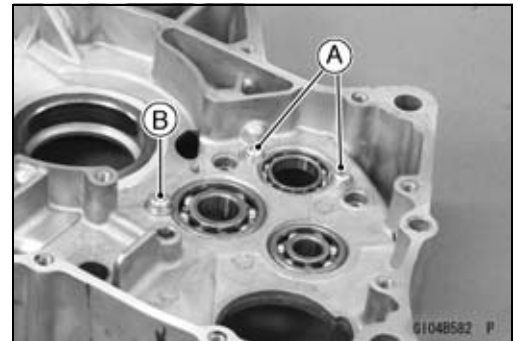


- Apply a non-permanent locking agent to the bearing retainer screws.
- Tighten the shift drum and drive shaft bearing retainer screws to the right crankcase.

Torque - Shift Drum Bearing Retainer Screws [A]: 2.5 N·m (0.25 kgf·m, 22 in·lb)

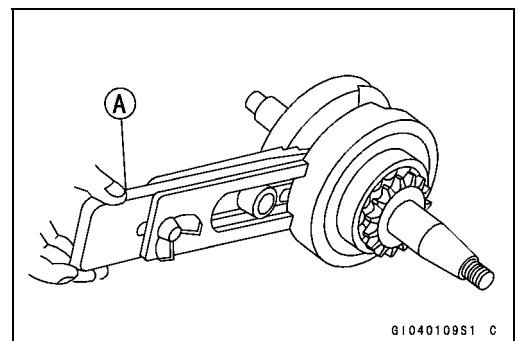
Drive Shaft Bearing Retainer Screw [B]: 5.2 N·m (0.53 kgf·m, 46 in·lb)

- Install the shift drum (see Shift Drum Installation).



- Insert the crankshaft jig [A] between the crankshaft flywheels opposite the connecting rod big end to protect flywheel alignment. This tool is easily adjustable to fit in any gap between the flywheel.

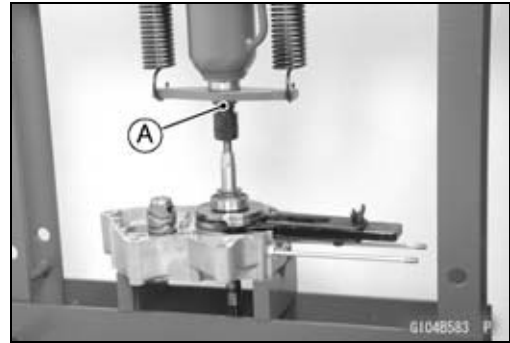
Special Tool - Crankshaft Jig: 57001-1174



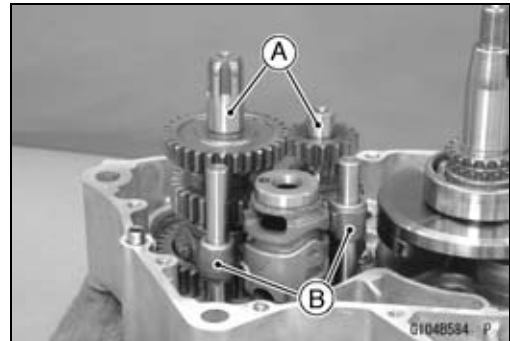
8-10 CRANKSHAFT/TRANSMISSION

Crankcase

- Fit the crankshaft into the right crankcase half using a press [A].



- Install:
 - Transmission Shaft Assemblies [A]
 - Shift Forks [B]
- Check that the shift drum is in neutral position.

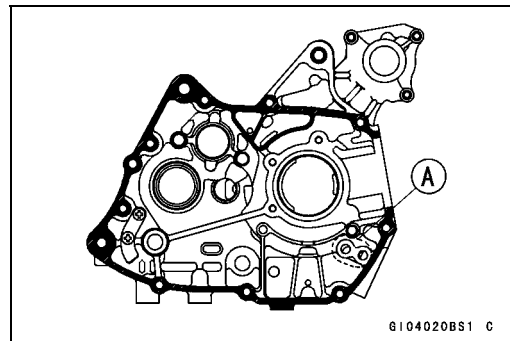


- Make sure that the mating surfaces of the crankcase halves are completely free of oil or contamination.
- Apply liquid gasket to the mating surface of the left crankcase half as shown.

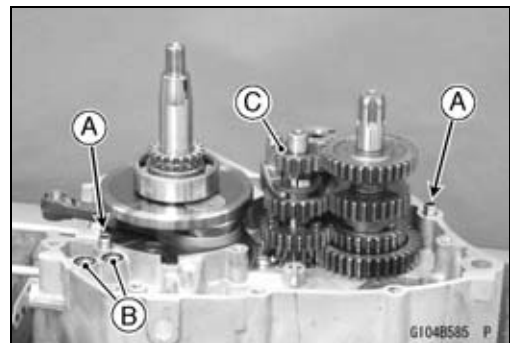
Sealant - Liquid Gasket, TB1215: 92104-1065

NOTE

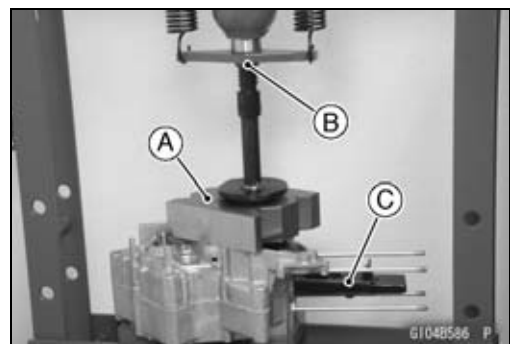
○Do not apply liquid gasket to this area [A].



- Check that two dowel pins [A], O-rings [B] and drive shaft spacer [C] are in place.



- Using a suitable tool [A] on the left crankcase to press around the hole for the crankshaft, fit the crankcase halves together with a press [B] on the tool.
- Remove the crankshaft jig [C].



Crankcase

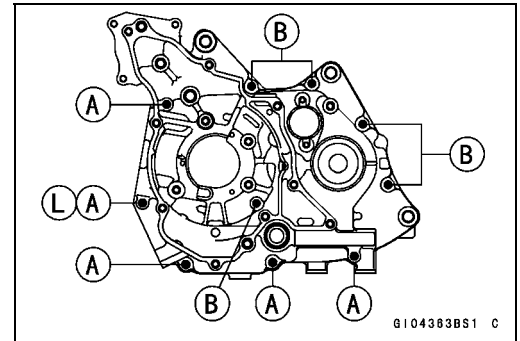
- Install the crankcase bolts in the left and right crankcase half and tighten them, starting with the nearest ones to the crankshaft, then farther ones.

Longer Bolts [A]

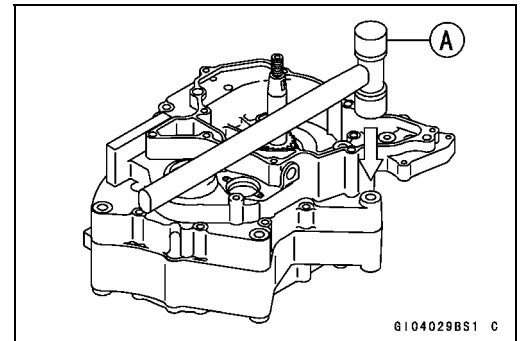
Shorter Bolts [B]

L: Apply a non-permanent locking agent.

Torque - Crankcase Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)



- Check to see that the crankshaft, and out put shaft all turn freely.
- ★ If the crankshaft will not turn, it is probably not centered. Tap the mount portion of the crankcase with a plastic hammer [A] to reposition it. If it does not free up, split the crankcase again and find the cause.
- ★ Spinning the output shaft, shift the transmission through all the gears to make certain there is not binding and that all the gears shift properly.
- Clean the cylinder and oil filter cap of the mating surface and wipe off the liquid gasket forced out.
- Install the removed parts.



8-12 CRANKSHAFT/TRANSMISSION

Crankshaft, Connecting Rod

Crankshaft Disassembly

NOTICE

Since assembly of the crankshaft demands exacting tolerance, the disassembly and reassembly of the crankshaft should only be performed by experienced mechanics with the necessary tools and equipment. The crankpin, connecting rod, and right crankshaft are available separately as spare parts, however it is recommended that the crankshaft assembly be replaced rather than attempting to replace the components.

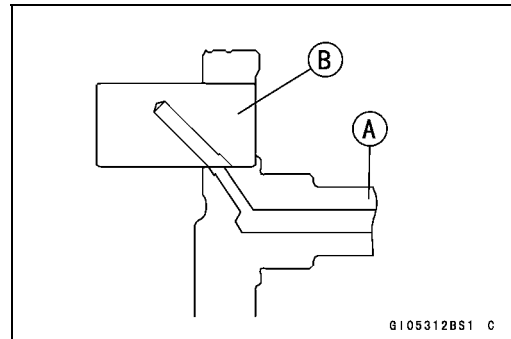
- If it should be necessary to disassemble the crankshaft, follow the following procedures.
- Remove the oil pump drive gear and bearing, using the bearing puller.

Special Tool - Bearing Puller: 57001-158

- Use a press to remove the crankpin.
- Removal of the crankpin separates the flywheels, connecting rod, big end needle bearing, and crankpin.

Crankshaft Assembly

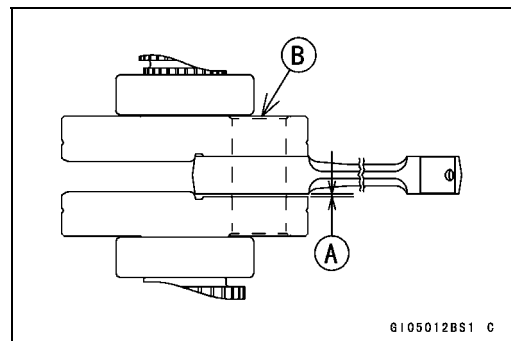
- Carefully align the oil passage hole in the right flywheel [A] with the one in the crankpin [B] at rebuilding of the crankshaft as shown.



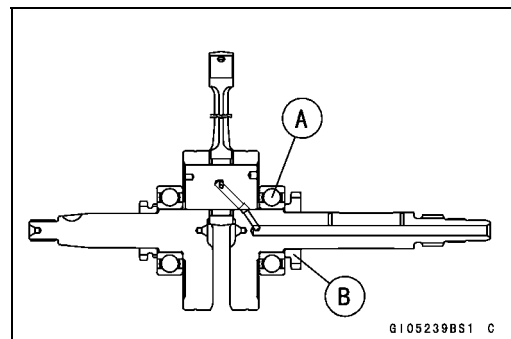
- Apply engine oil to the big end bearing.
- Press the crank halves onto the crankpin, noting the crankpin direction until connecting rod side clearance is within specification as shown.

Side Clearance [A]: 0.1 ~ 0.2 mm (0.004 ~ 0.008 in.)

Crankpin Depth [B]: 0.8 ~ 1.2 mm (0.0315 ~ 0.0472 in.)



- Press the bearing [A] and oil pump drive gear [B] until they bottom out.



Crankshaft, Connecting Rod

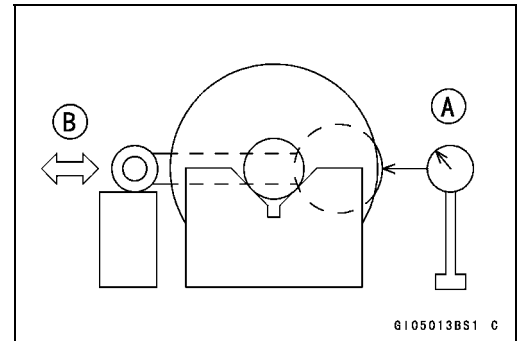
- Check the following items are within specifications after the crankshaft assembly.
 - Connecting Rod Radial Clearance (see Connecting Rod Big End Radial Clearance Inspection)
 - Connecting Rod Side Clearance (see Connecting Rod Big End Side Clearance Inspection)
 - Crankshaft Runout (see Crankshaft Runout Inspection)

Connecting Rod Big End Seizure Inspection

- ★ In the case of serious seizure with damaged flywheels, the crankshaft must be replaced.
- ★ In the case of less serious damage, disassemble the crankshaft and replace the crankpin, needle bearing, side washers, and connecting rod.

Connecting Rod Big End Radial Clearance Inspection

- Set the crankshaft in flywheel alignment jig or on a V block, and place a dial gauge [A] against the big end of the connecting rod.
- Push [B] 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

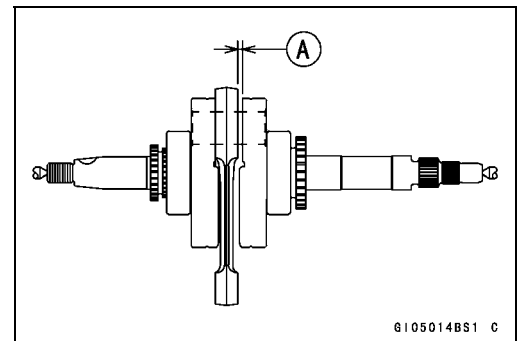
Standard: 0.005 ~ 0.025 mm (0.0002 ~ 0.0010 in.)
Service Limit: 0.07 mm (0.0028 in.)

Connecting Rod Big End Side Clearance Inspection

- Measure the side clearance [A] 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: 0.1 ~ 0.2 mm (0.004 ~ 0.008 in.)
Service Limit: 0.4 mm (0.016 in.)

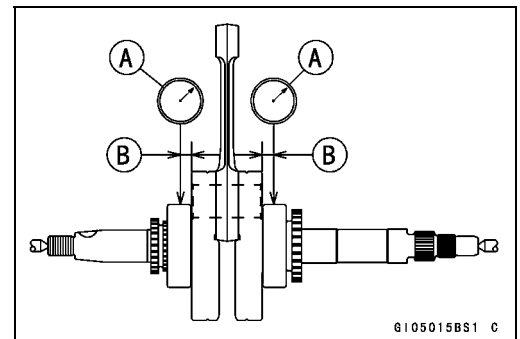


Crankshaft Runout Inspection

- Set the crankshaft in a flywheel alignment jig or on V blocks, and place a dial gauge [A] against the points indicated.
- Measurement Point [B]: 8 mm (0.315 in.)
- Turn the crankshaft slowly. The maximum difference in gauge readings is the crankshaft runout.

Crankshaft Runout

Standard: TIR 0.03 mm (0.001 in.) or less
Service Limit: TIR 0.08 mm (0.003 in.)



8-14 CRANKSHAFT/TRANSMISSION

Crankshaft, Connecting Rod

Crankshaft Alignment

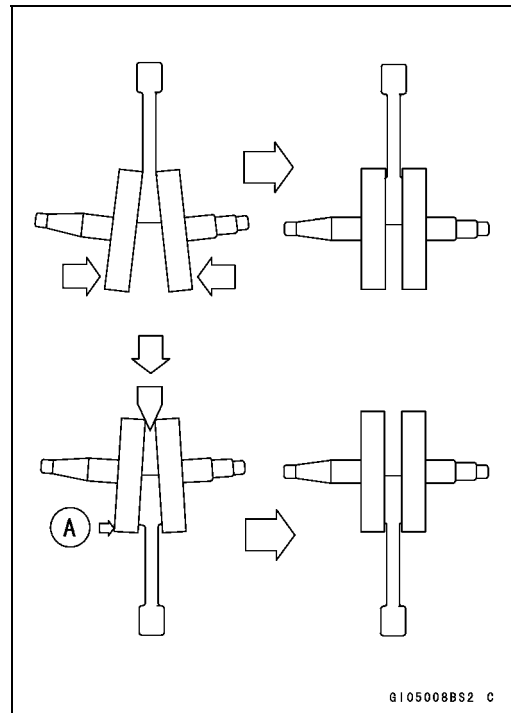
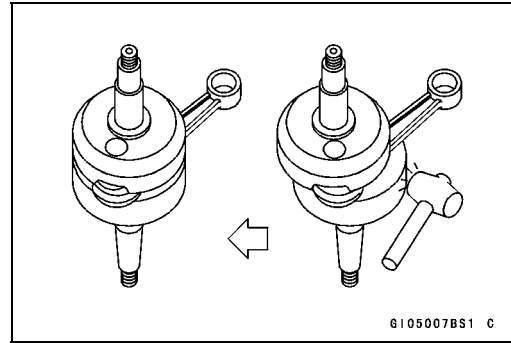
- ★ If the runout at either point exceeds the service limit, align the flywheels so that the runout falls within the service limit.
- In the case of horizontal misalignment, which is the most common, strike the projecting rim of the flywheel with a plastic, soft lead, or brass hammer as indicated in 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 the case of both horizontal and vertical misalignment, correct the horizontal misalignment first.
- Recheck big end side clearance after aligning crankshaft (see Connecting Rod Big End Side Clearance Inspection).

NOTE

○ If crankshaft alignment cannot be corrected by the above method, replace the crankpin or crank halves as required. Recheck the runout and repeat the process until the runout is within service limit.

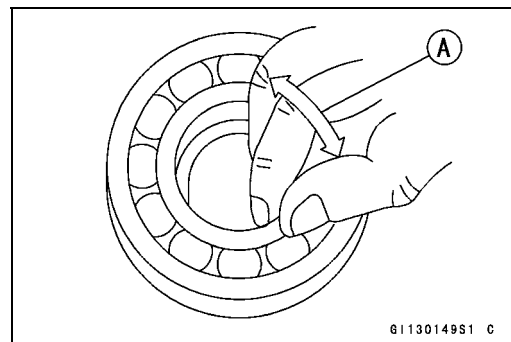
NOTICE

Don't hammer the flywheel at the point [A].



Crankshaft Main Bearing Wear Inspection

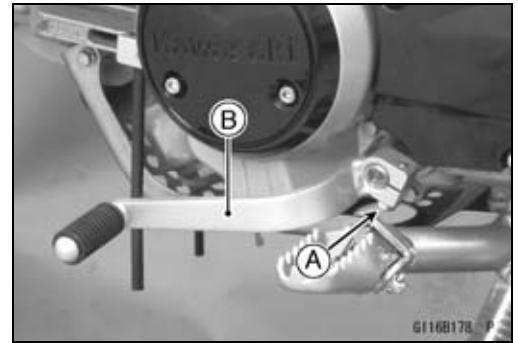
- Wash the bearings in high flash-point solvent, blow them dry (DO NOT SPIN THEM), and lubricate them with engine oil.
- Turn [A] each bearing over by hand and see that it makes no noise, turns smoothly and has no rough spots.
- ★ If any of the bearings are defective, replace them.



External Shift Mechanism

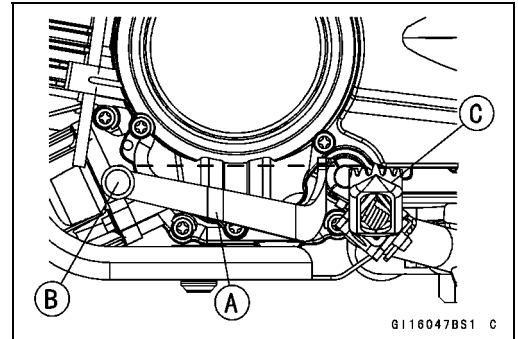
Shift Pedal Removal

- Remove the shift pedal bolt [A] and take off the shift pedal [B] from the shift shaft.



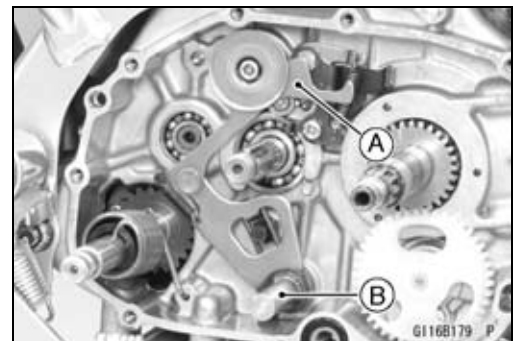
Shift Pedal Installation

- Install the shift pedal [A] to the shift shaft so that the upper surface of pedal [B] is level with the upper surface of footpeg [C].
- Tighten:
Torque - Shift Pedal Bolt: 5.2 N·m (0.53 kgf·m, 46 in·lb)

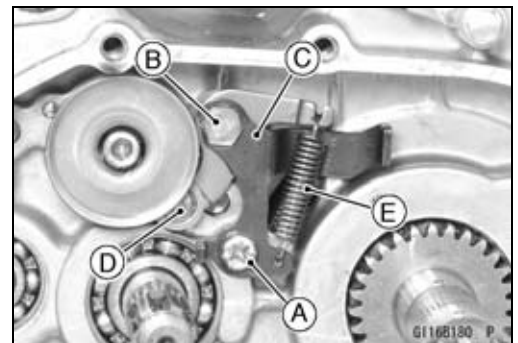


External Shift Mechanism Removal

- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove:
 Clutch (see Clutch Removal (KLX110C/D) in the Clutch chapter)
 Shift Pedal (see Shift Pedal Removal)
- Move the shift mechanism arm [A] out of its position on the end of the shift drum and pull out the shift shaft [B].

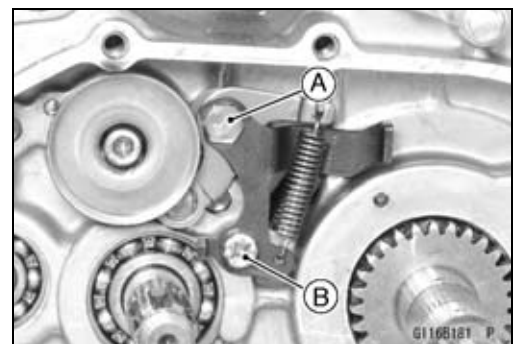


- Remove the screw [A] and pivot bolt [B].
- Remove the gear positioning plate [C], gear positioning lever [D] and its spring [E] as a set.



External Shift Mechanism Installation

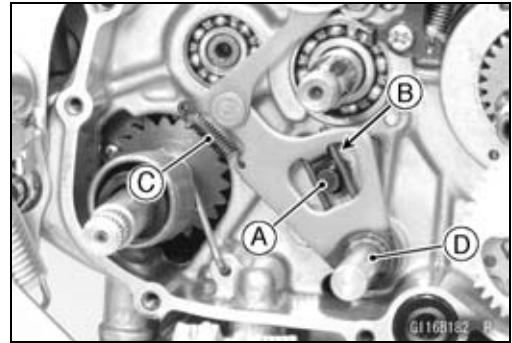
- Apply a non-permanent locking agent to the lever pivot bolt [A].
- Install the gear positioning lever, plate and spring.
Torque - Shift Drum Position Lever Pivot Bolt: 5.2 N·m (0.53 kgf·m, 46 in·lb)
Shift Drum Position Plate Screw [B]: 5.2 N·m (0.53 kgf·m, 46 in·lb)



8-16 CRANKSHAFT/TRANSMISSION

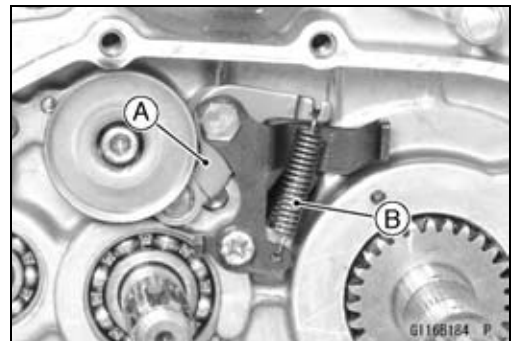
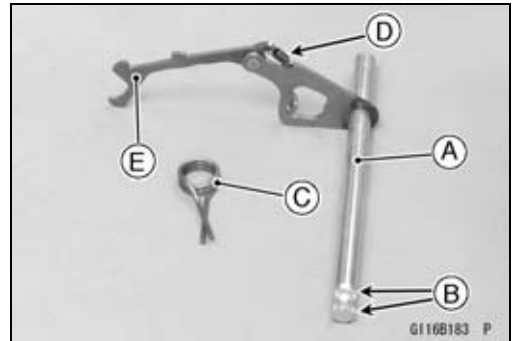
External Shift Mechanism

- Check that the return spring pin [A] is not loose.
- ★ If it is loose, unscrew it, apply a non-permanent locking agent to the threads, and tighten it.
- Torque - Return Spring Pin: 22 N·m (2.2 kgf·m, 16 ft·lb)**
- Check that the return spring [B] and shift arm spring [C] are properly fitted on the mechanism.
- Apply high-temperature grease to the oil seal lips.
- Install the shift shaft [D].
- Install the removed parts (see appropriate chapters).



External Shift Mechanism Inspection

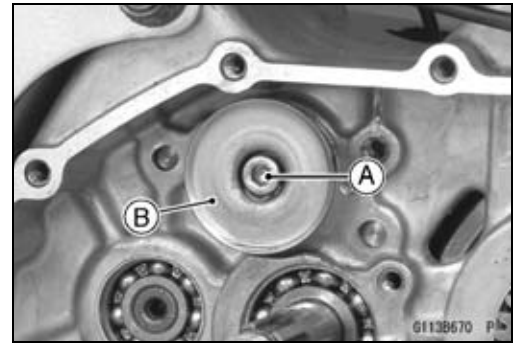
- Examine the shift shaft for any damage.
 - ★ If the shaft [A] is bent, straighten or replace it.
 - ★ If the splines [B] are damaged, replace the shaft.
 - ★ If the return spring [C] and arm spring [D] are damaged in any way, replace them.
 - ★ If the shift pawl [E] is damaged in any way, replace the shift shaft assembly.
-
- Check the gear positioning lever [A] and spring [B] for breaks or distortion.
 - ★ If the lever or springs are damaged in any way, replace them.



Transmission

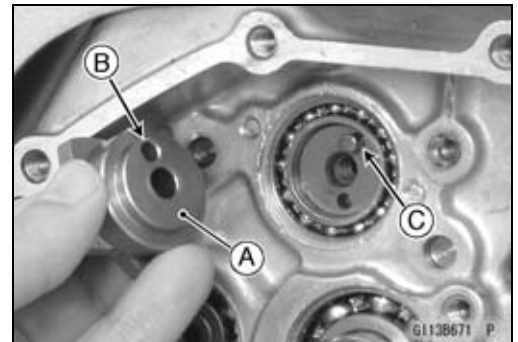
Shift Drum Removal

- Remove:
 - Clutch (see Clutch Removal (KLX110C/D) in the Clutch chapter)
 - External Shift Mechanism (see External Shift Mechanism Removal)
 - Shift Drum Allen Bolt [A]
 - Cam Holder [B]
 - Shift Drum Cam
 - Dowel Pin
- Split the crankcase (see Crankcase Splitting).
- Remove the shift drum.



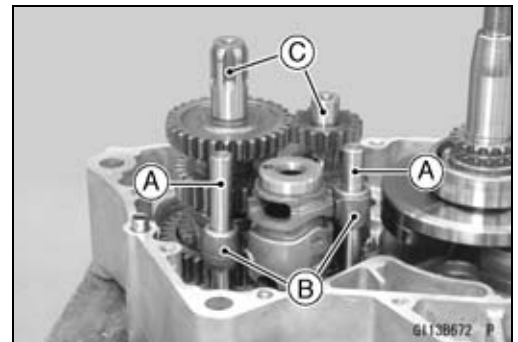
Shift Drum Installation

- Fit the shift drum to the right crankcase half.
 - Install the shift drum cam [A] aligning its hole [B] with the dowel pin [C].
 - Install the cam holder.
 - Apply a non-permanent locking agent to the threads of cam bolt, and tighten it.
- Torque - Shift Drum Cam Bolt: 5.2 N·m (0.53 kgf·m, 46 in·lb)**



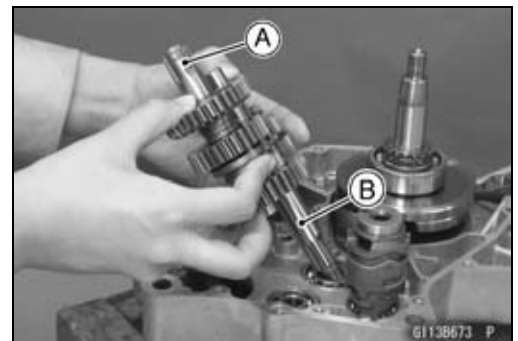
Transmission Removal

- Split the crankcase (see Crankcase Splitting).
- Remove:
 - Shift Rods [A]
 - Shift Forks [B]
 - Transmission Shafts [C]



Transmission Installation

- Apply a clean engine oil to the transmission gears, bearings, and shaft journal, and fit the output [A] and drive shaft [B] assemblies as a set into the right crankcase half.
- Set the shift drum in neutral position.



8-18 CRANKSHAFT/TRANSMISSION

Transmission

- Apply clean engine oil to the shift fork fingers, and fit each shift fork into its gear-groove so that the shift fork guide pin is in the proper shift drum-groove.

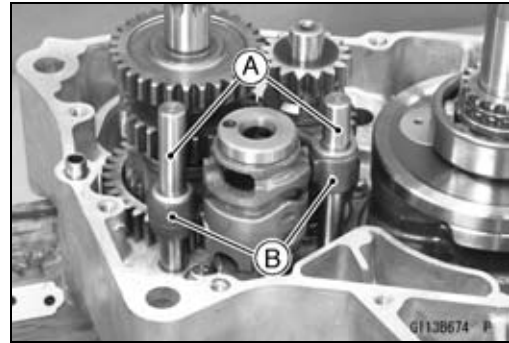
NOTE

○Fingers of the 1st/3rd shift fork are longer than the fingers of the 2nd/4th shift fork.

- Apply clean engine oil to the shift rods [A], and insert each rod running it through each shift fork [B].
- Set the shift drum in neutral position, that is, drive and output shaft turn freely.
- Assemble the crankcase (see Crankcase Assembly).

NOTE

○Shall be checked that it is impossible to shift change from top position to neutral position when output shaft is driven.



Transmission Shaft Disassembly

- Remove the transmission shafts.
- Using the circlip pliers to remove the circlip, disassemble the transmission shaft.

Special Tool - Outside Circlip Pliers: 57001-144

Transmission Shaft Assembly

- Assemble the transmission gears as shown.
- Replace the old circlip with a new one if it is removed.
- The drive shaft gears can be identified by size; the smallest diameter gear is 1st gear, and the largest it 4th. Be sure that all parts are put back in the correct sequence, facing the proper direction, and that the circlip and the washer are properly in place.

2nd Gear [A]

3rd Gear [B]

4th Gear [C]

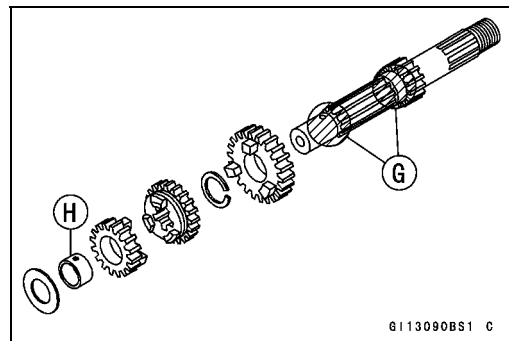
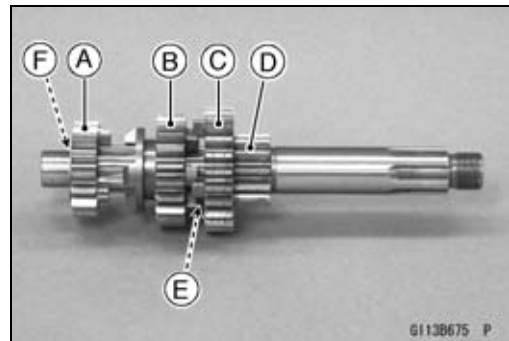
1st Gear [D]

Circlip [E]

Spacer [F]

Apply Engine Oil [G]

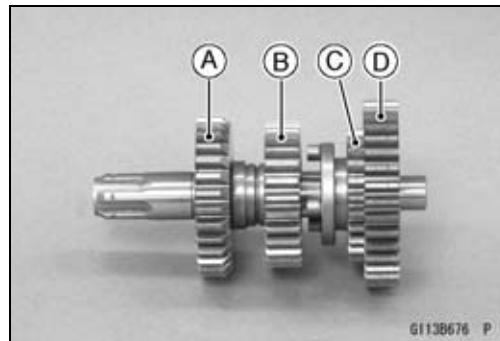
Bushing [H]



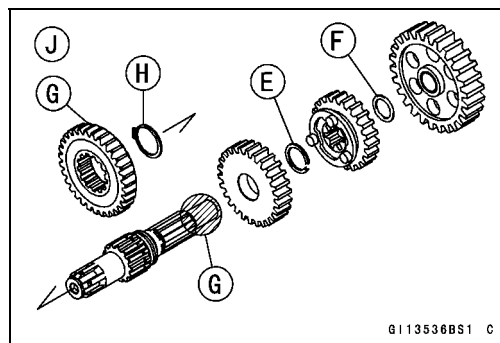
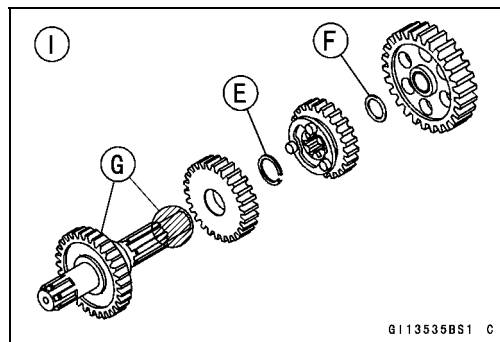
Transmission

○The output shaft gears can be identified by size; the largest diameter gear is 1st gear, and the smallest is 4th. Be sure that all parts are put back in the correct sequence and facing the proper direction, and that the circlip is properly in place.

- 2nd Gear [A]
- 3rd Gear [B]
- 4th Gear [C]
- 1st Gear [D]

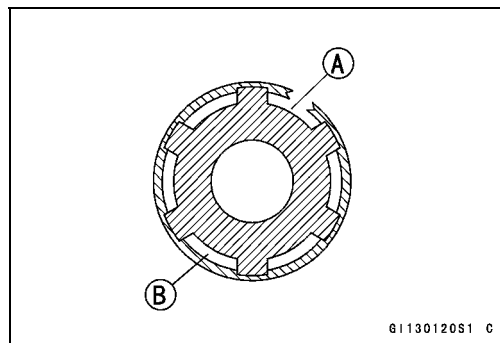


- Circlip [E]
- Spacer [F]
- Apply Engine Oil [G]
- Circlip [H]
- KLX110CA ~ CC, KLX110DA ~ DC Models [I]
- KLX110CD, KLX110DD Models ~ [J]



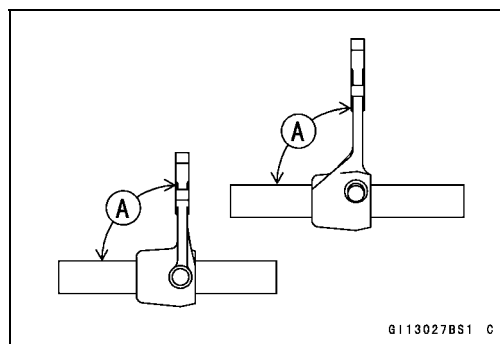
○Always install circlips so that the opening is aligned with a spline groove. To install a circlip without damage, first fit the circlip onto the shaft expanding it just enough to install it, and then use a suitable gear to push the circlip into place.

- [A] Opening of Circlip
- [B] Groove of Shaft Spline



Shift Fork Bending Inspection

- Visually inspect the shift forks, and replace any fork that is bent. A bent fork could cause difficulty in shifting, or allow the transmission to jump out of gear when under power. 90° [A]



8-20 CRANKSHAFT/TRANSMISSION

Transmission

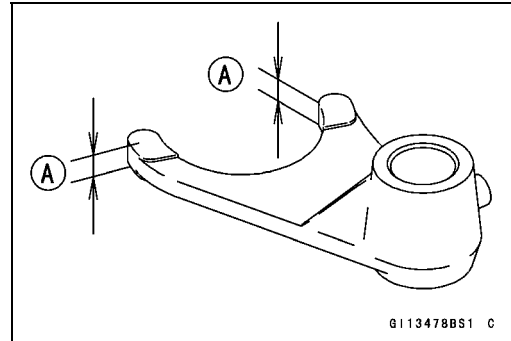
Shift Fork Ear/Gear Shift Fork Groove Wear Inspection

- Measure the thickness [A] of the shift fork ears.
- ★ If the thickness of a shift fork ear is less than the service limit, the shift fork must be replaced.

Shift Fork Ear Thickness

Standard: 3.9 ~ 4.0 mm (0.154 ~ 0.157 in.)

Service Limit: 3.8 mm (0.150 in.)

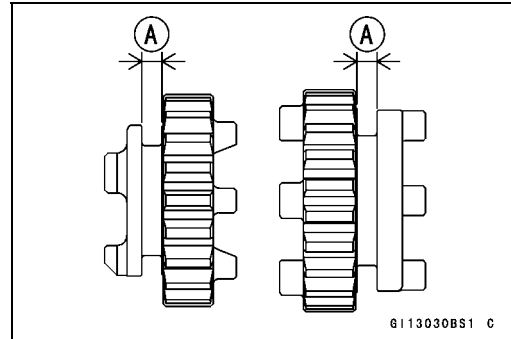


- Measure the width [A] of the gear shift fork grooves in the transmission gears.
- ★ If a gear shift fork groove is worn over the service limit, the gear must be replaced.

Gear Shift Fork Groove Width

Standard: 4.05 ~ 4.15 mm (0.159 ~ 0.163 in.)

Service Limit: 4.3 mm (0.17 in.)



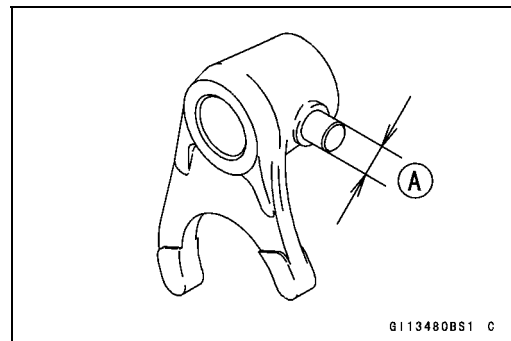
Shift Fork Guide Pin/Shift Drum Groove Wear Inspection

- Measure the diameter [A] of each shift fork guide pin, and measure the width of each shift drum groove.
- ★ If the guide pin on any shift fork is less than the service limit, the fork must be replaced.

Shift Fork Guide Pin Diameter

Standard: 4.9 ~ 5.0 mm (0.193 ~ 0.197 in.)

Service Limit: 4.8 mm (0.189 in.)

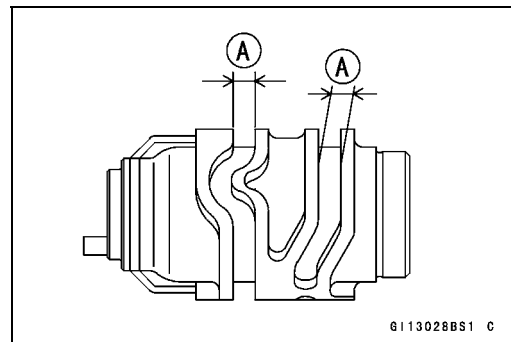


- ★ If any shift drum groove [A] is worn over the service limit, the drum must be replaced.

Shift Drum Groove Width

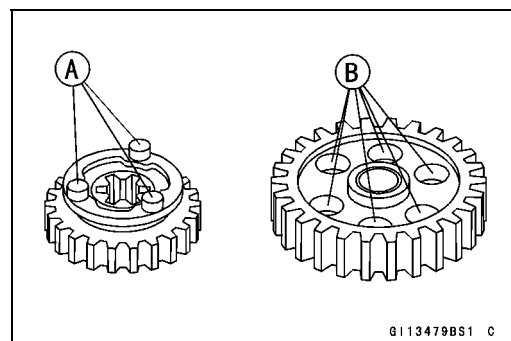
Standard: 5.05 ~ 5.20 mm (0.199 ~ 0.205 in.)

Service Limit: 5.3 mm (0.21 in.)



Gear Dog/Gear Dog Hole Damage Inspection

- Visually inspect the gear dogs [A] and gear dog holes [B].
- ★ Replace any damaged gears or gears with excessively worn dogs or dog holes.



Ball Bearing, Needle Bearing, and Oil Seal

Ball and Needle Bearing Wear Inspection**NOTICE**

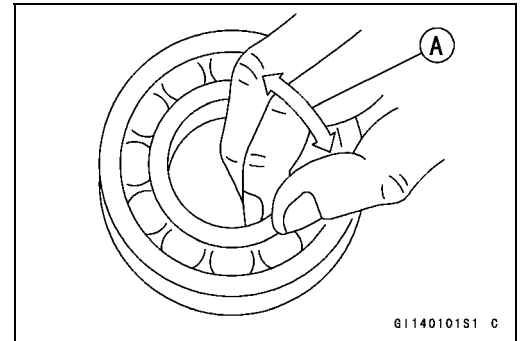
Do not remove the ball bearings for inspection. Removal may damage them.

- Check the ball bearings.
- Since the ball bearings are made to extremely close tolerances, the wear must be judged by feel rather than measurement. Clean each bearing in high flash-point solvent, dry it (do not spin the bearing while it is dry), and oil it with engine oil.
- Spin [A] the bearing by hand to check its condition.
- ★ If the bearing is noisy, does not spin smoothly, or has any rough spots, replace it.

- Check the needle bearings.
- The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.
- ★ If there is any doubt as to the condition of a needle bearing, replace it.

Oil Seal Inspection

- Inspect the oil seal.
- ★ Replace it if the lips are misshapen, discolored (indicating that the rubber has deteriorated), hardened or otherwise damaged.

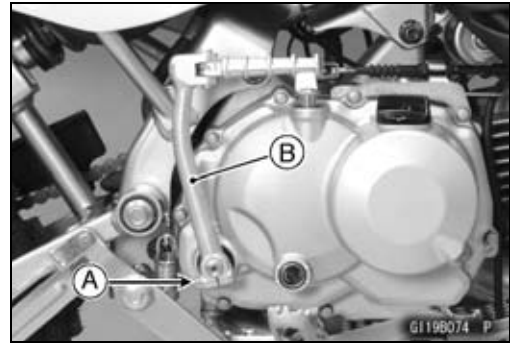


8-22 CRANKSHAFT/TRANSMISSION

Kickstarter

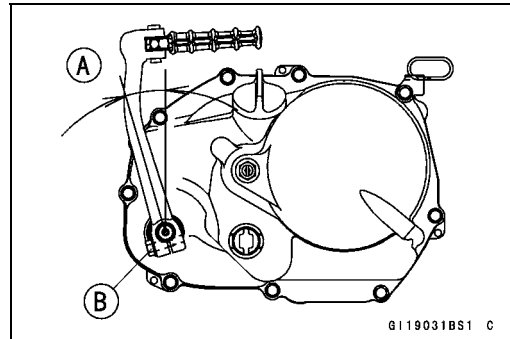
Kick Pedal Removal

- Remove:
 - Bolt [A]
 - Kick Pedal [B]



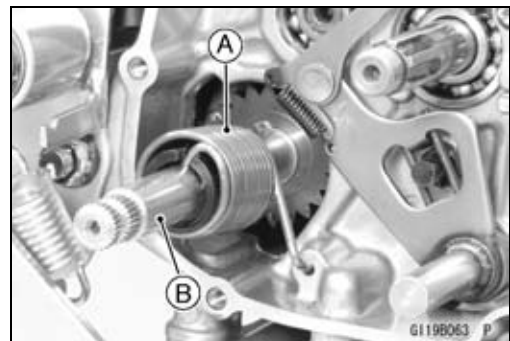
Kick Pedal Installation

- Installation is the reverse of removal.
- Install the kick pedal as shown in the figure.
 - [A] About 16°
- Tighten:
 - Torque - Kick Pedal Bolt [B]: 8.8 N·m (0.90 kgf·m, 78 in·lb)



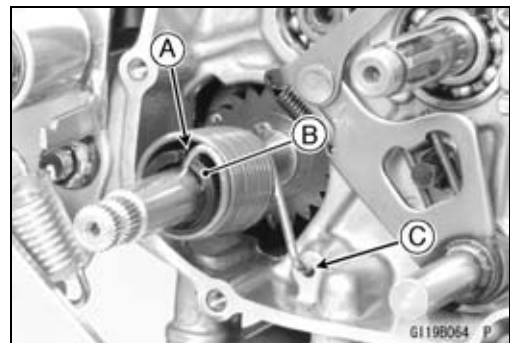
Kick Shaft Removal

- Remove the clutch (see Clutch Removal (KLX110C/D) in the Clutch chapter).
- Remove the return spring [A] with pliers.
- Remove the kick shaft assembly [B], twisting it counter-clockwise.
- There is a thrust washer between the kick shaft end and the crankcase.



Kick Shaft Installation

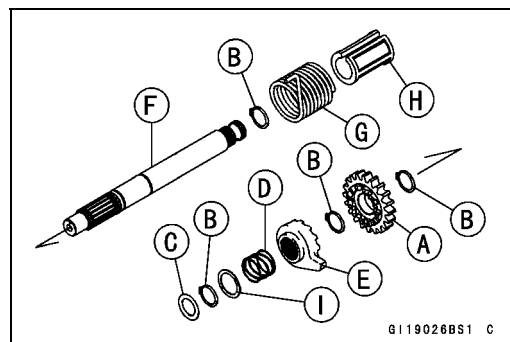
- Apply molybdenum disulfide grease to the thrust washer.
- Fit the return spring end [A] into the kick shaft and install the plastic spring guide [B].
- Put the thrust washer on the kick shaft end, and fit the kick shaft assembly in the crankcase.
- Insert the other spring end [C] into the crankcase.



Kick Shaft Disassembly/Assembly

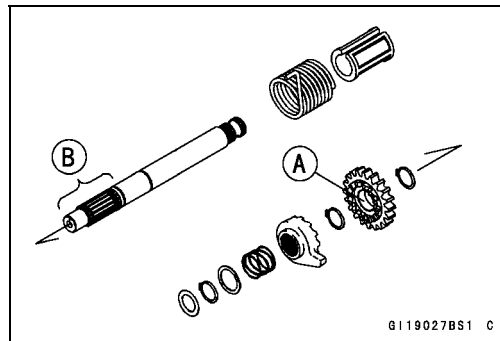
- The kick shaft assembly consists of the following parts.

- [A] Kick Gear
- [B] Circlips
- [C] Washer ($\phi 20 \times \phi 13.2$)
- [D] Spring
- [E] Ratchet Gear
- [F] Kick Shaft
- [G] Return Spring
- [H] Spring Guide
- [I] Washer ($\phi 22 \times \phi 16.8$)

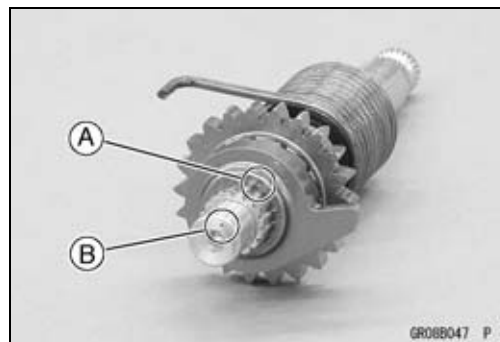


Kickstarter

- Apply molybdenum disulfide grease to the inside of the kick gear [A] and kick shaft [B].
- Replace the removed circlips with new ones.

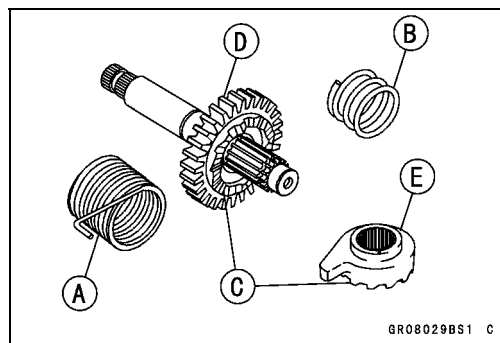


○When assembling the ratchet gear onto the kick shaft, align the punch mark [A] on the ratchet gear with the punch mark [B] on the kick shaft.



Kick Shaft Inspection

- Visually inspect the parts and portion listed below.
 - Kick shaft return spring [A]
 - Ratchet gear spring [B]
 - Ratchet portion [C] of the kick gear [D] and ratchet gear [E]
- ★ If there is any kind of damage, replace the damaged part.



- Measure the kick shaft diameter [A] where the kick gear fits.
- ★ If it is under the service limit, replace the shaft.
- Measure the inside diameter [B] of the kick gear.
- ★ If it exceeds the service limit, replace the gear.

Kick Shaft, Kick Gear Inside Diameter

Standard:

Kick Shaft	15.941 ~ 15.968 mm (0.62760 ~ 0.62866 in.)
Kick Gear	16.000 ~ 16.018 mm (0.62992 ~ 0.63063 in.)

Service Limit:

Kick Shaft	15.91 mm (0.6264 in.)
Kick Gear	16.04 mm (0.6315 in.)

