



LJ1P37QMB(3B3) 4-STROKE 50cc

SERVICE MANUAL



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1. SPECIFICATION / TIGHTEN TORQUE VALUES

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SPECIFICATIONS

MAKER		LONGJIA	MODEL		3B3
ENGINE	Type	4-STROKE ENGINE	Ignition		Transistorized coil ignition
	Installation and arrangement	Vertical, below center, incline 80°	Starting System		Electrical & Kick starter
	Fuel Used	Unleaded (92/95)	Deceleration equipment	Primary Reduction	Belt
	Cycle/Cooling	4-stroke/forced air cooled		Secondary Reduction	GEAR
	Cylinder	Bore		37.0 mm	Clutch
		Stroke	46.0 mm	Transmission	C.V.T
	Number/Arrangement	Single Cylinder	Max. HP	25km/h	2.3 kw/6500rpm
	Displacement	49.46 cc		45km/h	3.0 kw/8000rpm
	Compression Ratio	12±0.2 : 1	Max. Torque	25km/h	3.5N.m /6000 rpm
	Idle speed	1900±100 rpm		45km/h	3.6N.m /7500 rpm
			Spark Plug		CR6HSA

Standard Torque Values for Reference

TYPE	TIGHTEN TORQUE	TYPE	TIGHTEN TORQUE
5mm bolt · nut	4.5~6.0N.m	3mm screw	0.5~0.8N.m
6mm bolt · nut	8~12N.m	4mm screw	1.0~1.5N.m
8mm bolt · nut	18~25N.m	5mm screw	3.5~5.N.m
10mm bolt · nut	30~40N.m	6mm screw · SH nut	7~11N.m
12mm bolt · nut	50~60N.m	6mm bolt · nut	10~14N.m
		8mm bolt · nut	24~30N.m
		10mm bolt · nut	35~45N.m



1. SPECIFICATION / TIGHTEN TORQUE VALUES

TORQUE VALUES (ENGINE)

ITEM	Q'TY	THREAD DIA (mm)	TORQUE VALUE(N.m)	REMARKS
Cylinder head bolts	2	6	8~12	
Cylinder head left side cover bolts	2	6	8~12	
Cylinder head nuts	4	6	12~16	Apply oil to thread
Cylinder/cylinder head two-ends bolts	4	6	7~11	Tighten to crankcase
Tappet adjust hole cap	2	30	13~17	
Camshaft sprocket bolt	1	8	20~25	
Right crank case cover bolts	10	6	8~12	
Pulse generator bolts	2	5	5~7	
Valve adjustment fixing nuts	2	5	7~11	Apply oil to thread
Spark plug	1	10	10~14	
Engine oil filter screen cap	1	30	13~17	
Engine oil drain plug bolt	1	12	20~26	
Gear oil draining plug	1	8	10~15	
Gear oil filling bolt	1	8	10~15	
Oil pump flat screw	2	6	8~12	
Left crankcase cover bolts	10	6	8~12	
Camshaft chain tensioner pivot	1	6	8~12	Hex socket bolt
Camshaft chain adjuster bolts	2	6	10~14	
Cooling fan bolts	4	6	8~12	
Cooling fan cover bolt	2	6	7~11	
RR. brake shoe anchor fixing nut	1	8	15~20	
Shroud A/B	2	6	8~12	
Start clutch lock nut	1	20	70~80	
Flywheel nut	1	10	35~45	
Transmission(Gear box) bolts	7	8	20~25	
Movable drive face nut	1	12	55~65	
Drive pulley nut	1	10	35~45	
A.C. generator flange bolt	2	6	8~12	
Start motor bolts	2	6	8~12	
Crankcase bolts	1	6	8~12	
Air/C connect bracket bolts	2	6	8~12	
Kick starter arm bolt	1	6	8~12	
Inlet pipe bolt	2	6	8~12	
Exhaust pipe bolts	2	6	7~11	Apply oil to thread

The torque values listed in above table are for more important tighten torque values. Please see standard values for not listed in the table.

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PRECAUTIONS IN OPERATION

Specification

Fuel Tank Capacity	6.2L	
Engine Oil	capacity	800 c.c.
	change	700 c.c.
Transmission Gear oil	capacity	140 c.c.
	change	120 c.c.
Clearance of throttle valve	2~6 mm	
Spark plug	CR6HSA Gap: 0.6~0.7 mm	
Idling speed	1900±100 rpm	
Cylinder compression pressure	9.5±0.5 bar/550rpm	
Valve clearance: IN/EX	0.05±0.02 mm/0.10±0.02 mm	
45Km/h	"F"Mark in idling speed	Before TDC 13° /2000 rpm
	Full timing advanced	Before TDC 28° /8000 rpm
25Km/h	"F"Mark in idling speed	Before TDC 15° /2000 rpm
	Full timing advanced	Before TDC 28° /6500 rpm

2. MAINTENANCE INFORMATION



PERIODICAL MAINTENANCE SCHEDULE

Maintenance Code	Item	Initial 300KM	1 Month Every1000KM	3 month Every3000KM	6 month Every6000KM	1 year Every12000KM
1	☆Air cleaner	I		C	C	R
2	☆Fuel filter	I			I	R
3	☆Oil filter	C			C	C
4	☆Engine oil change	R	Replacement for every 1000km			
5	Tire pressure	I	I			
6	Battery inspection	I	I			
7	Brake & free play check	I	I			
8	Steering handle check	I	I			
9	Cushion operation check	I	I			
10	Every screw tightening check	I	I			
11	Gear oil check for leaking	I	I			
12	☆Spark plug check or change	I		I	R	
13	☆Gear oil change	R	Replacement for every 5000km			
14	Frame lubrication				L	
15	Exhaust pipe	I	I			
16	☆Ignition timing	I	I			
17	☆Emission check in Idling	A	I			
18	☆Throttle operation	I		I		
19	☆Engine bolt tightening	I		I		
20	☆CVT driving device (belt)				I	R
21	☆CVT driving device (roller)				C	
22	Lights/electrical equipment/multi-meters	I	I			
23	Main/side stands & springs	I			I	
24	Fuel pipes	I		I		
25	Cam chain	I		I		
26	☆Valve clearance	I		A		
27	☆Crankcase blow-by over-flow pipe	I	Replacement for every 1000km			

Code: I ~ Inspection, cleaning, and adjustment R ~ Replacement C ~ Cleaning (replaced if necessary) L ~ Lubrication

Have your motorcycle checked, adjusted, and recorded maintenance data periodically by your LLL Authorized Dealer to maintain the motorcycle at the optimum condition

The above maintenance schedule is established by taking the monthly 1000 kilometers as a reference which ever comes first.

Remarks:

1. These marks "☆" in the schedule are emission control items. According to EEC regulations, these items must be perform normally periodical maintenance following the use r manual instructions. They are prohibited to be adjusted or repaired by unauthorized people. Otherwise, LONGJIA is no responsible for the charge.
2. Clean or replace the air cleaner element more often when the motorcycle is operated on dusty roads or in the Heavily- polluted environment.
3. Maintenance should be performed more often if the motorcycle is frequently operated in high speed and after the motorcycle has accumulated a higher mileage.
4. Preventive maintenance
 - a. Ignition system - Perform maintenance and check when continuous abnormal ignition, misfire, after-burn, overheating occur.
 - b. Carbon deposit removal - Remove carbon deposits in cylinder head, piston heads, exhaust system when power is obvious lower than ever.
 - c. Replace worn out pistons, cylinder head.

LUBRICATION SYSTEM

Engine Oil Capacity

Caution

- Y The vehicle must be parked on a level ground when checking oil capacity.
- Y Run the engine for 2-3 minutes then stop, wait about 2-3 more minutes allowing engine oil to settle before checking the oil level.

Remove dipstick to check the oil level. If oil level is below the lower limit mark, add oil to the specified upper limit mark.

Oil change

Shut off the engine and remove dipstick. Remove the oil drain plug on the bottom-left of crankcase to drain oil. After draining out oil, clean oil plug and its gasket and reinstall. Replace the gasket if it is damaged.

Torque value: 20~26 N.m

Caution

Warm up the engine. This will make the oil flow out easily.

Add oil to the specified capacity.

Oil Viscosity: SAE 15W-40, recommended using API GL-4

Engine oil capacity:

Disassembly: 800cc

Change: 700cc

When checking for oil leak, run the engine at idle speed for a few minutes, then check oil capacity with dipstick.

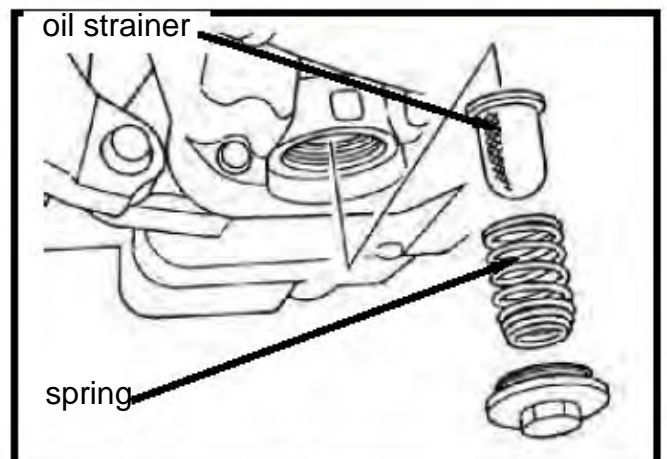
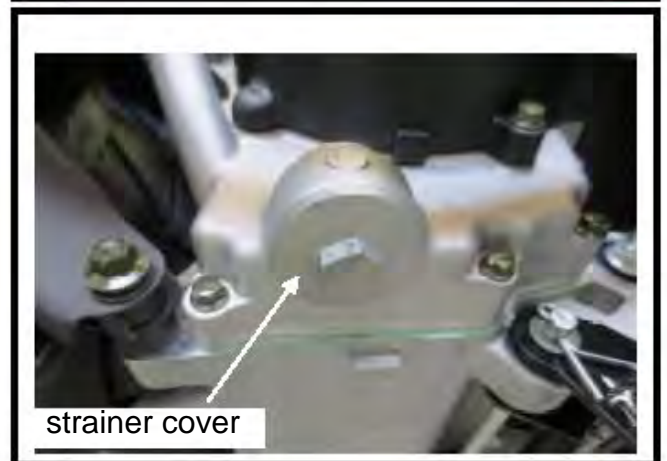
Cleaning the oil strainer

Drain oil from engine, remove the strainer cover, spring and strainer.

If there is an accumulation on the screen, wash it off with suitable solvent (recommended using compressed air). Check O-ring for damage, replace if necessary.

Reinstall strainer, spring, O-ring and strainer cover.

Torque value: 13~17 N.m



2. MAINTENANCE INFORMATION



Gear Oil

Inspection

Check gear oil if leaking.
Park the motorcycle with main stand on flat level place.
Turn off engine and remove the gear oil draining plug.
Place a measurement cup under the draining hole.
Remove the oil drain plug and drain gear oil into a measurement cup.
Check gear oil if enough.

Replacement

At first, remove the gear oil refilling bolt, and then remove the draining plug.
Install the draining plug after drained oil out.
Torque value: 10~15 N.m

Caution

Inspect if washer is in good condition.
Replace it with new one if it was deformed or damaged.

Fill out gear oil to specified quantity from the engine oil filling hole.
Install the oil filling bolt.

Torque value: 10~15 N.m

Transmission oil capacity: 140 c.c.(120 c.c. for change)

Recommended: API GL-4 gear oil (SAE 80W-90).



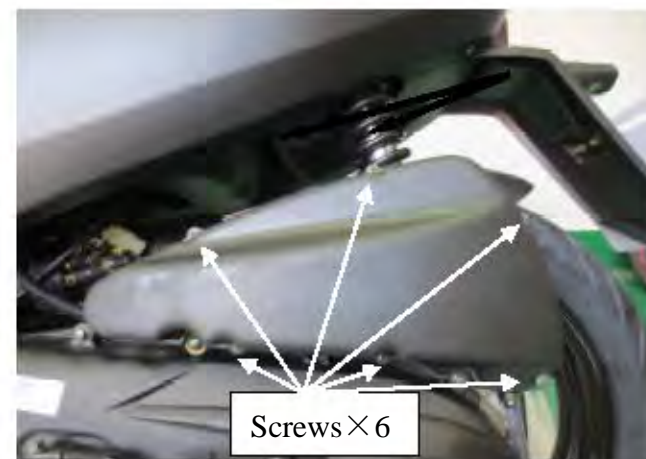
AIR CLEANER

Element

Remove frame body cover.
Remove 6 screws from the air cleaner cover.
Remove element of air cleaner (2 screws).
Check the element if dirt or damaged.
Replace it with new one if dirt or damaged.

Caution

✓ Air cleaner element contains a paper made filter so do not try to clean it.
✓ Make sure that the air cleaner cover had been installed properly after installation.



VALVE CLEARANCE ADJUSTMENT

⚠ Caution

Checks and adjustment must be performed when engine is cold (below 35°C).

Remove luggage box and front center cover.
Remove the left body cover & left side cover.
Remove cylinder head cap.
Remove the ignition timing check hole on the cooling fan cover.

With "T" type wrench, turn crankshaft in clockwise motion so that mark ("T") on the generator flywheel aligns with the mark on the crankshaft, and camshaft is at TDC position also as same as level of cylinder head top-end. A single hole on camshaft sprocket is forward to up. (Piston is at TDC position in the compression stroke.)

⚠ Caution

The crankshaft can not be rotated in counter-clockwise to prevent from damage so that valve clearance can not be measured.

VALVE CLEARANCE INSPECTION AND ADJUSTMENT

Check & adjust valve clearance with feeler gauge.

Valve clearance (IN/EX):

0.05±0.02 mm/0.10±0.02 mm

Loosen fixing nut and turn the adjustment nut for adjustment.

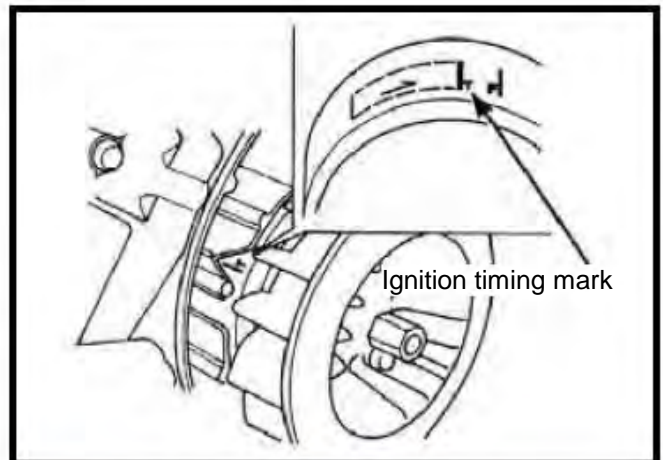
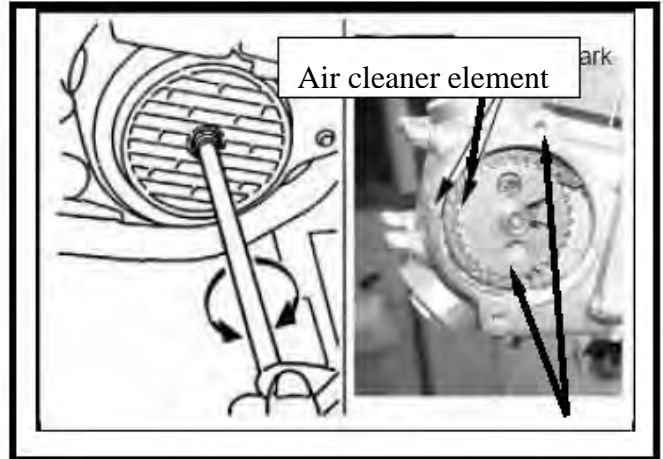
⚠ Caution

It has to make sure that valve-rocker arm is be adjusted to standard level when adjusting it, and re-check the valve clearance after tightened the fixing nut.

CARBURETOR IDLE SPEED ADJUSTMENT

⚠ Caution

- ÿ Inspection & adjustment for idle speed have to be performed after all other parts in engine that needed adjustment have been adjusted.
- ÿ Idle speed check and adjustment have to be done after engine is being warm up(around 10 minutes).



2. MAINTENANCE INFORMATION



Park the motorcycle with main stand and warm up engine.
Open the carburetor cover from the luggage box.
Turn the throttle valve stopper screw to specified idle speed.

Specified idle speed: 1900±100 rpm

Emission adjustment in Idle speed

Warm up the engine for around 10 minutes and then conduct this adjustment.

1. Connect the tachometer onto engine.
2. Adjust the idle speed adjustment screw and let engine runs in 1900±100 rpm.
3. Insert the exhaust sampling muffler of exhaust analyzer into the front section of exhaust pipe. Adjust the air adjustment screw so that emission value in idle speed is within standard.
4. Slightly accelerate the throttle valve and release it immediately. Repeat this for 2~3 times.
5. Read engine RPM and value on the exhaust analyzer. Repeat step 2 to step 4 procedures until measured value within Euro 4 standard.

Exhaust Emission: CO: <1000mg/km

THC: <630mg/km

NOx: <170mg/km

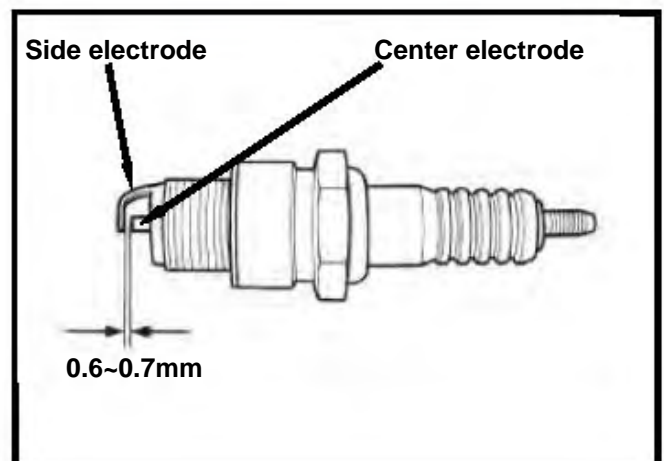
SPARK PLUG

Appointed spark plug: CR6HSA

Remove luggage box.
Remove center cover..
Remove spark plug cap.
Clean dirt around the spark plug hole.
Remove spark plug.
Measure spark plug gap.
Spark plug gap: 0.6~0.7 mm
Carefully bend ground electrode of the plug to adjust the gap if necessary.
Screw the park plug into the plug hole with hands, then tighten the plug with a wrench to prevent from damaging the spark plug's thread.

Torque value: 10~14 N.m

Connect spark plug cap.



CYLINDER COPMRESSION PRESSURE

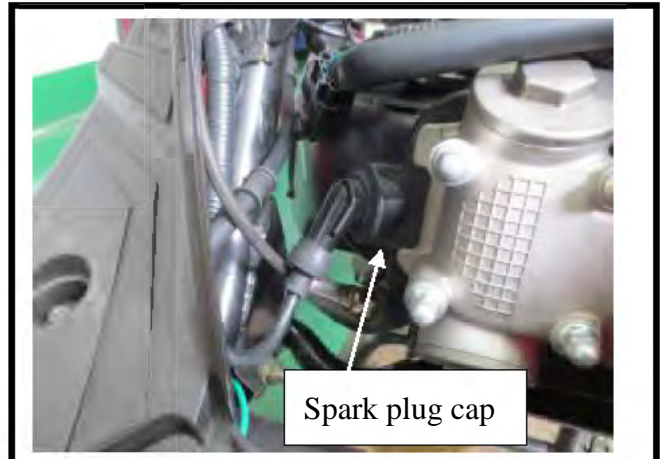
Warm up engine and then turnoff the engine.
Remove the luggage box and the center Cover.

Remove spark plug cap and spark plug.
Install compression gauge.

Full open the throttle valve, and rotate the engine by means of stepping the kick-starting lever.

Caution

Rotate the engine until the reading in the gauge no more increasing.
Usually, the highest pressure reading will be obtained in 4~7 seconds.

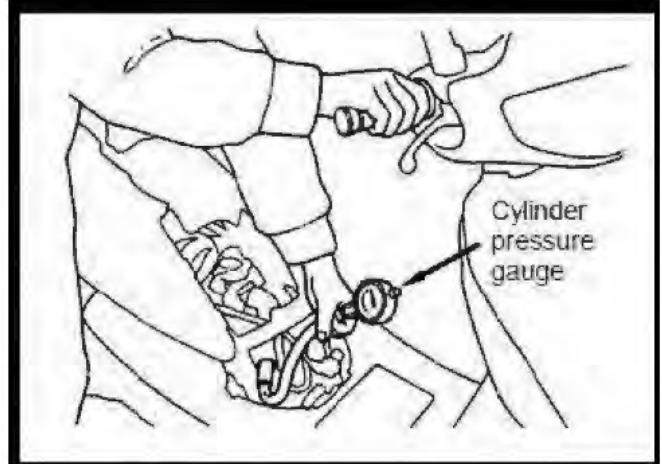


Compression pressure: 9.5±0.5 bar.

Check following items if the pressure is too low:

- I Incorrect valve clearance
- I Valve leaking
- I Cylinder head leaking, piston, piston ring and cylinder worn out

If the pressure is too high, it means carbon deposits in combustion chamber or piston head.



DRIVING SYSTEM

DRIVING BELT

Remove left side cover.

Remove mounting bolt located under air cleaner.

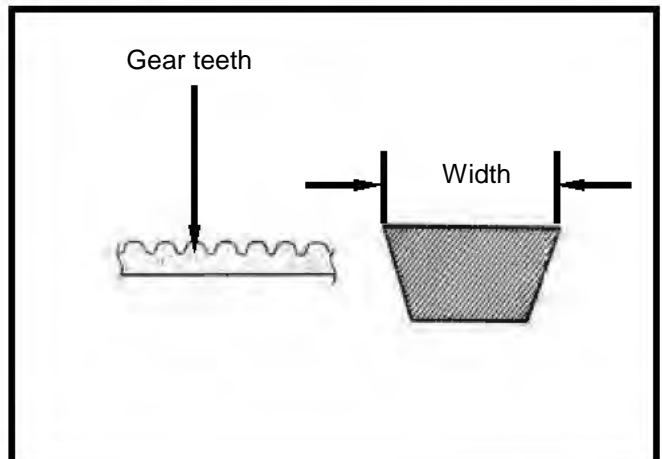
Remove 9 bolts of the engine left crankcase.

Remove the left crankcase cover.

Check if the belt is crack or worn out.

Replace the belt if necessary or in accord with the periodical maintenance schedule to replace it.

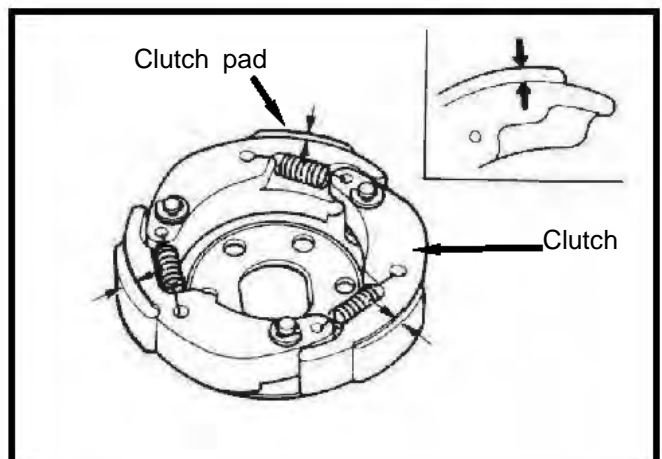
Width limit: above 17.2 mm



Clutch pad

Start the motorcycle and gradually increase throttle valve openness to check clutch pad operation.

If the motorcycle moves with shaking, then check its clutch pad for wearing. Replace it if necessary.



2. MAINTENANCE INFORMATION



Crankcase blow-by over-flow pipe

Replacement for every 1000km



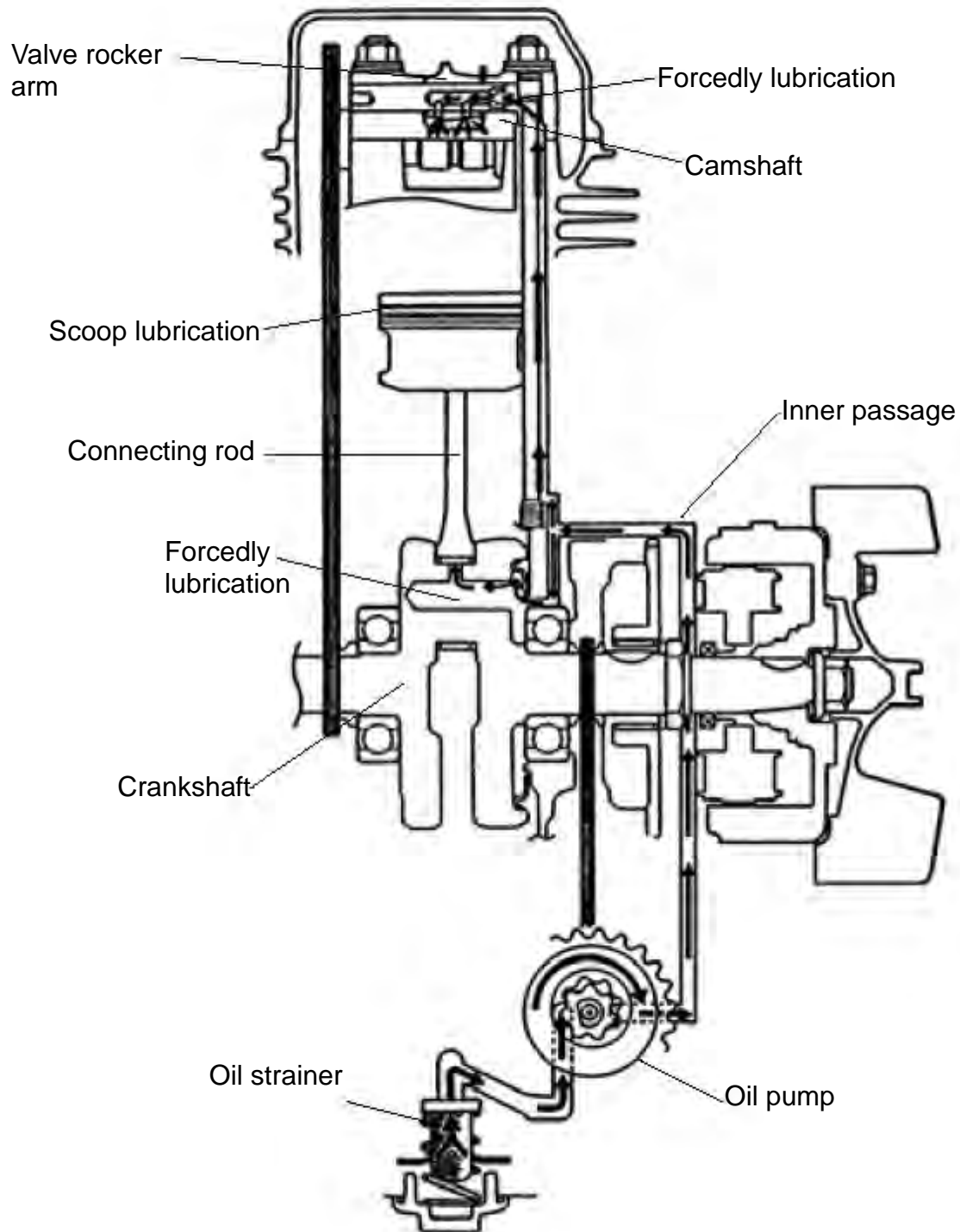
1. Open the stopper
2. Drain the oil
3. Install the stopper

Remove dipstick to check the oil level. If oil level is below the lower limit mark, add oil to the specified upper limit mark.



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OIL FLOW DIAGRAM



ENGINE OIL

Turn off engine, and park the motorcycle in flat ground with main stand.

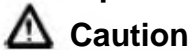
Check oil level with oil dipstick after 3-5 minutes.

Do not rotate the dipstick into engine as checking.

If oil level is nearly low level, fill out recommended oil to upper level.



Oil Replacement



Drain oil as engine warmed up so that make sure oil can be drained smoothly and completely.

Place an oil pan under the motorcycle, and remove oil strainer cap.

Make sure if the aluminum washer of the draining bolt is damaged. If so, replace it with new one.

Install the drain plug and tighten it.

Torque value: 20~26 N.m



CLEANING ENGINE OIL STRAINER

Remove the oil strainer cap.

Remove oil strainer and spring.

Clean oil strainer (recommended using compressed air to clean dirty foreign).

Check if the strainer and O-ring of the oil strainer are broken. Replace with new one if found.

Install the oil strainer and spring.

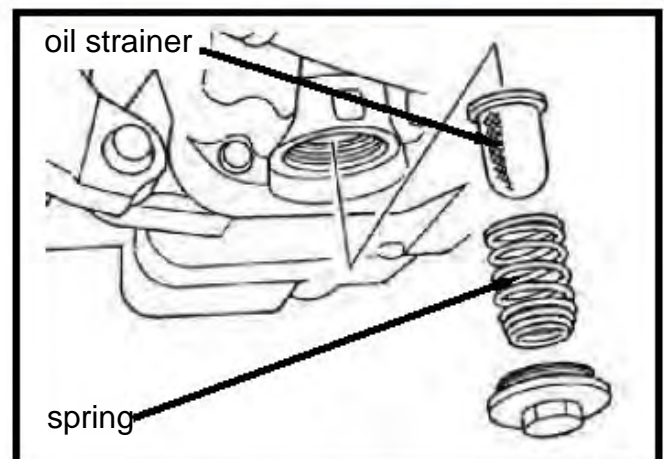
Install the oil strainer cap and tighten it.

Torque value: 13~17 N.m

Fill out oil to the oil filler (Oil viscosity SAE 15W-40)

Use SAE 5W-40 when outside temperature is below 0°C.

Engine oil quantity: Replacement 700 c.c.

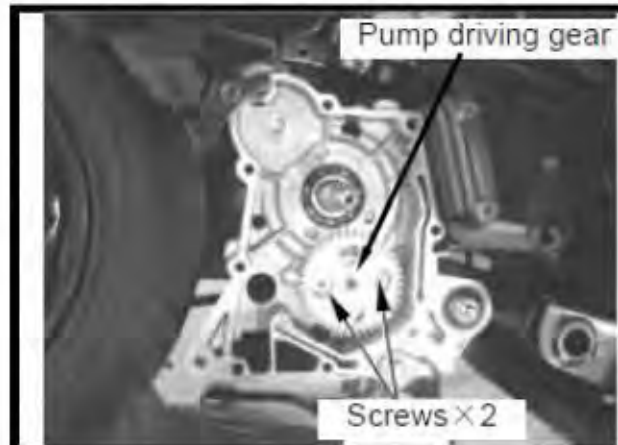


3. LUBRICATION SYSTEM

OIL PUMP

Oil Pump Removal

Remove the alternator (refer to chapter12).
Remove the engine right crankcase cover.
Make sure that the pump axle can be rotated freely.
Remove the oil pump driving gear nut.
Remove the oil pump .



Oil Pump Inspection

Check the clearance between oil pump body and outer rotor.

Limit: below 0.12 mm



Check clearance between inner and outer rotors.

Limit: below 0.12 mm



Check clearance between rotor side face and pump body.

Limit: below 2.0 mm

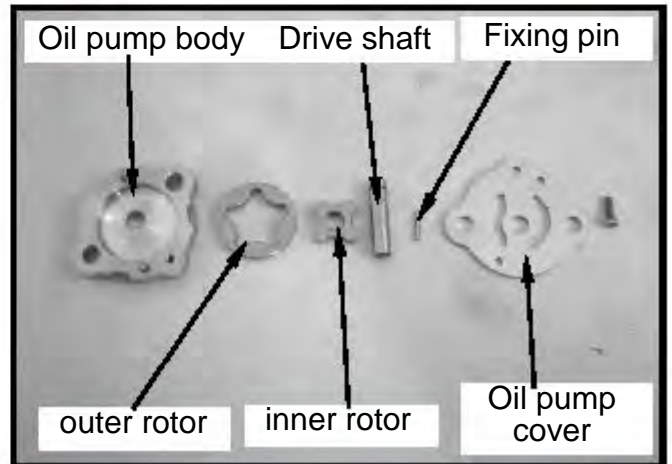


Oil Pump Re-assembly

Install inner and outer rotors into the pump body.

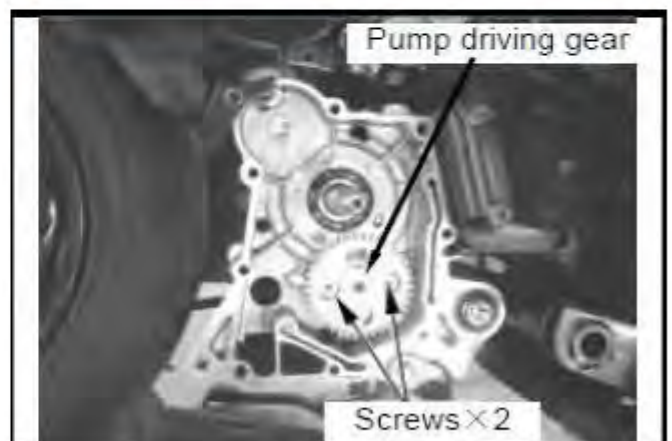
Align the indent on driving shaft with that of inner rotor. Install the driving shaft.

Install the oil pump cover and fixing pin properly and then tighten screw. (1 screw)



Oil Pump Installation

Install according to the reverse procedure of removal.



3. LUBRICATION SYSTEM



GEAR OIL

Oil Level Inspection

Park the motorcycle on flat ground with main stand.

Turn off engine and remove both gear oil filling bolt and gear oil draining plug.

Remove gear oil filling bolt and place a measurement cup under the draining plug. Remove the oil draining plug and the pour gear oil into the measurement cup. Measure the gear oil quantity if within standard value.

Add specified gear oil if the oil level too low. Standard quantity: 140 cc. Replacement: 120 cc.

Gear Oil Replacement

Remove the gear oil filling bolt and its draining plug and then drain oil completely. Install the draining plug and tighten it. (Make sure if the plug washer is damaged. If so, replace it with new one.)

Torque Value : 10~15 N.m

Add new gear oil (120 c.c.) from the gear oil filling hole and then install the gear oil filling hole bolt after added oil. And then, tighten the bolt.

Torque Value: 10~15 N.m

※Recommended to apply with SAE

80W-90. (Recommend API GL-4)

Start engine and run it for 2~3 minutes.

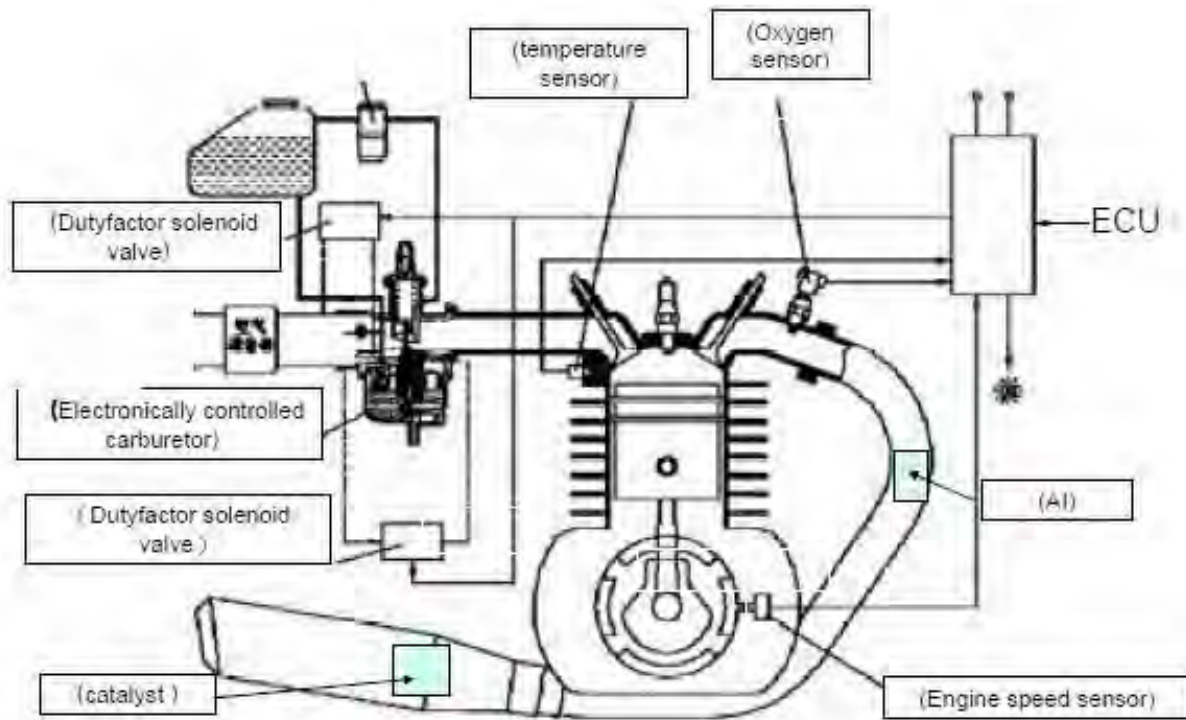
Turn off engine and check if oil leaking.



4. ELECTRONICALLY CONTROLLED CARBURETOR SYSTEM

ECS illustration4-1	General Information4-3
Precautions in operation 4-2	

ECS ILLUSTRATION



General Information

Cautions

- Do not bend or twist throttle valve cable. Damaged cable will make unstable driveability.
- When disassembling fuel system parts, pay attention to O-ring position, replace with new one as re-assembly
- There is a drain screw in the float chamber for draining residual gasoline.
- Do not disassemble automatic by-starter and air cut-off valve arbitrarily.

Specification

Item		Specification
Main jet	Speed limited:45km/h	86#
	Speed limited:25km/h	86#
	Speed limited:30km/h	86#
Pilot Jet		33#
Needle Jet		2.1 mm
Level in float chamber		21.5±0.5 mm
Float needle		1.6 mm
Mass of float		7.2g±0.1 g
Idle speed		2000±100 rpm
Fuel quantity adjustment screw		2 1/2±1/2
Jet needle		3r21
Throttle handle free play		2~6 mm

Torque value

Fuel valve tightening nut: 1.5~2.0 Kgf-m

Tool

Special service tools

Vacuum/air pressure pump

General service tools

Fuel level gauge

CARBURETOR REMOVAL

Remove the luggage box.

Loosen the adjustment nut and fixing nut of throttle valve cable, and release the cable from carburetor.

Remove fuel pipe, vacuum hose.

Disconnect auto by-starter connector.

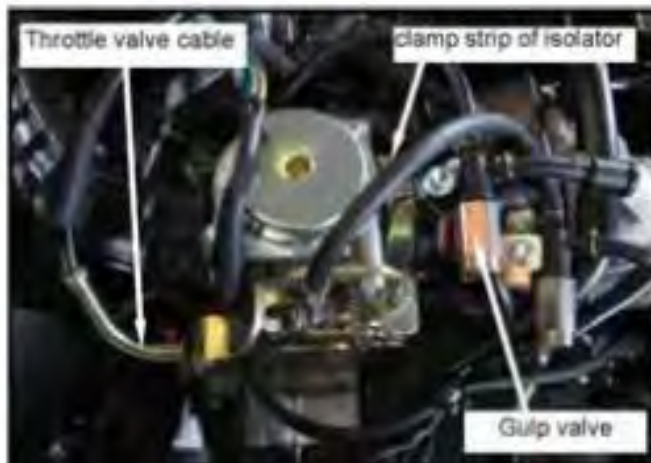
Disconnect gulp valve connectors.

Disconnect TPS controller connector.

Release the clamp strip of air cleaner.

Release the clamp strip of carburetor isolator.

Take the carburetor out.



VACUUM CHAMBER

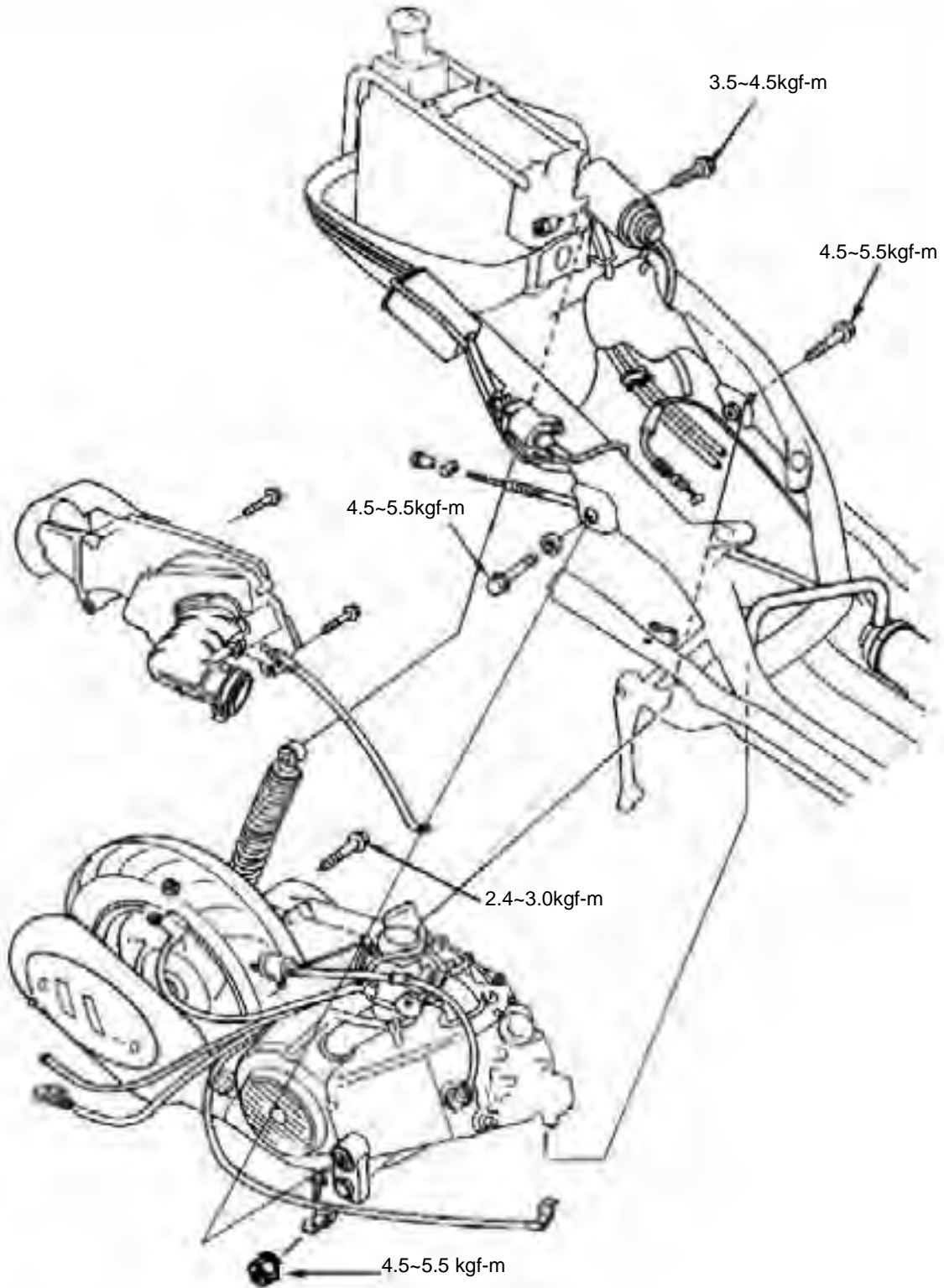
Removal

Loosen drain screw, and drain out residual fuel in float chamber.

Remove screws (2 screws) of vacuum chamber cover and the cover.

MECHANISM DIAGRAM 5-1	OPERATIONAL PRECAUTIONS 5-2
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MECHANISM DIAGRAM





5. REMOVAL OF ENGINE

OPERATIONAL PRECAUTIONS

General Information

Engine must be supported by a bracket or adjustable tool in height.

The following parts can be serviced with the engine installed on the frame.

1. Carburetor
2. Driving disk, driving belt, clutch, and transporting disk
3. Final reduction gear mechanism

Specification

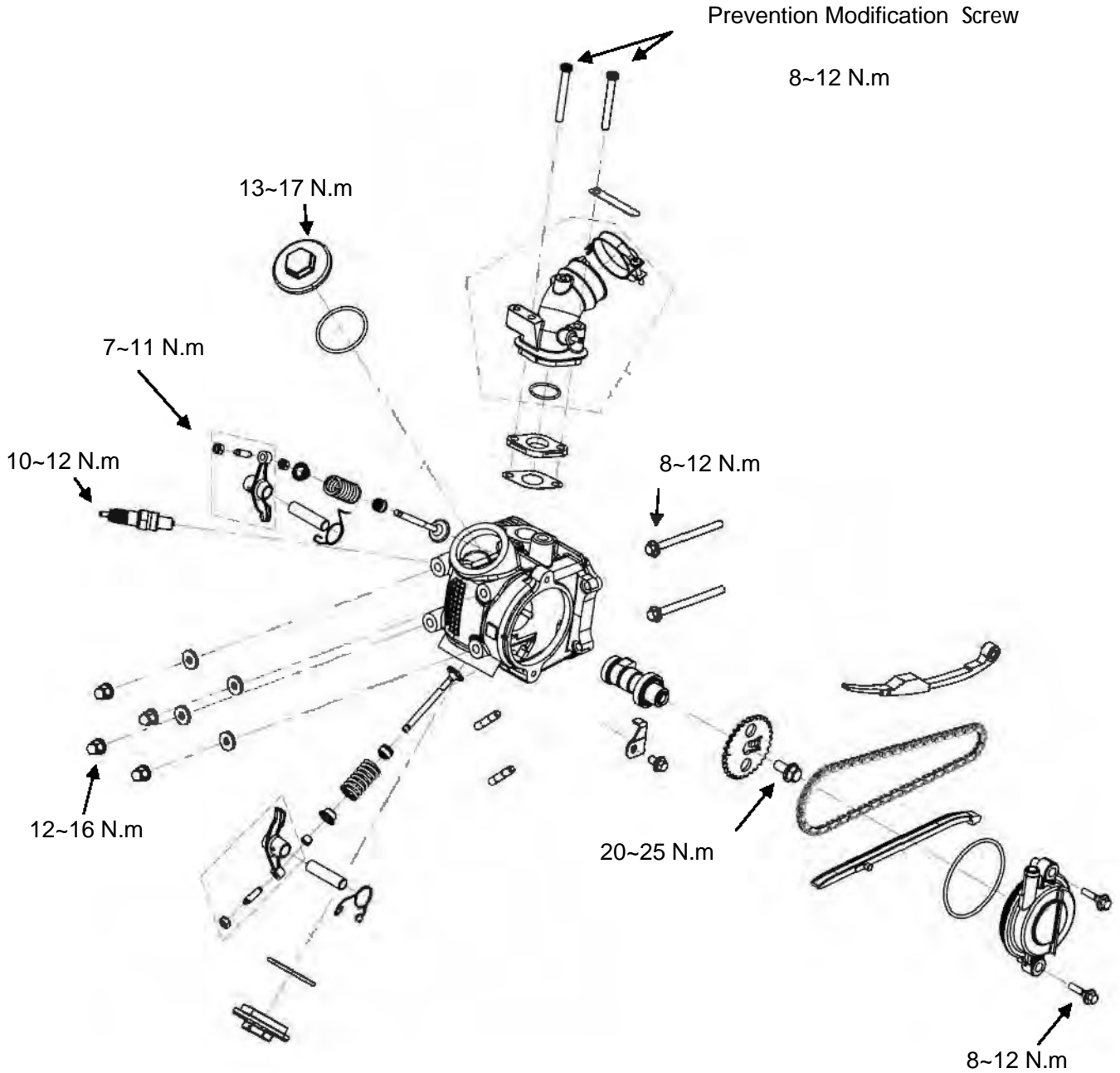
		Specification
Engine Oil Capacity	Disassemble	800 c.c.
	Replacement	700 c.c.
Gear Oil Capacity	Disassemble	140 c.c.
	Replacement	120 c.c.

Torque Values

Engine suspension bolt (frame side)	45~55N. m
Engine suspension nut (engine side)	45~55 N. m
Bolt of rear shock absorber upper connection	35~45 N. m
Bolt of rear shock absorber lower connection	24~30 N. m

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COMPONENT STRUCTURE



6. CYLINDER HEAD / VALVE



GENERAL INFORMATION

- Y This chapter is contained maintenance and service for cylinder head, valve, and camshaft as well as valve rocker arm.
- Y Cylinder head service cannot be carried out when engine is in frame.

Specification

unit: mm

Item		Standard	Limit
Compression pressure		9.5±0.5bar At 550rpm	-
Camshaft	Height of cam lobe	Intake	25.54~25.70
		Exhaust	25.14~25.30
Rocker arm	ID of valve rocker arm		10.000~10.015
	OD of valve rocker arm shaft		9.972~9.987
Valve	OD of valve stem	Intake	4.970~4.98
		Exhaust	4.955~4.97
	ID of Guide		5.000~5.012
	Clearance between valve stem and guide	Intake	0.03~0.07
		Exhaust	0.08~0.12
	Free length of valve spring		31.8~33.0

TROUBLESHOOTING

Cylinder head cover bolt	8~12 N.m
Camshaft sprocket bolt	20~25 N.m
Bolt of timing chain auto-adjuster	8~12 N.m
Spark plug	10~12 N.m
Cylinder head nut	12~16 N.m
Valve adjustment fixing nuts	7~11 N.m

TOOLS

Special service tools

- Valve reamer: 5.0mm
- Valve guide driver: 5.0mm
- Valve spring compressor

CYLINDER HEAD REMOVAL

Remove the engine from the vehicle
(Refer to chapter 5).

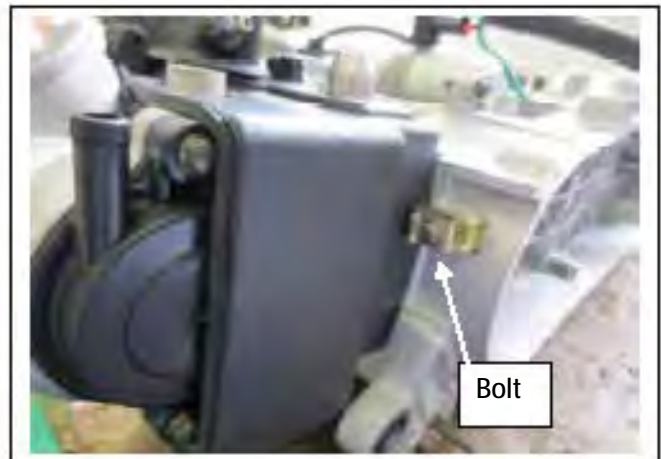
Remove the shroud of the engine.

Remove the crankcase blow-by system
hose from the cylinder head.

Remove the cylinder head cover 4 Cat nut
and then remove the cylinder head cover.



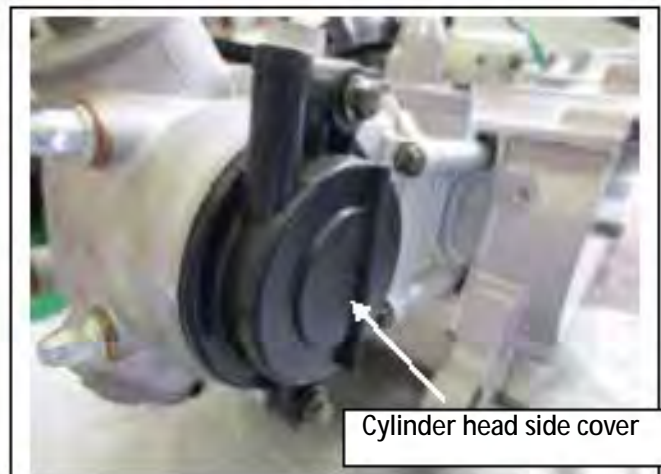
Loosen the bolt of camshaft chain adjuster
in a counter-clockwise motion for release
adjuster.



Removed cam chain adjustment bolt. And
then removed the chain adjuster (bolts × 2)

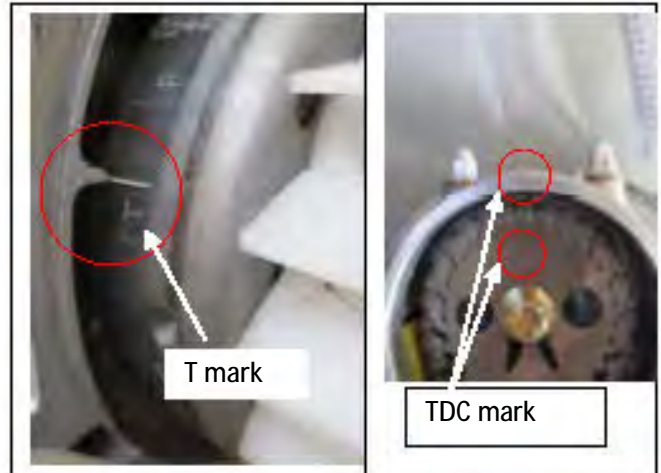


Removed cylinder head side cover.

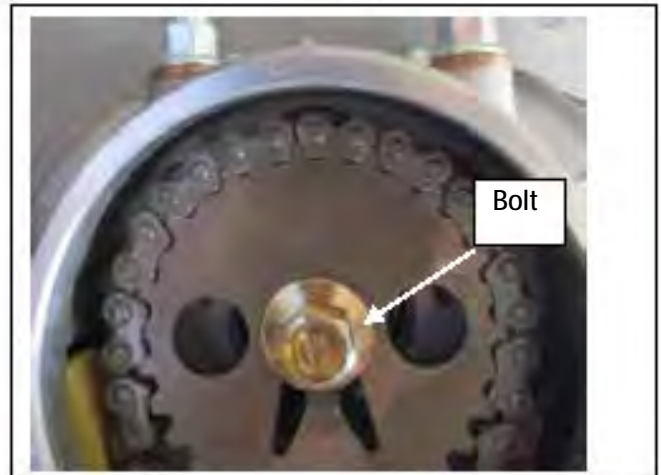


6. CYLINDER HEAD / VALVE

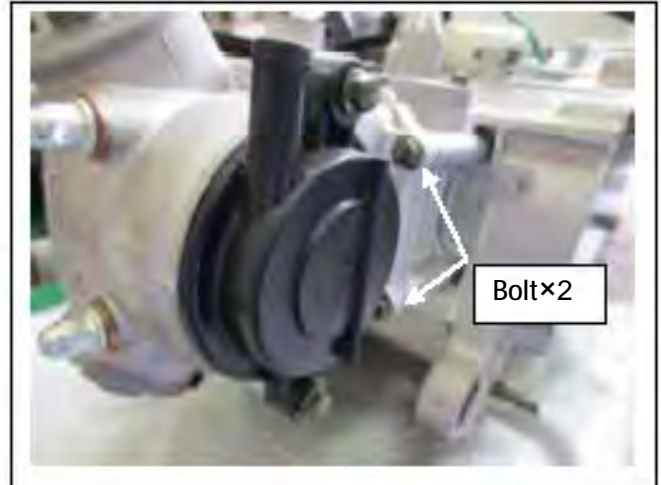
Turn the flywheel in counter-clockwise motion with T type wrench until the “T” mark on flywheel aligned with the mark on the crankcase so that the hole on the camshaft sprocket is forward up and piston is at TDC position.



Remove camshaft sprocket bolt(bolt).
Remove the cam sprocket and cam chain.



Removed the bolts of the left side of the cylinder head between cylinder head and cylinder(bolt × 2).



Removed cylinder head fixed nut (nuts × 4).



6. CYLINDER HEAD / VALVE

Remove cylinder head.

Caution

Loosen the nuts diagonally by 2-3 sequences.



CAMSHAFT REMOVAL

Remove the fixed (bolt × 1), then remove the camshaft.



Remove the valve rocker arm shaft.



Remove the valve rocker arm.



CYLINDER HEAD DISASSEMBLY

Use the special tool of compress valve springs. Remove valve spring removed location pin.

Caution

Do not over-compressed valve springs. Avoiding weaken the spring flexibility.

Put out the spring stopper, spring and valve. Remove the valve cotter, valve spring retainer, valve oil seal.

Clean carbon deposits in combustion chamber. Clean residues and foreign materials on cylinder head matching surface.

Caution

Do not damage the matching surface of cylinder head.

CAMSHAFT INSPECTION

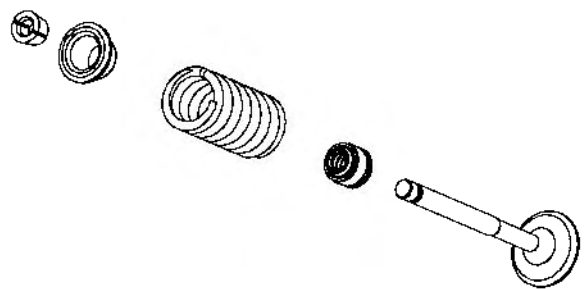
Inspect cam lobe height for damaged.

Service Limit

IN: Replacement when less than 25.14 mm

EX: Replacement when less than 24.74mm

Inspect the camshaft bearing for looseness or wear out. If any, replace whole set of camshaft and bearing.

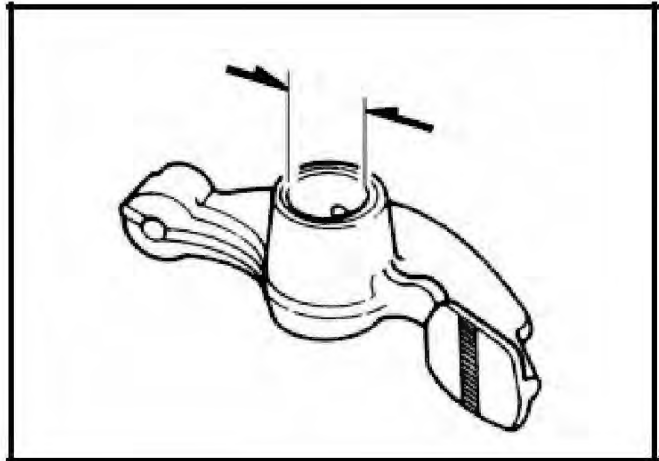


6. CYLINDER HEAD / VALVE



VALVE ROCKER ARM/ SHAFT INSPECTION

Measure the valve rocker arm I.D.
Service Limit: Replace when it is above 10.100 mm

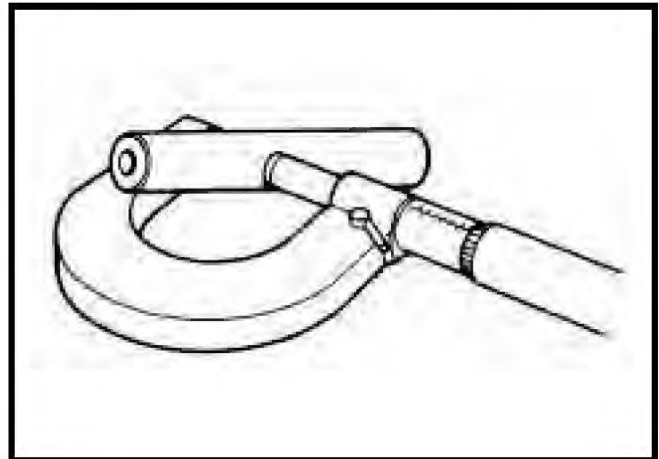


Measure the active O.D. of the valve rocker arm shaft.

Service Limit: Replace when it is above 9.90 mm

Calculate the clearance between the rocker arm shaft and the rocker arm.

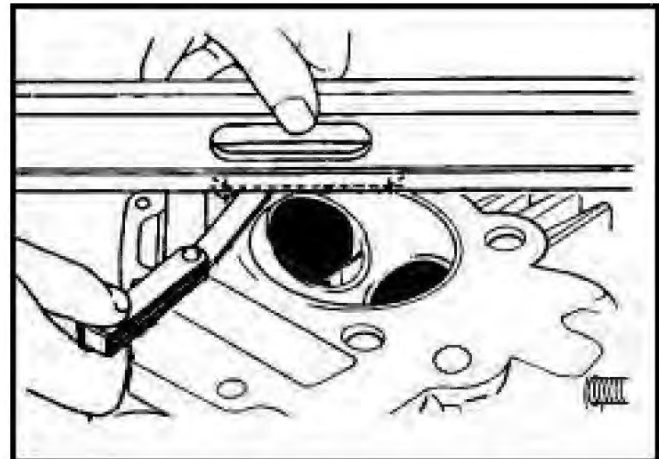
Service Limit: Replace when it is above 0.10 mm



CYLINDER HEAD INSPECTION

Check if spark plug and valve holes are crack. Measure cylinder head flat with a straightedge and flat feeler gauge.

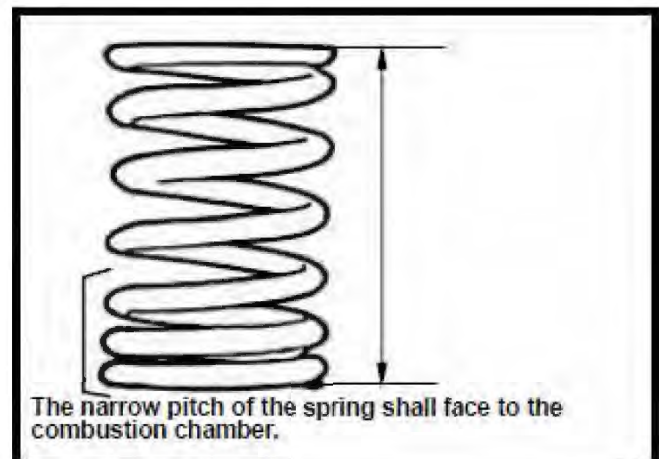
Service limit: below 0.05mm



Valve spring free length

Measure the free length of intake and exhaust valve springs.

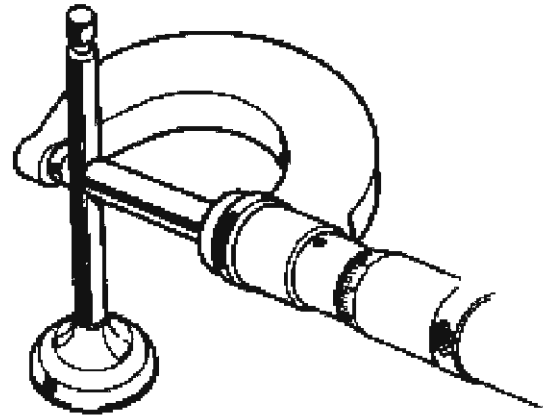
**Standard:
31.0mm**



Valve stem

Check if valve stems are bend, crack or burn. Check the operation condition of valve stem in valve guide, and measure & record the valve stem outer diameter.

Service Limit: IN→ 4.900mm
EX→ 4.900mm



Valve guide

Caution

Before measuring the valve guide, clean carbon deposits with reamer.

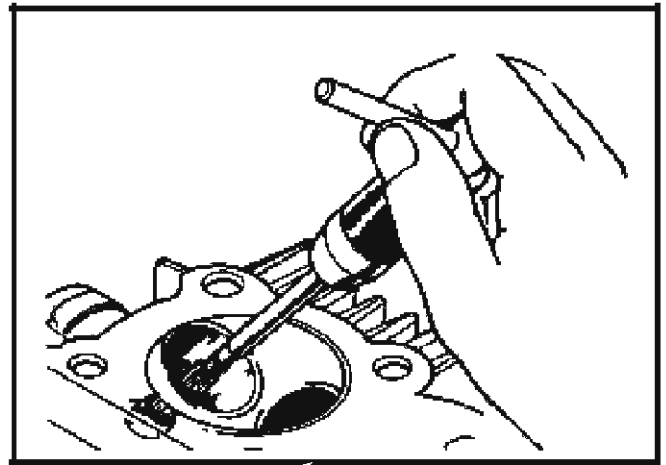
Special Service Tool: 5.0mm valve guide reamer

Measure and record each valve guide inner diameters.

Service limit: 5.030mm

The difference that the inner diameter of valve guide deducts the outer diameter of valve stem is the clearance between the valve stem and valve guide.

Service Limit: IN→ 0.13mm
EX→ 0.13mm

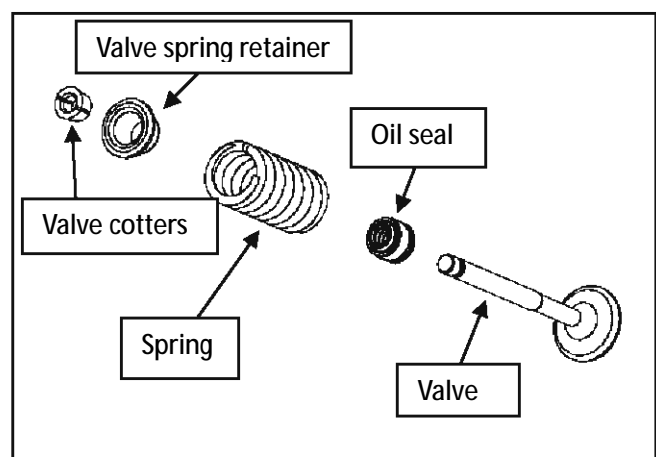


CYLINDER HEAD REASSEMBLY

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 valve spring compressor to press valve spring.
Install valve split locks and release the valve compressor.

⚠ Caution

In order to avoid to losing spring tension, do not compress the spring too much. Its length is based on the installation of latch.

Special tool: valve spring compressor



Tap valve stem to make valve retainer and valve stem sealing properly.

⚠ Caution

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

CYLINDER HEAD INSTALLATION

Install the lock pins and new cylinder head gasket onto the cylinder head.
Install the camshaft chain plate.

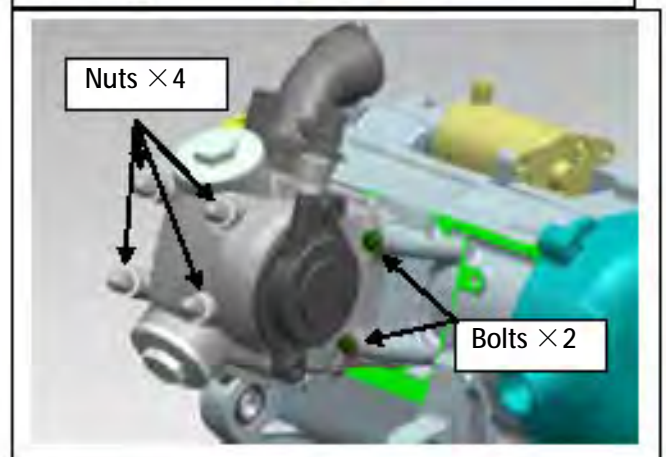
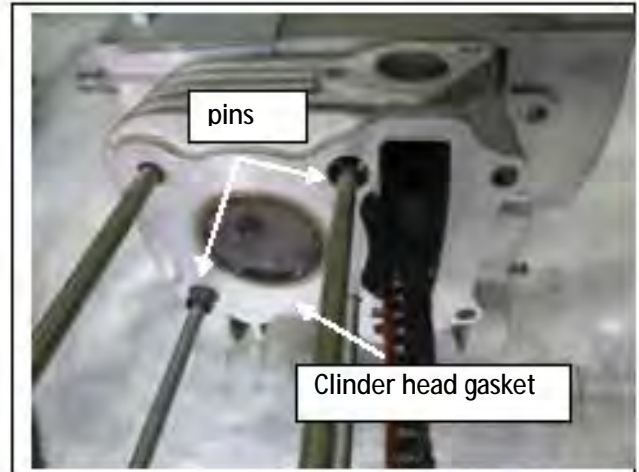
At first, tighten the 4 nuts on the cylinder top and then tighten the 2 bolts on the left side of cylinder head.

With T type wrench to turn crankshaft in a clockwise motion so that the "T" mark on the flywheel aligns with the mark on crankcase. (piston is at TDC position).
Install the cylinder head nuts and tighten it.

Torque value: 12~16 N.m

Install the cylinder head left side bolt and tighten it.

Torque value: 8~12 N.m



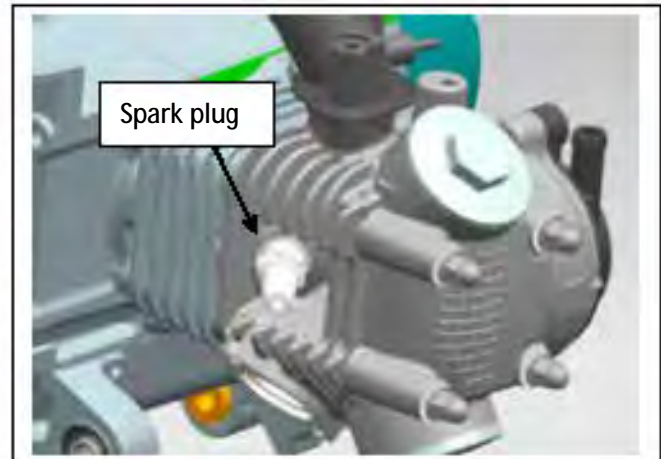
6. CYLINDER HEAD / VALVE

Install the spark plug and tighten it.

Torque value: 10~12 N.m

Apply with oil onto the thread of cylinder head bolts and tighten the bolts in diagonally for 2-3 sequences.

Do not over tightening the bolts to avoid the cylinder head deformation, noise created or leaking so that effects motorcycle's performance.



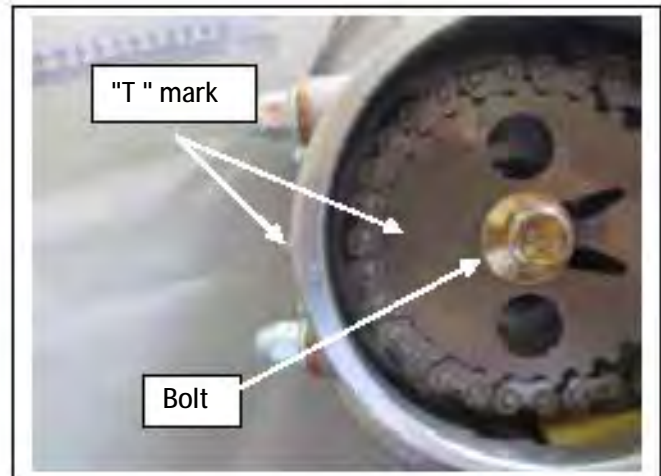
Install the cam shaft. Place the TDC marks of the cam sprocket at same level of the top-end of cylinder head. The other single hole of the cam sprocket is in upward. Then, install the cam chain onto the cam sprocket. Tighten the bolts of the cam sprocket. Install the cylinder head side cover.

Torque value: 20~25 N.m

Turn the cam chain adjuster in clockwise motion so that the adjuster is pushed out to contact the cam chain plate tightly. Tighten the bolt cap of the adjuster adjustment hole.

Caution

The O-ring must be installed into groove.



VALVE CLEARANCE ADJUSTMENT

Loosen valve clearance adjustment nuts and bolts located on valve rocker arm.

Measure and adjust valve clearance with feeler gauge.

After valve clearance had been adjusted to standard value, hold adjustment bolt and then tighten the adjustment nut.

Standard Value: IN 0.05±0.02mm
EX 0.10±0.02mm



7. CYLINDER/PISTON



GENERAL INFORMATION

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

Specification

unit: mm

Item		Standard	Limit	
Cylinder	ID	37.00~37.02	-	
	Bend/wrap age	-	0.050	
	Roundness	0.005	0.050	
	Cylindrical	0.005	0.030	
Piston/ Piston ring	Clearance between piston and rings	Top ring	0.020~0.060	0.090
		2 nd ring	0.020~0.060	0.090
	Ring-end gap	Top ring	0.10~0.25	0.500
		2 nd ring	0.10~0.25	0.650
		Oil ring	0.20~0.70	—
	OD of piston		36.970~36.990	36.920
	Piston OD measurement position		Lower-end up 7mm of piston shirt	
	Clearance between piston and cylinder		0.025~0.035	0.100
	ID of piston pin hole		10.004~10.010	10.040
OD of piston pin		9.994~9.998	9.980	
Clearance between piston and piston pin		0.006~0.016	0.02	
ID of connecting rod small-end		10.016~10.034	10.050	

TROUBLESHOOTING

Low Or Unstable Compression Pressure

- I Cylinder or piston ring worn out.
- I Compression pressure too high.
- I Too much carbon deposited in combustion chamber and piston.

Knock or Noise

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

Smoking in Exhaust Pipe

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

Engine Overheat

- I Carbon deposits on cylinder head top side.

CYLINDER REMOVAL

Remove cylinder head. (refer to chapter 6)
Remove 2 bolts and then take out the cam chain auto-adjuster.



Remove cam chain plate.
Remove cylinder.



Remove cylinder gasket and lock pins



Clean the residues attached onto the matching surfaces of cylinder and crankcase.



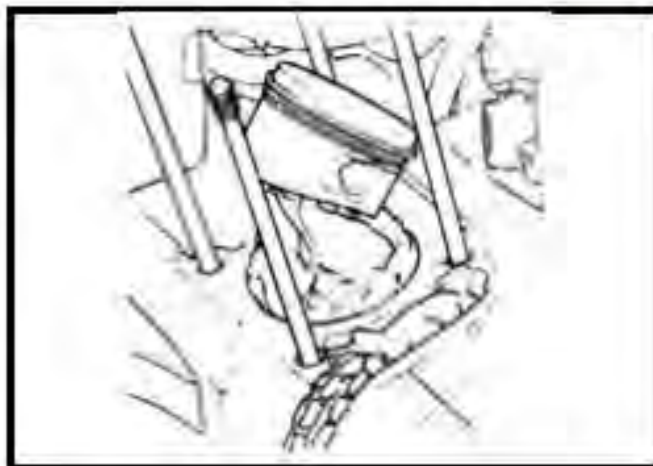
7. CYLINDER/PISTON

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

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

Caution

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



INSPECTION

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

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

Service limit: 39.05mm

Calculate both the real roundness (the difference between X and Y motion values) and the cylindrical roundness (the difference in the top, center or bottom positions of X or Y motion values.). Then, determinate by the max. value.

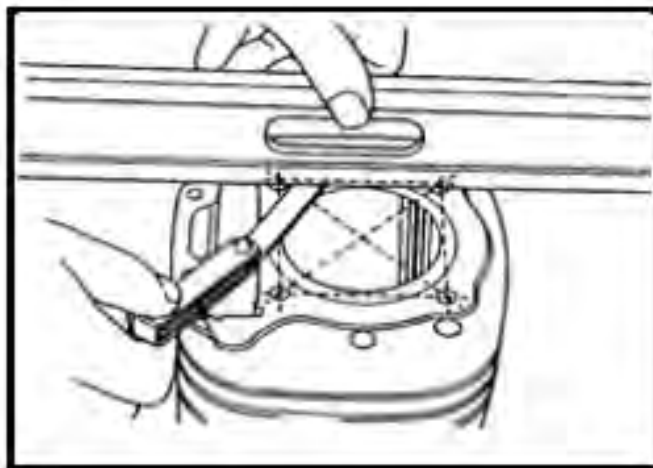
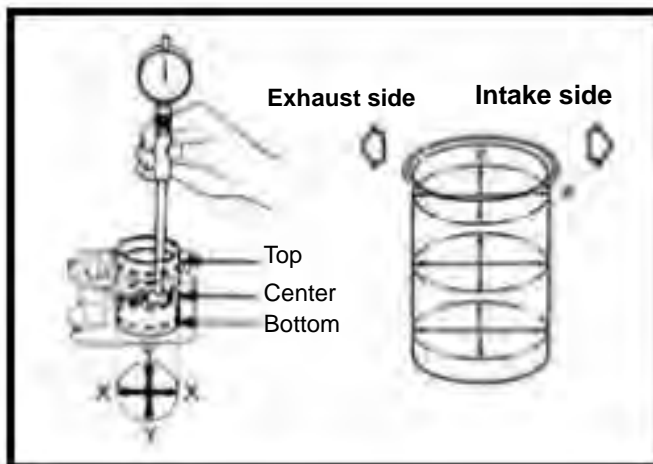
Service limit

Real roundness: correct or replace as over 0.05 mm

Cylindrical roundness: correct or replace as over 0.05 mm

Check Cylinder flat.

Service limit: correct or replace as over 0.05 mm

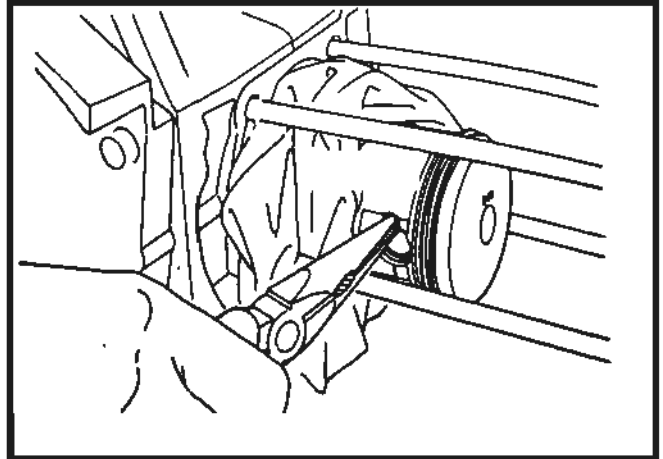


PISTON REMOVAL

Plug crankcase opening with a cleaning cloth to prevent from piston pin snap ring or other parts falling into crankcase when disassembling.

Hold another snap ring with pliers.

Push out the piston pin from the side that not removed the snap ring.



Remove piston rings.

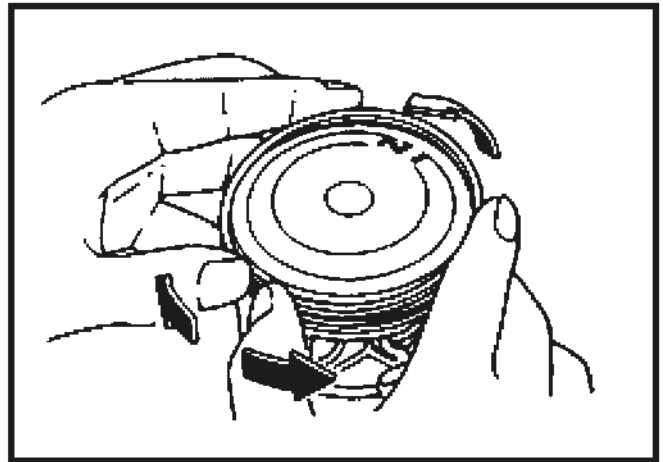
Caution

Pay attention to remove piston rings because they are fragile.

Disassemble the piston rings.

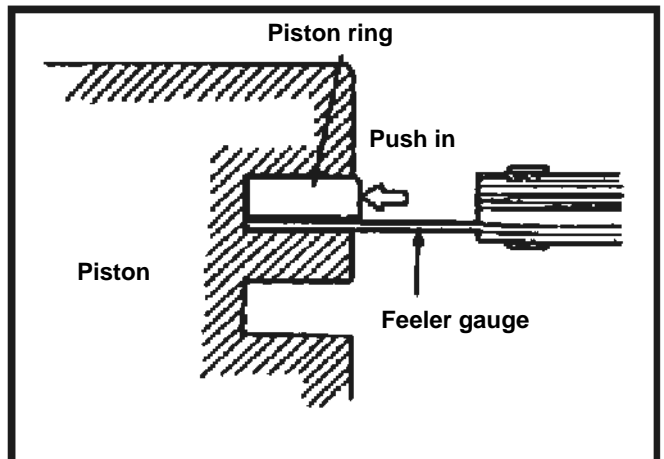
Check if the piston rings are damaged or its grooves are worn.

Cleaning the carbon in piston ring grooves.



Install the piston rings and then measure clearance between piston ring and its grooves.

Service Limit: Top ring: replace if over 0.09mm
2nd ring: replace if over 0.09mm

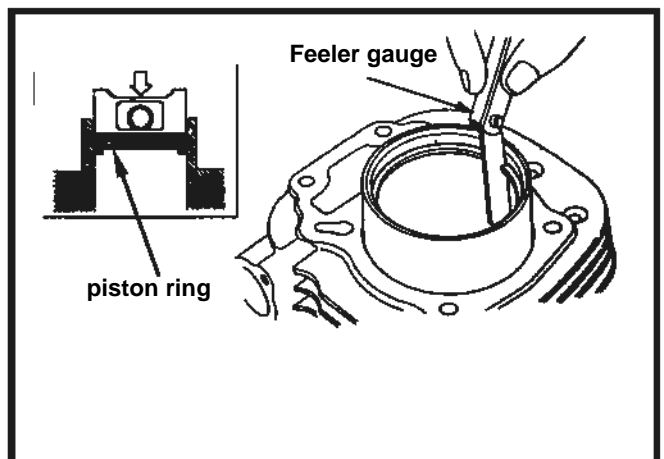


Take out the piston rings and place them respective into cylinder below 20mm of cylinder top. Measure each piston ring gaps.

Caution

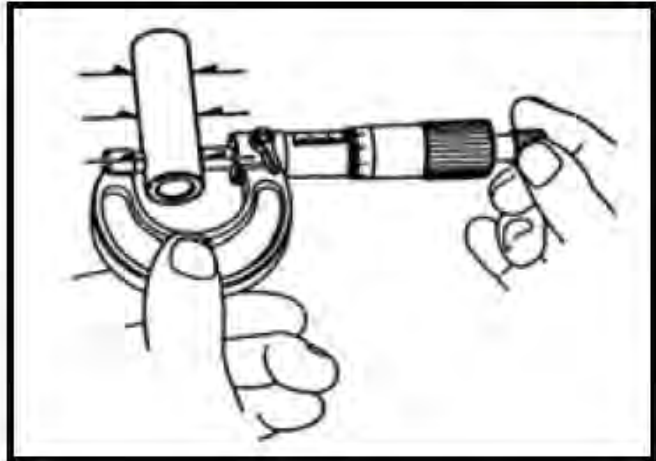
Push the piston rings into cylinder with piston top-end in parallel motion.

Service Limit: Top ring: replace if over 0.50mm
2nd ring: replace if over 0.650mm

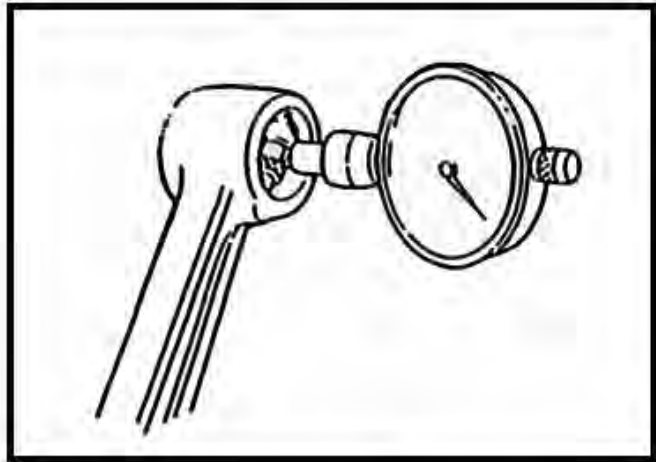


7. CYLINDER/PISTON

Measure the outer diameter of piston pin.
Service Limit: 9.980mm

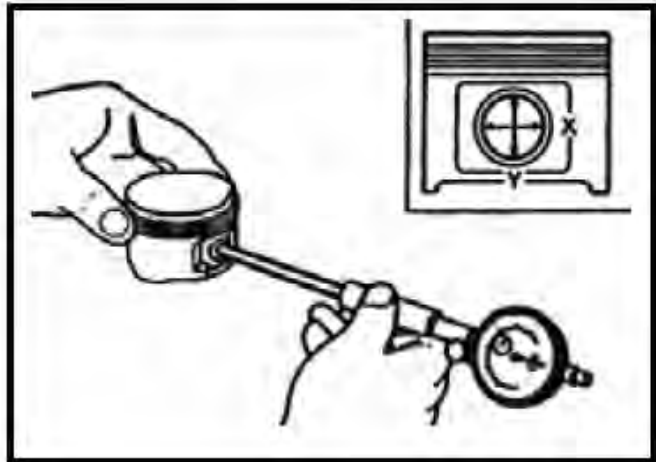


Measure the inner diameter of connecting rod small end.
Service Limit: 10.050mm



Measure the inner diameter of piston pin hole.
Service Limit: 10.040mm

Calculate clearance between piston pin and its hole.
Service Limit: 0.02mm



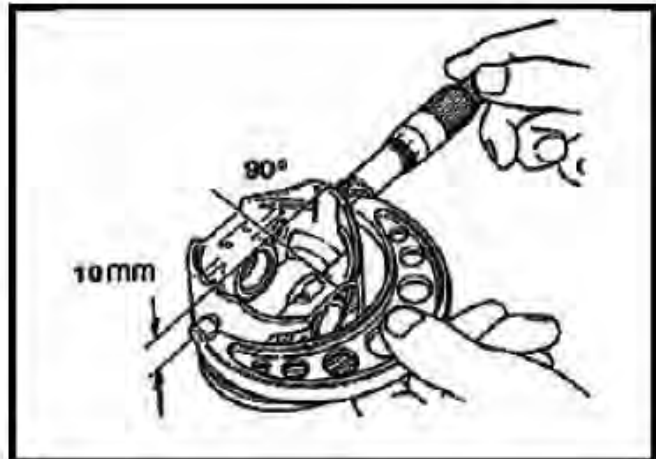
Measure piston outer diameter.

⚠ Caution

The measurement position is 7 mm distance from piston bottom side, and 90° to piston pin.

Service limit: 36.920mm

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

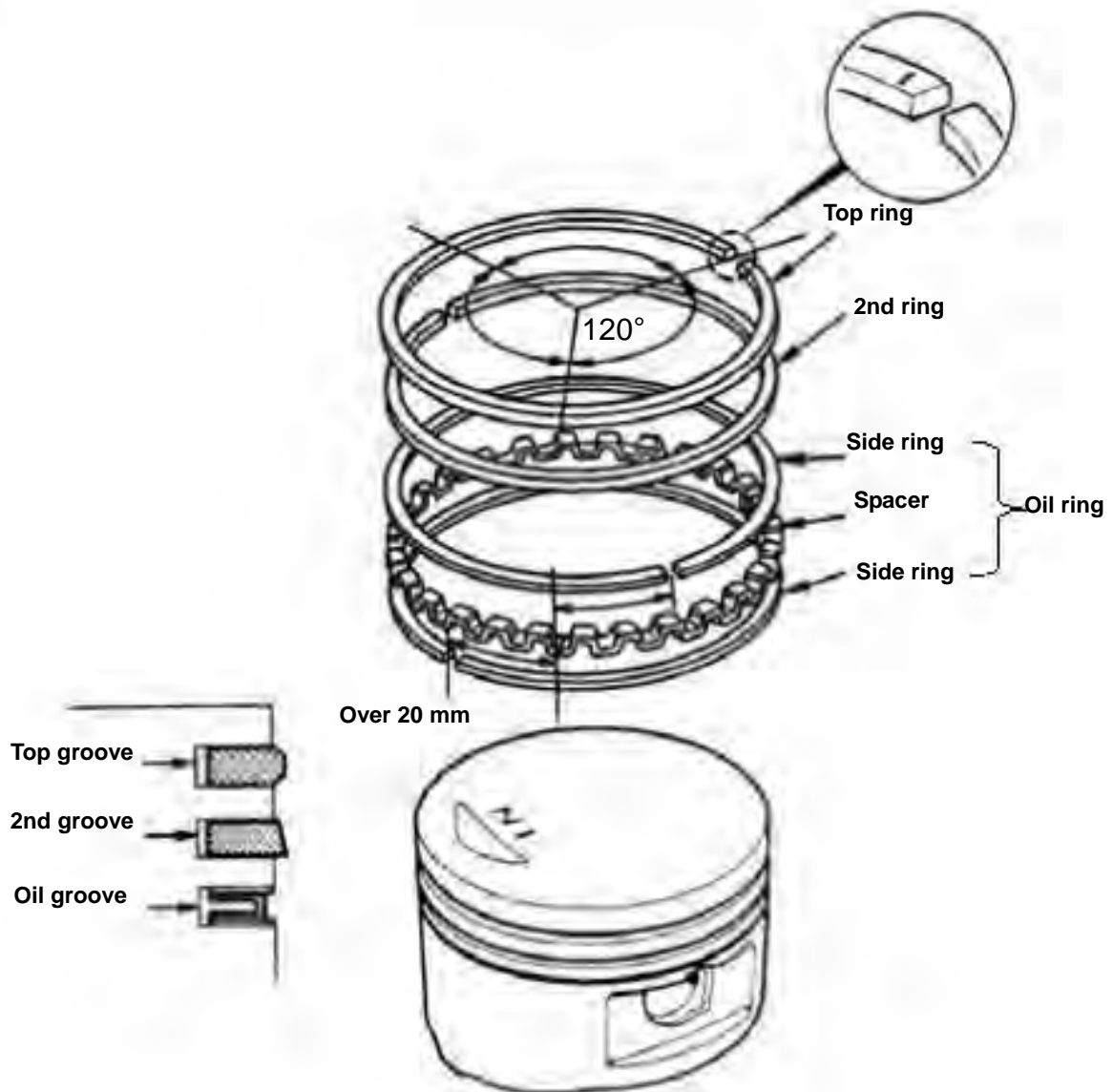


PISTON RING INSTALLATION

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



7. CYLINDER/PISTON

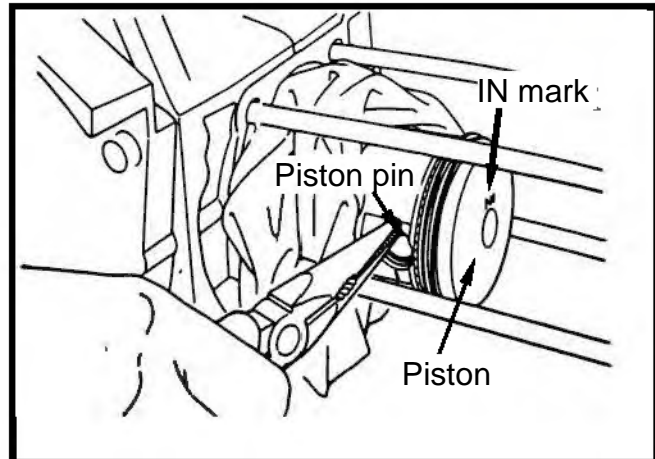
PISTON INSTALLATION

Install piston and piston pin, and place the IN mark on the piston top side forward to intake valve.

Install new piston pin snap ring.

Caution

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



CYLINDER INSTALLATION

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

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

Install 2 lock pins and new gasket.

Coat 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 this will cause the piston and the piston rings to be damaged.

Install the cam chain plate, the cylinder head gasket and lock pins.

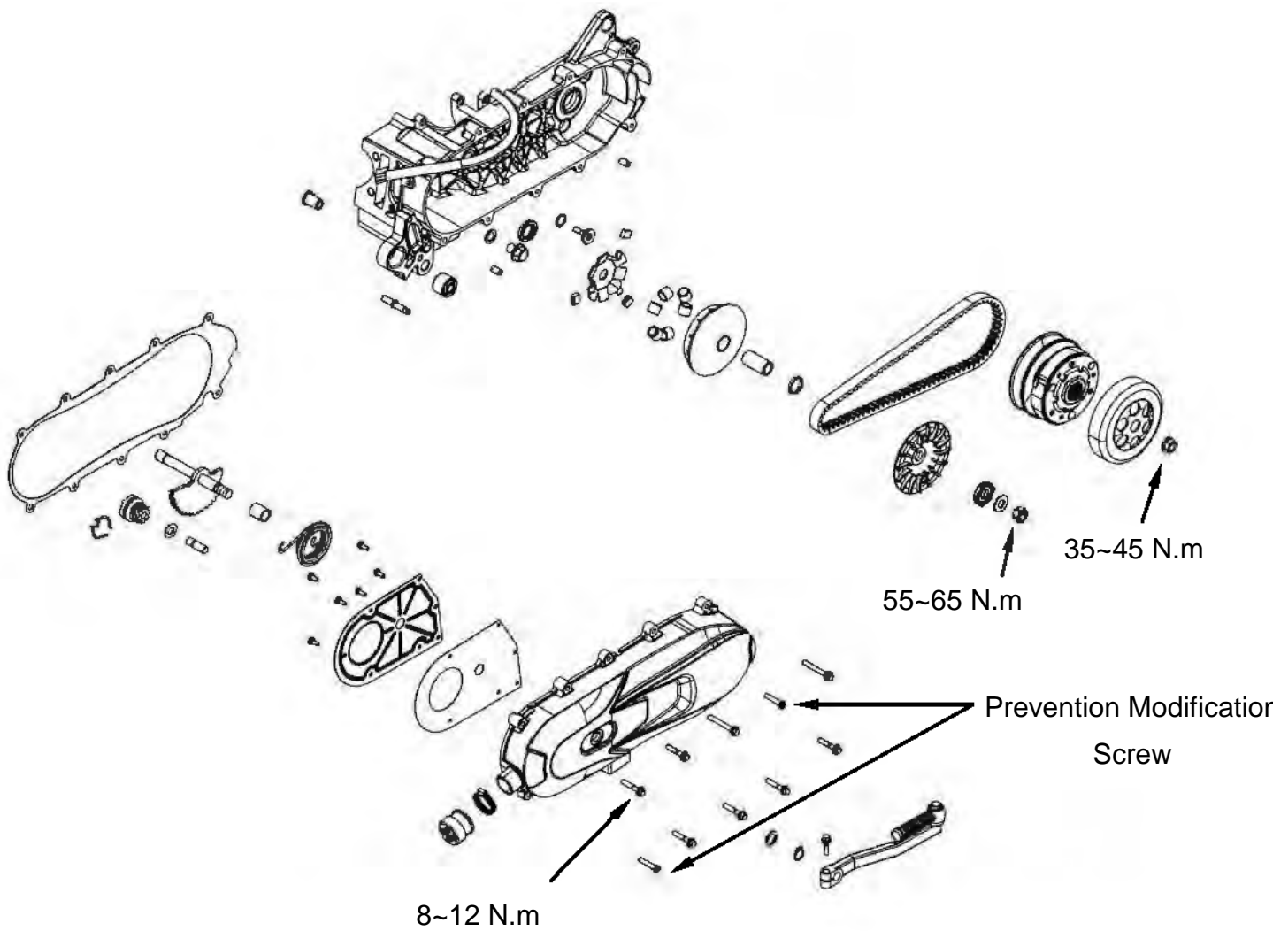
Install cylinder head. (refer to Chapter 6)

Install the cam chain auto-adjuster. (2 bolts)



COMPONENT STRUCTURE.....	8-1	KICK STARTER ARM.....	8-3
GENERAL INFORMATION.....	8-2	DRIVING BELT.....	8-4
TROUBLESHOOTING.....	8-2	SLIDING PULLEY.....	8-6
LEFT CRANKCASE COVER.....	8-3	CLUTCH/DRIVEN PULLEY.....	8-9

COMPONENT STRUCTURE



8. V-BELT DRIVING SYSTEM / KICK STARTER SYSTEM



GENERAL INFORMATION

- Driving pulley, clutch, and driven pulley can be serviced on the motorcycle.
- Driving belt and driving pulley surface must be free of grease.

Specification

Unit: mm

Item	Standard value	Limit
Driving belt width	18.3	17.2
ID of sliding pulley bush	20.035~20.085	20.150
OD of roller	15.920~16.080	15.570
ID of clutch outer	112.00~112.20	112.50
Thickness of clutch pad	4.000	2.0
Free length of drive pulley spring	97.20	96.5
OD of driven pulley	33.965~33.985	33.940
ID of sliding pulley	34.000~34.025	34.060

ID: Inner Diameter

OD: Outer diameter

Torque value

Sliding pulley nut: 40~50N.m

Clutch outer nut: 50~60N.m

driving pulley nut: 35~45N.m

Special Service Tools

Clutch spring compressor

Bearing puller (inner type)

Clutch mounting nut wrench

Universal fixture

TROUBLESHOOTING

Engine can be started but motorcycle can not be moved

- I Worn driving Belt
- I Worn tilt plate
- I Worn or damaged clutch pad
- I Broken driven pulley

Shudder or misfire when driving

- I Broken clutch pad
- I Worn clutch pad

Insufficient horsepower or poor high speed performance

- I Worn driving belt
- I Insufficient spring capacity of driven pulley
- I Worn roller
- I Driven pulley operation un-smoothly

LEFT CRANKCASE COVER

Left crankcase cover removal

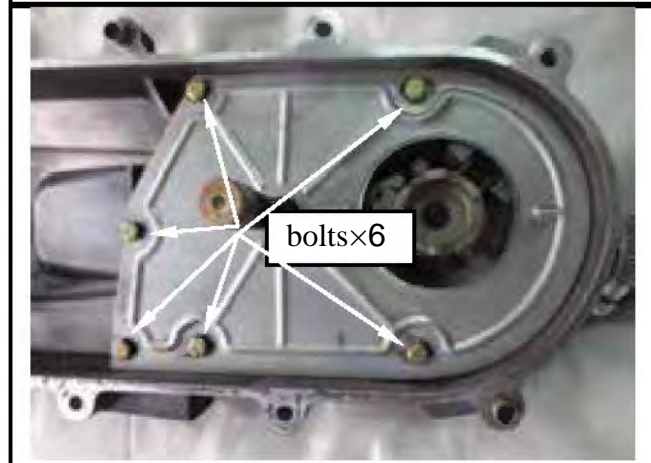
Remove air cleaner. (2 bolts)
 Remove kick starter arm (1bolts)
 Loosen vent strap on the front-left side of cover, and then remove the vent.
 Remove engine left-side cover (8 bolts).
 Remove Prevention Modification Screw



KICK STARTER ARM

Disassembly

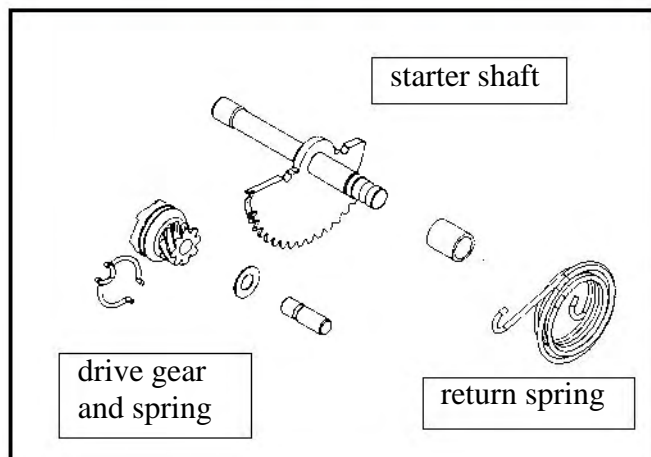
Remove left side cover plate on the left crankcase cover(bolts×6).
 Remove left side cover plate gasket.



First put kick starter pedal into the starter shaft. After a little rotation, remove the drive gear and washer.
 Removed kick starter pedal, starter shaft, return spring and the thrust washer.



Check if starter shaft, drive gear, bushing, for wear or damage. Replace it with new one if necessary.
 Check the return spring for spring force or damaged. Replace it with new one if poor parts found.



8. V-BELT DRIVING SYSTEM / KICK STARTER SYSTEM



Reassembly

Apply with some specified grease on the gear, shaft.

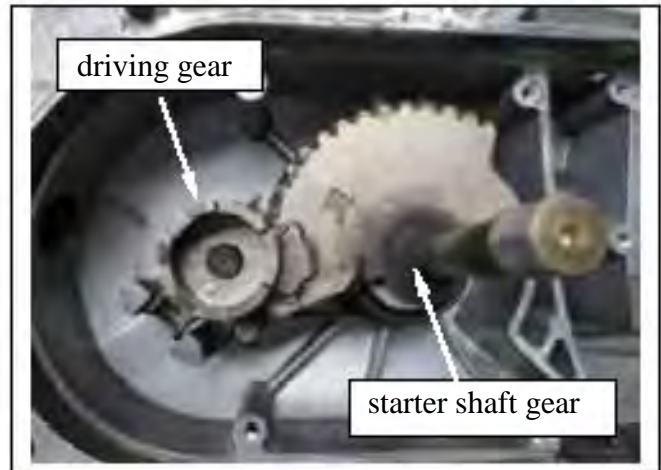
Install the friction spring of driving gear onto convex part of the case cover.

Install, return spring and starter shaft as diagram shown.

Install kick starter arm temporary.

Rotate the lever and then align driving gear with width-tooth on the starter shaft.

Install thrust washer and socket onto starter shaft.



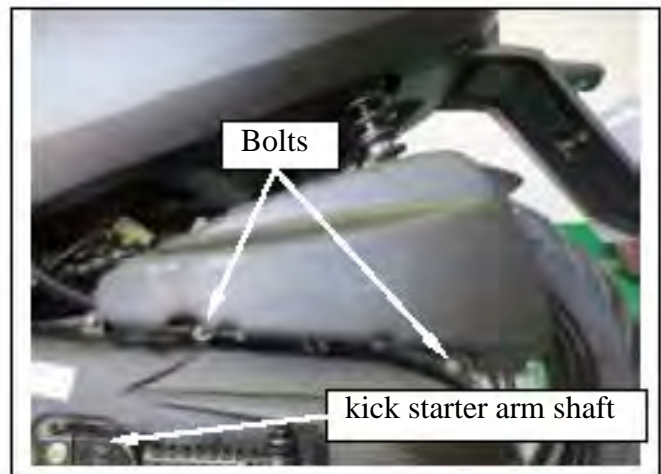
Installation of the left crankcase cover

Install the left crankcase cover. (8 bolts)

Install front vent tube of left cover and tighten the strap.

Install kick starter arm. (1 bolt)

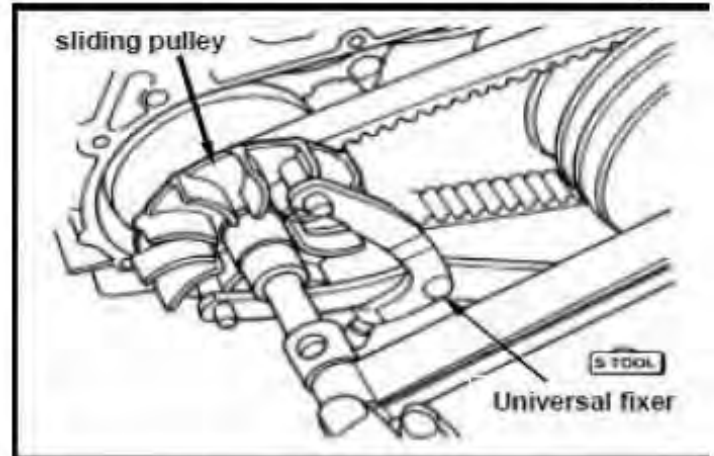
Tighten the air cleaner. (2 bolts)



DRIVING BELT

Removal

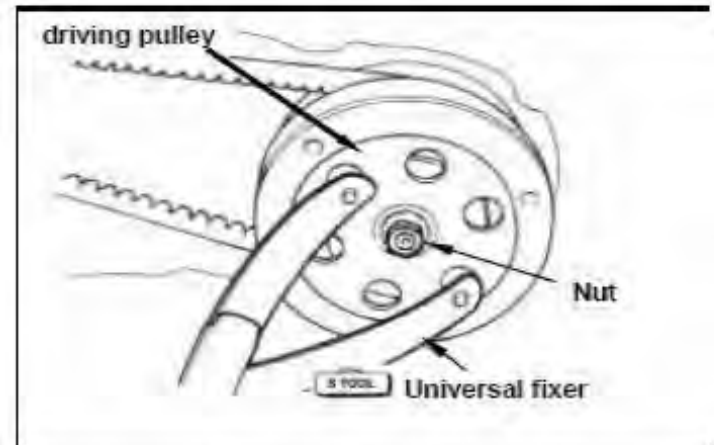
Remove left crankcase cover.
Hold the sliding pulley with a universal fixture, and then remove the nut and sliding pulley.



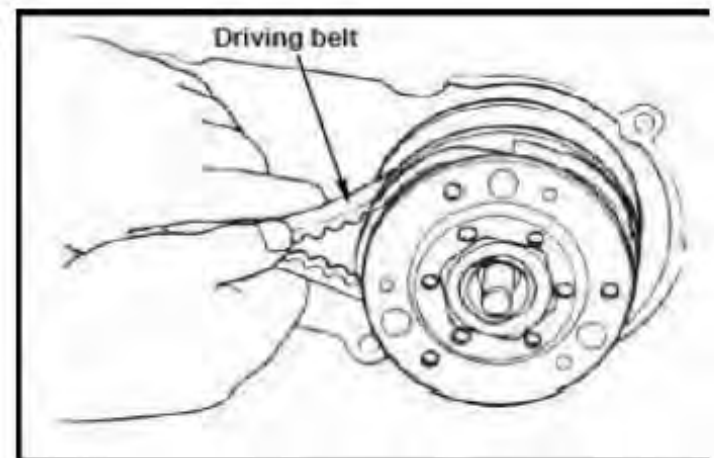
Hold driving pulley with universal fixture, and remove nut and clutch outer.

Caution

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



Push the driving belt into belt groove as diagram shown so that the belt can be loosened, and then remove driven belt and clutch at same time.



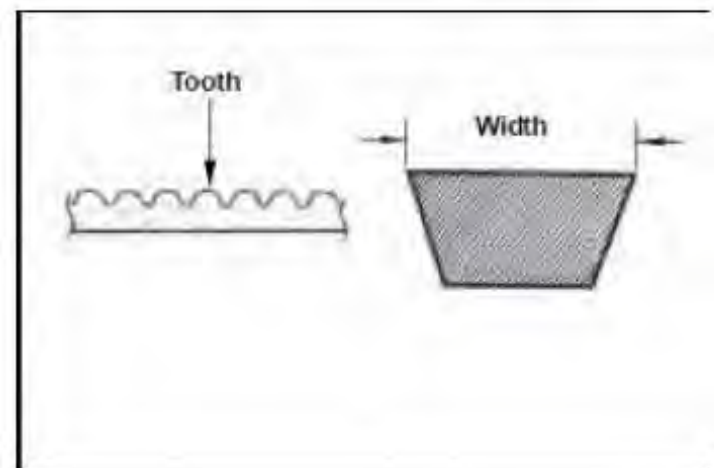
Inspection

Check the driving belt for crack or wear.
Replace it if necessary.
Measure the width of driving belt as diagram shown. Replace the driving belt if it exceed maintenance limited specification.

Service Limit: 16.80mm

Caution

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



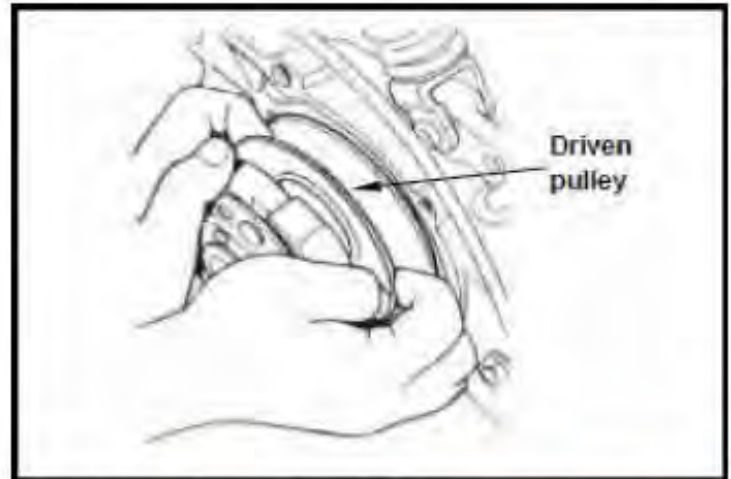
8. V-BELT DRIVING SYSTEM / KICK STARTER SYSTEM

Installation

Pull out driving pulley and then insert the driving belt into the driven belt.

Caution

Pull out driving pulley and then insert the driving belt into the driving pulley so that the driving belt set can be installed onto sliding pulley more easily.

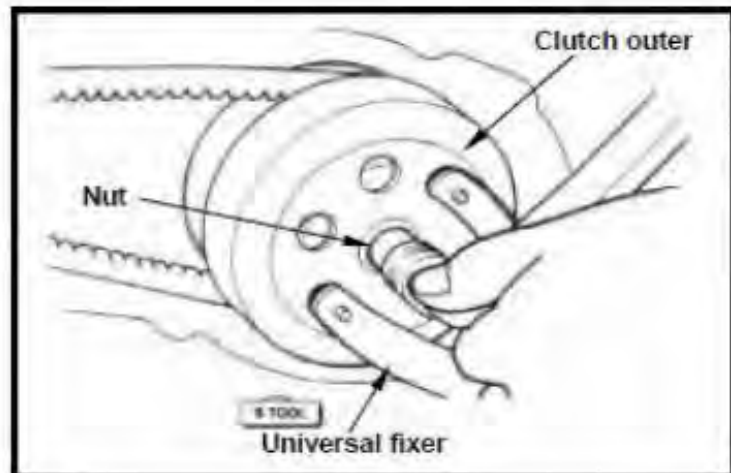


Install the starter clutch.
Install the clutch set with driving belt onto the driving shaft.
Install the sliding pulley on the other end of belt.
Install clutch outer.



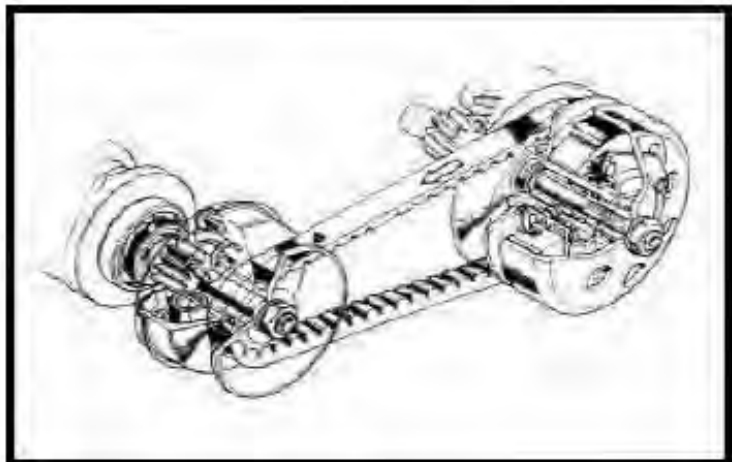
Install the clutch with universal fixture, and then tighten nut to specified torque value.

Torque value: 35~45 N.m



Caution

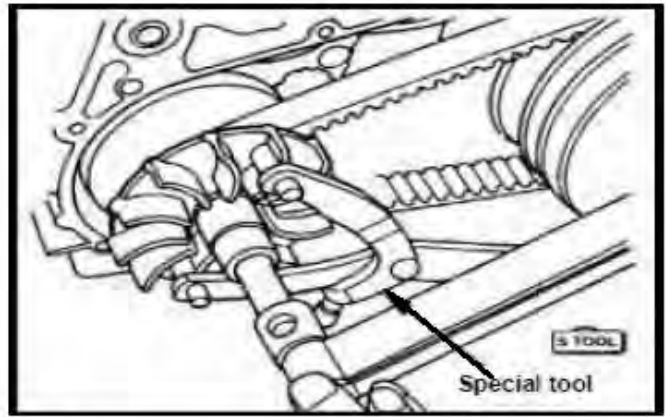
When install the driving belt, if there is a arrow mark, then the arrow mark must point to rotation motion. If not, the letters on the belt must be forwarded to assembly direction.



SLIDING PULLEY

REMOVAL

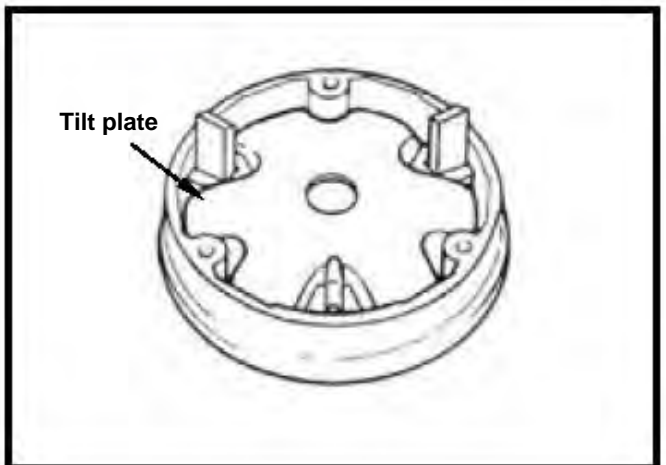
Remove left crankcase cover.
 Hold driving pulley with universal fixture, and then remove driving pulley nut.
 Remove driving pulley.



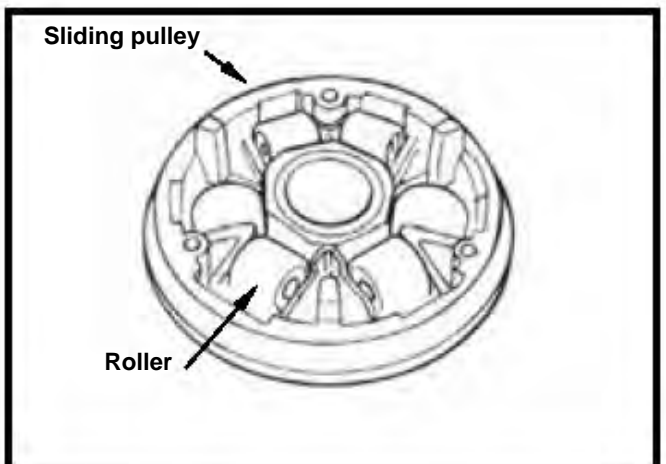
Remove the sliding pulley fixing nut and remove the driving belt from the sliding pulley.
 Remove the driving belt from the sliding pulley.
 Remove the limited speed bush.
 Remove the bush and remove the sliding pulley from the crankshaft.



Remove tilt plate.



Remove weight rollers from sliding pulley.



8. V-BELT DRIVING SYSTEM / KICK STARTER SYSTEM



Inspection

The operation of sliding pulley is means of the weight roller to pressing on it with centrifuge force. And then the speed is changed by the title plate rotation. Thus, if weight rollers are wear out or damage, the centrifuge force will be effected.

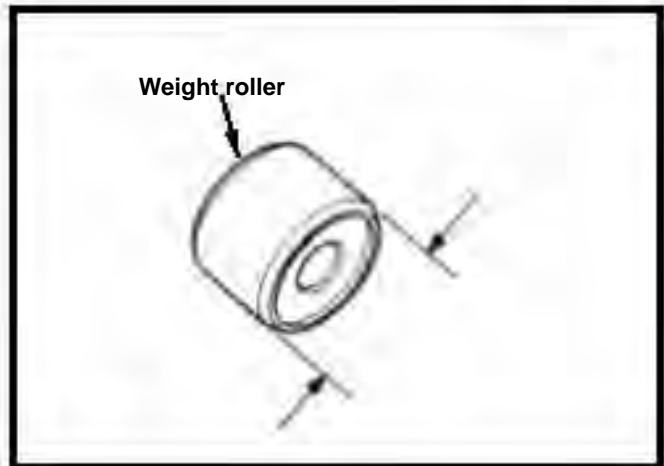
Check if rollers are wear out or damage.

Replace it if necessary.

Measure each rollers' outer diameter.

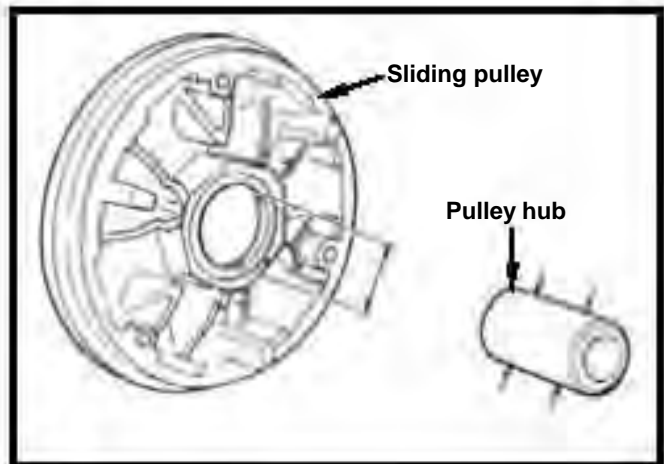
Replace it if exceed the service limit.

Service limit: 15.57 mm



Measure the inner diameter of the sliding pulley.

Service limit: 34.06 mm



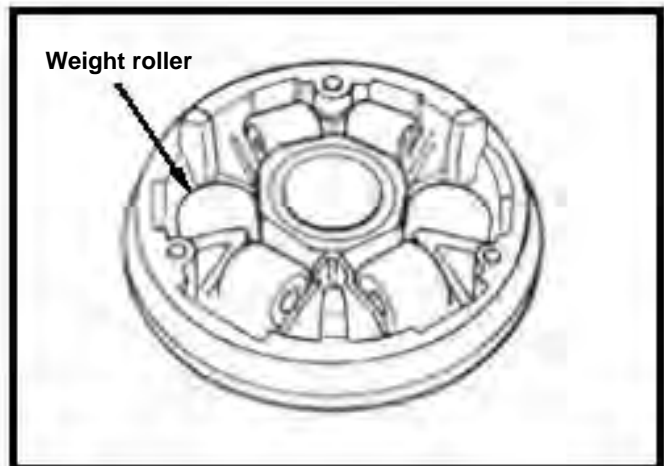
Measure the inner diameter of the pulley bush.

Replace it if exceed the service limit.

Service limit: 20.15 mm

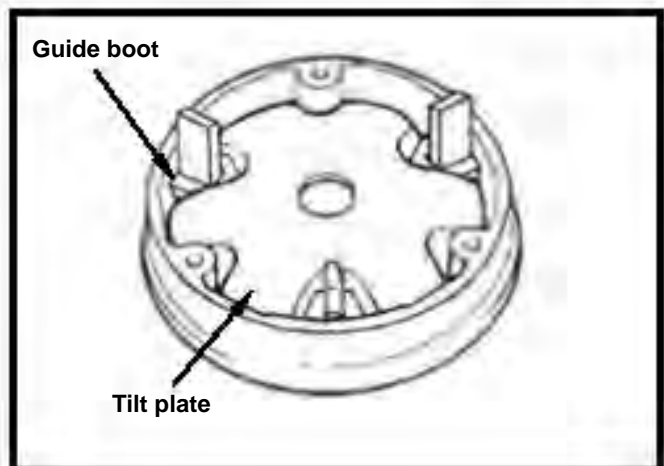
Assembly/Installation

Install the weight rollers.



Install the title plate guide boot onto the title plate.

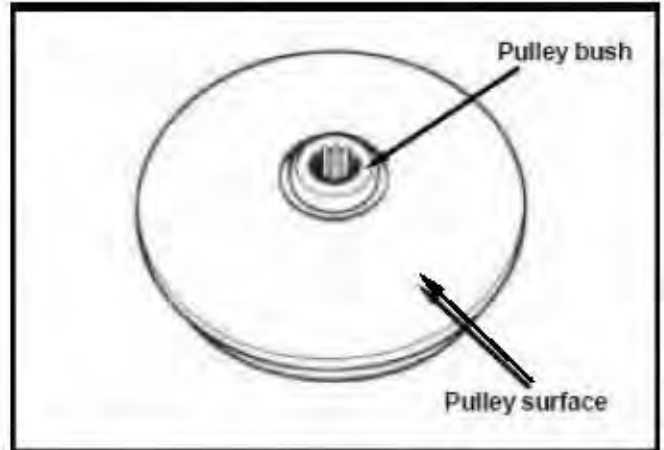
Install the title plate.



Apply with grease 4~5 g to inside of driving shaft hole, and install driving pulley hub.

⚠ Caution

The pulley surface has to be free of grease. Clean it with cleaning solvent.



Install siding pulley assembly onto crankshaft.

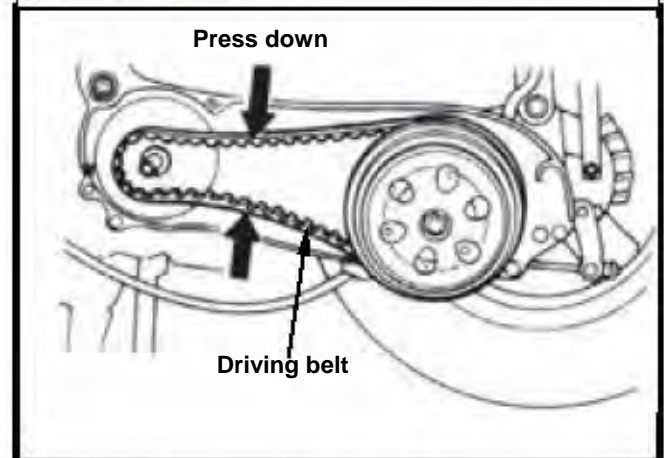


Driving pulley install

Press driving belt into pulley groove, and then press down the up & down sides of the driving belt to separate it away from the driving pulley hub.

⚠ Caution

To press down the up & down sides of the driving belt can avoid to pressing and damaging the belt when installing the driving pulley, and also can make sure that the driving pulley can be tighten.



Install driving pulley, washer and nut.

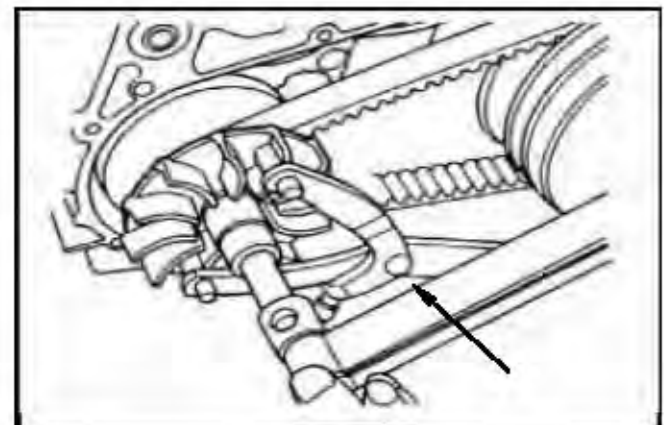
⚠ Caution

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

Hold driving pulley with universal fixture. Tighten nut to specified torque.

Torque value: 55~65 N.m

Install left crankcase cover.



8. V-BELT DRIVING SYSTEM / KICK STARTER SYSTEM



CLUTCH/DRIVEN PULLEY

Disassembly

Remove driving belt and clutch/driven pulley. Install clutch spring compressor onto the pulley assembly, and operate the compressor to let nut 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 nut wrench. Release the clutch spring compressor and remove clutch and spring from driven pulley. Remove socket from driven pulley.

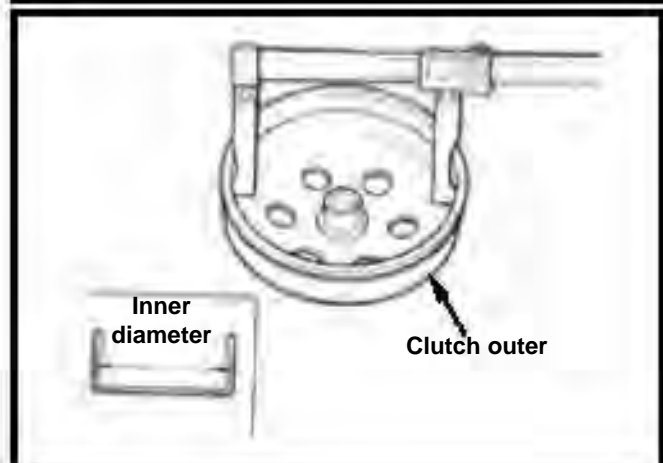
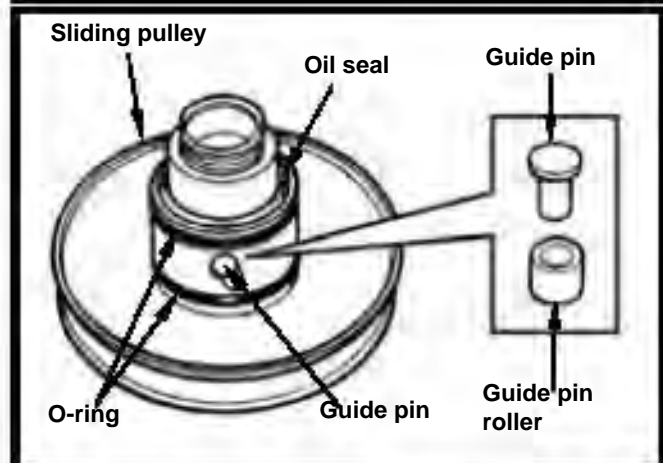
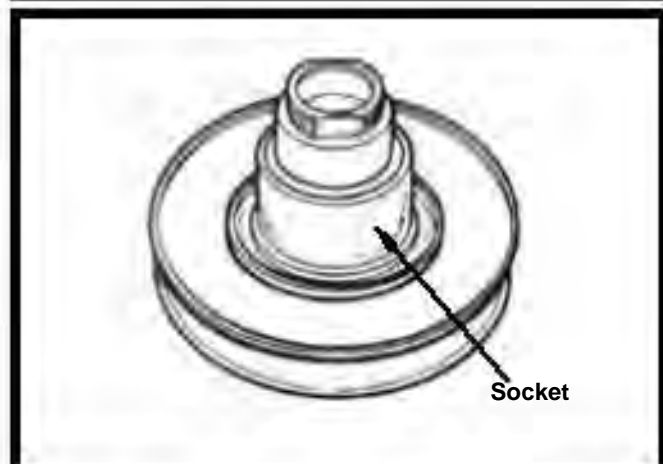
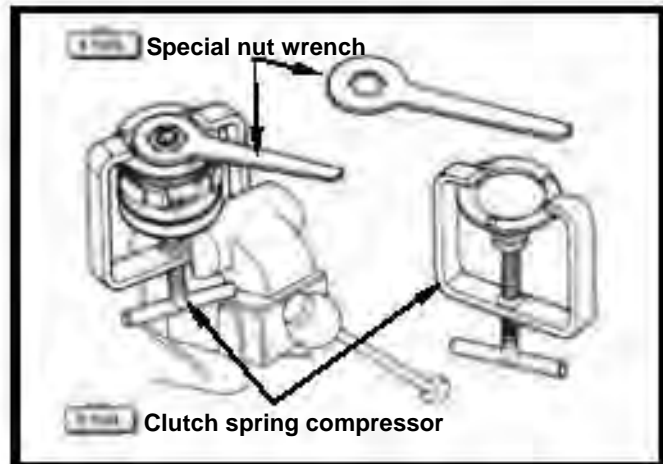
Remove oil seal from driven pulley. Remove guide pin, guide pin roller, and sliding pulley, and then remove O-ring & oil seal seat from sliding pulley.

Inspection

Clutch outer

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

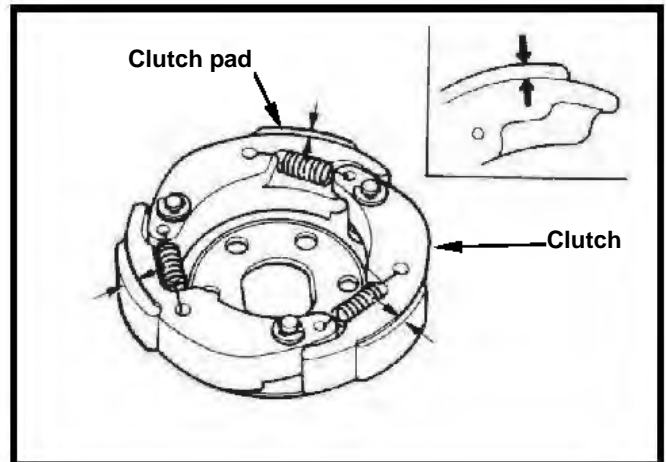
Service limit: 107.5 mm



Clutch lining

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

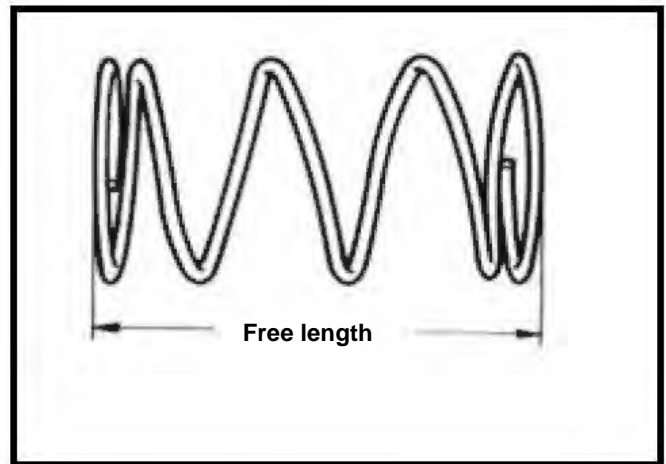
Service limit: 2.0mm



Driven pulley spring

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

Service limit: 93.2mm



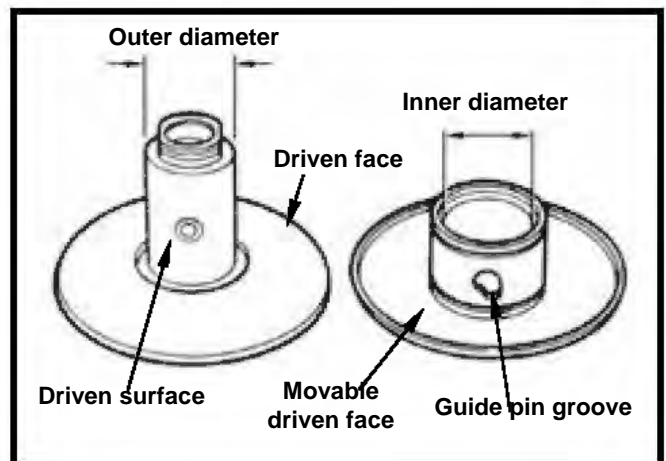
Driven pulley

Check following items;

- If both surfaces are damage or wear.
- If guide pin groove is damage or wear.

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 33.94mm
Inner diameter 34.06mm**

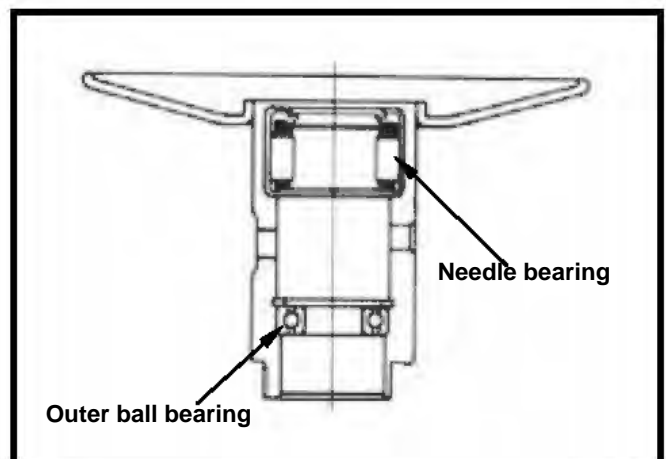


Driven Pulley Bearing Inspection

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.

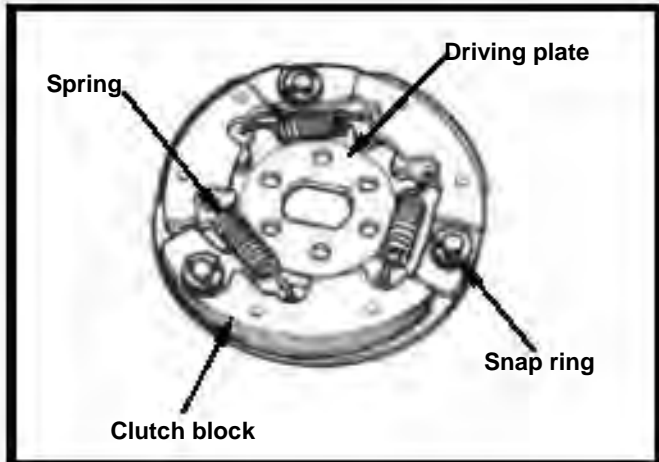


8. V-BELT DRIVING SYSTEM / KICK STARTER SYSTEM

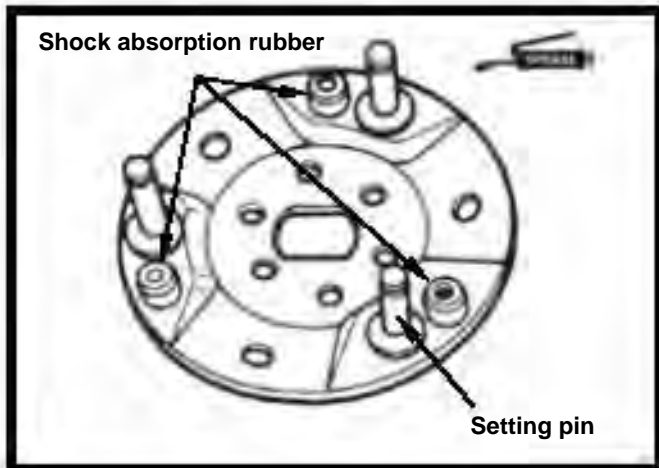


Clutch Block Replacement

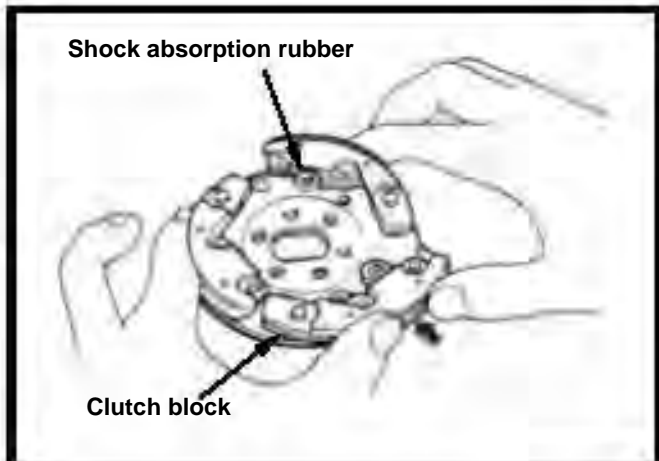
Remove snap and washer, and then remove the clutch block and spring from the driving plate. Check if the spring is damaged or has insufficient elasticity.



Check if the shock absorption rubber is damaged or deformed. Replace it if necessary. Apply grease to the setting pins.



Apply grease to the setting pins. However, the clutch block should not be greased. If so, replace it. Install the new clutch block onto the setting pin and then push it to the specified location.



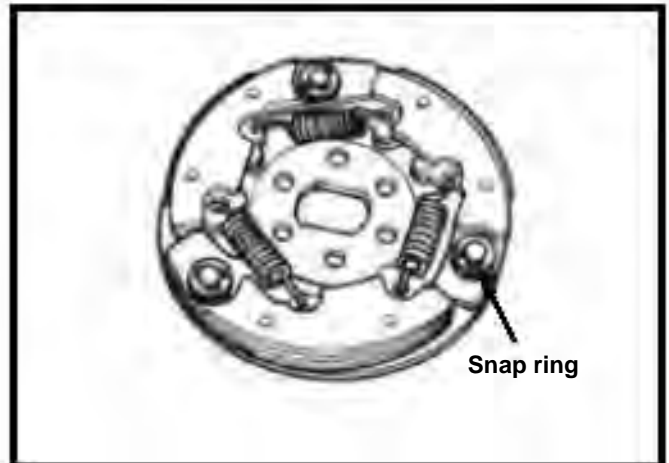
⚠ Caution

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

Install the spring snap into the groove with pliers.



Install snap ring and mounting plate onto setting pin.

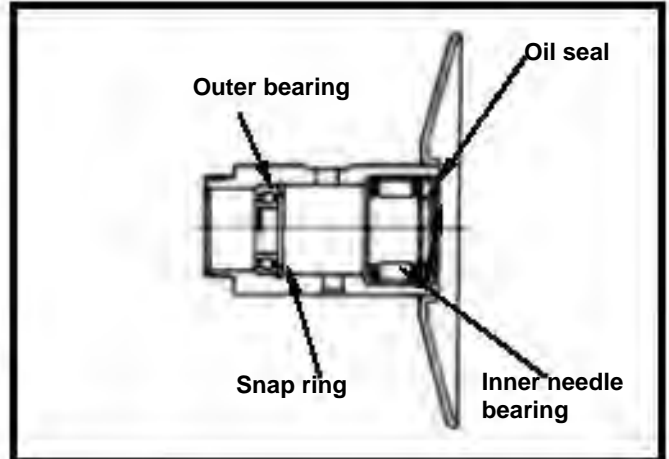


Replacement of driven pulley bearing

Remove inner bearing.

Caution

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

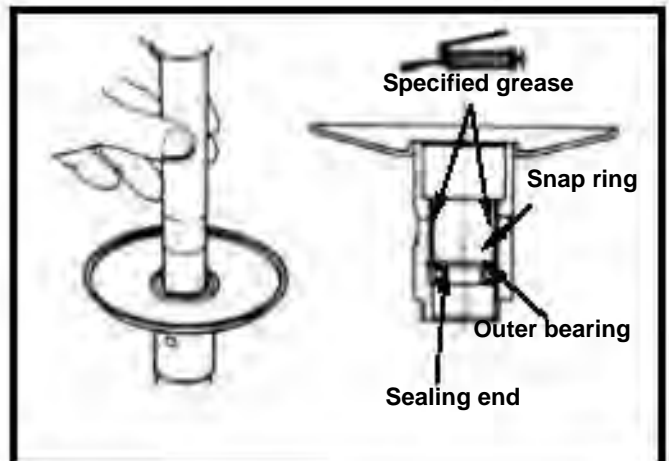


Remove snap ring and then push bearing forward to other side of inner bearing. Place new bearing onto proper position and its sealing end should be forwarded to outside.

Apply with specified grease.

Recommended to use G-3.

Install the snap ring and hold the bearing.

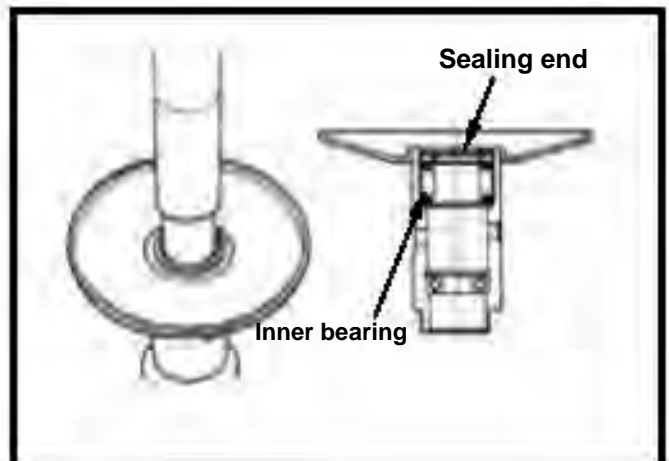


Install a new inner bearing.

Caution

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

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

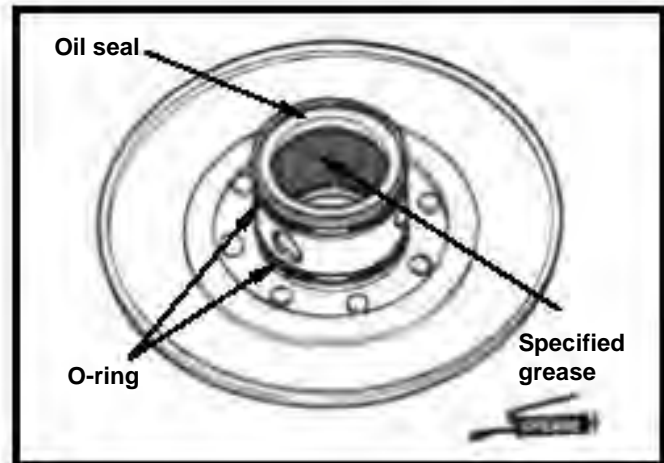


8. V-BELT DRIVING SYSTEM / KICK STARTER SYSTEM

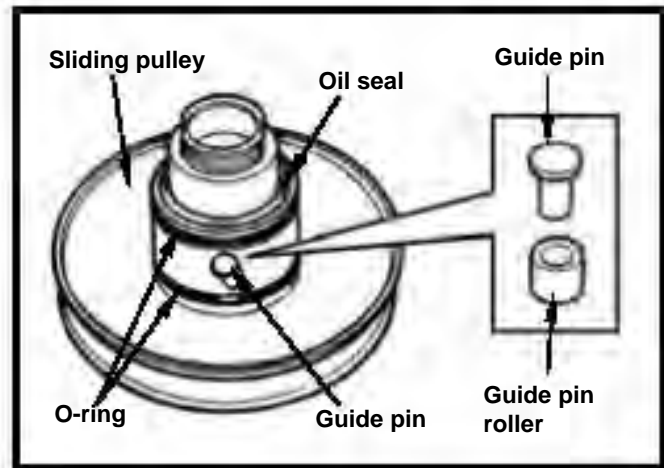


Installation of clutch/driven pulley

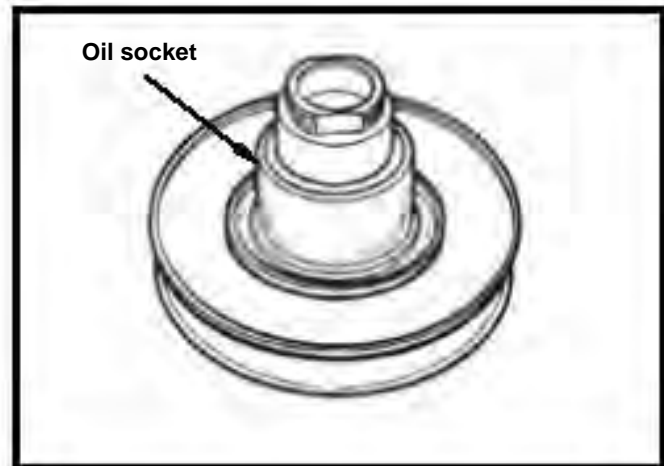
Install new oil seal and O-ring onto sliding pulley. Apply with specified grease to lubricate the inside of sliding pulley.



Install sliding pulley onto driven pulley. Install guide pin and guide pin roller.



Install oil socket.

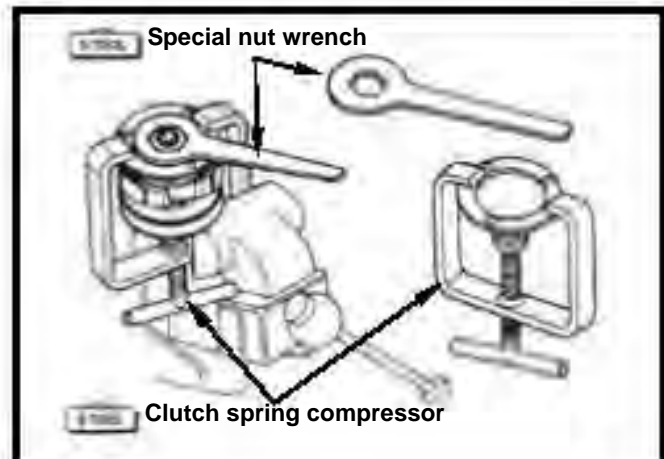


Install driven pulley, spring and clutch into clutch spring compressor, and press down the assembly by turning manual lever until mounting nut that can be installed. Hold the compressor by bench vise and tighten the mounting nut to specified torque with special nut wrench.

Remove the clutch spring compressor.

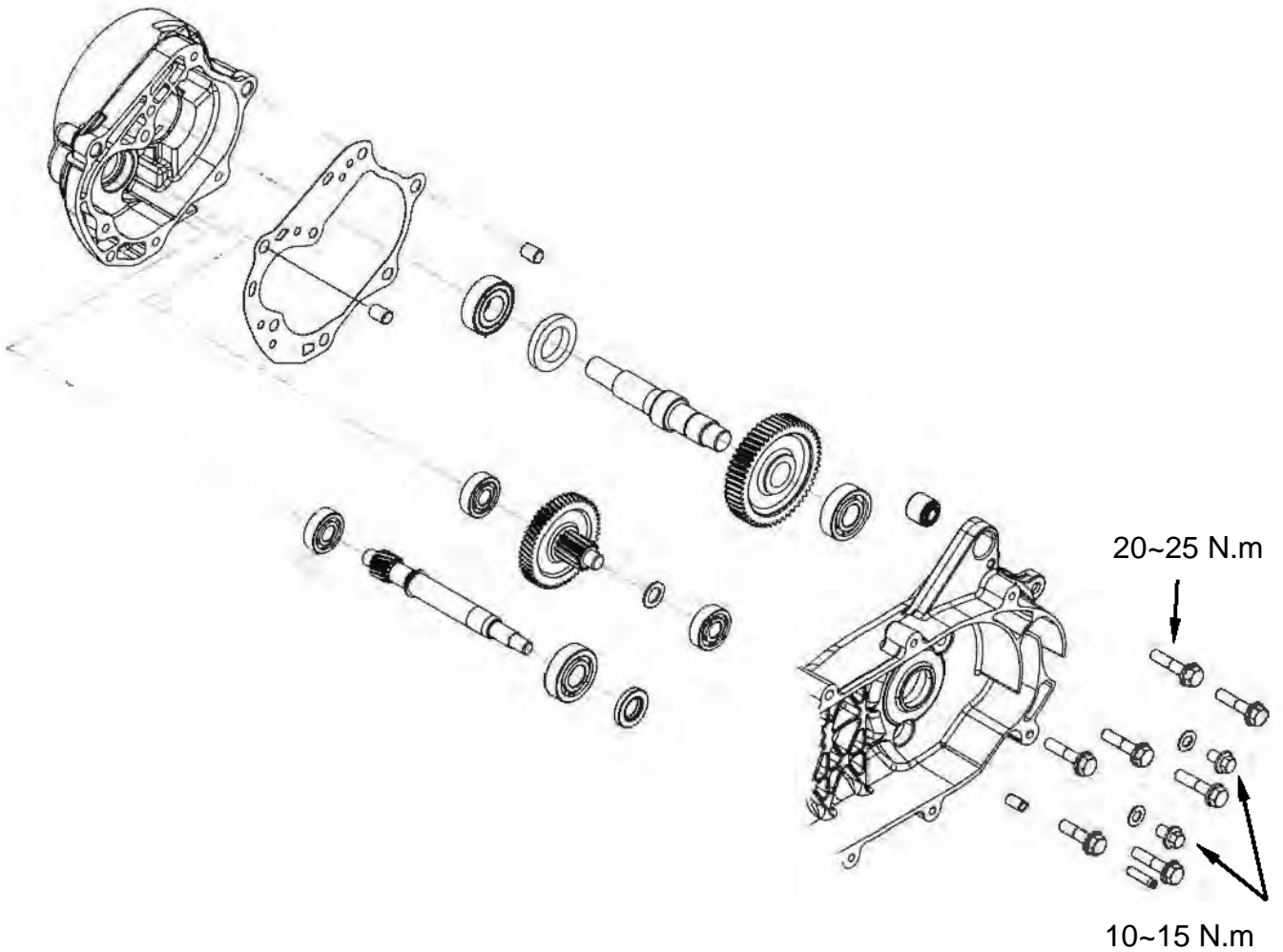
Torque value: 50~60 N.m

Install clutch/driven pulley and driving belt onto driving shaft.



COMPONENT STRUCTURE	9-1	INSPECTION OF FINAL DRIVING	
GENERAL INFORMATION	9-2	MECHANISM	9-3
TROUBLESHOOTING	9-2	BEARING REPLACEMENT	9-4
DISASSEMBLY OF FINAL DRIVING		RE-ASSEMBLY OF FINAL DRIVING	
SYSTEM	9-3	MECHANISM	9-6

COMPONENT STRUCTURE





9. FINAL DRIVING SYSTEM

GENERAL INFORMATION

Specification

Application gear oil: 4-stroke lubricant
Recommended gear oil: 80W-90
Oil quantity: 140 c.c. (120 c.c. when replacing)

Torque value

Gear box cover	20~25 N.m
Gear oil drain plug	10~15 N.m
Gear oil filling bolt	10~15 N.m

Tools

Special service tools

Inner type bearing puller
Outer type bearing puller
Gear box oil seal installer
Gear box bearing installer

TROUBLESHOOTING

Engine can be started but motorcycle can not be moved

- I Damaged driving gear
- I Burnt out driving gear
- I Broken driving belt

Gear oil leaks

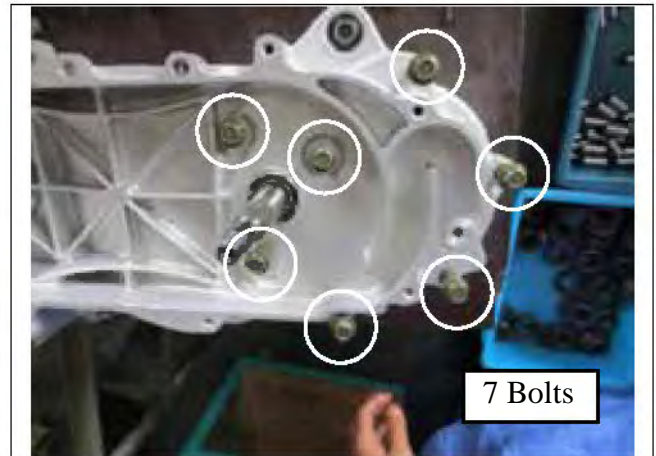
- I Excessive gear oil
- I Worn or damage oil seal

Noise

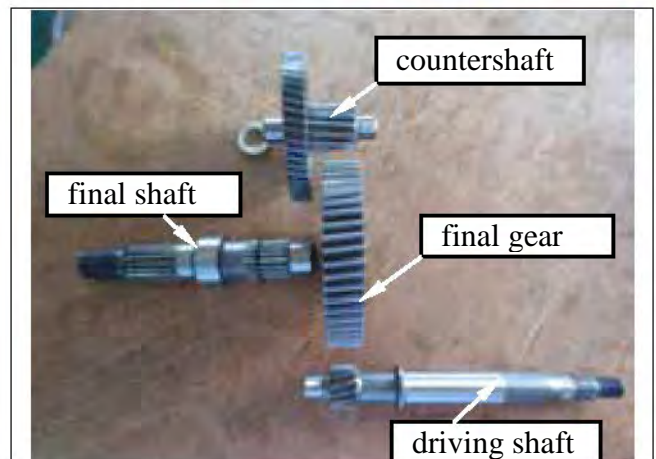
- I Worn or burnt gear
- I Worn gear

DISASSEMBLY OF FINAL DRIVING SYSTEM

Remove the rear wheel. (refer to chapter 15)
Remove the clutch.
Drain gear oil out from gear box.
Remove gear box cover bolts (7bolts) and then remove the cover and the final driving shaft.
Remove gasket and setting pin.

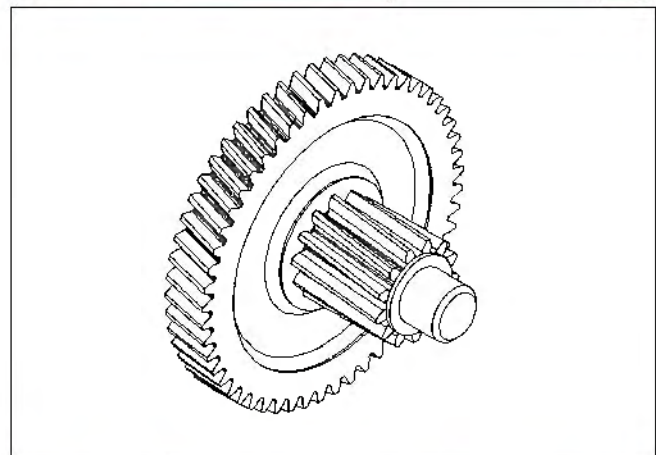


Remove countershaft and gear.
Remove final driving gear and shaft.



INSPECTION OF FINAL DRIVING SYSTEM

Check if the countershaft and the gear are wear or damage.



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



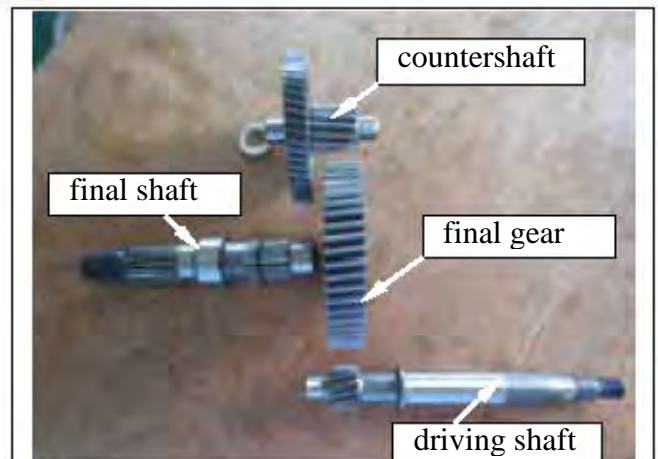
9. FINAL DRIVING SYSTEM



Check bearings on gear box and 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 box & cover 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.



Check driving shaft and gear for wear or damage.



BEARING REPLACEMENT

Caution

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

Remove driving shaft bearing from left crankcase using following tools;
Inner type bearing puller



Install new driving shaft bearing into left crankcase.

Tool:

Press the bearing into cover with C type hydraulic presser or bearing installer.



Press out the driving shaft from the crankcase.
 Remove oil seal from the crankcase.
 Remove the driving shaft bearing from the gear box cover with the inner type bearing puller.

⚠ Caution

Using the bearing protector as pressing out the driving shaft from the left crankcase.

Specified tool:

Inner type bearing puller.

If the driving shaft is pulled out with its bearing, then remove the bearing with bearing puller and bearing protector.

Tool:

Multi-functional bearing puller
 Bearing protector

Install a new driving shaft bearing onto crankcase.

Then, install the driving shaft.

Specified tool:

Press the bearing in with C type hydraulic presser or bearing installer.

Install a new final driving shaft bearing onto gear box cover.

Specified tool:

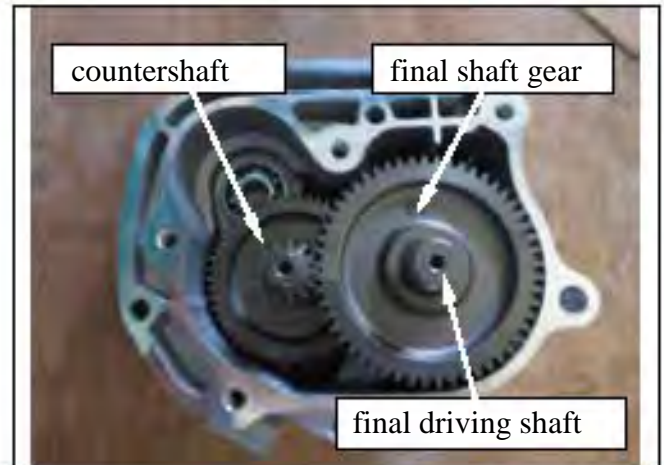
Press the bearing in with C type hydraulic presser or the bearing installer.
 Apply with some grease onto the lip section of oil seal and then install the seal.



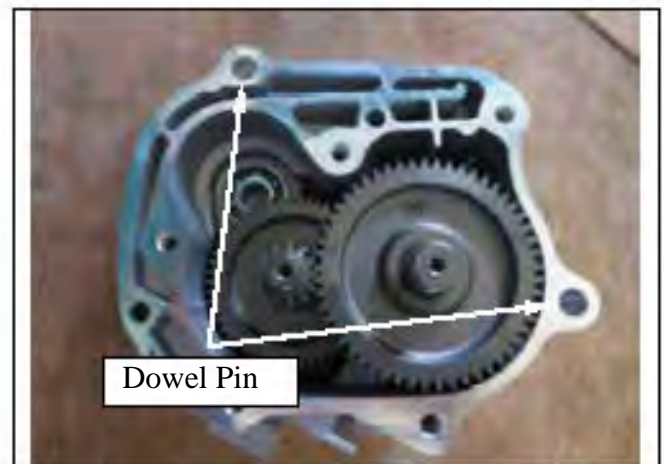
9. FINAL DRIVING SYSTEM

RE-ASSEMBLY OF FINAL DRIVING MECHANISM

Install final driving shaft and final driving gear, countershaft, and countershaft gear.



Install the setting pins(2 pins) and new gasket.



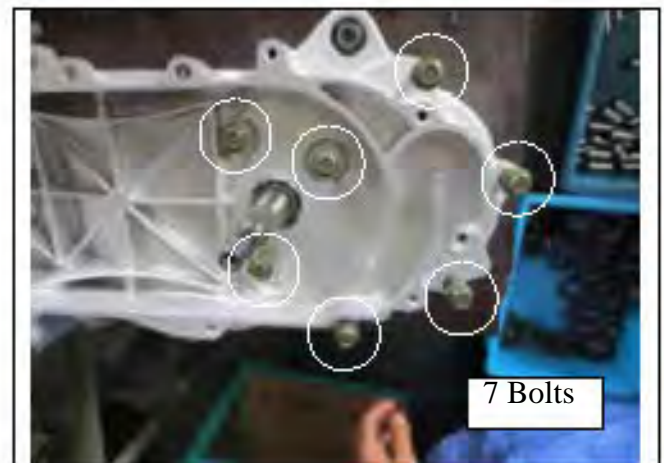
Apply with grease onto the oil seal lip of final driving shaft.

Install the gear box cover and 7 bolts.
(tighten the bolts)

Torque: 20~25 N.m

Install the clutch/sliding driving pulley.
Install the driving pulley, belt and left
crankshaft cover.

Install the rear wheel.

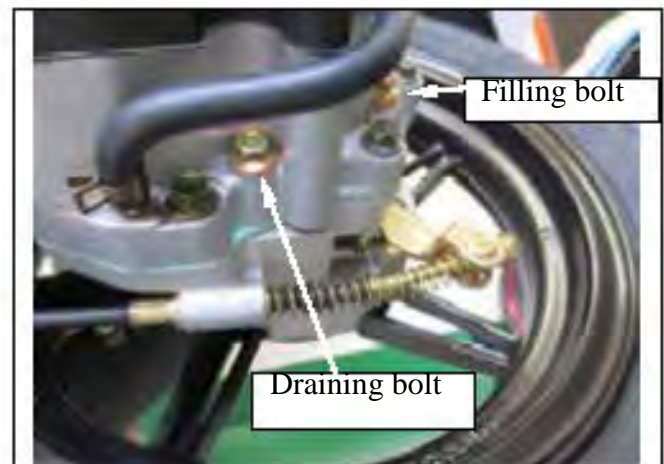


Add gear oil.

**Recommended usage gear oil: SAE
80W-90**

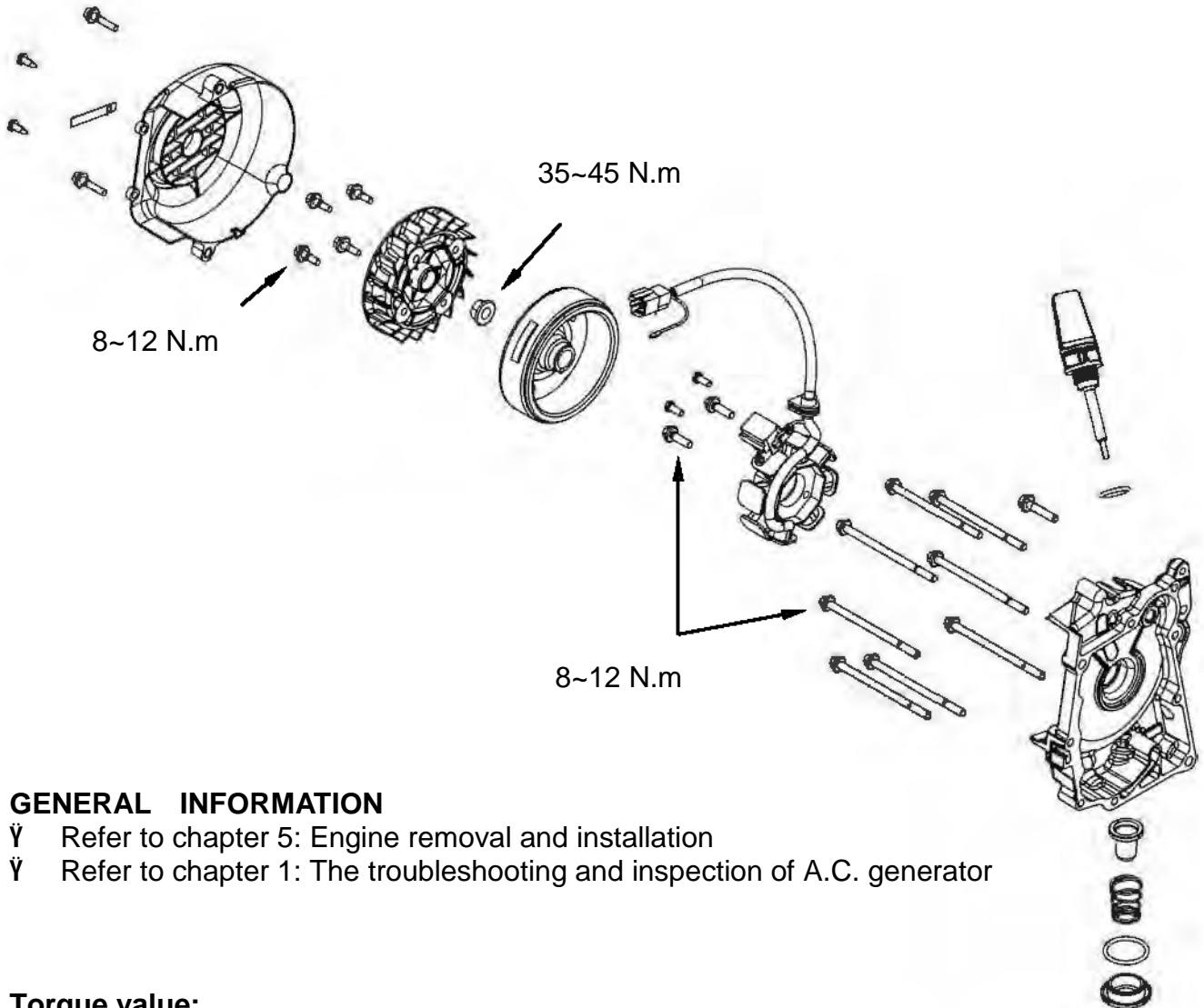
(140 cc: standard capacity)

(120 cc: when replacement)



COMPONENT STRUCTURE.....	10-1	RIGHT CRANKCASE COVER	
GENERAL INFORMATION.....	10-1	INSTALLATION	10-4
A.C.GENERATOR REMOVAL.....	10-2	MOUNTED COIL SET	
RIGHT CRANKCASE COVER		INSTALLATION	10-4
REMOVAL	10-3	FLY WHEEL INSTALLATION.....	10-4

COMPONENT STRUCTURE



GENERAL INFORMATION

Y Refer to chapter 5: Engine removal and installation

Y Refer to chapter 1: The troubleshooting and inspection of A.C. generator

Torque value:

Flywheel nut	35~45 N.m
Cooling fan bolt	8~12 N.m
Oil screen cover	13~17 N.m

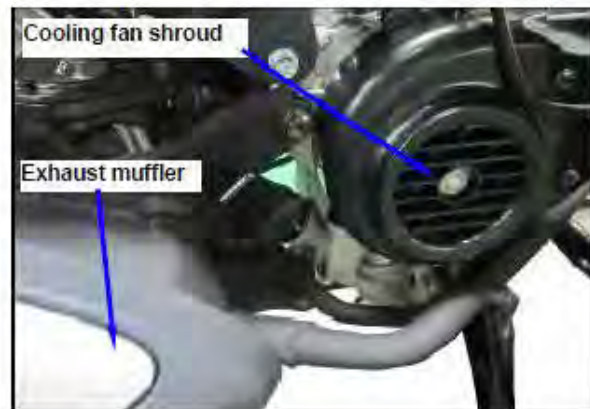
Special service tools

Flywheel puller
Universal fixture

10. A.C. GENERATOR/STARTING CLUTCH

A.C. GENERATOR REMOVAL

Drain out the engine oil.
Remove the exhaust muffler. (2 bolts, 2 nuts)
Remove the fan shroud. (4 bolts)

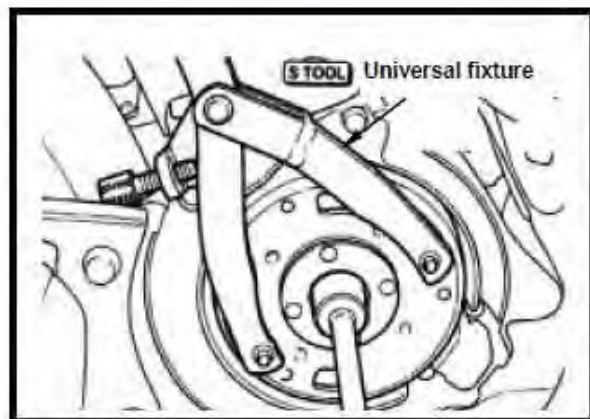


Remove the fan. (4 bolts)



Hold the flywheel with the universal fixture.
Remove the 10mm nut on the flywheel.

Special Service Tools:
Universal Fixture



Remove the flywheel with the flywheel puller.

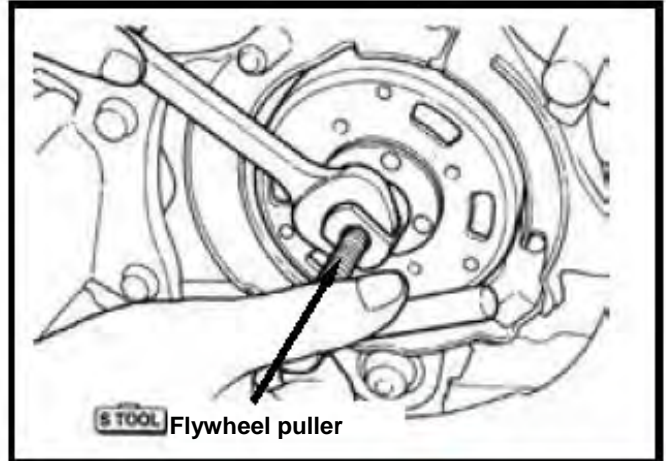
Special service tools:

Flywheel puller

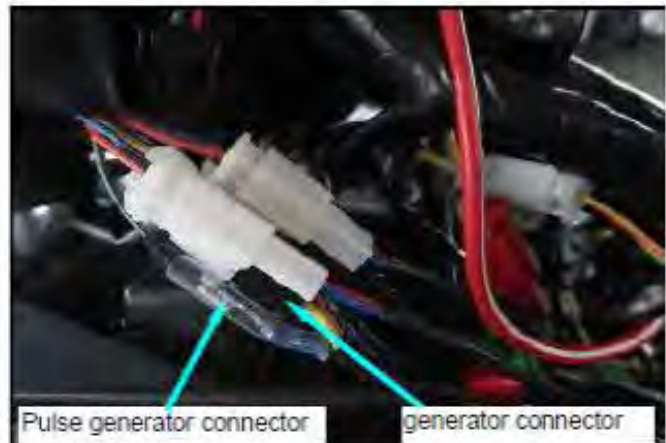
Shaft protector

⚠ Caution

Install a shaft protector on the right end of crankshaft to avoid damaging the crankshaft before installing the flywheel puller.



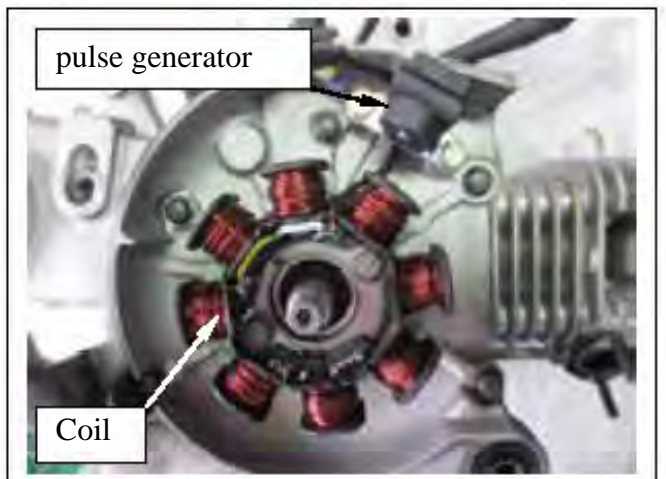
Remove the connectors of the A.C. generator and pulse generator.



Remove the 6 bolts for the pulse generator, the A.C. generator coil and cable guide. Then, remove the A.C. generator assembly.

⚠ Caution

Do not damage the alternator coil.



RIGHT CRANKCASE COVER REMOVAL

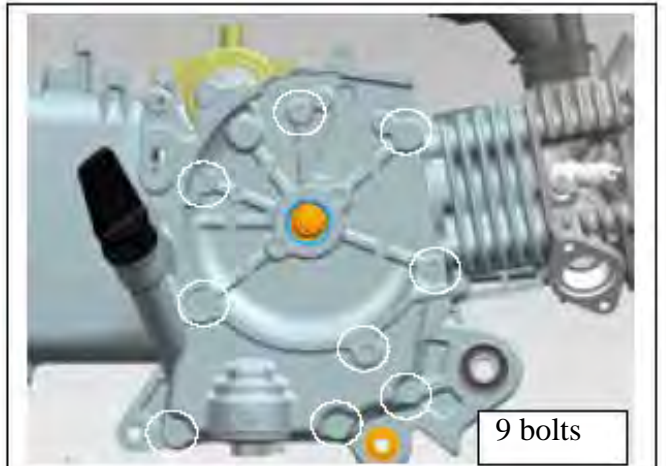
Remove the right crankcase cover. (9 bolts)

Remove setting pin and gasket.

Remove the gasket or foreign materials on the connection surfaces of both the cover and crankcase.

⚠ Caution

Do not damage the connection surfaces.



10. A.C. GENERATOR/STARTING CLUTCH

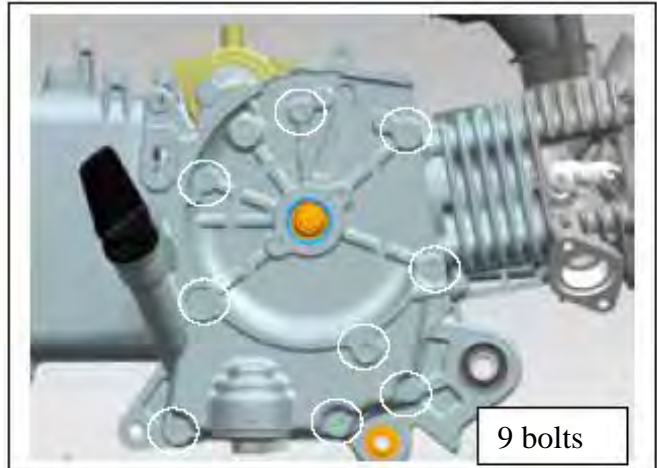
RIGHT CRANKCASE COVER INSTALLATION

Install setting pin and new gasket on the crankcase.

Replace the right crankshaft oil seal of the crankcase and apply some oil onto the oil seal lip.

Install right crankcase cover onto the right crankcase. (9 bolts)

Torque value: 8~12N.m



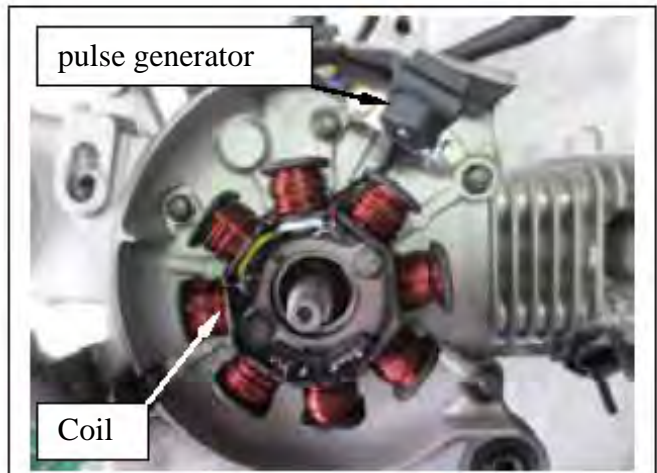
MOUNTED COIL SET INSTALLATION

Install the coil set onto right crankcase cover. (2 bolts)

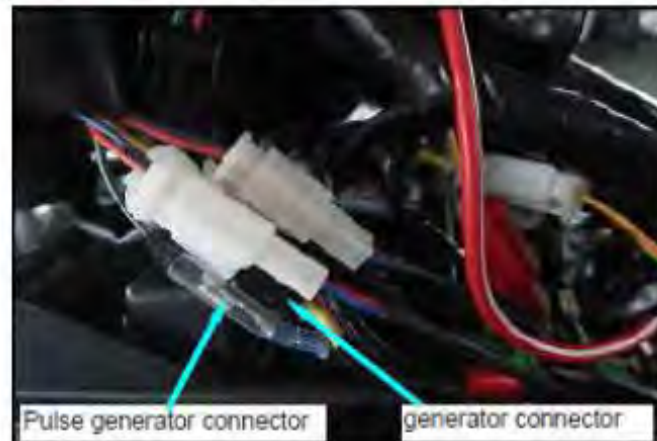
Install pulse generator. (2 bolts)

Torque: 8~12N.m

Tie the wire harness hose onto the indent of crankcase.



Install A.C. generator connector and pulse generator connector.



FLYWHEEL INSTALLATION

Make sure that there is no magnetic powder. If so, clean up it.

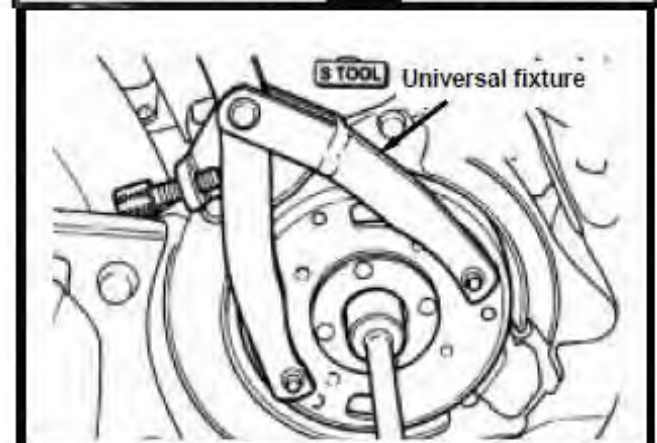
Align insert on crankshaft with the flywheel groove, and then install the flywheel.

Hold the flywheel with flywheel holder, and tighten its nut.

Torque value: 35~45N.m

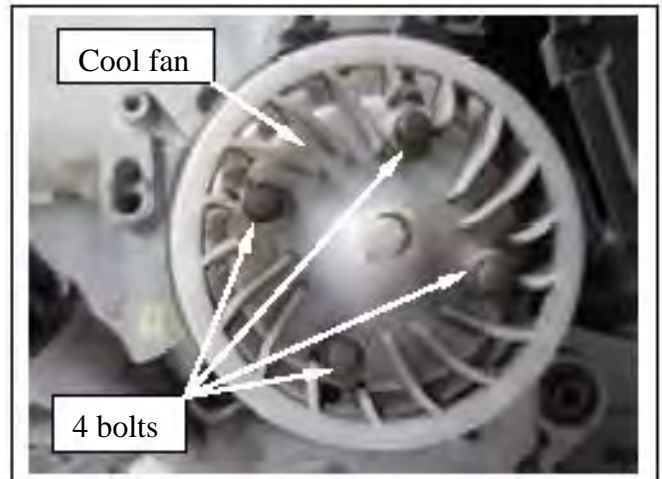
Special service tool:

Universal fixtue

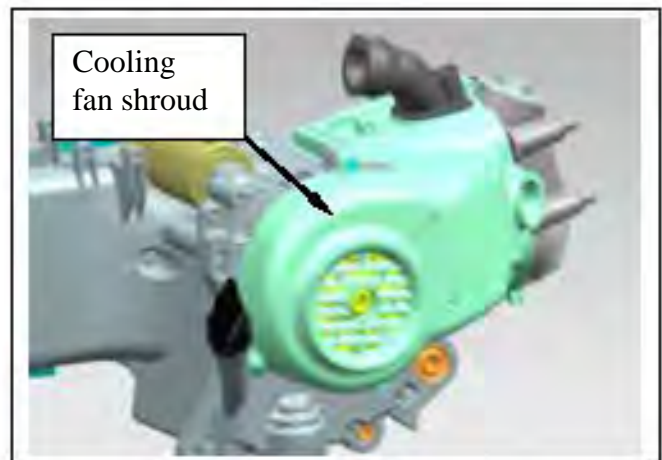


Install the cooling fan. (4 bolts)

Torque: 08~12N.m



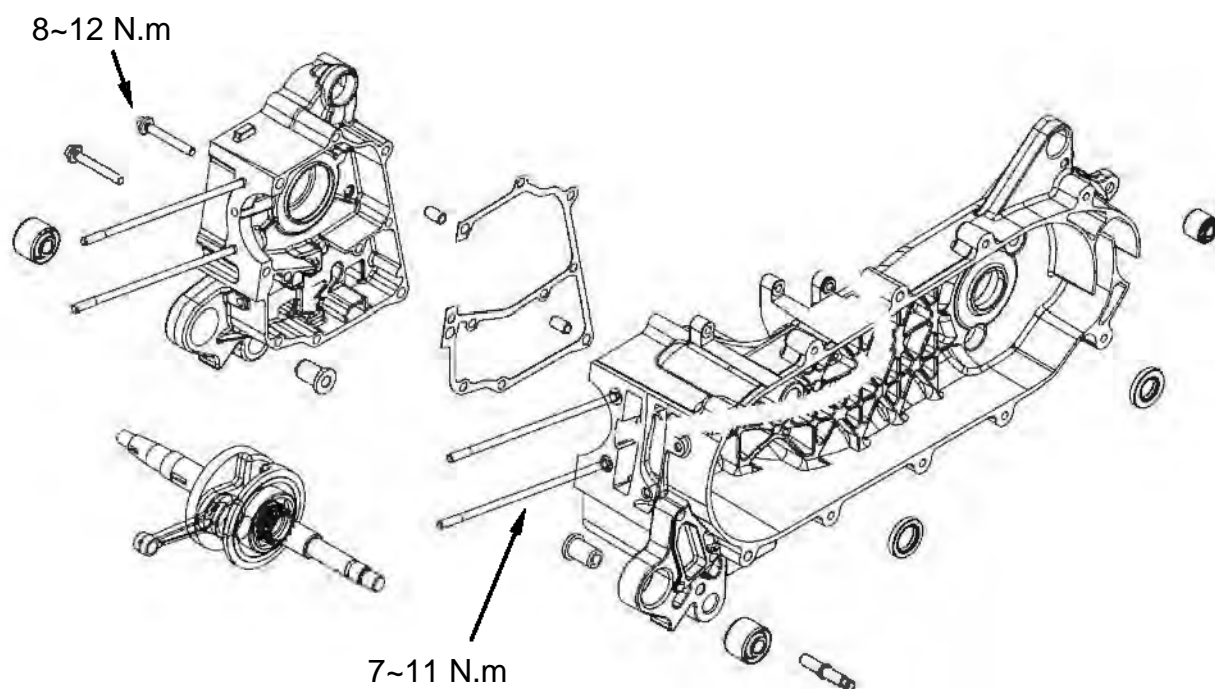
Install the cooling fan shroud. (4 bolts)
Install the exhaust muffler. (2 bolts, 2 nuts)
Add some engine oil according the specified quantity.



11. CRANKCASE/CRANKSHAFT

COMPONENT STRUCTURE..... 11-1	DISASSEMBLY OF CRANKCASE. 11-3
GENERAL INFORMATION 11-2	CRANKSHAFT INSPECTION 11-5
TROUBLESHOOTING 11-2	ASSEMBLY OF CRANKCASE..... 11-6

COMPONENT STRUCTURE



11. CRANKCASE/CRANKSHAFT



GENERAL INFORMATION

I This Section contains descriptions concerning disassembly of the crankcase so that the crankshaft can be serviced.

I Complete following operations before disassembling crankcase.

Engine	Chapter 5
Cylinder head	Chapter 6
Cylinder and piston	Chapter 7
V-belt Drive pulley	Chapter 8
AC generator	Chapter 10
Starting Clutch	Chapter 12

If the crankshaft bearing or timing sprocket need be replaced, then the crankshaft set have to replaced.

Specification

Unit: mm

Item	Standard	Limit
Left, right clearance of the big end of the connecting rod	0.100~0.350	0.550
Radial clearance of the big end of the connecting rod	0.000~0.008	0.050
Run-out	Below0.030	0.10

Torque value

Bolts for crankcase	8~12 N.m
Bolts for cylinder/cylinder head	7~11 N.m

Special Service Tools

- Crankcase remover/set
- Crankshaft installation puller
- Inner type bearing puller
- Outer type bearing puller
- Bearing pressing tools
- Oil seal pressing tools

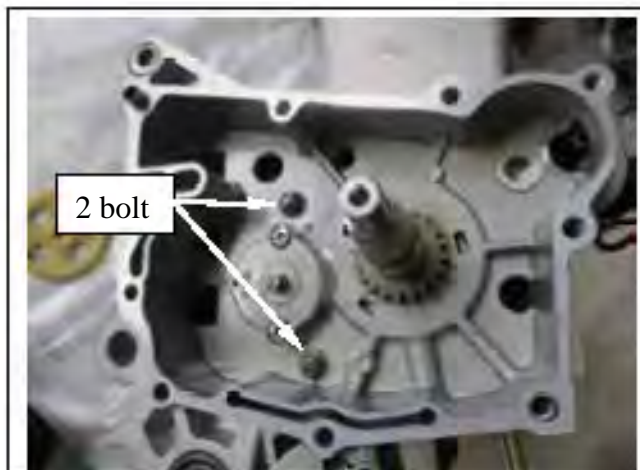
TROUBLESHOOTING

Engine noise

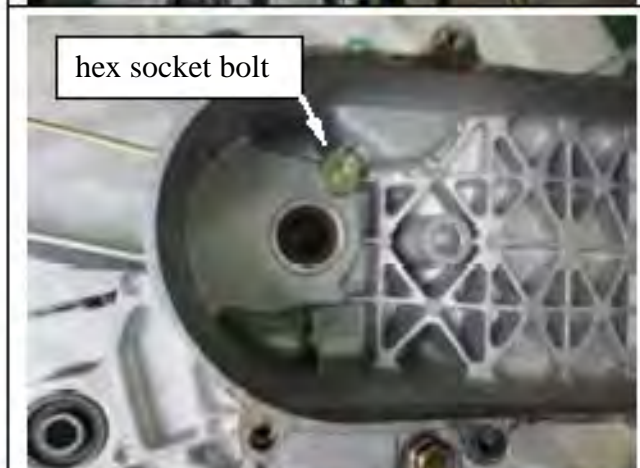
- Loose crankshaft bearing
- Loose crankshaft pin bearing
- Wear piston pin or piston pin hole

DISASSEMBLY OF CRANKCASE

Remove the 2 bolts from the right crankcase.



Remove the cam chain tensioner (hex socket bolt) from the left side of crankcase.



Place the left side of crankcase upward, and then install the crankcase remover/set onto the crankcase.

Drive the screw of the crankcase remover/set into the crankcase, and then separate the left and the right crankcases. Remove the cam chain.



Caution

- I Never pry out the connection surfaces of crankcases as separating. Otherwise, the connection surfaces could be damaged and cause oil leaking.
- I It have to separate the cam chain and the drive gear before pressing out the both left and right crankcases.

Special Service Tools:
Crankcase remover/set



11. CRANKCASE/CRANKSHAFT

Remove the crankshaft from the right crankcase.

⚠ Caution

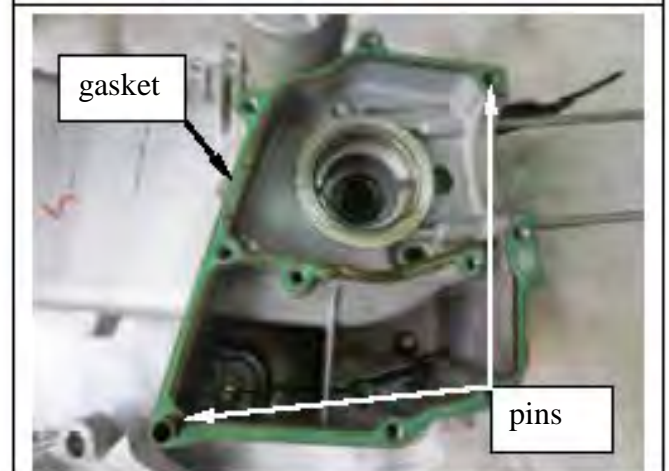
I The left and right bearings of crankshaft is to press-fit onto the crankshaft.



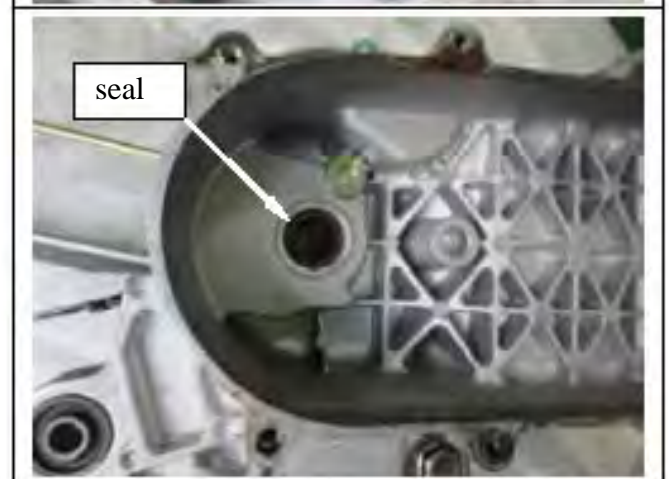
Remove gasket and dowel pins (2).
Scrape gasket residues off the crankcase contact surface.

⚠ Caution

- I Do not damage contact surface of the crankcase.
- I Soap the gasket residues into solvent and the residues will be removed easily.



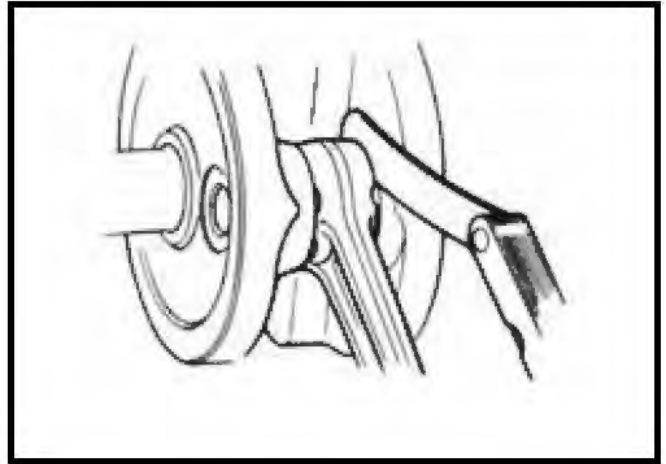
Remove oil seal from the left crankcase.



CRANKSHAFT INSPECTION

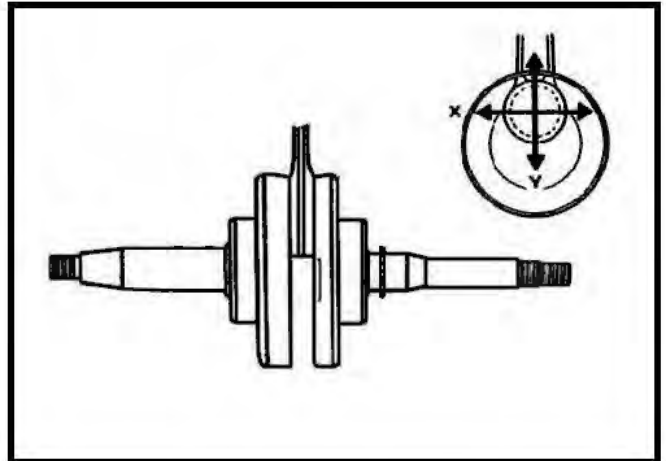
Measure left and right clearance of connecting rod big end.

Service limit: Replace when it is more than 0.55 mm



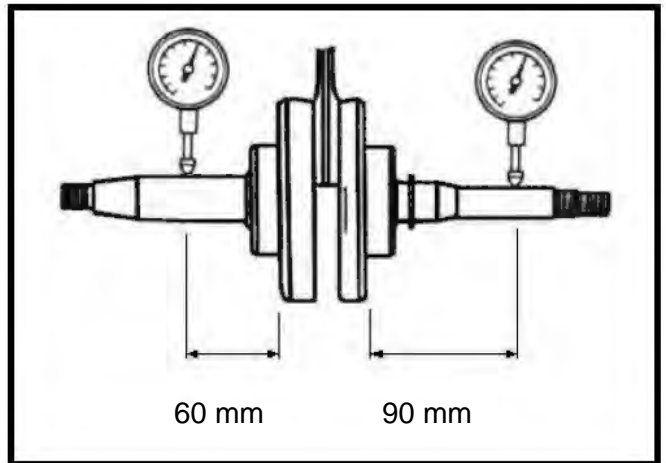
Measure the radial clearance of the big end at the vertical directions.

Service limit : 0.05 mm



Place the crankshaft onto a V-block and measure run-out of the crankshaft with dial gauge.

Service limit: 0.10mm

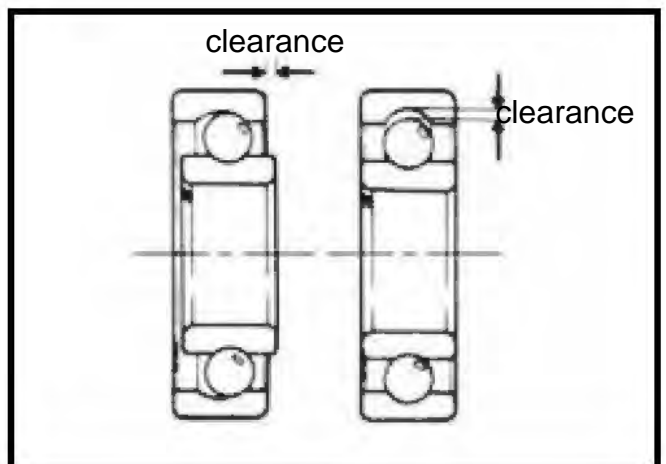


Bearing Inspection

Rotate the bearing with fingers and make sure the bearing can be rotated smoothly and quietly.

Check if the inner ring is connected onto the crankshaft tightly.

Replace crankshaft as a set when noise or looseness is detected.



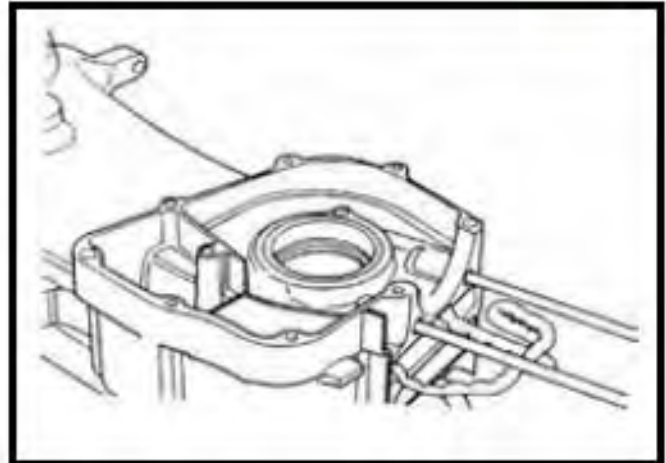
11. CRANKCASE/CRANKSHAFT

ASSEMBLY OF CRANKCASE

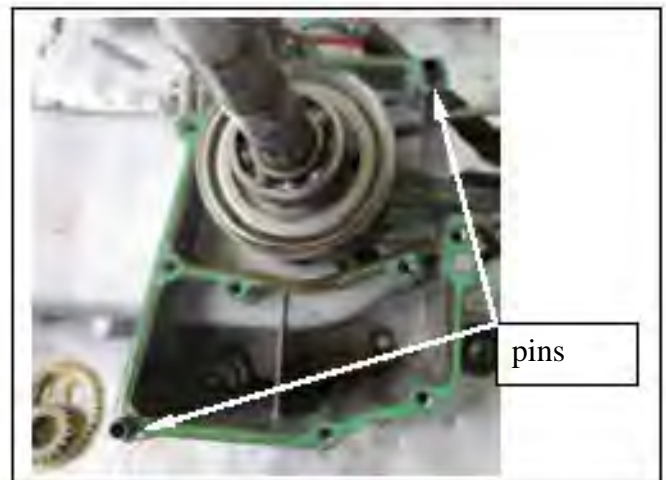
Install cam chain into the chain hole of the left crankcase, and then split out the cam chain.

 **Caution**

Do not damage the cam chain as installing the crankshaft.



Install crankshaft into the left crankcase and then install two dowel pins and new crankcase gasket.



Install the right crankcase and tighten the crankcase bolts (2 bolts).

Torque value: 8~12 N.m

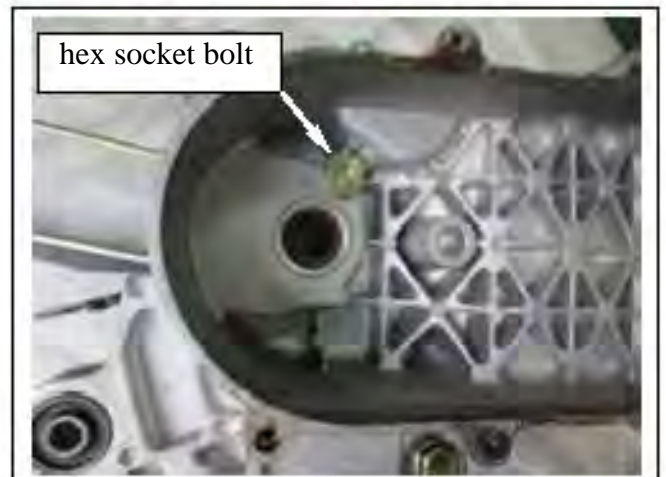


Install the cam chain tensioner.
Install a new O-ring onto the mounting bolt of the chain tensioner.
Apply some oil on the O-ring and tighten the bolt.

Torque value: 8~12 N.m

 **Caution**

The O-ring must be installed into the bolt's groove.



11. CRANKCASE/CRANKSHAFT

Apply with some grease onto the oil seal lip and then install it onto the left crankcase.

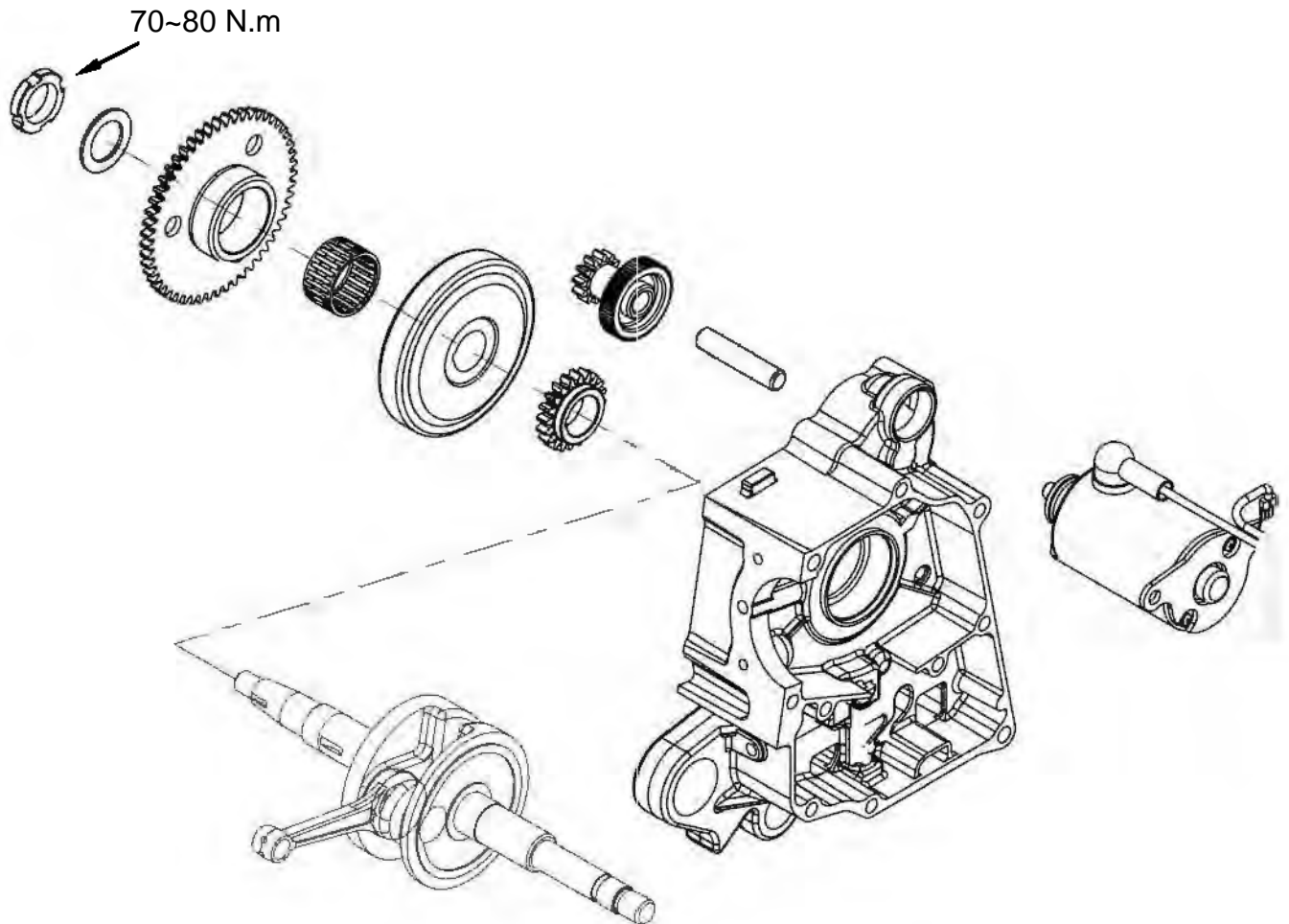


Press-fit the oil seal to specified position with the oil seal installer (25x37x6).
Special service tools: the oil seal installer (25x37x6)



COMPONENT STRUCTURE..... 12-1	INSTALLATION12-2
REMOVAL 12-2	

COMPONENT STRUCTURE



PRECAUTIONS IN OPERATION

General information

Y Refer to chapter 5: Engine removal and installation

Y Refer to chapter 10: The troubleshooting and inspection of A.C. generator

Specification

unit: mm

Item	Standard	Limit
ID of startion driven gear	32.000 ~ 32.025	32.06
OD of starting clutch cover		

Torque value:

Start clutch lock nut

70~80N.m

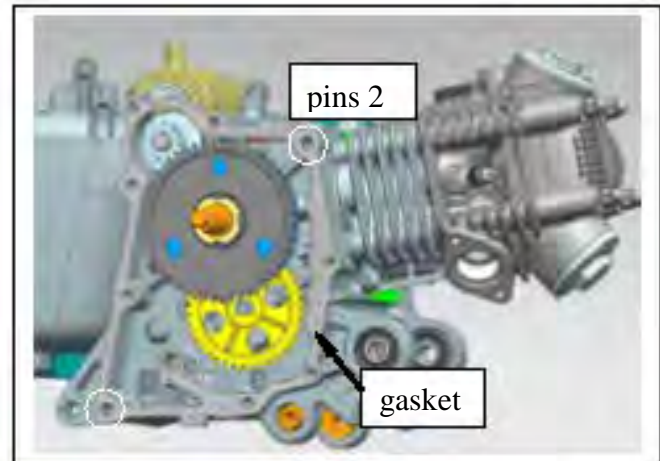
12. STARTING CLUTCH

Special service tools

Start clutch Universal fixture

START CLUTCH REMOVAL

Remove the Dowls pins(2 pins) and gasket



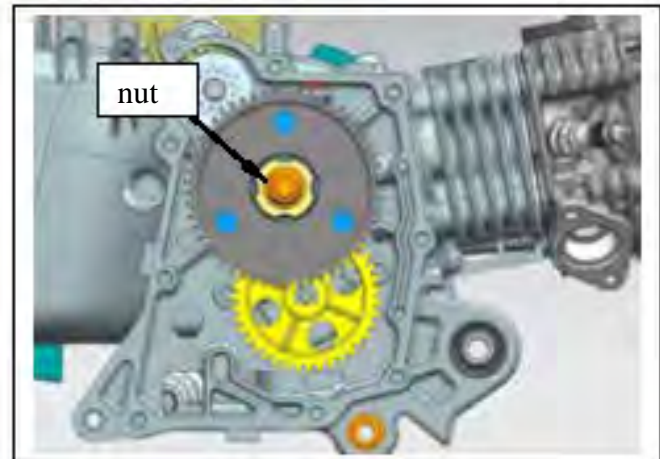
Remove the nut

TOOL:

Start clutch Universal fixture

Caution

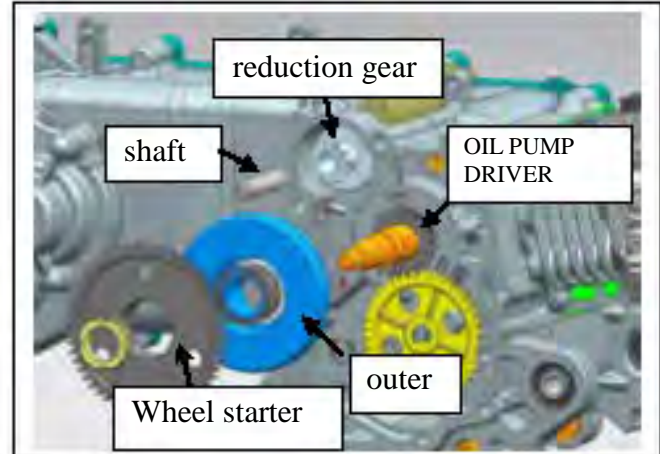
The nut is left - handed



Remove Start clutch outer and Wheel starter

Remove Start reduction gear shaft

Remove start reduction gear



The installation process is opposite to the removal process.