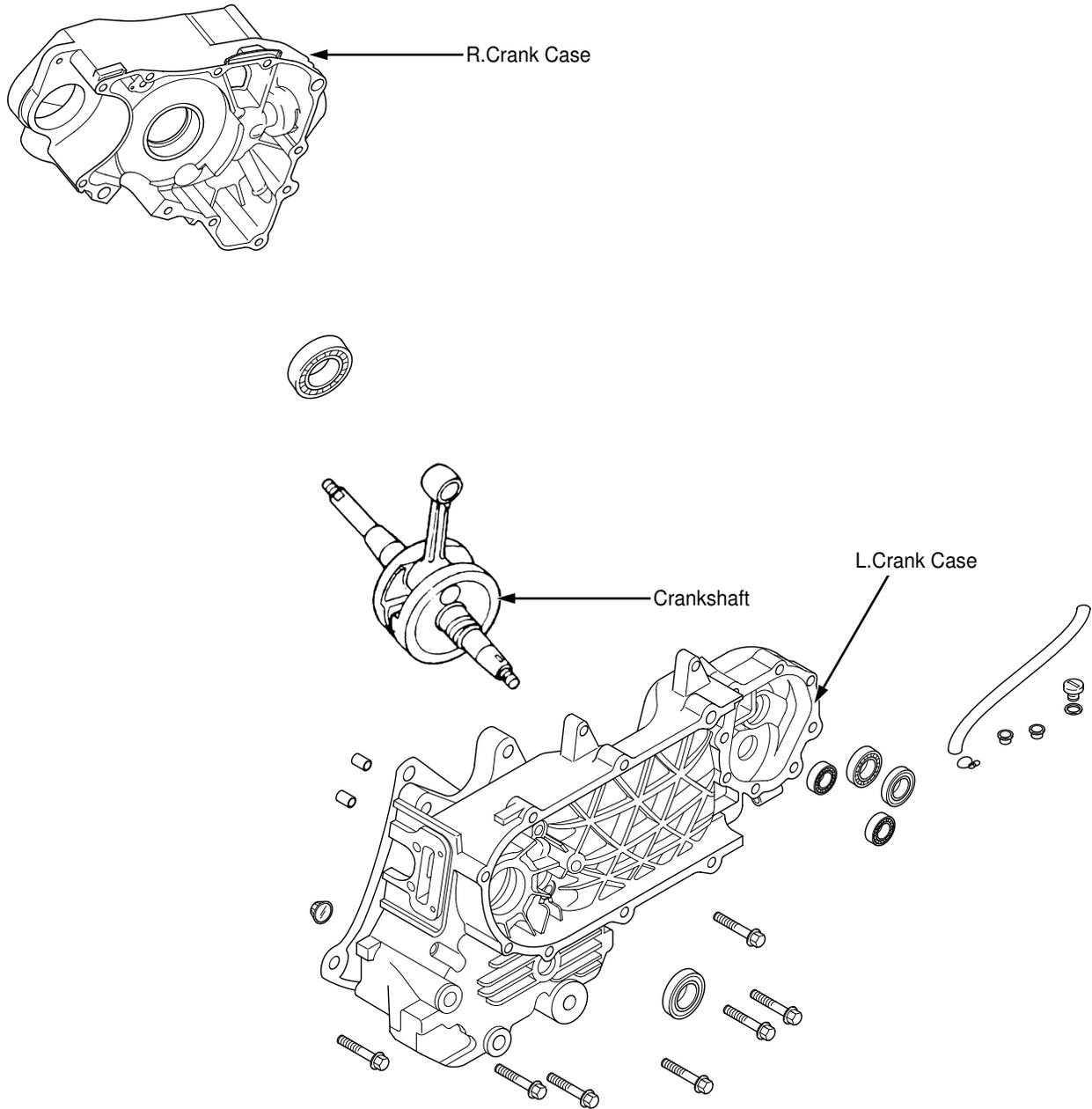


# Transmission/Crankshaft/Crank Case

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## 11. Transmission/Crankshaft/Crank Case

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### Service Information

#### General Safety

This section describes how to remove the crank case and to maintain the transmission and the crankshaft. Service transmission without removing the engine from the vehicle. However, to prevent damage to the L. crank case, remove the engine and disassemble the rear brake prior to changing the L. crank case bearing. Always use special tools to change the drive shaft. Fix the bearing inner race, and install the shaft. The following parts must be removed prior to removing the crank case. Follow the removal procedure specified in each section.

- Oil pump ( section 3)
- Carburetor ( section 5)
- Engine ( section 6)
- Cylinder head, cylinder, and piston ( section 9 and 10)
- AC generator ( section 8)
- Drive pulley ( section 7)
- Clutch / driven pulley ( section 7)

The following parts must be removed prior to changing the L. crank case. Follow the removal procedure specified in each section.

- Transmission ( section 11)
- Rear brake ( section 13)

To assemble the crank case and crankshaft, set the special tool to the inner race of the crankshaft bearing, and push and assemble. Remove the bearing from the crankshaft during disassembling work, and insert a new bearing in the case. Install the oil seal after the case is assembled.

#### Specifications

Unit: mm(in)

	Item	Standard value	Service Limit	
Crankshaft	Connecting rod big end side clearance	0.1~0.35(0.0039-0.0138)		
	Radial clearance	0-0.008(0-0.003)	0.05(0.002)	
	Crankshaft runout	Right	-	0.1(0.004)
		Left	-	0.1(0.004)

### **Torque value**

Crank case bolt 1.0kg-m(10N.m, 7ft-lb)

### **Tools**

- Universal bearing puller
- Bearing remover set
- Remover assembly
- Remover shaft
- Remover head
- Sliding weight
- Assembly shaft

## **Troubleshooting**

### **Engine noise**

Connecting rod big and small ends loose.  
Crank pin bearing loose.

### **Engine started but unable to move out**

Transmission damaged.  
Transmission seized.

### **Noise during operation**

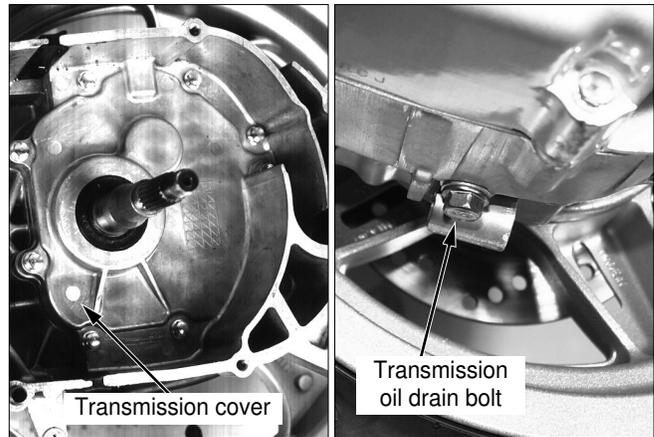
Gear worn, overheated, or cracked.  
Bearing worn.

### **Oil leaks**

Excessive oil level  
Oil seal worn or damaged.

## Transmission

Loosen the drain bolt and remove the transmission oil.  
 Remove R. crank case cover. ( section 8)  
 Remove the continuously variable transmission.  
 ( section 7)  
 Remove the rear wheel. ( section 13)  
 Loosen the 8 transmission cover bolts.  
 Remove the transmission cover.



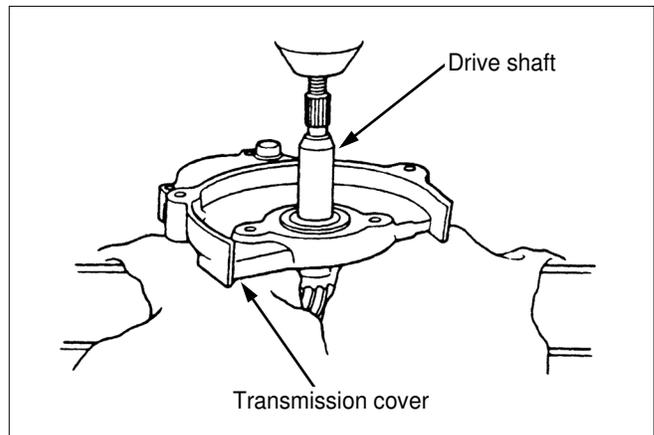
Remove the gasket and dowel pin.



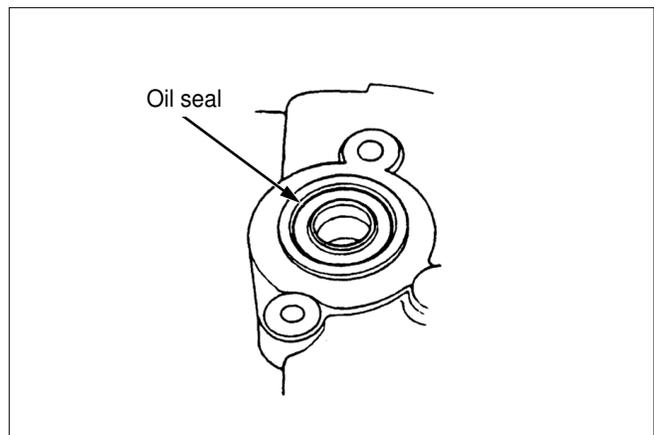
Remove the drive shaft from the transmission cover by using a hydraulic press.

### NOTE

Take precautions not to damage the cover joints.



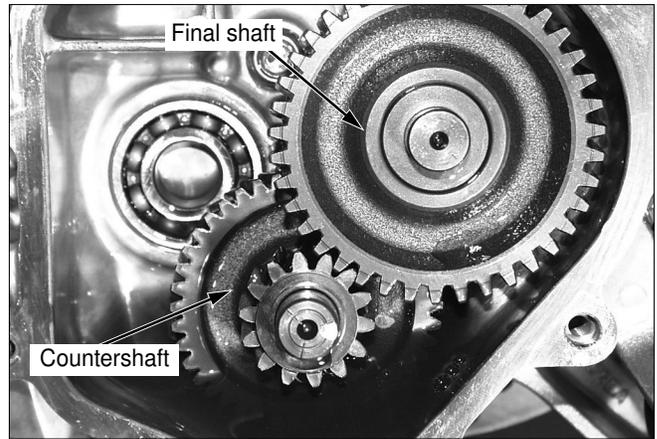
Remove the oil seal of the drive shaft.



## Transmission/Crankshaft/Crank Case

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Remove the final shaft and the countershaft comp.



### Inspection

Check the drive shaft for wear or damage.



Check the final shaft for wear or damage.



Check the countershaft for wear or damage.

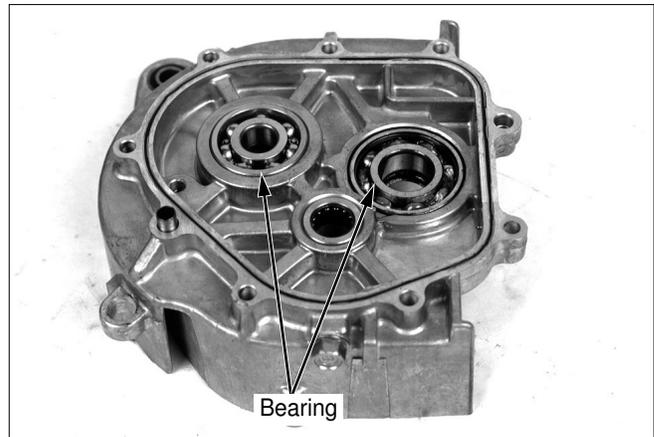


## Bearing inspection

Manually turn the bearing inner race installed inside the transmission cover, and check if the race is turning smoothly.

Verify the outer race is accurately installed in the case.

Replace the bearing, if necessary.



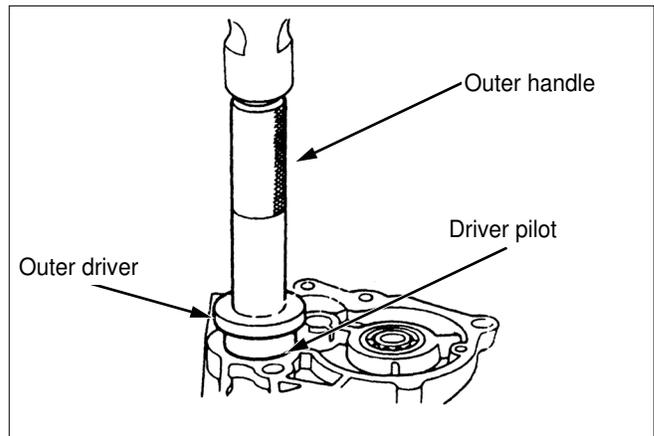
Use special tools to push in the bearing into the case.

**Tools: Driver handle A**

**Outer Driver**

**Driver pilot**

Check the L. crank case oil seal for wear or damage.



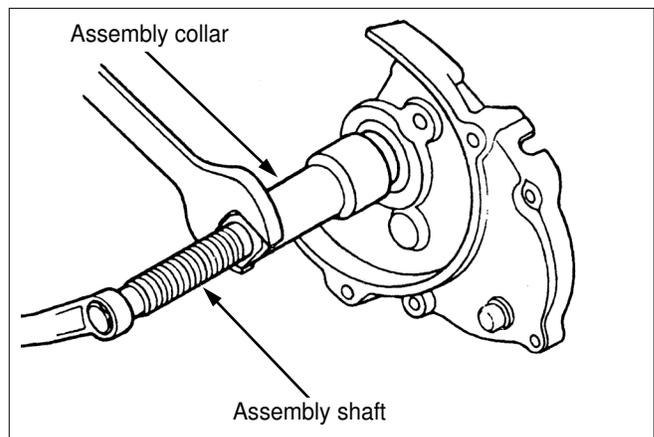
## Installation

Install the drive shaft on the transmission cover.

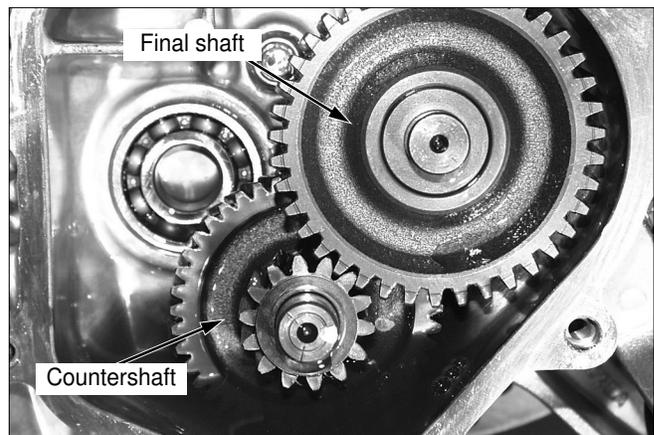
Install a new drive shaft oil seal.

**Tools: Crank assembly shaft**

**Crank assembly collar**



Install the final shaft and counter gear on the L. crank case.



## Transmission/Crankshaft/Crank Case

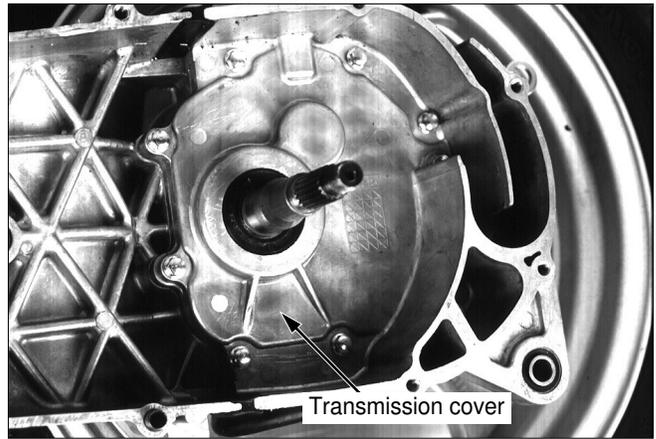
Install a new gasket and dowel pin.



Tighten the transmission cover with setting bolts.

- Assemble the rear wheel ( section 13)
- Assemble continuously variable transmission ( section 8)
- Assemble the R. crank case cover ( section 8)

Fill transmission oil.



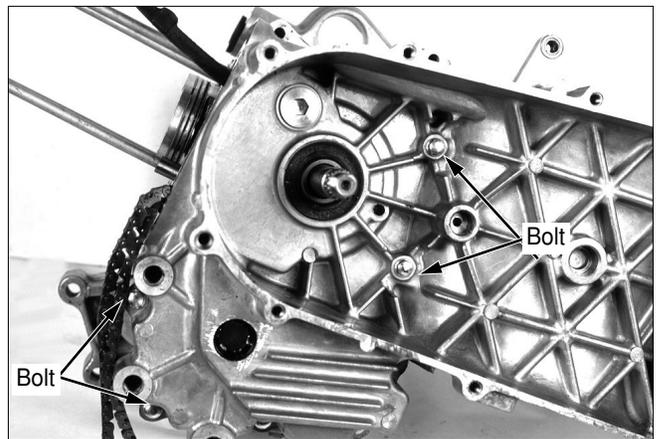
## Crank Case Disassembly

Remove the engine from the frame. ( section 6)

Remove the R/L crank case cover.

Remove the transmission cover.

Remove the parts to disassemble crank case.



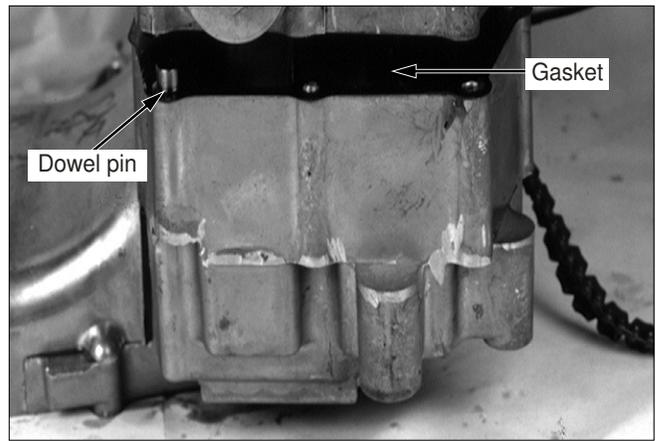
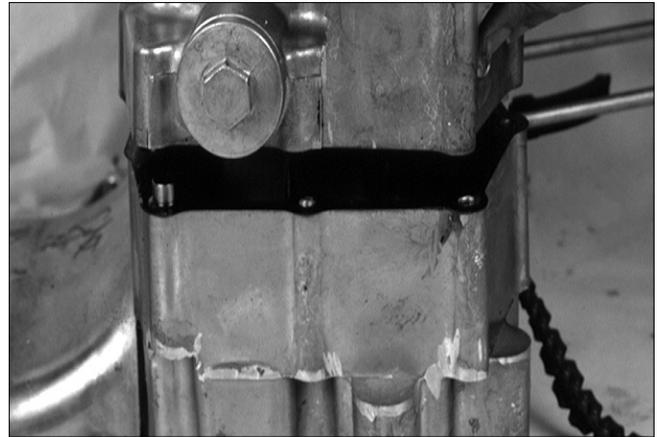
Loosen the seven R/L crank case setting bolts.

Remove the crank case bleeder tube.  
Face the L. crank case downward.  
Disassemble the R. crank case from the L. crank case while tapping a few places on the L. crank case with a plastic hammer.

**NOTE**

Be careful not to distort the mating surface of the crank case during disassembly.

Disassemble the dowel pin and gasket.

**Crankshaft Disassembly**

Remove the R. crank case cover.( 8-4)  
Remove the L. crank case cover.( 7-2)  
Remove the crankshaft from the R. crank case by using a crankshaft remover.  
If there is the bearing left in the L. crank case, use the driver handle and the outer driver to remove it.

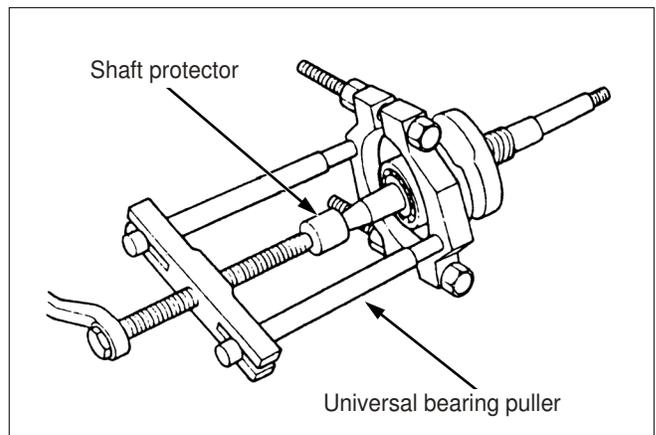
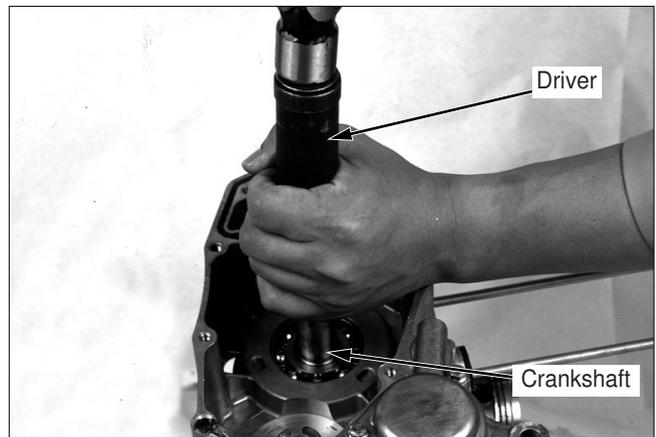
**Tool : Driver**  
**Attachment, 42×47mm**

If there is the bearing left in the crankshaft, use a bearing puller to remove it.

**Tool: Universal bearing puller**

**NOTE**

After removing the crankshaft from the R. crank case, replace the R. crankshaft bearing with a new one.

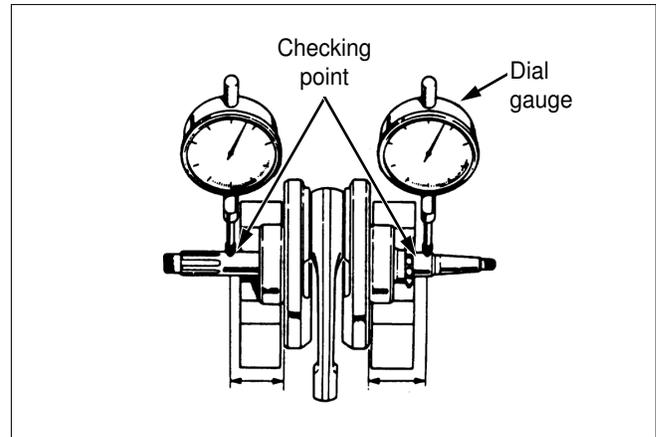


## Inspection

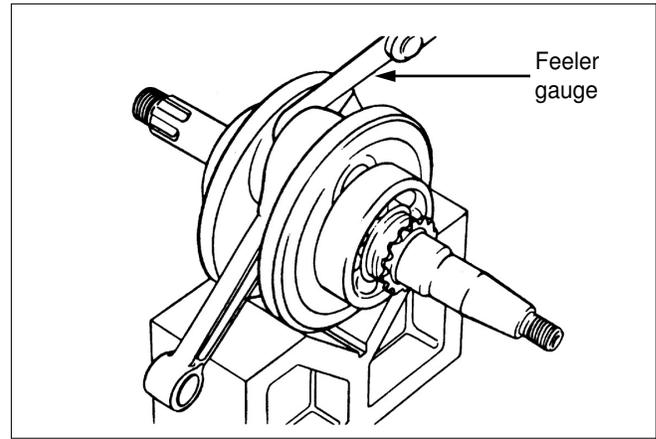
Place the crankshaft on a stand or V-block, and check the journal vibration.

**Service limit: Right side 0.1mm (0.004in)**

**Left side 0.1mm(0.004in)**

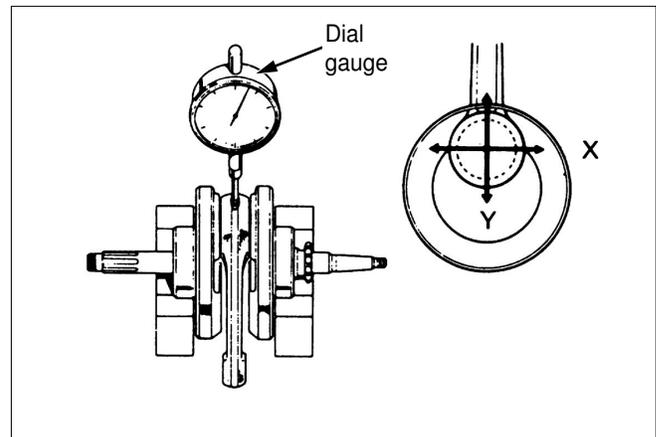


Measure the side gap between the connecting rod big end and the crank weight.



Check the vertical shaft play of the connecting rod big end from the X and Y direction.

**Service limit: 0.05mm (0.002in)**



## Crankshaft Bearing

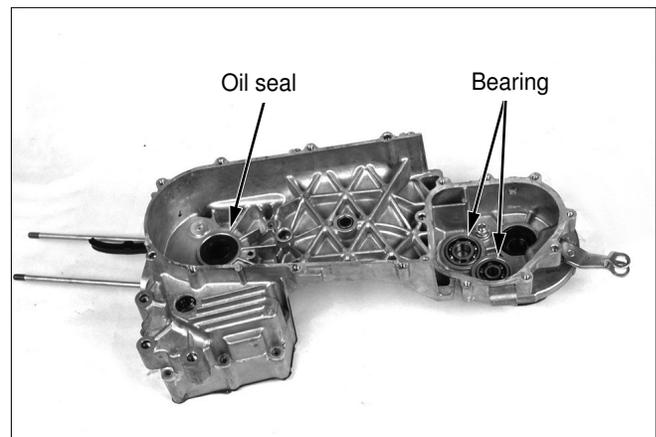
Remove the transmission and crankshaft.

### Inspection

Manually turn the bearing inner race to see if it rotates smoothly.

Check the outer race to see if it is accurately pressed into the case.

If the outer race is excessively loose, or is loosely pressed into the case, remove it and replace with a new one.



## Replacement

### L. crank case

Use special tools to remove the drive shaft bearing.

**Tools: Bearing remover set**

**Remover shaft**

**Remover head**

Remove the final shaft bearing and oil seal.

Remove the countergear bearing.

Apply clean engine oil to a new bearing, and assemble it to the crank case.

**Tools: Main shaft bearing:**

**Driver**

**Attachment, 32 × 35mm**

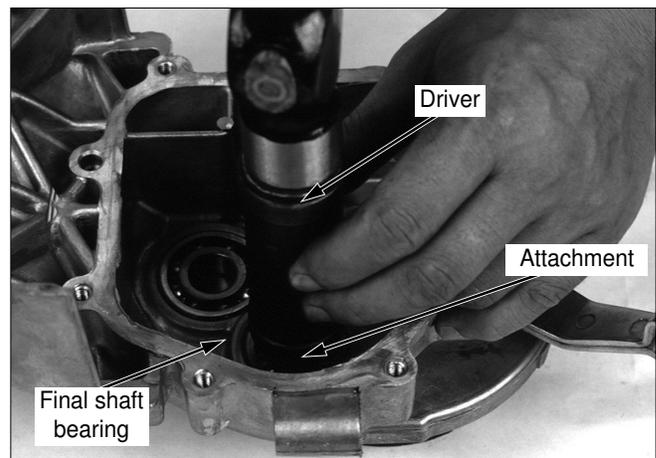
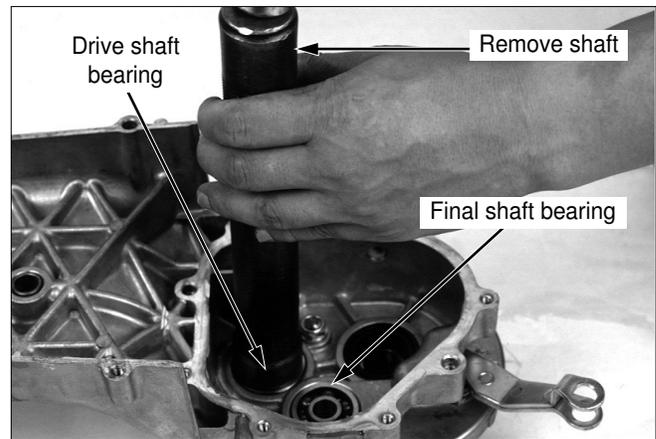
**Countershaft bearing:**

**Driver**

**Attachment, 42 × 47mm**

**Pilot 20mm**

Install a new final shaft oil seal.



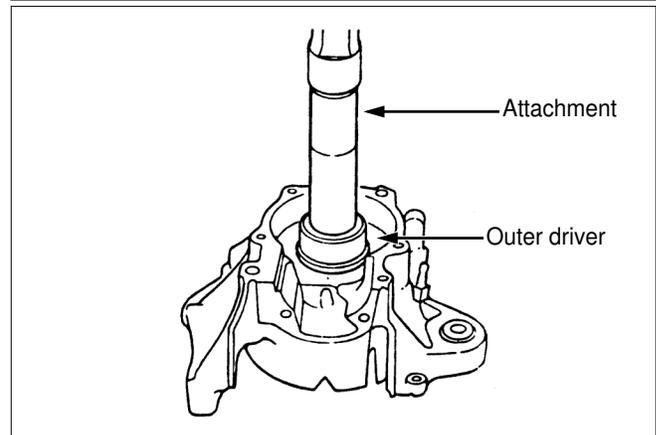
## Crankshaft Assembly

Apply clean engine oil to the new R. crankshaft bearing, and press in the bearing into the R. crank case.

**Tools: Driver**

**Attachment, 72 × 75mm**

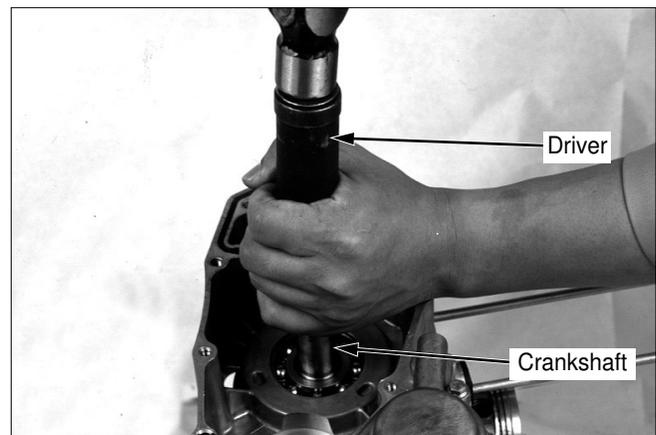
**Pilot, 35mm**



Use special tools to assemble the crankshaft to the L. crank case.

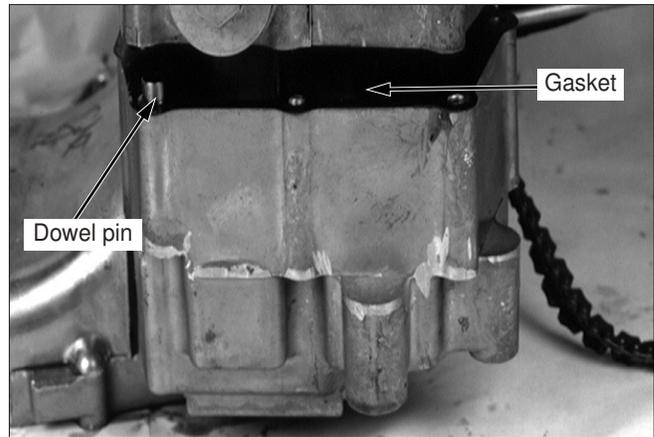
**Tools: Assembly shaft**

**Crankshaft assembly collar**



## Crank Case Assembly

Install dowel pins and new gaskets.



Assemble the R. crank case to the L. crank case.

### NOTE

Make sure that the gasket is completely attached without any clearance.



Tighten the crank case bolts.

**Torque value: 1.0kg-m (10N.m,7ft-lb)**

- Install the R/L crank case cover.
  - Assemble the disassembled parts.
- Install the engine on the frame.

