

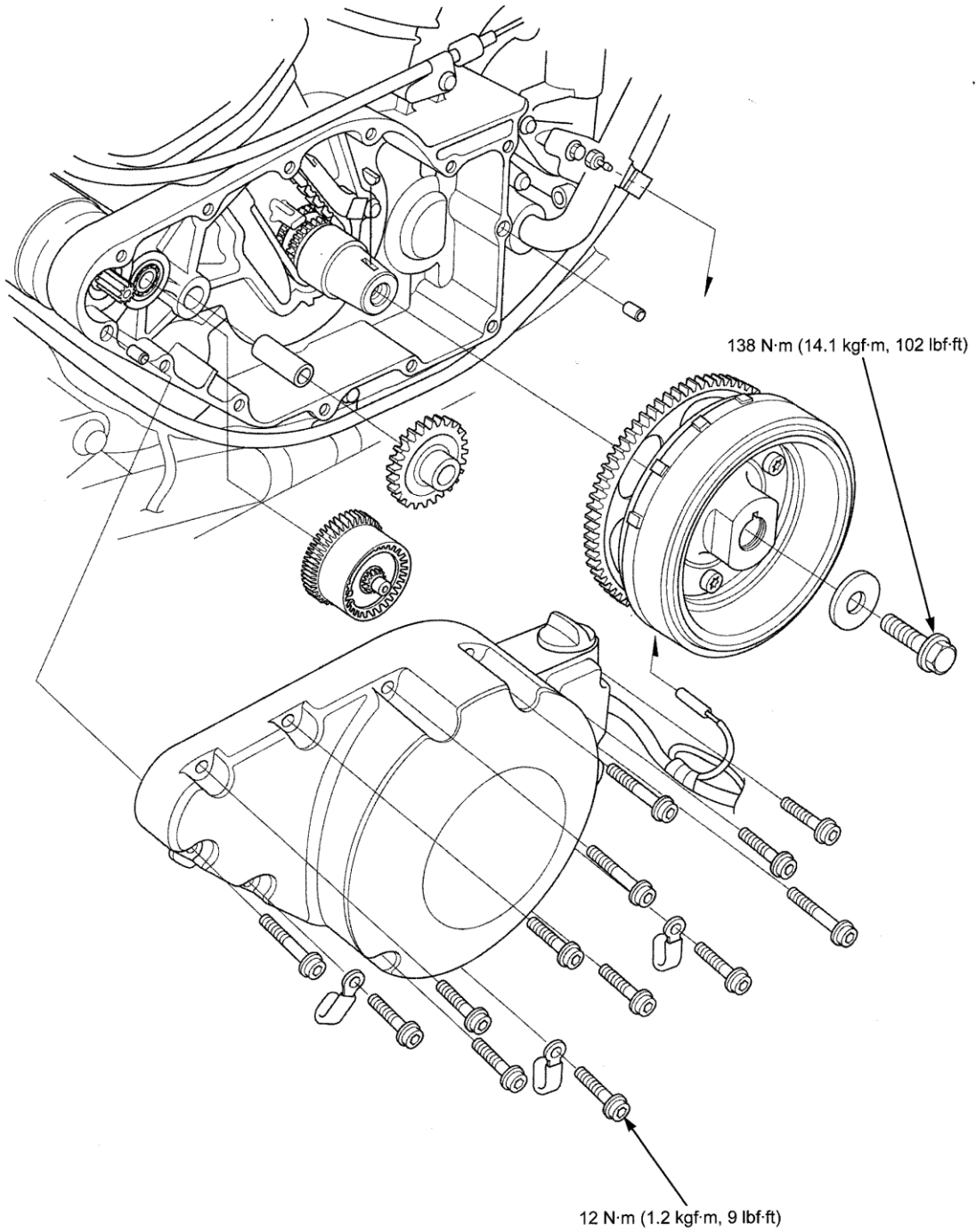
# 12. ALTERNATOR/STARTER CLUTCH

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**ALTERNATOR/STARTER CLUTCH  
COMPONENT LOCATION**

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**SERVICE INFORMATION**

**GENERAL**

- This section covers service of the stator and flywheel/starter clutch. All service can be done with the engine installed in the frame.
- For alternator inspection (page 19-10).
- For starter motor service (page 21-6).

**SPECIFICATIONS**

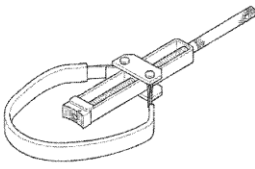
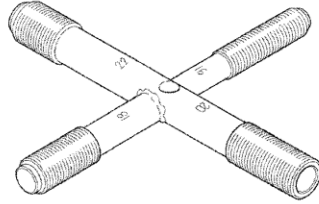
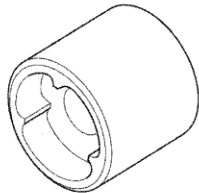
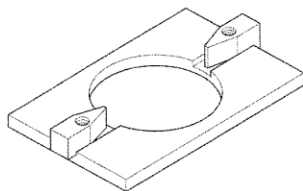
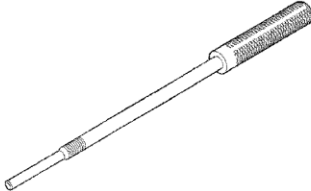
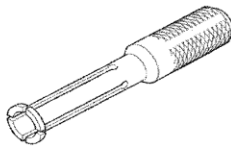
ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	44.000 – 44.016 (1.7323 – 1.7329)	44.10 (1.736)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.639 (2.2692)
Starter clutch outer I.D.		74.414 – 74.440 (2.9297 – 2.9307)	74.46 (2.931)
Torque limiter slip torque		52.9 – 84.3 N·m (5.4 – 8.6 kgf·m, 39 – 62 lbf·ft)	–

Unit: mm (in)

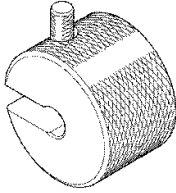
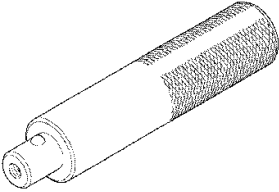


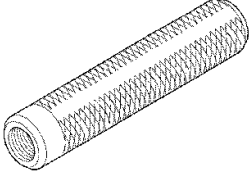
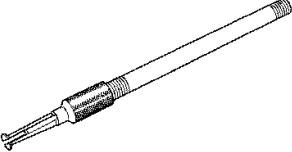
**TORQUE VALUES**

Left crankcase cover socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply engine oil to the threads. Apply locking agent to the threads. Apply locking agent to the threads. Apply locking agent to the threads. Apply locking agent to the threads.
Flywheel bolt	138 N·m (14.1 kgf·m, 102 lbf·ft)	
Stator mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Starter clutch socket bolt	29 N·m (3.0 kgf·m, 21 lbf·ft)	
CKP sensor mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Stator wire clamp bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	

**TOOLS**

<p>Flywheel holder 07725-0040001</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Rotor puller 07733-0020001</p>  <p>or 07933-3290000 (U.S.A. only)</p>	<p>Torque limiter attachment 07YMJ-MCF0100</p>  <p>U.S.A. loan program tool</p>
<p>Torque limiter inspection stopper tool A 07YMJ-MCF0200</p>  <p>U.S.A. loan program tool</p>	<p>Bearing remover shaft 07936-GE00100</p>  <p>Not available in U.S.A.</p>	<p>Bearing remover head, 10 mm 07936-GE00200</p>  <p>Not available in U.S.A.</p>

## ALTERNATOR/STARTER CLUTCH

<p>Remover weight 07741-0010201</p>  <p>or 07936-371020A (U.S.A. only)</p>	<p>Driver 07749-0010000</p> 	<p>Attachment, 24 x 26 mm 07746-0010700</p> 
<p>Pilot, 10 mm 07746-0040100</p> 	<p>Remover handle 07936-3710100 (U.S.A. only)</p> 	<p>Bearing remover, 10 mm 07936-GE0A000 (U.S.A. only)</p> 

## TROUBLESHOOTING

### Starter motor turns, but engine does not turn

- Faulty starter clutch
- Damaged reduction gear
- Damaged starter idle gear
- Faulty torque limiter
- Damaged or faulty starter motor pinion gear

### Engine does not turn

- Faulty starter clutch
- Damaged reduction gear
- Damaged starter idle gear
- Damaged or faulty starter motor pinion gear

## LEFT CRANKCASE COVER REMOVAL

Drain the following:

- Engine oil (page 4-13)
- Coolant (page 7-7)

Remove the following:

- Left crankcase rear cover (page 3-7)
- Left main step (page 3-4)

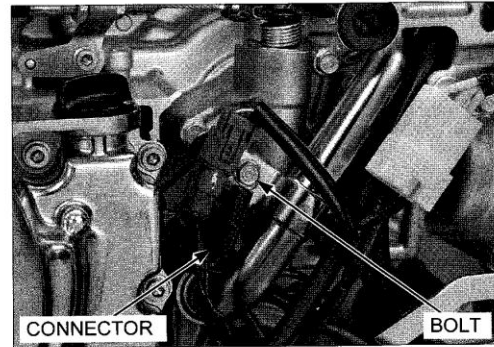
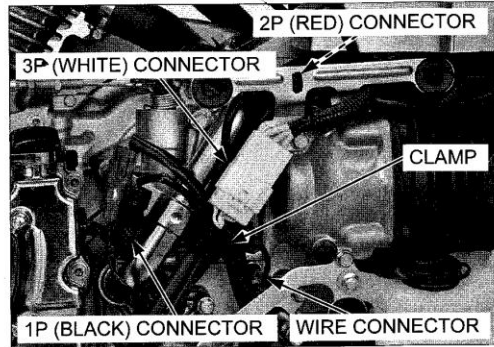
Remove the clamp.

Disconnect the following:

- CKP sensor 2P (Red) connector
- Alternator 3P (White) connector
- Neutral switch 1P (Black) connector
- Neutral switch wire connector

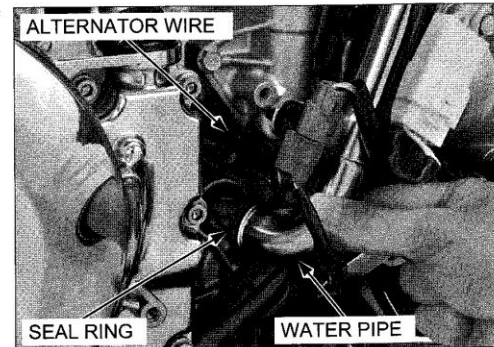
Remove the neutral switch 1P (Black) connector from the water pipe stay.

Remove the bolt.



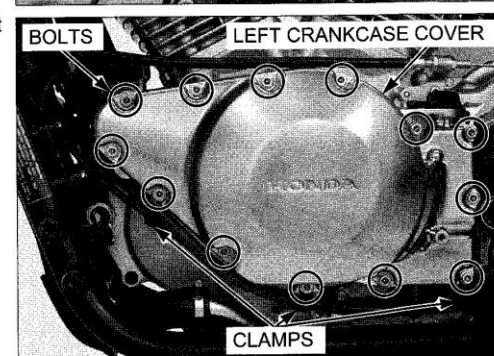
Disconnect the water pipe to get the clearance for alternator connector removal.

Remove the seal ring from the water pipe.



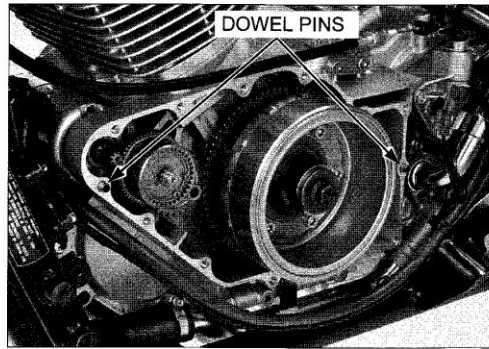
*Loosen the socket bolts in a crisscross pattern in several steps.*

Remove the socket bolts, cable clamps and the left crankcase cover.



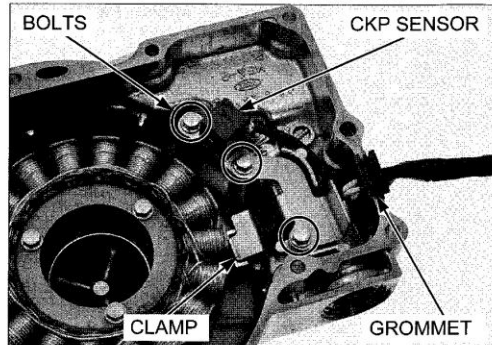
## ALTERNATOR/STARTER CLUTCH

*Be careful not to damage the mating surface.* Remove the dowel pins.

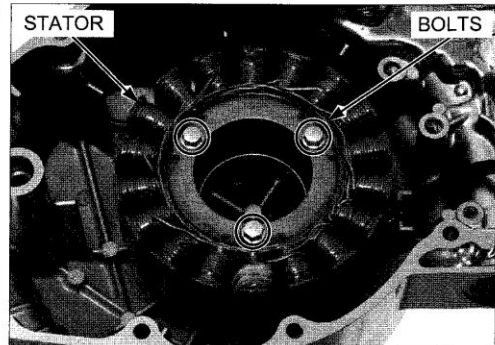


## STATOR REMOVAL

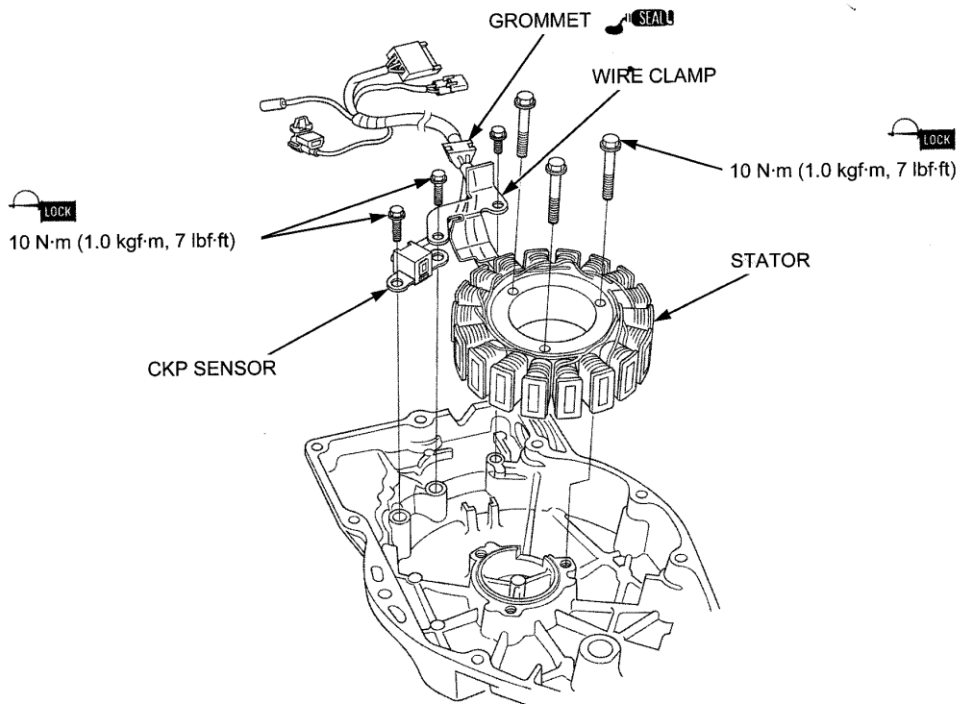
Remove the left crankcase cover (page 12-5).  
Remove the bolts, wire clamp and CKP sensor from the left crankcase cover.  
Remove the wire grommet from the left crankcase cover groove.



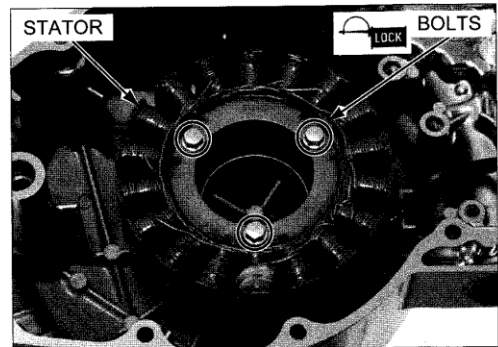
*Loosen the bolts in several steps.* Remove the bolts and stator from the left crankcase cover.



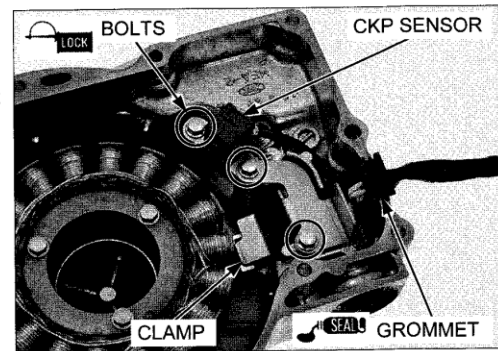
**STATOR INSTALLATION**



Install the stator onto the left crankcase cover.  
 Apply locking agent to the stator mounting bolt threads (page 1-17).  
 Install and tighten the bolts to the specified torque in several steps.  
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



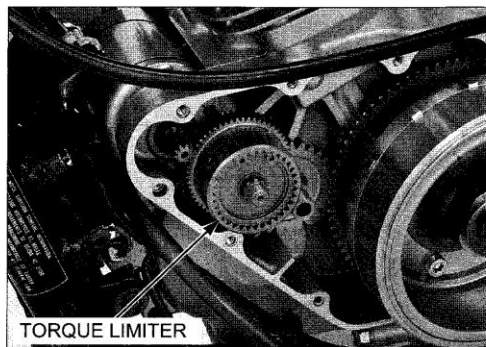
Apply liquid sealant (Three Bond 1207B or equivalent) to the wire grommet sealing surface and install the grommet to the left crankcase cover groove.  
 Apply locking agent to the CKP sensor mounting bolt and wire clamp bolt threads (page 1-17).  
 Install the CKP sensor, wire clamp and mounting bolts, and tighten the bolts to the specified torque.  
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



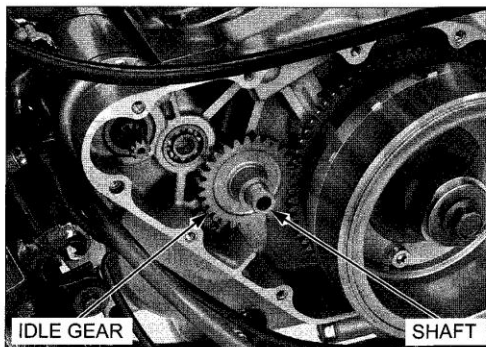
# STARTER TORQUE LIMITER/IDLE GEAR

## REMOVAL

Remove left crankcase cover (page 12-5).  
Remove the starter torque limiter.



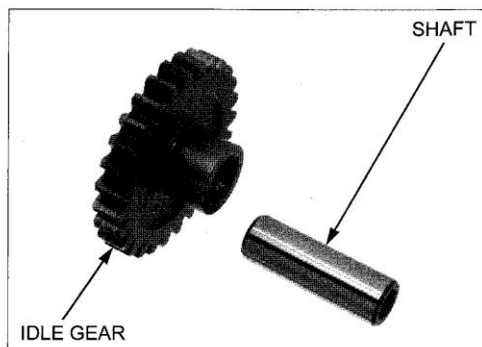
Remove the idle gear shaft and idle gear.



## INSPECTION

### STARTER IDLE GEAR/SHAFT

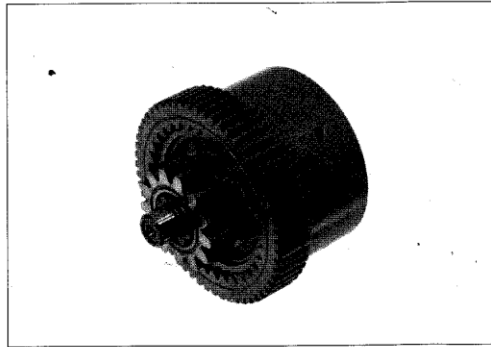
Check the starter idle gear teeth and shaft for abnormal wear or damage.





**STARTER TORQUE LIMITER**

Check the starter torque limiter gear teeth for abnormal wear or damage.



Hold the starter torque limiter in a vise with the special tool.

Check the torque limiter slip torque with the special tools and a torque wrench.

**TOOLS:**

- Torque limiter attachment      07YMJ-MCF0100
- Torque limiter inspection stopper tool A      07YMJ-MCF0200 (U.S.A. loan program tool)

**SLIP TORQUE:**

52.9 – 84.3 N·m (5.4 – 8.6 kgf·m, 39 – 62 lbf·ft)

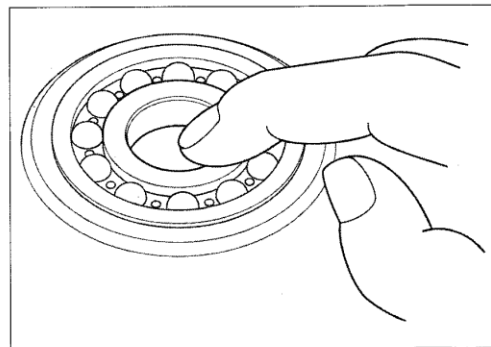
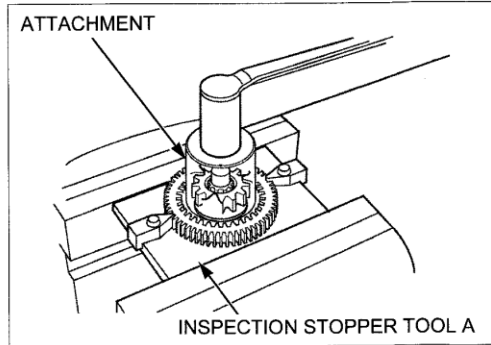
Replace the torque limiter assembly if the slip torque is out of specification.

Turn the inner races of the torque limiter bearings with your finger.

The bearings should turn smoothly and quietly.

Also check that the outer races fit tightly in the left crankcase and cover.

Remove and discard the bearings if the inner races do not turn smoothly and quietly, if the outer race fit loosely in the left crankcase and cover.



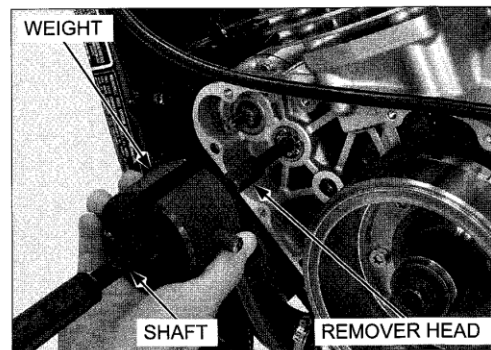
**TORQUE LIMITER BEARING REPLACEMENT**

**LEFT CRANKCASE SIDE**

Remove the torque limiter bearing from the crankcase using the special tools.

**TOOLS:**

- Bearing remover shaft      07936-GE00100
- Bearing remover head, 10 mm      07936-GE00200
- Remover weight      07741-0010201
- TOOLS, U.S.A. only:**
- Remover handle      07936-3710100
- Remover weight      07936-371020A
- Bearing remover, 10 mm      07936-GE0A000

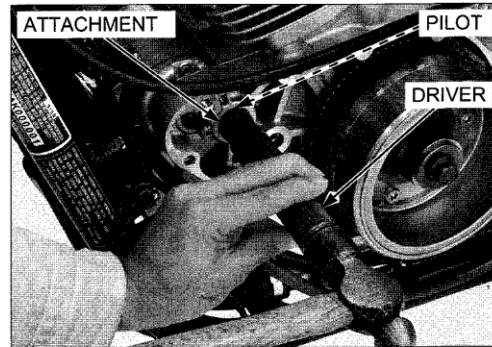


## ALTERNATOR/STARTER CLUTCH

Drive in a new bearing into the left crankcase with its mark side facing out until it is fully seated using the special tools.

### TOOLS:

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 10 mm	07746-0040100



### LEFT CRANKCASE COVER SIDE

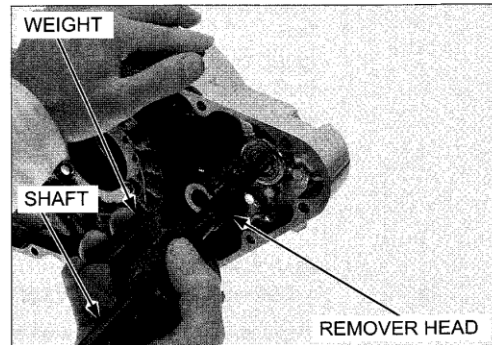
Remove the torque limiter bearing from the crankcase cover using the special tools.

### TOOLS:

Bearing remover shaft	07936-GE00100
Bearing remover head, 10 mm	07936-GE00200
Remover weight	07741-0010201

### TOOLS, U.S.A. only:

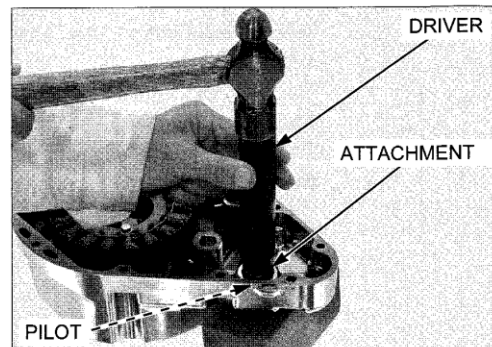
Remover handle	07936-3710100
Remover weight	07936-371020A
Bearing remover, 10 mm	07936-GE0A000



Drive in a new bearing into the left crankcase cover with its mark side facing up until it is fully seated using the special tools.

### TOOLS:

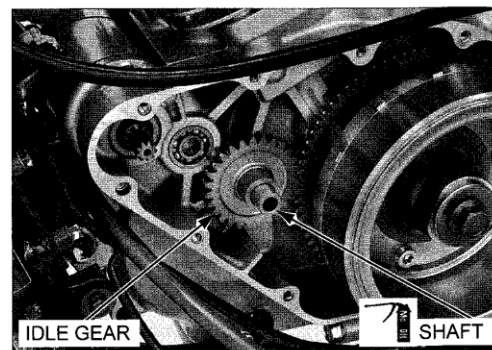
Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 10 mm	07746-0040100



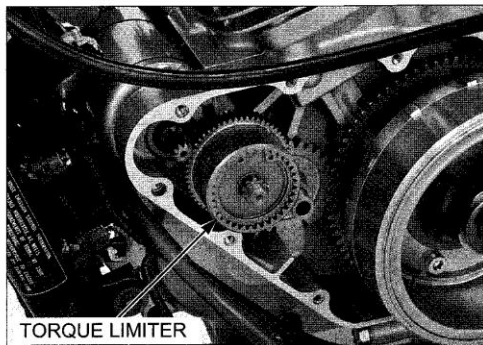
### INSTALLATION

Apply molybdenum oil solution to the starter idle gear shaft outer surface and install it to the left crankcase.

Install the idle gear to the idle gear shaft.



Install the starter torque limiter.  
Install the left crankcase cover (page 12-16).



## FLYWHEEL/STARTER CLUTCH

### FLYWHEEL REMOVAL

Remove the starter torque limiter and idle gear (page 12-8).

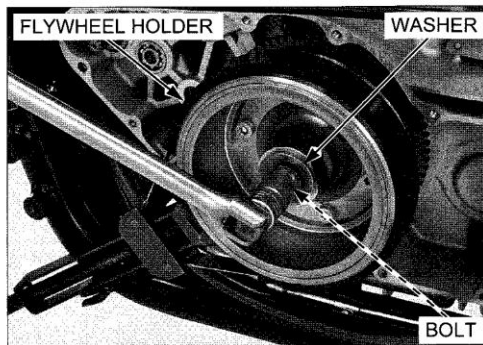
Hold the flywheel with the special tool and loosen the flywheel bolt.

**TOOL:**

**Flywheel holder**

**07725-0040001 or equivalent commercially available in U.S.A.**

Remove the flywheel bolt, washer and special tool.

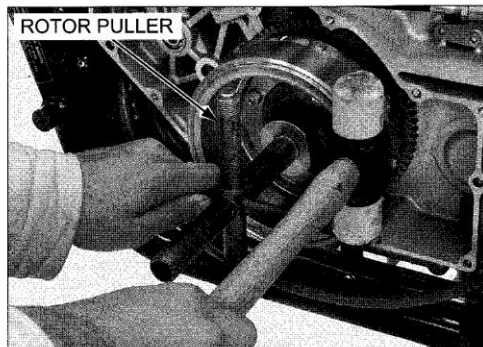


Remove the flywheel using the special tool.

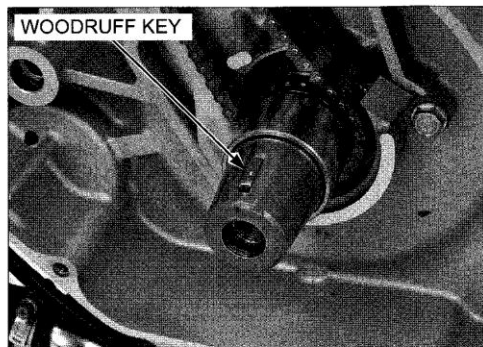
**TOOL:**

**Rotor puller**

**07733-0020001 or 07933-3290000 (U.S.A. only)**



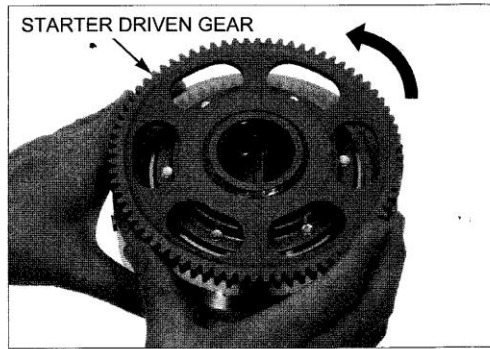
Remove the woodruff key from the crankshaft.



## ALTERNATOR/STARTER CLUTCH

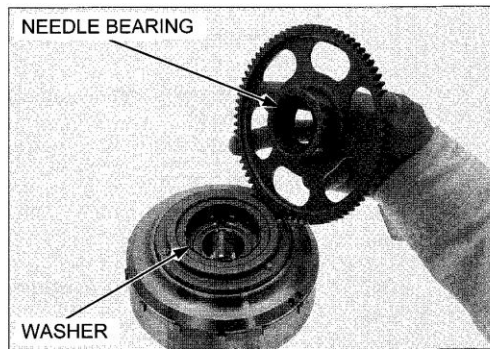
### STARTER DRIVEN GEAR/STARTER CLUTCH REMOVAL

Check the operation of the one-way clutch by turning the starter driven gear. You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



Remove the starter driven gear while turning it counterclockwise.

Remove the needle bearing and thrust washer.

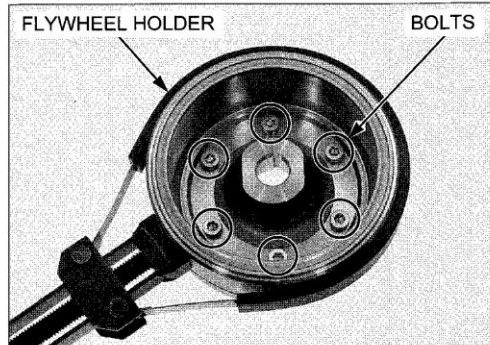


*Loosen the socket bolts in a crisscross pattern in several steps.*

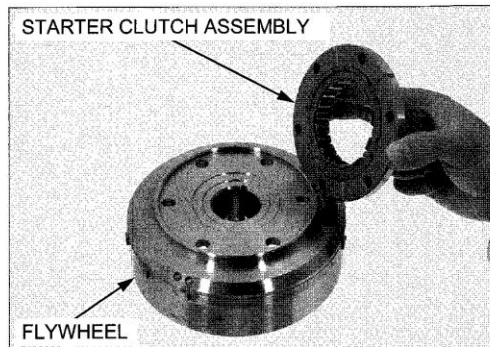
Hold the flywheel with the special tool and remove the starter clutch socket bolts.

**TOOL:**  
Flywheel holder

**07725-0040001 or equivalent commercially available in U.S.A.**



Remove the starter clutch assembly from the flywheel.



**STARTER CLUTCH INSPECTION**

**STARTER DRIVEN GEAR/NEEDLE BEARING**

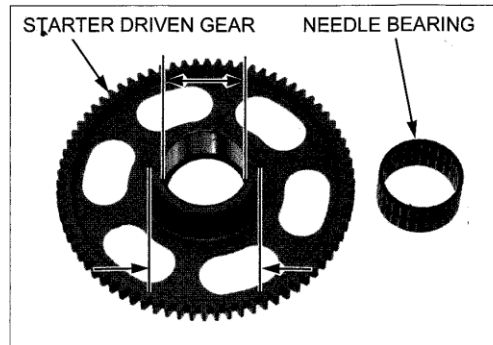
Check the starter driven gear and needle bearing for abnormal wear or damage.

Measure the starter driven gear O.D.

**SERVICE LIMIT: 57.639 mm (2.2692 in)**

Measure the starter driven gear I.D.

**SERVICE LIMIT: 44.10 mm (1.736 in)**



**STARTER CLUTCH OUTER/ONE-WAY CLUTCH**

Check the starter clutch outer and one-way clutch for abnormal wear, damage or irregular movement.

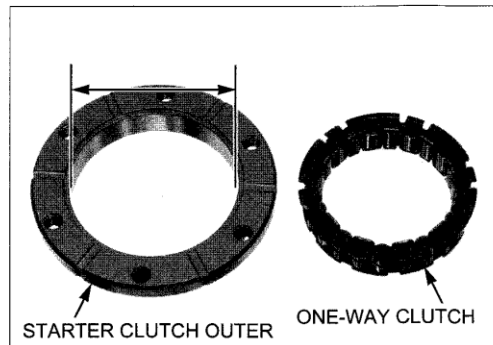
**NOTE:**

- Do not remove the one-way clutch from the clutch outer, unless it is necessary to check or replace with a new one.
- If the spring is removed from the one-way clutch groove, replace the one-way clutch assembly with a new one.

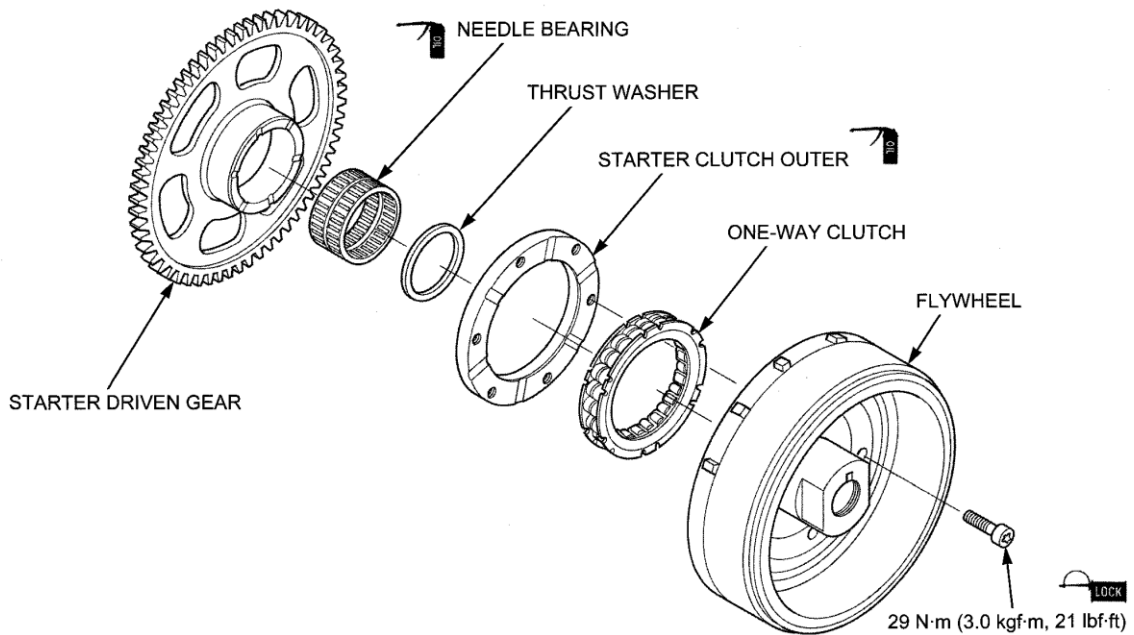
Check the starter clutch outer inner contact surface for wear or damage.

Measure the starter clutch outer I.D.

**SERVICE LIMIT: 74.46 mm (2.931 in)**



**STARTER DRIVEN GEAR/STARTER CLUTCH INSTALLATION**

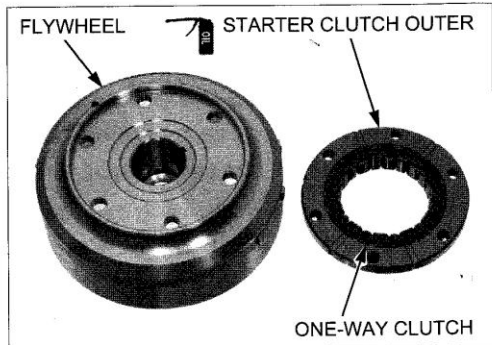


## ALTERNATOR/STARTER CLUTCH

Apply engine oil to the starter clutch outer sliding surface.

Install the one-way clutch into the starter clutch outer with the flanged side toward the flywheel.

Install the starter clutch onto the flywheel.



Apply locking agent to the starter clutch socket bolt threads (page 1-17).

Install the starter clutch socket bolts and hold the flywheel with the special tool.

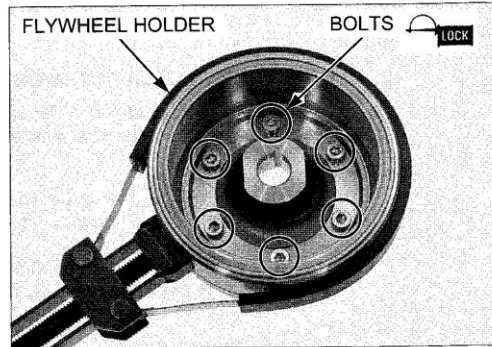
Tighten the bolts to the specified torque in a crisscross pattern in several steps.

**TOOL:**

Flywheel holder

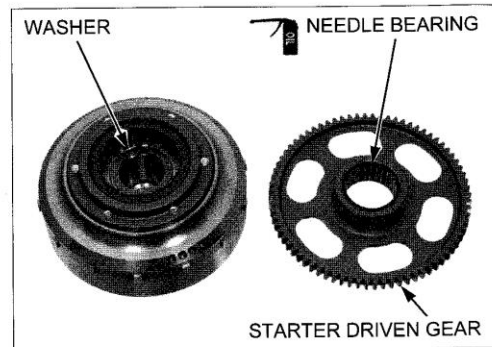
07725-0040001 or equivalent commercially available in U.S.A.

**TORQUE: 29 N·m (3.0 kgf·m, 21 lbf·ft)**

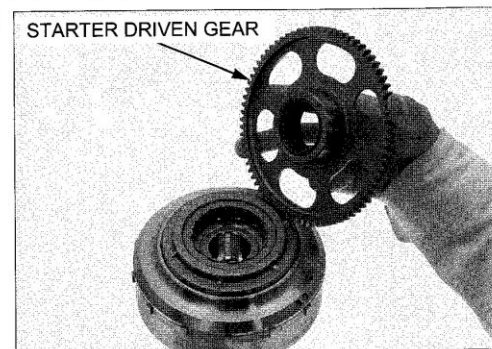


Install the thrust washer onto the flywheel.

Apply engine oil to the needle bearing rotating area and install it into the starter driven gear.



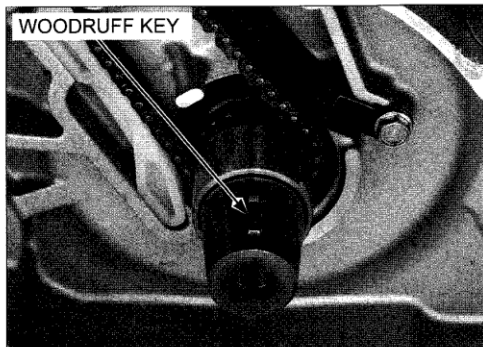
Install the starter driven gear while turning it counterclockwise.



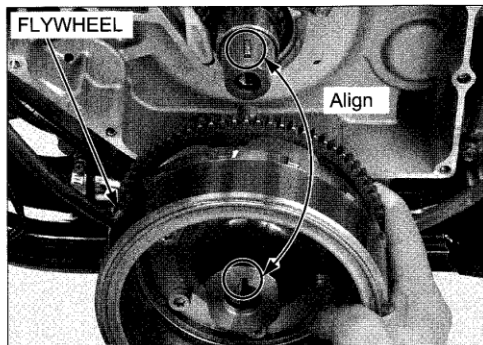
**FLYWHEEL INSTALLATION**

Clean any oil from the tapered portion of the crankshaft and flywheel.

Install the woodruff key in the crankshaft key groove.



Install the flywheel on the crankshaft, aligning the key way with the woodruff key.



Apply engine oil to the flywheel bolt threads and seating surface.

Install the washer and bolt.

Hold the flywheel with the special tool and tighten the bolt to the specified torque.

**TOOL:**

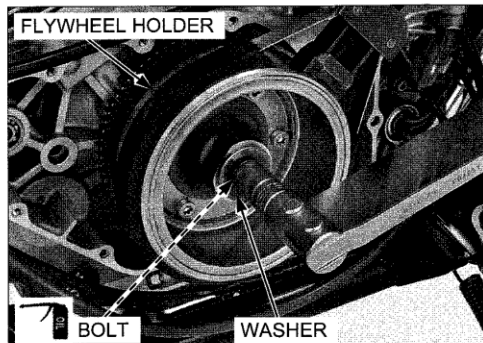
**Flywheel holder**

**07725-0040001 or equivalent commercially available in U.S.A.**

**TORQUE: 138 N·m (14.1 kgf·m, 102 lbf·ft)**

Remove the special tool.

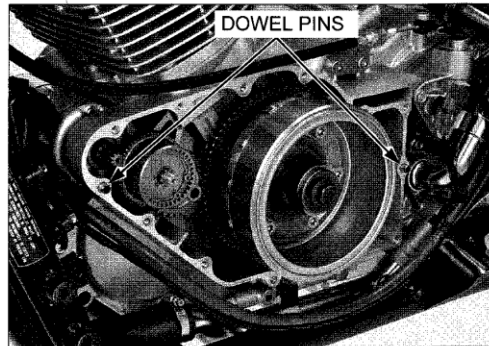
Install the starter torque limiter and idle gear (page 12-10).



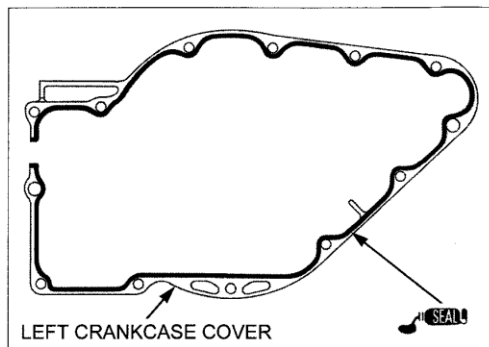
## ALTERNATOR/STARTER CLUTCH

### LEFT CRANKCASE COVER INSTALLATION

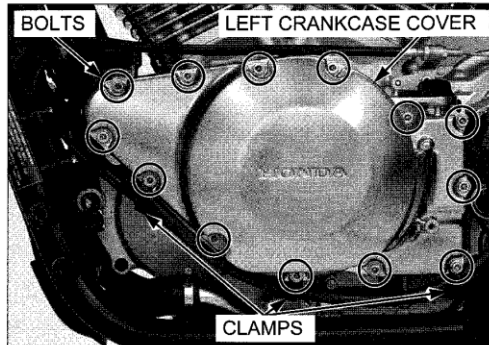
*Be careful not to damage the mating surfaces.* Clean the mating surfaces of the left crankcase cover and left crankcase thoroughly. Install the dowel pins.



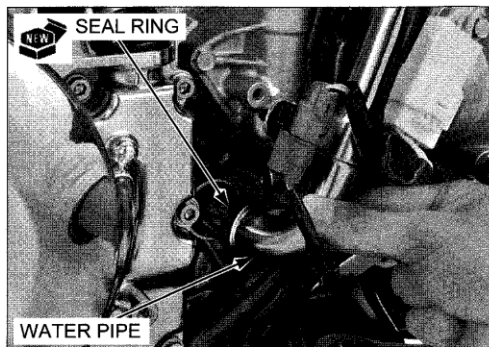
Apply liquid sealant (Three Bond 1207B or equivalent) to the left crankcase cover mating surface as shown.



*The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during installation.* Install the left crankcase cover, wire clamps and socket bolts. Tighten the socket bolts to the specified torque in a crisscross pattern in several steps. **TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



*Route the alternator wire properly (page 1-22).* Install a new seal ring to the water pipe and install them to the water pump.

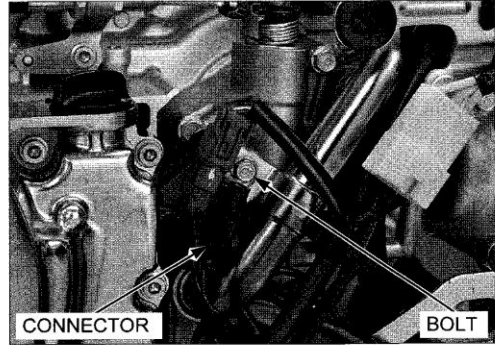




## ALTERNATOR/STARTER CLUTCH

Install and tighten the bolt.

Install the neutral switch 1P (Black) connector to the water pipe stay.



*Route the wires properly (page 1-22).*

Connect the following:

- CKP sensor 2P (Red) connector
- Alternator 3P (White) connector
- Neutral switch 1P (Black) connector
- Neutral switch wire connector

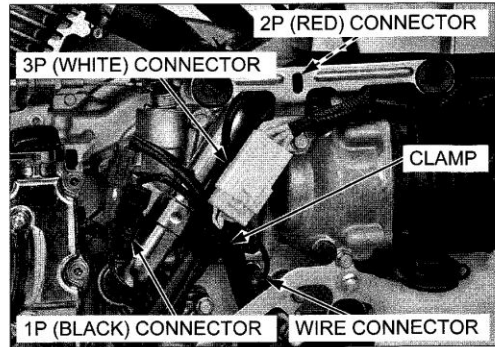
Install the clamp.

Install the following:

- Left main step (page 3-4)
- Left crankcase rear cover (page 3-7)

Fill the recommended engine oil (page 4-13).

Fill and bleed the cooling system (page 7-6).



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**MEMO**

