

Use 60° cutter to cut a quarter lower parts out.
Remove the cutter and check new valve seat.

Use 45° cutter to grind the valve seat to specified width.

Caution

Make sure that all roughness and uneven faces had been ground.

Grind valve seat again if necessary.

Coat the valve seat surface with red paint.

Install the valve through valve guide until the valve contacting with valve seat, slightly press down the valve but do not rotate it so that a seal track will be created on contact surface.

Caution

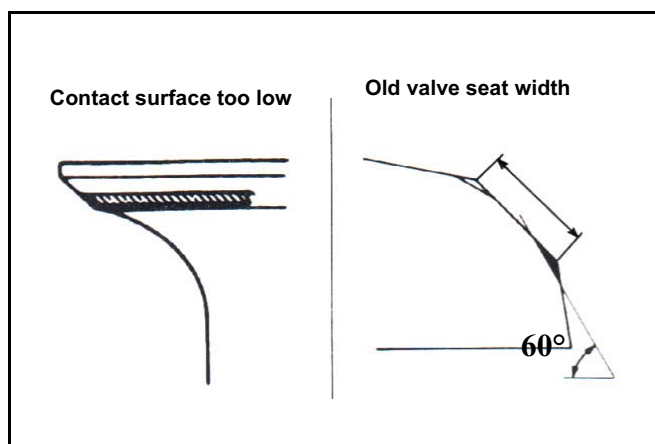
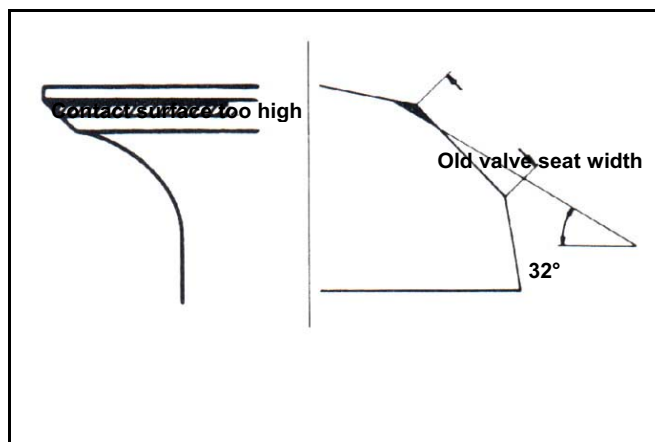
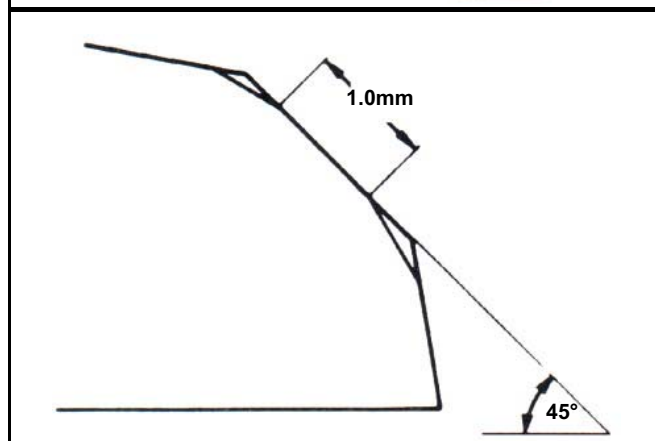
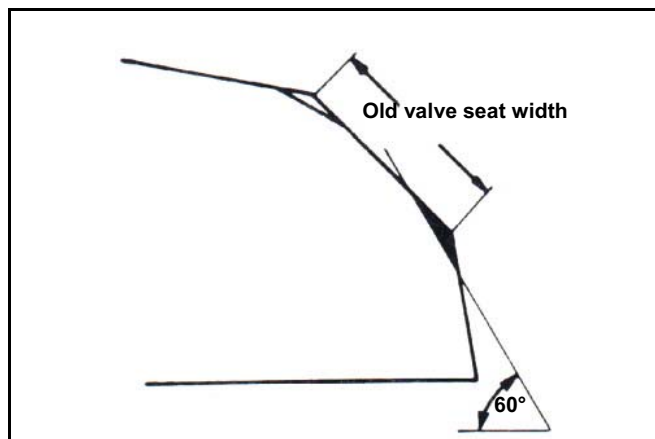
The contact surfaces of valve and valve seat are very important to the valve sealing capacity.

If the contact surface too high, grind the valve seat with 32° cutter.

Then, grind the valve seat to specified width.

If the contact surface too low, grind the valve seat with 60° cutter.

Then, grind the valve seat to specified width.



After the valve seat ground, coat valve seat surface with emery and then slightly press the ground surface.

Clean up all emery coated onto cylinder and valve after ground.

6-8 Cylinder Head Reassembly

Lubricate valve stem with engine oil, and then insert the valve into valve guide.

Install new valve stem oil seal.

Install valve springs and retainers.

Caution

The closed coils of valve spring should face down to combustion chamber.

Use a valve cotter remove & assembly tool to press the valve spring, and then remove valves.

Caution

In order to avoid damaging the valve stem and the cylinder head, in the combustion chamber place a rag between the valve spring remover/installer as compressing the valve spring directly.

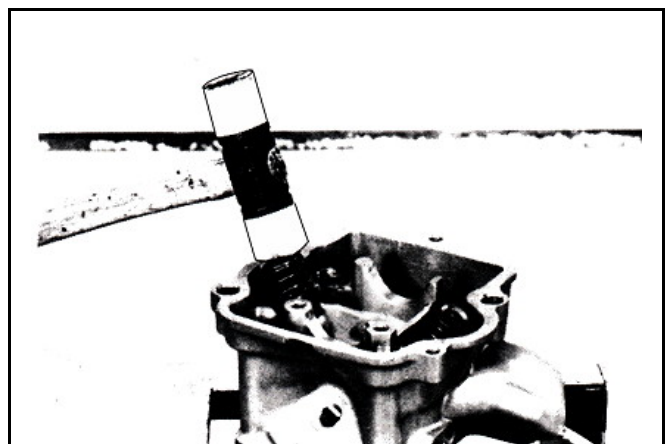
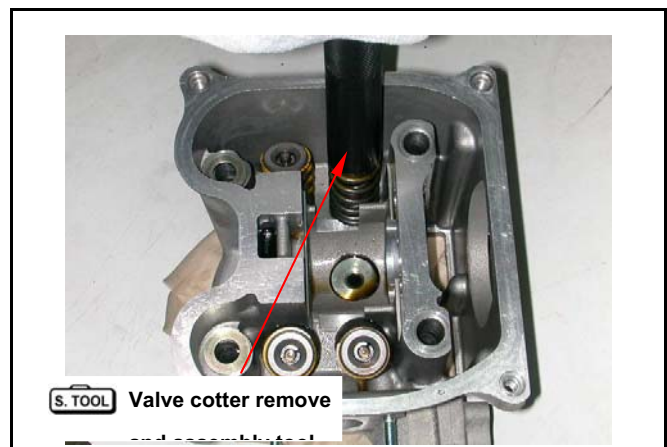
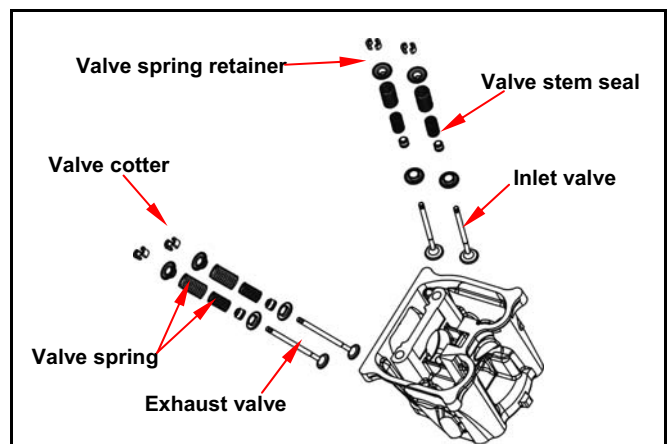
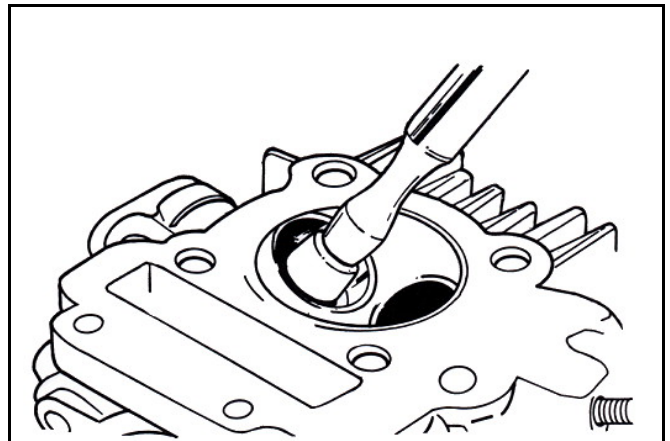
Special Service Tool:

Valve cotter remove & assembly tool

Tap the valve stems gently with a plastic hammer to make sure valve retainer and valve cotter is settled.

Caution

Place and hold cylinder head on to working table so that can prevent from valve damaged.



6-9 Cylinder Head Installation

Clean up all residues and foreign materials onto the matching surfaces of both cylinder and cylinder head.

Install chain guide, dowel pins and a new cylinder head gasket onto the cylinder.

Caution

Do not damage the matching surfaces of cylinder and cylinder head.

Avoid residues of gasket or foreign materials falling into crankcase as cleaning.

Install 4 washers and tighten 4 nuts on the cylinder head upper side, and then tighten 2 cylinder head mounting bolts of cylinder head right side.

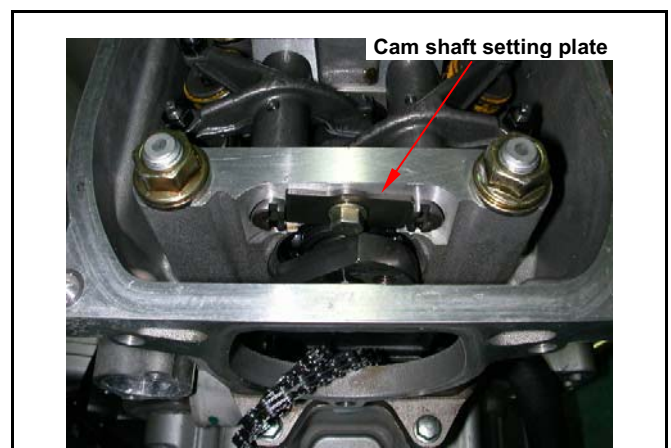
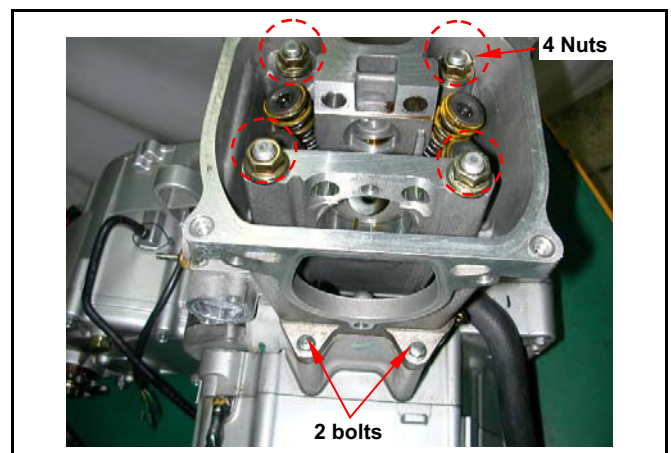
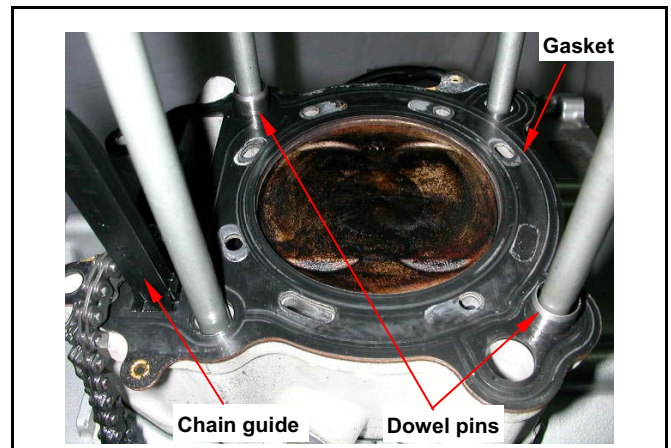
Torque value:

Nut 3.6~4.0kgf-m

Bolt 1.0~1.4kgf-m

Install camshaft into cylinder head, and install rocker arm, rocker arm shaft.

Install rocker arm pin mounting plate.

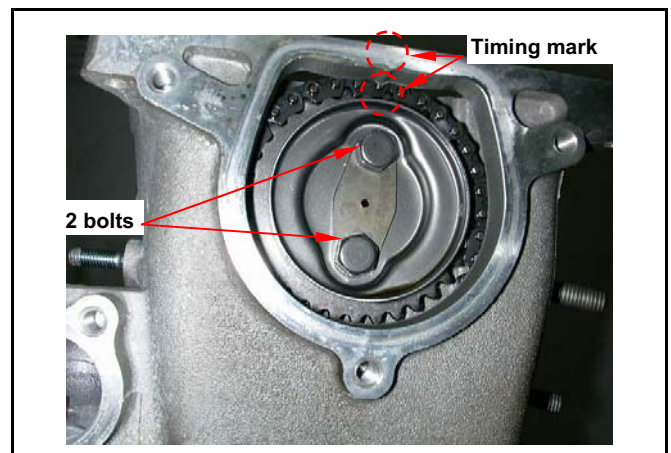


Install cam chain on to sprocket and align the timing mark on the sprocket with that of cylinder head.

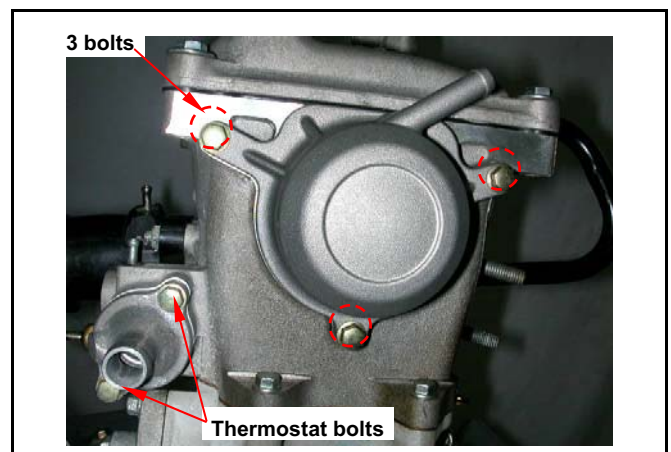
Align sprocket bolt hole with camshaft bolt hole.
Tighten the sprocket mounting bolts.

⚠ Caution

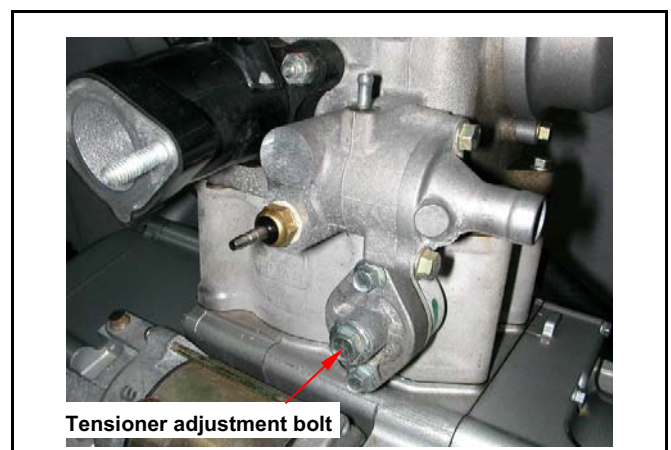
Make sure timing marks are matched.



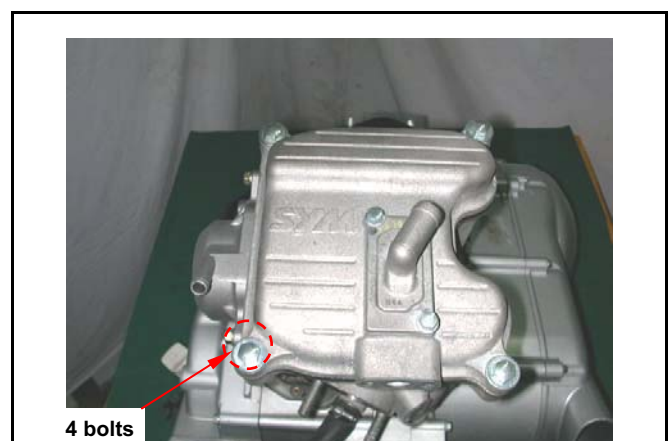
Install cylinder head side cover (3 bolts).
Install thermostat (2 bolts).



Loosen auto tensioner adjustment bolt and remove bolt and spring.
Install tensioner and install spring and adjustment bolt.



Install cylinder cover (4 bolts).



Install Air Injection system (AI) pipe. (4 bolts)

Install inlet pipe onto cylinder

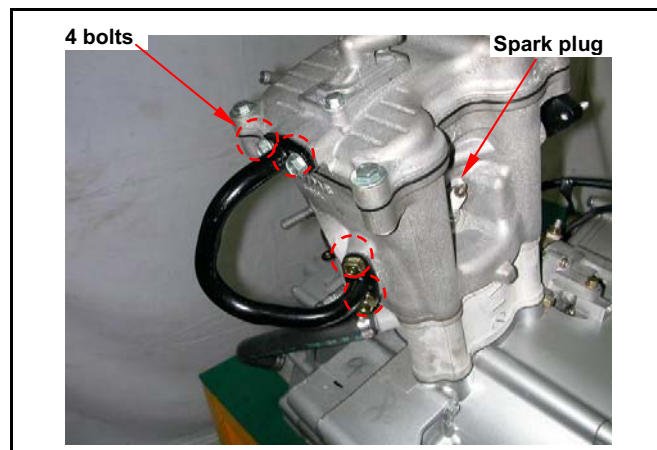
Install and tighten spark plug

Torque value: 1.0~2.0kgf-m

⚠ Caution

This model is equipped with more precision 4-valve mechanism so its tighten torque can not be exceeded standard value in order to avoid causing cylinder head deformation, engine noise and leaking so that motorcycle's performance be effected.

Install the engine onto frame (refer chapter 5).



6-10 Valve Clearance Adjustment

Loosen Air Injection system (AI) pipe upper side bolt

Caution

Checks and adjustment must be performed when the engine temperature is below 35°C.

Remove front fender, fuel tank cover and fuel tank.
Remove cylinder head cover.

Remove cylinder head side cover.

Turn camshaft bolt in C.W. direction and let the "T" mark on the camshaft sprocket align with cylinder head mark so that piston is placed at TDC position in compression stroke.

Caution

Do not turn the bolt in C.C.W. direction to prevent from camshaft bolt looseness.

Valve clearance inspection and adjustment.
Check & adjust valve clearance with feeler gauge.

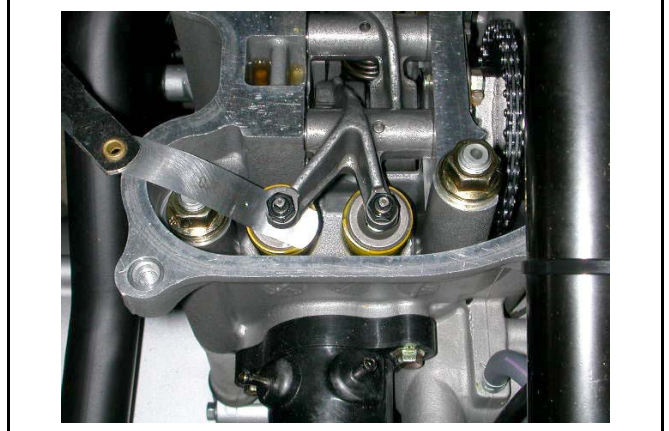
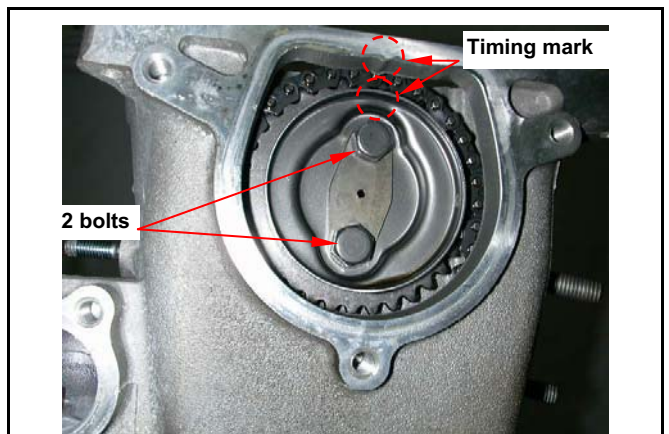
Standard Value: IN 0.10 ± 0.02 mm

EX 0.15 ± 0.02 mm

Loosen fixing nut and turn the adjustment nut for adjustment.

Caution

Re-check the valve clearance after tightened the fixing nut.

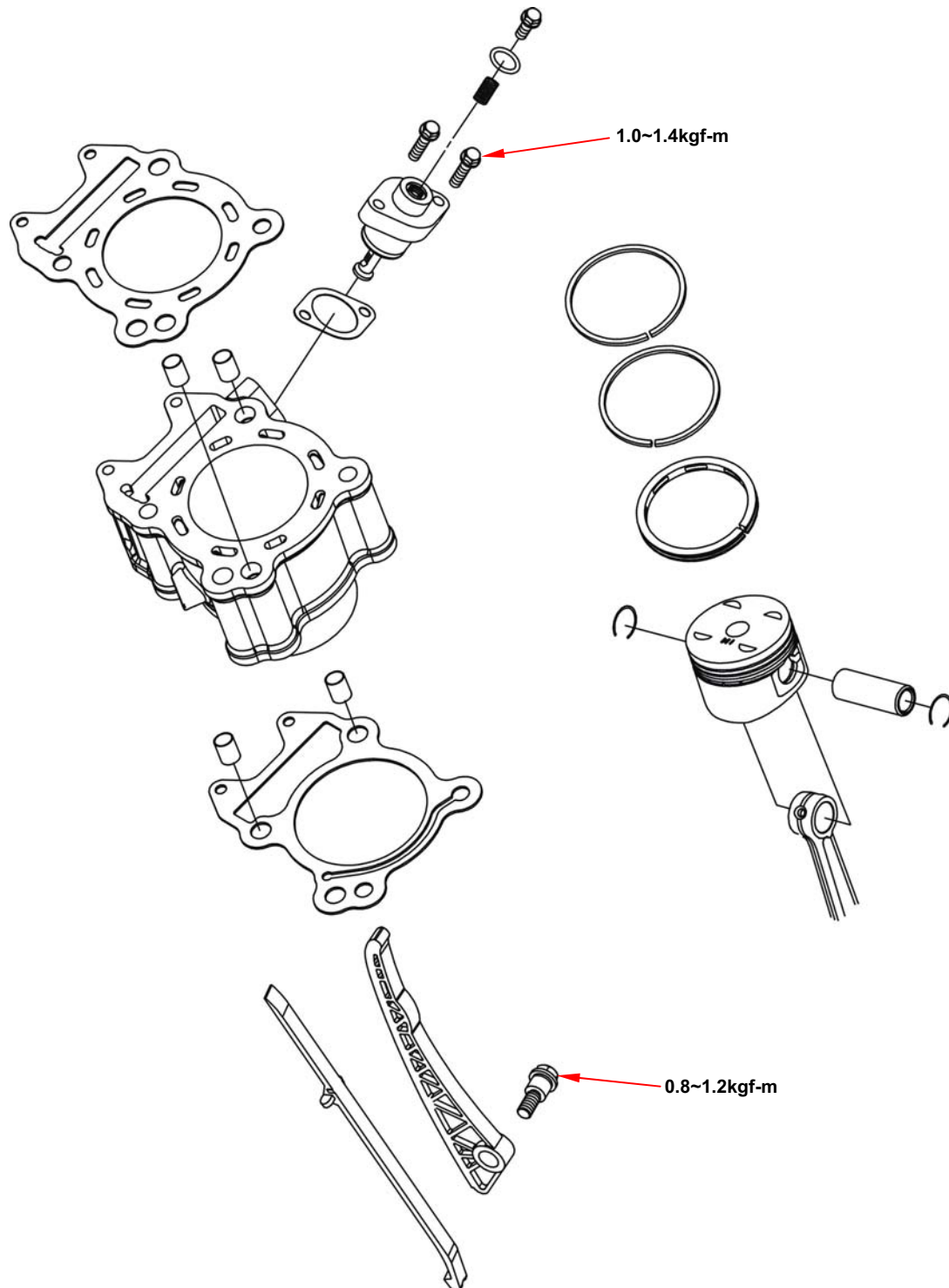


7. CYLINDER/PISTON

7-1 Mechanism Diagram
7-2 Precautions In Operation
7-3 Trouble Diagnosis
7-4 Cylinder And Piston Removal

7-5 Piston Ring Installation
7-6 Piston Installation
7-7 Cylinder Installation

7-1 Mechanism Diagram



7-2 Precautions In Operation

General Information

- Both cylinder and piston service cannot be carried out when engine mounted on frame.

UA25A

Specification

Unit : mm

Item			Standard	Limit
Cylinder	ID		74.995~75.015	75.100
	Bend		-	0.050
Piston/ Piston ring	Clearance between piston rings	Top ring	0.015~0.050	0.090
		2 nd ring	0.015~0.050	0.090
	Ring-end gap	Top ring	0.150~0.300	0.500
		2 nd ring	0.300~0.450	0.650
		Oil ring side rail	0.200~0.700	-
	OD of piston (2 nd)		74.430~75.480	75.380
	Clearance between piston and cylinder		0.010~0.040	0.100
	ID of piston pin boss		17.002~17.008	17.020
OD of piston pin			16.994~17.000	16.960
Clearance between piston and piston pin			0.002~0.014	0.020
ID of connecting rod small-end			17.016~17.034	17.064

7-3 Trouble Diagnosis

Low or Unstable Compression Pressure

- Cylinder or piston ring worn out

Smoking in Exhaust Pipe

- Piston or piston ring worn out
- Piston ring installation improperly
- Cylinder or piston damage

Knock or Noise

- Cylinder or piston ring worn out
- Carbon deposits on cylinder head top-side
- Piston pin hole and piston pin wear out

Engine Overheat

- Carbon deposits on cylinder head top side
- Cooling pipe clogged or not enough in coolant flow

7-4 Cylinder And Piston Removal

Remove cylinder head (refer to chapter 6).

Remove coolant hose from cylinder.

Remove cylinder.



Cover the holes of crankcase and cam chain with a piece of cloth.

Remove piston pin clip, and then remove piston pin and piston.

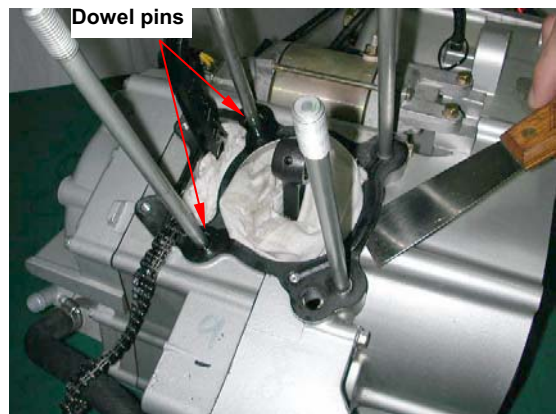


Remove cylinder gasket and dowel pin.

Clean up all residues or foreign materials from the two matching surfaces of cylinder and crankcase.

Caution

- Soap the residues into solvent so that the residues can be removed more easily.

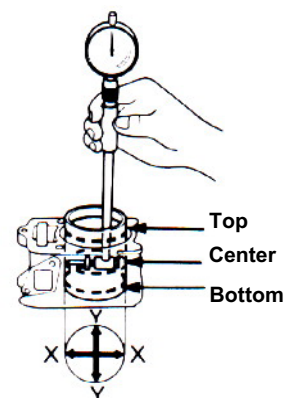


Inspection

Check if the inner diameter of cylinder is wear out or damaged.

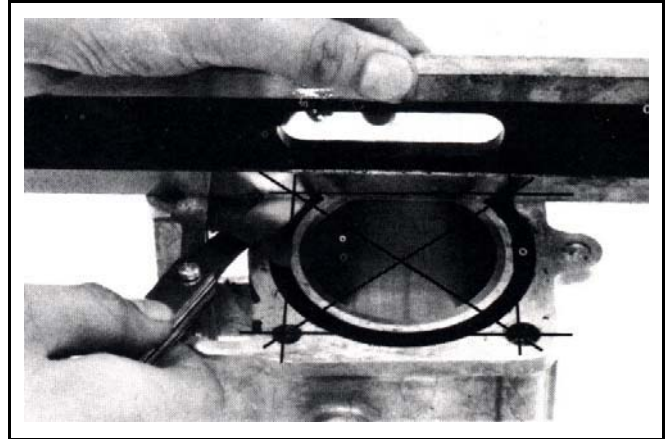
In the 3 positions, top, center and bottom, of cylinder, measure the X and Y values respective in the cylinder.

Service limit: 75.100 mm



Check cylinder if warp.

Service limit: 0.05 mm



Measure clearance between piston rings and grooves.

Service Limit: Top ring: 0.09 mm

2nd ring: 0.09 mm



Remove piston rings

Check if the piston rings are damaged or its grooves are worn.

⚠ Caution

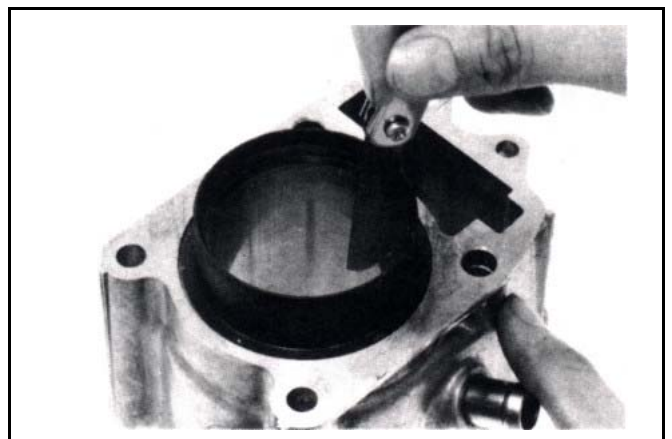
Pay attention to remove piston rings because they are fragile.



Place piston rings respective into cylinder below 20 mm of cylinder top. In order to keep the piston rings in horizontal level in cylinder, push the rings with piston.

Service Limit: Top ring: 0.50 mm

2nd ring: 0.65 mm



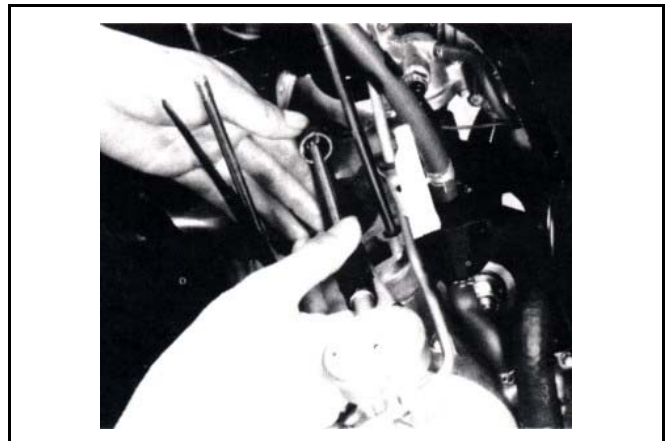
Measure the outer diameter of piston pin.

Service Limit: 16.96 mm



Measure the inner diameter of connecting rod small end.

Service Limit: 17.064 mm

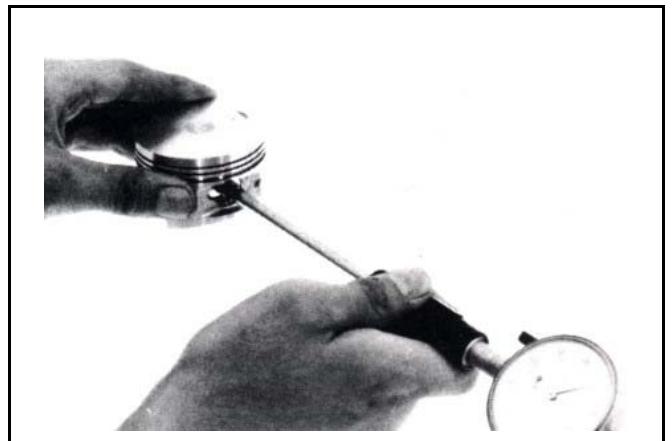


Measure the inner diameter of piston pin hole.

Service Limit: 17.02 mm

Calculate clearance between piston pin and its hole.

Service Limit: 0.02 mm



Measure piston outer diameter.

⚠ Caution

The measurement position is 10 mm distance from piston bottom side, and 90° to piston pin.

Service limit : 75.380 mm

Compare measured value with service limit to calculate the clearance between piston and cylinder.



7-5 Piston Ring Installation

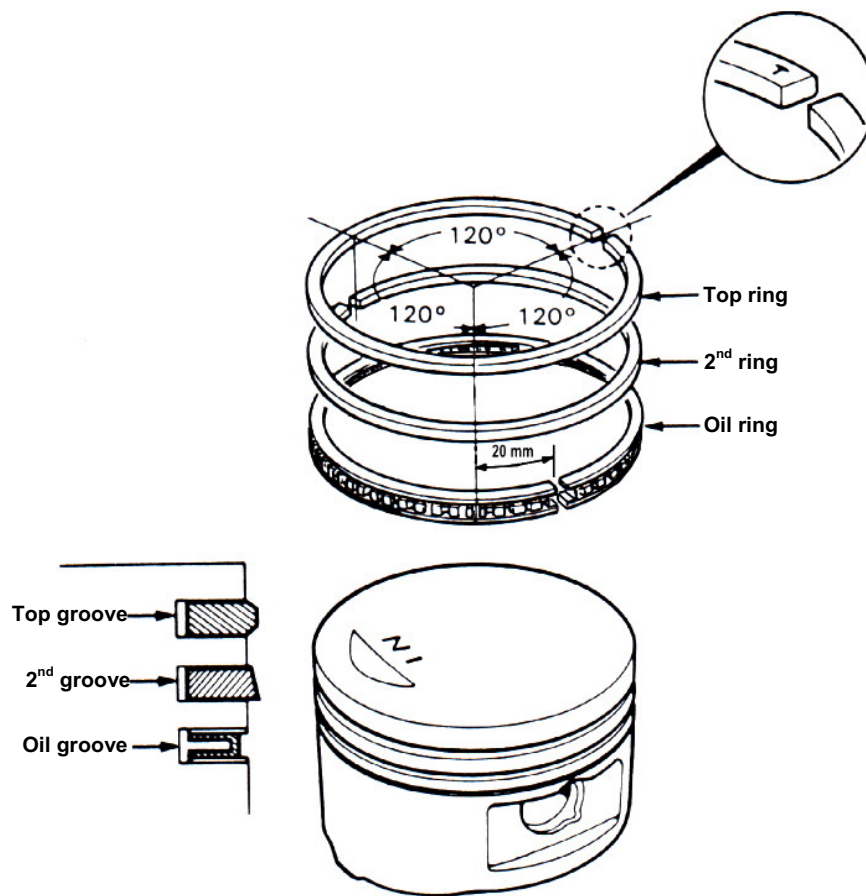
Clean up piston top, ring groove, and piston surface.

Install the piston ring onto piston carefully.

Place the openings of piston ring as diagram shown.

Caution

- Do not damage piston and piston rings as installation.
- All marks on the piston rings must be forwarded to up side.
- Make sure that all piston rings can be rotated freely after installed.



Clean up all residues and foreign materials on the matching surface of crankcase. Pay attention to not let these residues and foreign materials fall into crankcase.

⚠ Caution

Soap the residues into solvent so that the residues can be removed more easily.



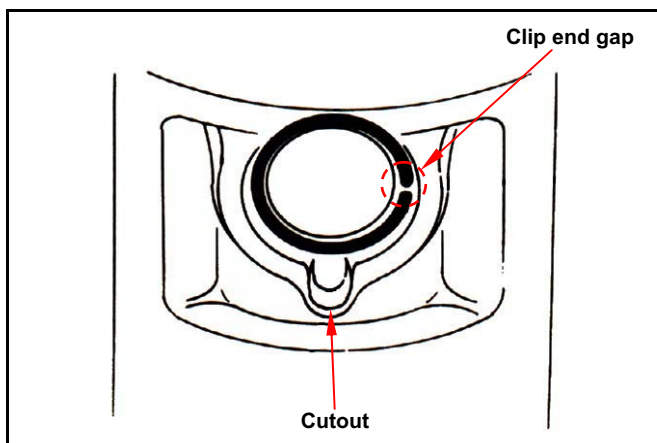
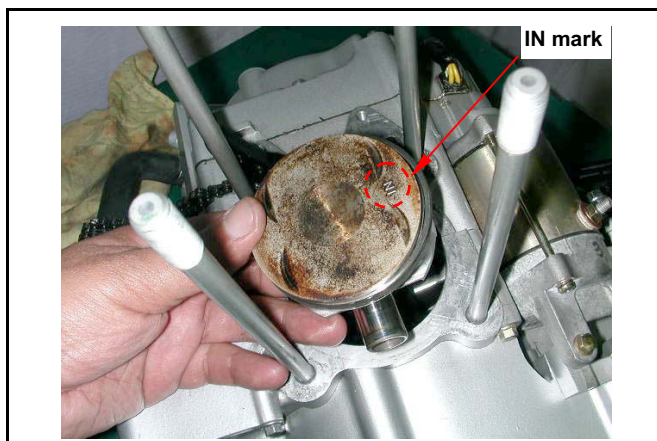
7-6 Piston Installation

Install piston and piston pin, and place the IN marks on the piston top side forward to inlet valve.

Install new piston pin clip.

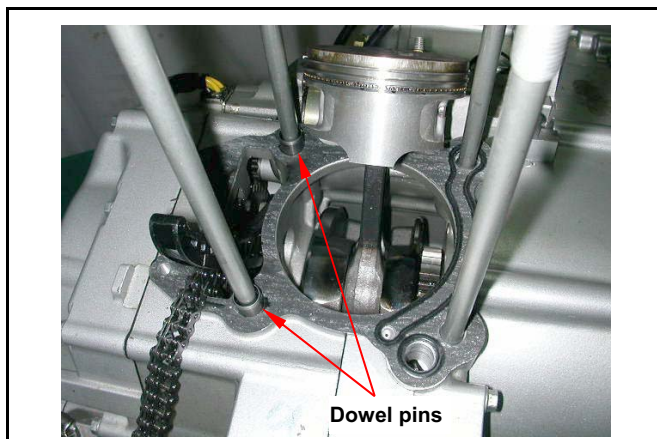
⚠ Caution

- Do not let the opening of piston pin clip align with the piston cutout.
- Place a piece of cloth between piston and crankcase in order to prevent snap ring from falling into crankcase as operation.



7-7 Cylinder Installation

Install dowel pins and new gasket.



Coat some engine oil to inside of cylinder, piston and piston rings.

Care to be taken when installing piston into cylinder. Press piston rings in one by one as installation.



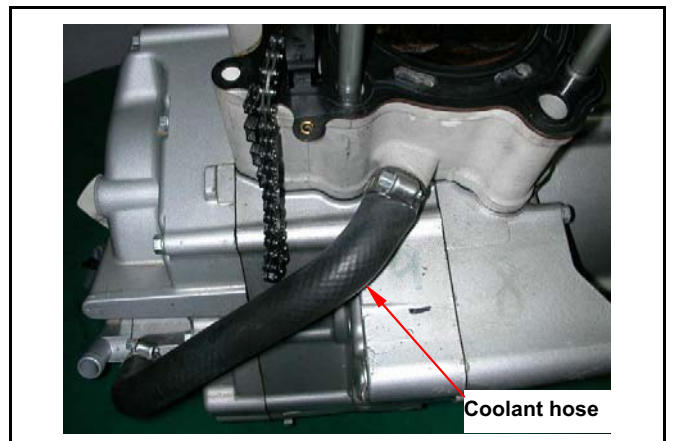
Caution

Do not push piston into cylinder forcefully because piston and piston rings will be damaged. °



Install coolant hose onto cylinder.

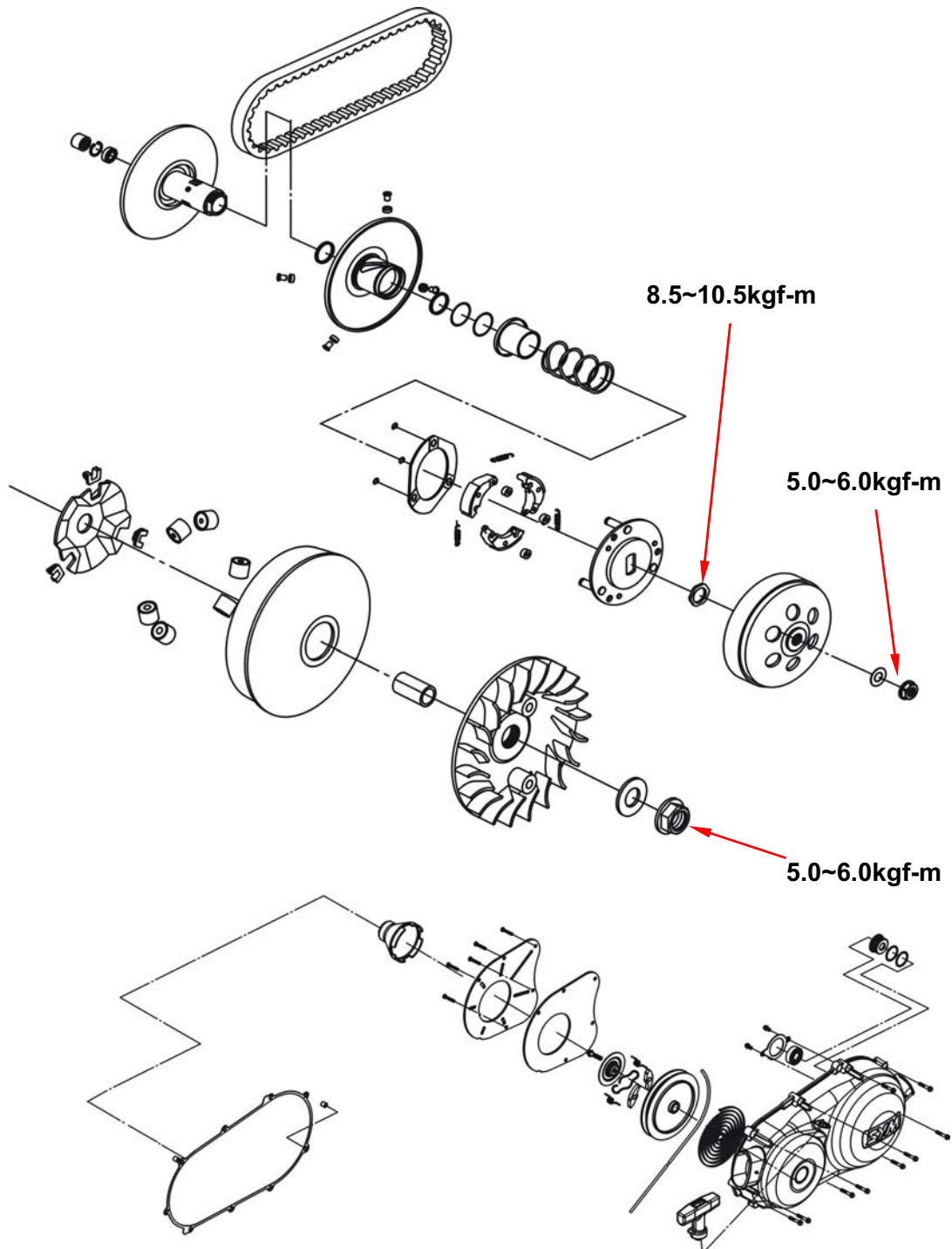
Install cylinder head (refer to Chapter 6).



8. V-BELT DRIVING SYSTEM

8-1 Mechanism Diagram	8-5 Drive Belt
8-2 Maintenance Description	8-6 Drive Face
8-3 Trouble Diagnosis	8-7 Clutch Outer/Driven Pulley
8-4 Left Crankcase Cover	

8-1 Mechanism Diagram



8-2 Maintenance Description

Precautions in Operation

General Information

- Drive face, clutch outer, and driven pulley can be serviced on the motorcycle.
- Drive belt and drive pulley must be free of grease.

Specification

Item	Standard value	Limit
Driving belt width	24.000 mm	22.500 mm
OD of movable drive face boss	29.946~29.980 mm	29.926 mm
ID of movable drive face	30.000~30.040 mm	30.060 mm
OD of weight roller	19.500~20.000 mm	19.000 mm
ID of clutch outer	144.850~145.150 mm	145.450 mm
Thickness of clutch weight	6.000 mm	3.000 mm
Free length of driven pulley spring	102.400 mm	97.400 mm
OD of driven pulley boss	40.950~40.990 mm	40.930 mm
ID of driven face	41.000~41.050 mm	41.070 mm
Weight of weight roller	17.700~18.300 g	17.200 g

Torque value

- Drive face nut: 8.5~10.5kgf-m
- Clutch outer nut: 5.0~6.0kgf-m
- Drive plate nut: 5.0~6.0kgf-m

Special Service Tools

Clutch spring compressor: SYM-2301000

Inner bearing puller: SYM-6204002

Clutch nut wrench 39 x 41 mm: SYM-9020200

Universal holder: SYM-2210100

Bearing driver: SYM-9100100

8-3 Trouble Diagnosis

Engine can be started but motorcycle can not be moved

1. Worn drive Belt
2. Worn drive face
3. Worn or damaged clutch weight
4. Broken driven pulley

Insufficient horsepower or poor high speed performance

1. Worn drive belt
2. Insufficient spring force of driven pulley
3. Worn roller
4. Driven pulley operation un-smoothly

Shudder or misfire when driving

1. Broken clutch weight
2. Worn clutch weight

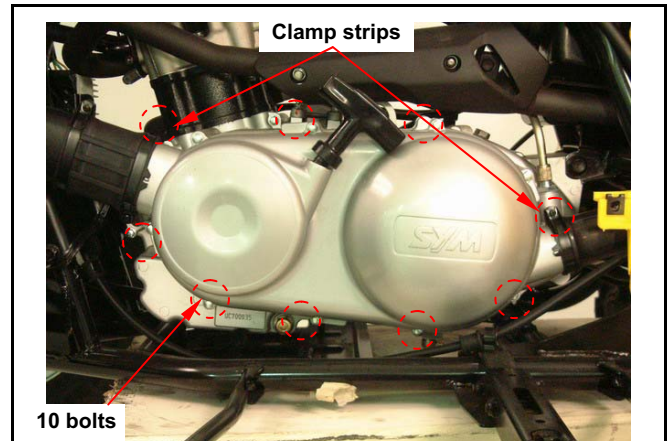
8-4 Left Crankcase Cover

Left crankcase cover removal

Release the 2 clamp strips of left crankcase cover ducts, and then remove the ducts.

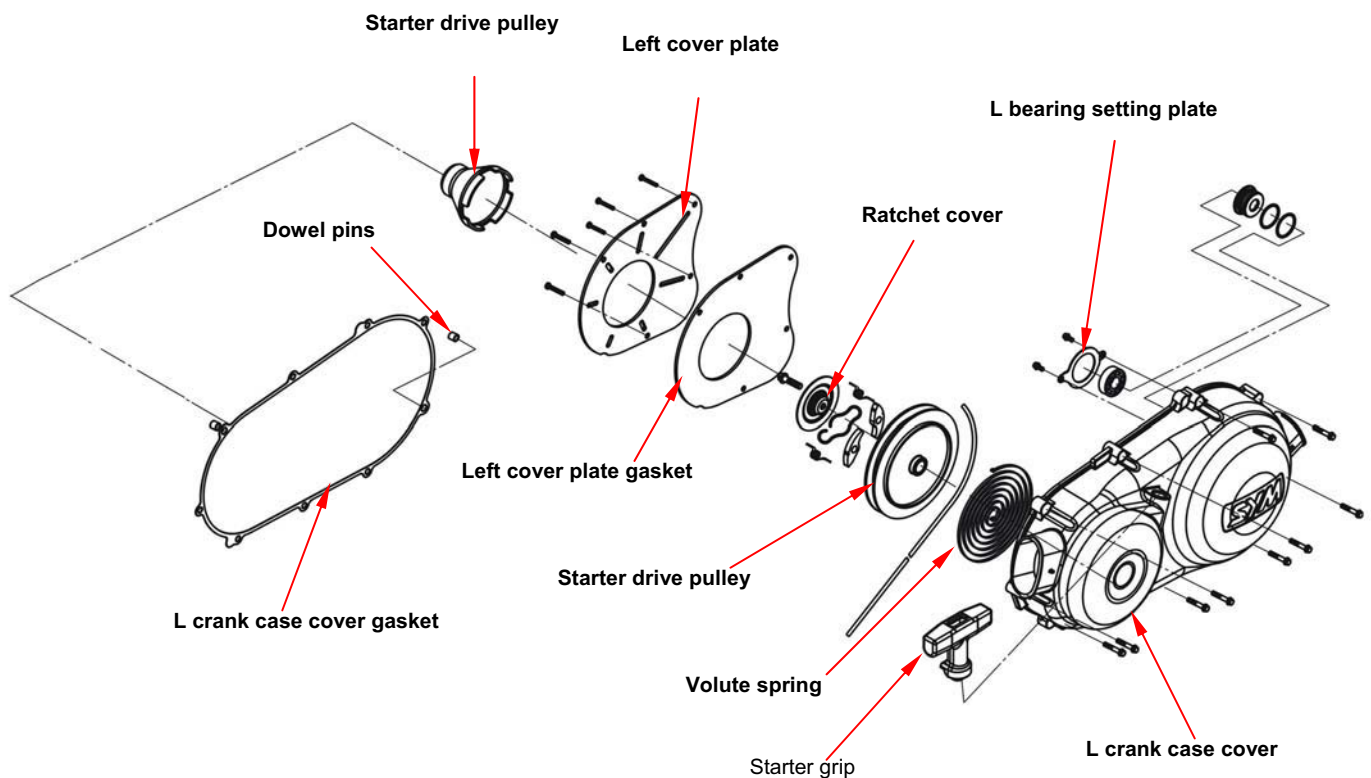
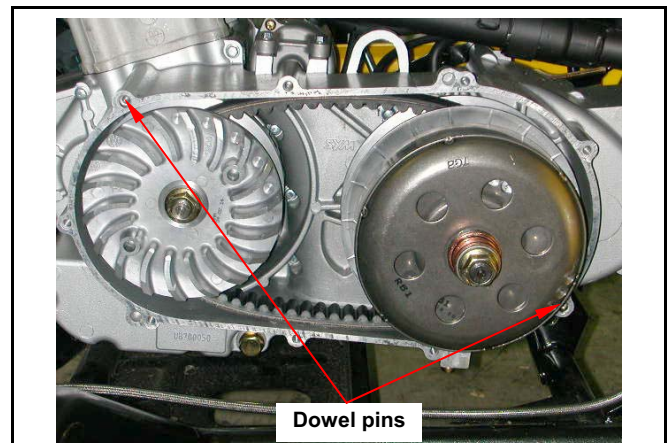
Remove left crankcase cover. (10 bolts)

Remove 2 dowel pin and gasket.



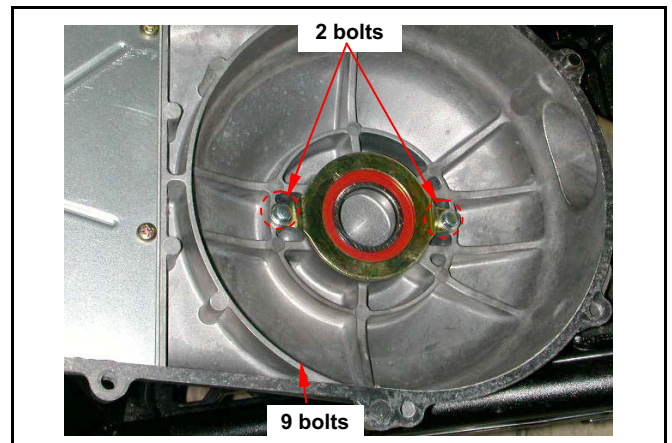
Left crankcase cover install

Install left crankcase cover in the reverse procedures of removal.



Left crankcase cover inspection

Remove 2 bolts to remove left crankcase cover bearing setting plate.



Check bearing on left crankcase cover.
Rotate bearing's inner ring with fingers.
Check if bearings can be turned in smooth and silent, and also check if bearing outer ring is mounted on cover tightly.
If bearing rotation is uneven, noising, or loose bearing mounted, then replace it.



Remove the bearing 6006 with inner bearing puller.

Tools number:SYM-6204025

Tools name: INNER BEARING PULLER.



Bearing 6006 install with special tool.

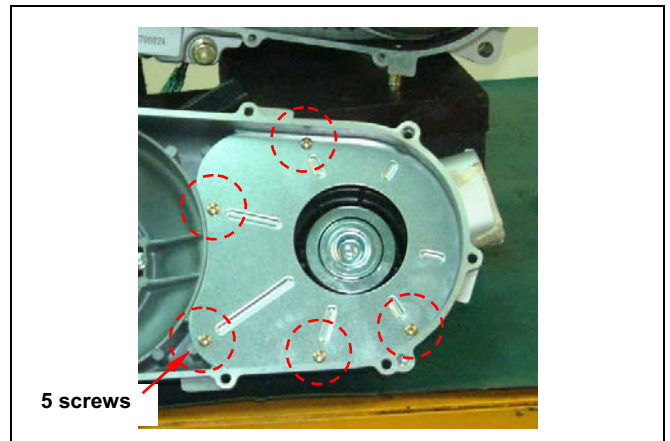
Tools number:SYM-1134600-HMA RB1 6006.

Tools name: L CRANK CASE COVER BEARING INSTALL TOOL.

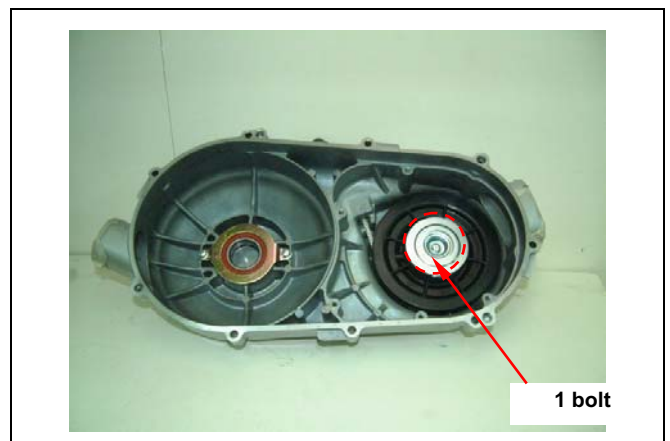


Disassembly

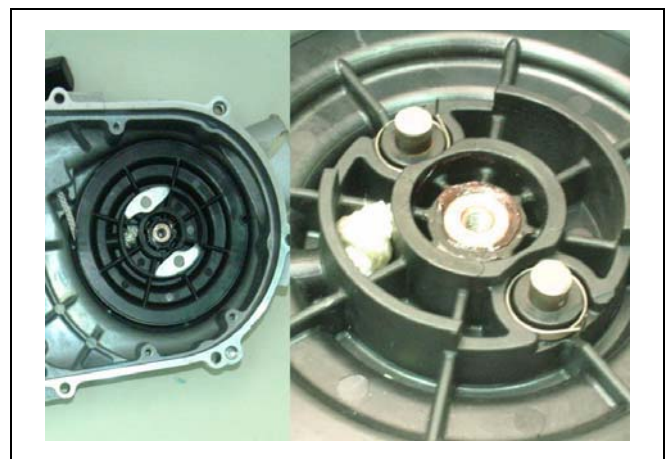
Remove 5 screws from I cover plate and remove I cover plate.



Remove 1 bolt from ratchet cover



Remove 2 starter ratchets and 2 ratchet springs



Remove starter drive pulley and volute spring

⚠ Caution

- If remove the volute spring from the I crank cover then its has to be replaced.



Loosen the starter rope from the starter grip.

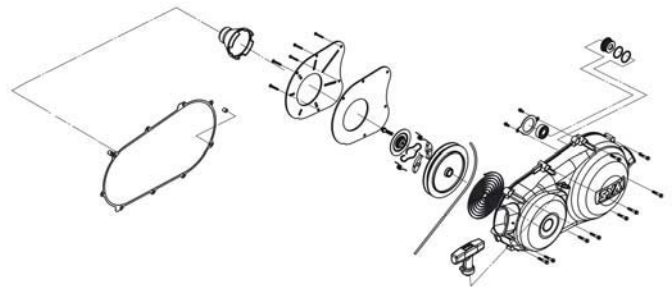


Installation

Install in reverse order of removal procedures

⚠ Caution

First before installing the drive pulley must establish 2 1/2 of the pressures transferred to pressure springs.



8-5 Drive Belt

Removal

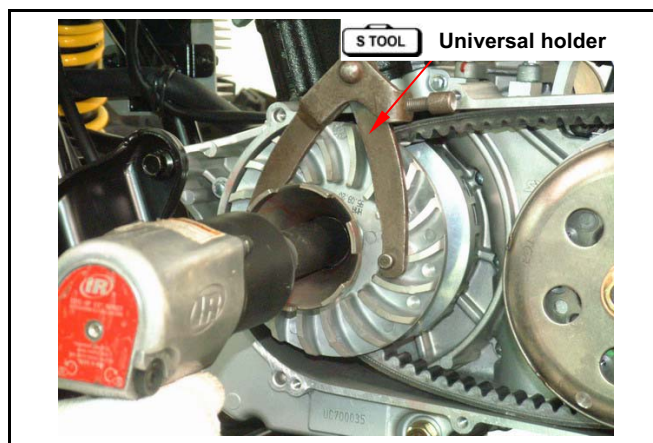
Remove left crankcase cover.

Hold drive face with universal holder, and remove nut and drive face.

Special Tool :

Tool number : SYM-2210100

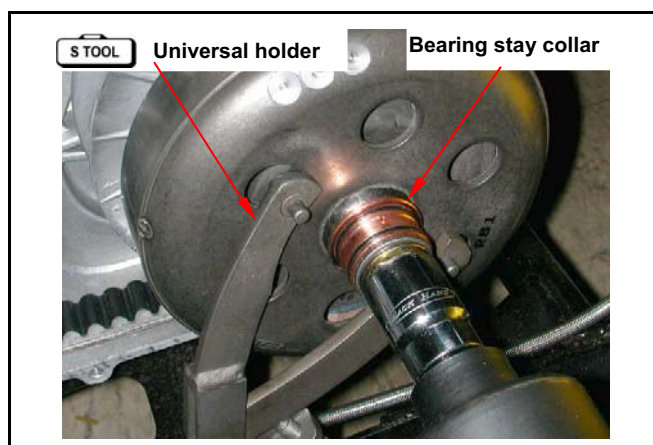
Tool name: universal holder



Hold clutch outer with universal holder, and remove nut, bearing stay collar and clutch outer.

Caution

- Using special service tools for tightening or loosening the nut.
- Fixed rear wheel or rear brake will damage reduction gear system.



Push the drive belt into belt groove as diagram shown so that the belt can be loosened, and then remove the driven pulley.

Remove driven pulley. Do not remove drive belt. Remove the drive belt from the groove of driven pulley.

Inspection

Check the drive belt for crack or wear. Replace it if necessary.

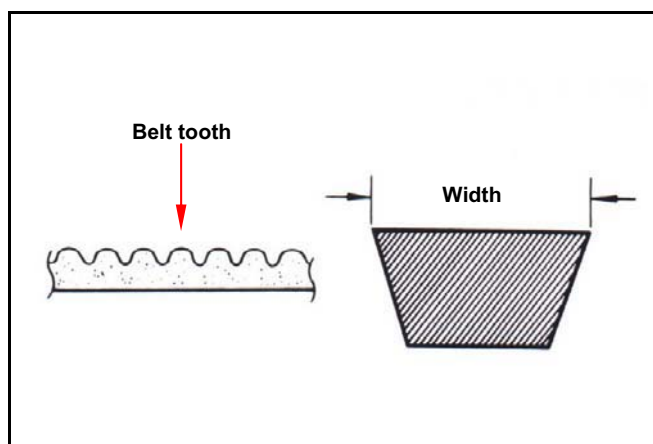
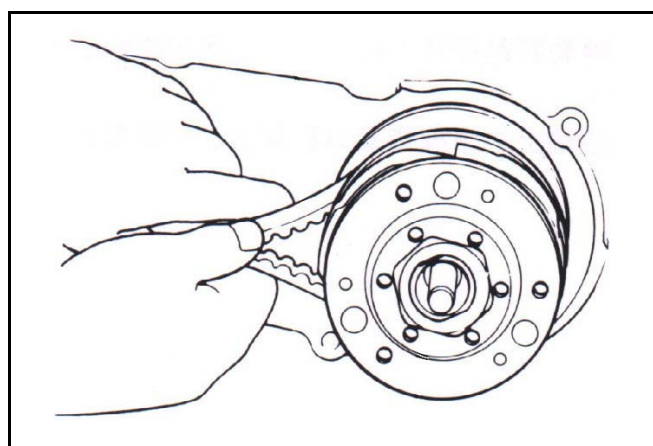
Measure the width of drive belt as diagram shown.

Service Limit: 22.5 mm

Replace the belt if exceeds the service limit.

Caution

- Using the genuine parts for replacement.
- The surfaces of drive belt or pulley must be free of grease.
- Clean up all grease or dirt before installation.

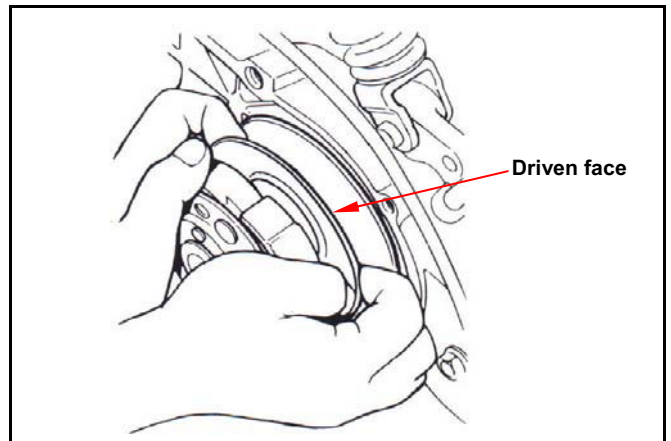


Installation

Caution

- Pull out driven face to avoid it closing.
- Cannot oppress friction plate comp in order to avoid creates the distortion or the damage.

Install drive belt onto driven pulley.



Install the driven pulley that has installed the belt onto drive shaft.

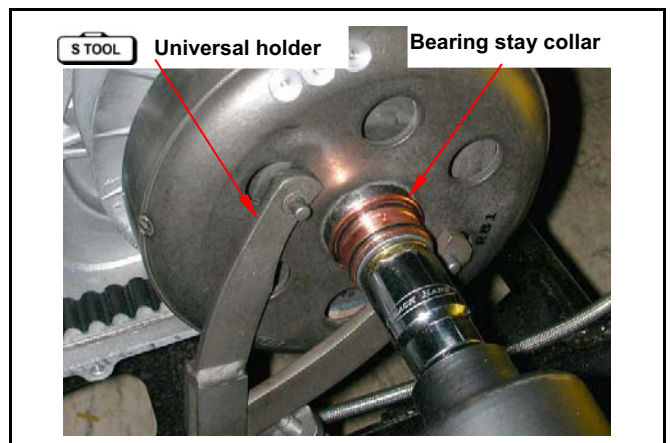
On the drive belt another end to the movable drive face.



Install the clutch outer and bearing stay collar.

Hold the clutch outer with universal holder, and then tighten nut to specified torque value.

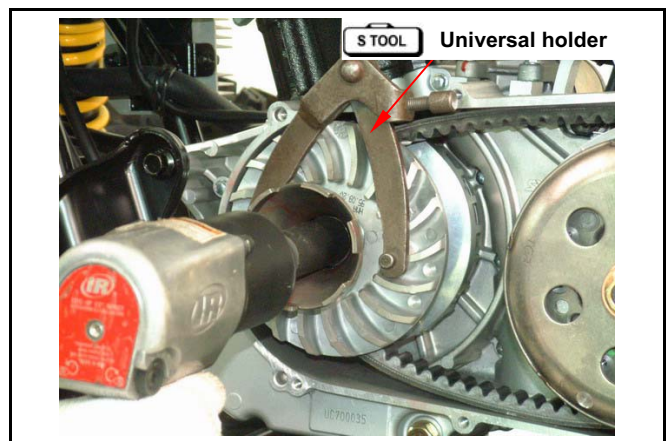
Torque value: 5.0~6.0kgf-m



Install the drive face, washer and drive face nut.

Hold drive face with universal holder, and then tighten nut to specified torque value.

Torque value: 8.5~10.5kgf-m



8-6 Drive Face

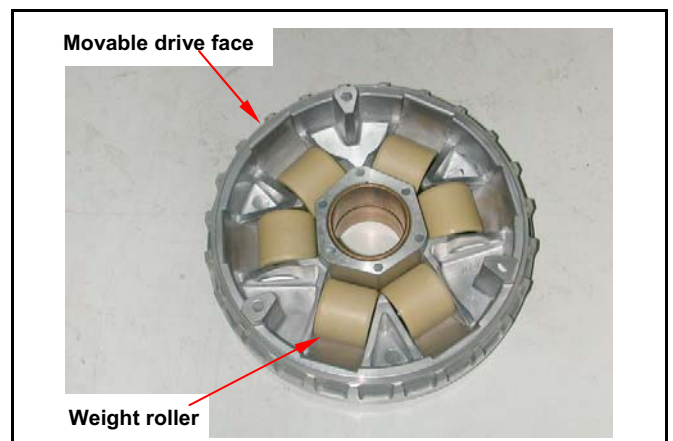
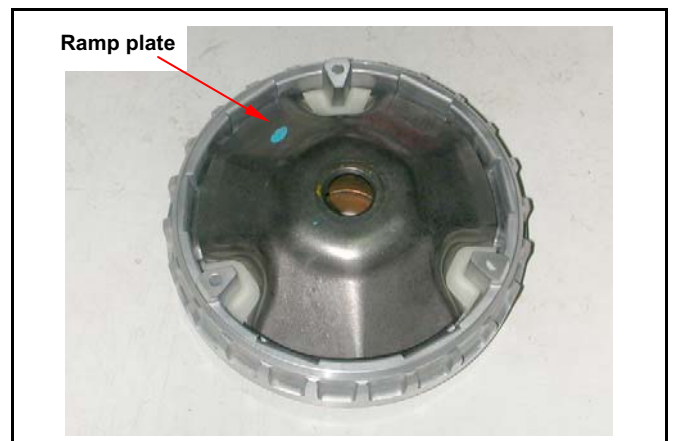
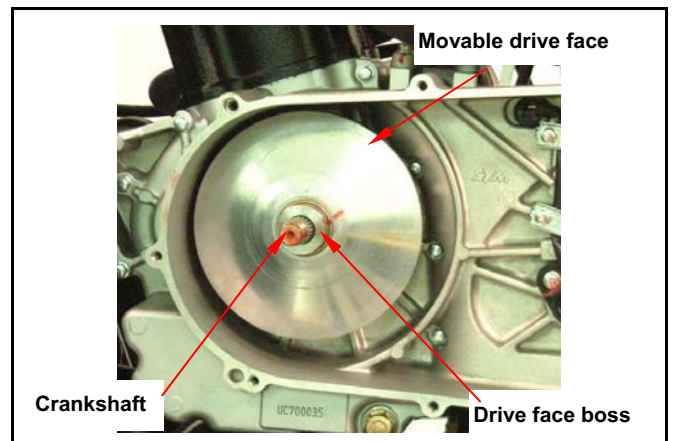
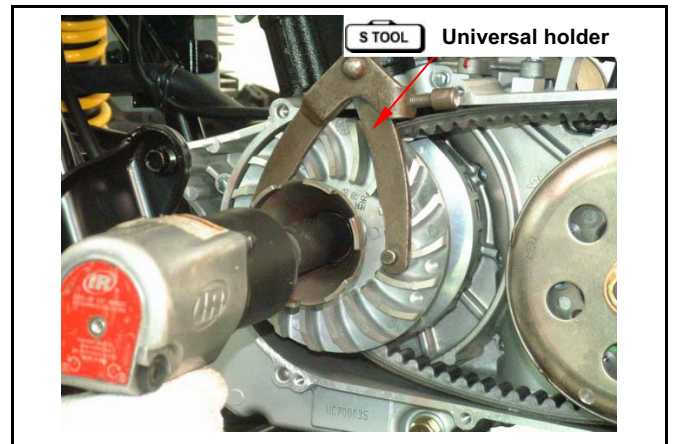
Removal

Remove left crankcase cover.
Hold drive face with universal holder, and then
remove drive face nut.
Remove drive face and drive belt.

Remove movable drive face comp and drive face
boss from crankshaft.

Remove ramp plate.

Remove weight rollers from movable drive face.



Inspection

The weight rollers are to press movable drive face by means of centrifuge force.

Thus, if weight rollers are worn out or damaged, the centrifuge force will be affected.

Check if rollers are worn or damaged. Replace it if necessary.

Measure each roller's outer diameter. Replace it if it exceed the service limit.

Service limit: 19.0 mm

Weight: 17.2g

Check if drive face boss is worn or damaged and replace it if necessary.

Measure the outer diameter of movable drive face boss, and replace it if it exceed service limit.

Service limit: 29.962 mm

Measure the inner diameter of movable drive face, and replace it if it exceed service limit.

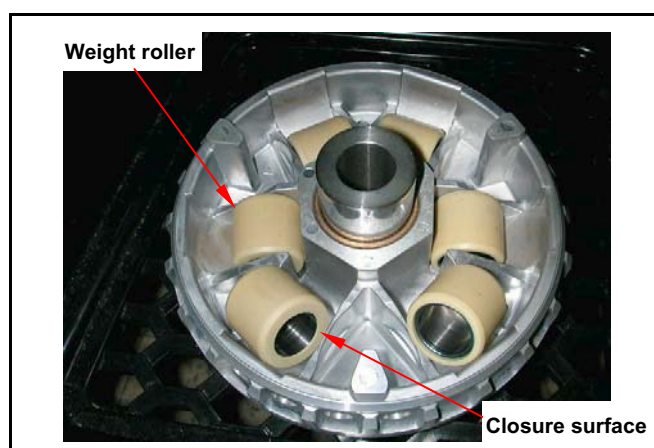
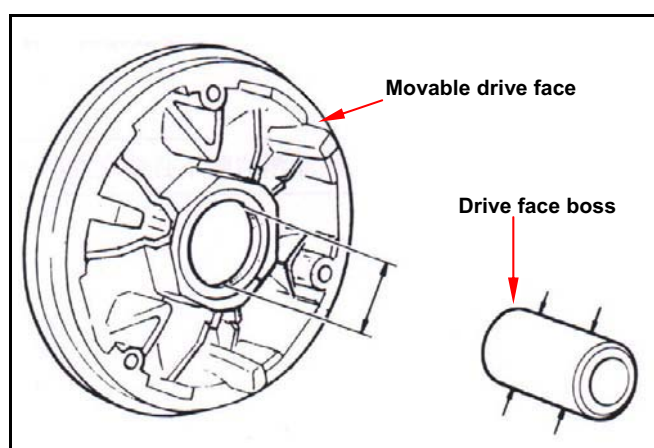
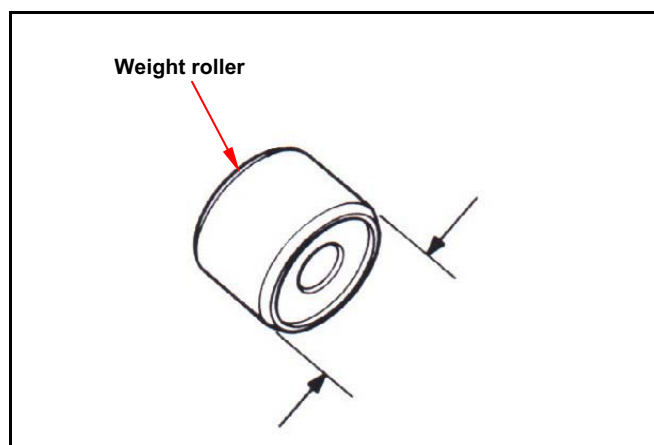
Service limit: 30.060 mm

Reassembly/installation

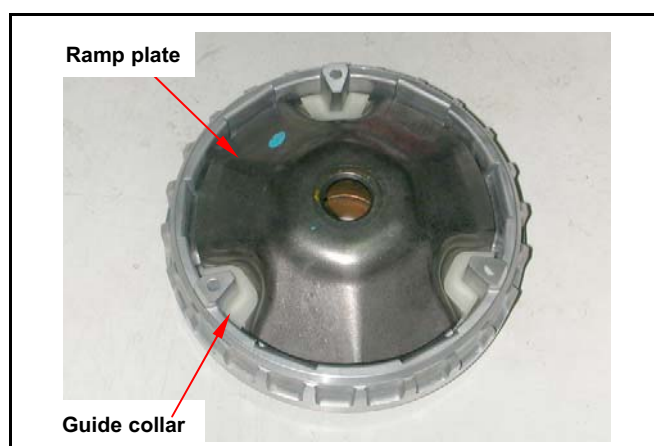
Install weight rollers.

⚠ Caution

The weight roller two end surfaces are not certainly same. In order to lengthen the roller life and prevented exceptionally wears the occurrence, Please end surface of the closure surface counter clockwise assemblies onto movable drive face.



Install ramp plate.

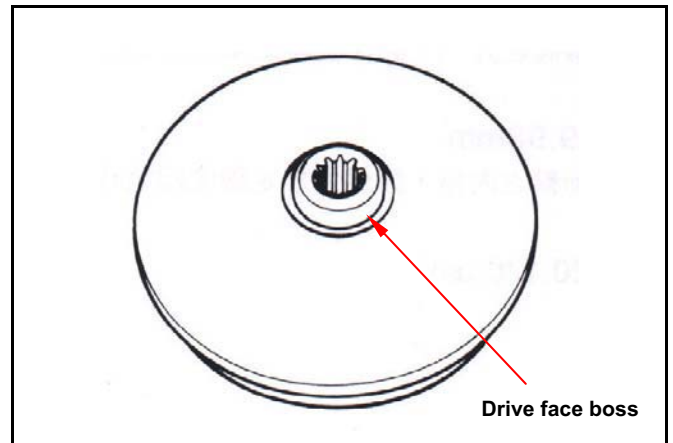


With 4~5g grease spreads wipes drives in the movable drive face axis hole.

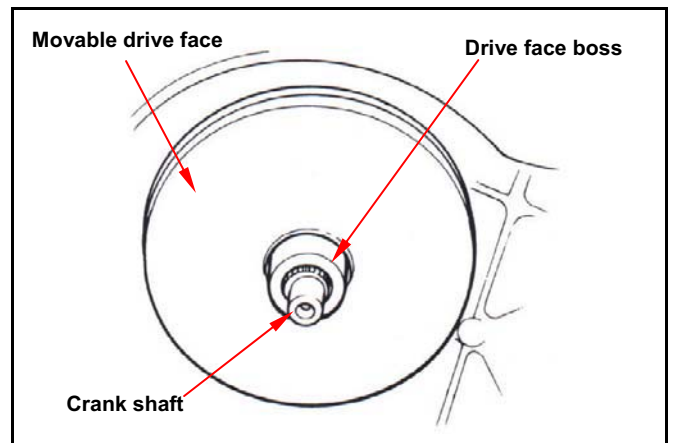
Install drive face boss.

Caution

The movable drive face surface has to be free of grease. Clean it with cleaning solvent.

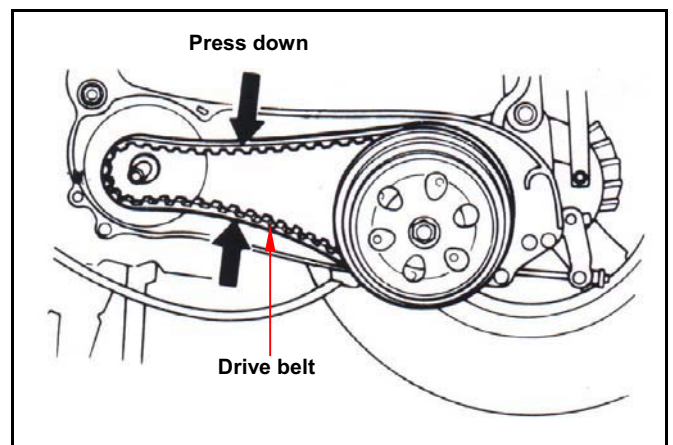


Install movable drive face comp. onto crankshaft.



Driven pulley installation

Press drive belt into pulley groove, and then pull the belt onto drive shaft.



Install drive face, washer and nut.

Caution

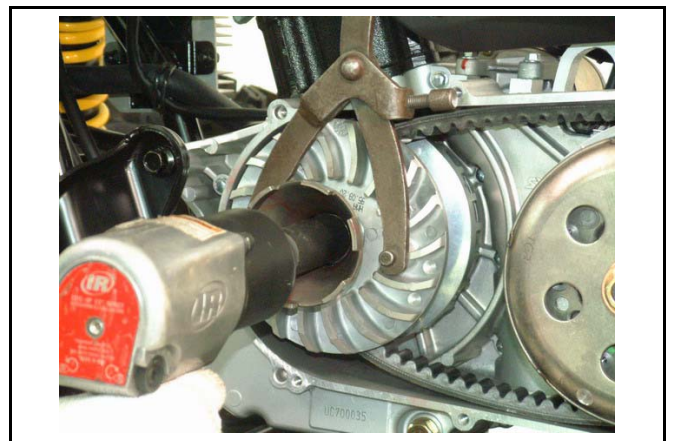
Make sure that two sides of pulley surfaces have to be free of grease. Clean it with cleaning solvent.

Hold drives face with universal holder.

Tighten nut to specified torque.

Torque value: 8.5~10.5kgf-m

Install left crankcase cover.



8-7 Clutch Outer/Driven Pulley

Disassembly

Remove drive belt, clutch outer and driven pulley. Install clutch spring compressor onto the pulley assembly, and operate the compressor to let the wrench be installed more easily.

Caution

Do not press the compressor too much.

Hold the clutch spring compressor onto bench vise, and then remove mounting nut with special service tool.

Release the clutch spring compressor and remove friction plate, clutch weight and spring from driven pulley.

Remove seal collar from driven pulley.

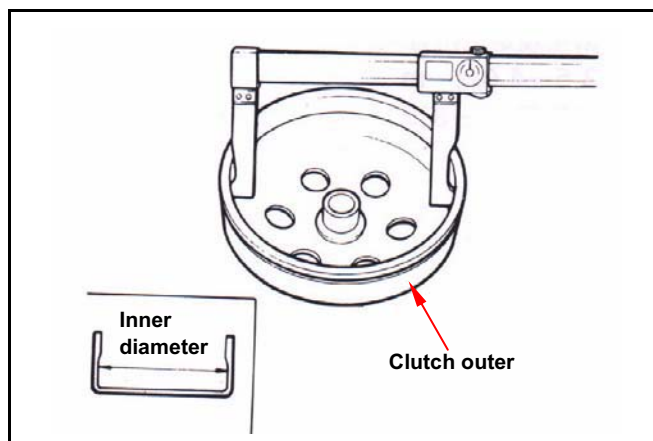
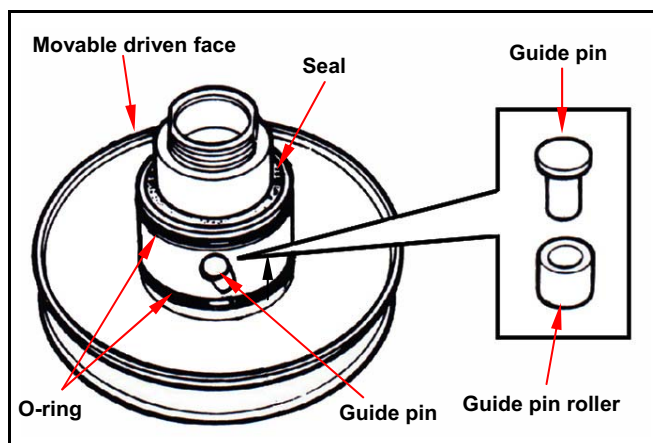
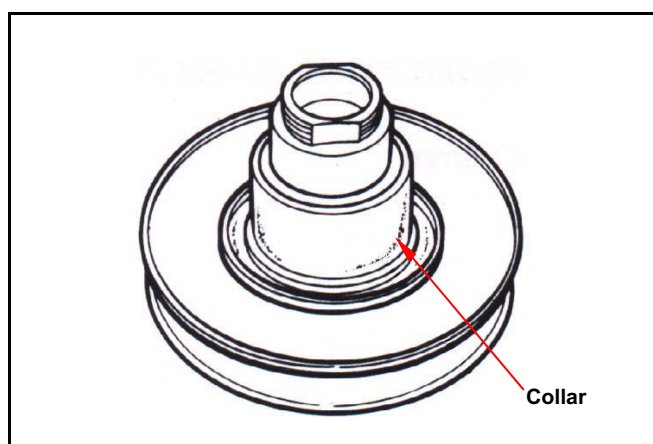
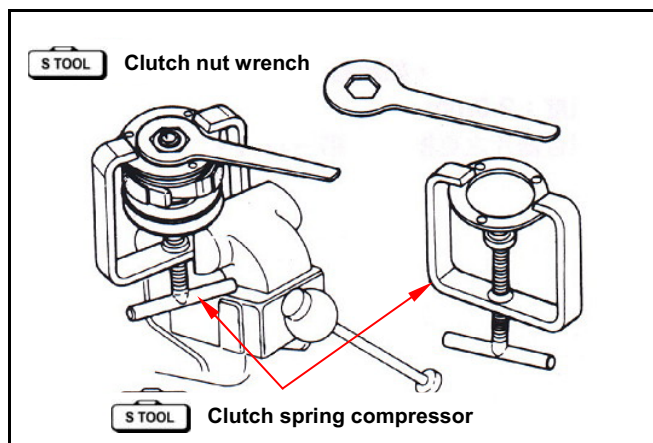
Remove guide pin, guide pin roller, and movable driven face, and then remove O-ring & oil seal seat from movable driven face.

Inspection

Clutch outer

Measure the inner diameter of clutch outer. Replace the clutch outer if exceed service limit.

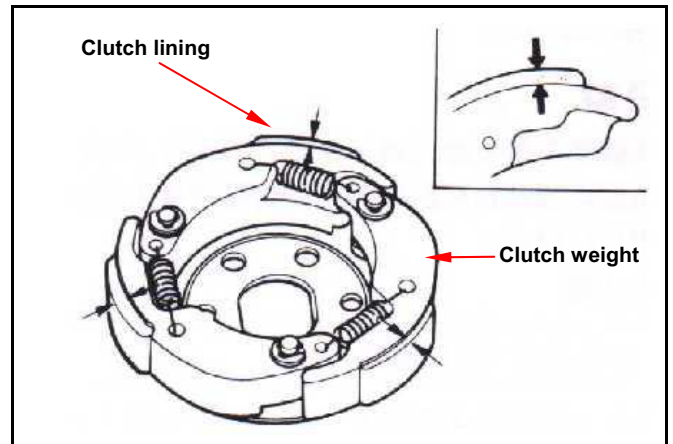
Service limit: 145.450 mm



Clutch lining

Measure each clutch weight thickness. Replace it if exceeds service limit.

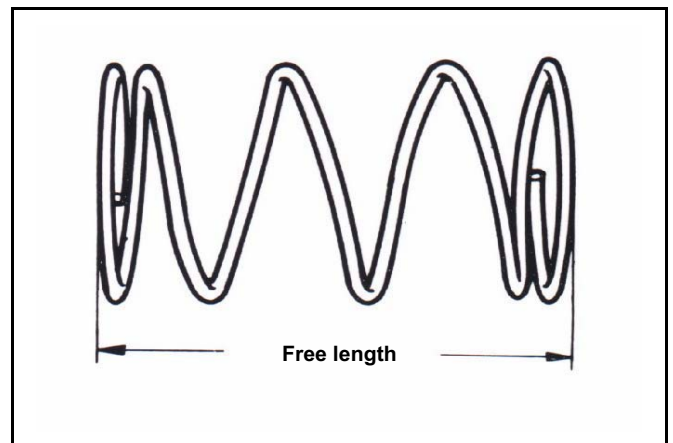
Service limit: 3.0 mm



Driven pulley spring

Measure the length of driven pulley spring. Replace it if exceeds service limit.

Service limit: 97.4 mm



Driven pulley

Check following items:

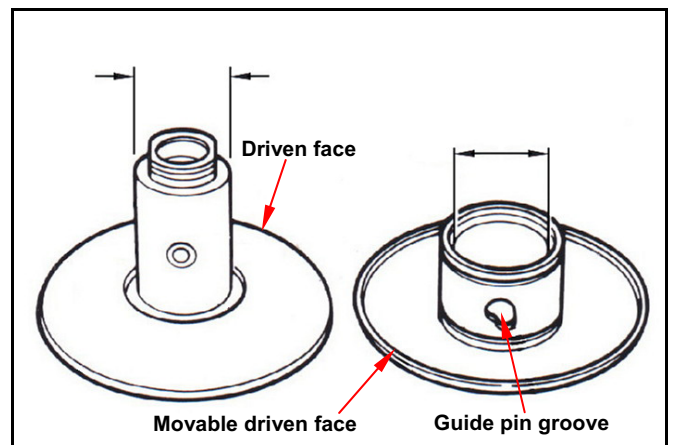
- If both surfaces are damaged or worn.
- If guide pin groove is damaged or worn.

Replace damaged or worn components.

Measure the outer diameter of driven face and the inner diameter of movable driven face. Replace it if exceeds service limit.

Service limit: Outer diameter 40.93 mm

Inner diameter 41.07 mm



Driven Pulley Bearing Inspection

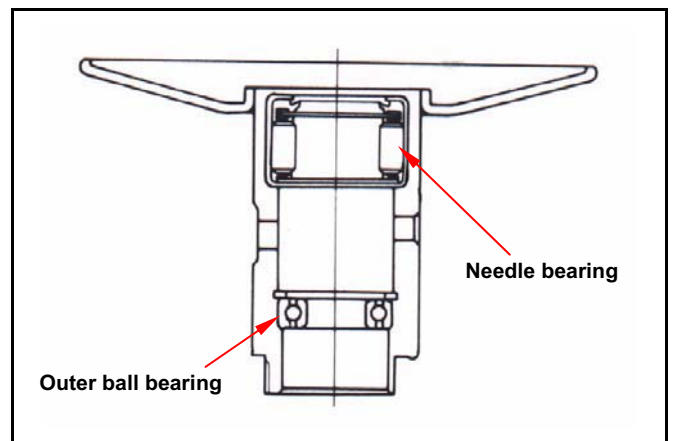
Check if the inner bearing oil seal is damage.

Replace it if necessary.

Check if needle bearing is damage or too big clearance. Replace it if necessary.

Rotate the inside of inner bearing with fingers to check if the bearing rotation is in smooth and silent.

Check if the bearing outer parts are closed and fixed. Replace it if necessary.



Clutch weight Replacement

Remove snap ring and washer, and then remove clutch weight and spring from driving plate.

Caution

Some of models are equipped with one mounting plate instead of 3 snap rings.

Check if spring is damage or insufficient elasticity.

Check if shock absorption rubber is damage or deformation. Replace it if necessary.
Apply with grease onto setting pins.

Install new clutch weight onto setting pin and then push to the specified location.

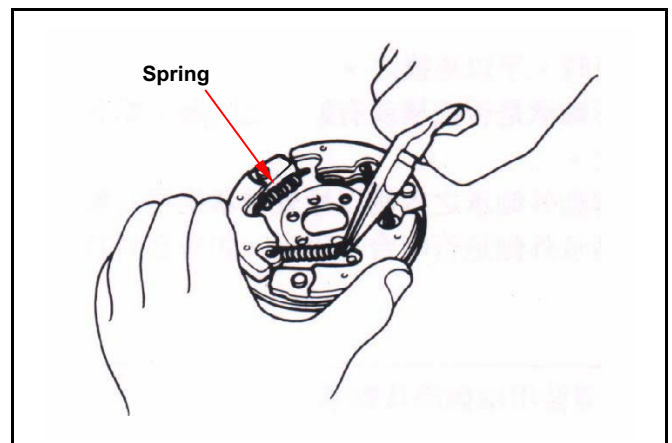
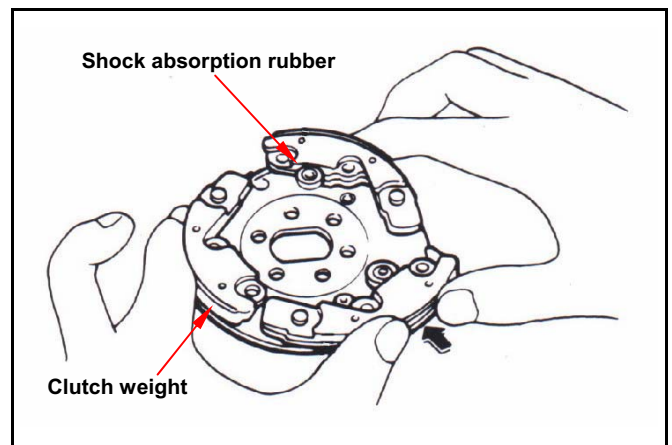
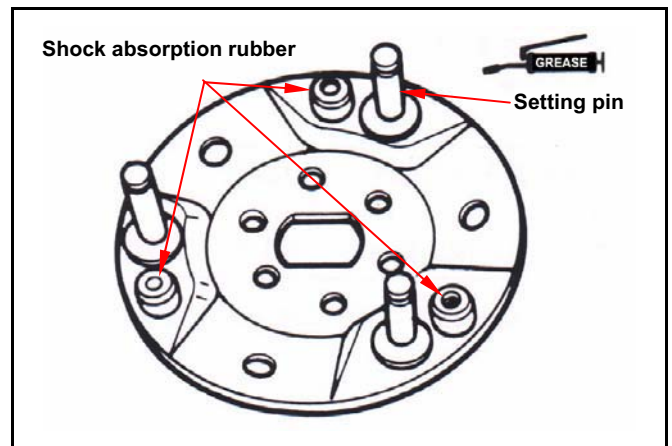
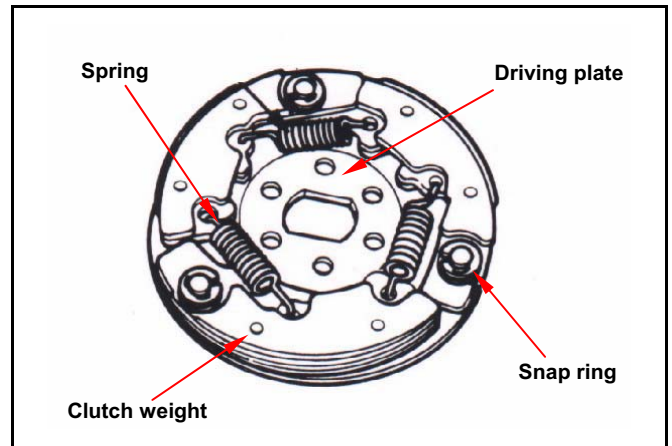
Apply with grease onto setting pins.

But, the clutch block should not be greased. If so, replace it.

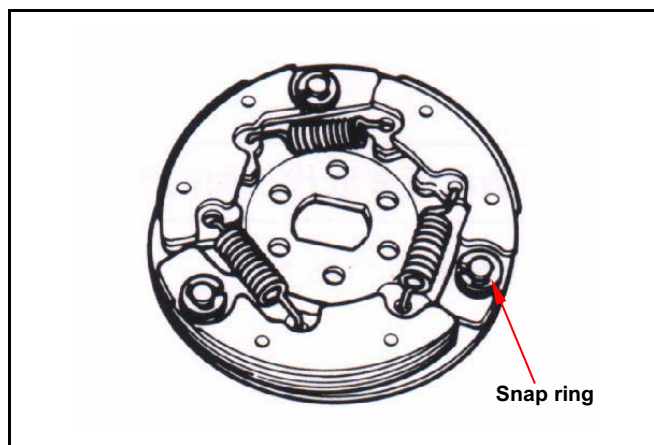
Caution

Grease or lubricant will damage the clutch weight and affect the block's connection capacity.

Install the spring into groove with pliers.



Install snap ring and mounting plate onto setting pin.

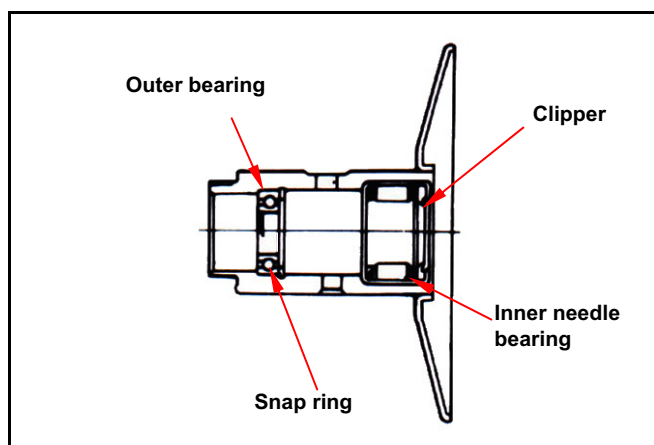


Replacement of Driven Pulley Bearing

Remove inner bearing.

Caution

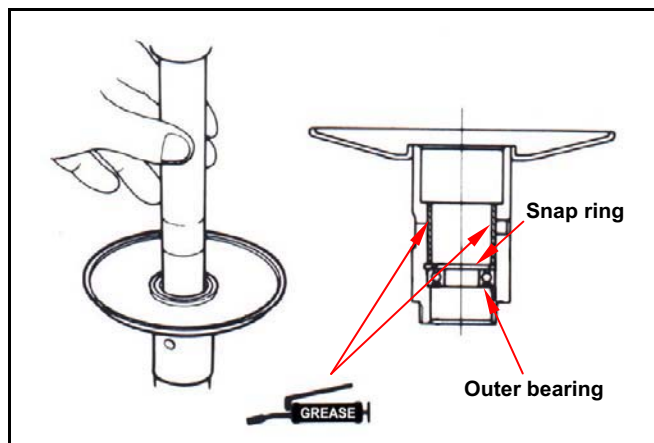
- If the inner bearing equipped with oil seal on side in the driven pulley, then remove the oil seal firstly.
- If the pulley equipped with ball bearing, it has to remove snap ring and then the bearing.



Remove snap ring and then push bearing forward to other side of inner bearing.

Place new bearing onto proper position and its sealing end should be forwarded to outside.

Apply with specified oil.



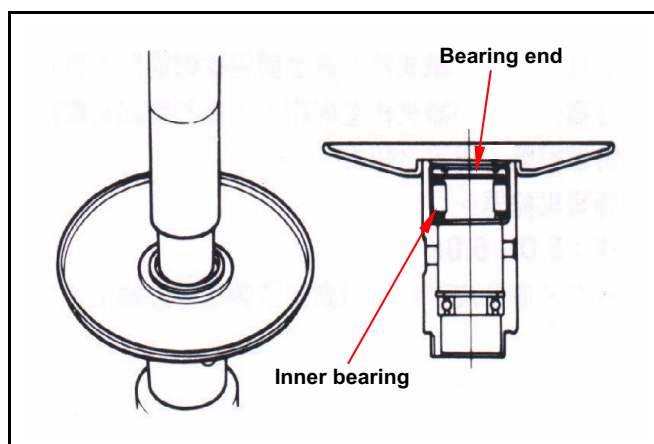
Install new inner bearing.

Caution

- Its sealing end should be forwarded to outside as bearing installation.
- Install needle bearing with hydraulic presser. Install ball bearing by means of hydraulic presser.

Install snap ring into the groove of drive face.

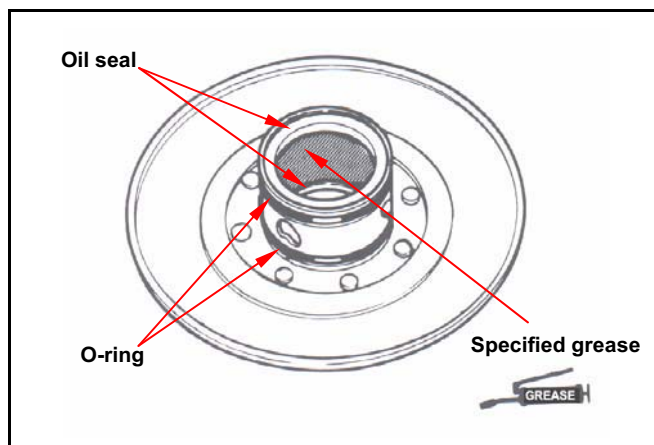
Align oil seal lip with bearing, and then install the new oil seal (if necessary).



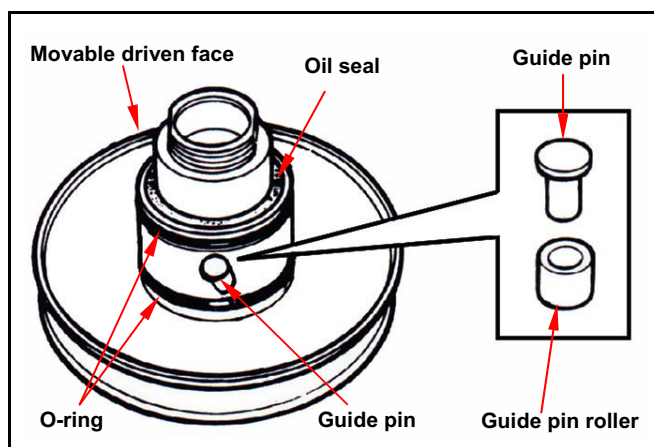
Installation of Clutch OUTER/Driven Pulley Assembly

Install new oil seal and O-ring onto movable driven face.

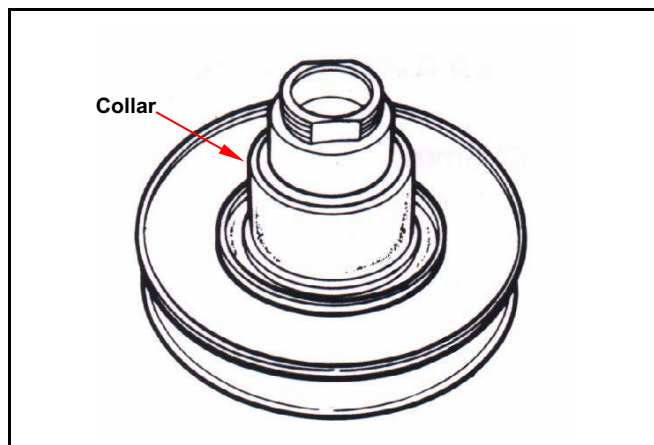
Apply with specified grease to lubricate the inside of movable driven face.



Install the movable driven face onto driven face.
Install the guide pin and guide pin roller.



Install the collar.



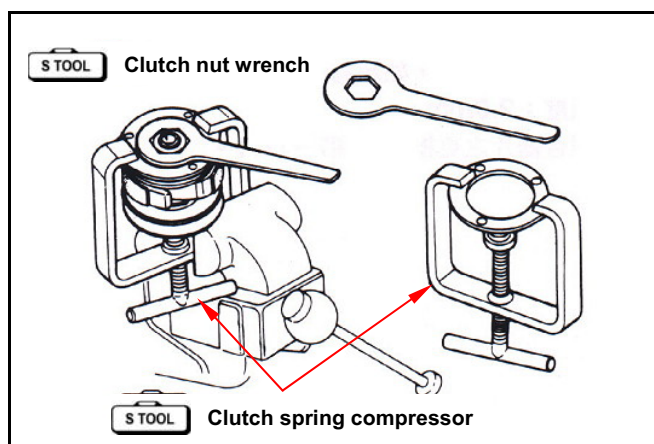
Install friction plate, spring and clutch weight into clutch spring compressor, and press down the assembly by turning manual lever until mounting nut that can be installed.

Hold the compressor by bench vise and tighten the mounting nut to specified torque with clutch nut wrench.

Remove the clutch spring compressor.

Torque value: 5.0~6.0kgf-m

Install clutch outer/driven pulley and drive belt onto drive shaft.



9. FINAL DRIVING MECHANISM

9-1 Mechanism Diagram - Transmission Cover

9-2 Precautions In operation

9-3 Trouble Diagnosis

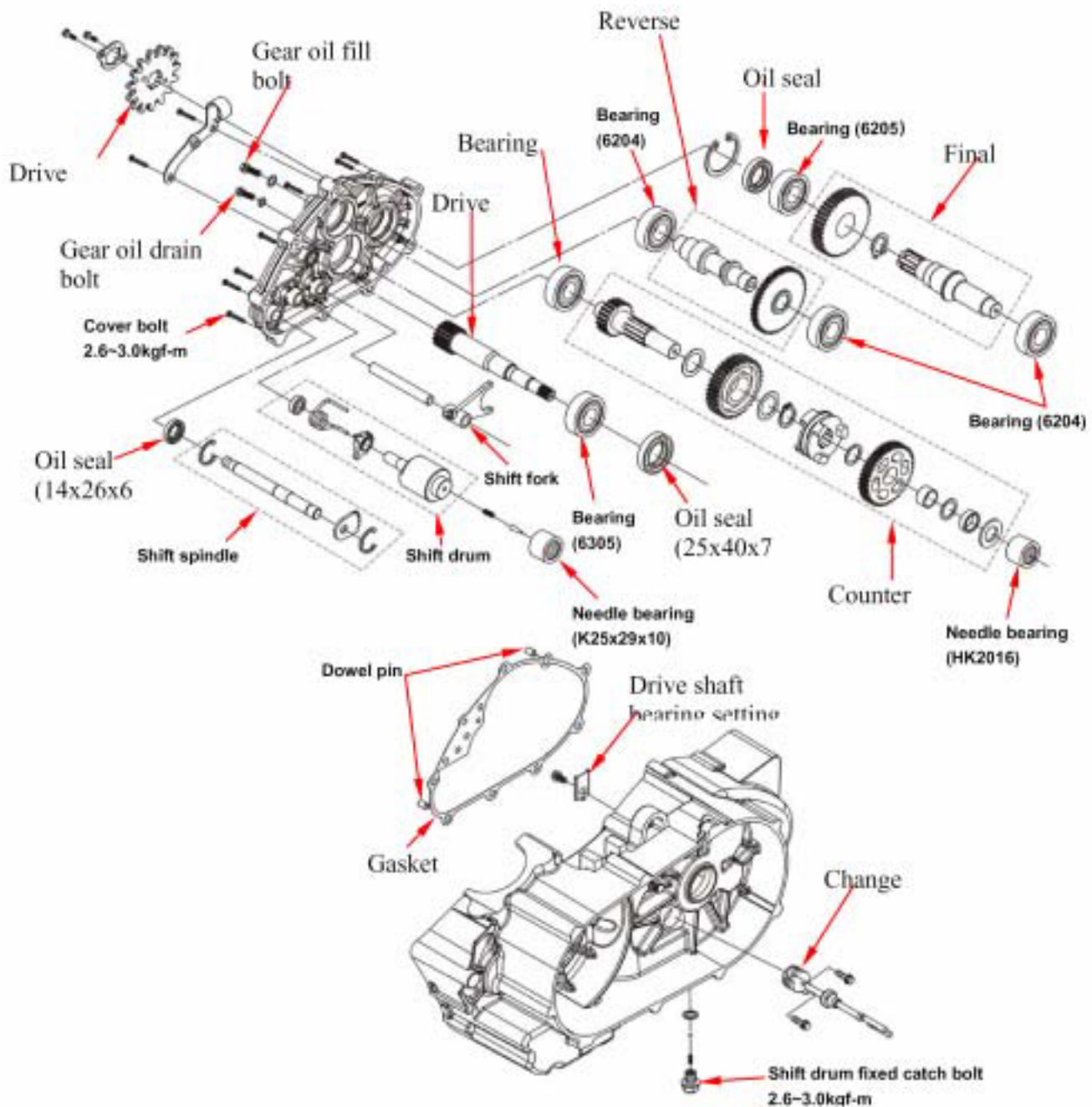
9-4 Disassembly Of Transmission

9-5 Inspection Of Mission Mechanism

9-6 Bearing Replacement

9-7 Re-assembly Of Final Driving Mechanism

9-1 Mechanism Diagram - Transmission Cover



9-2 Precautions In operation

Specification

Application oil: scooter gear oil

Recommended oil: KING MATE serial gear oils

Oil quantity: 750c.c. (650c.c. when replacing)

Torque value

Gear box cover 2.6~3.0kgf-m

Gear oil drain bolt 0.8~1.2kgf-m

Gear oil fill bolt 3.5~4.5kgf-m

Tools

Special tools

Bearing driver (6204): SYM-9110400

Bearing driver (6205LLU): SYM-9100400-HMA

Bearing driver (6305): SYM-9100400-RB1

Needle bearing driver (HK2016): SYM-9100300-RB1

Drive shaft and oil seal driver: SYM-9120200-HMA

Drive shaft puller: SYM-2341100

Inner bearing puller: SYM-6204002

9-3 Trouble Diagnosis

Engine can be started but motorcycle can not be moved.

- Damaged drive gear
- Burnt out drive gear
- Damaged gear shift system

Noise

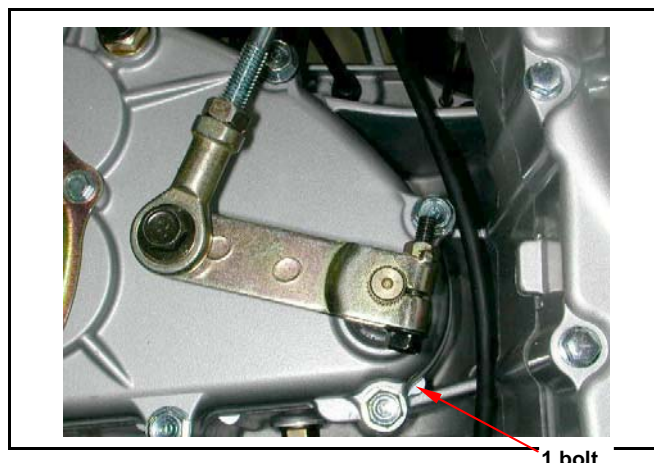
- Worn or burnt gear
- Worn gear

Gear oil leaks

- Excessive gear oil.
- Worn or damage oil seal

9-4 Disassembly Of Transmission

Remove gear change lever (1 bolt).

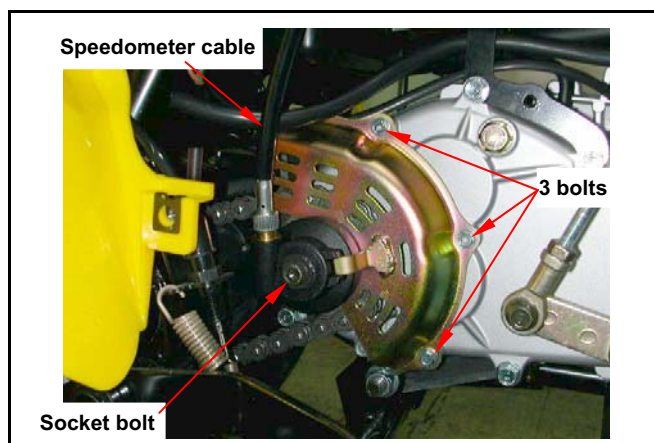


Loosen speedometer cable mounting nut, and then remove the cable.

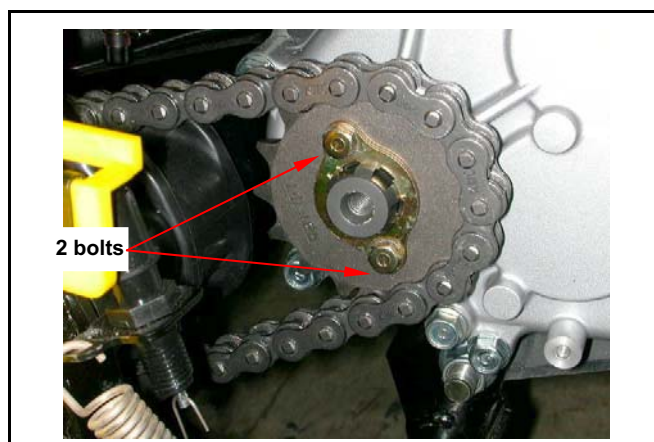
Remove 3 bolts and remove drive chain protector. Turn the socket bolt clockwise, and then remove speedometer gear box.

Caution

The socket bolt is provided with left turn thread.



Remove 2 bolts, and then remove the drive sprocket fixing plate, drive chain and drive sprocket.



Remove gear fill bolt.

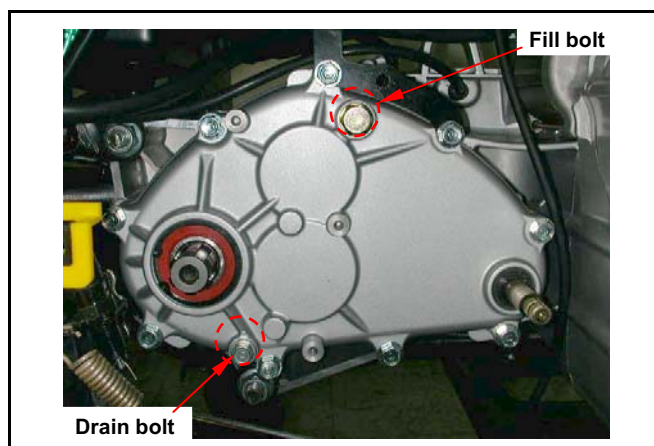
Place an oil pan under the ATV, and remove gear oil drain bolt.

After drained, make sure washer can be re-used. Install oil drain bolt.

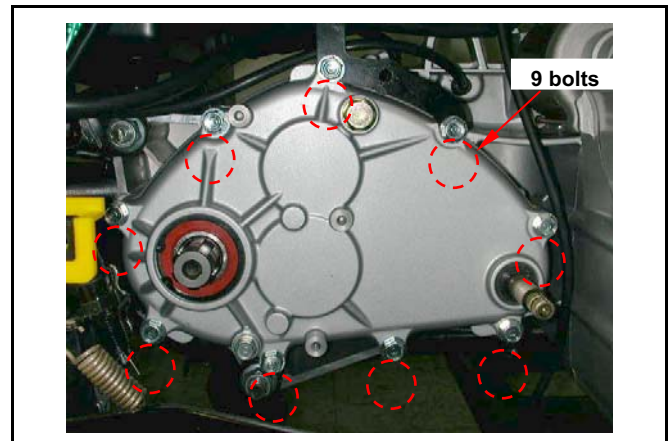
Torque value:

Gear oil fill bolt **3.5~4.5kgf-m**

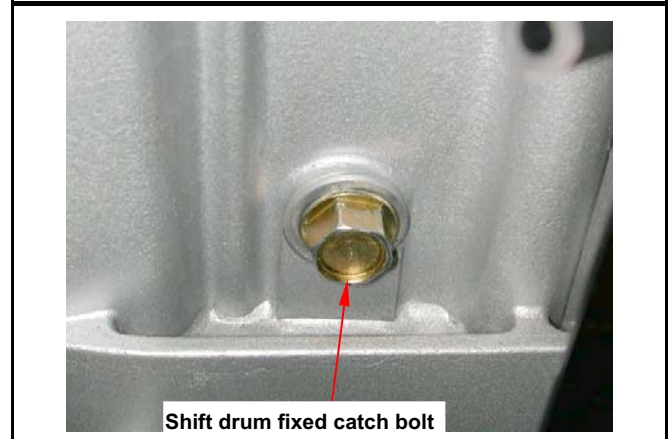
Gear oil drain bolt **0.8~1.2kgf-m**



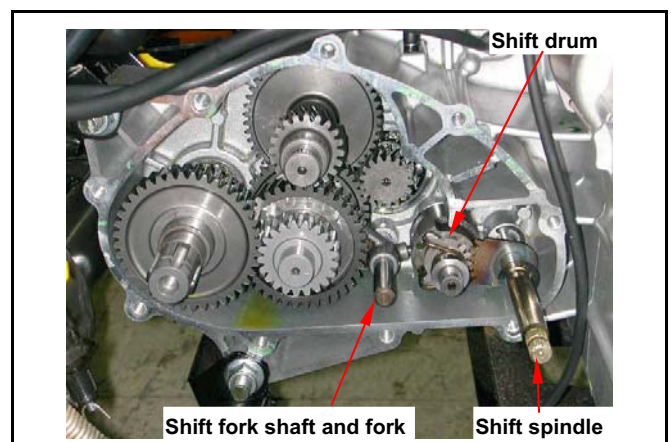
Remove gear box cover bolts (9 bolts) and then remove the cover.



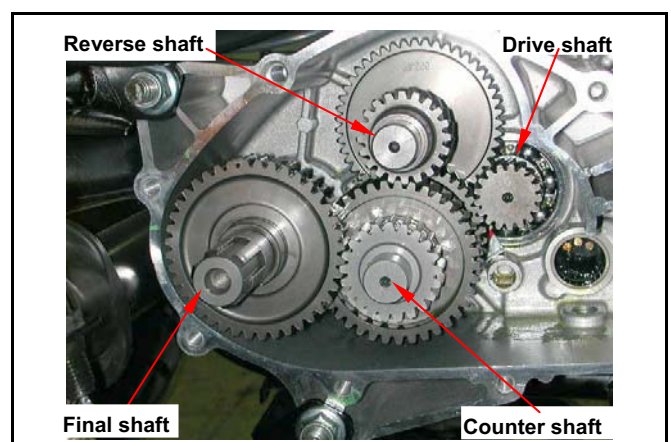
Remove shift drum catch ball, spring and bolt.



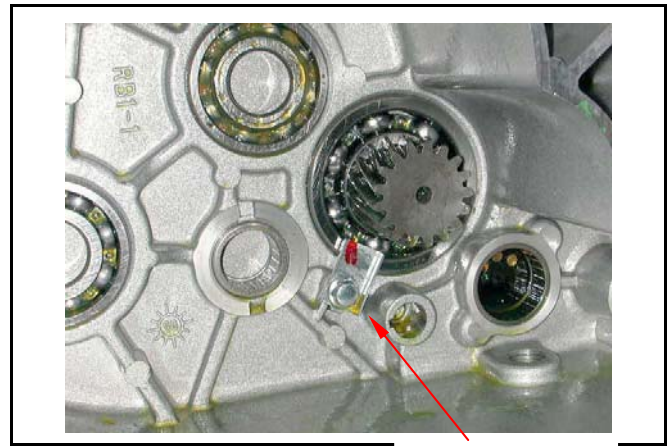
Remove shift spindle, shift fork shaft, shift fork and shift drum.



Remove final shaft, counter shaft and reverse shaft.



Remove drive shaft bearing setting plate (1 bolt).



Bearing setting plate

Remove the drive shaft.

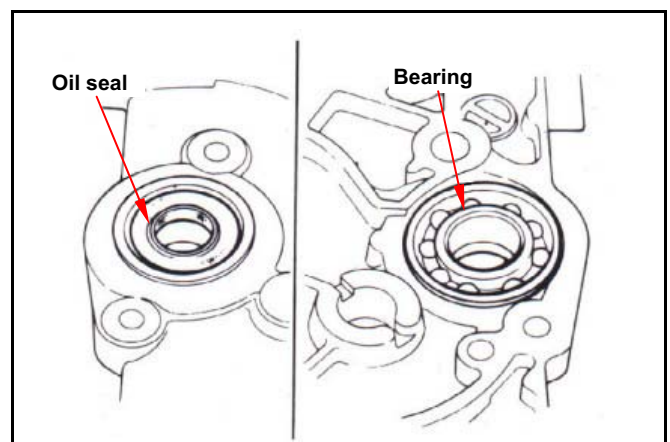
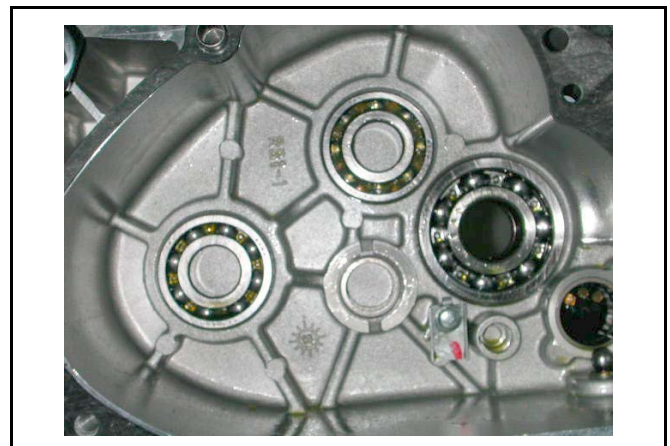
Special tool:

Shaft protector

Remove gasket and dowel pin.

⚠ Caution

- If non- essential do not remove the drive shaft from the case upper side.
- If remove the drive shaft from the gear box, then its bearing and oil seal has to be replaced.



9-5 Inspection Of Mission Mechanism

Check if the shift spindle is wear or damage.



Check if the shift drum is wear or damage.



Check if the shift fork and shaft is wear or damage.



Check if the counter shaft is wear or damage.



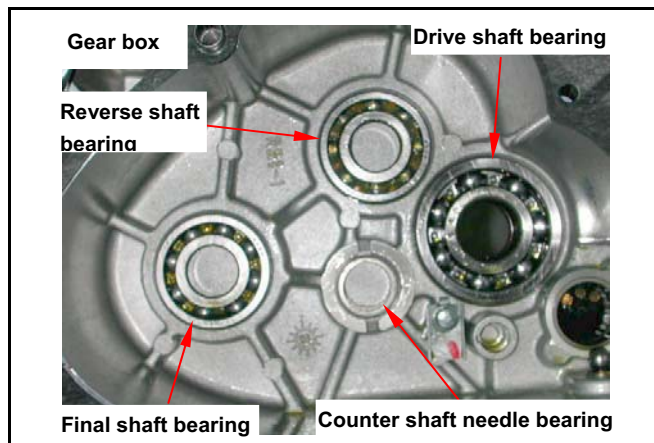
Check if the reverse shaft is wear or damage.



Check if the final shaft and gear are burn, wear or damage.

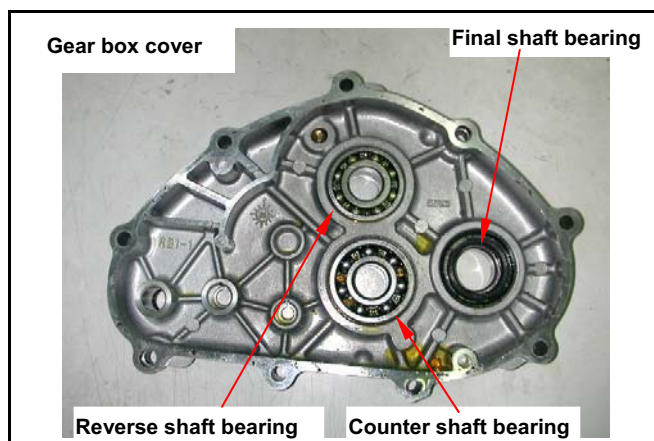


Check bearings on gear box and gear box cover. Rotate each bearing's inner ring with fingers. Check if bearings can be turned in smooth and silent, and also check if bearing outer ring is mounted on gear tightly. If bearing rotation is uneven, noising, or loose bearing mounted, then replace it. Check oil seal for wear or damage, and replace it if necessary.



Caution

- If remove the drive shaft from the crankcase upper side, then its bearing has to be replaced.



9-6 Bearing Replacement

Caution

- Never install used bearings. Once bearing removed, it has to be replaced with new one.

Crankcase side

Remove drive shaft bearing setting plate, and then remove drive shaft bearing from left crankcase using following tools.

Remove reverse shaft bearing and counter shaft bearing from left crankcase using following tools.
Remove drive shaft oil seal.

Special tool:

Inner bearing puller

Install new final shaft, counter shaft and reverse shaft bearings into left crankcase.

Special tool:

Bearing driver (6204)

Needle bearing driver (HK2016)

Install new drive shaft bearings and bearing driver into left crankcase.

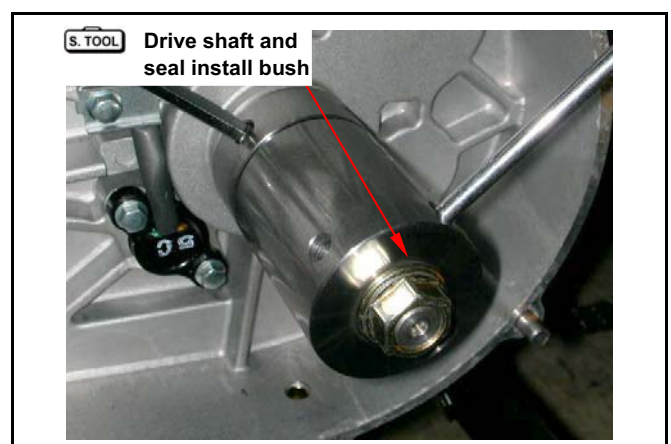
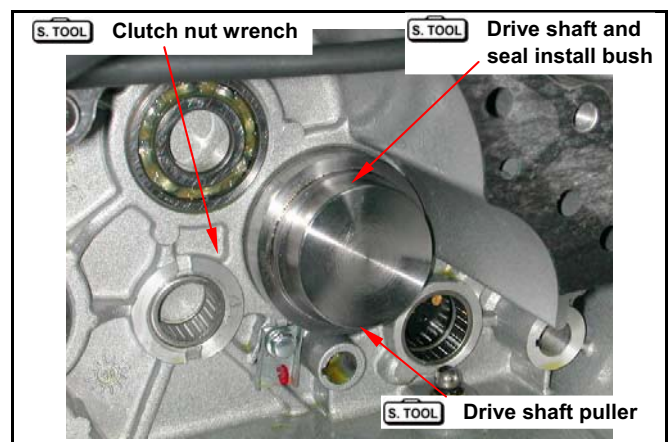
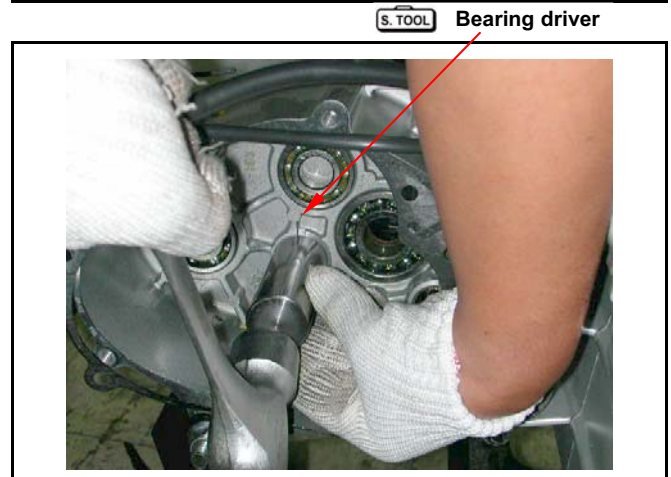
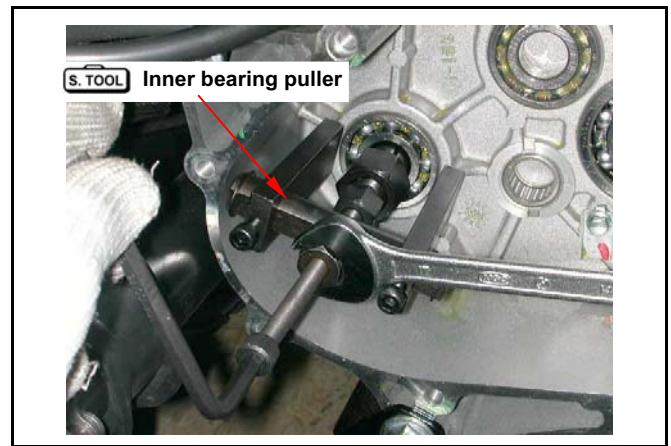
Install the universal bearing puller and bearing driver.

Turn the universal bearing puller to install drive shaft bearing.

Special tool:

Bearing driver (6305)

Universal bearing puller



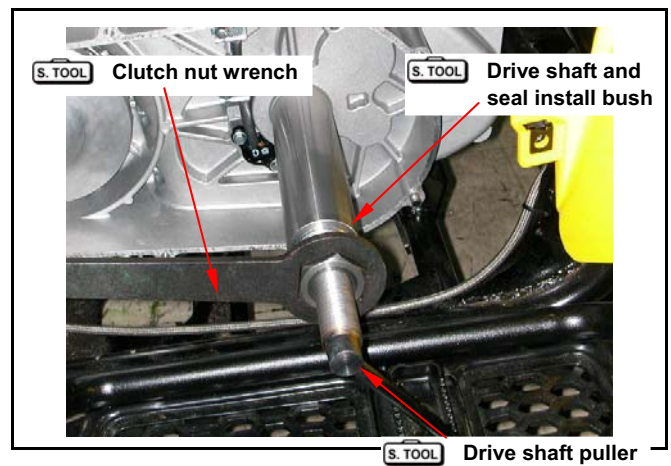
Install drive shaft.

Special tool:

Drive shaft puller

Drive shaft and oil seal install bush

Clutch nut wrench

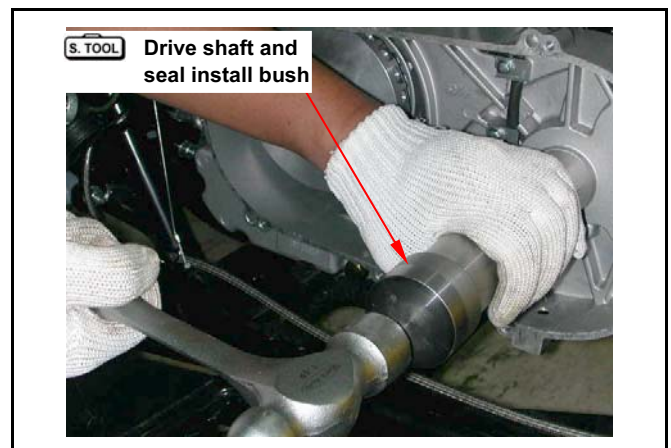


Apply with grease onto new drive shaft oil seal lip, and then install the oil seal.

Special tool:

Drive shaft and oil seal install bush

Install drive shaft bearing setting plate (1 bolt).

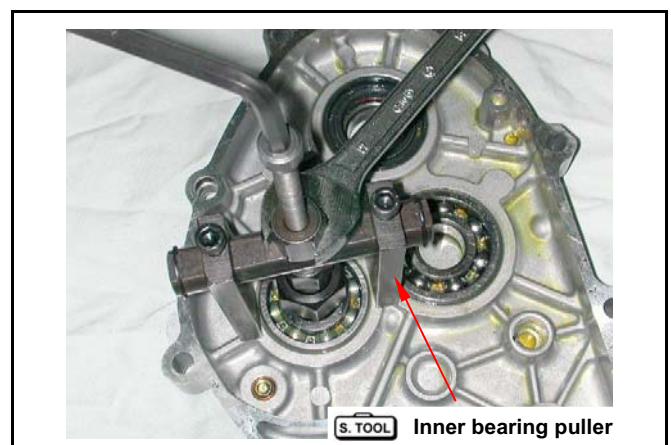


Gear box side

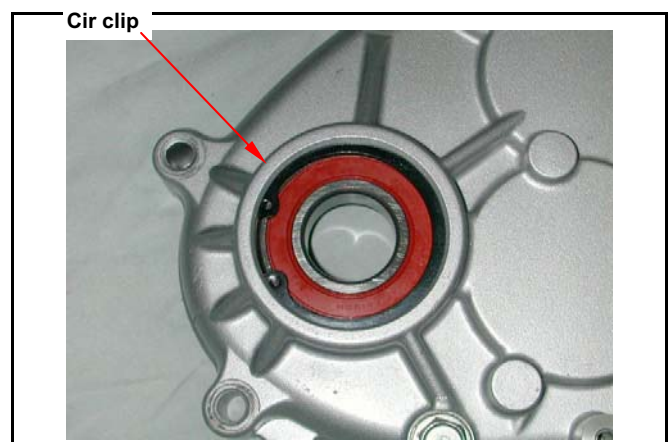
Use inner bearing puller to remove the final shaft needle bearing, gear shift shaft bearing and counter shaft bearing from the cover inner side.

Special tool:

Inner bearing puller



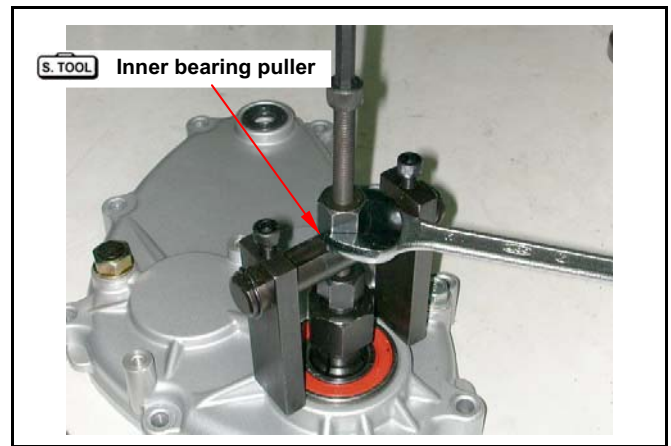
Remove cir clip of final shaft outside bearing.



Special tool:

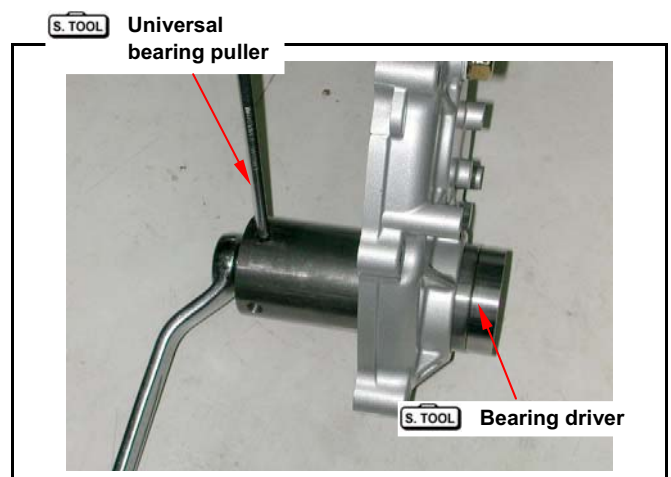
Inner bearing puller

Remove oil seal from gear box cover and discard the seal



Install new bearing and bearing driver into gear box cover outer side.

Install the universal bearing puller and bearing driver.

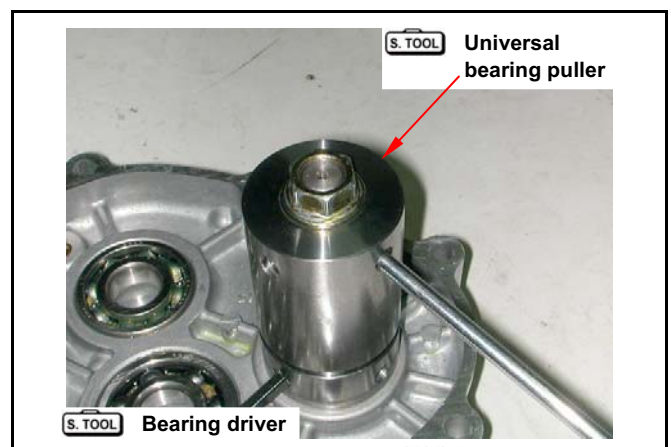


Turn the universal bearing puller to install drive shaft bearing.

Special tool:

Bearing driver (6205)

Universal bearing puller



Install new oil seal and bearing driver into gear box cover inner side.

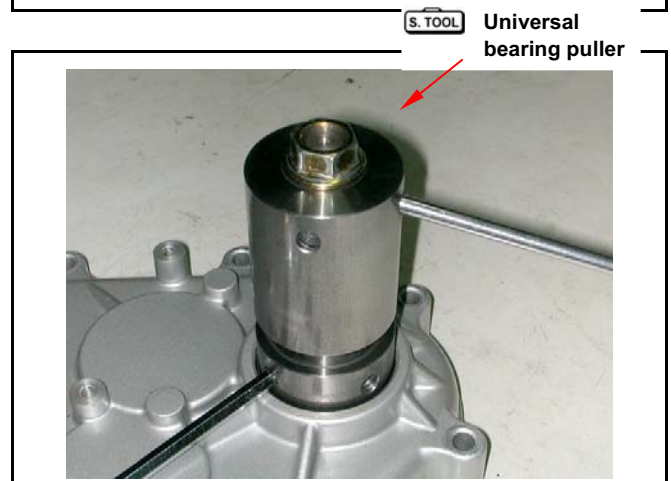
Install the universal bearing puller and bearing driver.

Turn the universal bearing puller to install drive shaft oil seal.

Special tool:

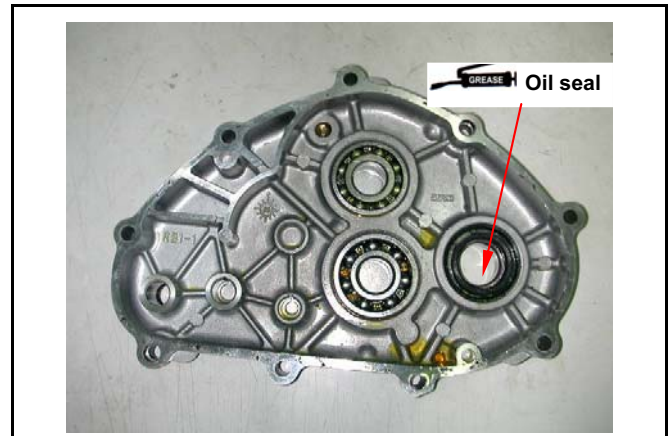
Bearing driver (6205)

Universal bearing puller

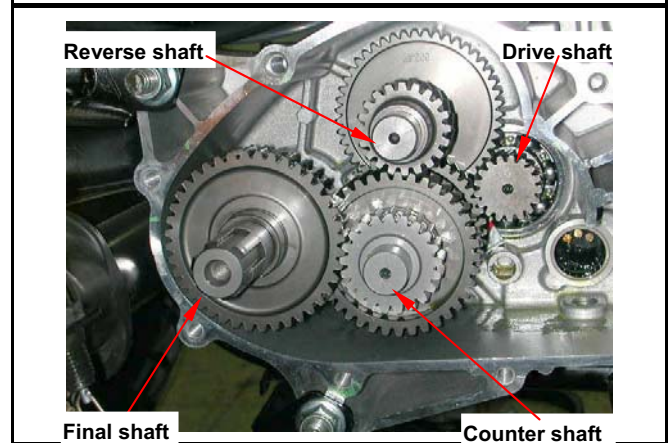


9-7 Re-assembly Of Final Driving Mechanism

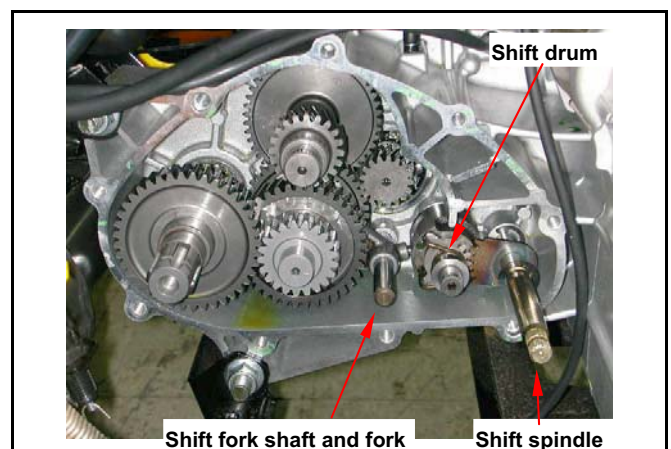
Apply with grease onto the oil seal lip of final driving shaft.



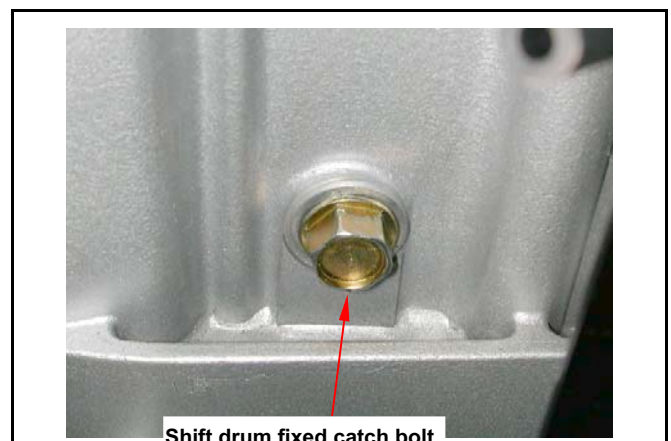
Install counter shaft, reverse shaft and final shaft onto gear box.



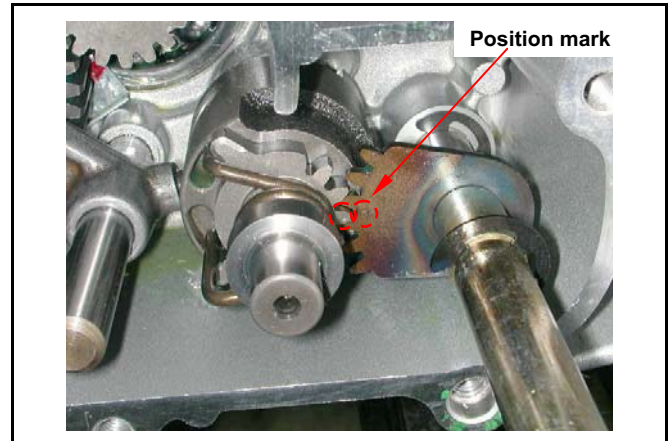
Install shift drum, shift fork and fork shaft onto gear box.



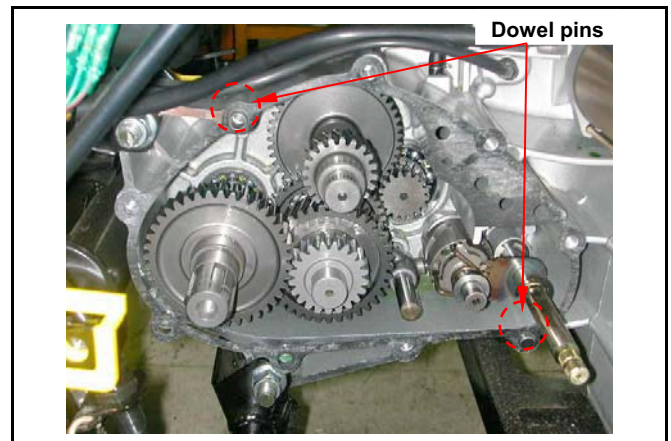
Install shift drum fixed catch ball, spring and bolt onto gear box.



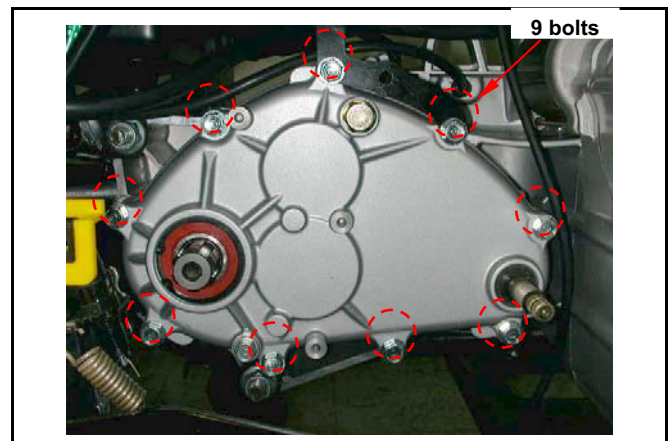
Align the position mark on the shift spindle sprocket with that of shift drum, and then install shift spindle.



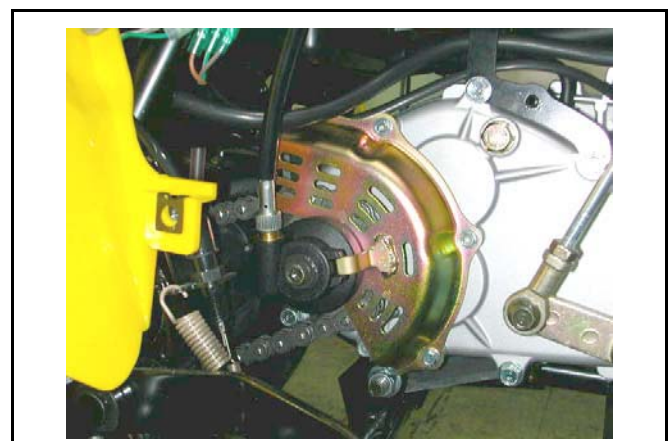
Install dowel pins and new gasket.



Install gear box cover and bolts, and tighten.
Torque value: 1.0~1.4kgf-m



Install the shift spindle bracket, drive chain protector, speedometer gear box and gear change lever.
Add gear oil.
Gear oil quantity: 750c.c.



10. ALTERNATOR/STARTING CLUTCH

10-1 Mechanism Diagram

10-2 Precautions In Operation

10-3 Right Crankcase Cover Removal

10-4 A.C.G. Set Removal

10-5 Right Cover Bearing

10-6 Flywheel Removal

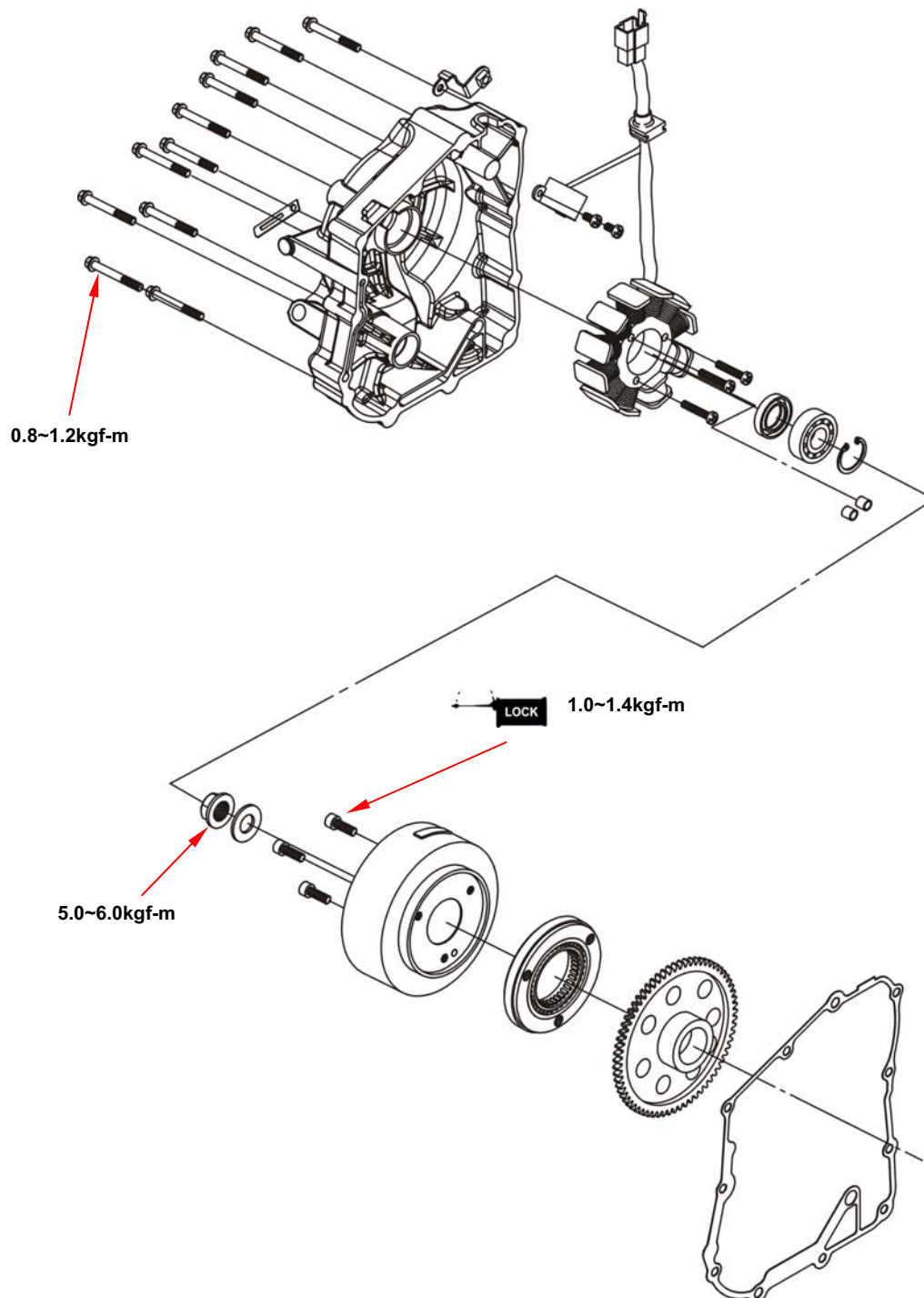
10-7 Starting Clutch

10-8 Flywheel Installation

10-9 A.C.G. Set Installation

10-10 Right Crankcase Cover Installation

10-1 Mechanism Diagram



10-2 Precautions In Operation

General information

- Refer to chapter 17: The troubleshooting and inspection of alternator
- Refer to chapter 17: The service procedures and precaution items of starter motor

Specification

Item	Standard value (mm)	Limit (mm)
ID of starting clutch gear	25.026~25.045	25.100
OD of starting clutch gear	42.175~42.200	42.100

Torque value

Flywheel nut	5.0~6.0kgf-m
Starting clutch hexagon bolt	1.0~1.4kgf-m with adhesive
8 mm bolts	0.8~1.2kgf-m
12 mm bolts	1.0~1.4kgf-m

Tools

Special tools

A.C.G. flywheel puller: SYM-3110A00

Universal holder: SYM-2210100

10-3 Right Crankcase Cover Removal

Remove left footrest.

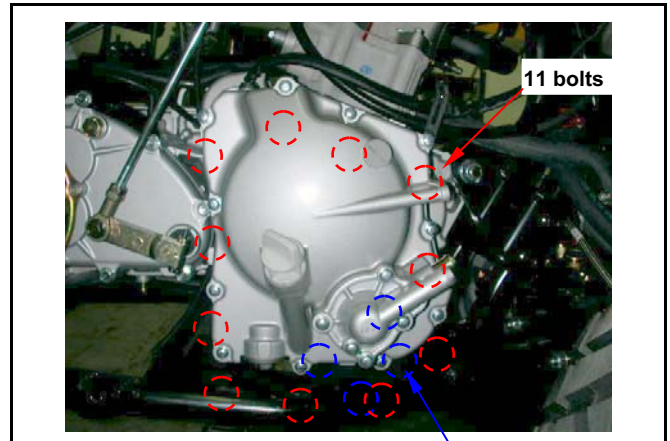
Drain out the engine oil and coolant, and then remove coolant hoses.

Remove water pump cover (4 bolts).

Remove 11 bolts from the right crankcase cover.

Remove the right crankcase cover.

Remove dowel pin and gasket.

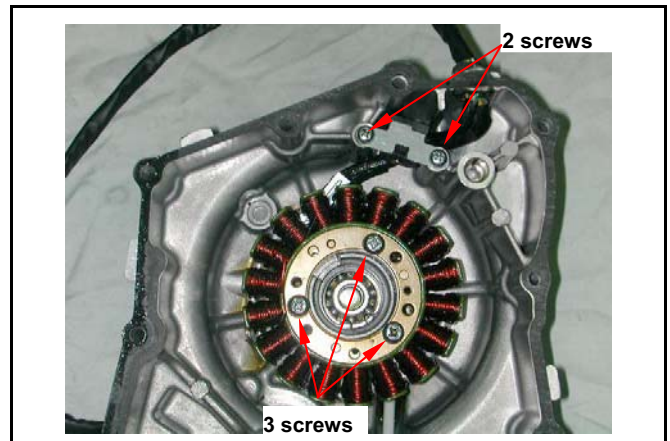


Water pump cover bolts

10-4 A.C.G. Set Removal

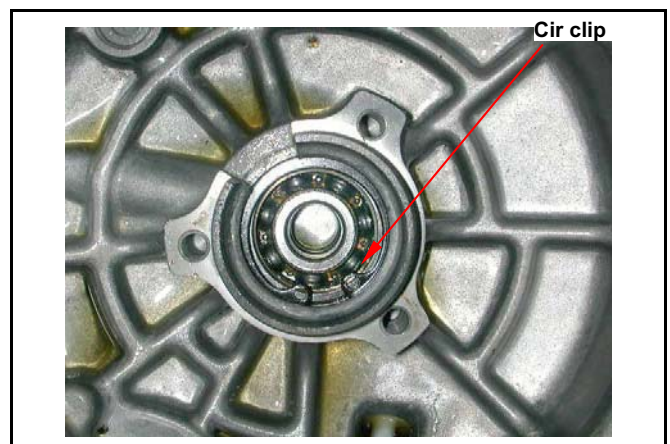
Remove 2 mounted screws from pulse generator and then remove it.

Remove 3 screws from right crankcase cover and then remove generator coil set.



10-5 Right Cover Bearing Inspection

Rotate the bearing with finger to check if the bearing rotation is in smooth and silent. Check if the bearing outer parts are closed and fixed. Replace it if necessary.



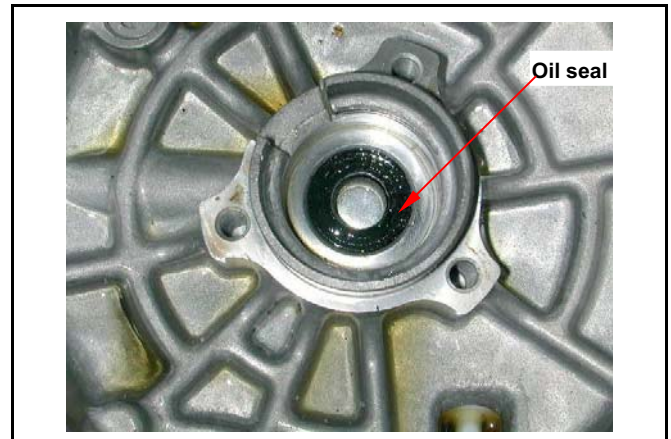
Remove the cir clip, and then remove bearing.

Special tool:

Inner bearing puller

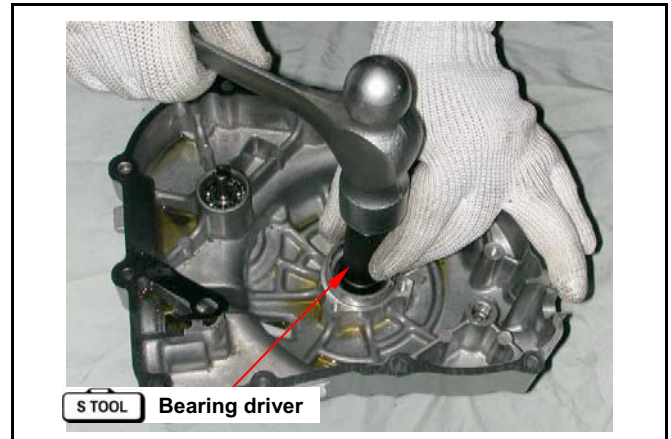


Check the oil seal for wear or damage. Replace it if necessary.



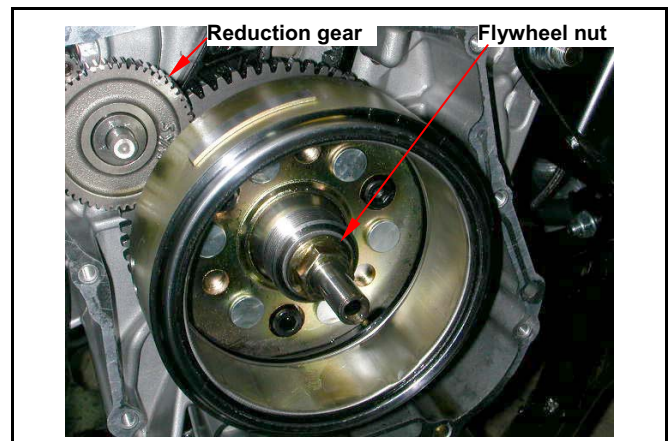
Install a new one bearing (6201LU) by bearing driver.

Special tool:
Bearing driver



10-6 Flywheel Removal

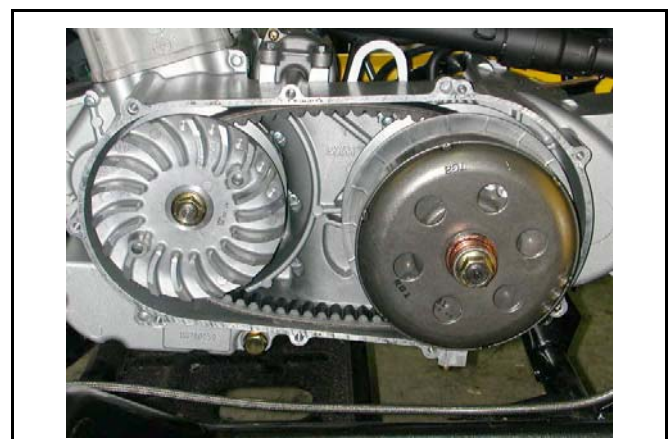
Remove right crankcase cover.



Remove left crankcase cover.
Hold the flywheel by drive face with universal holder.

Remove flywheel nut.

Special tool:
Universal Holder

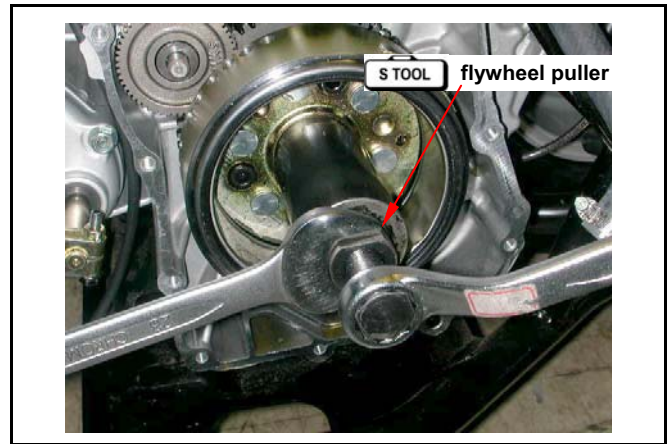


Remove starter reduction gear and shaft.
Pull out flywheel with A.C.G. flywheel puller.

Special tool:

A.C.G. Flywheel puller

Remove flywheel and starting driven gear.

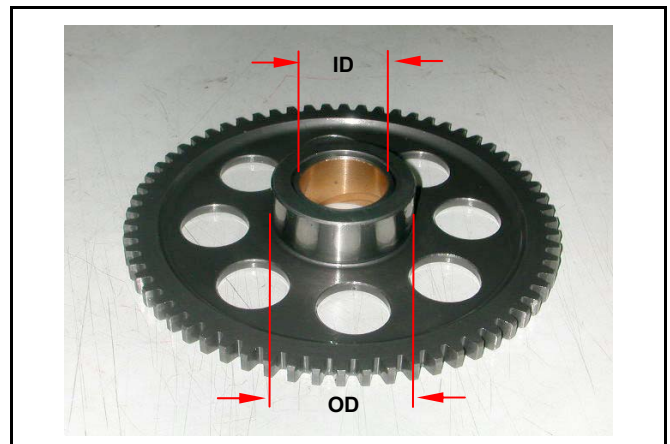


10-7 Starting Clutch

Starting Clutch Inspection

Remove starting clutch driven gear.
Check the gear for wear or damage.
Measure the ID and OD of the starting clutch driven gear.

Service Limit: ID: 25.1 mm
OD: 42.10 mm



Check the starting reduction gear and shaft for wear or damage.



Check each roller for wear or damage.

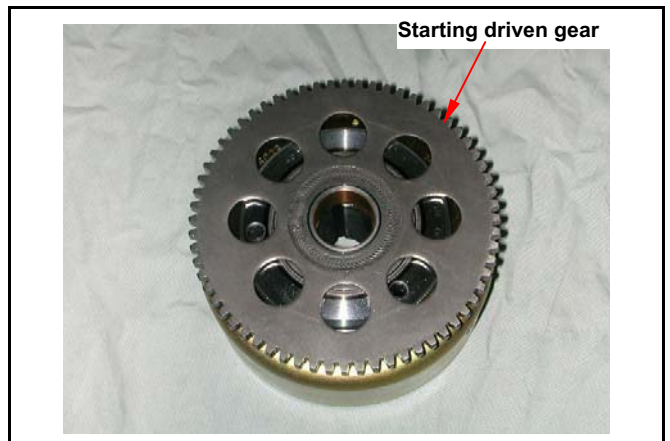


Install starting clutch driven gear onto one way clutch.
Hold flywheel and rotate starting clutch gear.
The starting clutch gear should be rotated in C.C.W direction freely, but not C.W direction. (View as shown in this figure.)

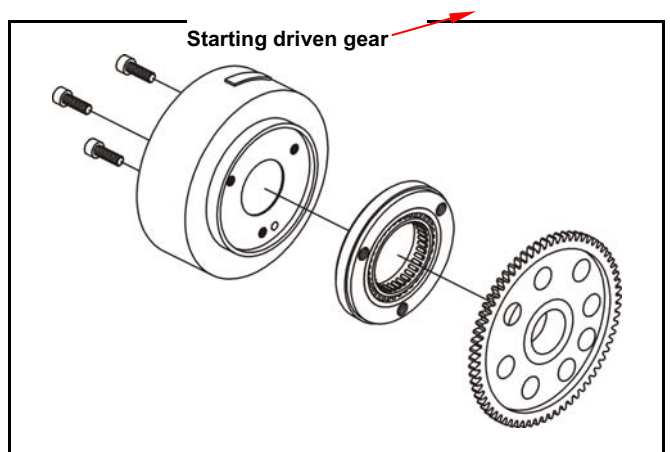
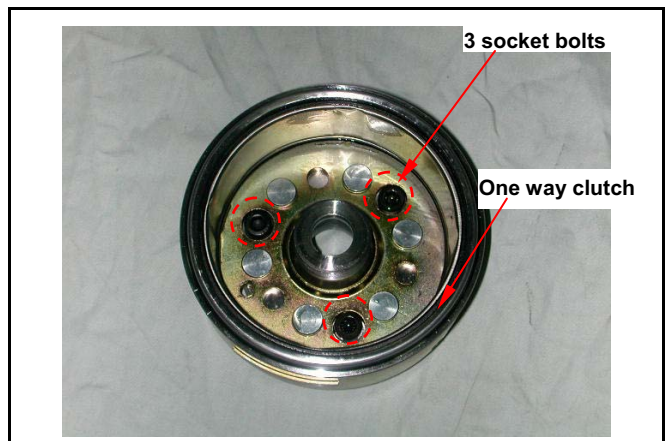


One way clutch removal

Remove starting driven gear.



Remove 3 socket bolts, and then remove one way clutch.



One way clutch Installation

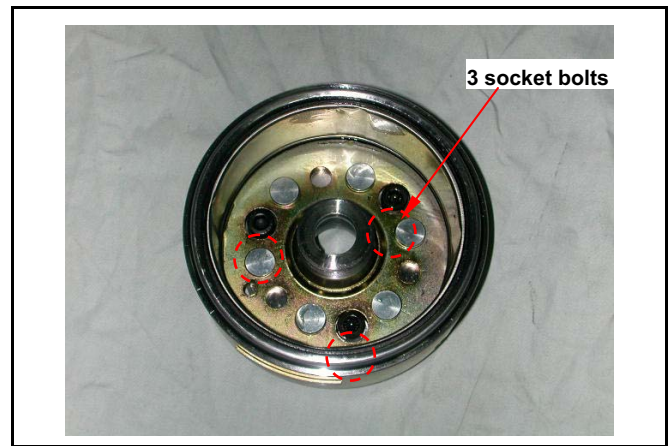
Install the components in the reverse procedures of removal.



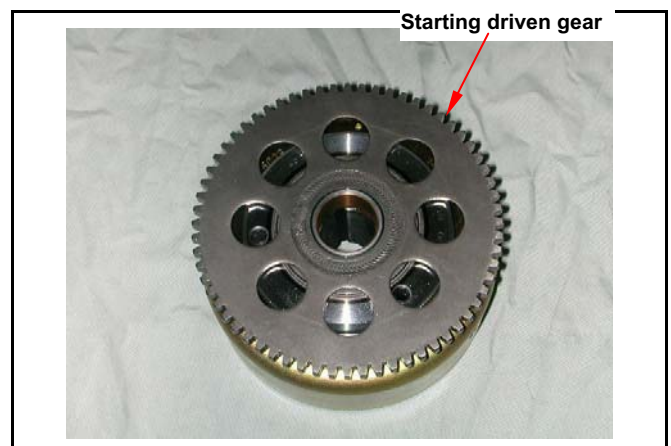
Caution

Tape a tightening tape onto the thread of hexagon bolt.

Torque value: 1.0~1.4kgf-m

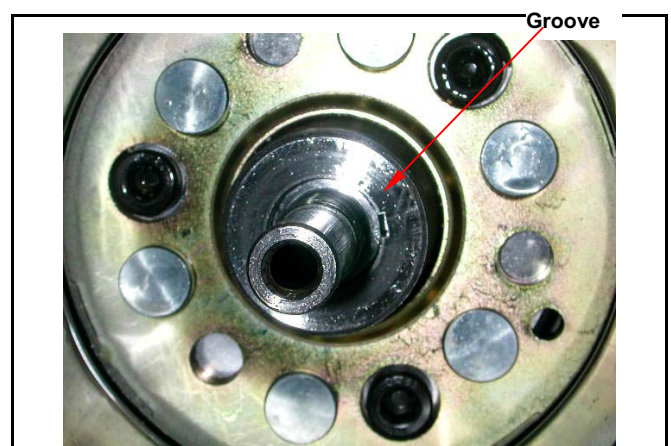


Install starting driven gear.



10-8 Flywheel Installation

Align the key on crankshaft with the flywheel groove, and then install the flywheel.



Hold the flywheel by drive face with universal holder, and tighten flywheel nut.

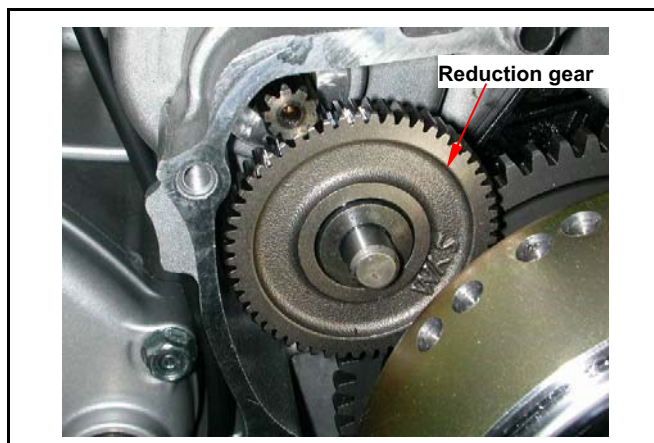
Torque value: 5.0~6.0kgf-m

Special tool:

Universal Holder



Install reduction gear shaft and reduction gear.



10-9 A.C.G. Set Installation

Install the A.C.G. coil set onto right crankcase cover (3 screws).

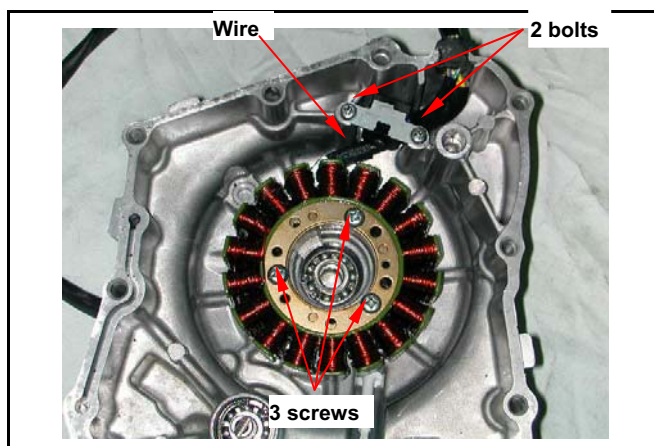
Install pulse generator (2 screws).

Tie the wire harness securely onto the indent of crankcase.



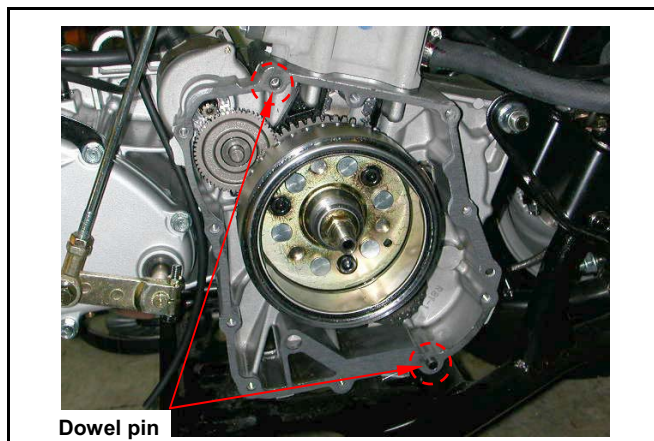
Caution

Make sure that the wire harness is placed under pulse generator.



10-10 Right Crankcase Cover Installation

Install dowel pin and new gasket.



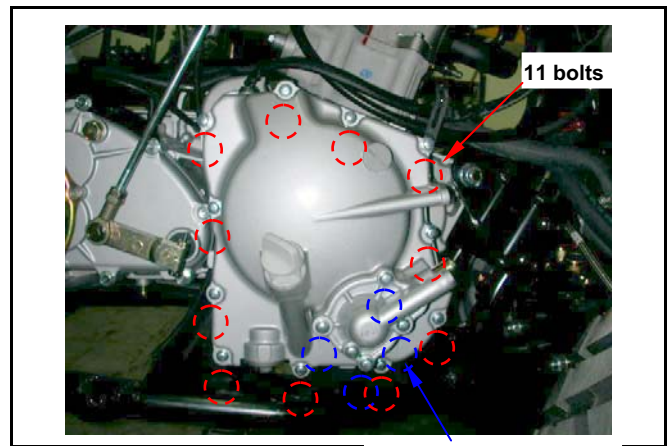
Remove water pump cover.

Install right crankcase cover onto the crankcase.

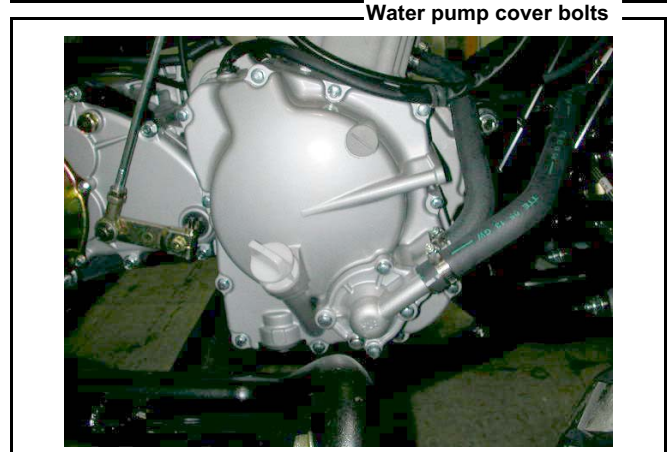
Note: Align the water pump shaft indent with the oil pump shaft.



Install right crankcase cover (11 screws).
Install the dowel pin, new gasket and water pump
cover onto crankcase cover.



Connect water hoses to the right crankcase cover
and water pump cover.



11. CRANKCASE / CRANK

11-1 Mechanism Diagram

11-2 General Information

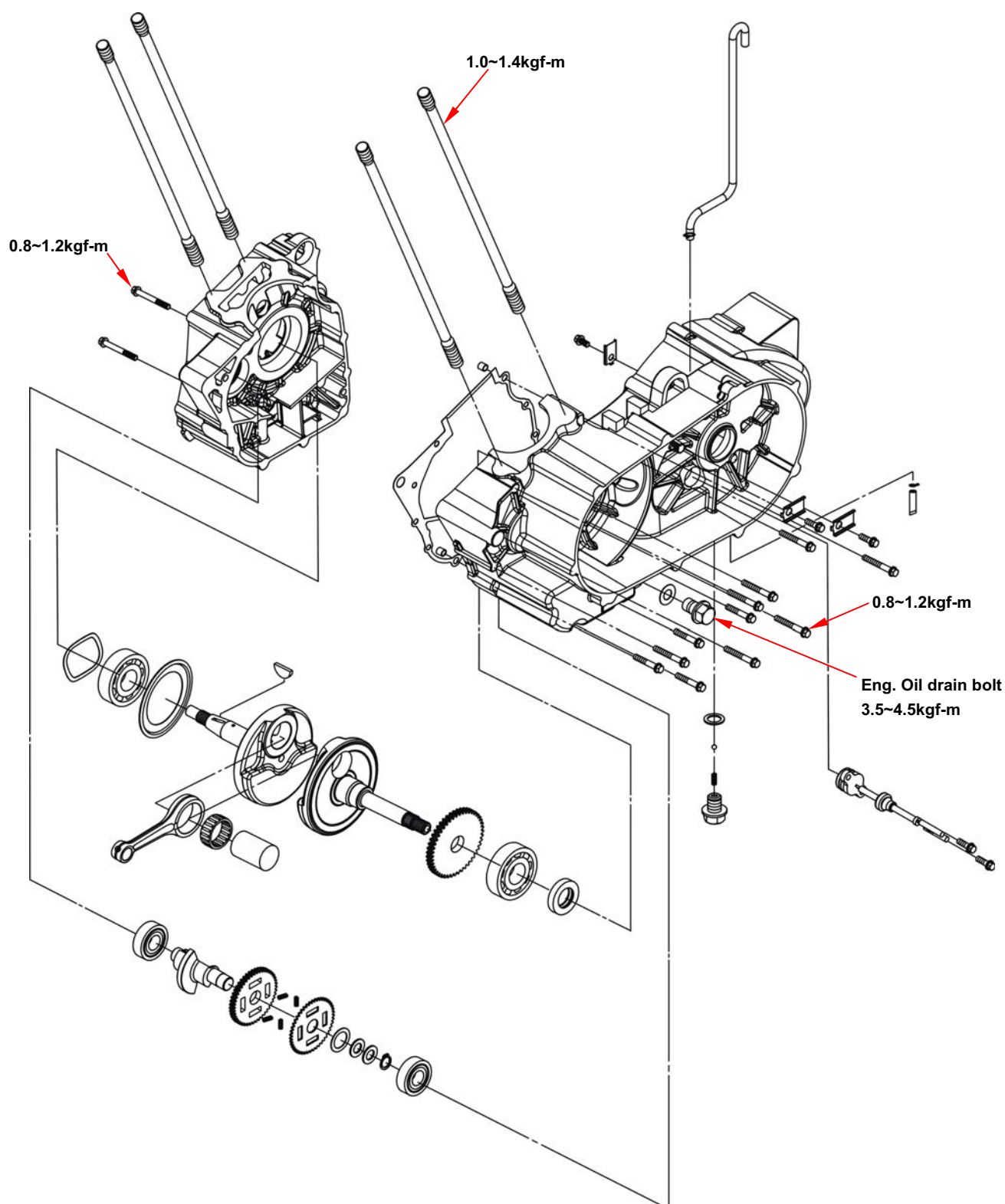
11-3 Trouble Diagnosis

11-4 Disassembly Of Crankcase

11-5 Crankshaft Inspection

11-6 Assembly Of Crankcase

11-1 Mechanism Diagram



11-2 General Information

Operational precautions

- This Section concerns disassembly of the crankcase for repair purpose.
- Remove following components before disassembling crankcase.
 - Engine remove Section 5
 - Cylinder head Section 6
 - Cylinder and piston Section 7
 - Drive face and driven pulley Section 8
 - AC generator/Start one way clutch Section 10
- In case it requires replacing the crankshaft bearing, the driving chain of engine oil pump or the timing chain, it is preferably to replace crankshaft as a unit.

Specification

Unit: mm

	Item	Standard	Limit
Crankshaft	Connecting rod side clearance of the big end	0.100~0.400	0.600
	Vertical clearance of the big end of the connecting rod	0~0.008	0.050
	Run-out	0.030	0.100

Torque value

Bolts for crankcase	0.8~1.2kgf-m
Engine oil drain bolt	3.5~4.5kgf-m
Cylinder stud bolt	1.0~1.4kgf-m

Tools

Special tools

L. crank shaft oil seal driver (27*42*7): SYM-1332100-HMA

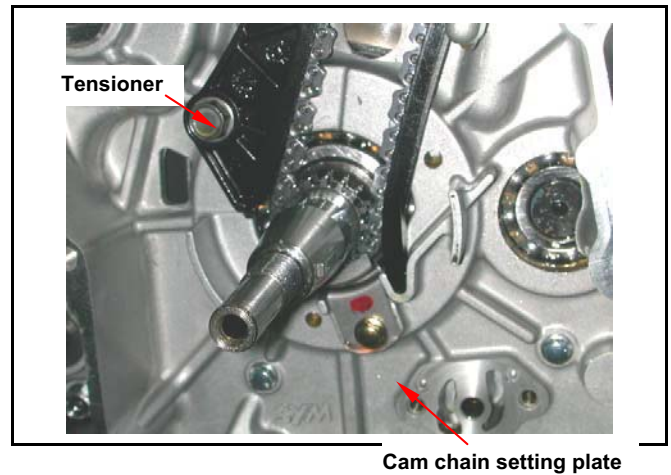
11-3 Trouble Diagnosis

Engine noise

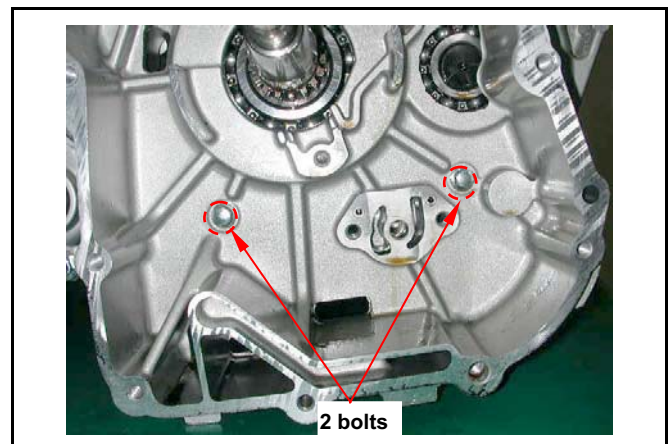
- Loose crankshaft bearing
- Loose crankshaft pin bearing
- Worn out piston pin and pin hole

11-4 Disassembly Of Crankcase

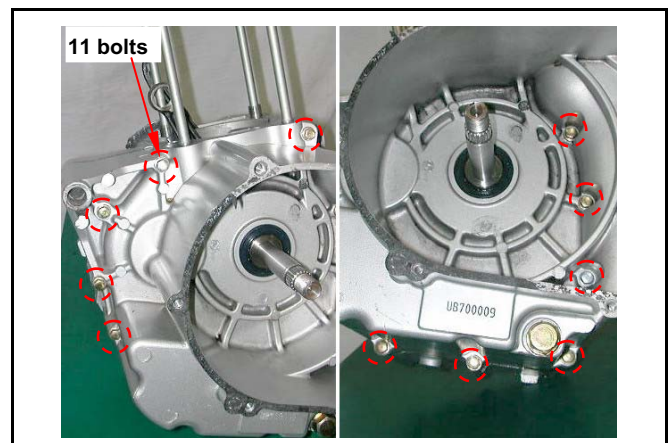
Remove the cam chain setting plate, and then remove cam chain.
Loosen the pivot bolt and remove the tensioner.



Loosen 2 bolts on the right crankcase.



Loosen 11 bolts on the left crankcase.



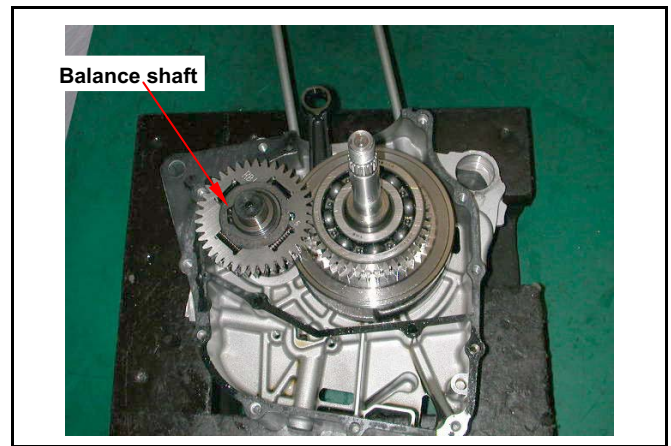
Place right crankcase downward and left crankcase up.
Tap the left crankcase with a plastic hammer to remove it.

Caution

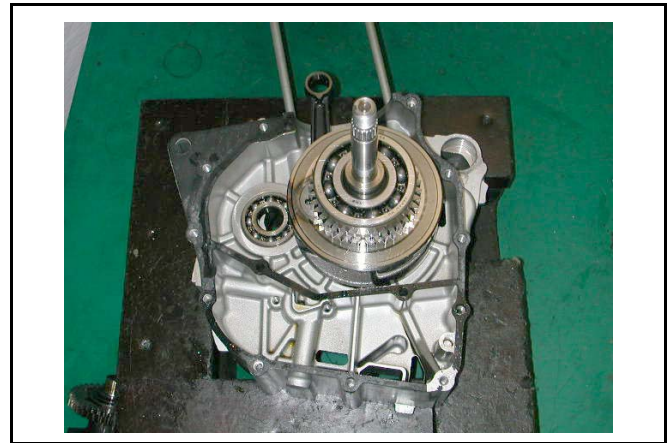
Care should be taken not to damage the contact surfaces.



Remove balance shaft from right crankcase.



Remove crankshaft from right crankcase.



Remove gasket and dowel pins.
Scrape gasket residues off the crankcase contact surface.



Caution

Do not damage contact surface of the gasket.
It is better to moisten the gasket residue for easy scrapping.



Drive out left crankcase oil seal.

