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MECHANISM ILLUSTRATIONS

EuroMx 125

SERVICE MANUAL

This service manual contains the technical data of each component inspection and repair for the SANYANG Euro MX 125 motorcycle.
The manual is shown with illustrations and focused on “Service Procedures”, “Operation Key Points”, and “Inspection Adjustment” so that provides technician with service guidelines.

If the style and construction of the motorcycle are different from that of the photos, pictures shown in this manual, the actual vehicle shall prevail.
Specifications are subject to change without notice.

This manual that contains all data, illustration, indication and specifications is based on current production information. SANYANG reserves the right to make changes at any time without notice and without incurring any obligation whatever. No part of this manual can be duplicated by any means without written permission of SANYANG.

Service Department

SANYANG Industry Co., LTD.

How to Use This Manual

This service manual describes basic information of different system parts and system inspection & service for SANYANG Euro MX 125 motorcycles. In addition, please refer to the manual contents in detailed for the model you serviced in inspection and adjustment.

The first chapter covers general information and trouble diagnosis.

The second chapter covers service maintenance and special service tools information.

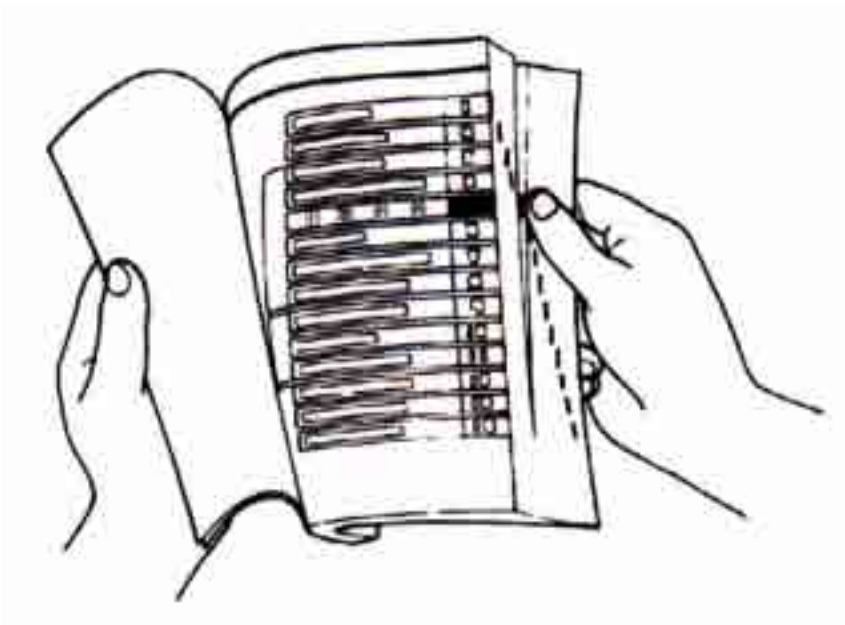
The third to the eleventh chapters cover engine, fuel systems and driving systems.

The twelfth to fifteenth chapters are contained the parts set of assembly body.

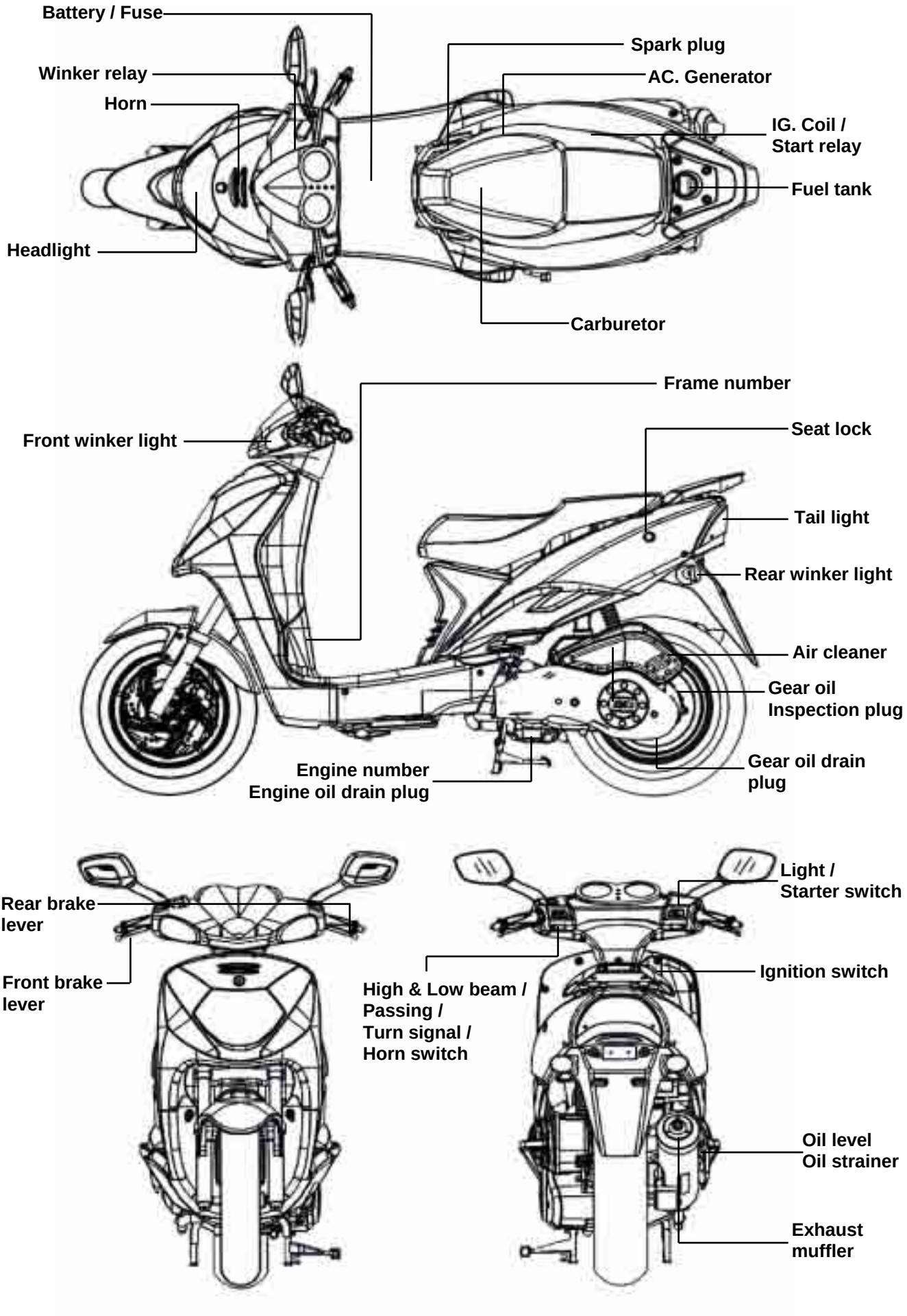
The sixteenth chapter is electrical equipment.

The seventh chapter is for wiring diagram.

Please see index of content for quick having the special parts and system information.



Model illustration



Symbols And Marks

Symbols and marks are used in this manual to indicate what and where the special service are needed, in case supplemental information is procedures needed for these symbols and marks, explanations will be added to the text instead of using the symbols or marks.

Warning	Means that serious injury or even death may result if procedures are not followed.
Caution	Means that equipment damages may result if procedures are not followed.
Engine oil	Limits to use SAE 10W-30 API SG class oil. Warranty will not cover the damage that caused by not apply with the limited engine oil. (Recommended oil: KING MATE G-3 oil)
Grease	King Mate G-3 is recommended. (KING MATE G-3)
Gear oil	King Mate gear oil (SYM HYPOID GEAR OIL) is recommended. (SAE 85W-140)
Locking sealant	Apply sealant, medium strength sealant should be used unless otherwise specified.
Oil seal	Apply with lubricant.
Renew	Replace with a new part before installation.
Brake fluid	Use recommended brake fluid “DOT3” or “WELLRUN” brake fluid.
Special tools	Special service tools.
correct	Meaning correct installation.
wrong	Meaning wrong installation.
Indication	Indication of components.
directions	Indicates position and operation directions.
	Components assembly directions each other.
	Indicates where the bolt installation direction, --- means that bolt cross through the component (invisibility).

General safety

Carbon monoxide

If you must run your engine, ensure the place is well ventilated. Never run your engine in a closed area. Run your engine in an open area, if you have to run your engine in a closed area, be sure to use an extractor.

Caution

Exhaust contains toxic gas which may cause one to lose consciousness and even result in death.

Gasoline

Gasoline is a low ignition point and explosive material. Work in a well-ventilated place, no flame or spark should be allowed in the work place or where gasoline is being stored.

Caution

Gasoline is highly flammable, and may explode under some conditions, keep it away from children.

Used engine oil

Caution

Prolonged contact with used engine oil (or transmission oil) may cause skin cancer although it might not be verdict.
We recommend that you wash your hands with soap and water right after contacting.
Keep the used oil beyond reach of children.

Hot components

Caution

Components of the engine and exhaust system can become extremely hot after engine running. They remain very hot even after the engine has been stopped for some time. When performing service work on these parts, wear insulated gloves and wait until cooling off.

Battery

Caution

- Battery emits explosive gases; flame is strictly prohibited. Keep the place well ventilated when charging the battery.
- Battery contains sulfuric acid (electrolyte) which can cause serious burns so be careful do not be spray on your eyes or skin. If you get battery acid on your skin, flush it off immediately with water. If you get battery acid in your eyes, flush it off immediately with water, then go to hospital to see an ophthalmologist.
- If you swallow it by mistake, drink a lot of water or milk, and take some laxative such as castor oil or vegetable oil, and then go to see a doctor.
- Keep electrolyte beyond reach of children.

Brake shoe

Do not use an compressed air or a dry brush to clean components of the brake system, use a vacuum cleaner or the equivalent to avoid asbestos dust flying.

Caution

Inhaling asbestos dust may cause disorders and cancer of the breathing system.

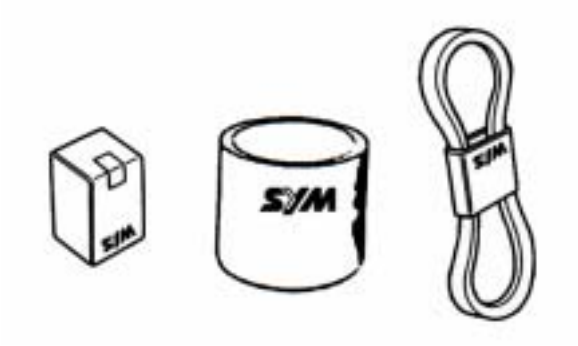
Brake fluid

Caution

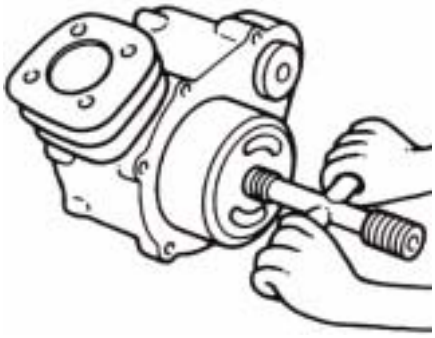
Spilling brake fluid on painted, plastic, or rubber parts may cause damage to the parts. Place a clean towel on the above-mentioned parts for protection when servicing the brake system. Keep brake fluid beyond reach of children.

Service Precautions

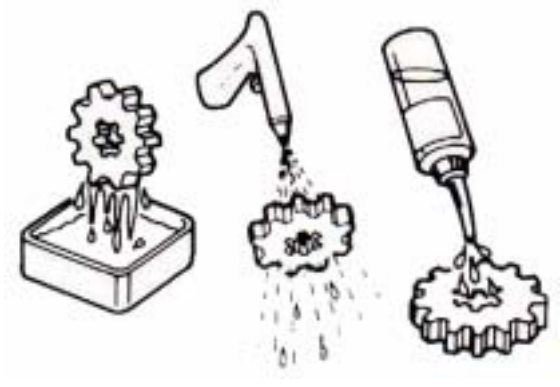
- Always use with SANYANG genuine parts and recommended oils. Using non-designed parts for SANYANG motorcycle may damage the motorcycle.



- Special tools are designed for remove and install of components without damaging the parts being worked on. Using wrong tools may result in parts damaged.

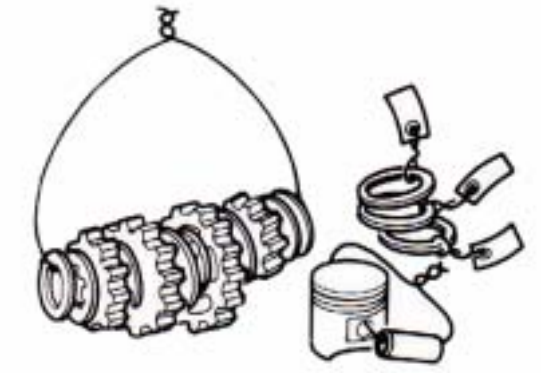


- When servicing this motorcycle, use only metric tools. Metric bolts, nuts, and screws are not interchangeable with the English system, using wrong tools and fasteners may damage this vehicle.
- Clean the outside of the parts or the cover before removing it from the motorcycle. Otherwise, dirt and deposit accumulated on the part's surface may fall into the engine, chassis, or brake system to cause a damage.
- Wash and clean parts with high ignition point solvent, and blow dry with compressed air. Pay special attention to O-rings or oil seals because most cleaning agents have an adverse effect on them.



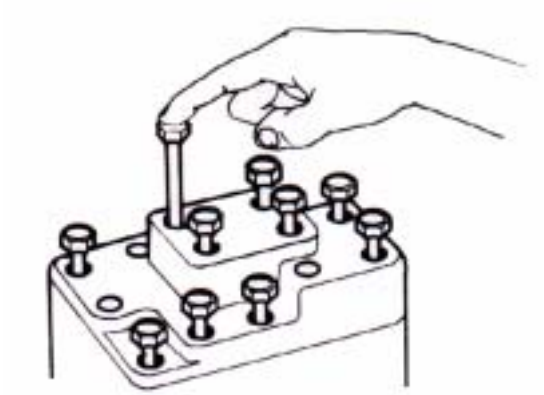
- Never bend or twist a control cable to prevent stiff control and premature worn out.

- Rubber parts may become deteriorated when old, and prone to be damaged by solvent and oil. Check these parts before installation to make sure that they are in good condition, replace if necessary.
- When loosening a component which has different sized fasteners, operate with a diagonal pattern and work from inside out. Loosen the small fasteners first. If the bigger ones are loosen first, small fasteners may receive too much stress.
- Store complex components such as transmission parts in the proper assemble order and tie them together with a wire for ease of installation later.

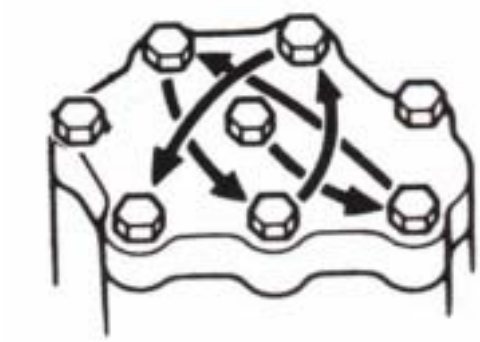


- Note the reassemble position of the important components before disassembling them to ensure they will be reassembled in correct dimensions (depth, distance or position).
- Components not to be reused should be replaced when disassembled including gaskets metal seal rings, O-rings, oil seals, snap rings, and split pins.

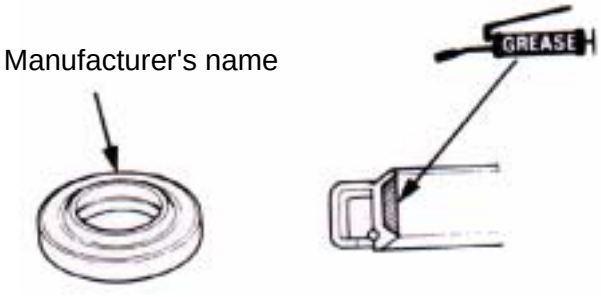
· The length of bolts and screws for assemblies, cover plates or boxes is different from one another, be sure they are correctly installed. In case of confusion, Insert the bolt into the hole to compare its length with other bolts, if its length out side the hole is the same with other bolts, it is a correct bolt. Bolts for the same assembly should have the same length.



· Tighten assemblies with different dimension fasteners as follows: Tighten all the fasteners with fingers, then tighten the big ones with special tool first diagonally from inside toward outside, important components should be tightened 2 to 3 times with appropriate increments to avoid warp unless otherwise indicated. Bolts and fasteners should be kept clean and dry. Do not apply oil to the threads.

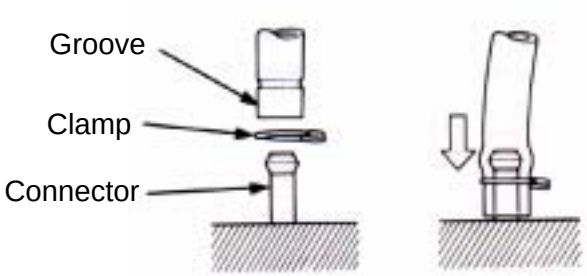


· When oil seal is installed, fill the groove with grease, install the oil seal with the name of the manufacturer facing outside, check the shaft on which the oil seal is to be installed for smoothness and for burrs that may damage the oil seal.

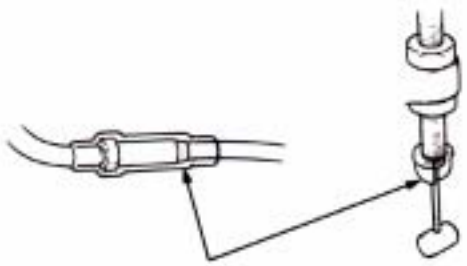


· Remove residues of the old gasket or sealant before reinstallation, grind with a grindstone if the contact surface has any damage.

· The ends of rubber hoses (for fuel, vacuum, or coolant) should be pushed as far as they can go to their connections so that there is enough room below the enlarged ends for tightening the clamps.

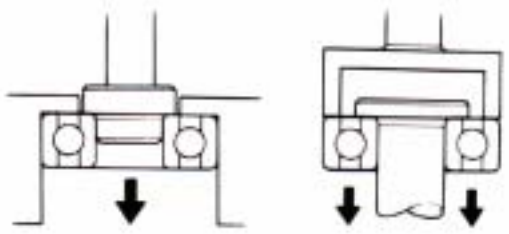


· Rubber and plastic boots should be properly reinstalled to the original correct positions as designed.



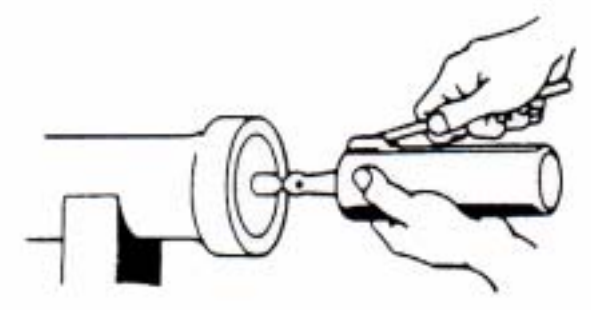
Boots

· The tool should be pressed against two (inner and outer) bearing races when removing a ball bearing. Damage may result if the tool is pressed against only one race (either inner race or outer race). In this case, the bearing should be replaced. To avoid damaging the bearing, use equal force on both races.

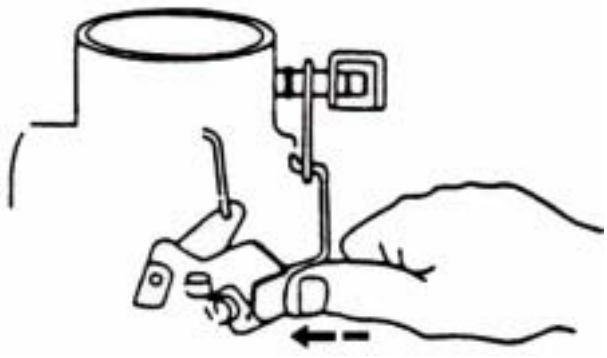


Both of these examples can result in bearing damage.

· Lubricate the rotation face with specified lubricant on the lubrication points before assembling.



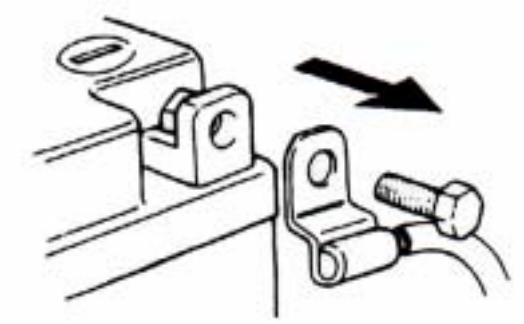
· Check if positions and operation for installed parts is in correct and properly.



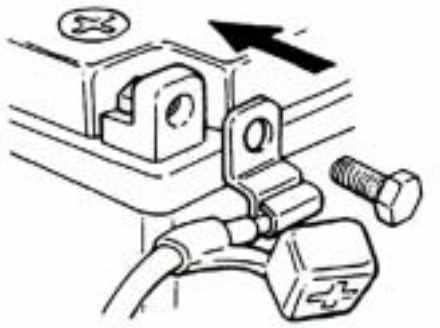
· Make sure service safety each other when conducting by two persons.

· Note that do not let parts fall down.

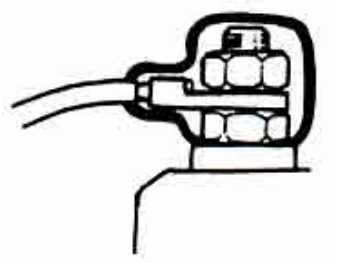
· Before battery removal operation, it has to remove the battery negative (-) cable firstly. Notre tools like open-end wrench do not contact with body to prevent from circuit short and create spark.



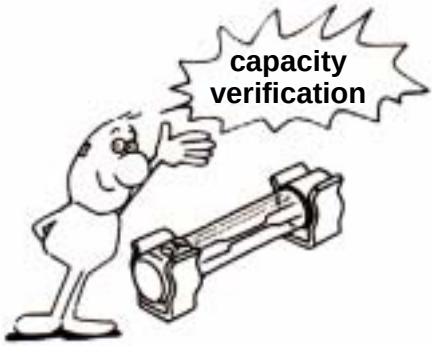
· After service completed, make sure all connection points is secured.
Battery positive (+) cable should be connected firstly.
And the two posts of battery have to be greased after connected the cables.



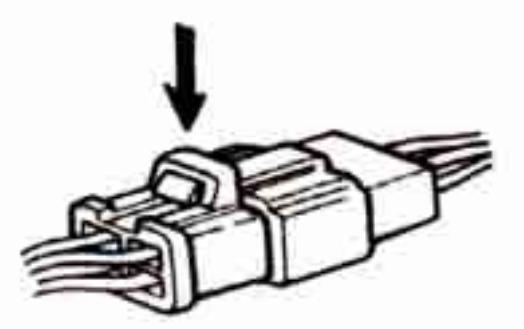
· Make sure that the battery post caps are located in properly after the battery posts had been serviced.



· If fuse burned, it has to find out the cause and solved it. And then replace with specified capacity fuse.

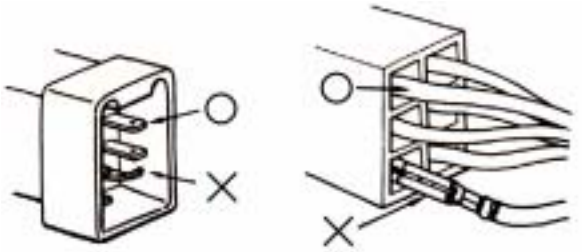


· When separating a connector, it locker has to be unlocked firstly. Then, conduct the service operation.

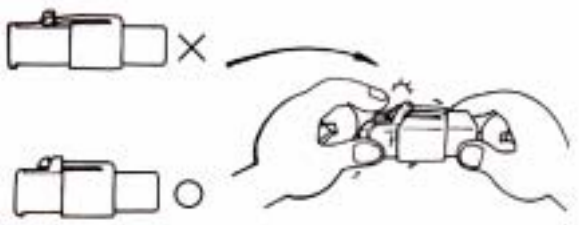


· Do not pull the wires as removing a connector or wires. Hold the connector body.

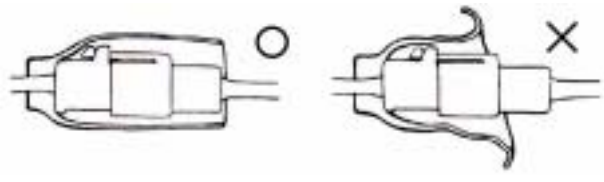
· Make sure if the connector pins are bent, extruded or loosen.



· Insert the connector completely.
If there are two lockers on two connector sides, make sure the lockers are locked in properly.
Check if any wire loose.



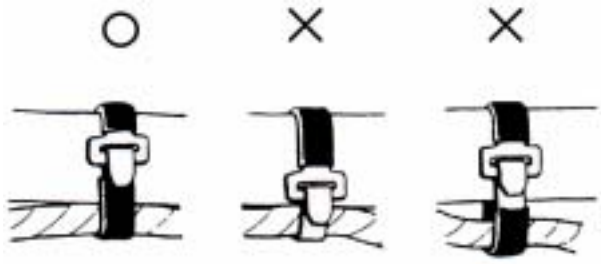
· Check if the connector is covered by the twin connector boot completely and secured properly.



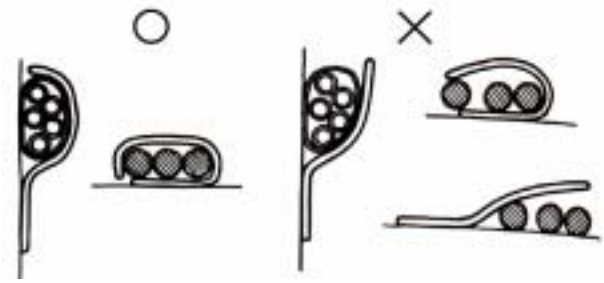
· Before terminal connection, check if the boot is crack or the terminal is loose.

· Insert the terminal completely.
Check if the terminal is covered by the boot.
Do not let boot open facing up.

· Secure wires and wire harnesses to the frame with respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.

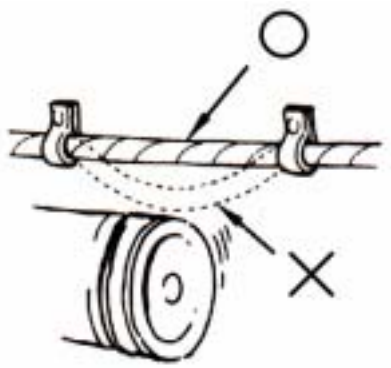


· Wire band and wire harness have to be clamped secured properly.

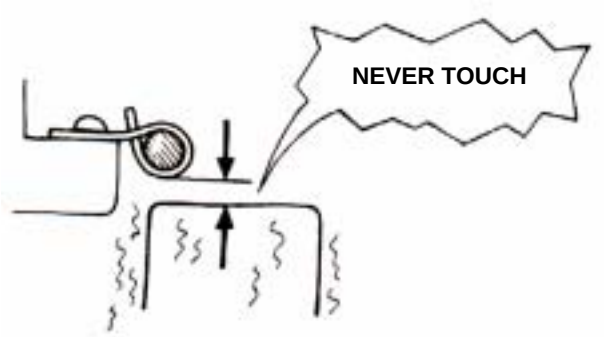


· Do not squeeze wires against the weld or its clamp.

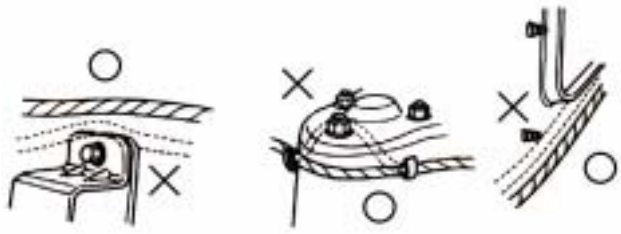
· Do not let the wire harness contact with rotating, moving or vibrating components as routing the harness.



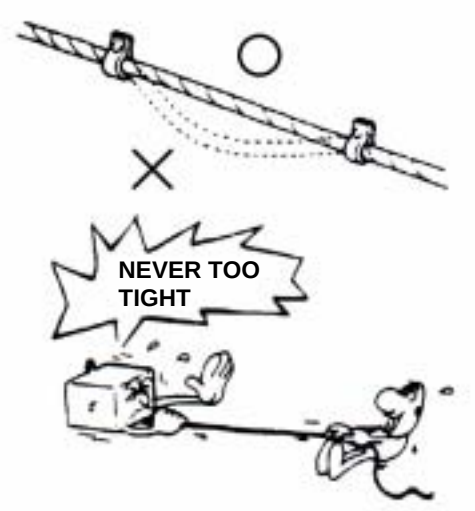
· Keep wire harnesses far away from the hot parts.



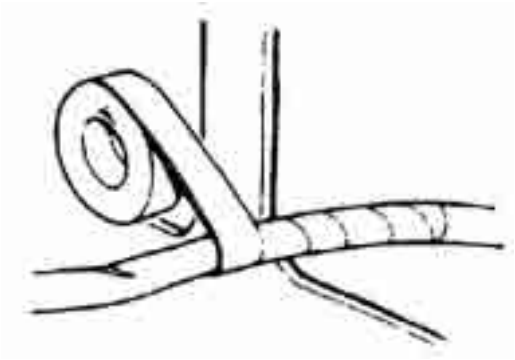
- Route wire harnesses to avoid sharp edges or corners and also avoid the projected ends of bolts and screws.



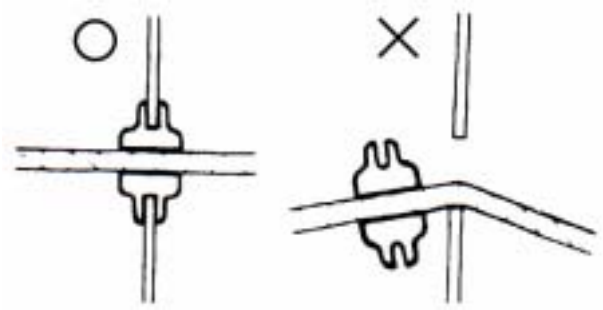
· Route harnesses so that they neither pull too tight nor have excessive slack.



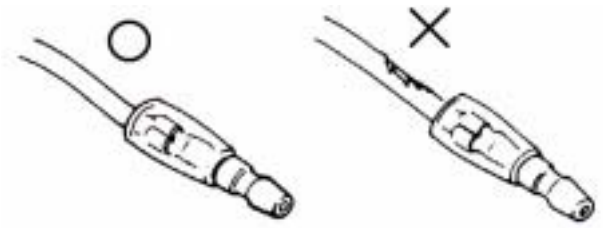
· Protect wires or wire harnesses with electrical tape or tube if they contact a sharp edge or corner. Thoroughly clean the surface where tape is to be applied.



· Secure the rubber boot firmly as applying it on wire harness.

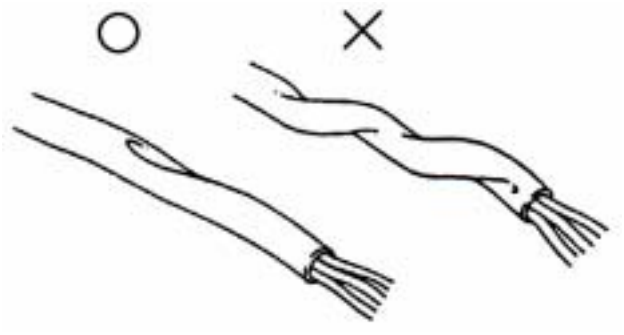


· Never use wires or harnesses which insulation has been broken. Wrap electrical tape around the damaged parts or replace them.

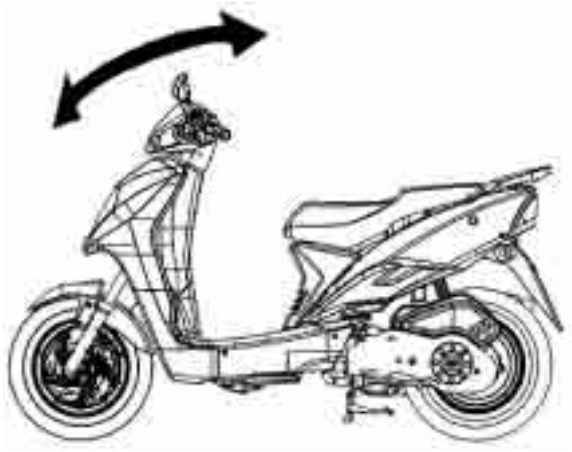


· Never clamp or squeeze the wire harness as installing other components.

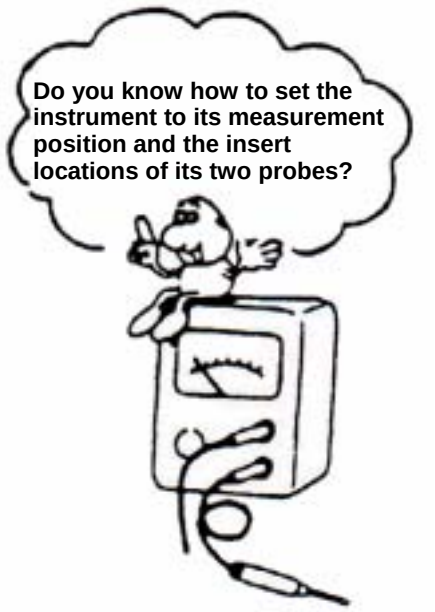
· Do not let the wire harness been twisted as installation.



- Wire harnesses routed along the handlebar should not be pulled too tight or have excessive slack, be rubbed against or interfere with adjacent or surrounding parts in all steering positions.



- Before operating a test instrument, operator should read the operation manual of the instrument. And then, conduct test in accordance with the instruction.



· With sand paper to clean rust on connector pins/terminals if found. And then conduct connection operation later.

Specifications

Maker			SANYANG	MODEL		HF12W-6
DIMENSION	Overall Length		1945 mm	Suspension System	Front	TELESCOPE
	Overall Width		700 mm		Rear	UNIT SWING
	Overall Height		1160 mm	Tire Specifications	Front	100 / 90-12 (61L)
	Wheel Base		1335 mm		Rear	130 / 70 –12 (64L)
WEIGHT	Curb Weight	Front	48 kg	Brake System	Front	DISK (ø 273 mm)
		Rear	75 kg			
		Total	123 kg		Rear	DRUM (ø 130 mm)
	Passengers/ Weight		Two /110 kg	PERFOR MANCE	Max. Speed	96 km/hr Above
	Total Weight	Front	84 kg		Climb Ability	28° Below
		Rear	162 kg	Reduction	Primary Reduction	BELT
		Total	246 kg		Secondary Reduction	GEAR
ENGINE	Type		4-STROKE ENGINE		Clutch	Centrifugal, dry type
	Installation and arrangement		Vertical, below center, incline 80°		Transmission	C.V.T.
	Fuel Used		Unleaded	Speedometer		0 ~ 140 km/hr
	Cycle/Cooling		4-stroke/forced air cooled	Horn		70~90 dB/A
	Cylinder	Bore	52.4 mm	Muffler		Expansion & Pulse Type
		Stroke	57.8 mm	Exhaust Pipe Position and Direction		Right side, and Backward
		Number/Arran gement	Single Cylinder	Lubrication System		Separated-lubrication
	Displacement		124.6 cc	Exhaust Concentration	Solid Particulate	-
	Compression Ratio		10.3 : 1		CO	Below 4 %
	Max. HP		11.0 ps / 8250 rpm		HC	Below 2000 ppm
	Max. Torque		1.0 kg-m / 7000 rpm	E.E.C.		NO
	Ignition		C.D.I.	P.C.V.		NO
	Starting System		Power & Foot	Catalytic reaction control system		NO

Torque Values (Engine)

Item	Q'ty	Thread Dia. (mm)	Torque Value(Kg-m)	Remarks
Cylinder head bolts	4	6	1.0~1.4	
Cylinder head nuts	4	8	2.0~2.4	
Cylinder/cylinder head two-ends bolts	4	8	0.7~1.1	Tighten to crankcase
Cylinder head left bolts	4	6	1.0~1.4	
Valve adjustment fixing nuts	4	5	0.7~1.1	Apply oil to thread
Cylinder head left cover bolts	2	6	1.0~1.4	
Spark plug	1	10	1.0~1.2	
Carburetor heat protector connecting nuts	2	6	0.7~1.1	
Engine oil draining plug	1	12	3.5~4.5	
Engine oil strainer cap	1	30	1.0~2.0	
Gear oil draining plug	1	8	0.8~1.2	
Gear oil filling bolt	1	10	1.0~1.4	
Oil pump screws	3	3	0.1~0.3	
Engine left side cover bolts	8	6	1.0~1.5	Rubber washer attached
Camshaft chain tensioner bolt	1	6	0.35~0.5	Hex socket bolt
Camshaft chain adjuster bolts	1	6	0.8~1.2	
Clutch driving plate nut	1	28	5.0~6.0	
Clutch outer bracket nut	1	12	5.0~6.0	
Driving disk nut	1	12	5.0~6.0	
Flywheel nut	1	12	5.0~6.0	
One-way clutch tighten bolts	3	6	1.0~1.4	Apply locking sealant
One-way clutch nut	1	22	9.0~10.0	Apply oil to thread
Crankcase bolts/right crank cover bolt	12	8	1.5~2.0	
Gear box cap bolts	7	8	2.0~2.4	
Exhaust pipe bolts	2	8	3.0~3.6	
Exhaust pipe connection nut	2	7	0.5~1.0	

Torque Values (Frame)

Item	Q'ty	Thread Dia. (mm)	Torque Value(Kg-m)	Remarks
Mounting bolt for steering handlebar	1	10	4.0~5.0	
Mounting nut for steering rod	1	25.4	1.0~2.0	
Cone seat for steering rod	1	25.4	0.2~0.3	
Front wheel shaft nut	1	12	5.0~7.0	
Rear wheel shaft nut	1	16	11.0~13.0	
Wheel hub/rim mounting nuts	1	5	0.15~0.3	
Speedometer cable locking screw	4	8	2.4~3.0	
Front shock absorber mounting bolts	1	10	3.5~4.5	
Rear shock absorber upper connection bolt	1	8	2.4~3.0	
Rear shock absorber upper connection bolt	4	6	1.0~1.4	
Brake lever bolts	2	4	0.1~0.2	
Front brake hose bolts	2	6	1.0~1.4	
Front brake air-bleeding valve	2	10	3.0~4.0	
Front brake disc mounting bolts	1	6	0.7~1.1	
Front brake clipper mounting bolts	4	8	4.0~4.5	
Drum brake arm bolts (front/rear)	2	8	2.9~3.5	
Engine suspension bracket bolts	2	10	4.5~5.5	On frame side
Engine connection bolt	1	12	5.0~7.0	On engine side
Main standard nut	1	10	3.5~4.5	
Foot-starting lever bolt	1	6	1.6~1.8	
Air cleaner bolts	2	6	1.0~1.4	

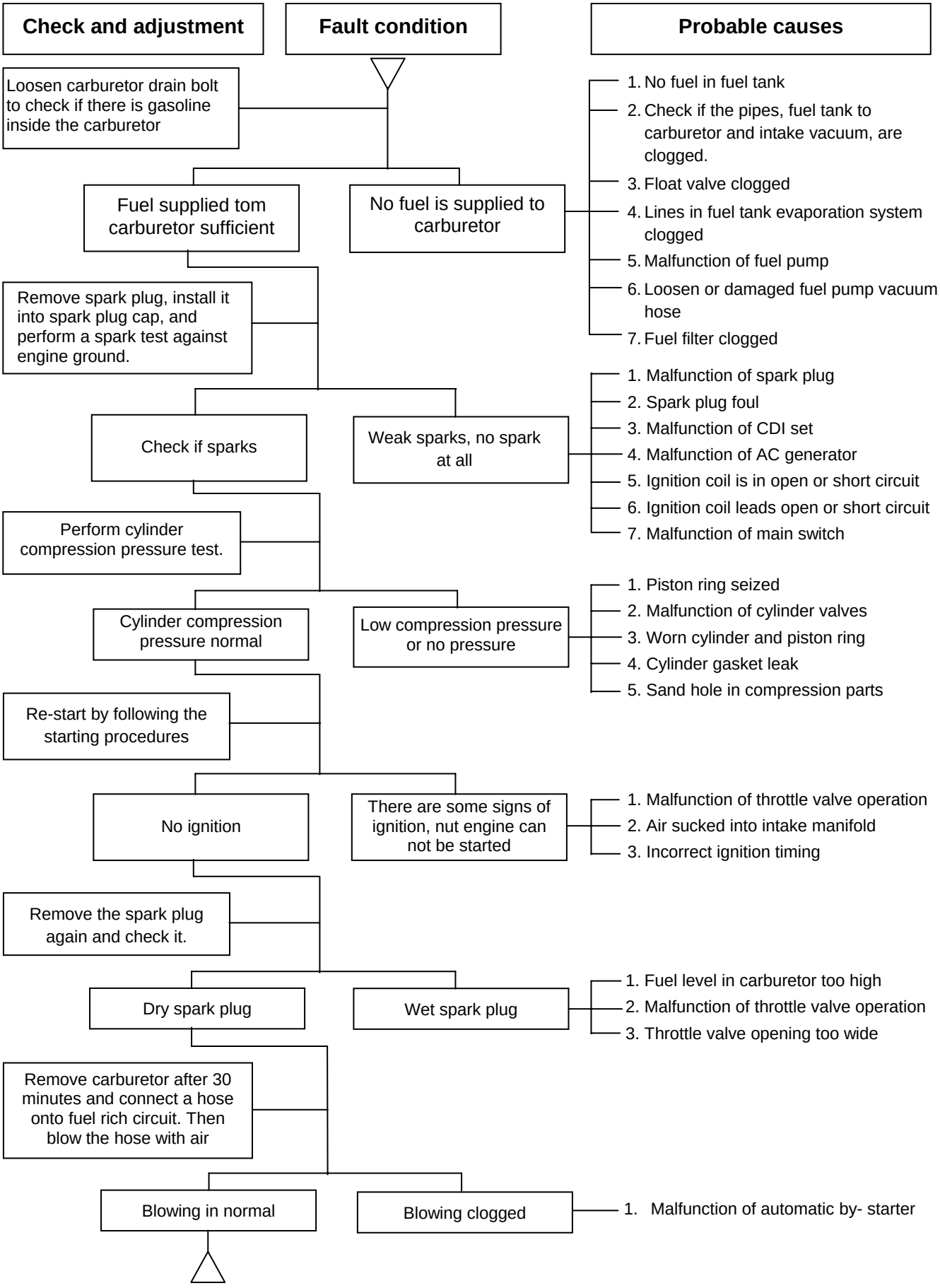
The torque values listed in above table are for more important tighten torque values. Please see standard values for not listed in the table.

Standard Torque Values for Reference

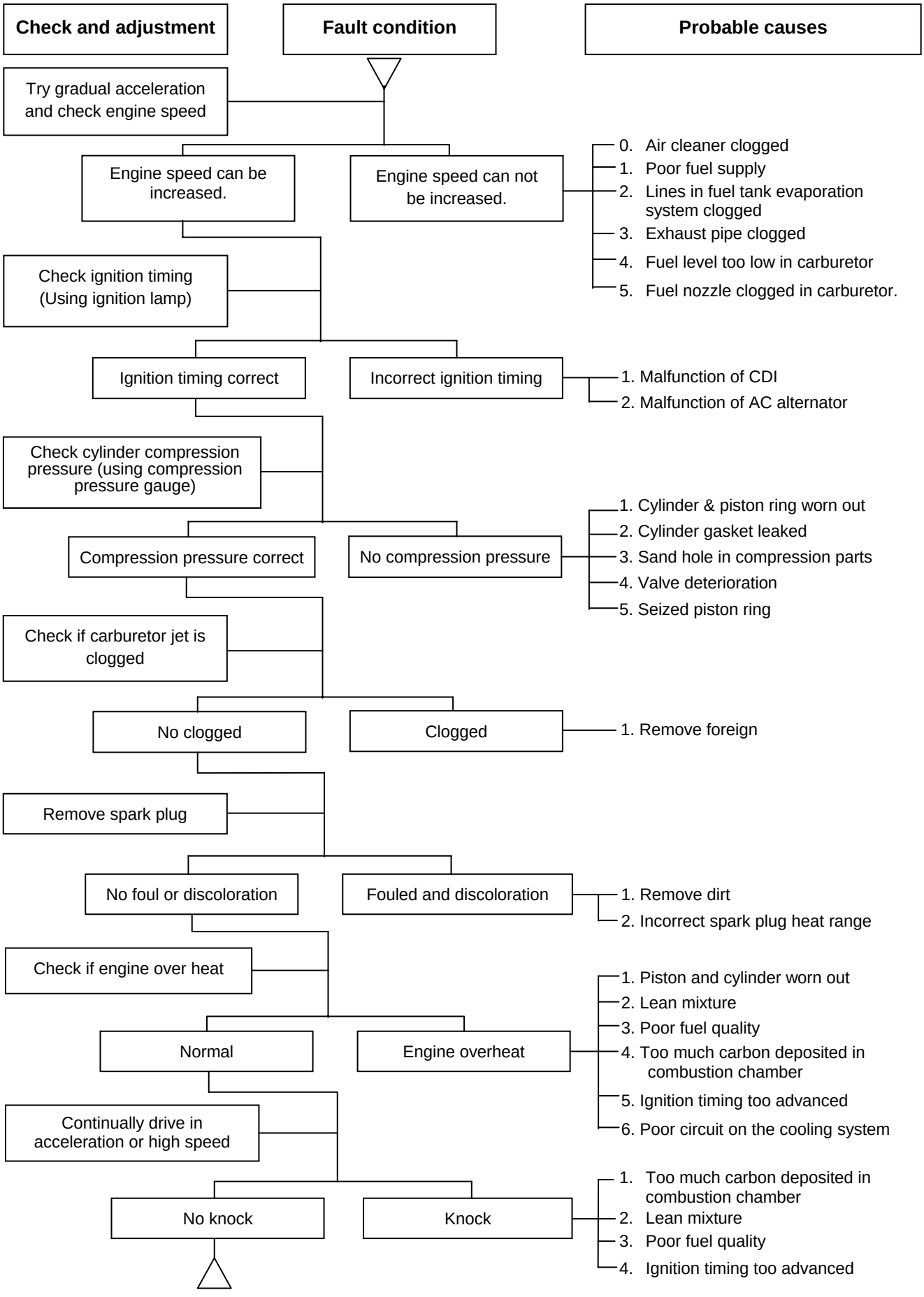
Type	Tighten Torque	Type	Tighten Torque
5mm bolt、nut	0.45~0.60 kgf-m	3mm screw	0.05~0.08 kgf-m
6mm bolt、nut	0.80~1.20 kgf-m	4mm screw	0.10~0.15 kgf-m
8mm bolt、nut	1.80~2.50 kgf-m	5mm screw	0.35~0.50 kgf-m
10mm bolt、nut	3.00~4.00 kgf-m	6mm screw、SH nut	0.70~1.10 kgf-m
12mm bolt、nut	5.00~6.00 kgf-m	6mm bolt、nut	1.00~1.40 kgf-m
		8mm bolt、nut	2.40~3.00 kgf-m
		10mm bolt、nut	3.50~4.50 kgf-m

Troubles Diagnosis

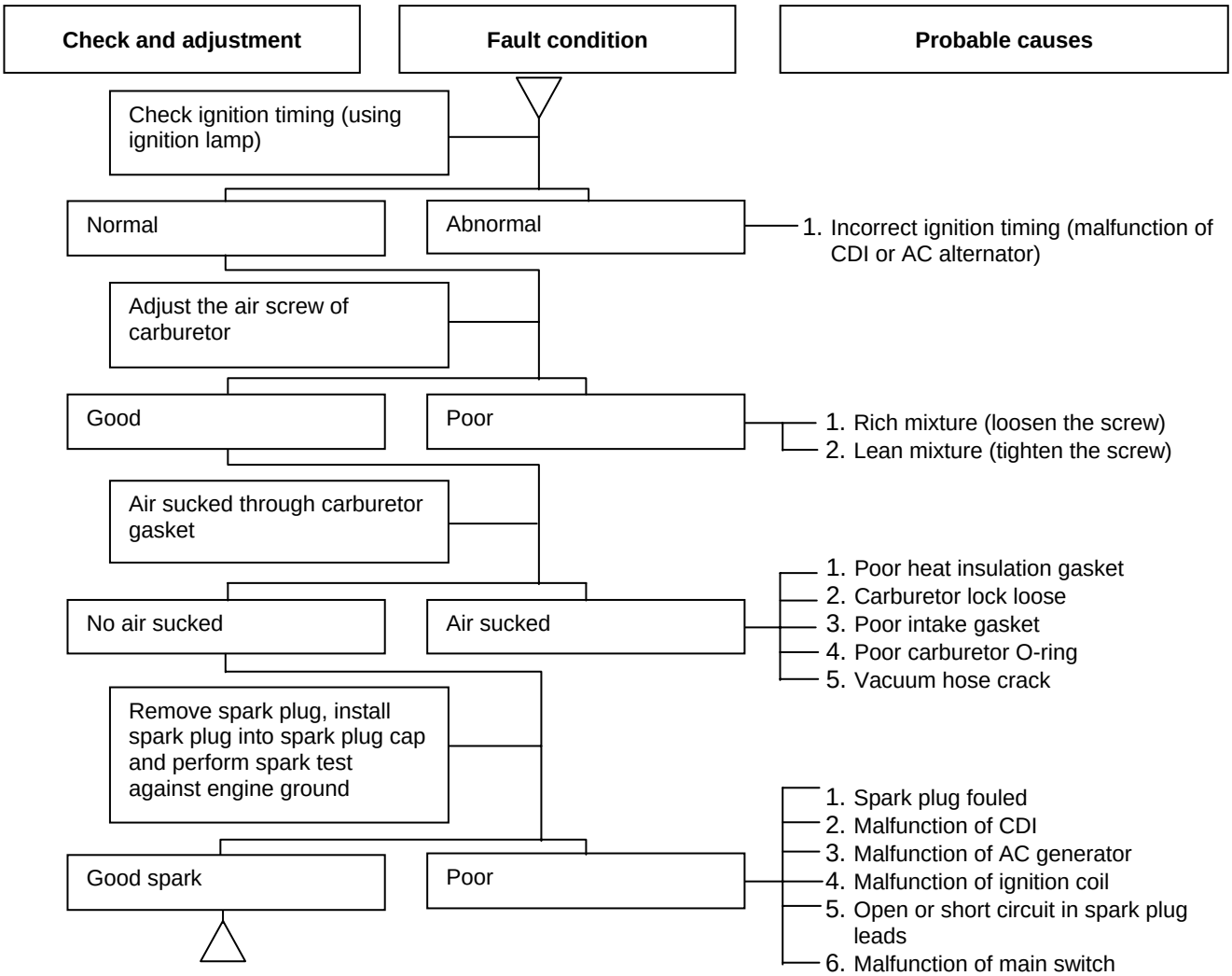
A. Engine hard to start or can not be started



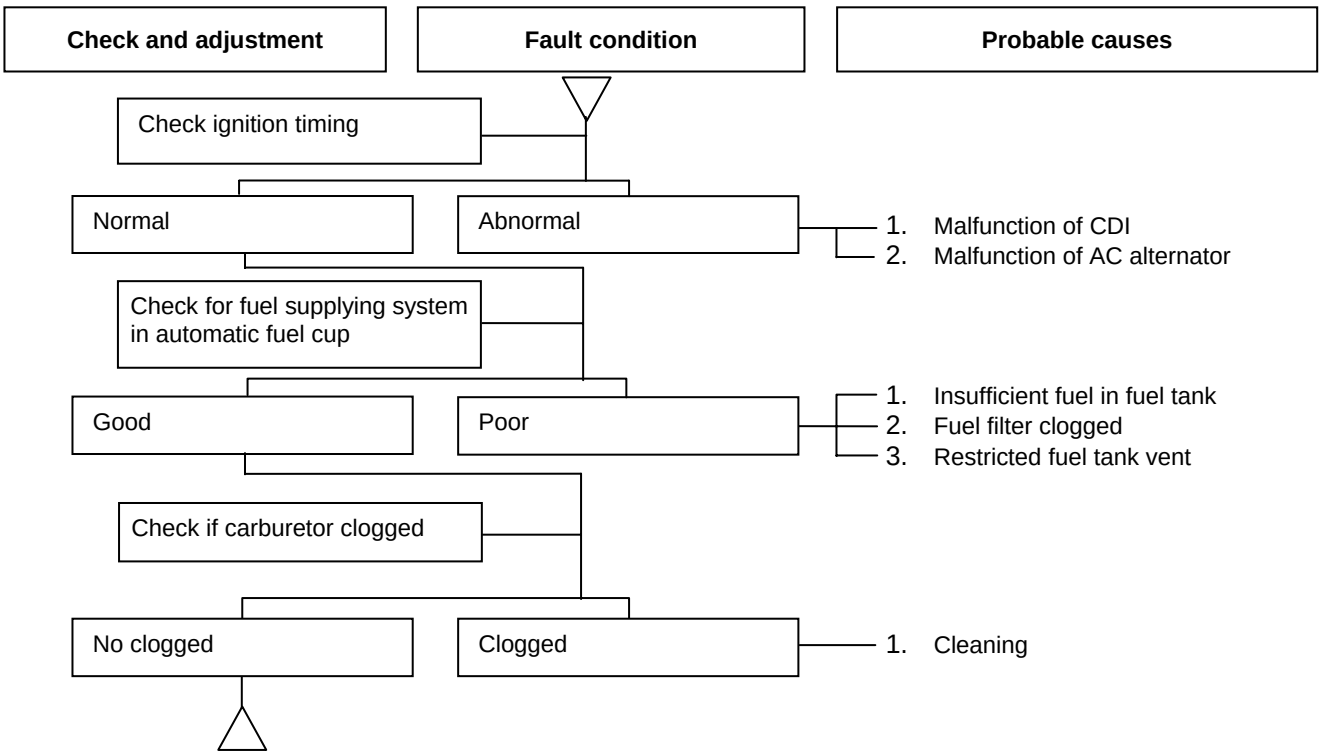
B. Engine run sluggish (Speed does not pick up, lack of power)



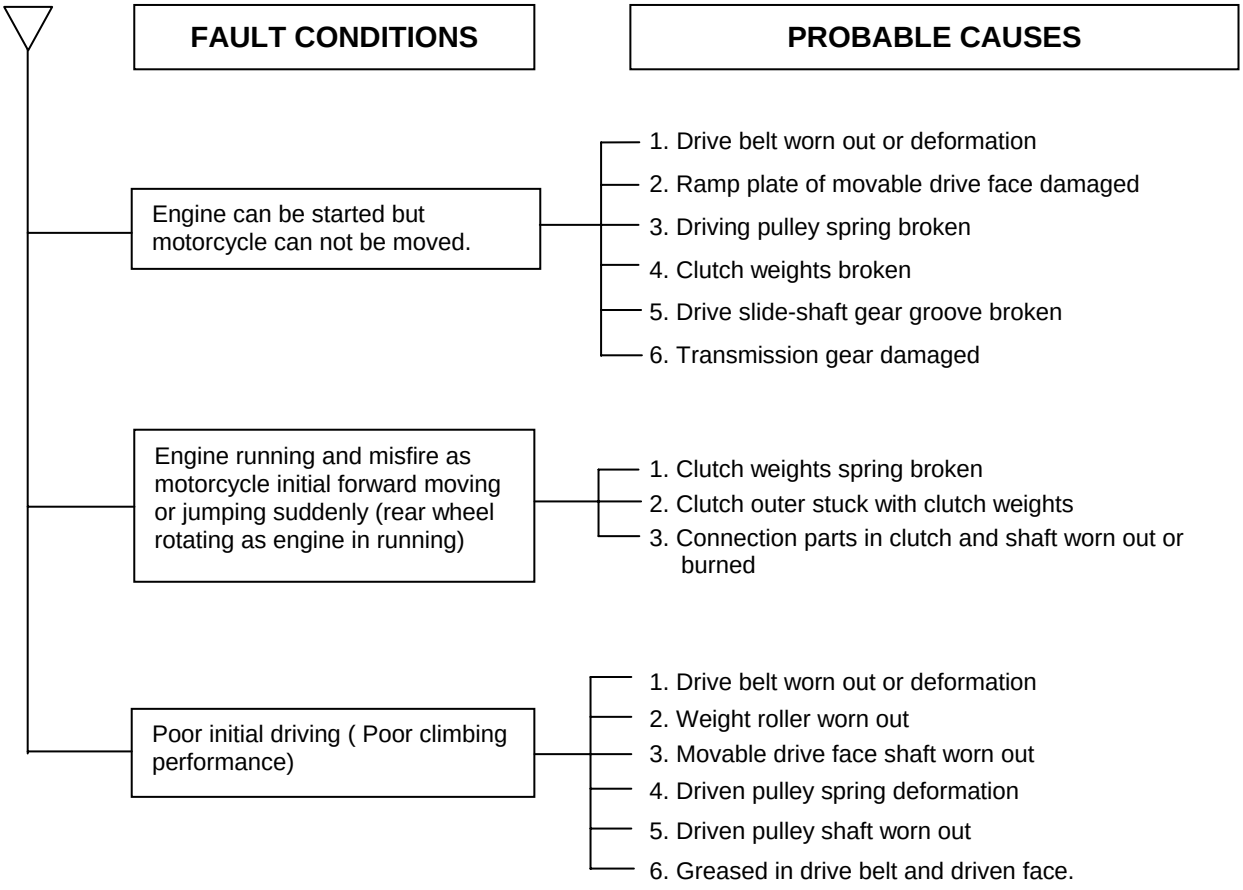
C. Engine runs sluggish (especially in low speed and idling)



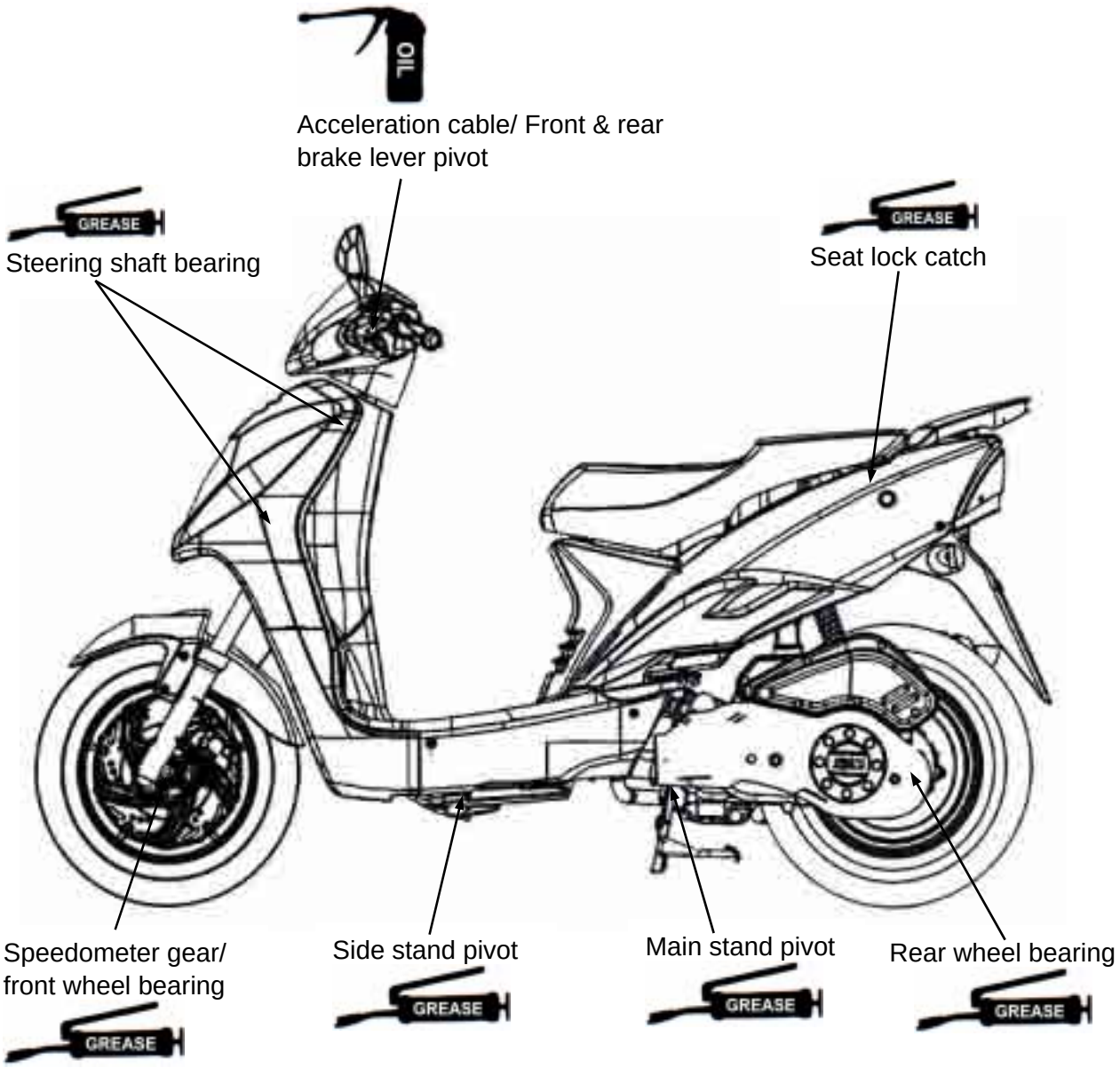
D. Engine runs sluggish (High speed)



E. Clutch, driving and driving pulley



Parts To Be Greased



Precautions In Operation

Specification

Fuel Tank Capacity		7500 c.c.
Engine Oil	Capacity	1000 c.c.
	Change	800 c.c.
Transmission Gear oil	Capacity	110 c.c.
	Change	100 c.c.
Clearance of throttle valve		2~6 mm
Spark plug		NGK CR8E Gap: 0.8 mm
“F” Mark in idling speed		BTDC 13º / 1700 rpm
Full timing advanced		BTDC 27º / 8000 rpm
Idling speed		1600±100 rpm
Cylinder compression pressure		10.3 ± 0.2 kgf/cm²
Valve clearance: IN/EX		0.12 ± 0.02 mm
Tire dimension	Front	110/80-12 61L
	Rear	130/70-12 64L
Tire pressure (cold)	Single	Front: 1.75 kg/cm² rear : 2.25 kg/cm²
	Two persons	Front: 1.75 kg/cm² rear : 2.50 kg/cm²
Battery		12V8Ah (MF battery) type: YTX9A-BS (8Hr)

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	☆2nd air jet cleaner	I		C	C	R
3	☆Fuel filter	I			I	R
4	☆Oil filter	C			C	C
5	☆Engine oil change	R	Replacement for every 1000km			
6	Tire pressure	I	I			
7	Battery inspection	I	I			
8	Brake & free play check	I	I			
9	Steering handle check	I	I			
10	Cushion operation check	I	I			
11	Every screw tightening check	I	I			
12	Gear oil check for leaking	I	I			
13	☆Spark plug check or change	I		I	R	
14	☆Gear oil change	R	Replacement for every 5000km			
15	Frame lubrication				L	
16	Exhaust pipe	I	I			
17	☆Ignition timing	I	I			
18	☆Emission check in Idling	A	I			
19	☆Throttle operation	I		I		
20	☆Engine bolt tightening	I		I		
21	☆CVT driving device(belt)				I	R
22	☆CVT driving device(roller)				C	
23	Lights/electrical equipment/mutli-meters	I	I			
24	Main/side stands & springs	I			I	
25	Fuel lines	I		I		
27	Cam chain	I		I		
28	☆Valve clearance	I		A		

Note: I - Inspection, A-Adjustment R- Replacement C- Cleaning L- Lubrication (The 33rd, 34th, and 35th items are for the fuel injection system)

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 EPA regulations, these items must be perform normally periodical maintenance following the user manual instructions.
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

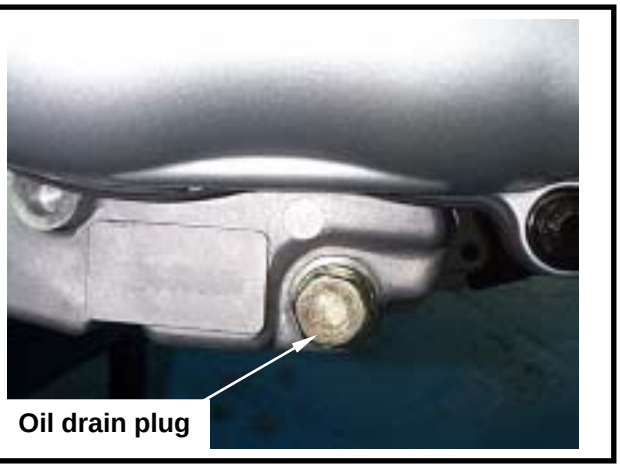
Caution

- The vehicle must be parked on a level ground when checking oil capacity.
- Run the engine for 3-5 minutes then stop, wait about 3-5 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.

Engine 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: 3.5~4.5 kgf-m



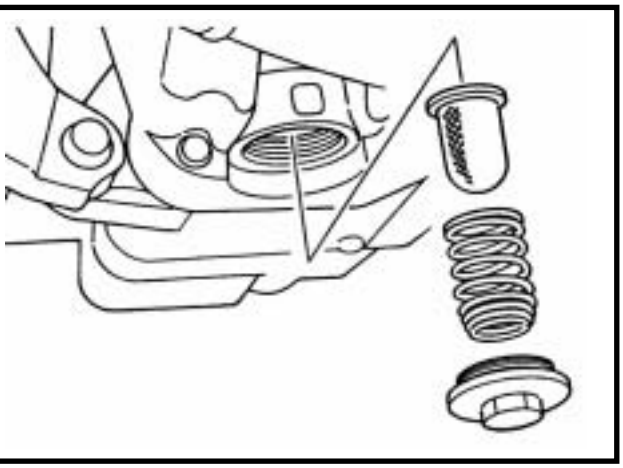
Caution

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

Add oil to the specified capacity.
Oil Viscosity: SAE 10W-30, or equivalent recommended using King-Mate serial oil.
Engine oil capacity: Disassembly: 1050cc
Change: 800cc
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 to cleaning the foreign).
Check O-ring for damage, replace if necessary.
Reinstall strainer, spring, O-ring and strainer cover.
Torque value: 1.3~1.7 kgf-m



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.
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: 0.8~1.2 kgf-m

Caution

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

Fill out specified gear oil from the engine oil filling opening.
Install the oil filling bolt.
Torque value: 1.0~1.4 kgf-m
Quantity: 100 c.c.
Recommended: King-Mate HYPOID GEAR OIL (#140)

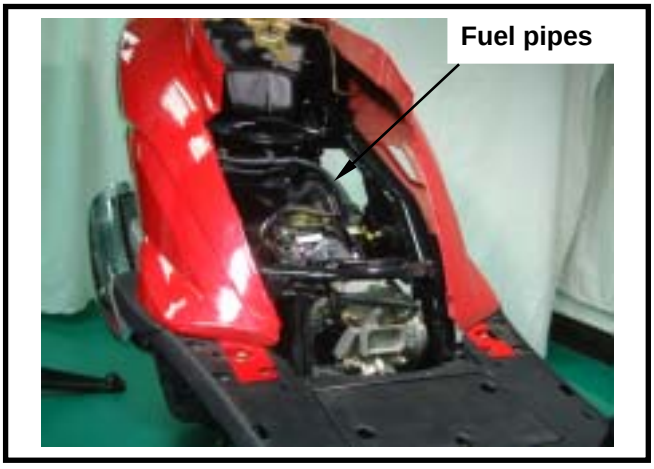
Fuel System

Fuel Lines

Remove luggage box.
Check all lines, and replace it when they are deterioration, damage or leaking.

Warning

Gasoline is a low ignition material so any kind of fire is strictly prohibited as dealing it.



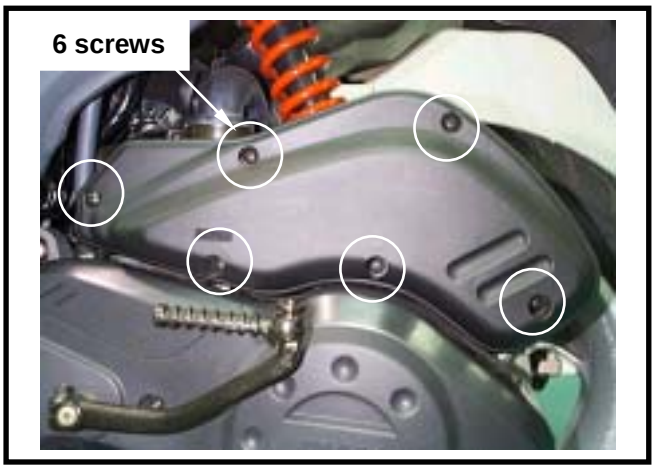
Fuel filter

Remove luggage box.
Check if the fuel filter is clogged, broken. If so, replace the fuel filter with new one.

Air Cleaner

Air element

Remove the air cleaner cover (6 screws).
Remove the lock plate from the element of air cleaner.
Check the element if dirt or damaged.
If it dirt, clean it with solvent and then soap it into cleaning engine oil after cleaned. Finally, squeeze it.
Replace it with new one if dirt or damaged.

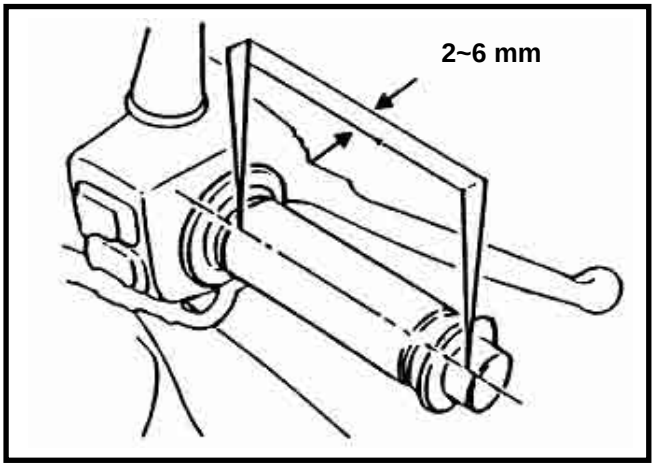


Caution

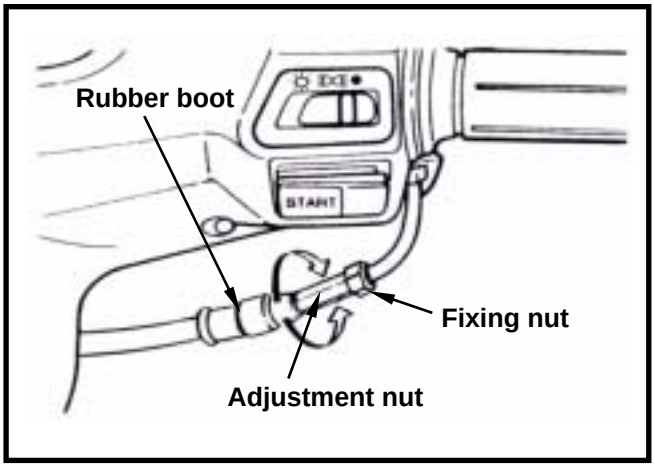
- Make sure that the air cleaner cover had been installed properly after installation because improperly installation will cause foreign sucking into cylinder.
- Do not wet the air cleaner as washing the motorcycle. Or it may effect engine performance.

Throttle Valve Operation

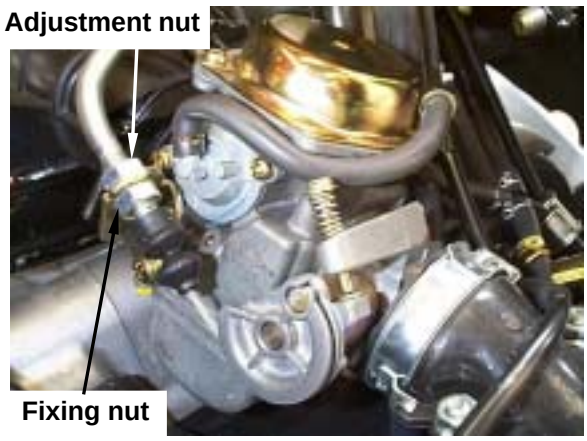
Have a wide open of throttle valve as handle bar in any position and release it to let back original (full closed) position.
Check handle bar if its operation is smooth.
Check throttle valve cable and replace it if deteriorated, twisted or damaged.
Lubricate the cable if operation is not smooth.
Measure handle bar free play in its flange part.
Free play：2~6 mm



Adjustment can be done in either ends.
Secondary adjustment is conducted from top side.
Remove rubber boot, loosen fixing nut, and then adjust it by turning the adjustment nut.



Primary adjustment is conducted from button side of cable on the throttle body.
Loosen fixing nut, and adjust by turning the adjustment nut for its free-play.
Tighten the fixing nut, and check acceleration operation condition after adjusted.



Crankcase Ventilation

Pull out the plug from draining hose to clean deposits.

Caution

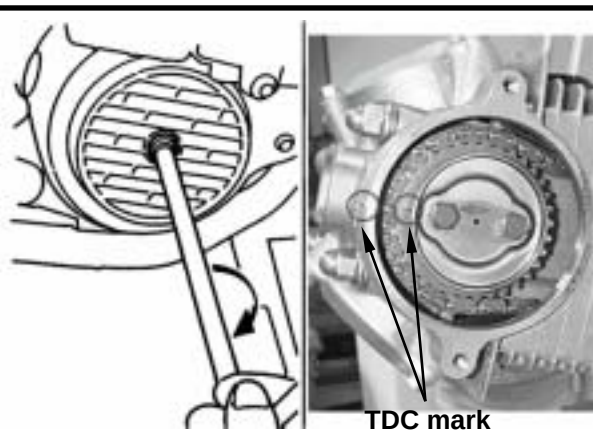
When always riding in rainy area or full throttle position, maintenance travel must be shorted. The deposits can be seen in the transparent section of draining hose.

Valve Clearance Adjustment

Caution

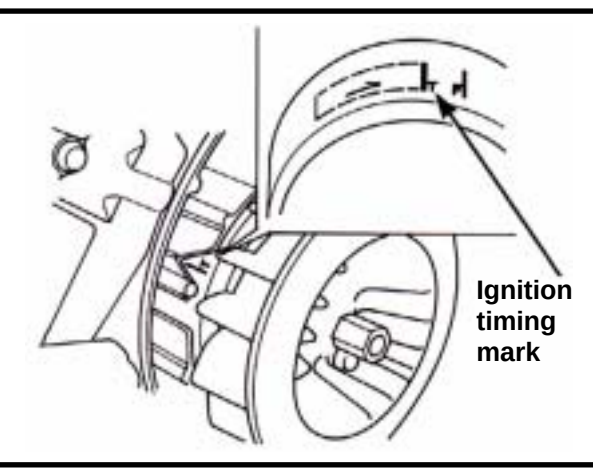
Checks and adjustment must be performed when engine is cold (below 35°C).

Remove luggage box.
Remove center cover.
Remove cylindre head left cap.
Remove the ignition timing check hole cap 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 model that equipped with starting compression pressure reduction system can not be rotated in counter-clockwise to prevent from operating compression pressure reduction function so that valve clearance can not be measured.



Valve Clearance Inspection And Adjustment

Check & adjust valve clearance with feeler gauge.

Valve clearance (IN/EX): 0.12 ± 0.02 mm

Loosen fixing nut and turn the adjustment nut for adjustment.

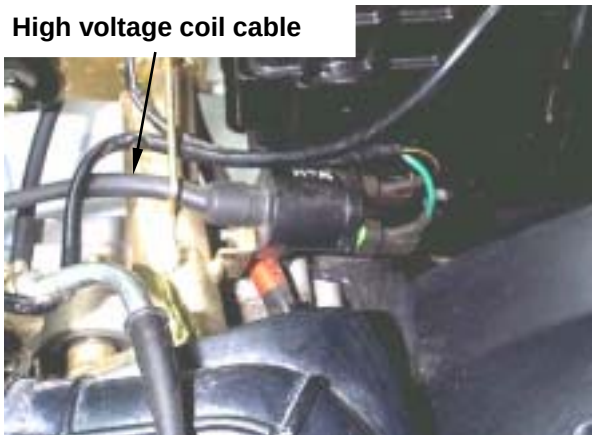
Caution

It has to make sure that valve rock-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

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



Park the motorcycle with main stand and warn up engine.
Connect tachometer (the wire clamp of tachometer is connected to the high voltage coil).
Open the carburetor cover from the trunk.
Turn the throttle valve stopper screw to specified idle speed.

Specified idle speed: 1700±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 1700±100 rpm.
3. Insert the exhaust sampling pipe 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 standard.

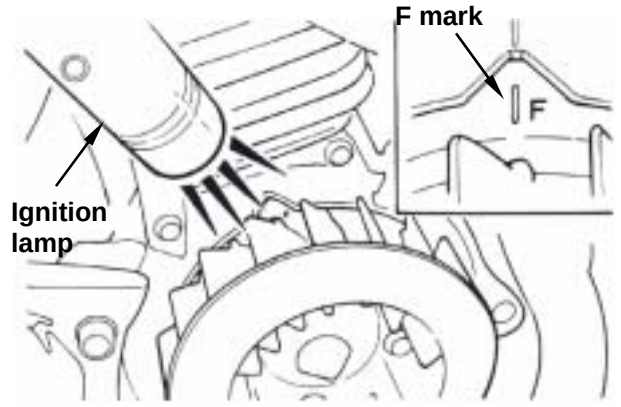
Emission standard: CO: below 4.0%
HC: below 2000 ppm

Ignition System

Ignition Timing

Caution

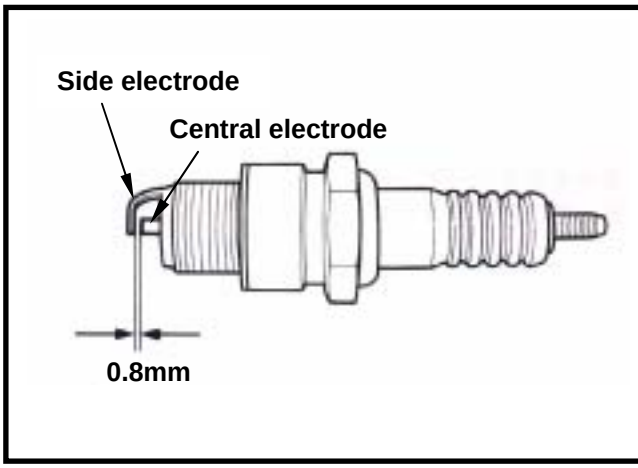
C.D.I ignition system is set by manufacturer so it can not be adjusted.
Ignition timing check procedure is for checking whether CDI function is in normal or



Remove right side cover.
Remove ignition timing hole cap located on the cooling fan cap.
Connect tachometer and ignition lamp.
Start engine and set engine idle speed in 1600 rpm, and if the mark aligns with the “F”, then it means that ignition timing is correct.
Increase engine speed to 8000 rpm to check ignition timing advance. If the detent aligns with advance mark “II”, then it means ignition timing advance is in functional.
If not, check CDI set, pulse flywheel, and pulse generator. Replace these components if malfunction of these parts are found.

Spark Plug

Appointed spark plug：CR8E (NGK)
Remove luggage box.
Remove central cover.
Remove spark plug cap.
Clean dirt around the spark plug hole.
Remove spark plug.
Measure spark plug gap.
Spark plug gap: 0.8 mm
Carefully bend ground electrode of the plug to adjust the gap if necessary.
Hold spark plug washer and install the spark plug by screwing it. Tighten the plug by turning 1/2 turn more with plug socket after installed.
Torque value: 1.0~1.2 kgf-m
Connect spark plug cap.



Cylinder Compression Pressure

Warn up engine and then turn off 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 foot-starting lever.

Caution

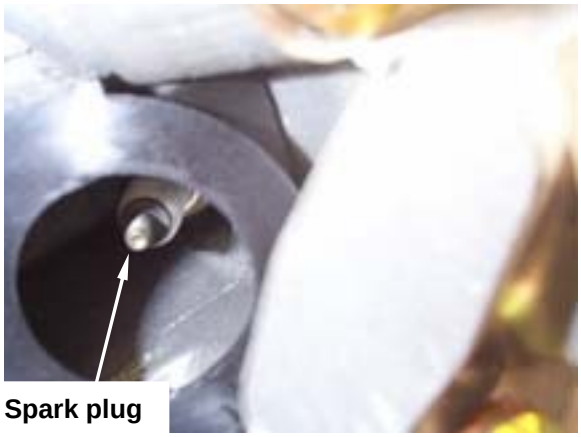
Rotate the engine until the reading in the gauge no more increasing.
Usually, the highest pressure reading will be obtained in 4~7 seconds.

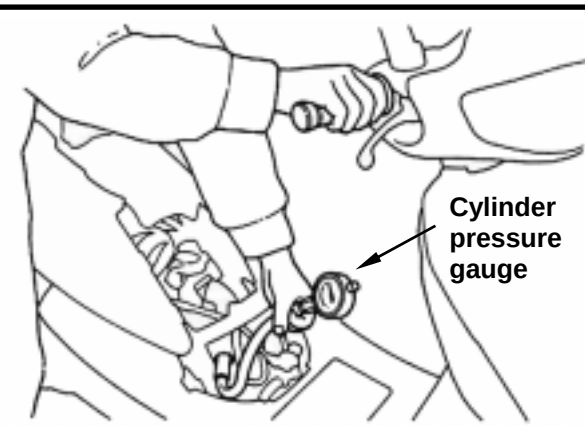
Compression pressure: 10.3 ± 0.2 Kg/cm²

Check following items if the pressure is too low:

- Incorrect valve clearance
- Valve leaking
- 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.



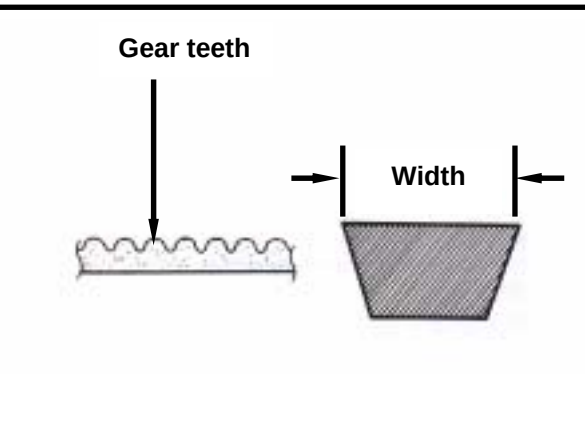


Driving System

Drive Belt

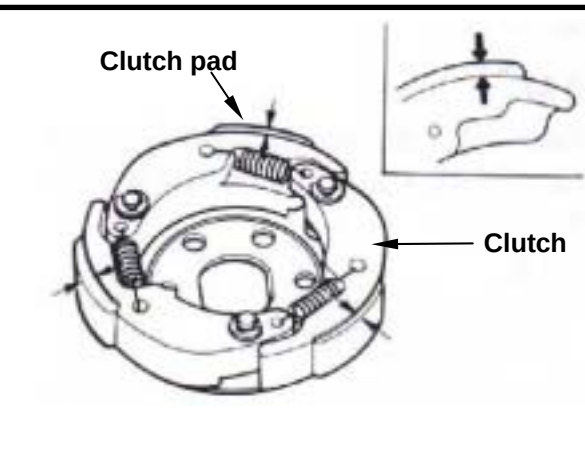
Remove left side cover.
Remove mounting bolt located under air cleaner.
Remove 9 bolts of the engine left side cover and the cover.
Check if the belt is crack or worn out.
Replace the belt if necessary or in accord with the periodical maintenance schedule to replace it.

Width limit: 18.5mm or more



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.

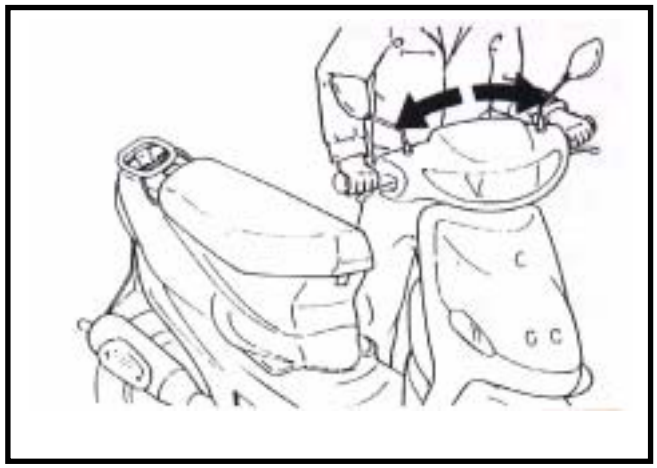


Steering System

Caution

Check all wires and cables if they are interfered with the rotation of steering handle bar.

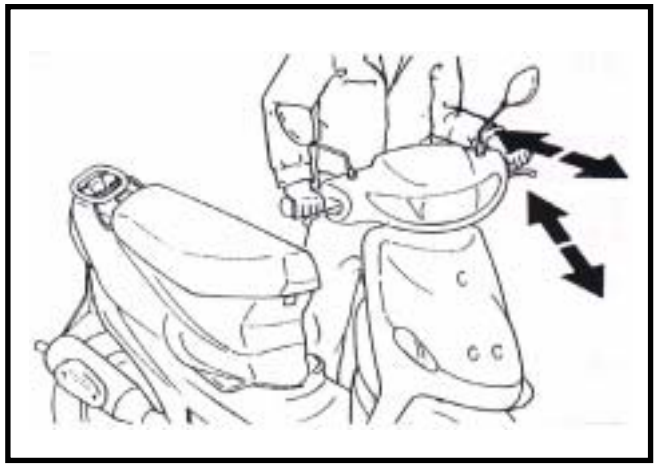
Lift the front wheel out of ground.
Turn handle from right to left alternative and check if turning is smoothly.
If handle turning is uneven and bending, or the handle can be operated in vertical direction, then adjust the handle top bearing.



Suspension System

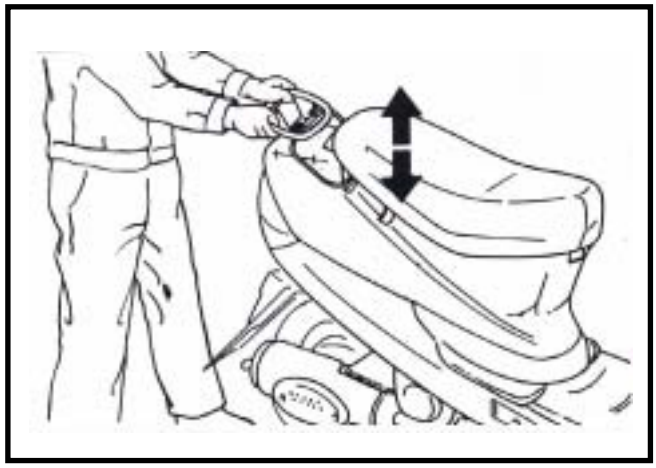
Warning

- Do not ride the motorcycle with poor shock absorber.
- Looseness, wear or damage shock absorber will make poor stability and drive ability.



Front shock absorber

Hold front brake lever and press down the front shock absorber for several times to check its operation.
Hold front brake lever and push forward the front shock absorber for several times to check its locking status.
Check if it is scratched or leaking.
Replace damaged and non-repairable components.
Tighten all nuts and bolts.



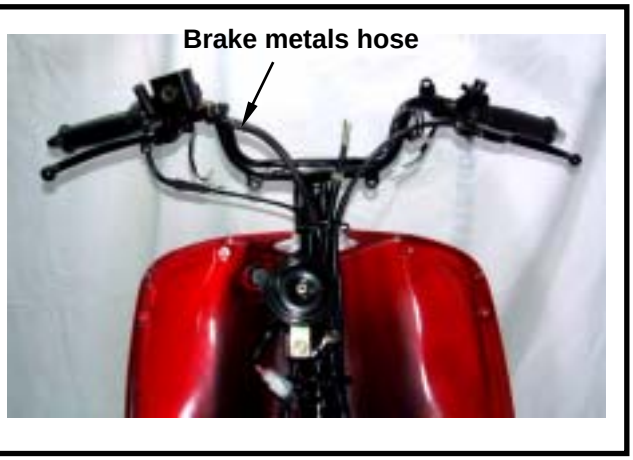
Rear Shock absorber

Press down the rear shock absorber for several times to check its operation.
Check if it is scratched or leaking.
Replace damaged and non-repairable components.
Park the motorcycle with main standard.
Start engine and let the rear wheel rotate after increased engine rpm. Check engine for any parts loose or shaking. Also check the engine suspension bushing for wear out. Replace the bushing if worn out.
Tighten all nuts and bolts.

Disk Brake System (Front Disk Brake)

Brake System Metal Hoses

Make sure the brake metal hoses for corrosion or leaking oil, and also check brake system for leaking.

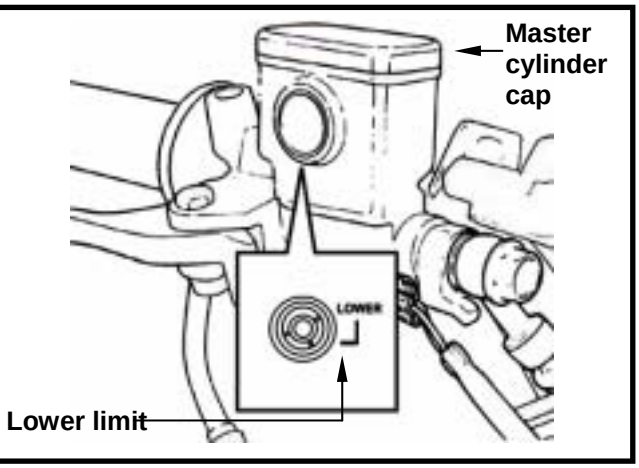


Brake Fluid

Check brake fluid level in the brake fluid reservoir. If the level is lower than the LOWER limit, add brake fluid to UPPER limit. Also check brake system for leaking if low brake level found.

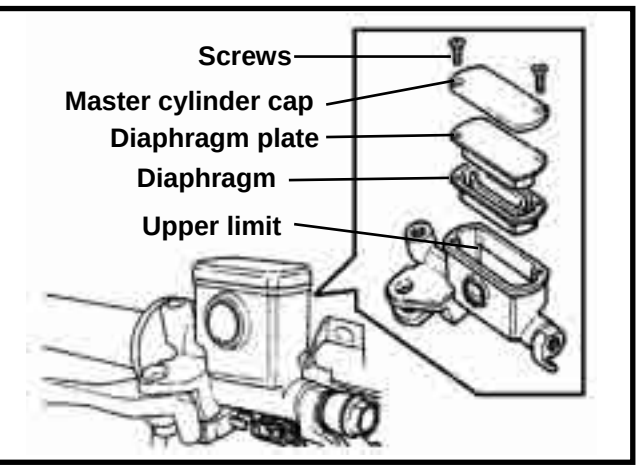
Caution

In order to maintain brake fluid in the reservoir in horizontal position, do not remove the cap until handle bar stop.
Do not operate the brake lever after the cap had been removed. Otherwise, the brake fluid will spread out if operated the lever.
Do not mix non-compatible brake fluid together.



Filling Out Brake Fluid

Tighten the drain valve, and add brake fluid.
Place the diaphragm in.
Operate the brake lever so that brake fluid contents inside the brake system hoses.

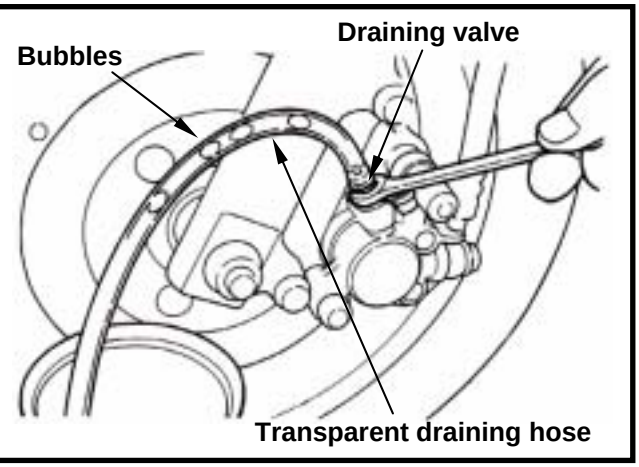


Air Bleed Operation

Connect a transparent hose to draining valve.
Hold the brake lever and open air bleeding valve.
Perform this operation alternative until there is no air inside the brake system hoses.

Caution

Before closing the air bleed valve, do not release the brake lever.



Added Brake Fluid

Add brake fluid to UPPER limit lever.
Recommended brake fluid: DOT3 or DOT4 WELL RUN brake fluid.

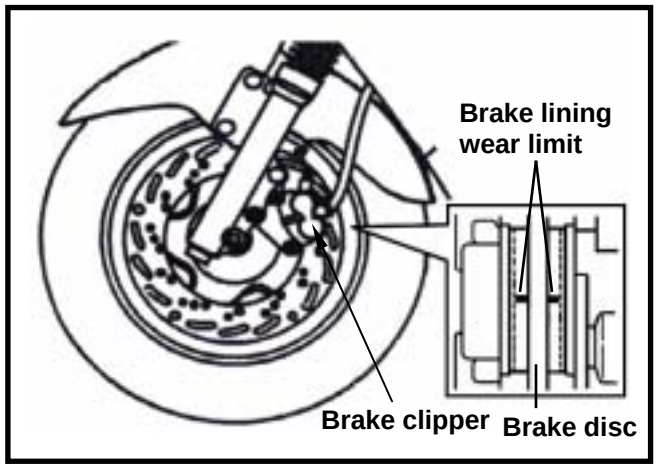
Caution

Never mix or use dirty brake fluid to prevent from damage brake system or reducing brake performance.

Brake Lining Wear

The indent mark on brake lining is the wear limitation.

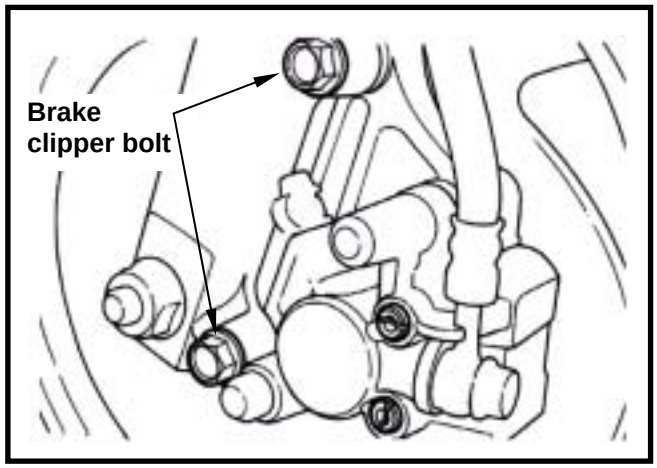
Replace the brake lining if the wear limit mark closed to the edge of brake disc.



Caution

It is not necessary to remove brake hose when replacing the brake lining.

Remove the brake clipper bolt, and take out the clipper.



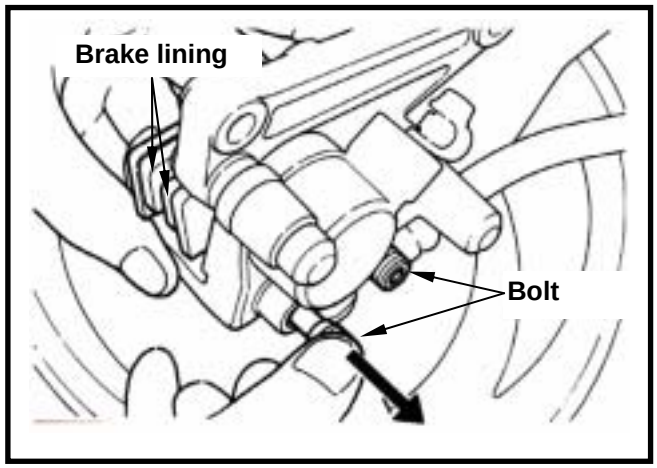
Caution

Do not operate the brake lever after the clipper removed to avoid clipping the brake lining.

Pry out the brake lining with a flat driver if lining be clipped.

Remove brake lining bolt.

Take out the lining.



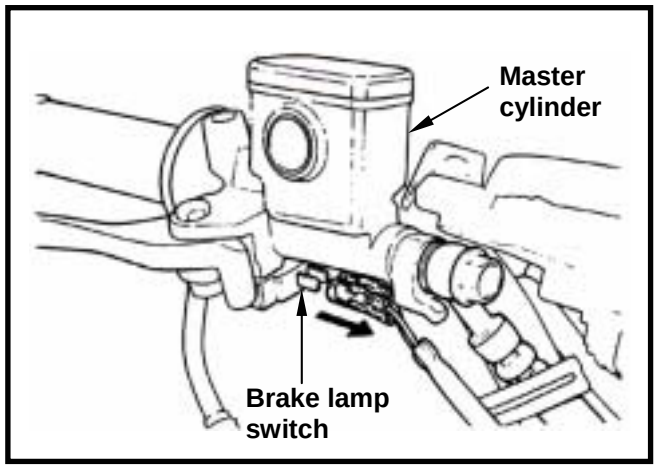
Caution

In order to maintain brake power balance, the brake lining must be replaced with one set.

Brake Lamp Switch

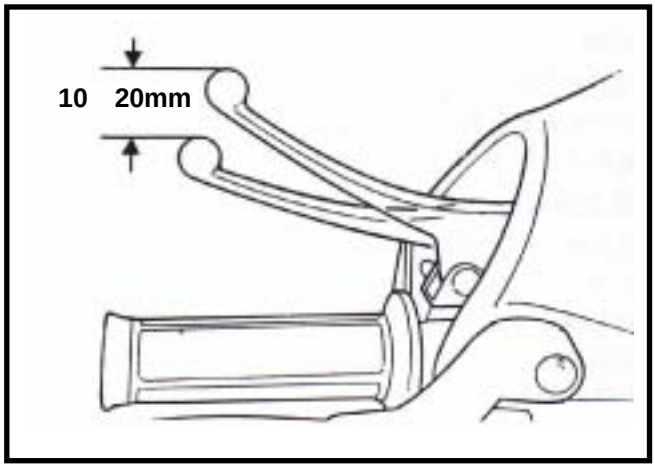
The brake lamp switch is to lit up brake lamp as brake applied.

Make sure that electrical starter can be operated only under brake applying.

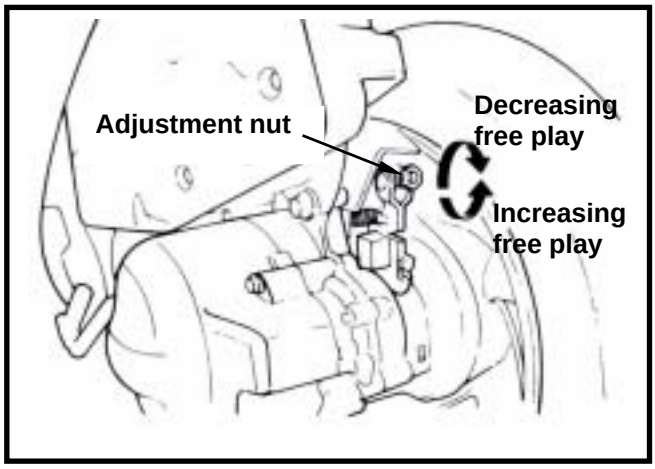


Drum Brake System

Rear Brake Free Play: (Drum brake)
Measure free play of rear brake level at the end of the lever.
Free play: 10-20 mm



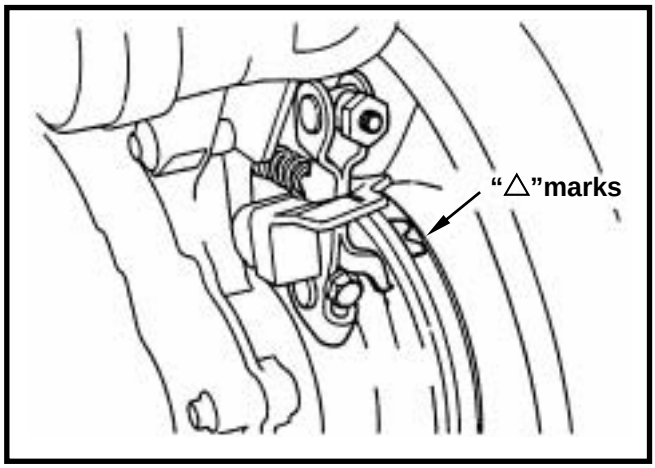
Measure the free play of the front brake lever at the end of the lever.
Free play: 10-20 mm
Adjust the free play by turning the front brake adjustment nut if necessary.



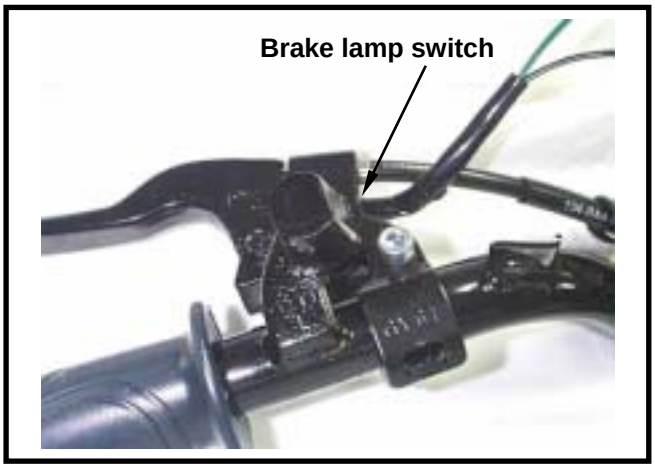
Brake Confirmation

Caution

- After brake adjustment, it has to check the brake operation to make sure the front and rear wheel can be braked.
- Pull the brake lever, and make sure that the wear limit marks of brake ling on the both front & rear brake arm are closer and touch to the "△" marks. If so, replace the brake ling with new one.



Brake Lamp Switch
The brake lamp switch is to lit up brake lamp as brake applied.
Make sure that electrical starter can be operated only under brake applying.



Wheel / Tire

Check if both front & rear tires' pressure is in correct.

Caution

Tire pressure check should be done as cold tire.

Appointed tire pressure

Tire size		Front tire	Rear tire
Tire pressure as cold tire (Kg/cm²)	Load for single	1.75	2.25
	Load for two persons	1.75	2.5

Appointed Tire

Front wheel: 100/90-12 59J (T/L)

Rear wheel: 130/70-12 59J (T/L)

Check if tire surface is ticked with nails, stones or other materials.

Check if tire surface or wall for crack or damaged, and replace it if necessary.

The tire tread depth can be checked by visual inspection or depth gauge.

- Replace the tire if tire tread dent or unusual wearing out.
- The tire should be replaced if the wear limit mark "△" is in visible.

Measure tire thread depth from tire central surface.

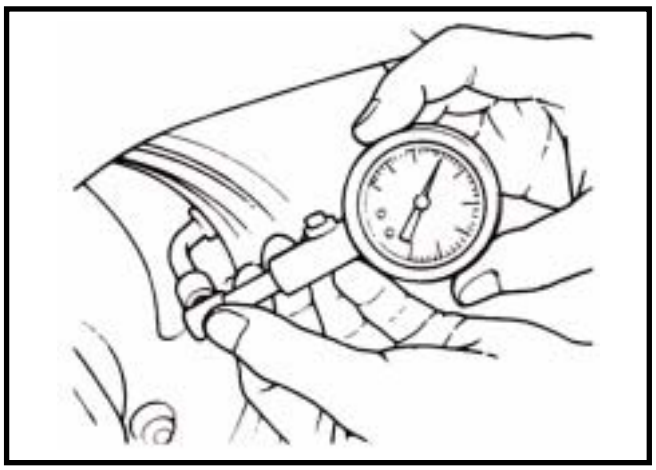
Replace the tire if the depth is not come with following specification:

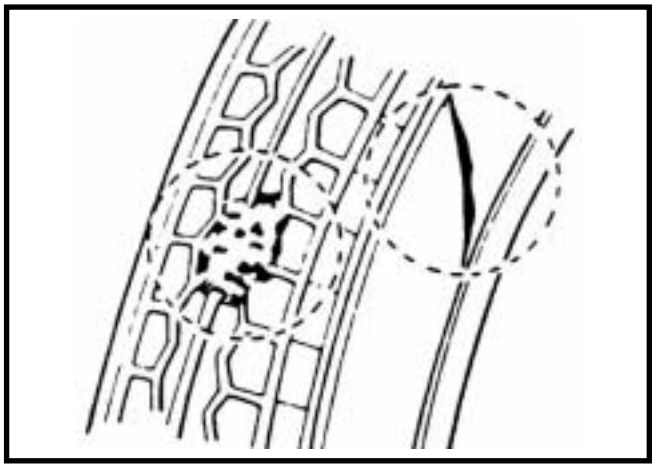
Front tire: 1.5 mm

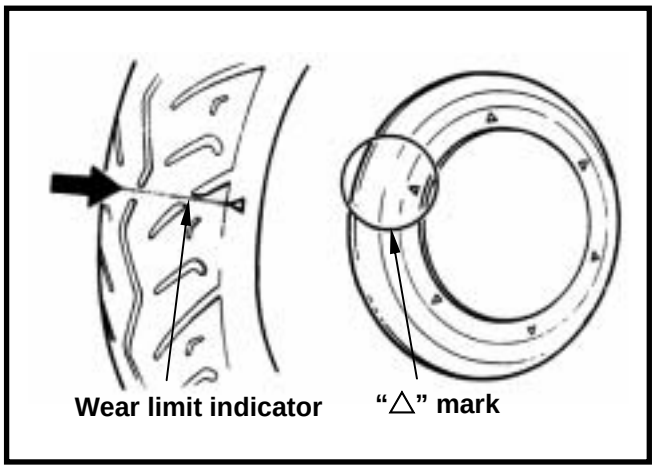
Rear tire: 2.0 mm

Caution

The wear limit marks "Δ" are located around the tire wall even for inspection.



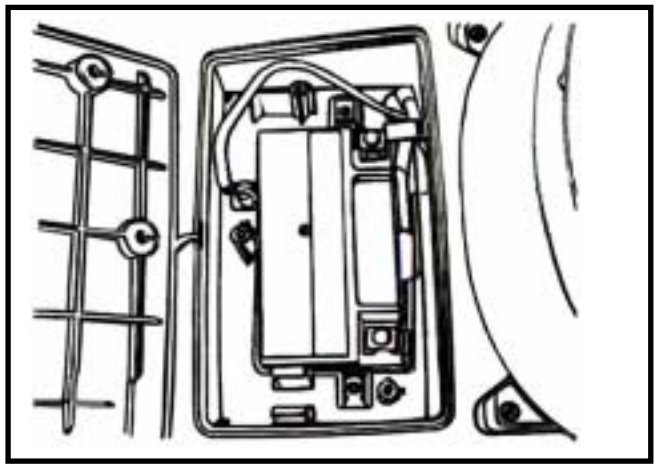




Battery

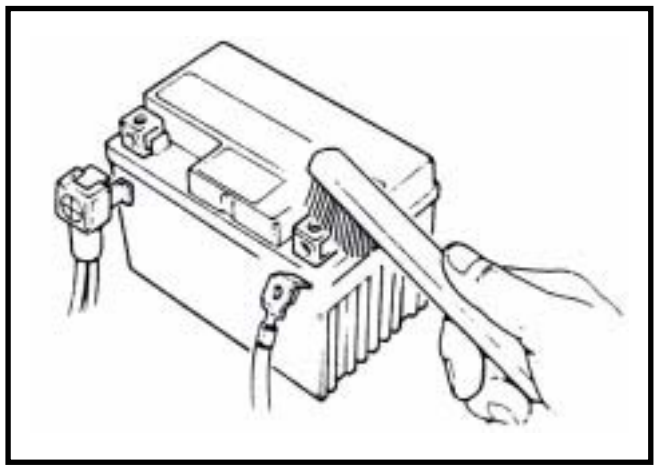
Battery Removal

Remove right cover. (3 screws)



Battery cables removal:

1. At first, remove the negative “-” cable.
2. Then, remove the positive “+” cable.
3. Remove the battery.



If there is some rust on battery posts, clean it with steel brush.

Install the battery in the reverse procedures of removal.

Caution

- If there is rust on the posts very serious, spray some hot water on the posts. Then, clean it with steel brush so that can remove rust for more easily.
- Apply some grease on the posts after rust removed to prevent from rust again.

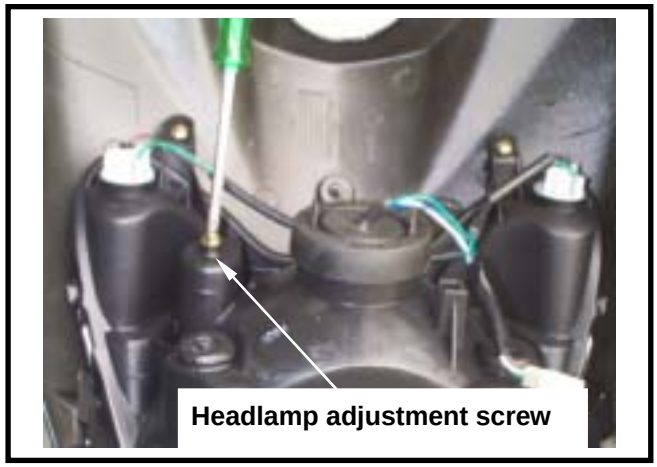
Headlamp Adjustment

Headlamp adjustment

Remove the front fender.

Turn the headlamp adjustment screw to adjust headlamp beam height. (C.W. is for increasing beam height, and C.C.W. is for decreasing beam height)

Reinstall the front fender.



Caution

- To adjust the headlamp beam follows related regulations. Do not adjust it arbitrarily if not necessary.
- Improper headlamp beam adjustment will make in coming driver dazzled or insufficient lighting.

Nuts, Bolts Tighteness

Perform periodical maintenance in accord with the Periodical Maintenance Schedule.

Check if all bolts and nuts on the frame are tightened securely.

Check all fixing pins, snap rings, hose (pipe) clamps, and wire holders for security.

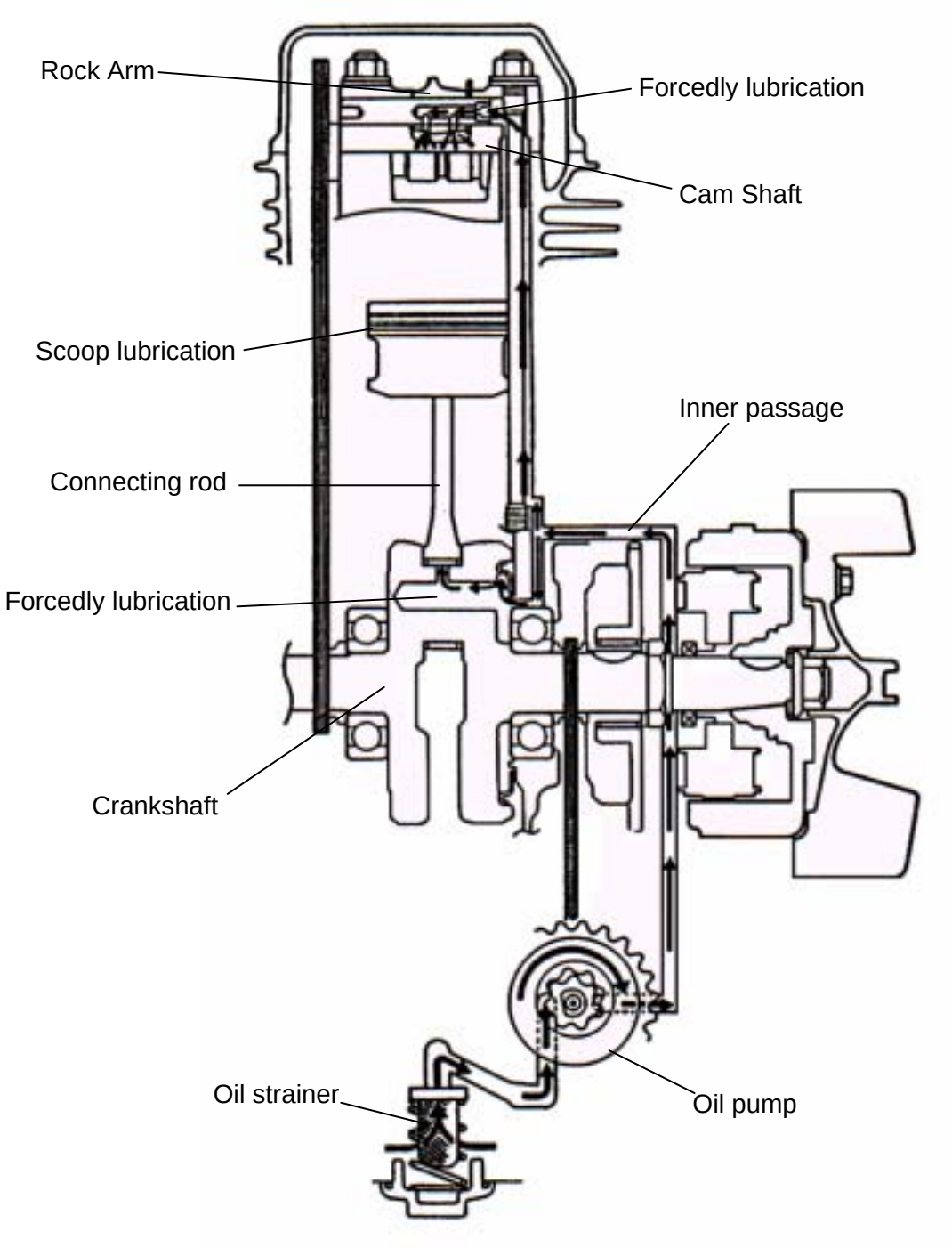
Special Service Tools Catalogue

	 (ψ30mm)	 (ψ22mm)
Name: Alternator fly wheel remover	Name: Puller/presser for crankcase bushing	Name: Puller/presser for crankcase bushing
Parts no.: SYM-3110A01	Parts no.: SYM-1120310	Parts no.: SYM-1120320
		
Name: Presser for crankcase bushing	Name: Valve spring compressor	Name: Valve spring compressor
Parts no.: SYM-1120300-H9A	Parts no.: SYM-1471100	Parts no.: SYM-1471110/20
		
Name: Valve clearance adjustment wrench	Name: Universal fixer	Name: Clutch spring compressor
Parts no.: SYM-9001200	Parts no.: SYM-2210100	Parts no.: SYM-2301000
		
Name: Valve clearance adjuster	Name: Bearing remover (inner type)	Name: Bearing remover (outer type)
Parts no.: SYM-9001210	Parts no.: SYM-6204002	Parts no.: SYM-6204001

 (6301)		 (6204)		 (6203/6004UZ)	
Name	Bearing installer	Name	Bearing installer	Name	Bearing installer ψ 17mm
Parts no.	SYM-9610000	Parts no.	SYM-9110400	Parts no.	SYM-9620000
 (27*42*7)		 (25*40*8)		 (20*32*6)	
Name	Oil seal installer	Name	Oil seal installer	Name	Oil seal installer
Parts no.	SYM-9125500	Parts no.	SYM-9121600	Parts no.	SYM-9120200
					
Name	Clutch mounting bolt wrench	Name	Valve cap / Oil filter cap wrench		
Parts no.	SYM-9020200	Parts no.	SYM-1236100		

NOTE:

Mechanism Illustration



3. Lubrication System

Operational Precautions:

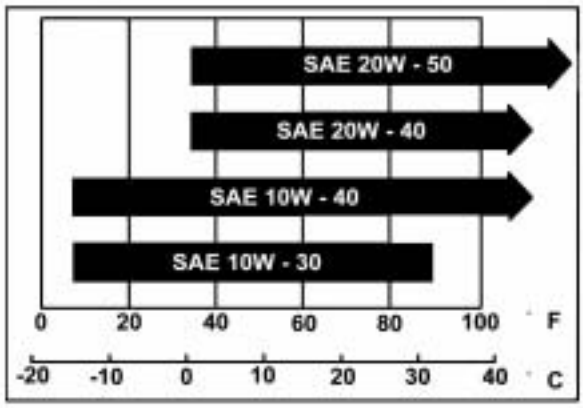
General Information

- This chapter contains maintenance operations for the engine oil pump, engine oil and gear oil.

Specifications

Engine oil quantity	Disassembly	1000 c.c.
	Replacement	800 c.c
Oil viscosity	SAE 10W-30 or equivalent (Recommended King-Mate serial oils)	
Gear Oil	Disassembly	110 c.c.
	Replacement	100 c.c.
Oil viscosity of gear oil	SAE 85W-140 (Recommended King-Mate gear oil series SYM HYPOID GEAR OIL)	

Oil viscosity



unit: mm

Items		Standard (mm)	Limit (mm)
Oil pump	Inner rotor clearance	-	0.12
	Clearance between outer rotor and body	-	0.12
	Clearance between rotor side and body	0.05~0.10	0.20

Torque value

Engine oil drain plug	3.5~4.5 kgf-m
Engine oil filter cover	1.3~1.7 kgf-m
Gear oil drain plug	0.8~1.2 kgf-m
Gear oil filling bolt	1.0~1.4 kgf-m
Oil pump connection screw	0.1~0.3 kgf-m

Trouble Diagnosis

Low engine oil level

- Oil leaking
- Valve guide or seat worn out
- Piston ring worn out

Dirty oil

- No oil change in periodical
- Cylinder head gasket damage
- Piston ring worn out

Low Oil Pressure

- Low engine oil level
- Clogged in oil strainer, circuits or pipes
- Oil pump damage

Engine Oil

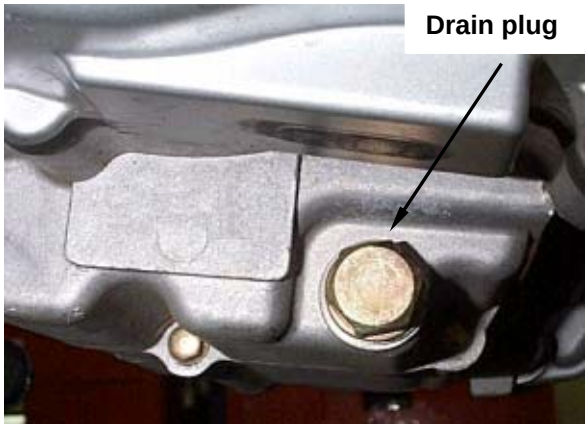
Turn off engine, and park the motorcycle in flat surface with main stand. Check oil level with oil dipstick after 3-5 minutes.
Do not screw the dipstick into engine as checking.
If oil level is nearly low level, fill out recommended oil to upper level.

Oil Replacement

⚠ Caution

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

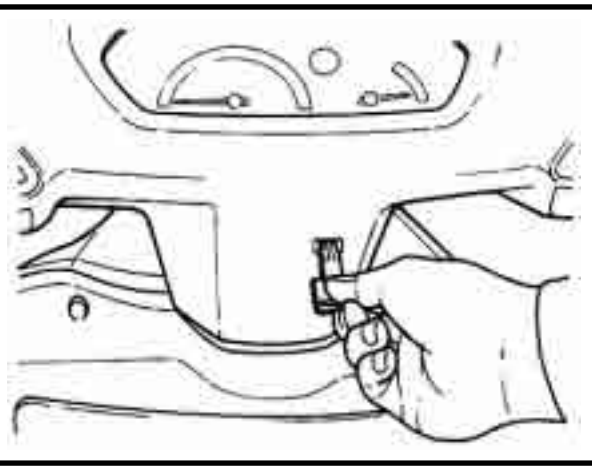
Place an oil pan under the motorcycle, and remove oil strainer cap.
Make sure if the aluminum washer of the draining bolt is damaged. If so, replace it with new one.
Install the drain bolt and tighten it.
Torque value: 3.5~4.5 kgf-m



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: 1.3~1.7 kgf-m
Fill out oil to the oil filler. (Oil viscosity SAE 10W-30) (Recommended King-Mate serial oils)

Engine oil quantity: Replacement 800 c.c.
After oil replaced, insert ignition key into the re-set bottom under instrument panel so that the oil indicator is changed from red to green and set oil replacement mileage to zero.
Install dipstick, start the engine for running several minutes.
Turn off engine, and check oil level again if within standard level after 3-5 minutes.
Check if engine oil leaks.



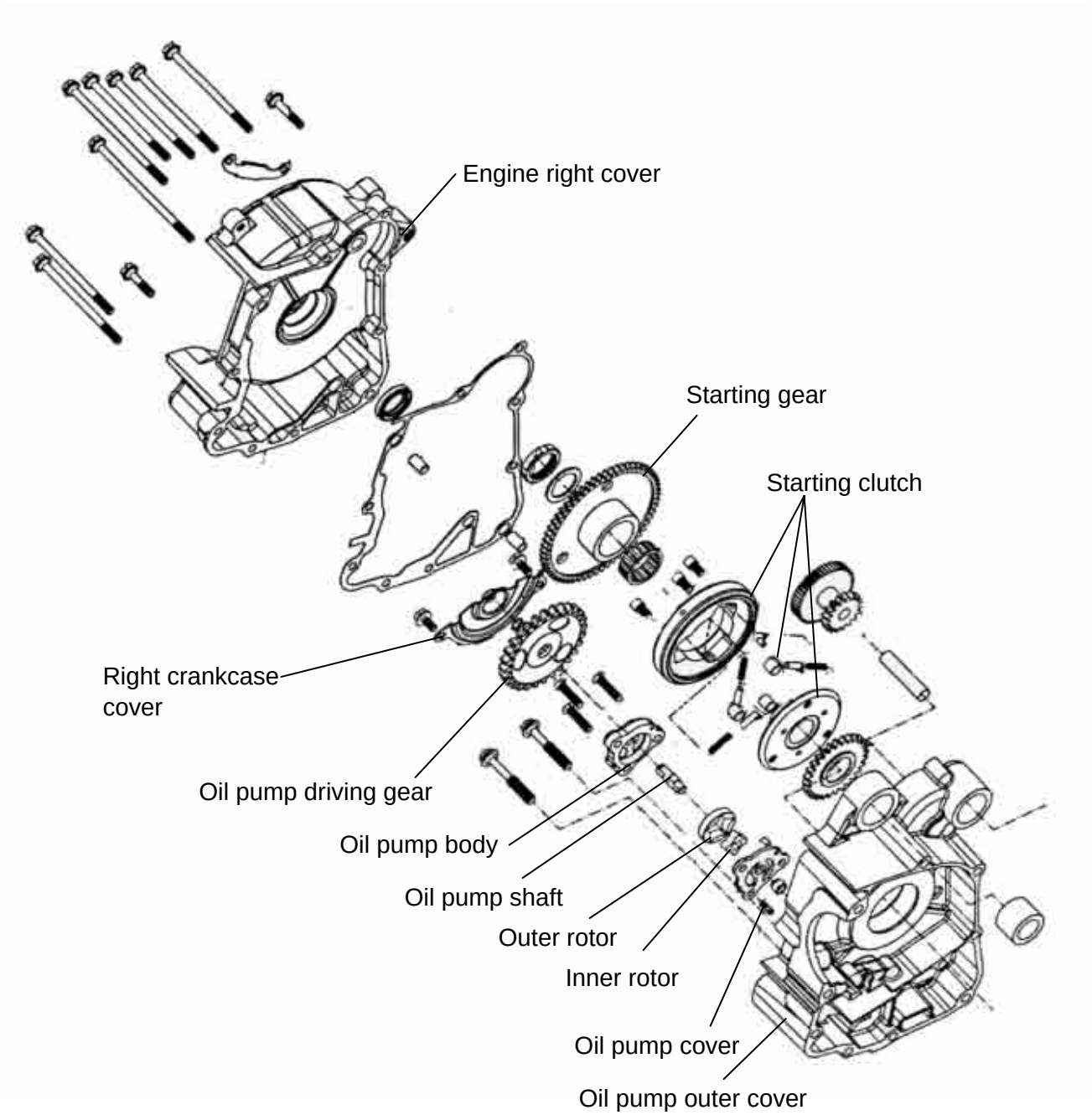
3. Lubrication System

Oil Pump Removal

Remove the alternator (refer to chapter 10).
Remove the engine right cover.
Remove the one-way clutch and starting gear (1 nut).
Make sure that the pump axle can be rotated freely.
Remove the oil pump cover (2 screws), and then the oil pump driving gear clamp and the gear.
Remove oil pump body screws (3 screws).

Oil Pump Disassembly

Remove the screws on oil pump cover and disassemble the pump as illustration shown.



Oil Pump Inspection

Check the clearance between oil pump body and outer rotor.
Limit：below 0.12mm

Check clearance between inner and outer rotors.
Limit: below 0.12mm

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)

Install driving gear and clamp.

Caution

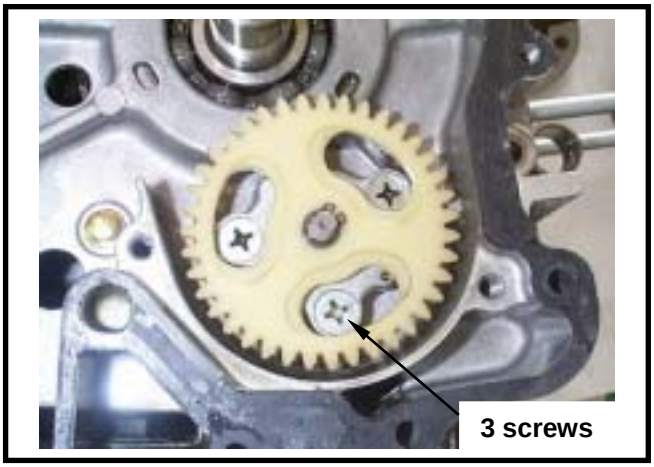
Install the oil pump cover and fixing pin properly.

Oil Pump Installation

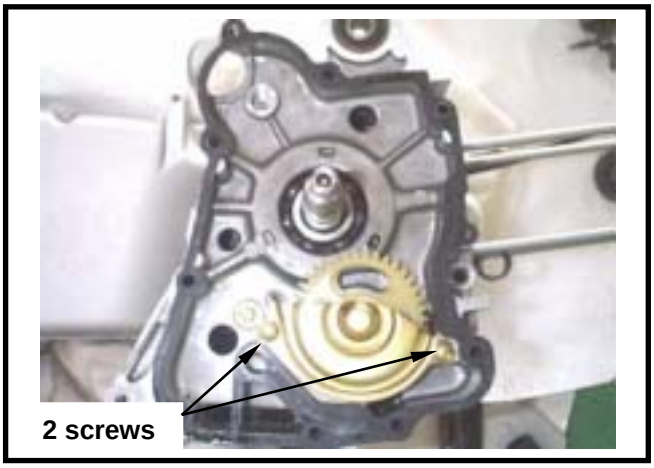
Install the oil pump (3 screws).

Caution

The elliptical hole on the driving gear is not match with the screw hole. Thus, the elliptical hole has to align with the screw hoe before tightening it.



Install oil pump outer cover (2 bolts).



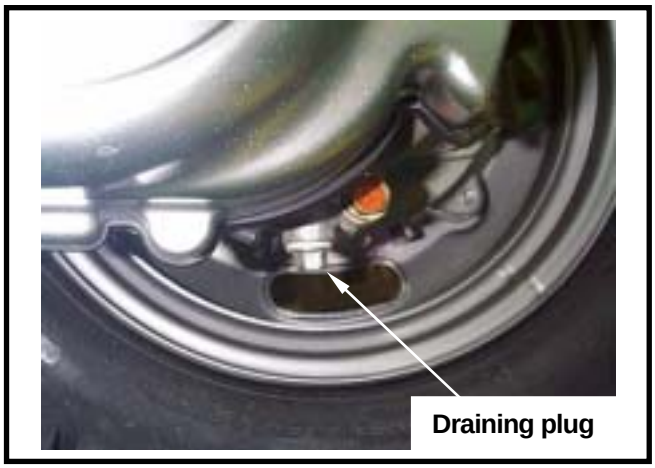
Install the starting gear and the alternator. (Refer to chapter 10)

Gear Oil

Oil Level Inspection

Park the motorcycle on flat surface with main stand.

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



Remove gear oil filling hole 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: 110cc. / replacement: 100 cc.)

Gear Oil Replacement

Remove the gear oil filling hole 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: 0.8~1.2 kgf-m

Add new gear oil (100 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: 1.0~1.4 kgf-m

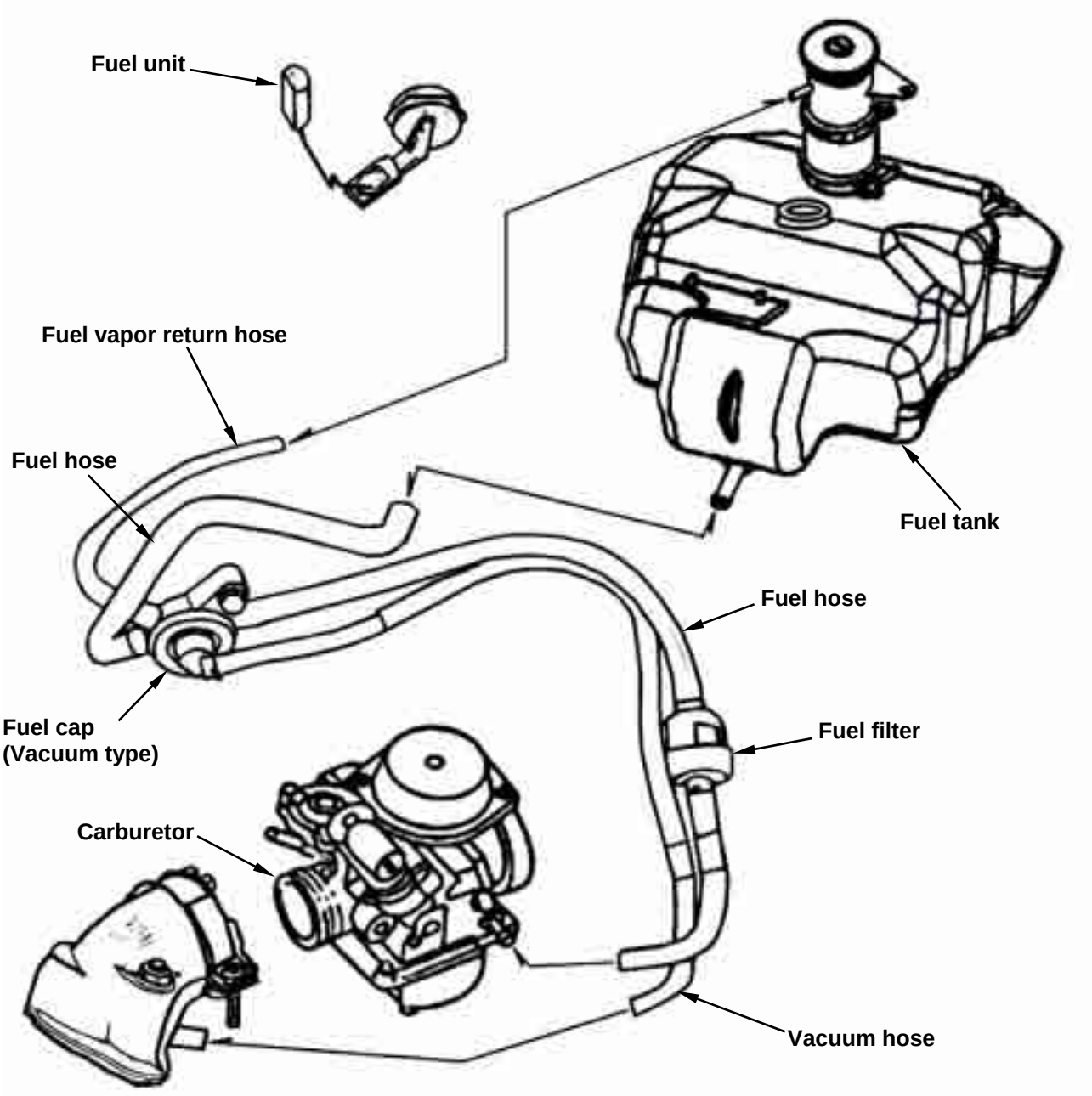
※Recommended to apply with SYM HYPOID GEAR OIL (SAE 85W-140)

Start engine and run it for 2~3 minutes.

Turn of f engine and check if oil leaking.

NOTES:

Mechanism Illustration



4. FUEL INJECTION SYSTEM

Precautions In Operation

General Information

Warning

Gasoline is a low ignition point and explosive materials, so always work in a well-ventilated place and strictly prohibit flame when working with gasoline.

Cautions

- Do not bend or twist throttle valve cable. Damaged cable will make unstable drive ability.
- 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
Carburetor diameter	24 mm
I.D. number	063c
Fuel level	17.5 mm
Main injector	# 92
Idle injector	# 35
Idle speed	1700±100 rpm
Throttle handle free play	2~6 mm
Fuel quantity adjustment screw	1 3/4±3/4 turns

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

Trouble Diagnosis

Poor engine start
- No fuel in fuel tank
- Clogged fuel tube
- Too much fuel in cylinder
- No spark from spark plug (malfunction of ignition system)
- Clogged air cleaner
- Malfunction of automatic by-starter
- Malfunction of throttle valve operation

Stall after started
- Malfunction of automatic by-starter
- Incorrect ignition timing
- Malfunction of carburetor
- Dirty engine oil
- Air existing in intake system
- Incorrect idle speed

Rough idle
- Malfunction of ignition system
- Incorrect idle speed
- Malfunction of carburetor
- Dirty fuel

Intermittently misfire as acceleration
- Malfunction of ignition system

Late ignition timing
- Malfunction of ignition system
- Malfunction of carburetor

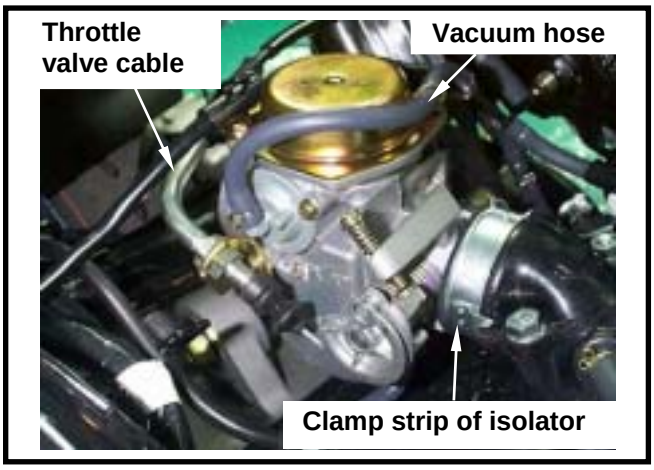
Power insufficiency and fuel consuming
- Fuel system clogged
- Malfunction of ignition system

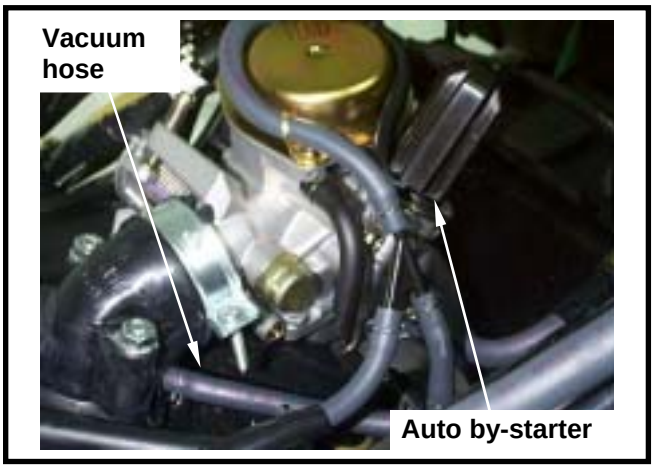
Mixture too lean
- Clogged fuel injector
- Vacuum piston stick and closed
- Malfunction of float valve
- Fuel level too low in float chamber
- Clogged fuel tank cap vent
- Clogged fuel filter
- Obstructed fuel pipe
- Clogged air vent hose
- Air existing in intake system

Mixture too rich
- Clogged air injector
- Malfunction of float valve
- Fuel level too high in float chamber
- Malfunction of automatic by-starter
- Dirty air cleaner

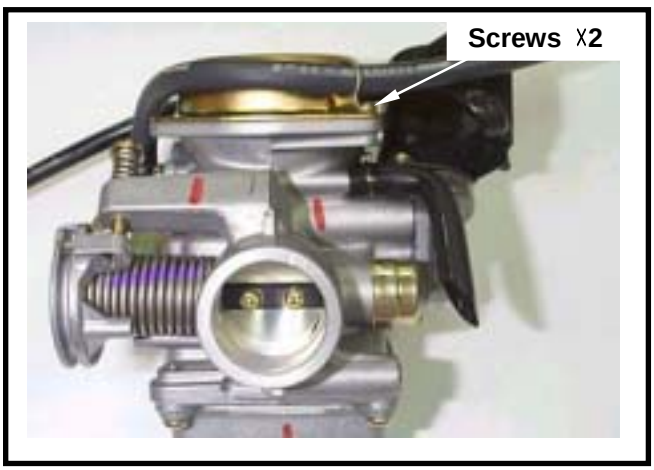
Carburetor Removal

Remove the trunk.
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 connectors.
Release the clamp strip of air cleaner.
Release the clamp strip of carburetor isolator.
Take the carburetor out.

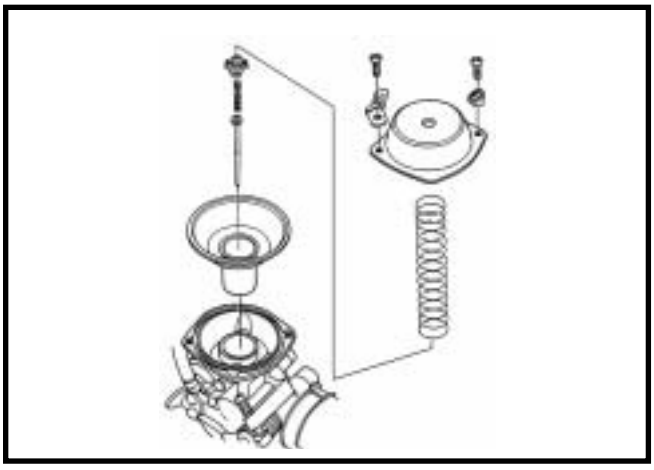




Vacuum Chamber
Removal
Loosen drain screw, and drain out residual fuel in float chamber.
Remove screws (2 screws) of vacuum chamber cover and the cover.



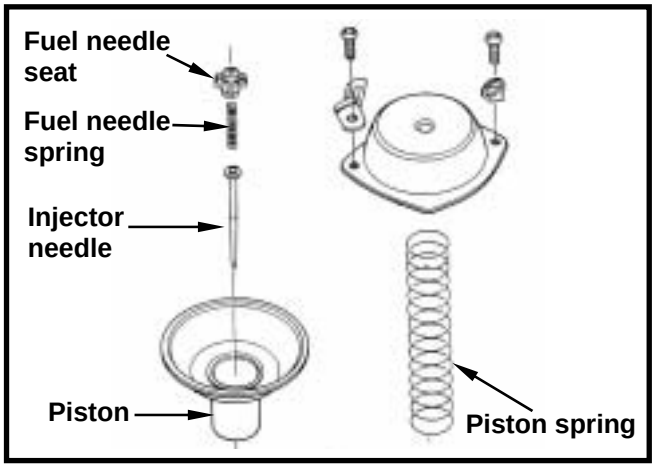
Remove compress spring and vacuum piston.



Remove fuel needle seat, spring, and injector needle.
Check if the vacuum piston for wear out, crack or other damage.
Check if the diaphragm for damage or crack.

Cautions

Do not damage vacuum diaphragm.



Installation

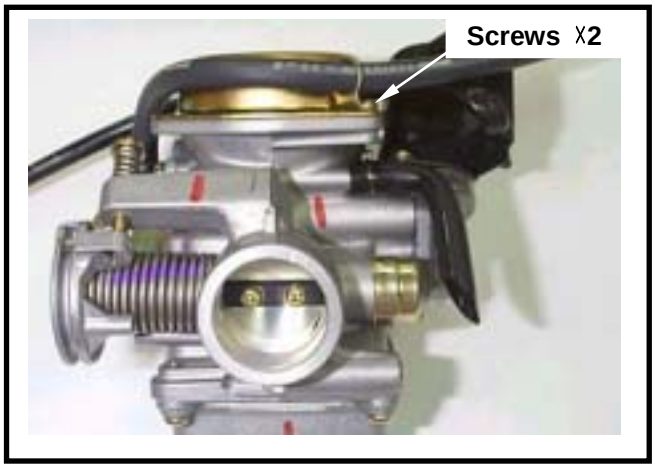
Install injector needle, spring and fuel needle seat to vacuum piston.

Cautions

- Note direction as installing the piston set because wrong direction of the piston cab not be installed.
- Align the indent of vacuum diaphragm with the carburetor body.

Install vacuum piston to carburetor body.
Install compress spring.

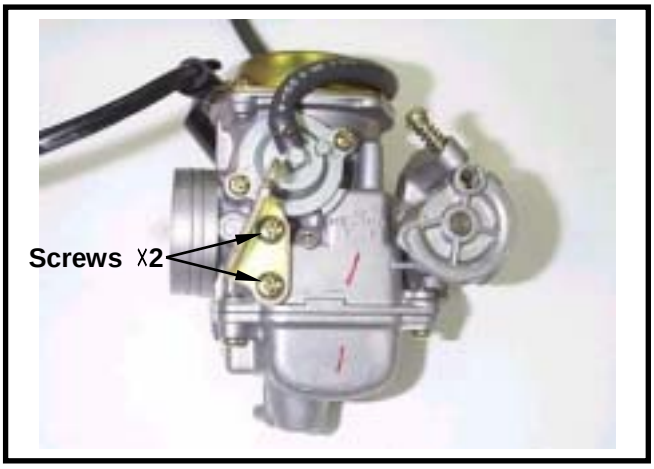
Install vacuum chamber cover and tighten 2 screws.



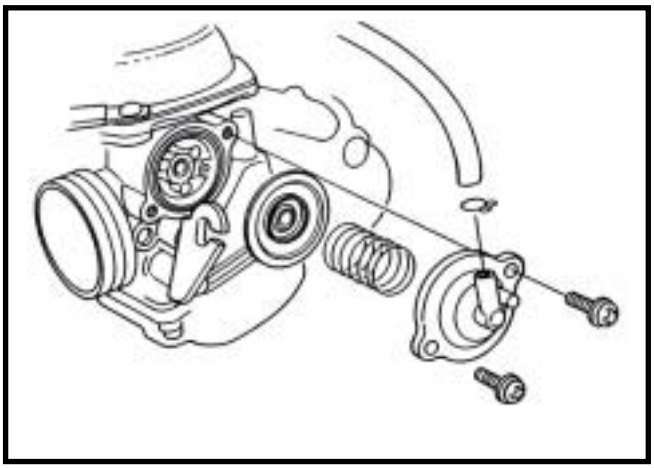
Air Cut-off Valve

Removal

Remove the vacuum hose clamp and then the vacuum hose.



Remove the screws (screw x 2) of the air cut-off valve and its cover.



Remove the spring and vacuum diaphragm. Check if the diaphragm for deterioration or crack.

Installation

Install the valve as reverse order of removal.

Cautions

Do not damage the vacuum diaphragm or in opposite installation direction.

Auto By-Starter

Inspection

Turn off engine and waiting for over 10 minutes for cooling.

Check resistance across the two terminals of the auto by-starter

Resistance value: Max. 10Ω (Measured after engine stopped for more than 10 minutes)

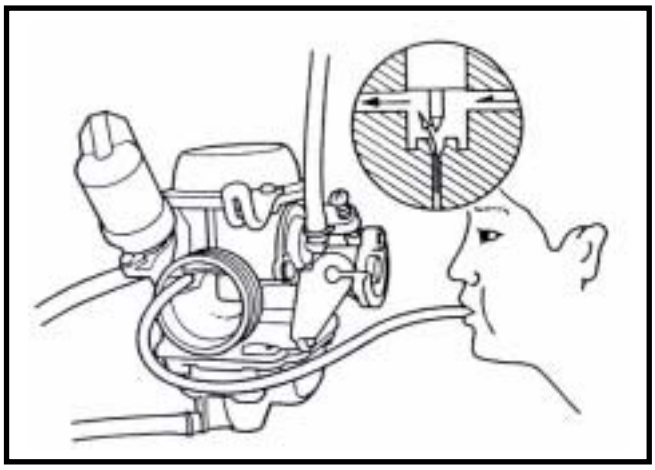
Replace the auto by-starter with a new one if resistance value exceeds standard.

Remove the carburetor, allow it to cool off for 30 minutes.

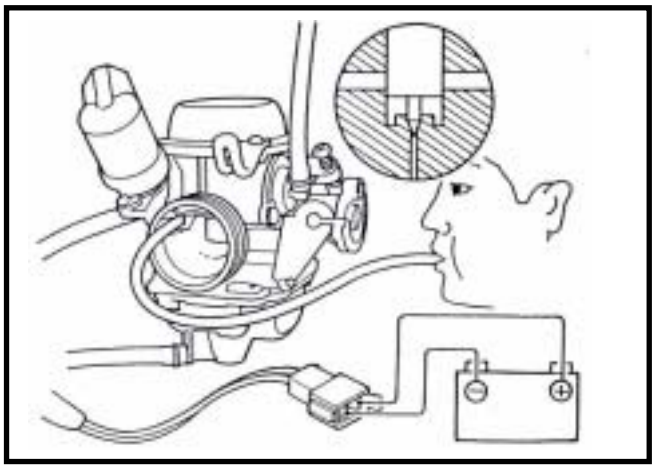
Connect a hose to fuel increase circuit.

Pump compressed air to the circuit.

Replace the auto by-starter if the circuit clogged.

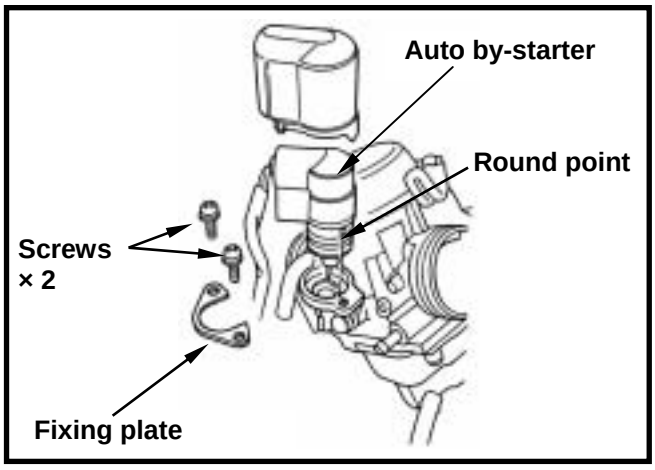


Connect battery posts (12V) to starter's connectors. After 5 minutes, test the increase circuit with compressed air. If air flow through the circuit, then replace the starter.



Removal

Remove fixing plate screw, and then remove the plate and auto by-starter from carburetor.



Valve inspection

Check if auto by-starter and valve needle for damage or wear out.

Installation

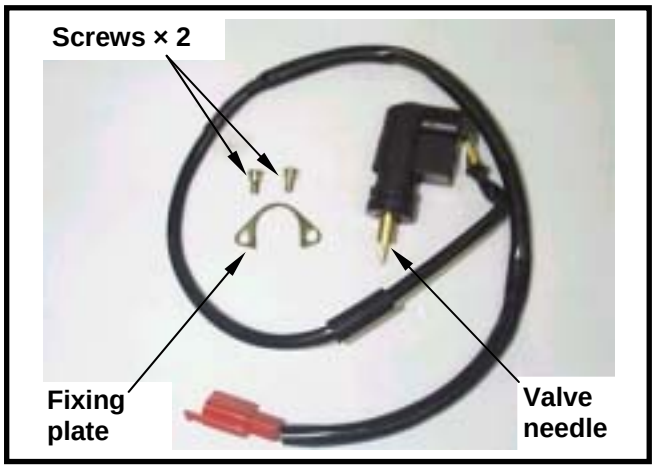
Install auto by-starter to the carburetor body.

Install fixing plate to the upper groove of auto by-starter, and install its flat surface to carburetor.

Install screw and tighten it.

Cautions

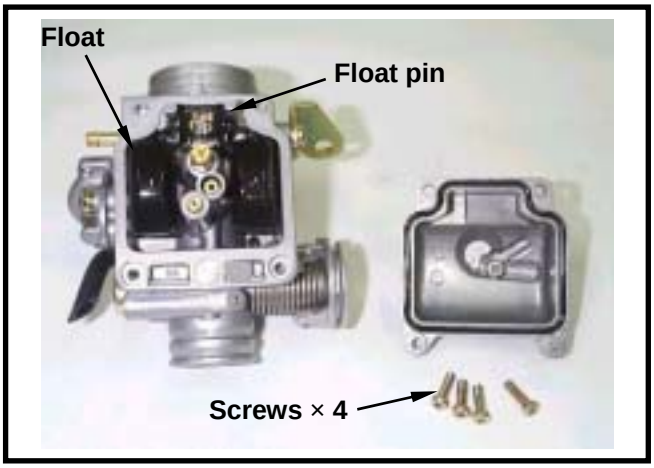
Align the round point of the starter with the screw hole of air intake side.



Float Chamber

Disassembly

Remove 4 mounting screws and then the float chamber cover.
Remove the float pin and float valve.

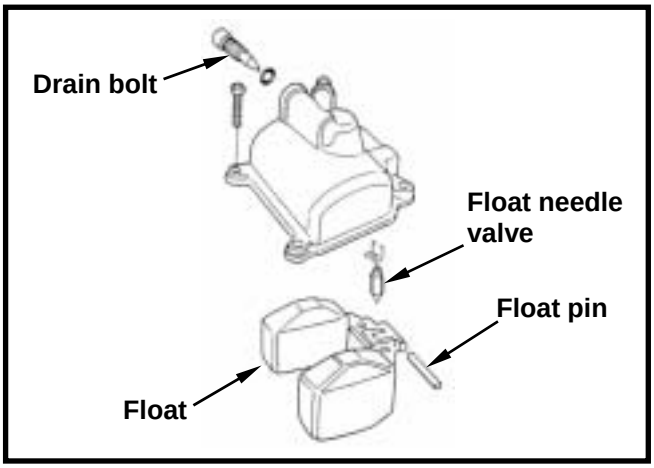


Checking

Check float needle valve and valve seat for drop difference damage, wear out, dirty or clogged.

Cautions

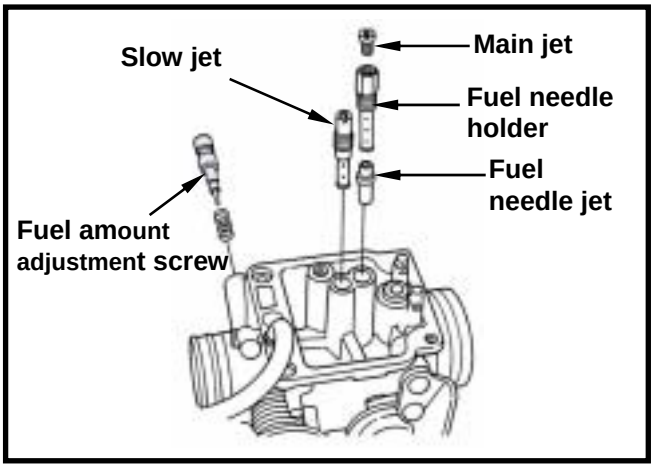
In case of worn out or dirt, the float valve and valve seat will not tightly close causing fuel level to increase and as a result, fuel flooding. A worn out or dirty float valve must be replaced with a new a new one.



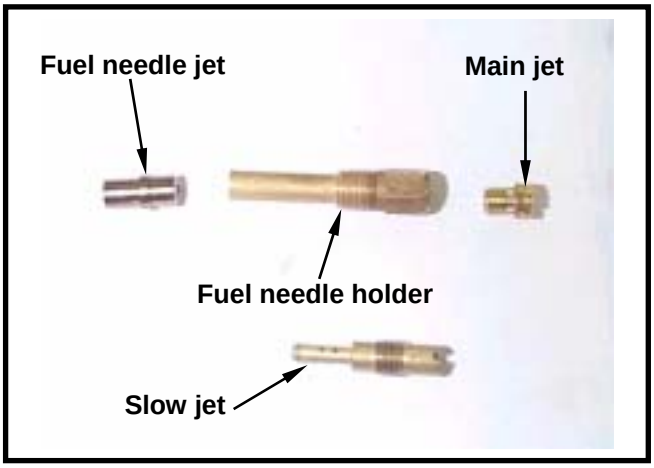
Remove main jet, fuel needle jet holder, fuel needle jet, slow jet, fuel amount adjustment screw.

Cautions

- Take care not to damage jets and adjust screw.
- Before removing adjustment screw, turn it all the way down and note the number of turns.
- Do not turn adjustment screw forcefully to avoid damaging valve seat face.



Clean jets with cleaning fluid.
Then use compressed air to blow dirt off.
Blow carburetor body passages with compressed air.



Installation
Install main jet, fuel needle jet seat, fuel needle jet, slow speed jet and fuel amount adjustment screw.

Cautions

Set the adjustment screw in according to number of turns noted before it was removed.

Install the float valve, float, and float pin.

Checking Fuel Level

Cautions

- Check again to ensure float valve, float for proper installation.
- To ensure correct measurement, position the float meter in such a way so that float chamber face is vertical to the main jet.

Fuel level: 17.5 mm

Installation Of Carburetor

Install carburetor in the reverse order of removal. Following adjustments must be made after installation.

- Throttle valve cable clearance adjustment
- Idle speed adjustment

Idle Speed Adjustment

Caution

- Fuel amount adjust screw was set at factory, so no adjustment is needed. Note the number of turns it takes to screw it all the way in for ease of installation.
- Never screw in forcedly to avoid damaging the screw seat.
- The main stand must be used to support the motorcycle to perform the

Use a tachometer when adjusting engine RPM. Screw in adjustment screw gently, then back up to standard turns.

Standard turns: 1 3/4±3/4 turns

Warm up engine, adjust throttle valve stopper screw to standard RPM.

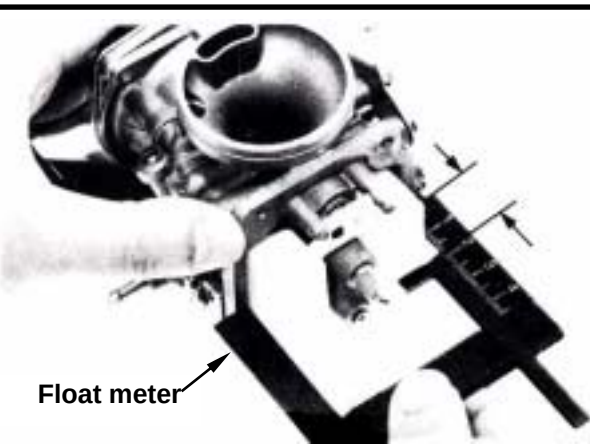
Idle speed rpm: 1700±100 rpm

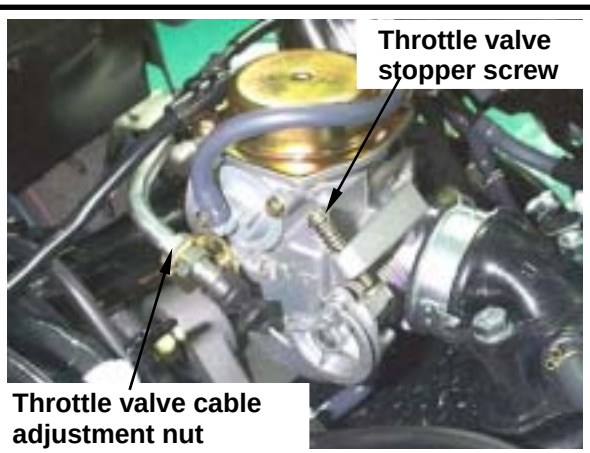
Connect the sampling hose of exhaust analyzer to exhaust front end. Press test key on the analyzer.

Adjust the air volume adjustment screw and read CO reading on the analyzer.

CO standard value: 1.0~1.5 %

Accelerate in gradual increments, make sure both rpm and CO value are in standard values after engine running in stable. If rpm and CO value fluctuated, repeat the procedures described above for adjusting to standard value.





Fuel Tank

Removal of fuel unit.

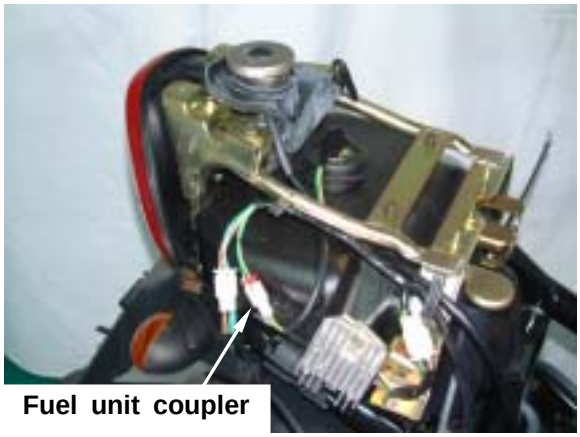
Open the seat.

Remove the luggage box assembly. (bolt x 4, screw x 1)

Remove the rear carrier. (bolt x 4)

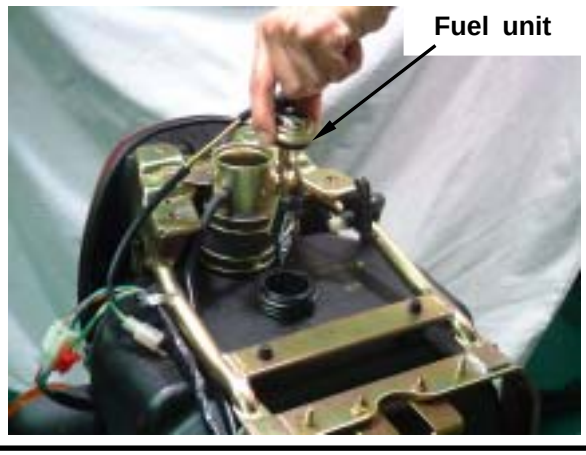
Remove both the left and right body covers. (screw x 4, bolt x 2)

Remove the fuel unit coupler.



Turn the plastic cap in CCW direction and then remove the fuel unit plastic cap.

Remove the fuel unit.



Caution

Do not bend the float arm.

Install in reverse order of removal procedures.

Remark: Aligning the slot of fuel unit with the ring of fuel tank as installation.

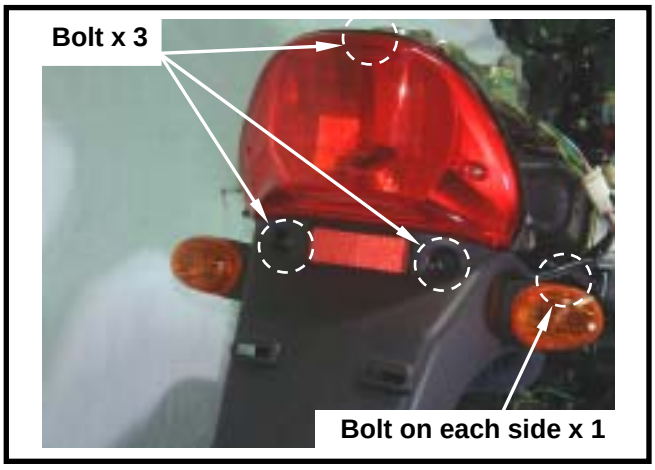
Removal of fuel tank

Open the seat.

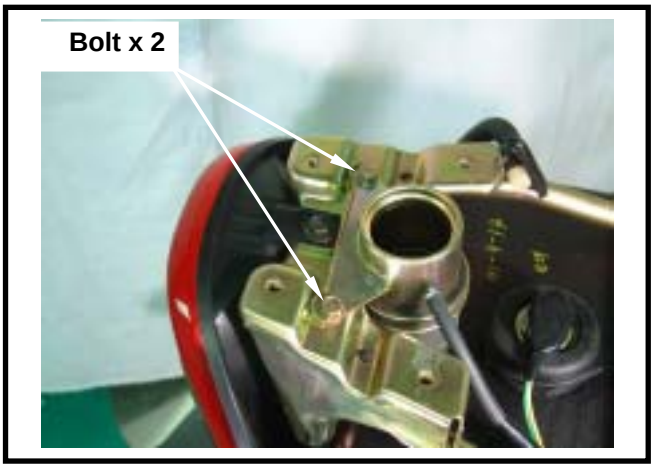
Remove the luggage box assembly. (bolt x 4, screw x 1)

Remove the body cover. (screw x 4)

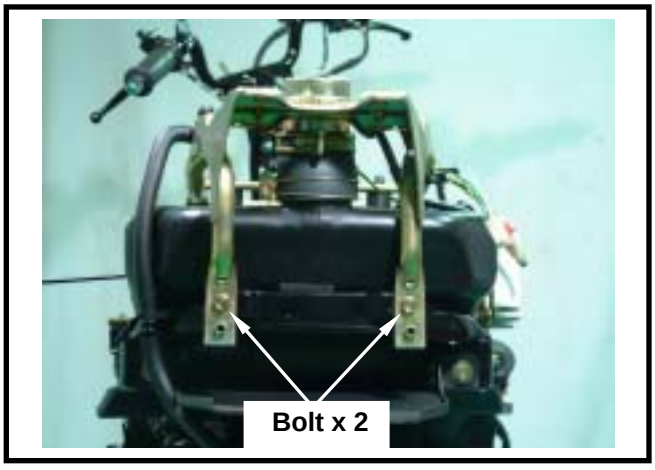
Remove the rear lamp and rear fender assembly. (screw x 4)

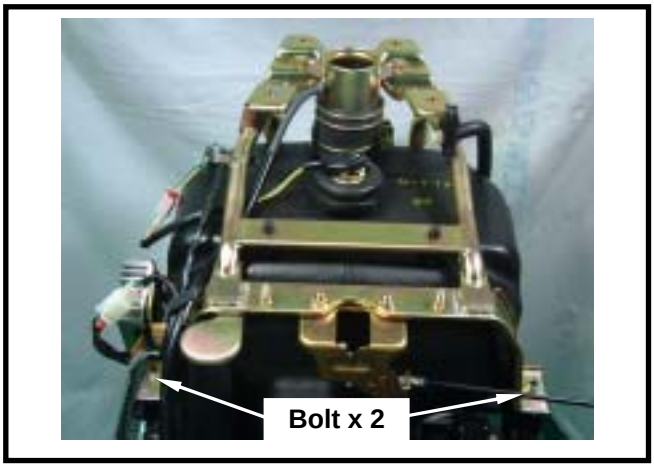


Remove the fuel inlet. (bolt x 2)



Remove the fuel tank mounting bracket. (bolt x 4)





Loosen the fuel inlet clamper and then remove the fuel vapor return hose.

Remove the fuel hose and then remove the fuel tank.

Caution

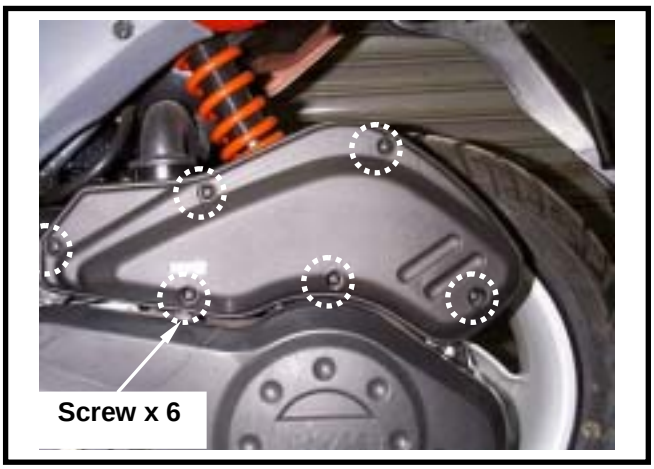
Be sure that the fuel in the fuel bank had been drain out clearly before removing.

Installation

Install the fuel tank in reverse procedure of removal.

Air Cleaner

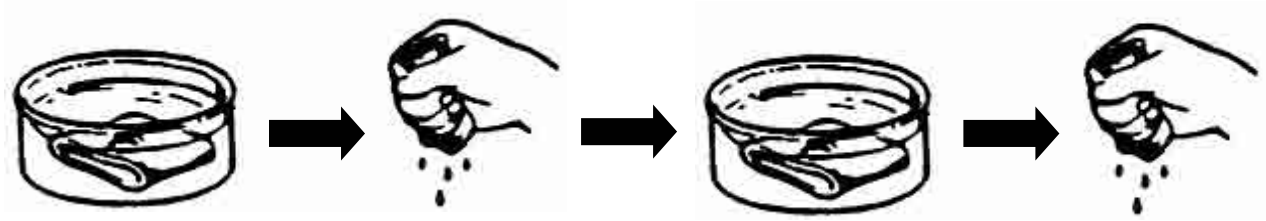
Remove the air cleaner cover. (screw x 6)



Remove the air cleaner assembly.

Installation:
Install the air cleaner in reverse procedure of removal.

Procedures for cleaning air cleaner element: (sponge type only)



1.clean. 2.squeeze dry. 3.soak in engine oil. 4.squeeze dry

NOTE:

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. Throttle valve
  2. Driving disk, driving belt, clutch, and transporting disk
  3. Final reduction gear mechanism

Specification

Item		Specification
Engine Oil Capacity	Replacement	800 c.c.
	Disassemble	1000 c.c.
Gear Oil Capacity	Replacement	100 c.c.
	Disassemble	110 c.c.

Torque Values

Engine suspension bolt (Frame side)	4.5~5.5 kgf-m
Engine suspension nut (engine side)	4.5~5.5 kgf-m
Bolt of rear shock absorber upper connection	3.5~4.5 kgf-m
Bolt of rear shock absorber lower connection	2.4~3.0 kgf-m
Bolt of rear brake clipper	2.9~3.5 kgf-m
Nut of rear wheel axle	11.0~13.0 kgf-m
Nut of exhaust connection	0.5~1.0 kgf-m
Bolt of exhaust fixed	3.0~3.6 kgf-m
Bolt of rear bracket	3.0~3.6 kgf-m

5. REMOVAL OF ENGINE

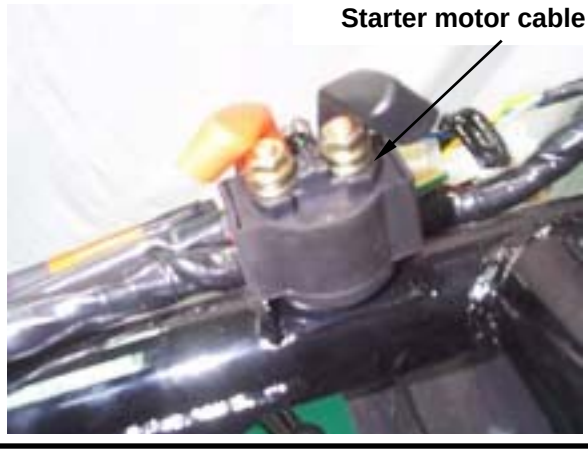
Engine Removal

Remove the battery cap (screw ×3).
Remove the battery negative (-) cable.
Remove the battery positive (+) cable.

Open the seat.
Remove the luggage box assembly. (bolt x 4, screw x 1)
Remove center cover. (screw x2)
Remove rear carrier and fuel tank cap. (hex-socket bolt x 4)
Remove both left & right body covers and center upper cover set. (screw x 4)
Remove both left & right side covers. (screw x4)
Remove both left & right pedals. (screw x 8)

Remove the connector of rear lamp power wire and generator wire.

Remove the starter motor cable on the relay.

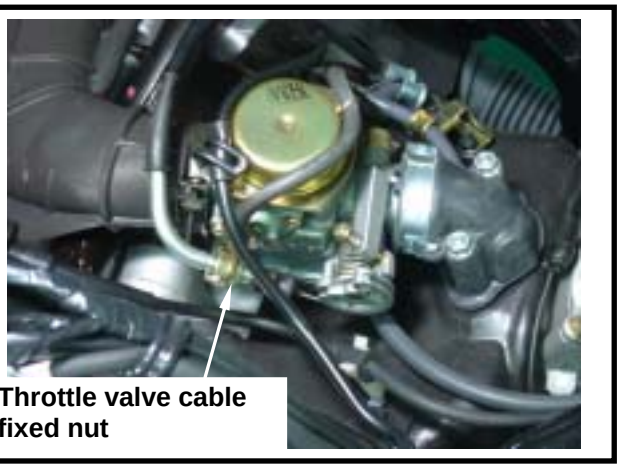


Remove the spark plug.
Remove the engine temperature sensor connector.

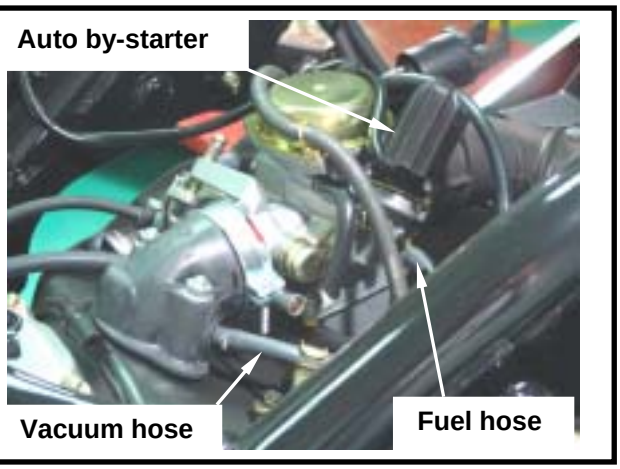
Caution

Open the latch located under the temperature sensor before disconnect it so that the connector can be pull out and not be damaged.

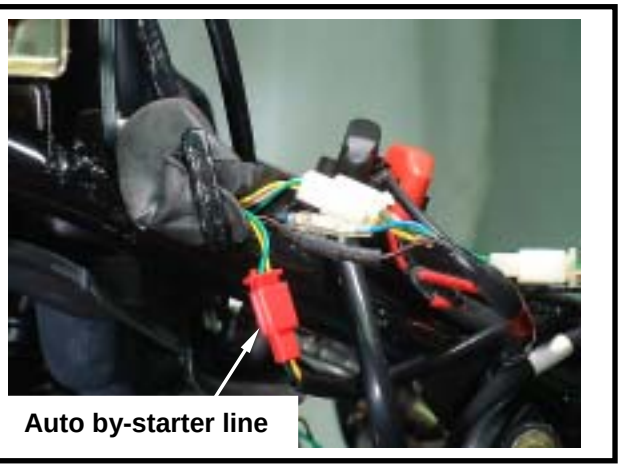
Loose the throttle valve cable fixed nut and remove the throttle valve cable.



Remove fuel hose, vacuum hose.

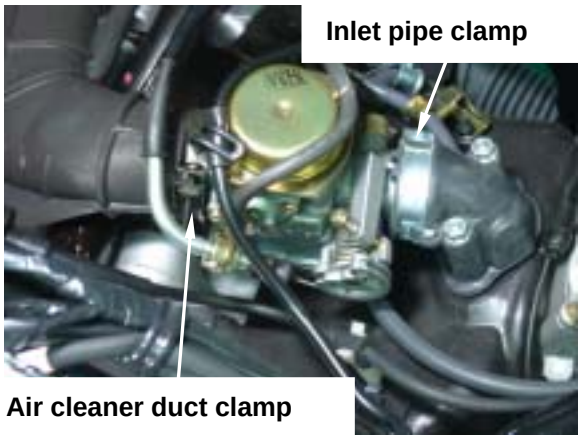


Disconnect auto by-starter line coupler.



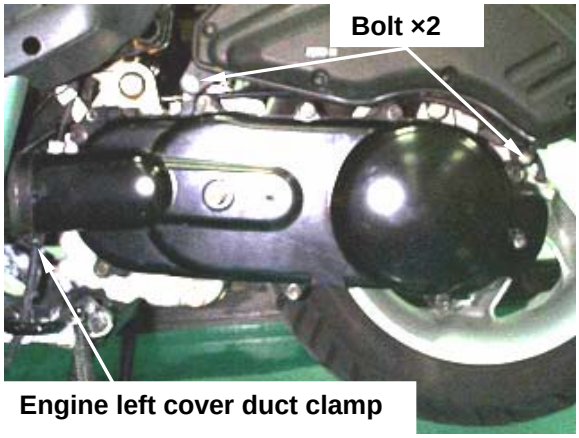
5. REMOVAL OF ENGINE

Loosen the clamp of the air cleaner duct, and then remove the duct.
Loosen the clamp of the inlet pipe, and then remove the carburetor.

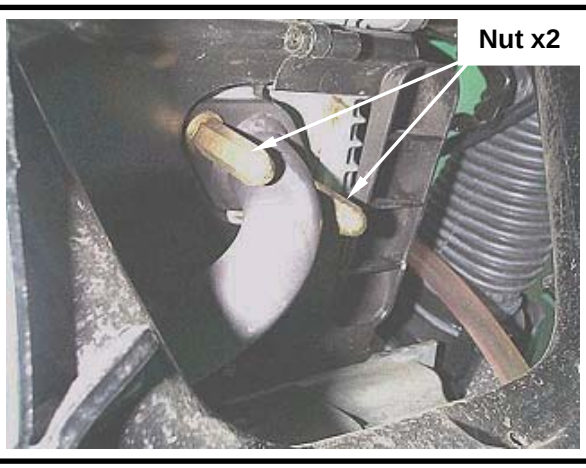


Remove the kick starter arm.(bolt×1)
Remove the engine left cover protecting cover. (screw×3)

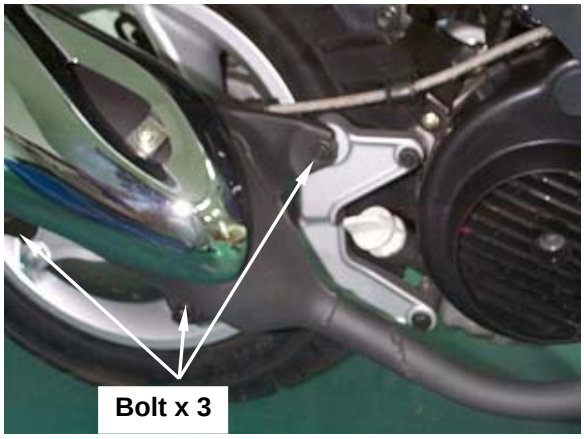
Loosen the clamp of the engine left cover air duct, and then remove the duct.
Remove the air cleaner fixed bolt. (blot×2)



Remove the front-end nuts of exhaust muffler. (Nut ×2)

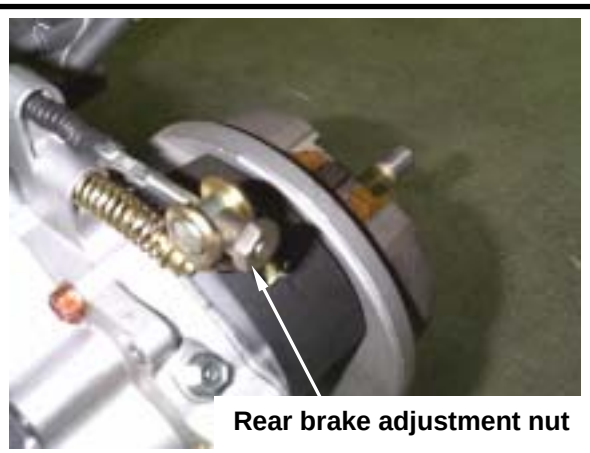


Remove the rear-end bolts of exhaust muffler. (Bolt ×3)
Remove the exhaust muffler.

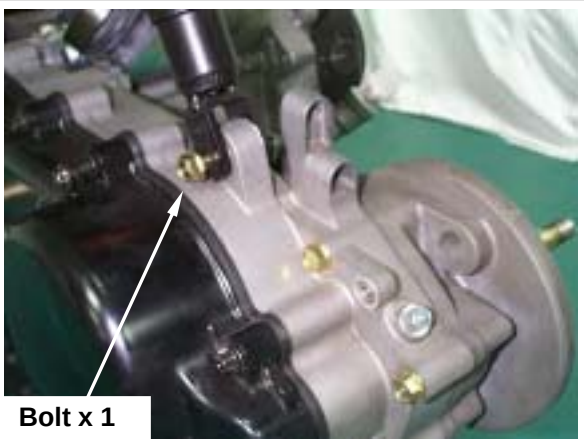


Remove the rear wheel and muffler rear bracket. (nut x 1)

Remove the rear brake adjustment nut.



Engine suspension removal
Remove the rear shock absorber lower bolt. (bolt x 1)



5. REMOVAL OF ENGINE

Remove the side hole cap of cooling fan.

Remove the engine suspension nuts, and then remove the bolt from the side hole.

Caution

With a bracket to support the engine to prevent from it damage by falling down as removing the engine.

Check if the engine suspension, rear shock absorber bushing, and cushion rubber for damage. Replace them with new ones if so.

Removal Of Engine Suspension Bushing

If engine suspension frame and the cushion rubber of rear shock absorber bushing damaged. Then, with the bushing remover / pressor, **Ø** 28mm & **Ø** 20mm, to press the bushing out, and replace it with new one.

Engine suspension bushing: **Ø 28mm**
Rear shock absorber bushing: **Ø 20mm**

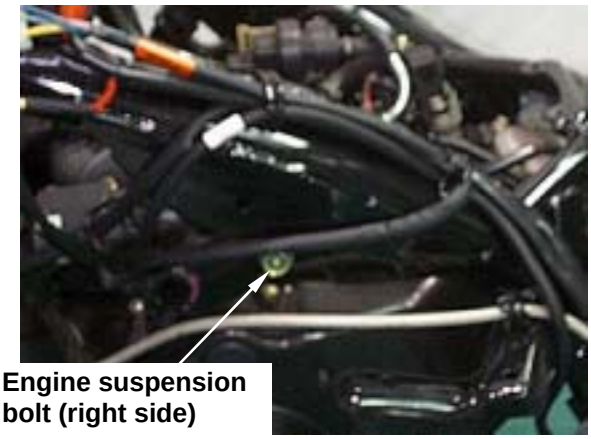
Pressing out
Place the detent section of the bushing remover toward the bushing, and drive both the pressing ring and bolt in to press the bushing out.

Pressing In
Place the flat section of the remover toward the bushing, and then drive the bushing, pressing ring, and bolt in to install the bushing.

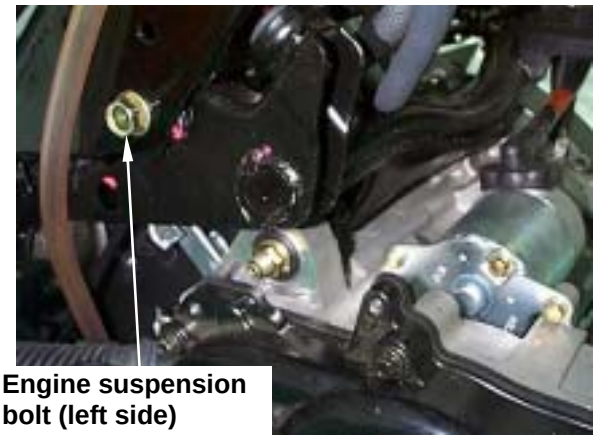
Engine Suspension Frame

Removal

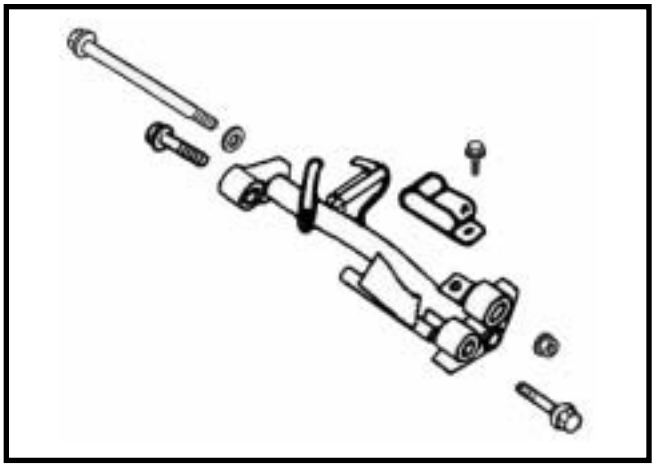
Remove the right side bolt of engine suspension frame.



Remove the left side bolt of engine suspension frame.



Check if the engine suspension frame bushing and cushion rubber for damage. If so, replace with new ones.



Installation

Tighten the bolts and nuts of engine suspension frame.

Engine suspension frame nut:
Torque Value: 4.5~5.5 kgf-m

Installation Of Engine

Check if the bushings of engine suspension frame and shock absorber for damaged. If so, replace with new ones.
Install the engine according to the reversing order of removal.

Caution

- Note both feet and hands safety for squeezing as engine installation.
- Do not bent or squeeze each wires or hose.
- Route all cables and wires in accordance with the routine layout.

Engine suspension nut:
Torque Value: 4.5~5.5 kgf-m

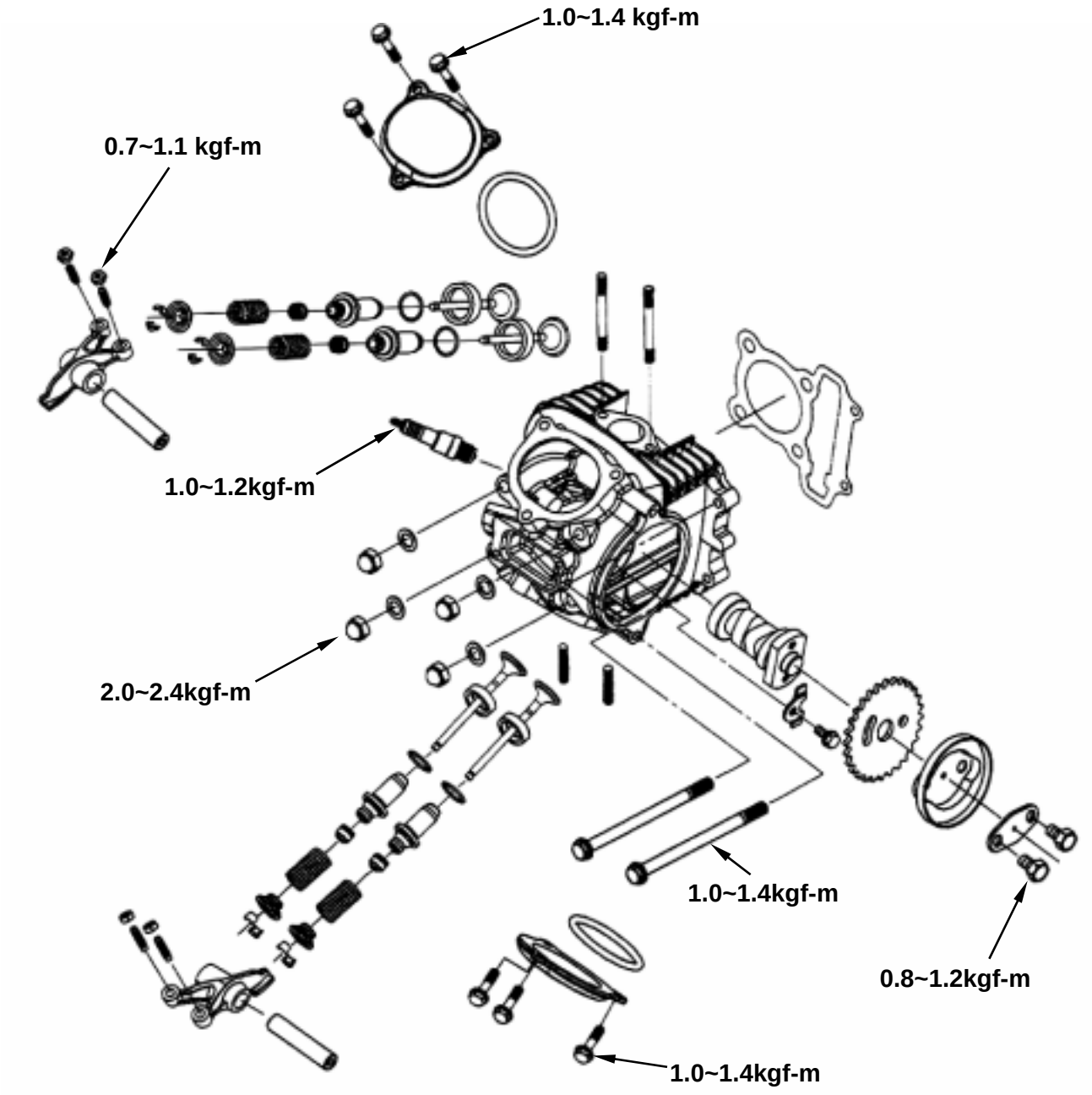
Rear shock absorber bolt:
Torque Value: Top: 3.5~4.5 kgf-m
Down: 2.4~3.0 kgf-m

Rear wheel axle nut:
Torque Value: 11.0~13.0 kgf-m

5. REMOVAL OF ENGINE

NOTE:

Mechanism Illustration



6. Cylinder Head/Valve

Precautions In Operation

General Information

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

Specification **Unit: mm**

Item			Standard	Limit
Compression pressure			12 ± 2 kg/cm²	-
Camshaft	Height of cam lobe	Intake	25.688	25.290
		Exhaust	25.519	25.120
Rocker arm	ID of valve rocker arm		12.000~12.015	12.100
	OD of valve rocker arm shaft		11.966~11.984	11.910
Valve	OD of valve stem	Intake	4.975~4.990	4.900
		Exhaust	4.950~4.975	4.900
	Guide seat		5.000~5.012	5.030
	Clearance between valve stem and guide	Intake	0.010~0.037	0.080
		Exhaust	0.025~0.062	0.100
	Free length of valve spring		35.000	31.500
	Valve seat width		1.000	1.600
Connection Flatness of cylinder head			-	0.050

Torque Value

Cylinder head bolt	1.0~1.4kgf-m
Cylinder head bolt (LH)	1.0~1.4kgf-m
Cylinder head Nut	1.8~2.2kgf-m (apply with oil on bolt thread & seat)
Sealing bolt of timing chain auto-tensioner	0.8~1.2kgf-m
Bolt of timing chain auto-tensioner	1.0~1.4kgf-m
Timing gear cover bolts	0.7~1.1kgf-m (apply with oil on bolt thread & seat)
Spark plug	1.0~1.4kgf-m

Tools

Special service tools

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

Troubleshooting

Engine performance will be effected by troubles on engine top-end. The troubles usually can be determinated or by performing cylinder compression test and judging the abnormal noise generated.

Rough Idle

- Low compression pressure

Low compression pressure

1. Valve

- Improper valve adjustment
- Burnt or bended valve
- Improper valve timing
- Valve spring damaged
- Valve carbon
- Poor sealing on valve seat
- Improper spark plug installation

2. Cylinder head

- Cylinder head gasket leaking or damage
- Tilt or crack cylinder surface

3. Piston

- Piston ring worn out

High compression pressure

- Too much carbon deposit on combustion chamber or piston head

Noise

- Improper valve clearance adjustment
- Burnt valve or damaged valve spring
- Camshaft wear out or damage
- Cam chain wear out or looseness
- Auto-tensioner wear out or damage of cam chain
- Camshaft sprocket wear out
- Rocker arm or rocker arm shaft wear out

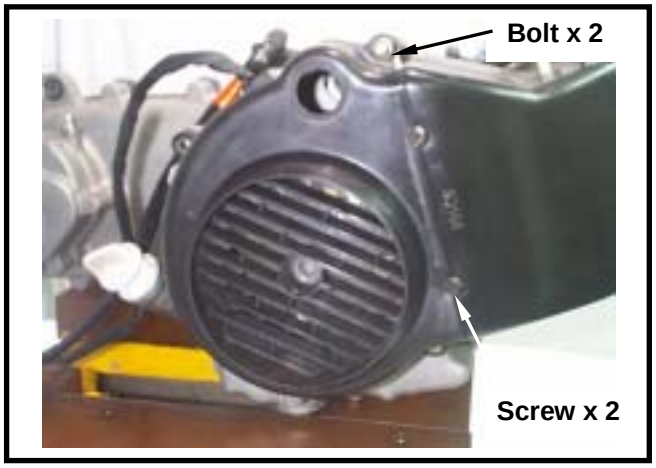
White smoke

- Valve guide or valve stem wear out
- Valve stem seal wear out

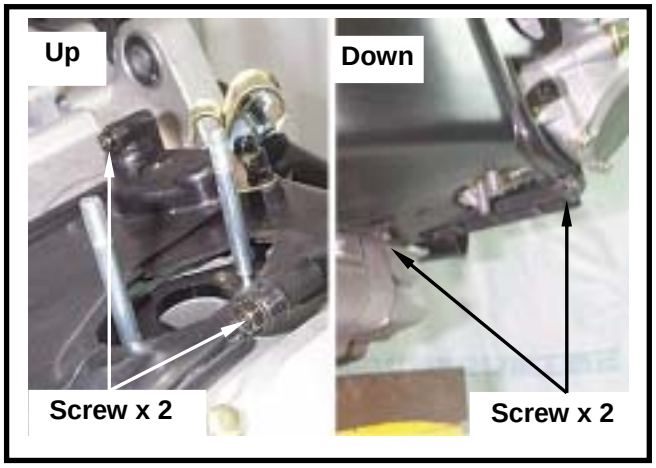
Cylinder Head Removal

Remove:

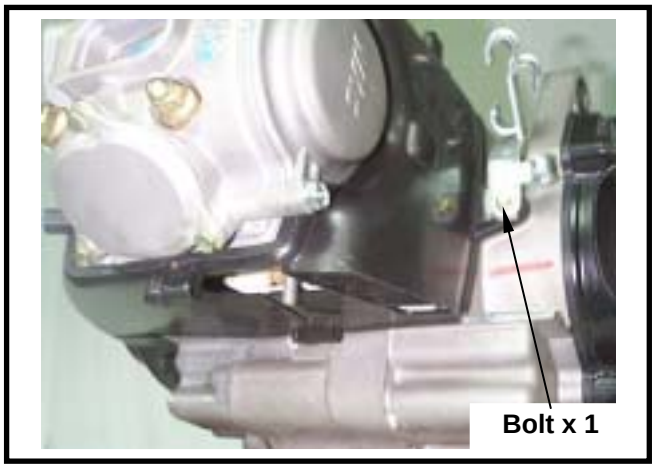
Remove the cooling fan cover. (screw x 2, bolt x 2)



Remove the right cover of engine. (screw x 4)

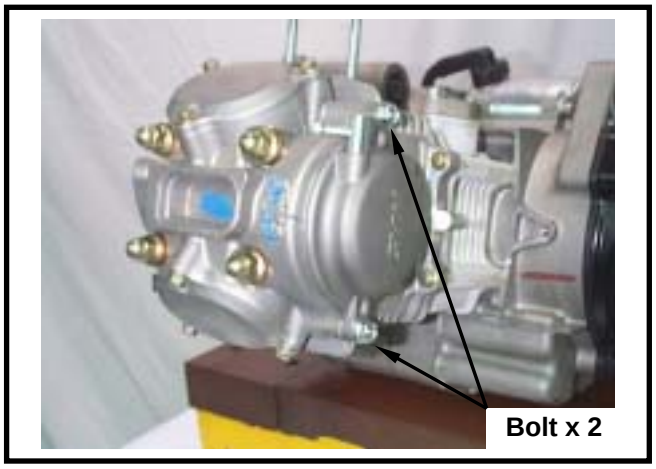


Remove the left cover of engine. (screw x 4)

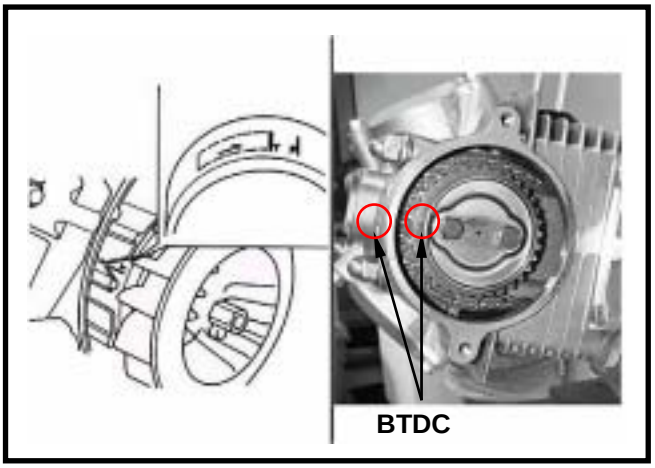


Remove the left cap bolt of cylinder head (bolt x2), and then remove the left cap of cylinder head.

Remove the spark plug.

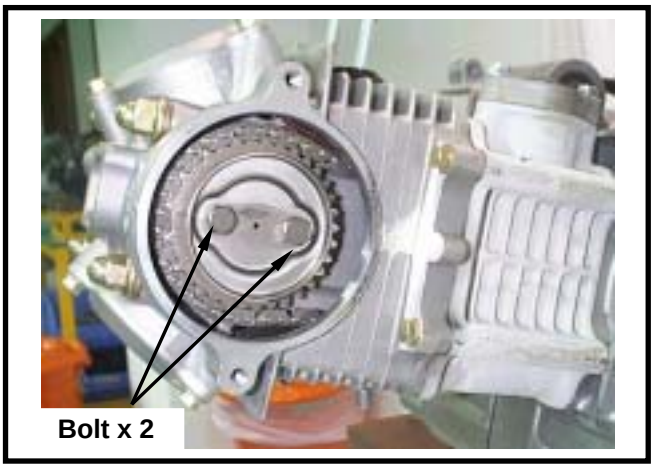


Turn the flywheel in counter clockwise motion with T type wrench until the “T” mark on flywheel aligned with the mark on the crankcase so that the hole on the camshaft sprocket is forward up and piston is at TDC position.



Loosen the screw cap of camshaft chain tensioner and remove O-ring.
With a flat screwdriver to tighten the screw of camshaft chain tensioner in a clockwise motion for release tensioner.

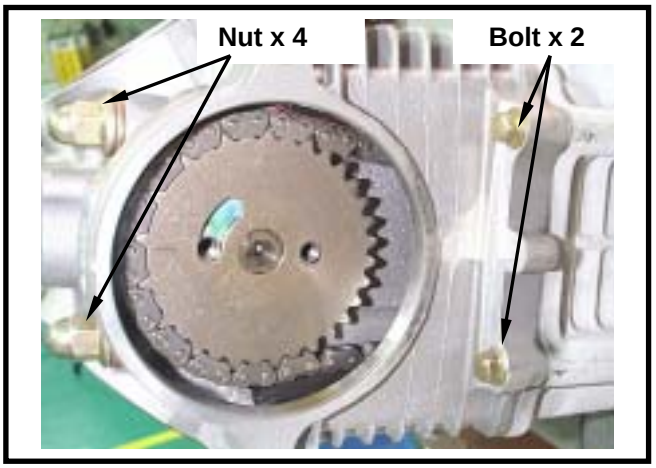
Remove the cam sprocket. (bolt x2)



Remove the left bolt (bolt x2) of cylinder head firstly, and then remove the 4 nuts & washers from the cylinder head top-end.
Pry out the chain and take out the sprocket.
Then, remove the cylinder head.

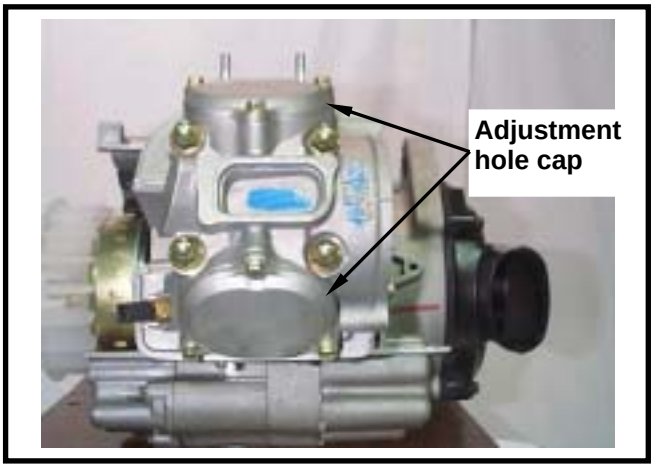
Caution

- Loosen the nuts diagonally by 2-3 sequences.
- Do not let the chain fall into the crankcase after removed the sprocket.

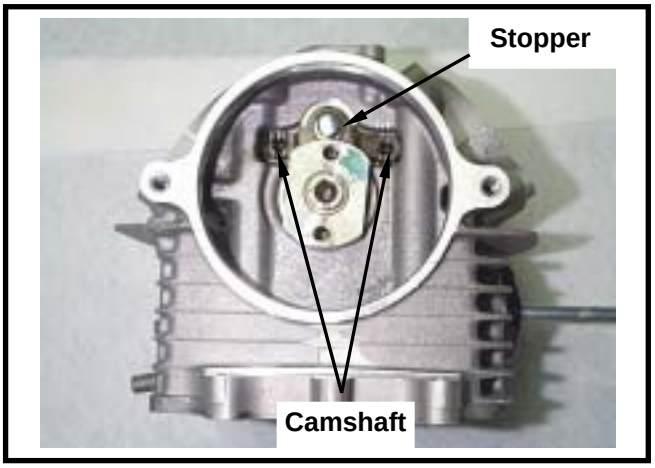


Cylinder Head Disassembly

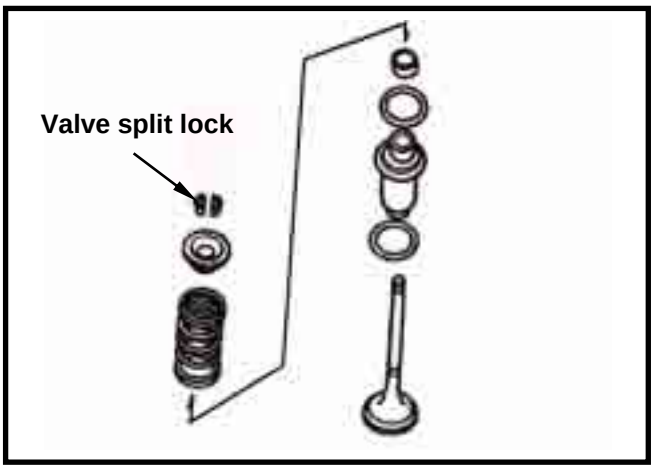
Remove the adjustment hole cap for the EX & IN valve clearance. (bolt x 6)



Firstly, remove the camshaft stopper, and then drive a 6mm bolt into camshaft. Finally, remove the camshaft and rocker arm.



Use a valve compressor to press the valve spring.
After removed valve split locks, release the compressor and then take out spring retainer, valve spring and valves.



Caution

In order to avoid loosing spring elasticity, do not press the spring too much. Thus, press length is based on the valve split locks in which can be removed.

Special Service Tool: Valve spring compressor

Or with the valve spring remover/installer to compress the valve spring directly. Then, remove the valve and valve spring.

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 spring remover/ installer.

Remove valve, valve stem and valve spring.

Cylinder Head Inspection

Camshaft

Inspect cam lobe height for damaged.

Service Limit:

IN: Replacement when less than 25.29mm

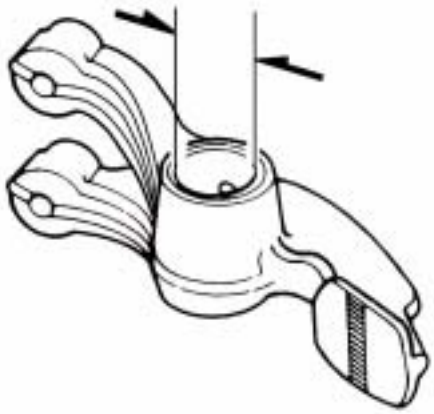
EX: Replacement when less than 25.12mm

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

Rocker Arm

Measure the cam rocker arm I.D.

Service Limit: Replace when it is less than 12.10 mm.



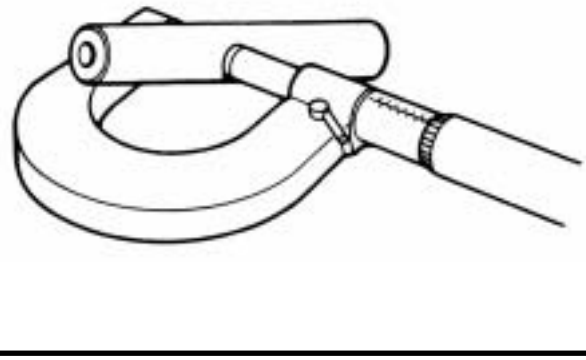
Rocker Arm Shaft

Measure the active O.D. of the cam rocker arm shaft and cam rocker arm.

Service Limit: Replace when it is less than 11.91 mm.

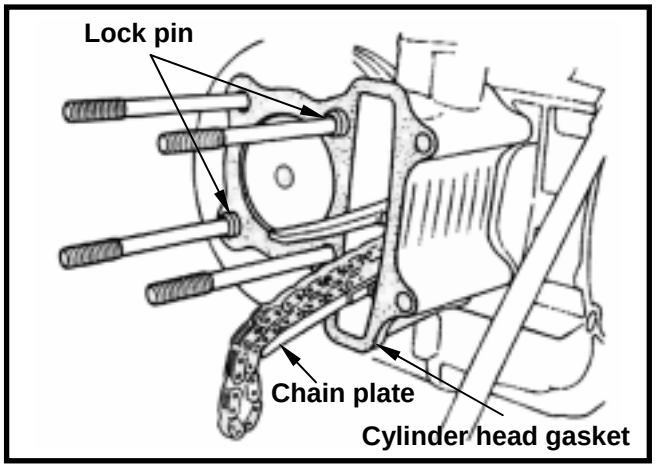
Calculate the clearance between the rocker arm shaft and the rocker arm.

Service Limit: Replace when it is less than 0.10 mm.



6. Cylinder Head/Valve

Remove cylinder head gasket and 2 lock pins.
Remove chain plate.
Clean up residues from the matching surfaces of cylinder and cylinder head.



Caution

- Do not damage the matching surfaces of cylinder and cylinder head.
- Avoid residues of gasket or foreign materials falling into crankcase as cleaning.

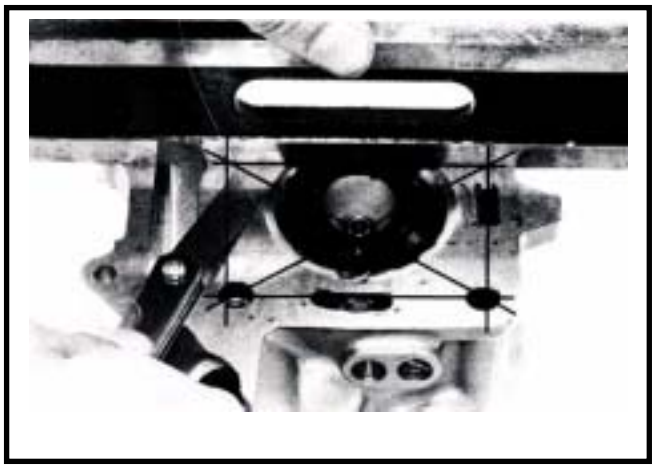
Remove valve stem guide seal.
Clean carbon deposits in combustion chamber.
Clean residues and foreign materials on cylinder head matching surface.

Caution

Do not damage the matching surface of cylinder head.

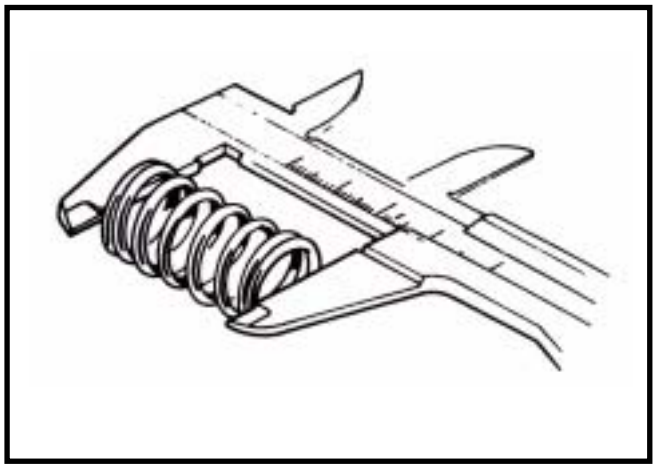
Cylinder Head

Check if spark plug and valve holes are crack.
Measure cylinder head plane with a straightedge and flat feeler gauge.
Service limit: 0.5 mm



Valve Spring Free Length

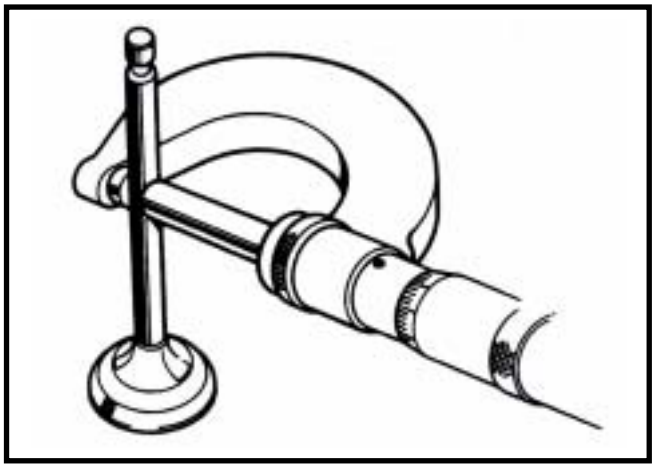
Measure the free length of intake and exhaust valve springs.
Service limit: 31.5 mm



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→4.90 mm**
EX→4.90 mm



Valve Guide

Caution

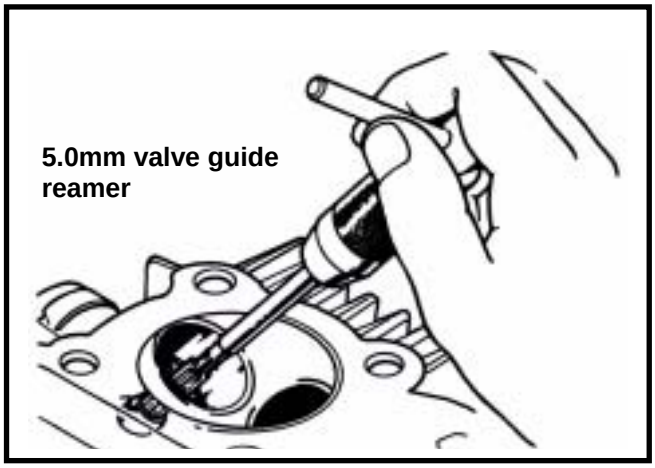
Before measuring the valve guide, clean carbon deposits with reamer.

Special Service Tool: 5.0mm valve guide reamer
Measure and record each valve guide inner diameters.

Service limit: 5.03 mm

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.

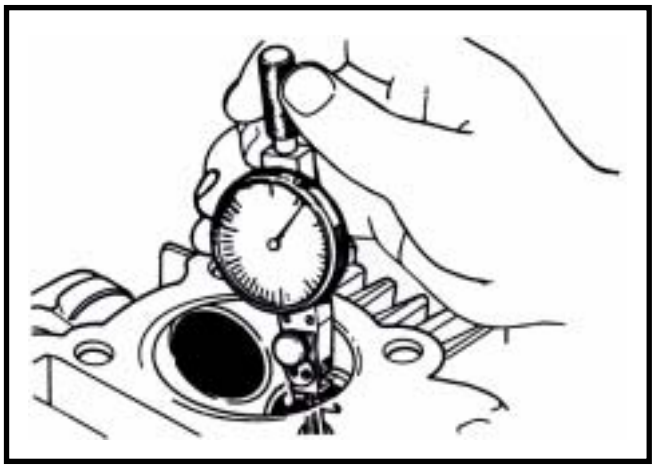
Service Limit: **IN→0.08 mm**
EX→0.10 mm



Caution

If clearance between valve stem and valve guide exceeded service limit, check whether the new clearance that only replaces new valve guide is within service limit or not. If so, replace valve guide.

Correct it with reamer after replacement.
If clearance still exceeds service limit after replaced valve guide, replace valve stem too.

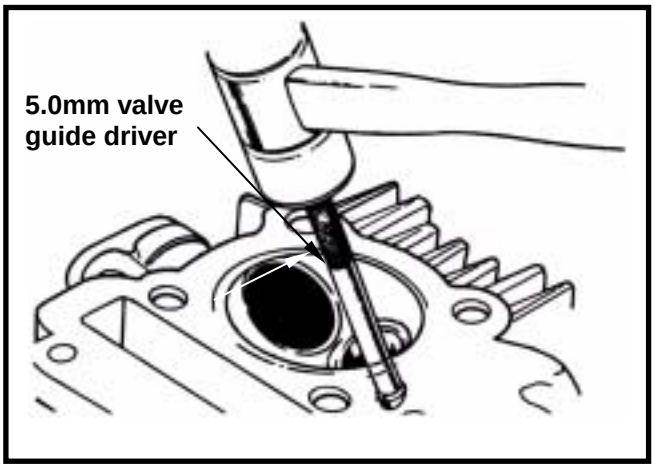


Caution

It has to correct valve seat when replacing valve guide.

Valve Stem Replacement

Heat up cylinder head to 100~150°C with heated plate or toaster.



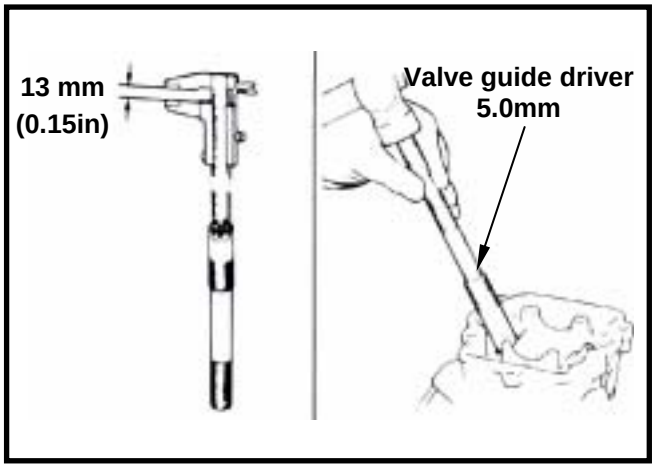
Caution

- Do not let torch heat cylinder head directly. Otherwise, the cylinder head may be deformed as heating it.
- Wear on a pair of glove to protect your hands when operating.

Hold the cylinder head, and then press out old valve guide from combustion chamber side.
Tool: Valve guide driver: 5 mm

Caution

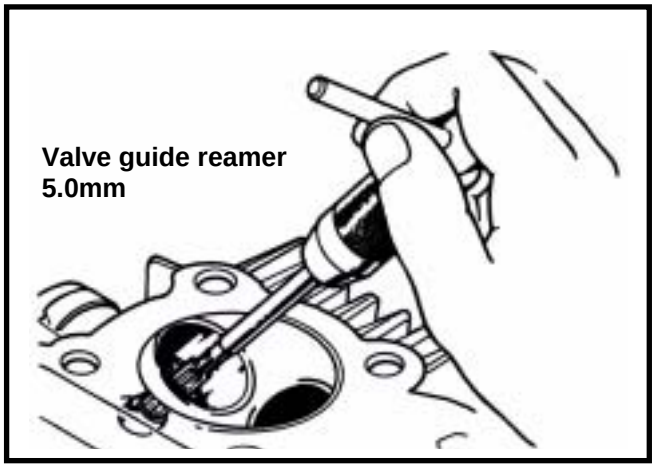
- Check if new valve guide is deformation after pressed it in.
- When pressing in the new valve guide, cylinder head still have to be kept in 100~150℃.



Adjust the valve guide driver and let valve guide height is in 13mm.
Press in new valve guide from rocker arm side.
Tool: Valve guide driver: 5 mm
Wait for the cylinder head cooling down to room temperature, and then correct the new valve guide with reamer.

Caution

- Using cutting oil when correcting valve guide with a reamer.
- Turn the reamer in same direction when it be inserted or rotated.



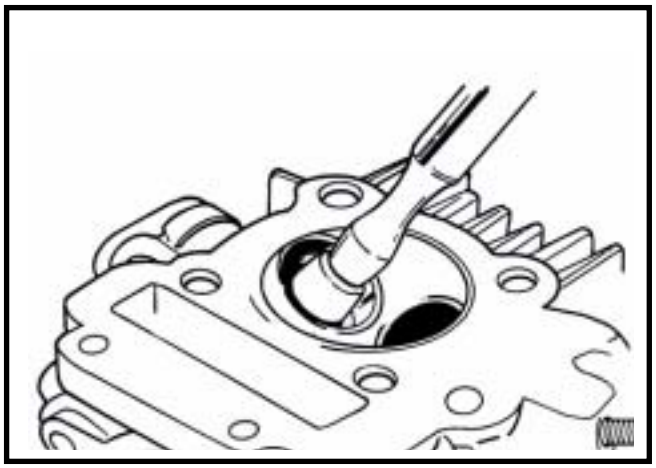
Correct valve seat, and clean up all metal residues from cylinder head.
Tool: Valve guide reamer 5 mm

Valve Seat Inspection And Service

Clean up all carbon deposits onto intake and exhaust valves.
Apply with emery slightly onto valve contact face.
Grind valve seat with a rubber hose or other manual grinding tool.

Caution

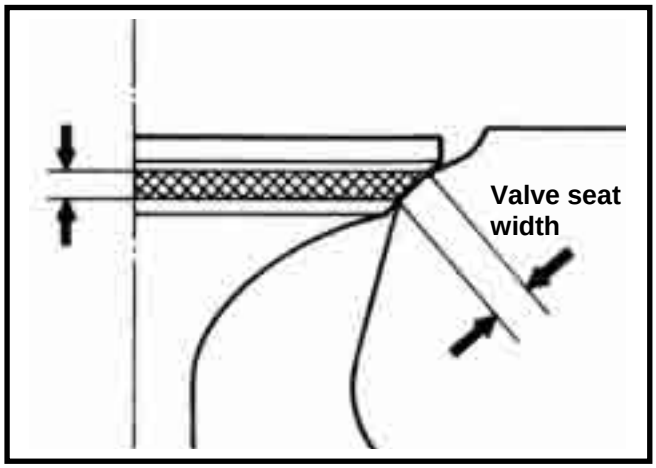
- Do not let emery enter into between valve stem and valve guide.
- Clean up the emery after corrected, and apply with red paint onto contact faces of valve and valve seat.



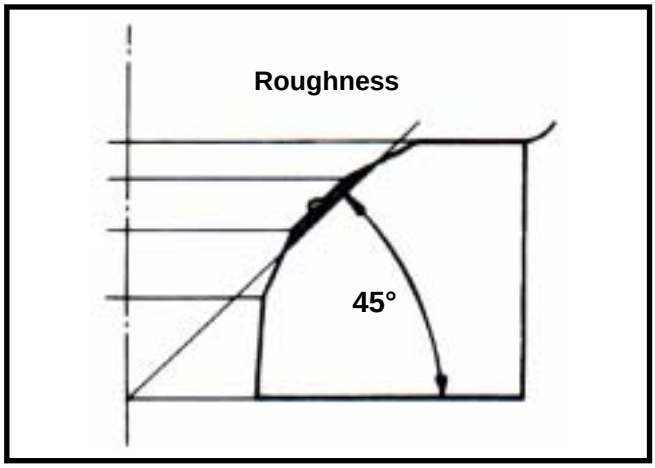
Remove the valve and check its contact face.

Caution

- Replace the valve with new one if valve seal is roughness, wear out, or incomplete contacted with valve seat.
- If the valve and the valve seat still can not be matched sealing after grinded, replace it with new one.



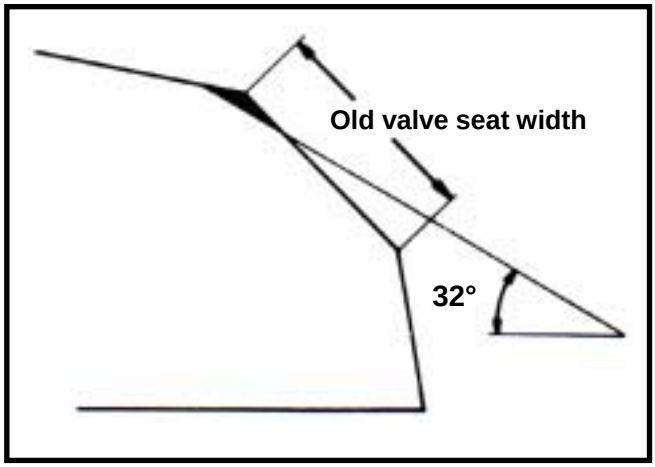
Valve Seat Inspection
If the valve seat is too width, narrow or rough, correct it.
Valve seat width
Service limit: 1.6 mm
Check the contact condition of valve seat.
Valve Seat Grinding
The worn valve seat has to be grinded with valve seat chamfer cutter.
Use 45° valve seat chamfer cutter to cut any rough or uneven surface from valve seat.



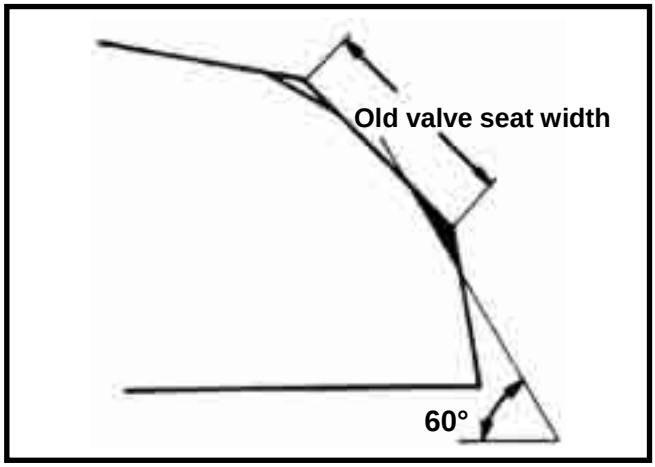
Caution

After valve guide had been replaced, it has to be grinded with 45° valve seal chamfer cutter to correct its seat face.

Use 32° cutter to cut a quarter upper part out.



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

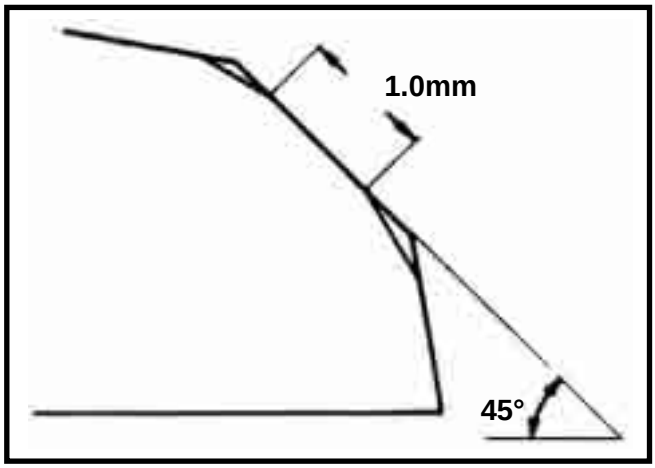


Use 45° cutter to grind the valve seat to specified width.

Caution

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

Grind valve seat again if necessary.

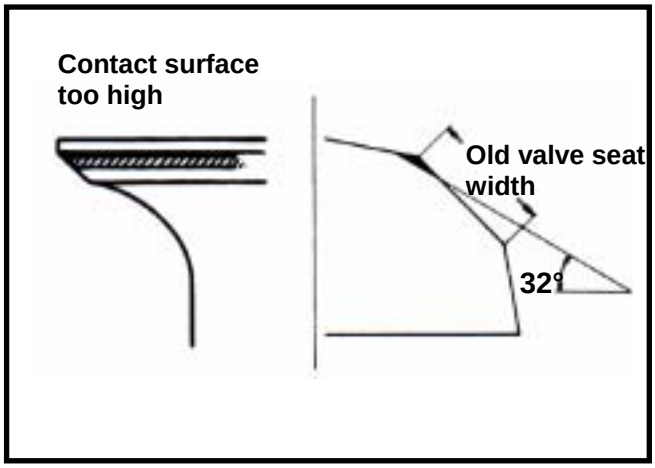


Coat the valve seat surface with red paint.
Install the valve through valve guide until the valve contacting with valve seat, slightly press down the valve but do not rotate it so that a seal track will be created on contact surface.

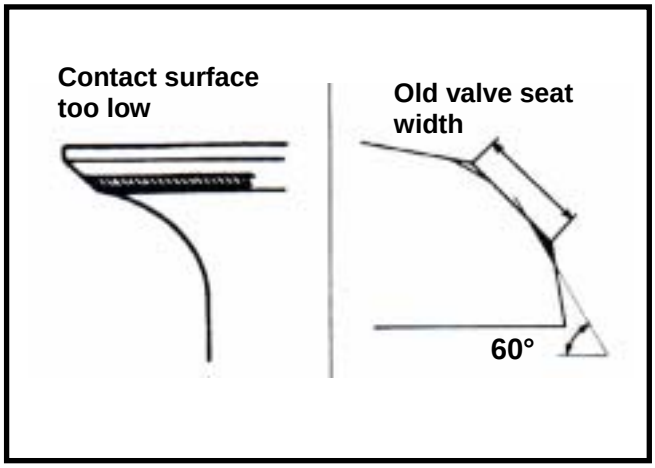
Caution

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

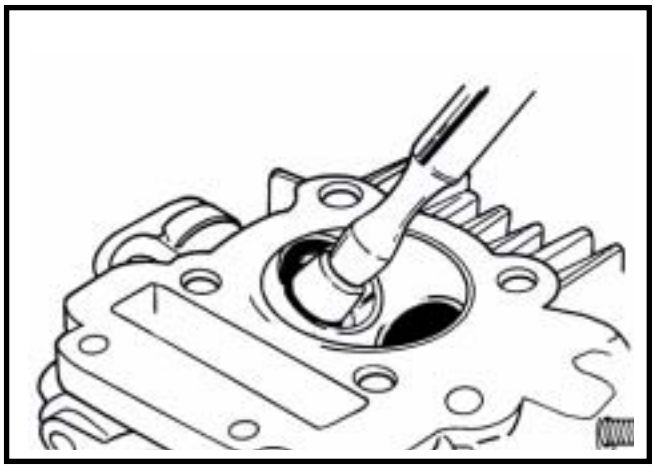
If the contact surface too high, grind the valve seat with 32° cutter.
Then, grind the valve seat to specified width.



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 grinded, coat valve seat surface with emery and then slightly press the grinded surface.
Clean up all emery coated onto cylinder and valve after grinded.

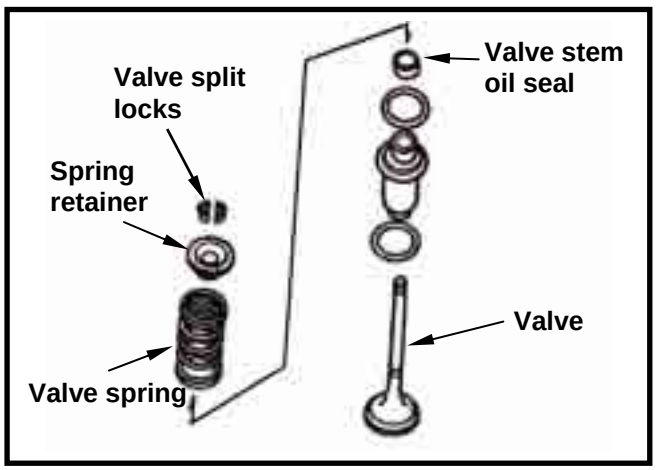


Cylinder Head Reassembly

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 loosing spring elasticity, do not press the spring too much. Thus, press length is based on the valve split locks in which can be removed.

Special Service Tool: Valve spring compressor

Or with the valve spring remover/installer to install valve and spring.
Firstly, install valve spring, retainers onto the valve as assembling.

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.

With the valve spring remover/installer, compress the valve spring directly. Then, remove the valve and valve spring.

Special Service Tool: Valve spring remover/ installer.

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

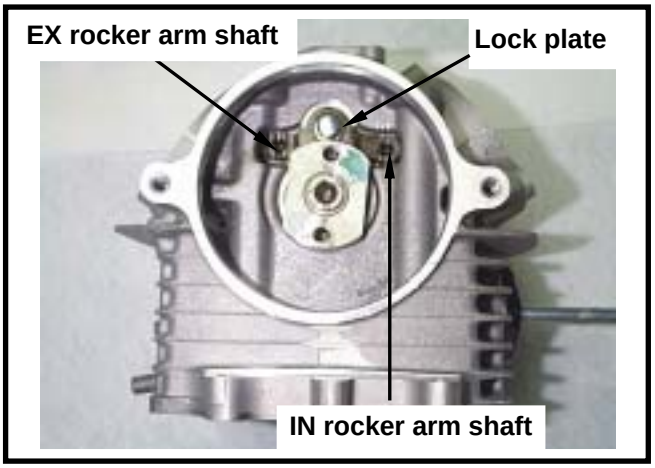
Caution

Place and hold cylinder head on to working table and place a rag against onto the valve so that can prevent damage valve stem and cylinder head.

Install the camshaft onto the cylinder head and then the rocker arm and the rocker arm shaft. Lock the lock plate after rotate the rocker arm shaft to properly position.

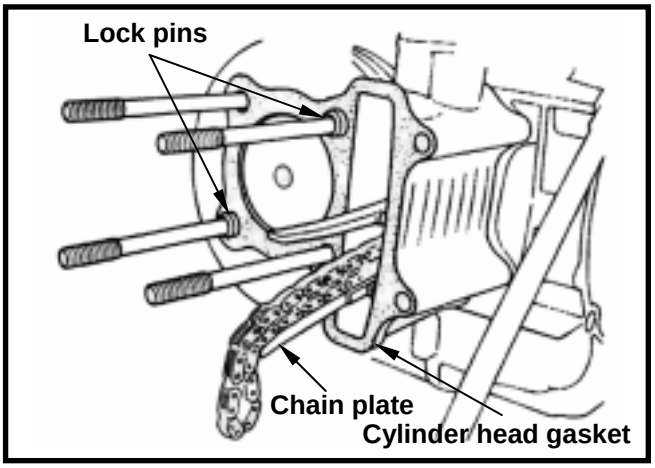
Caution

There is different shapes on the top-end of rocker arm shaft. The machined surface on the rocker arm shaft has to face toward exhaust side, and then the larger surface has to align with the bolt hole of cylinder



Cylinder Head Installation

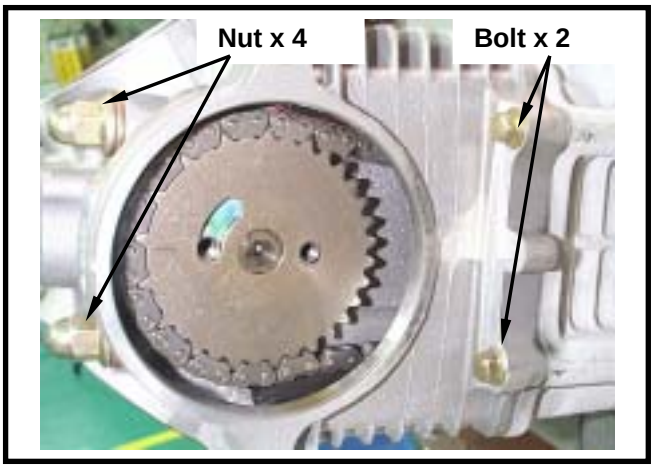
Install the lock pins and new cylinder head gasket onto the cylinder head.
Install the camshaft chain plate.



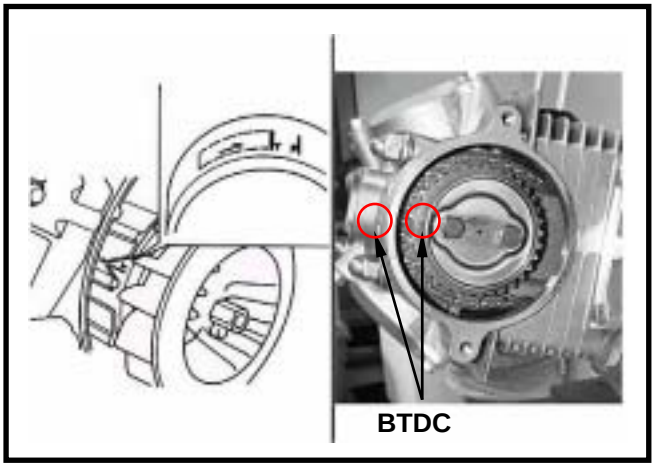
Install the cylinder head.
Tighten the 4 nuts onto the cylinder head top-end, and then the 2 cylinder head mounting bolts on its side.
Torque value: 2.0~2.4 kgf-m

Caution

This model is equipped with precious 4 valves mechanism so tighten torque can not be over the limited value and tightening the bolts diagonally by 2-3 sequences. It can prevent from cylinder head deformation and then cause noise or leaking problems so that effect motorcycle's performance.

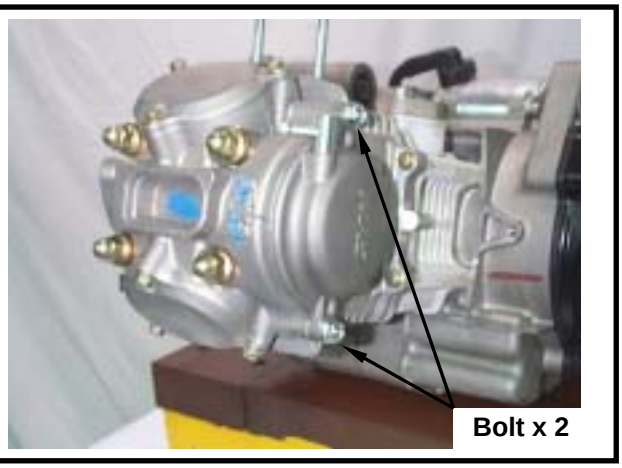


With T type wrench to turn crankshaft in a clockwise motion so that the "T" mark on the alternator flywheel aligns with the mark on crankcase. (piston is at TDC position)
Place the TDC marks of the cam sprocket at same level of the top-end of cylinder head. The other single hole of the cam sprocket is in upward. Then, install the cam chain onto the cam sprocket.



Install the spark plug and tighten it.
Torque value: 1.0~1.2 kgf-m

Tighten the cylinder head right side cover. (bolt x 2)

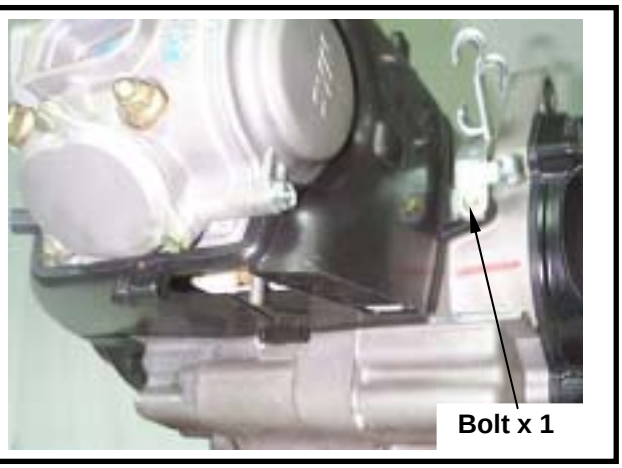


With flat screwdriver, turn the cam sprocket tensioner in counter-clockwise motion so that the tensioner is pushed out to contact the cam chain plate tightly. Apply with oil onto a new O-ring and then install it onto the tensioner hole. Tighten the bolt cap of the tensioner adjustment hole.

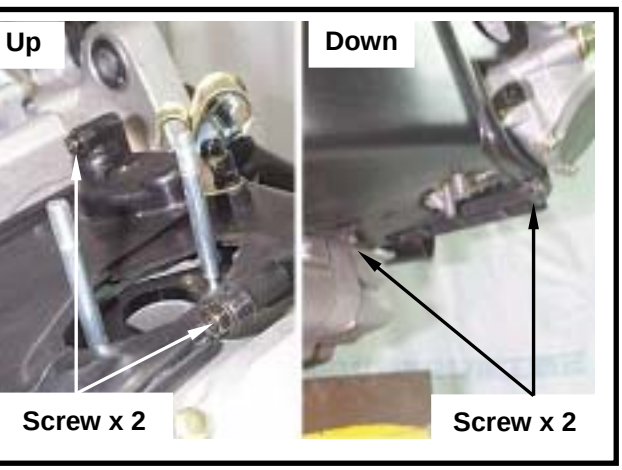
Caution

The O-ring must be installed into glove.

Install the left-side cover of the engine body. (bolt x 1)



Install the right-side cover of the engine body. (screw x 4)



Install the cooling fan cover. (screw x2, bolt x 2)

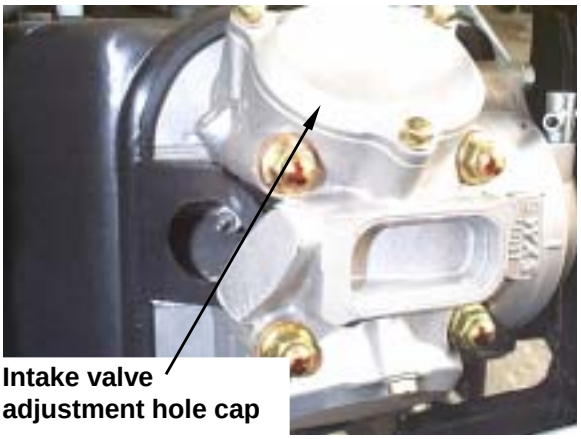
Valve Clearance Adjustment

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 0.12 ± 0.02 mm**
EX 0.12 ± 0.02 mm

Install the valve clearance adjustment hole cap. (bolt x2)

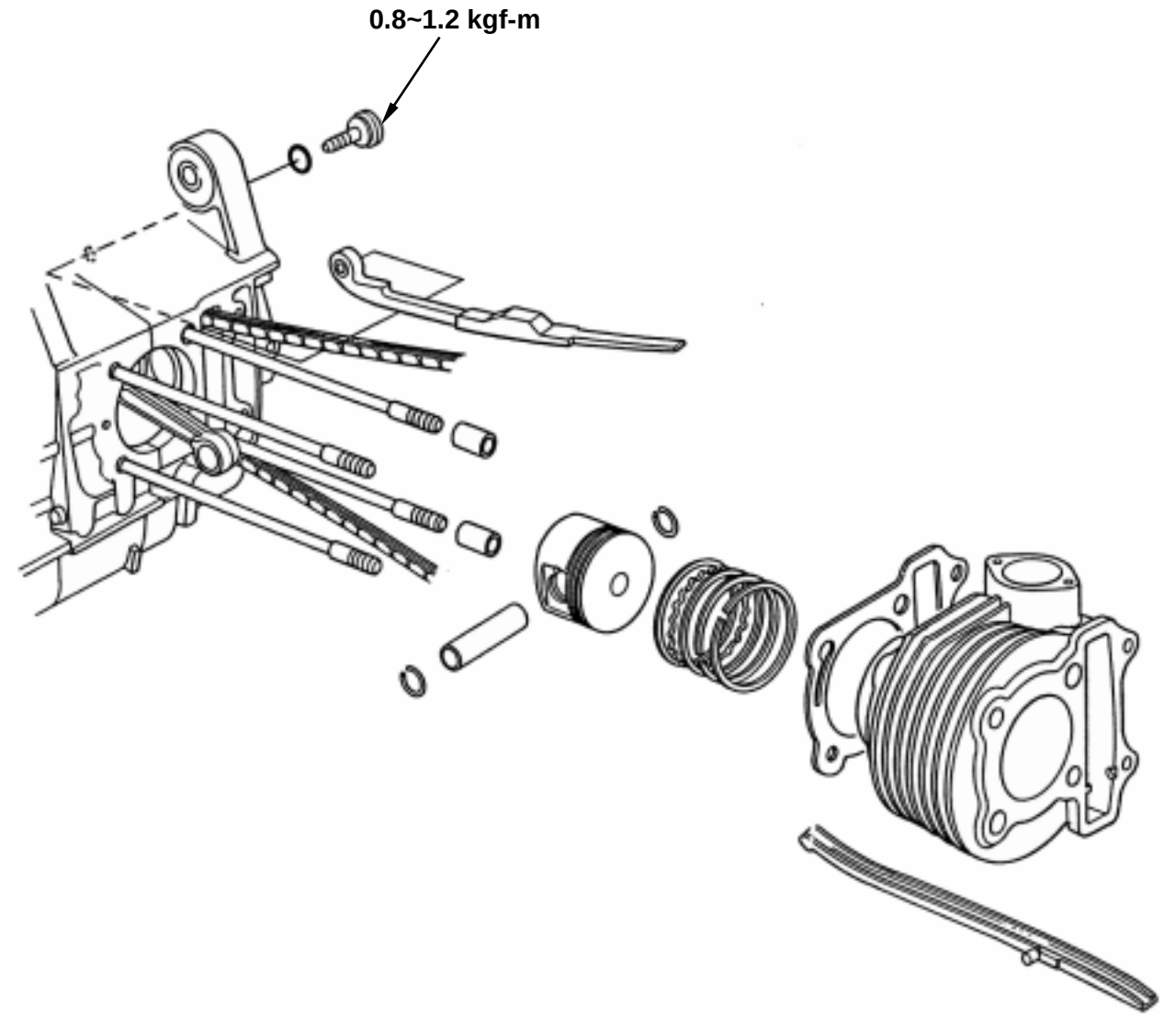
Start the engine after assembly. Remove the intake valve adjustment hole cap and make sure that engine oil flows onto the cylinder head.
Stop the engine after confirmed, and then install the intake valve adjustment hole cap.
Install the seat cushion and the central cover.



Caution

- The cylinder components will be serious wear out if lubricant did not flow onto the cylinder head. So it has to be confirmed.
- It has to be in idle speed when conduct this procedure. Never increase engine speed in high RPM.

Mechanism Illustration



7. Cylinder/Piston

Precautions In Operation

General Information

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

Specification **Unit: mm**

Item			Standard	Limit
Cylinder	ID		52.400~52.410	52.500
	Bend/wrapage		—	0.050
	Cylindrical roundness		—	0.050
	Cylindrical roundness		—	0.050
Piston/Piston ring	Clearance between piston rings	Top ring	0.025~0.060	0.090
		2nd ring	0.015~0.050	0.090
	Ring-end gap	Top ring	0.100~0.250	0.500
		2nd ring	0.250~0.400	0.650
		Oil ring side rail	0.200~0.800	—
	OD of piston		52.370~52.390	52.300
	Piston OD measurement position		Lower-end up 9mm of piston skirt	—
	Clearance between piston and cylinder		0.010~0.040	0.100
	ID of piston pin boss		15.002~15.008	15.040
OD of piston pin			14.994~15.000	14.960
Clearance between piston and piston pin			0.002~0.014	0.020
ID of connecting rod small-end			15.016~15.034	15.060

Trouble Diagnosis

Low Or Unstable Compression Pressure

- Cylinder or piston ring worn out

High Compression Pressure

- Carbon deposit onto the piston & combustion chamber

Knock or Noise

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

Smoking in Exhaust Pipe

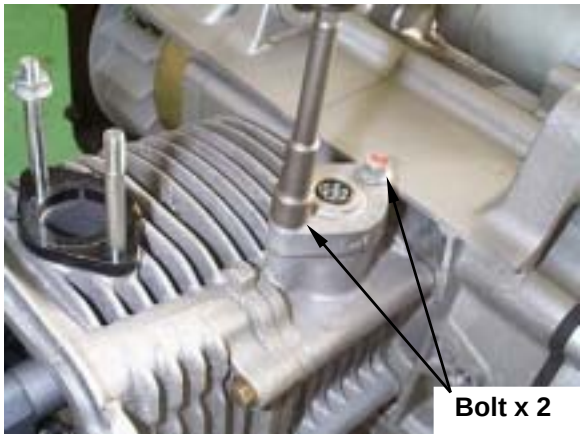
- Piston or piston ring worn out
- Piston ring installation improperly
- Cylinder or piston damage

Engine Overheat

- 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-tensioner.



Remove cam chain plate.
Remove cylinder.

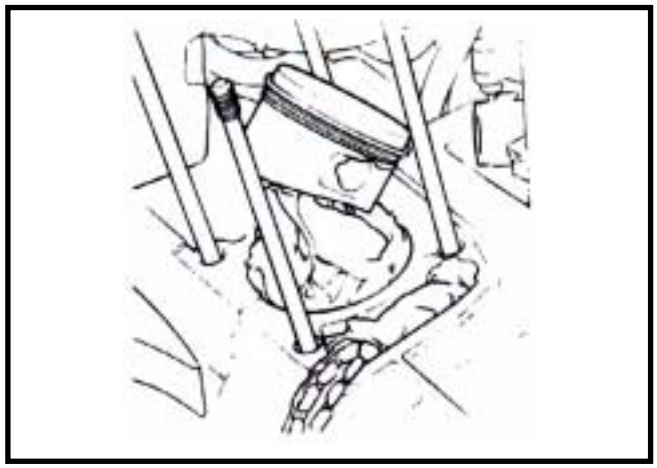
Remove cylinder gasket and lock pins.

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

Cover the holes of crankcase and cam chain with a piece of cloth.
Clean up all residues or foreign materials from the two matching surfaces of cylinder and crankcase.

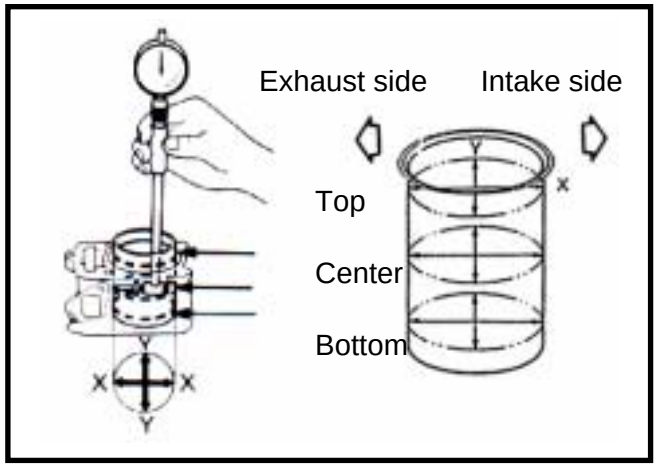
Caution

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

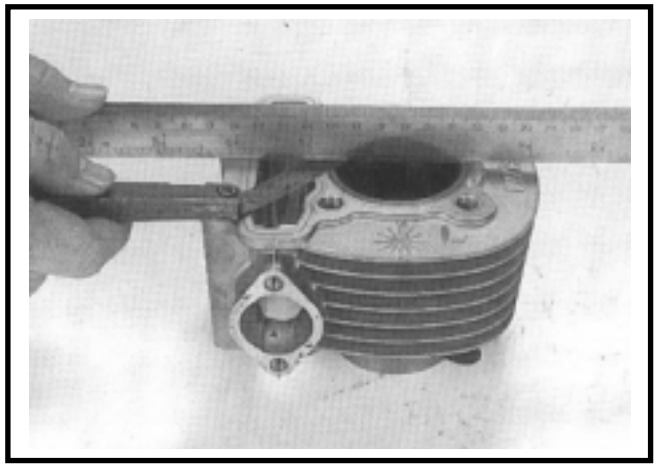


Cylinder Inspection

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: 52.50 mm
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

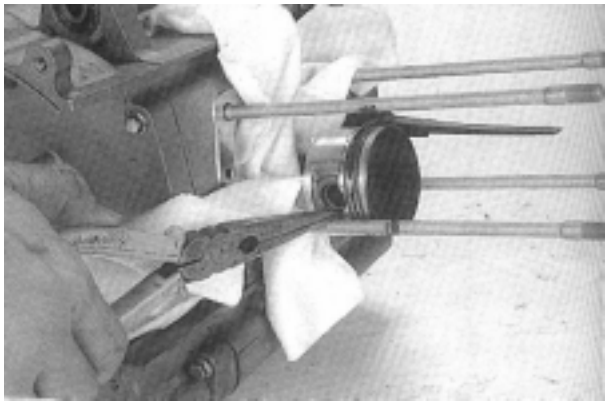


Check Cylinder Wrapage.
Service limit: correct or replace as over 0.05 mm



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

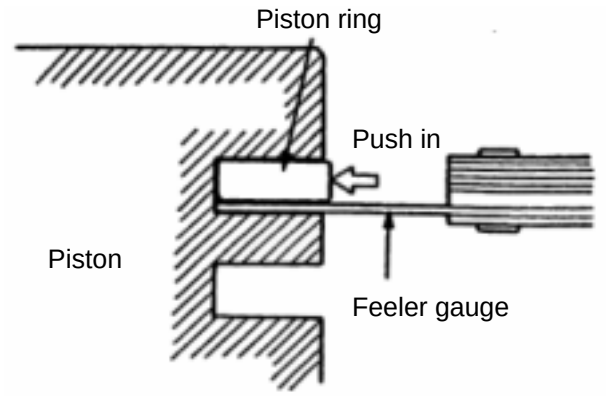
Pay attention to remove piston rings because they are fragile.

Disassemble the piston rings.
Check if the piston rings are damaged or its grooves are worn.
Clean out the carbon deposit around the piston ring groove.

Piston Inspection

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

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



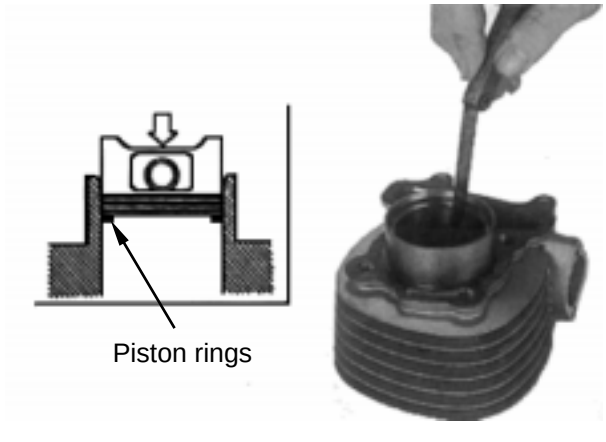
Take out the piston rings and place them respective into cylinder below 20mm of cylinder top. Measure each piston ring gaps.

Caution

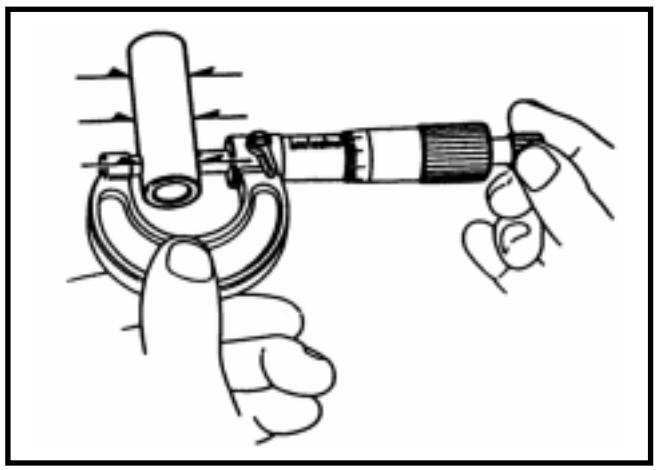
Push the piston rings into cylinder with piston top-end in parallel motion.

Service Limit:

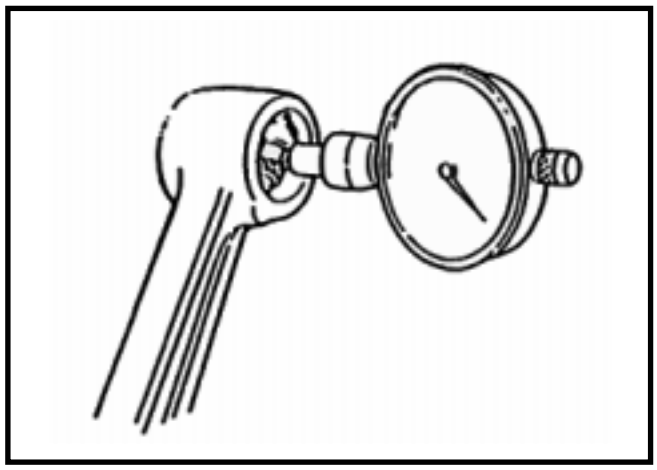
Top ring: replace if over 0.5 mm
2nd ring: replace if over 0.65 mm



Measure the outer diameter of piston pin.
Service Limit: 14.96 mm

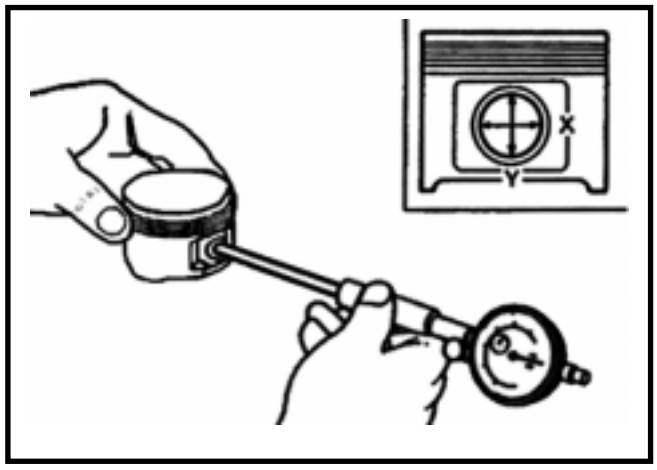


Measure the inner diameter of connecting rod small end.
Service Limit: 15.06 mm



Measure the inner diameter of piston pin hole.
Service Limit: 15.04 mm

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

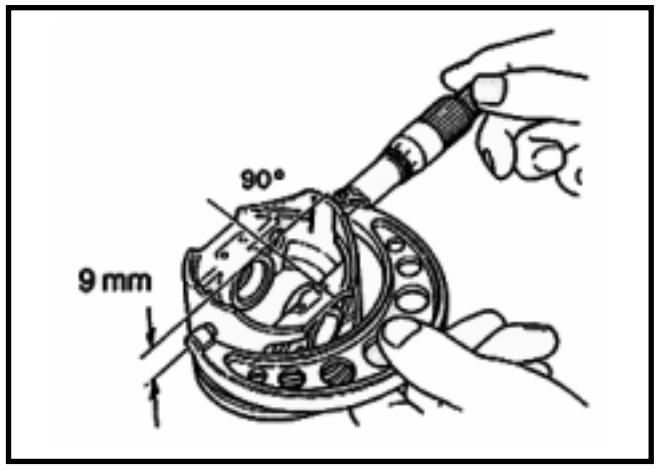


Measure piston outer diameter.

Caution

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

Service limit: 52.30 mm
Compare measured value with service limit to calculate the clearance between piston and cylinder.

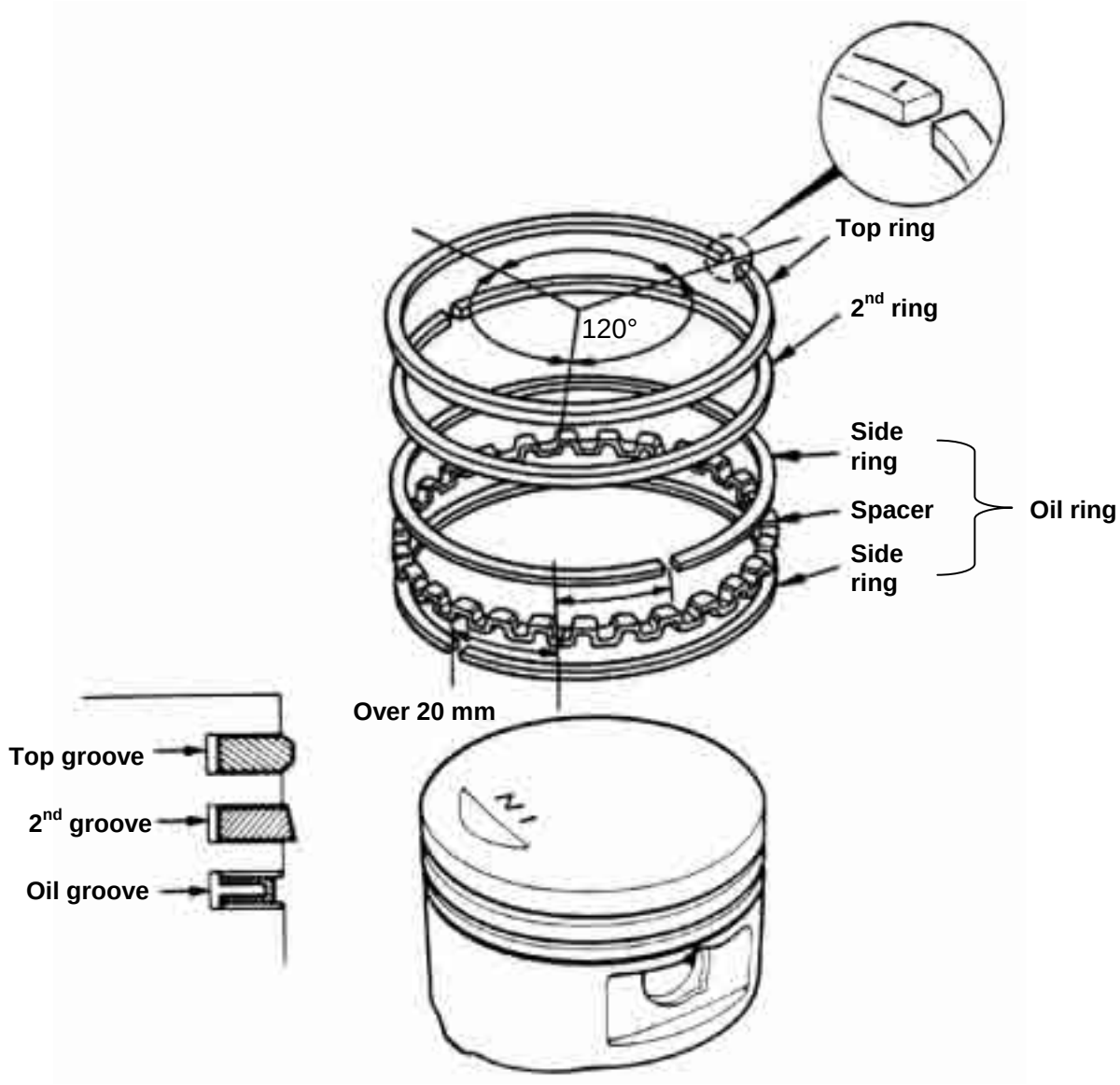


Piston Ring Installation

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

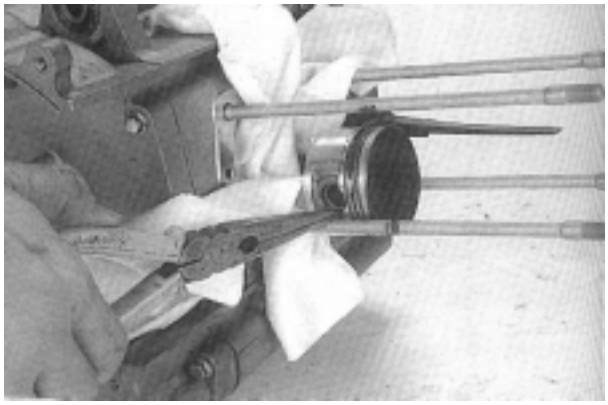


Piston Installation

Install piston and piston pin, and place the IN marks 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 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.

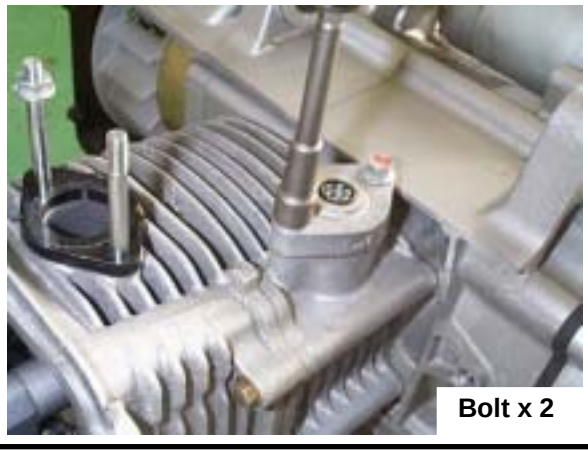
Install 2 lock pins and new gasket.

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

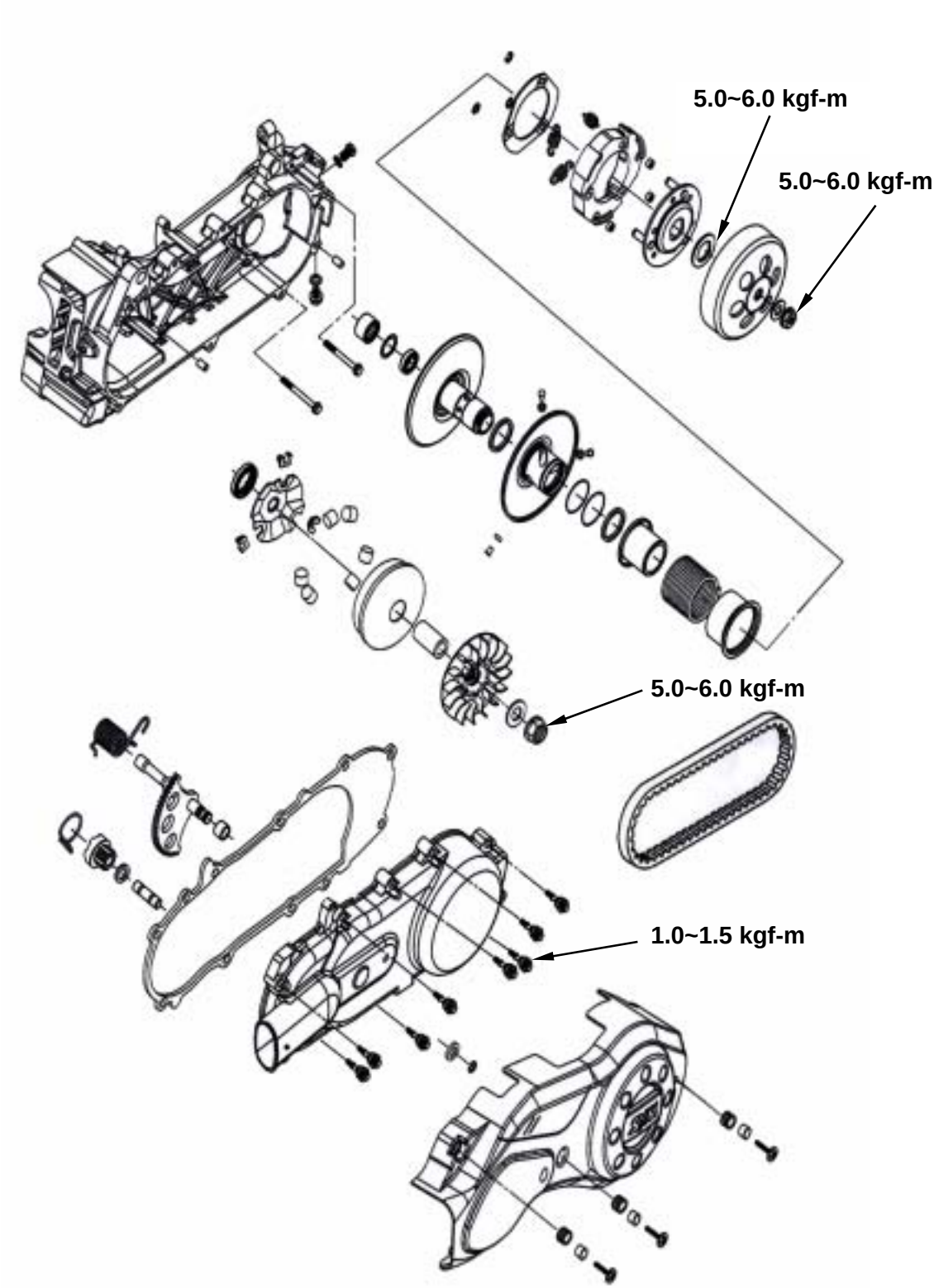
Do not push piston into cylinder forcefully because this will cause the piston and the piston rings to be damaged.

Install the cam chain plate, the cylinder gasket and lock pins.
Install cylinder head. (refer to Chapter 6)
Install the cam chain auto-tensioner. (2 bolts)



Bolt x 2

Mechanism Illustration



8. V-Belt Driving System/Foot Starter

Maintenance Description

PRECAUTIONS IN OPERATION

- 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	**19.500**	**18.500**
ID of sliding pulley bushing	**27.000~27.021**	**27.060**
OD of sliding pulley hub	**26.970~26.990**	**26.940**
OD of weight roller	**19.950~20.100**	**19.500**
ID of clutch jacket	**130.000~130.200**	**130.500**
Thickness of clutch lining	**4.000~4.100**	**2.000**
Free length of driving pulley spring	**128.400**	**123.400**
OD of driving 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: 5.0~6.0 kgf-m
Clutch jacket nut: 5.0~6.0 kgf-m
driving pulley nut: 5.0~6.0 kgf-m

Special Service Tools
Clutch spring compressor
Bearing puller (inner type)
Clutch mounting nut wrench
Universal fixture

Trouble Diagnosis

Engine can be started but motorcycle can not be moved
1. Worn driving Belt
2. Worn tilt plate
3. Worn or damaged clutch lining
4. Broken driven pulley

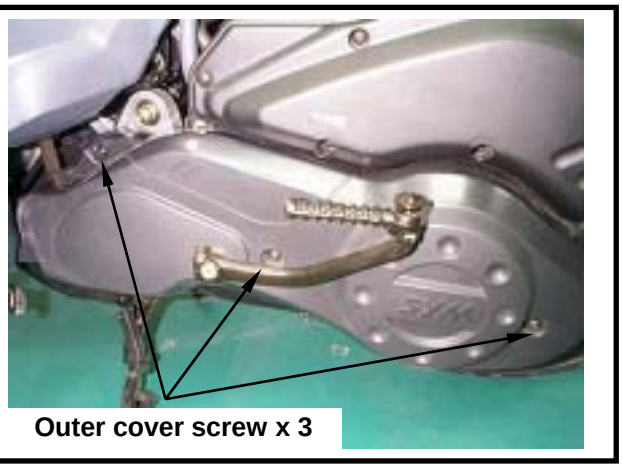
Shudder or misfire when driving
1. Broken clutch lining
2. Worn clutch lining

Insufficient horsepower or poor high speed performance
1. Worn driving belt
2. Insufficient spring capacity of driven pulley
3. Worn roller
4. Driven pulley operation un-smoothly

Left Crankcase Cover

Removal of Crankcase Cover

Remove body cover.
Remove foot starter lever. (bolt x 1)
Remove the outer cover of engine left-side cover. (screw x 3)
Loosen vent strap on the front-left side of cover, and then remove the vent.
Remove air cleaner. (bolt x 2)
Remove the engine left-side cover. (bolt x 8)



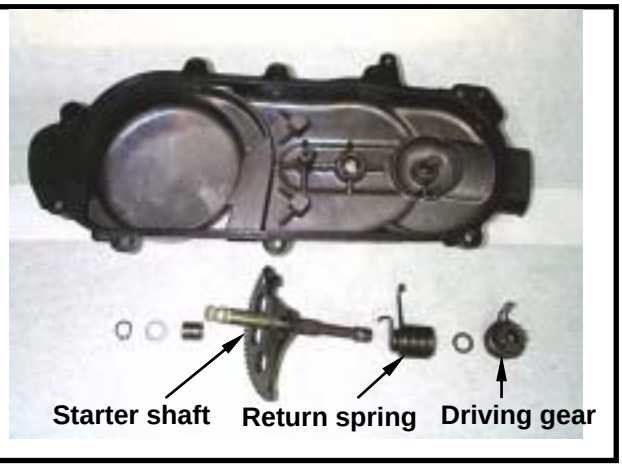
Foot Starter

Disassembly

Remove snap ring and thrust washer from engine left-side cover.
Install foot starter lever, rotate the lever slightly and then remove driving gear and washer.
Remove the lever, foot starter, starter shaft, and return spring as well as socket.

Inspection

Check if starter shaft, driving gear, socket and bearing hole for wear or damage. Replace it with new one if necessary.
Check the return spring and friction spring for spring force or damaged. Replace it with one if poor parts found.

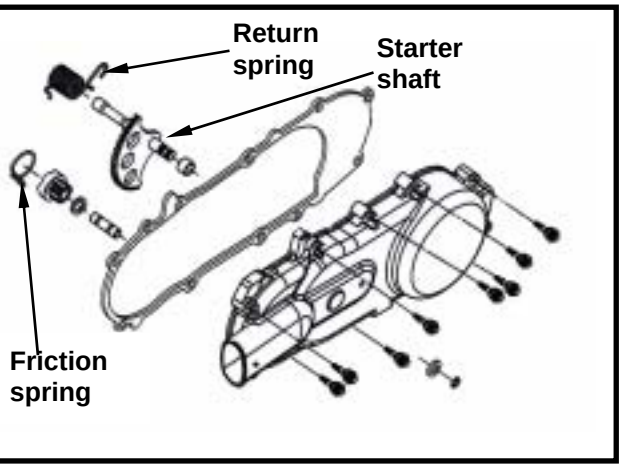


Reassembly

Install socket, return spring and starter shaft as diagram shown.
Install thrust washer and snap ring onto starter shaft.
Install foot starter lever temporary.
Rotate the lever and then align driving gear with width-tooth on the starter shaft.
Install the friction of driving gear onto convex part of the cover.

Installation of the left crankcase cover

Install the left crankcase cover. (8 screws)
Install front vent tube of left cover and tighten the strap.
Install foot starter lever. (1 bolt)
Tighten the air cleaner. (2 bolts)
Install the body cover.

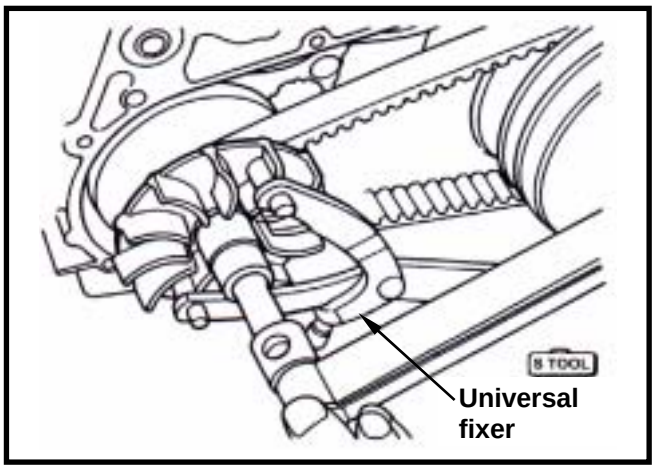


Drive Belt

Removal

Remove left crankcase cover.

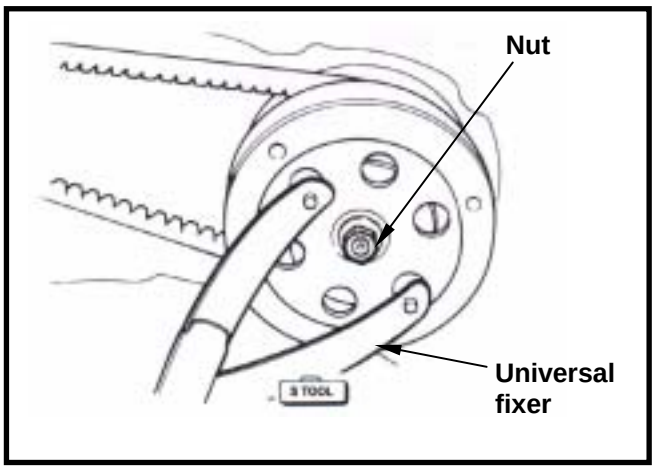
Hold drive face with universal fixture, and remove nut and drive face.



Hold the clutch outer with the universal fixture, and the remove the nut and the clutch outer .

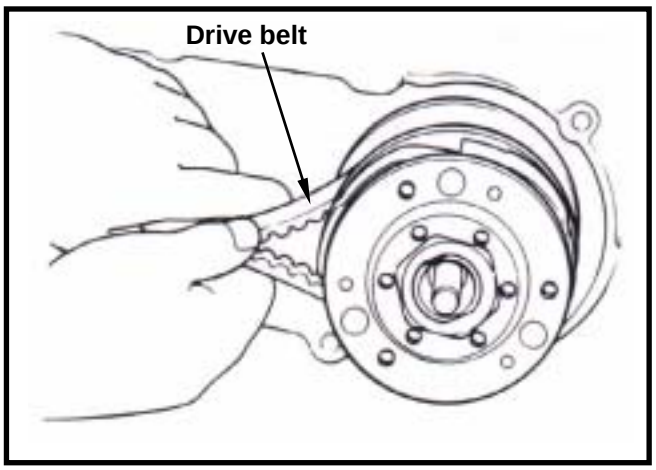
Caution

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



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

Drive belt and clutch at same time.



Inspection

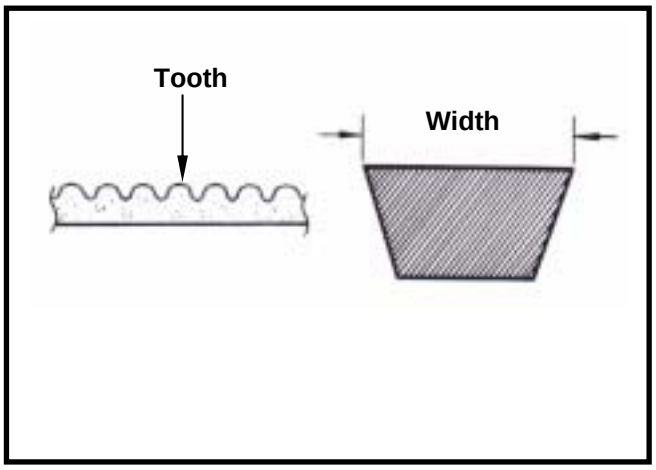
Check the drive belt for crack or wear. Replace it if necessary.

Measure the width of drive belt as diagram shown. Replace the belt if exceeds the service limit.

Service Limit: 18.5 mm

Caution

- Using the genuine parts for replacement.
- The surfaces of drive belt or pulley must be free of grease.

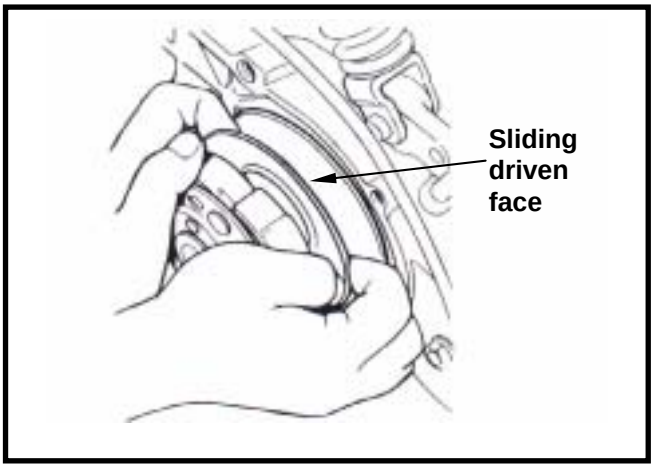


Installation

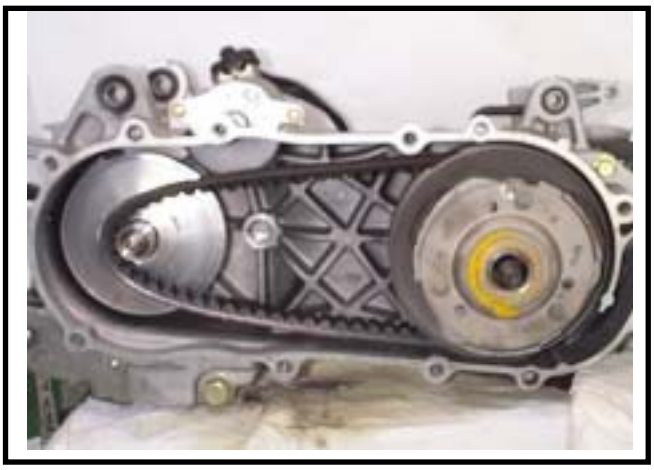
Pull out the driven face and then insert the drive belt into the driven pulley.

Caution

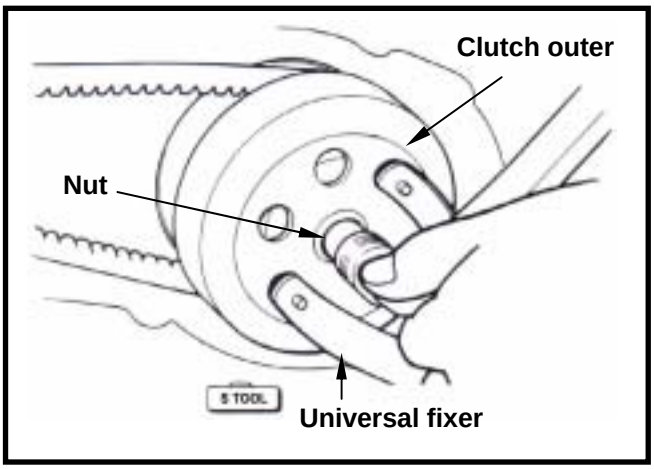
Pull out sliding driven face and then insert the drive belt into the driven pulley so that the drive belt set can be installed onto pulley more easily.



Install the clutch set with drive belt onto the drive shaft.
The other end of belt hook onto the movable drive face.
Install the clutch outer.

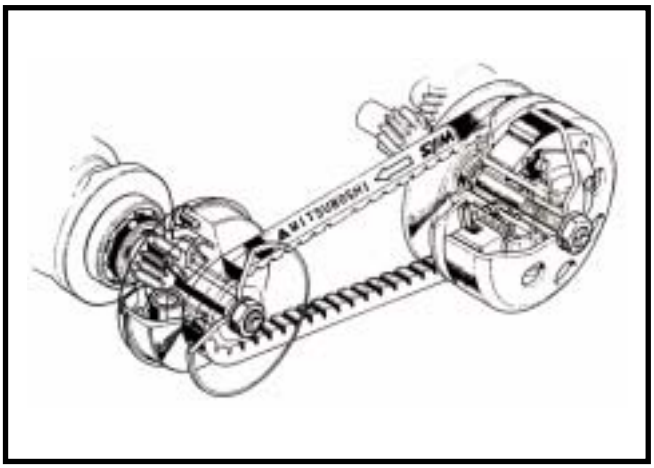


Install the clutch with universal fixture, and then tighten nut to specified torque value.
Torque value: 5.0~6.0 kgf-m



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.



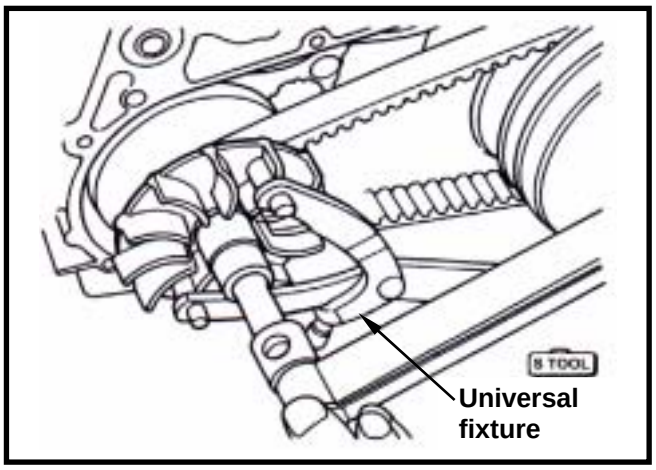
Movable Drive Face

REMOVAL

Remove left crankcase cover.

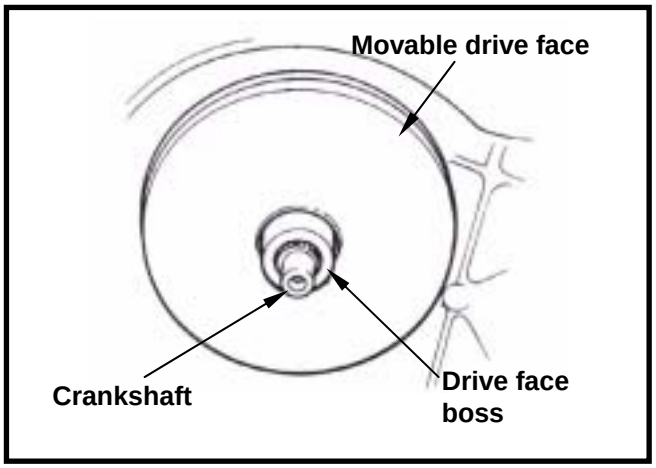
Hold drive face with universal fixture, and then remove drive face nut.

Remove drive face.

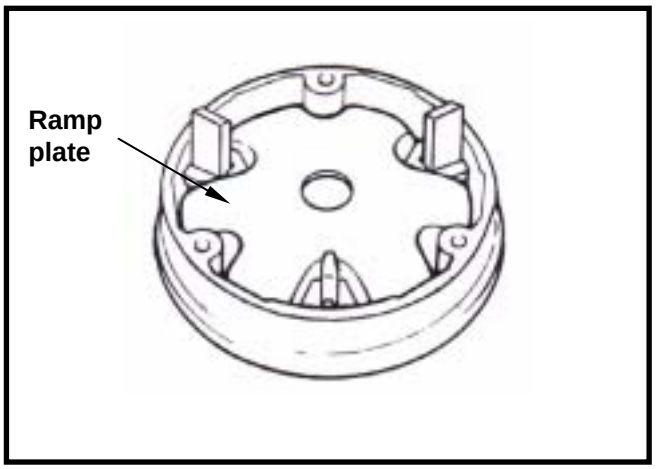


Take out the drive belt from the drive face.

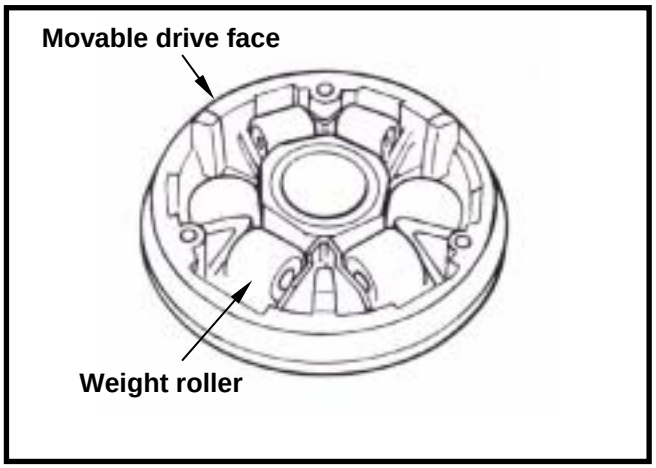
Remove movable drive face set and drive face boss from crankshaft.



Remove ramp plate.



Remove weight rollers from movable drive face.



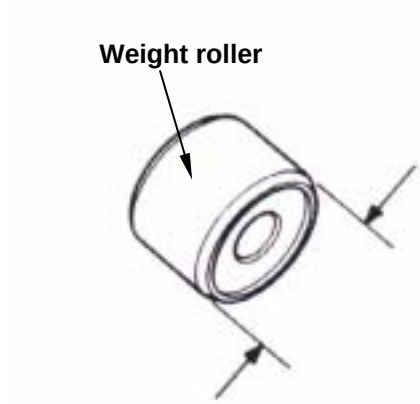
Inspection

The operation of movable drive face is means of the weight roller to pressing on it with centrifuge force. And then the speed is changed by the ramp 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 roller's outer diameter. Replace it if exceed the service limit.

Service limit: 19.50 mm



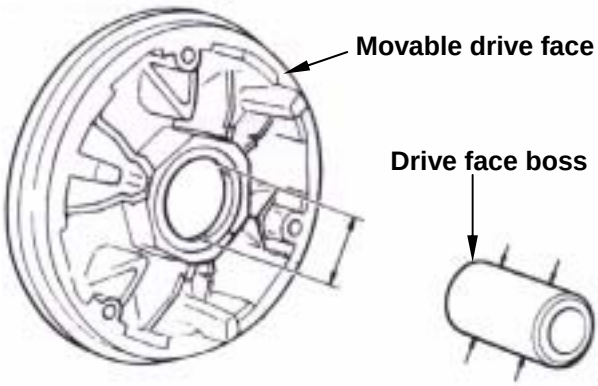
Check the drive face boss if damaged or wear out. Replace it if necessary.

Measure the drive face boss's outer diameter. Replace it if exceed the service limit.

Service limit: 23.94 mm

Measure the drive face boss's inner diameter. Replace it if exceed the service limit.

Service limit: 24.06 mm

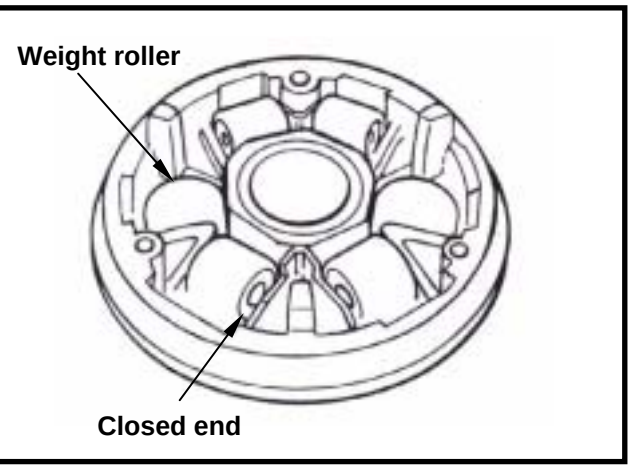


Assembly/Installation

Install the weight roller.

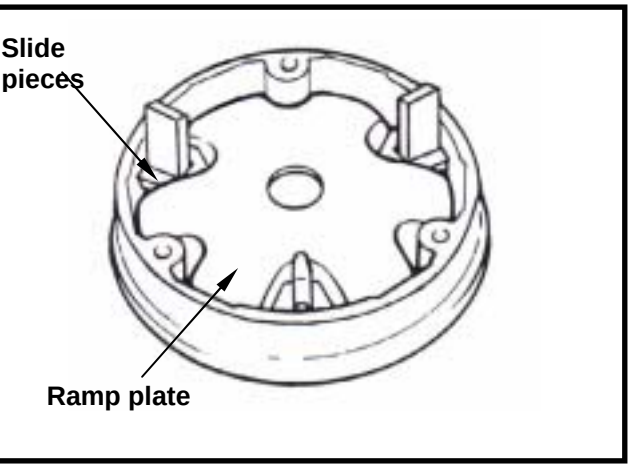
Caution

The both ends of weight roller are different. In order to prolong the roller life span and prevent abnormal wearing out, install the closed end onto the movable drive face in the movement of CCW.



Install the ramp plate slide pieces (3 pieces) onto the ramp plate.

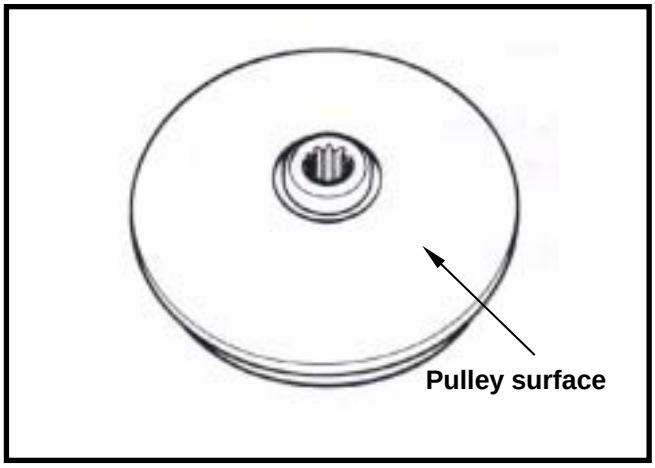
Install the ramp plate.



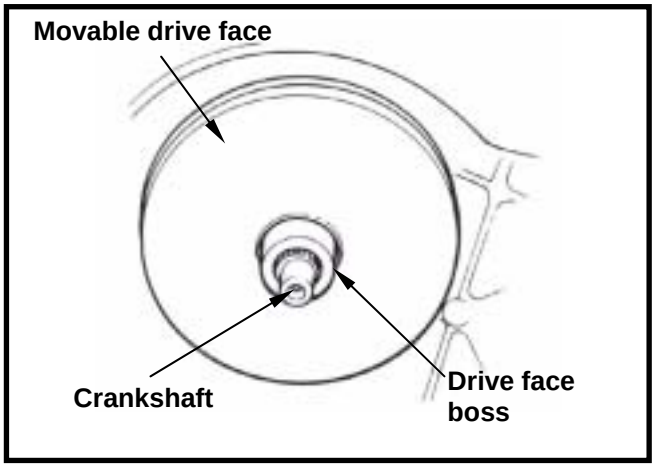
Apply with grease 4~5 g to inside of drive face boss hole, and install drive face boss.

Caution

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



Install movable drive face assembly onto crankshaft.

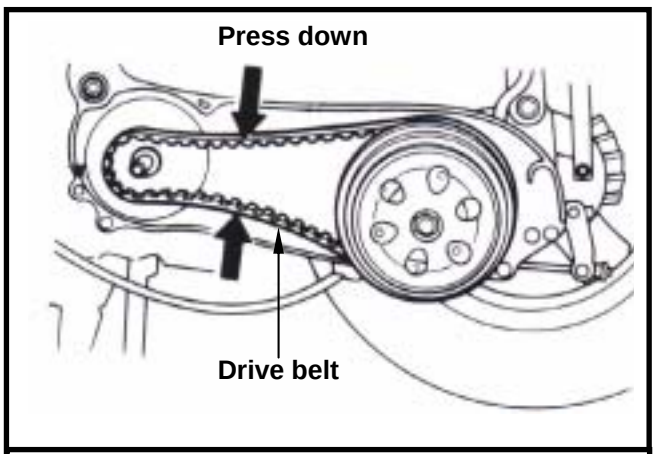


MOVABLE DRIVE FACE INSTALLATION

Press drive belt into movable drive face, and then press down the up & down sides of the drive belt to separate it away from the drive face boss.

Caution

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

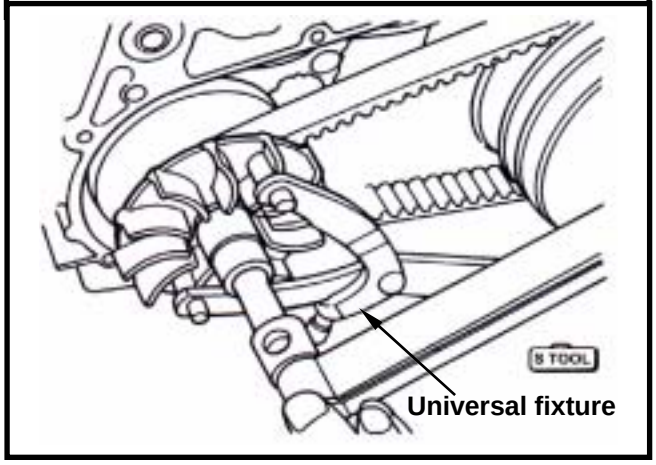


Install drive face, washer and nut.

Caution

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

Hold drive face with universal fixture.
Tighten nut to specified torque.
Torque value: 5.0~6.0 kgf-m
Install left crankcase cover.



Clutch / Driven Pulley

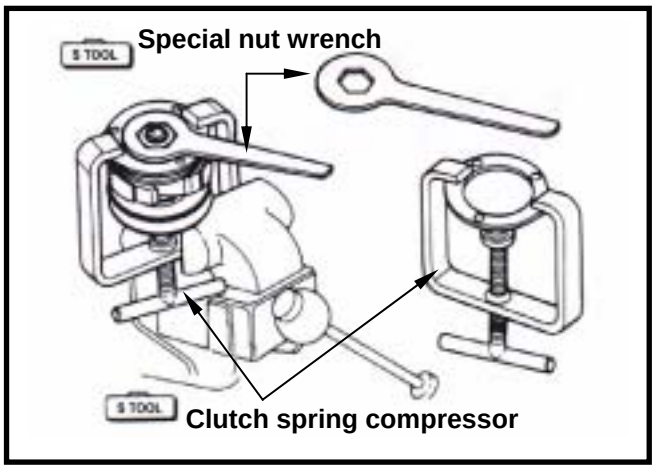
DISASSEMBLY

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

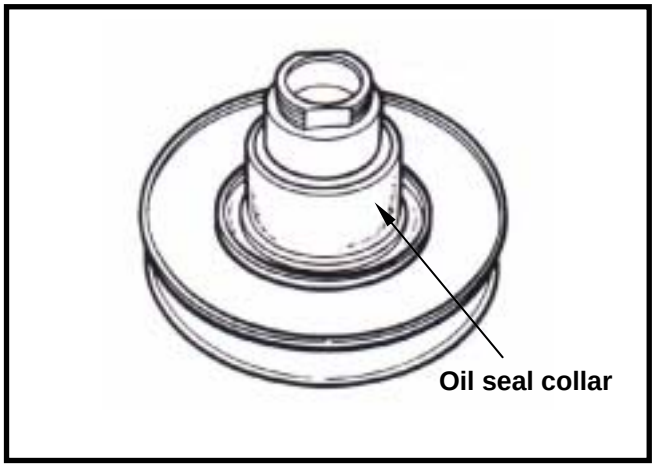
Caution

Do not press the compressor too much.

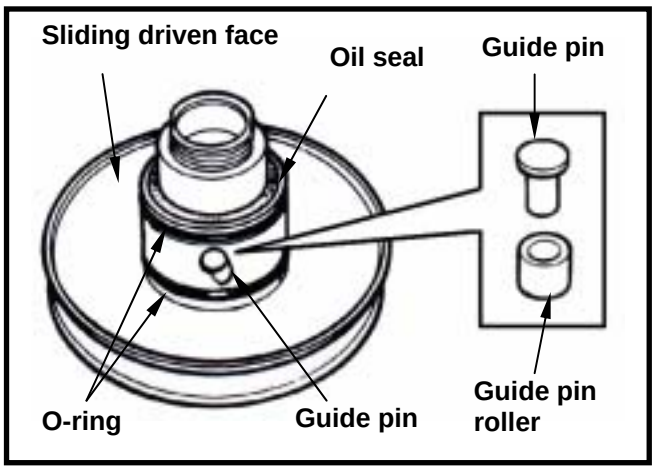
Hold the clutch spring compressor onto bench vise, and then remove mounting nut with special nut wrench.
Release the clutch spring compressor and remove clutch and spring from driven pulley.



Remove oil seal collar from driven pulley.



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

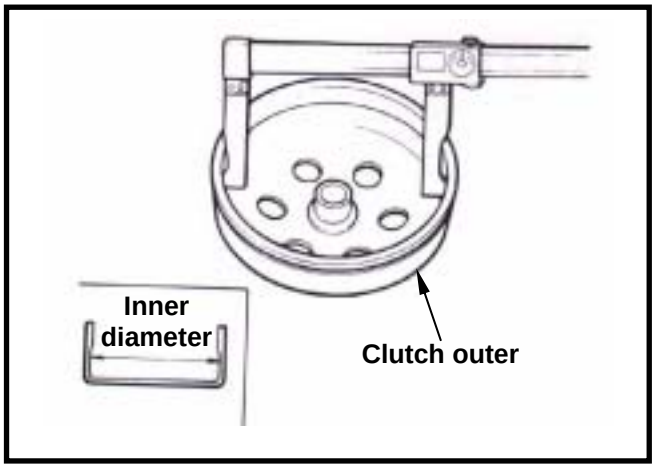


INSPECTION

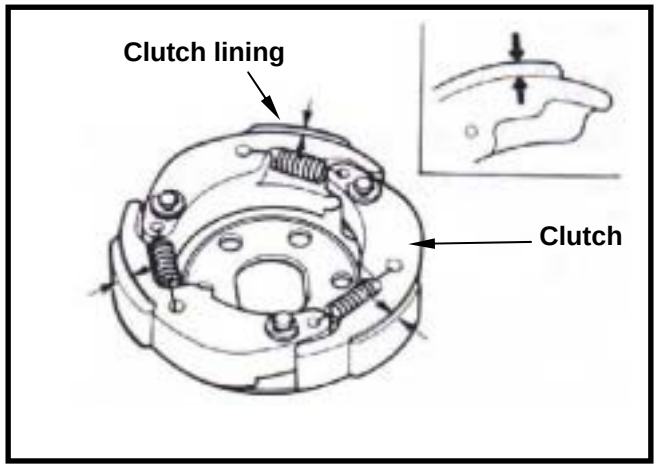
Clutch outer

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

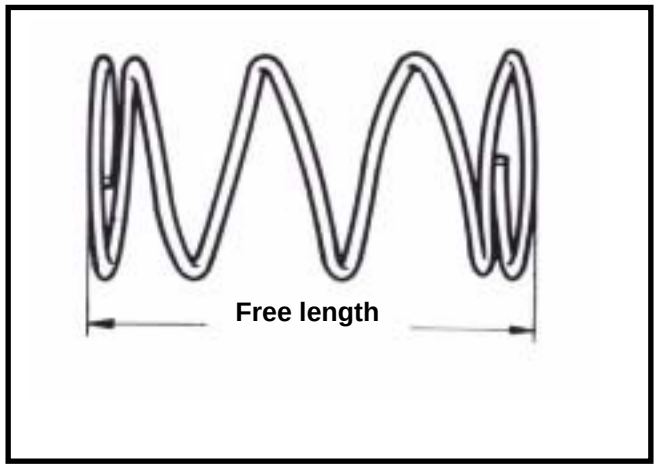
Service limit: 130.5 mm



Clutch lining
Measure each clutch lining thickness. Replace it if exceeds service limit.
Service limit: 2.0 mm

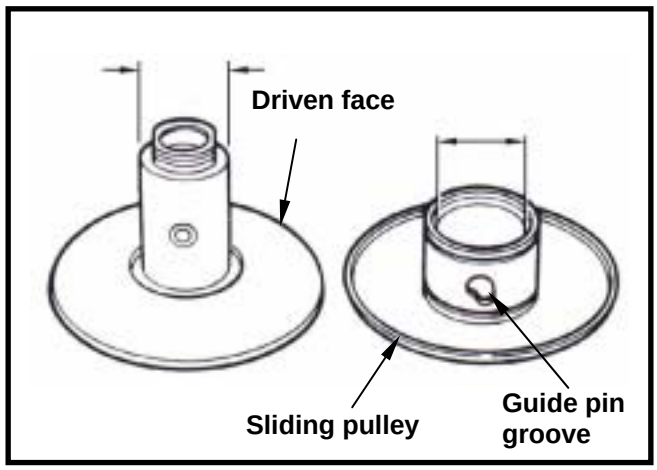


Driven pulley spring
Measure the length of driven pulley spring. Replace it if exceeds service limit.
Service limit: 123.4 mm

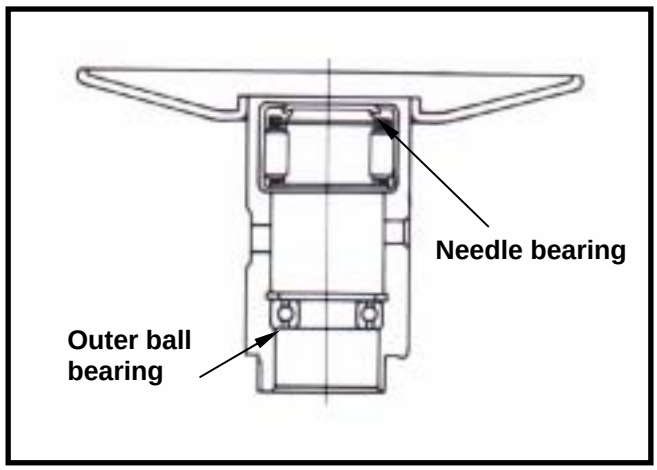


Driven pulley
Check following items:
- If both surfaces are damage or wear.
- If guide pin groove is damage or wear.
- Replace damaged or worn components.
- Measure the outer diameter of driven surface and the inner diameter of driven pulley. Replace it if exceeds service limit.

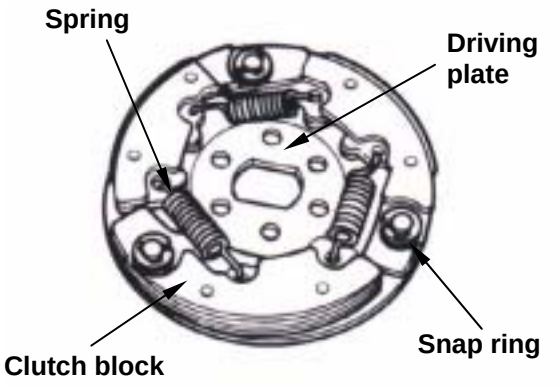
Service limit: Outer diameter 33.94 mm
Inner diameter 34.06 mm



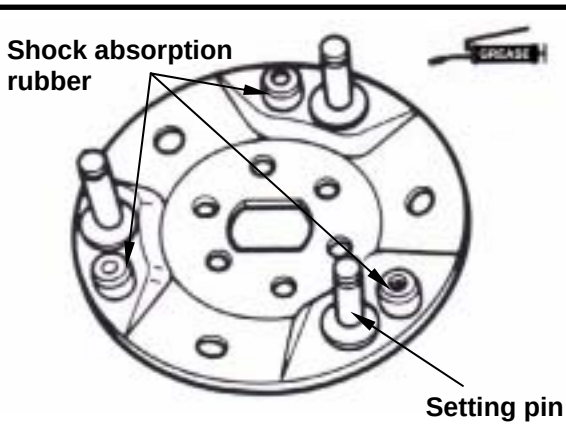
Driven Pulley Bearing Inspection
Check if the inner bearing oil seal is damage. Replace it if necessary.
Check if needle bearing is damage or too big clearance. Replace it if necessary.
Rotate the inside of inner bearing with fingers to check if the bearing rotation is in smooth and silent. Also check if bearing outer is installed properly. Replace it if necessary.



Clutch Block Replacement
Remove snap and washer, and the remove clutch block and spring from driving plate.
Check if spring is damage or insufficient elasticity.



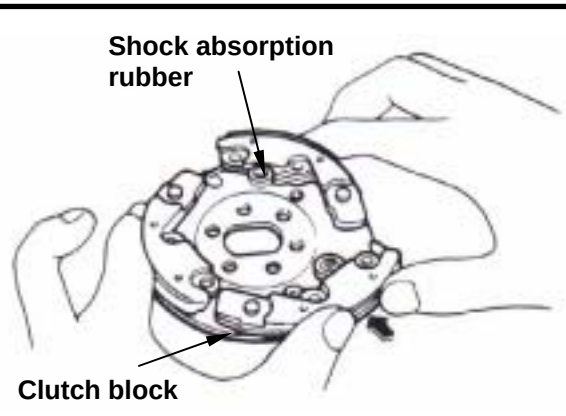
Check if shock absorption rubber is damage or deformation. Replace it if necessary.
Apply with grease onto setting pins.



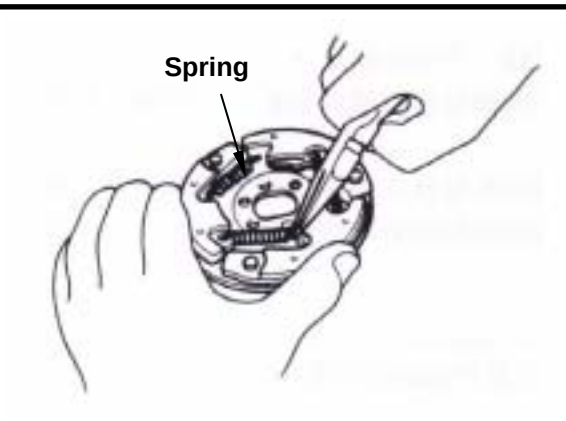
Apply with grease onto setting pins. But, the clutch block should not be greased. If so, replace it.
Install new clutch block onto setting pin and then push to specified location.

Caution

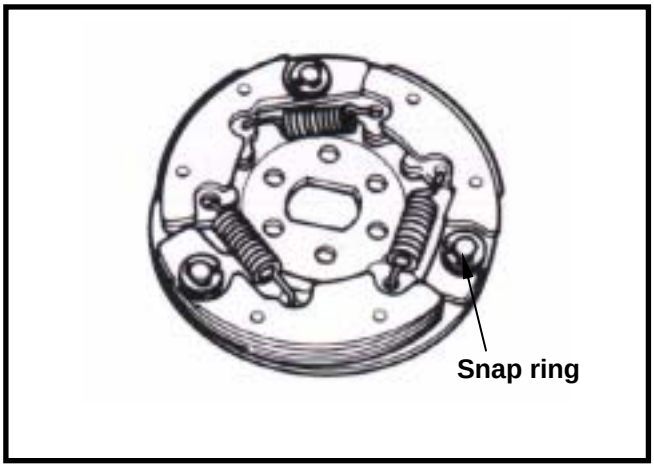
- Grease or lubricant will damage the clutch block and effect the block's connection capacity.



Install the spring snap into groove with pliers.



Install snap ring and mounting plate onto setting pin.

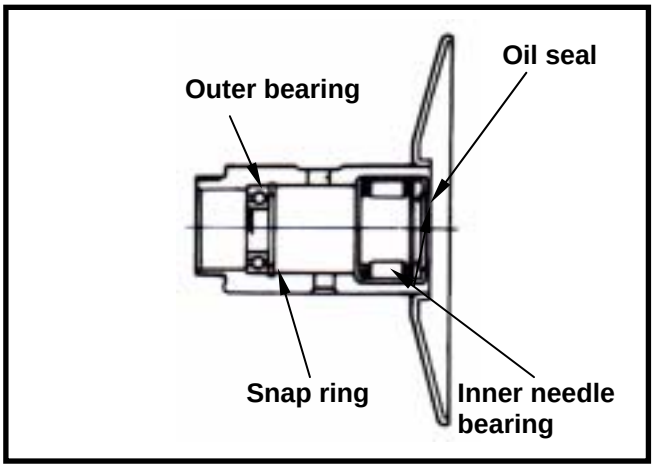


REPLACEMENT OF DRIVEN PULLEY BEARING

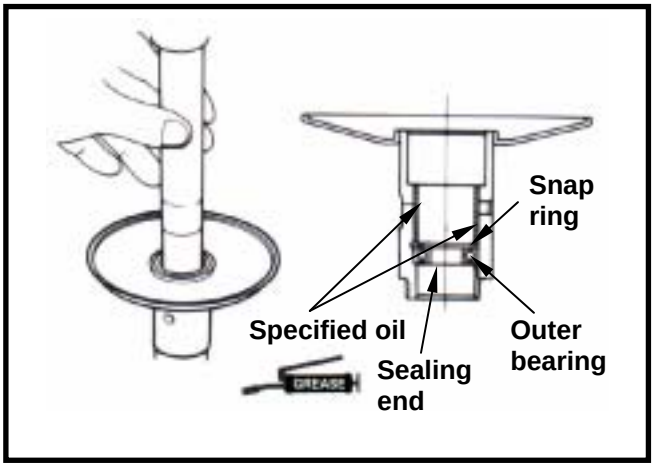
Remove inner bearing.

Caution

- If the inner bearing equipped with oil seal on one 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.



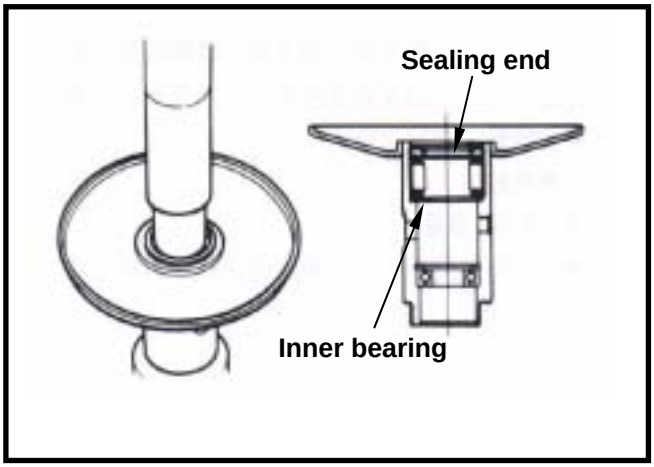
Remove snap ring and then push bearing forward to other side of inner bearing.
Place new bearing onto proper position and its sealing end should be forwarded to outside.
Apply with specified grease. Recommended to use the KING MATE G-3.
Install the snap ring and hold the bearing.



Install a new inner bearing.

Caution

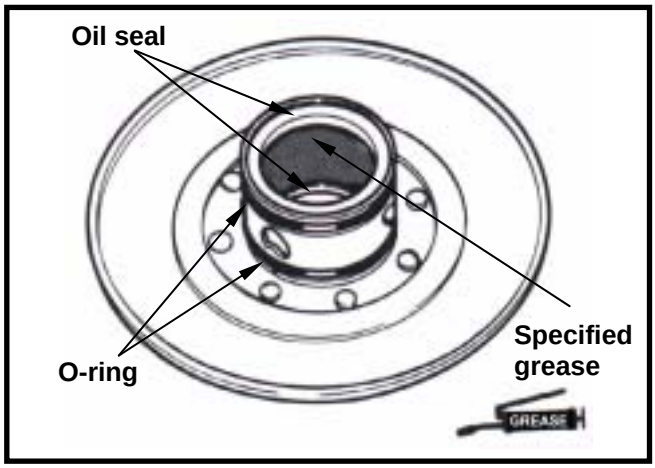
- Its sealing end should be forwarded to outside as bearing installation.
- Install needle bearing with hydraulic presser. Install ball bearing by means of hydraulic presser.



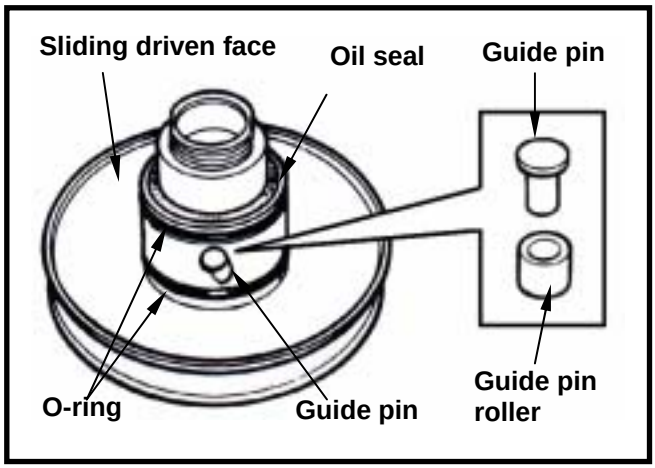
Align oil seal lip with bearing, and then install the new oil seal. (if necessary)

INSTALLATION OF CLUTCH/DRIVEN PULLEY ASSEMBLY

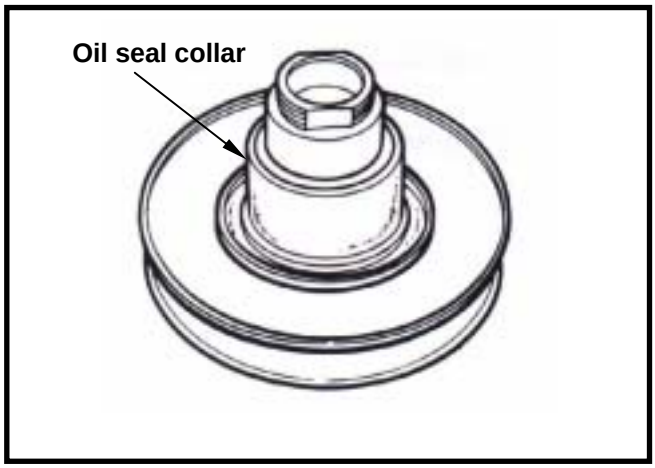
Install new oil seal and O-ring onto sliding driven face. Apply with specified grease to lubricate the inside of sliding driven face.



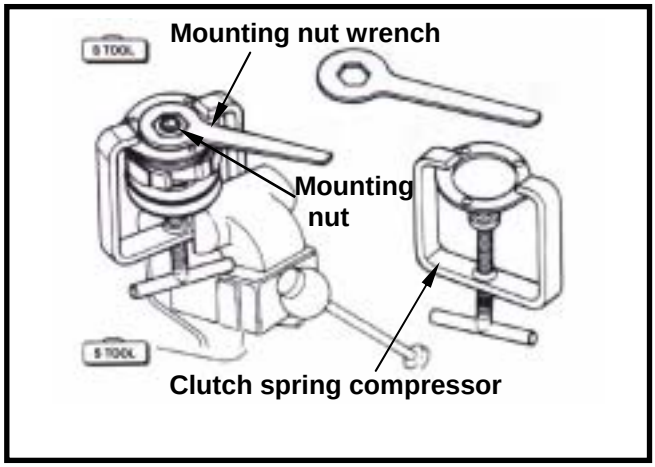
Install sliding driven face onto driven face.
Install guide pin and guide pin roller.



Install oil seal collar.

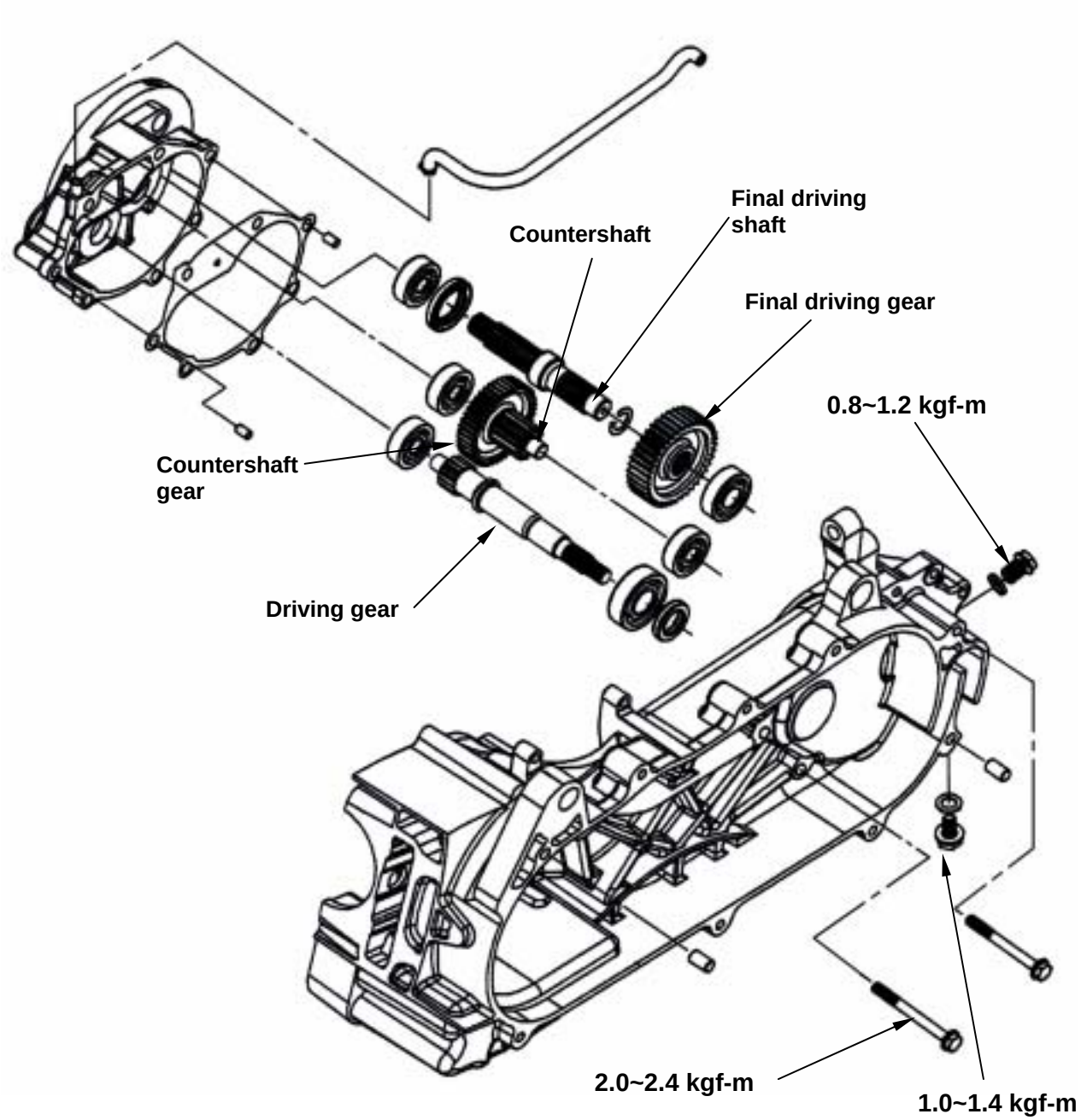


Install driven pulley spring and clutch into clutch spring compressor, and press down the assembly by turning manual lever until mounting nut that can be installed.
Hold the compressor by bench vise and tighten the mounting nut to specified torque with special nut wrench.
Remove the clutch spring compressor.
Torque value: 5.0~6.0 kgf-m
Install clutch/driven pulley and driving belt onto driving shaft.



NOTE:

Mechanism Illustration



9. Final Driving Mechanism

Operational precautions

Specification

Application gear oil: 4-stroke lubricant
Recommended oil: KING MATE serial gear oils
Oil quantity: 110 c.c. (100 c.c. when replacing)

Torque value

Gear box cover	2.0~2.4 kgf-m
Gear oil drain plug	1.0~1.4 kgf-m
Gear oil filling bolt	0.8~1.2 kgf-m

Tools

Special service tools

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

Trouble Diagnosis

Engine can be started but motorcycle can not be moved

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

Noise

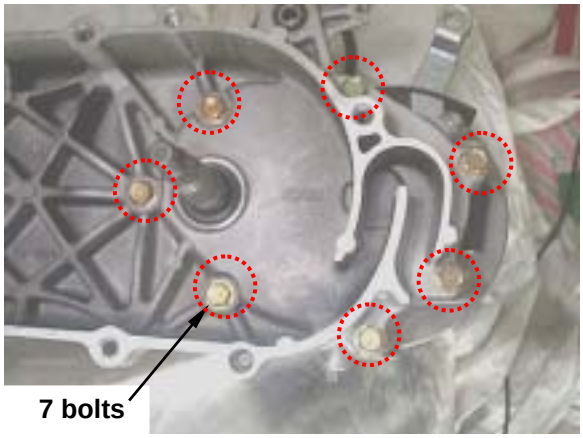
- Worn or burnt gear
- Worn gear

Gear oil leaks

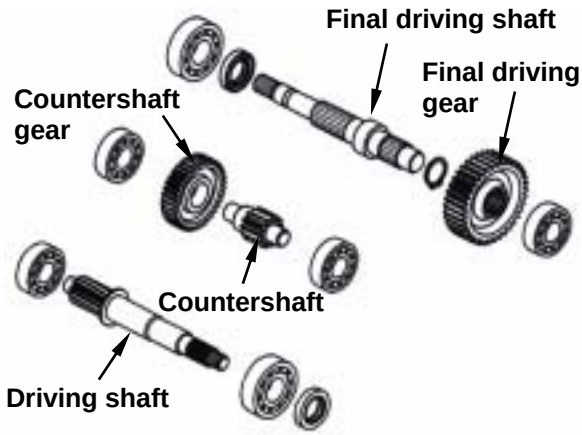
- Excessive gear oil
- Worn or damage oil seal

Disassembly of Final Driving Mechanism

Remove the rear wheel. (refer to chapter 15)
Remove the clutch.
Drain gear oil out from gear box.
Remove gear box cover bolts (7 bolts) 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 Mechanism

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

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

9. Final Driving Mechanism

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.

Caution

- Do not remove the driving shaft from the cover top side.
- If remove the driving shaft from the gear box, then its bearing has to be replaced.

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

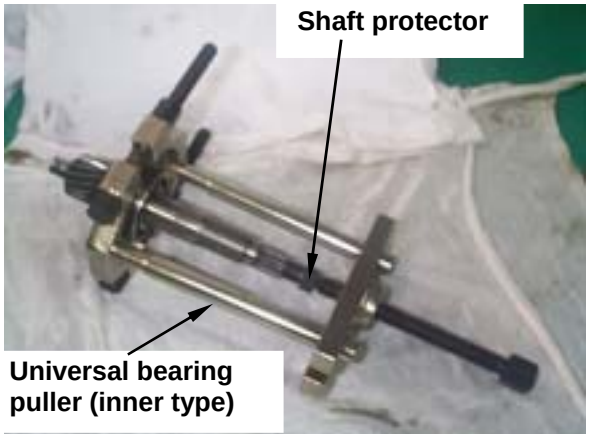
Press out the driving shaft from the gear box.
Remove oil seal from the gear box.
Remove the driving shaft bearing from the gear box cover with the inner type bearing puller.

Caution

· Using the bearing protector as pressing out the driving shaft from the gear box cover.

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.
Special tool:
Multi-functional bearing puller
Bearing protector

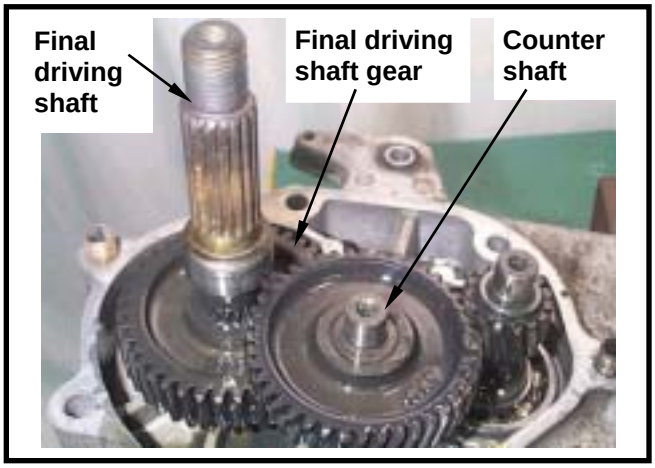


Install a new driving shaft bearing onto gear box cover.
Then, install the driving shaft.
Specified tool:
Press the bearing in with C type hydraulic presser or bearing installer.

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.

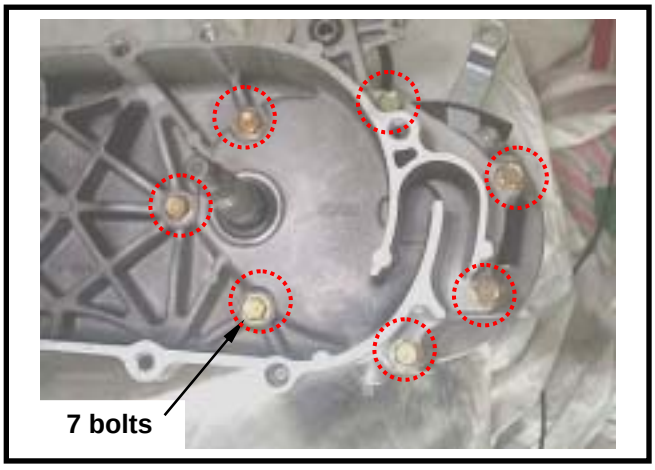
Re-Assembly Of Final Driving Mechanism

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

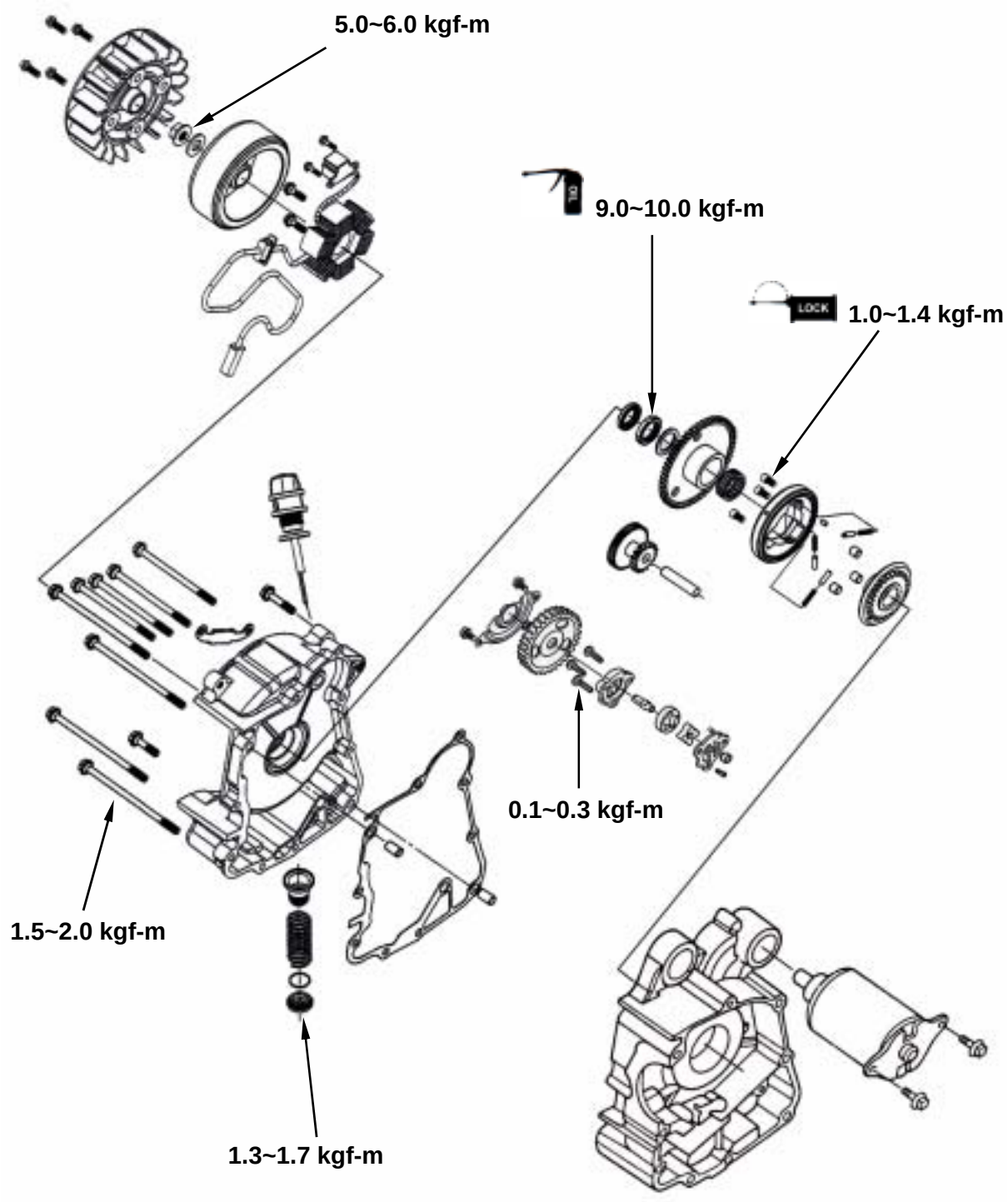


Install the setting pins (2 pins) and new gasket.

Apply with grease onto the oil seal lip of final driving shaft.
Install the gear box cover and 7 bolts. (tighten the bolts)
Torque: 2.0~2.4 kgf-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: SYM HYPOID GEAR OIL (SAE 85W-140)
(110 cc: standard capacity)
(100 cc: when replacement)



Mechanism Illustration



10. Alternator/Starting Clutch

Precautions in Operation

General information

- Refer to chapter 5: Engine removal and installation
- Refer to chapter 1: The troubleshooting and inspection of alternator
- Refer to chapter 16: The service procedures and precaution items of starter motor

Specification **Unit: mm**

Item	Service Limit
ID of starting driven gear	32.060
OD of starting clutch cover	27.940
ID of starting idle gear	10.05
OD of starting idle gear shaft	9.94

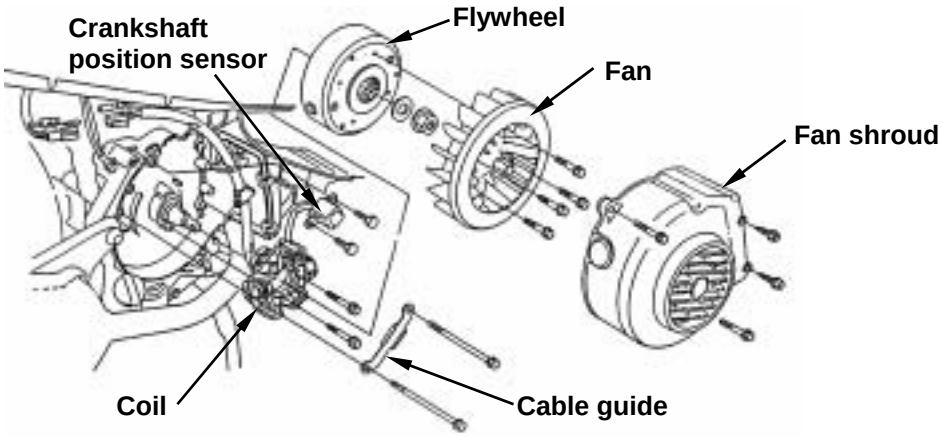
Torque value:

Flywheel nut	5.0~6.0 kgf-m
Bolt 8mm	1.5~2.0 kgf-m
Oil screen cover	1.3~1.7 kgf-m
Starting clutch mounting bolt	9.0~10.0 kgf-m with oil on the thread
Starting clutch hex socket bolt	1.0~1.4 kgf-m with adhesive

Special service tools

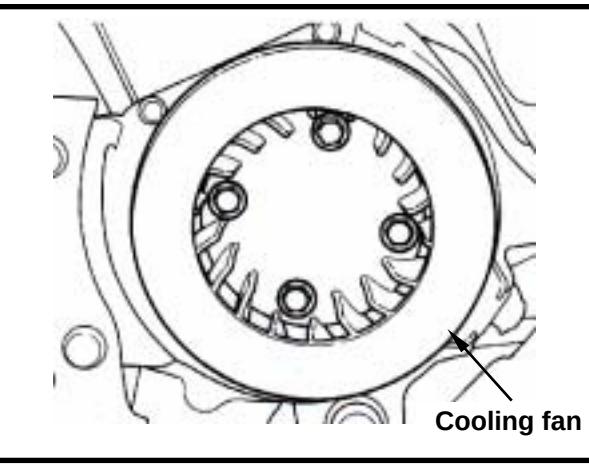
Flywheel puller
Universal fixture

Alternator Removal

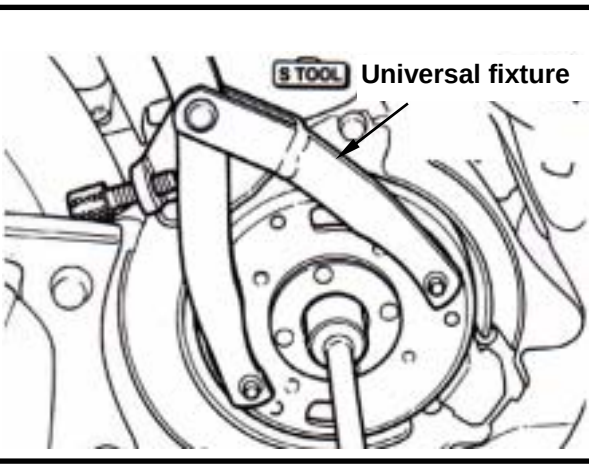


Drain out the engine oil.
Remove the right side cover. (4 screws)
Remove the exhaust muffler. (2 bolts, 2 nuts)
Remove the fan shroud. (2 screws)
Remove the cooling fan shroud. (bolt x 2, screw x 2)

Remove the cooling fan. (4 bolts)



Hold the flywheel with the universal fixture.
Remove the 10mm nut on the flywheel.
Special Service Tools:
Universal Fixture

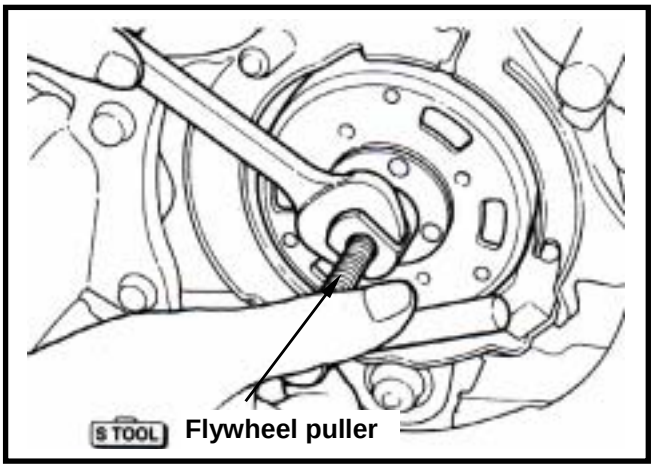


10. Alternator/Starting Clutch

Remove the flywheel with the flywheel puller.
Special service tools:
Flywheel puller
shaft protector

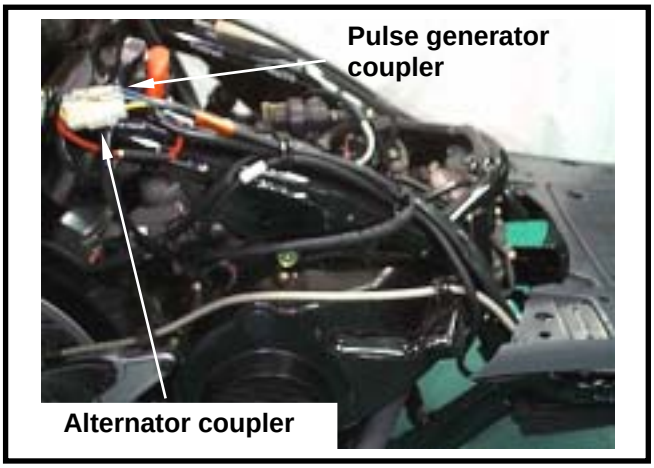
Caution

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



Alternator Coil Set Removal

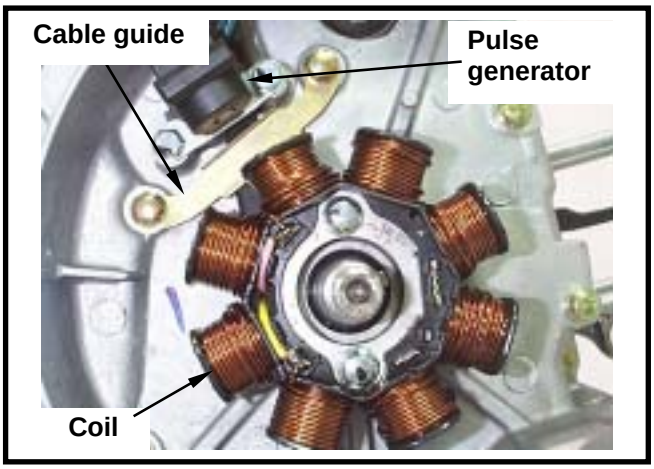
Remove the couplers of the alternator and pulse generator.



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

Caution

Do not damage the alternator coil.

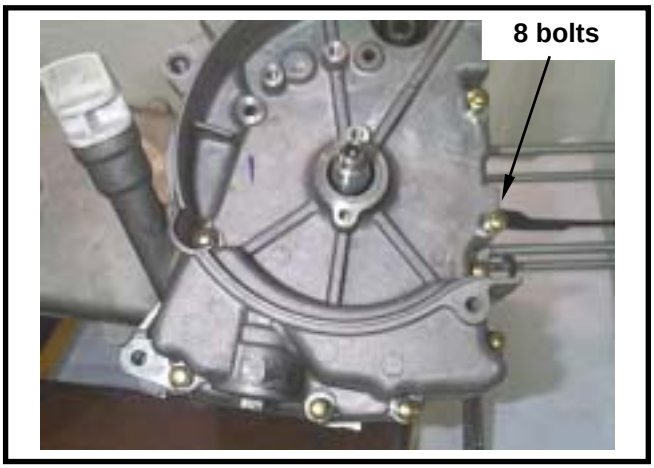


Right Crankcase Cover Removal

Remove the right crankcase cover. (8 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.



Starting Clutch

Starting Clutch Removal

Hold the starting driven gear with the universal fixture.

Remove the 22mm anti-loosen mounting nut and gasket.

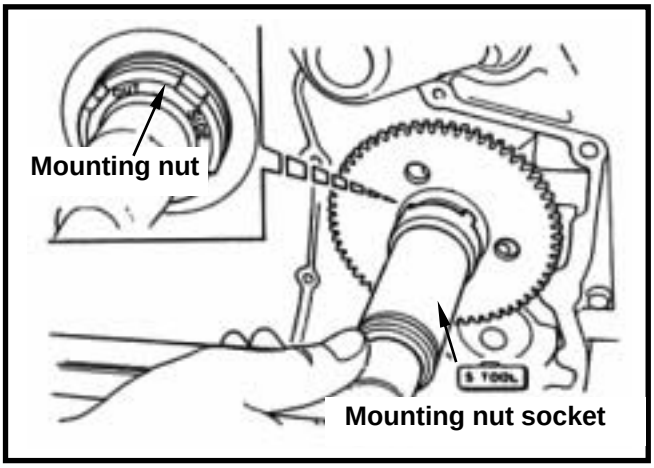
Special service tools:

Anti-loosen mounting nut socket

Universal fixture

Caution

The mounting nut is left-turn thread.



Remove the starting driven gear.

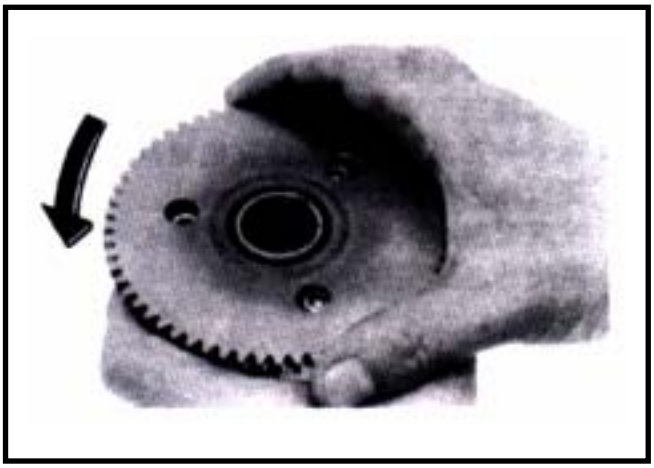
Remove starting clutch, starting idle-gear, and shaft.

Starting Clutch Inspection

Install the starting clutch onto the starting driven gear.

Hold the starting clutch and turn the starting driven gear.

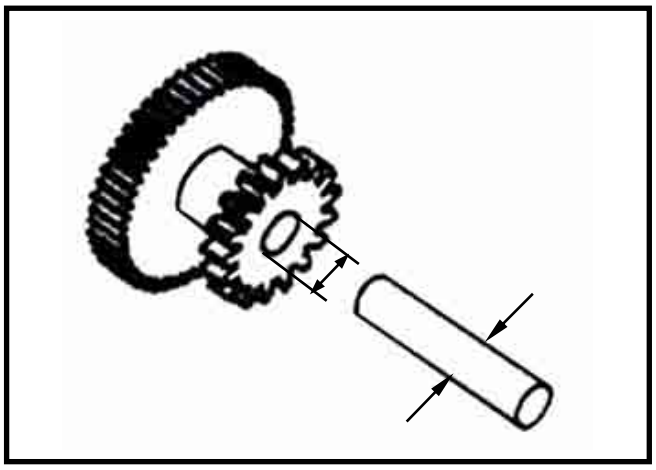
The starting driven gear should can be turned in the motion of C.W. and can not be turned in C.C.W.



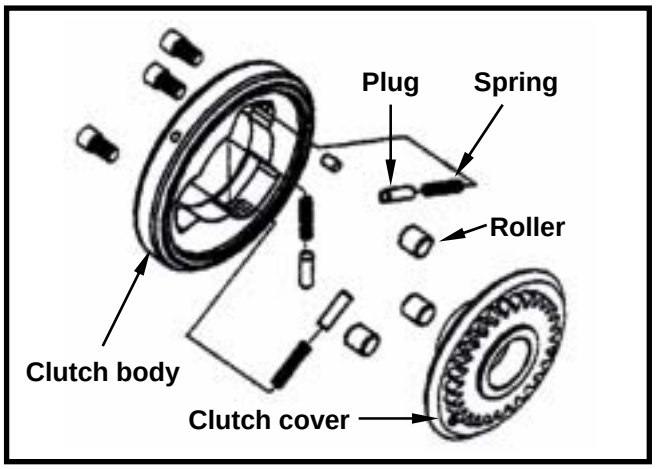
Check the starting driven gear for wear or damage.
Measure the ID of the starting driven gear.
Service Limit:
ID: 32.06 mm or less

Check the starting idle gear and shaft for wear or damage.
Measure the ID of the starting idle gear.
Service Limit:
ID: 10.05 mm or less

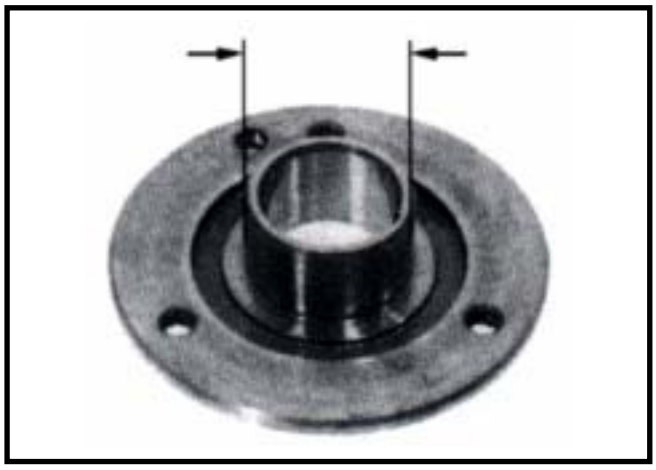
Measure the OD of the starting idle gear.
Service Limit:
OD: 9.94 mm or more



Disassembly
Remove the hex blots (3 bolts) inside the starting clutch.
Separate the clutch body and the clutch cover.
Remove the rollers, plugs, and springs on the one way clutch.
Check each rollers and plugs for wear or damage.
Install rollers, plugs and springs.



Measure the OD of the starting clutch cover.
Service Limit:
OD: 27.94 mm or more

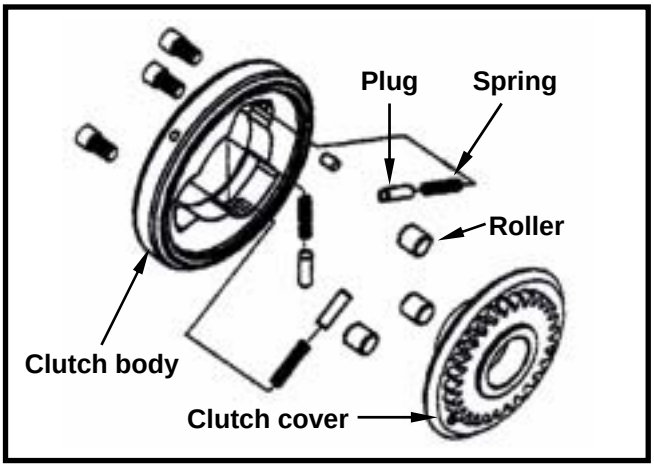


Installation
Install the components in the reverse procedures of removal.

Caution

Add adhere seal onto the thread of hex socket bolt.

Torque value: 1.0~1.4 kgf-m



Starting clutch Installation
Install idle gear shaft and idle gear.
Install starting clutch.

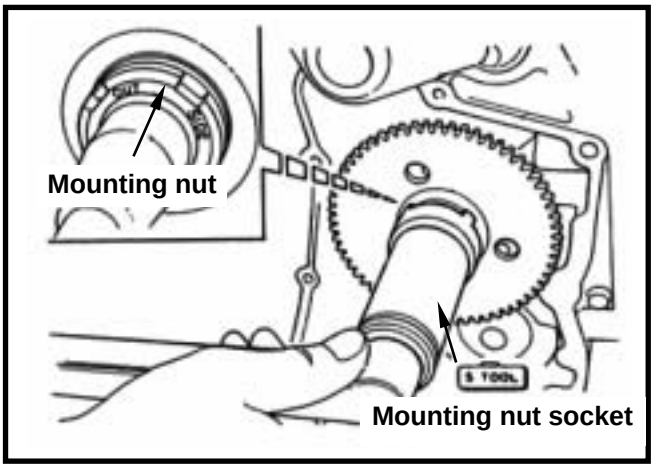
Install the starting driven gear onto the starting clutch.

Hold the starting driven gear with the universal fixture.
Tighten the 22mm anti-loosen mounting nut and gasket.

Caution

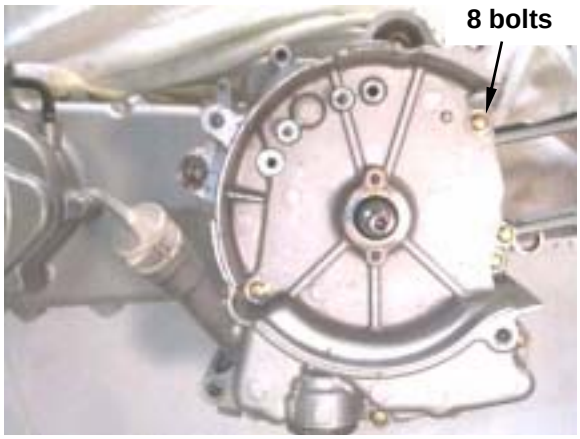
Add engine oil onto the thread of mounting nut.

Special service tools:
Anti-loosen mounting nut socket
Universal fixture.
Torque value: 9.0~10.0 kgf-m



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. (8 bolts)
Torque value: 1.5~2.0 kgf-m

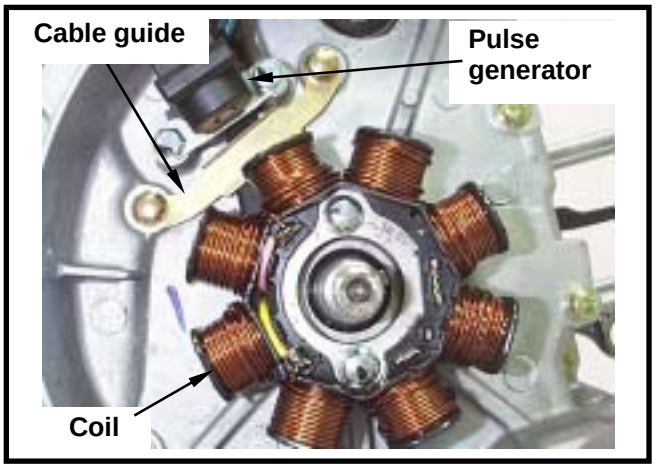


Mounted Coil Set Installation

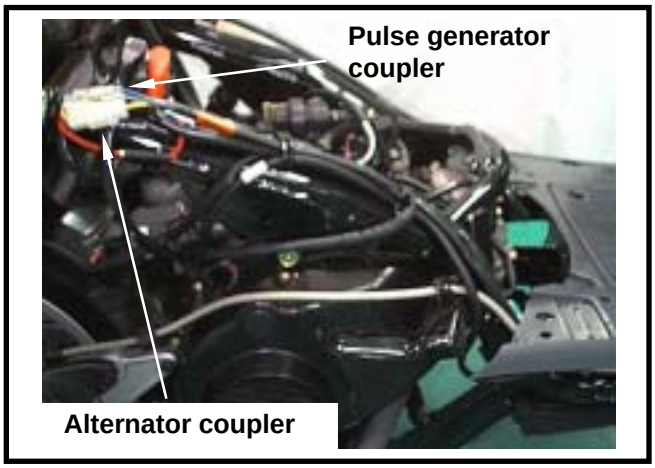
Install the coil set onto right crankcase cover. (2 screws)
Install crankshaft position sensor. (2 screws)
Tighten the cable guide. (2 screws)
Torque: 1.5~2.0 kgf-m
Tie the wire harness hose onto the indent of crankcase.

Caution

Make sure that the wire harness is placed under the crankshaft position sensor.

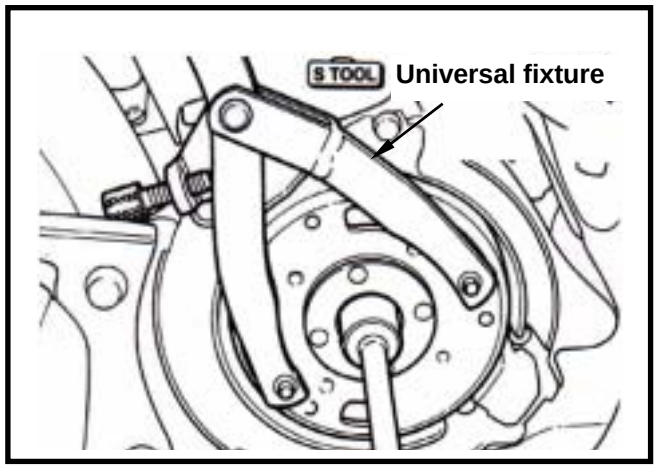


Connect the connectors of alternator and crankshaft position sensor.

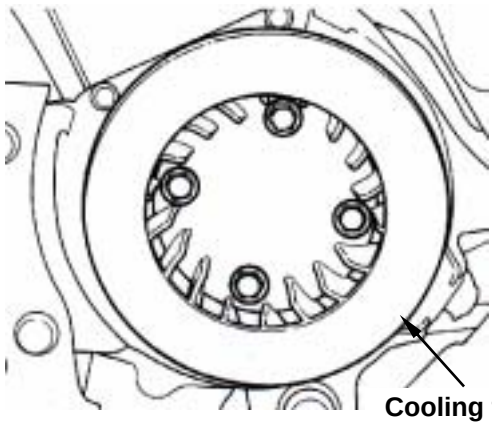


Flywheel Installation

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: 5.0~6.0 kgf-m
Special service tool:
Universal fixture



Install the cooling fan. (4 bolts)

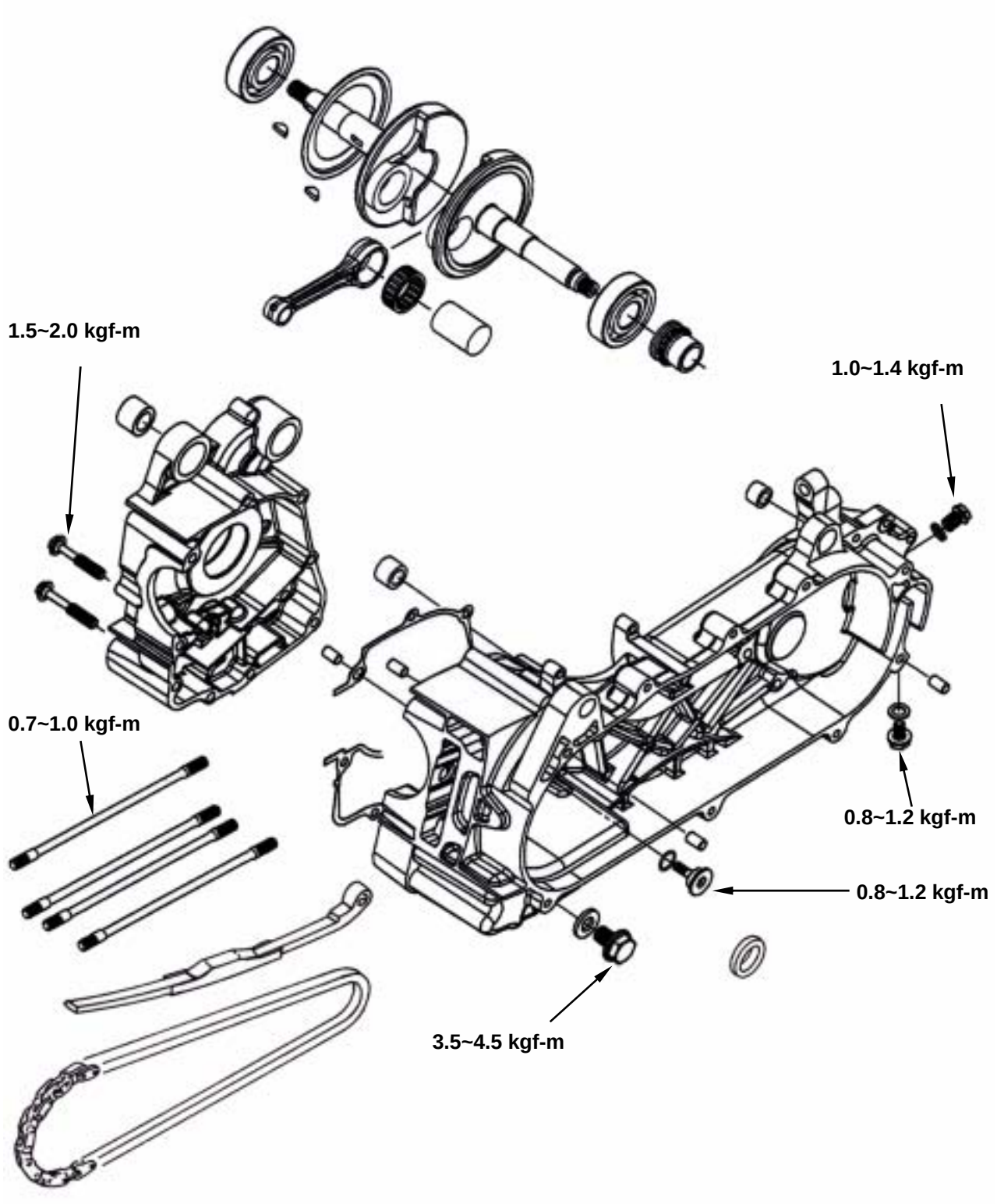


Install the cooling fan shroud. (3 screws)
Install the rear bracket mounting bolts. (2 bolts)
Install the exhaust pipe. (2 bolts, 2 nuts)
Install the right side cover. (4 screws)
Add some engine oil according to specified quantity.

10. Alternator/Starting Clutch

NOTE:

Mechanism Illustration



11. Crankcase/Crankshaft

Operational precautions

General Information

- This Section contains descriptions concerning disassembly of the crankcase so that the crankshaft can be serviced.
- Complete following operations before disassembling crankcase.

Engine	Chapter 5
Cylinder head	Chapter 6
Cylinder/ piston	Chapter 7
V-belt Drive pulley	Chapter 8
Alternator/Foot Starting Clutch	Chapter 10
Start motor	Chapter 16

- 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	0.100~0.300	0.550
Right angle clearance of the big end of the connecting rod	0.000~0.008	0.050
Run-out	—	0.100

Torque value

Bolts for crankcase	:	1.5~2.0 kgf-m
Bolts for cylinder/cylinder head	:	0.7~1.0 kgf-m
Engine oil draining plug	:	3.5~4.5 kgf-m
Bolts for cam chain tensioner	:	0.8~1.2 kgf-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

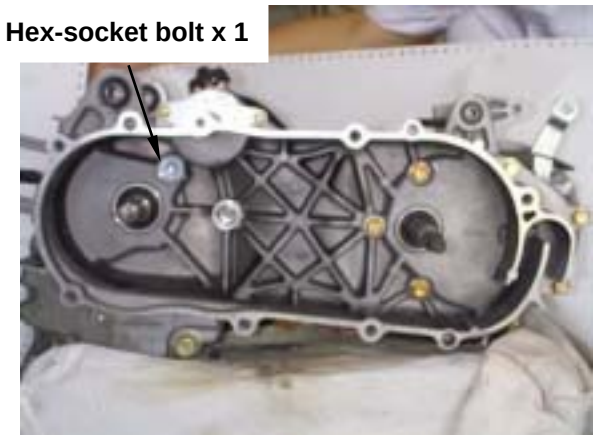
Trouble diagnosis

Engine noise

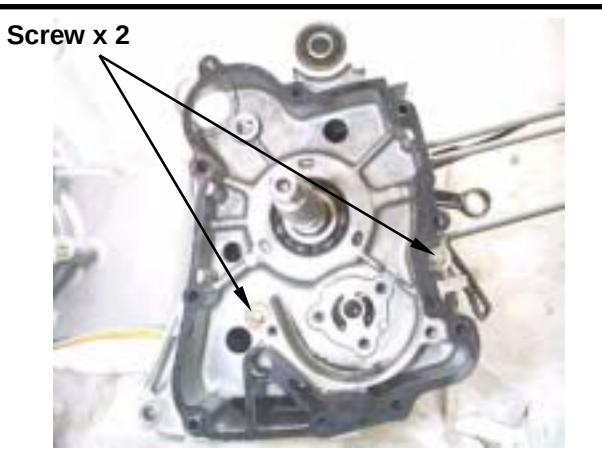
- Loose crankshaft bearing
- Loose crankshaft pin bearing
- Wear piston pin or piston pin hole

Disassembly Of Crankcase

Remove the cam chain tensioner (hex socket bolt x 1) from the left crankcase side.



Remove the 2 bolts from the right side of crankcase, and then remove the right crankcase.

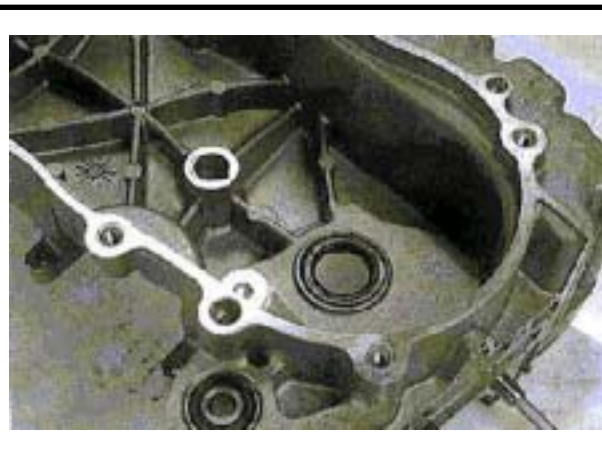


Remove the crankshaft from the left crankcase.
Remove the cam chain.
Remove the gasket and setting pin. (2 bolts)
Scrape gasket residues off the crankcase contact surface.

Caution

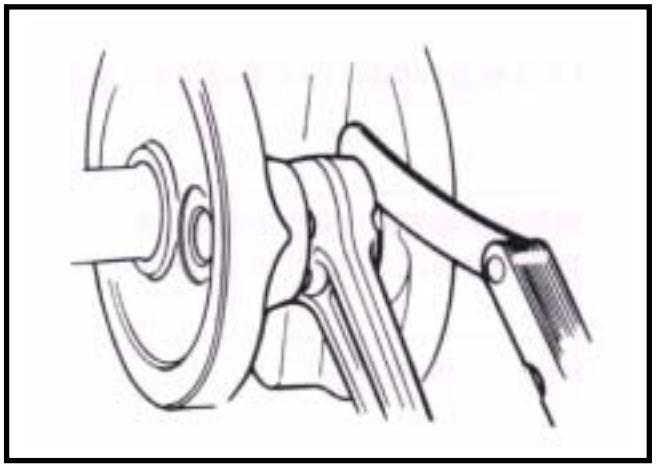
- Check if the right & left bearings are press-in the crankshaft.
- Do not damage contact surface of the crankcase.
- Soap the gasket residues into solvent and the residues will be removed easily.

Remove oil seal from the left crankcase side.

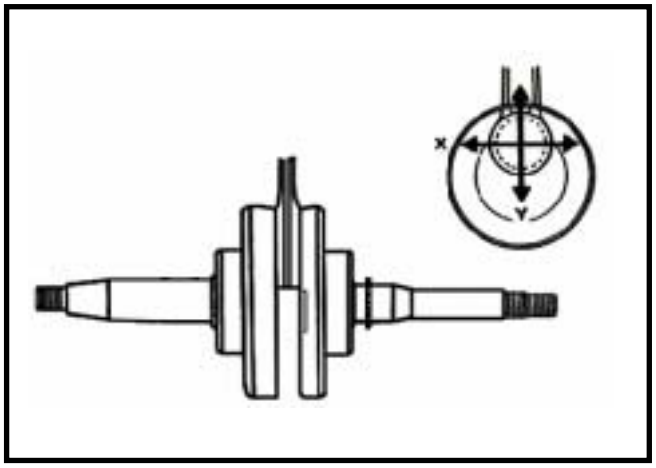


Crankshaft Inspection

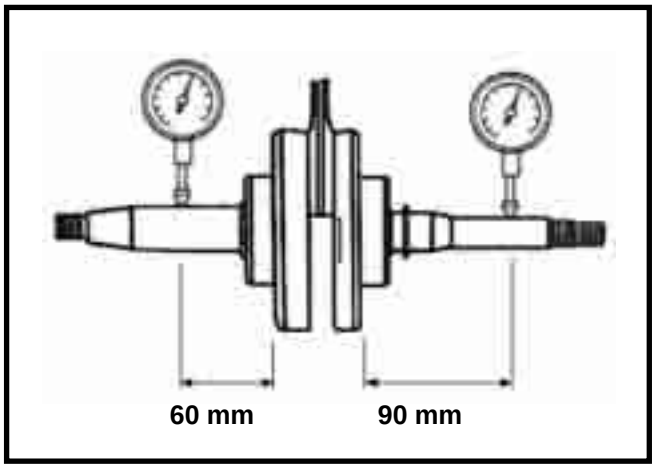
Measure left and right clearance of connecting rod big end.
Service limit: Replace when it is more than 0.55 mm



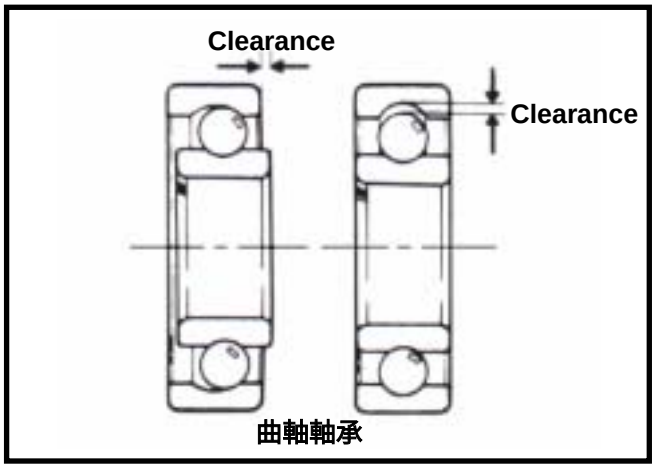
Measure the radical clearance of the big end at the vertical directions.
Service limit : 0.05 mm



Place the crankshaft onto a V-block and measure run-out of the crankshaft with dial gauge.
Service limit: 0.10 mm



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.

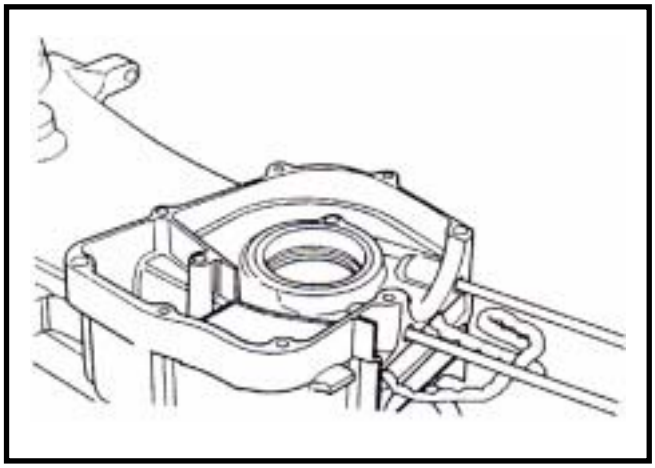


Assembly Of Crankcase

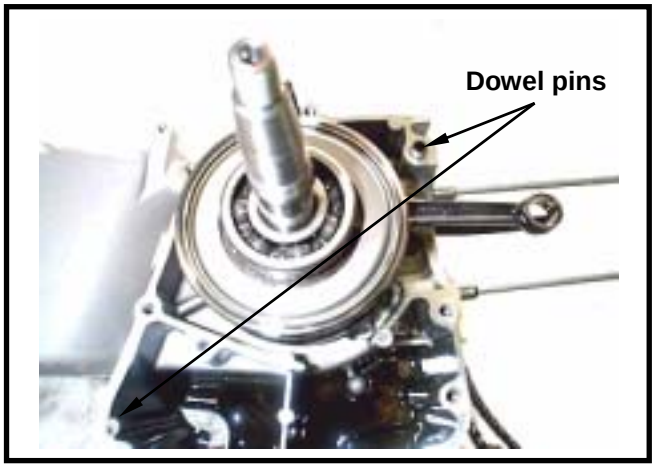
Install cam chain into the chain hole of the left crankcase, and then split out the cam chain.

Caution

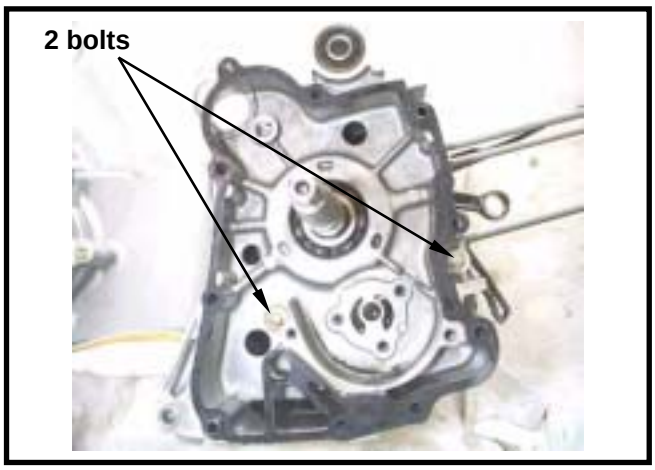
Do not damage the cam chain as installing the crankshaft.



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



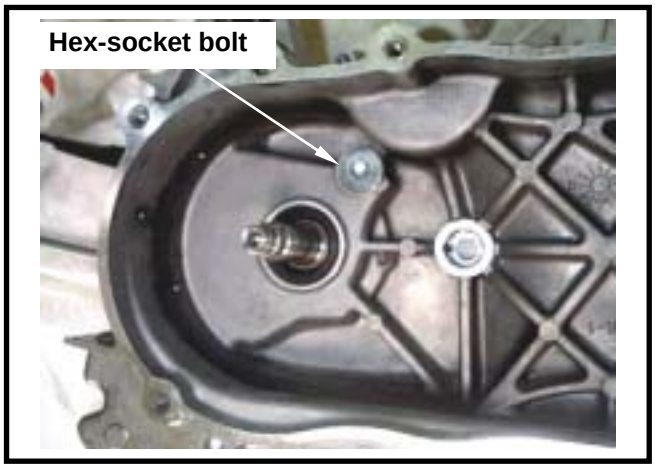
Install the right crankcase and tighten the crankcase bolts. (2 bolts)
Torque value: 1.5~2.0 kgf-m



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: 0.8~1.2 kgf-m

Caution

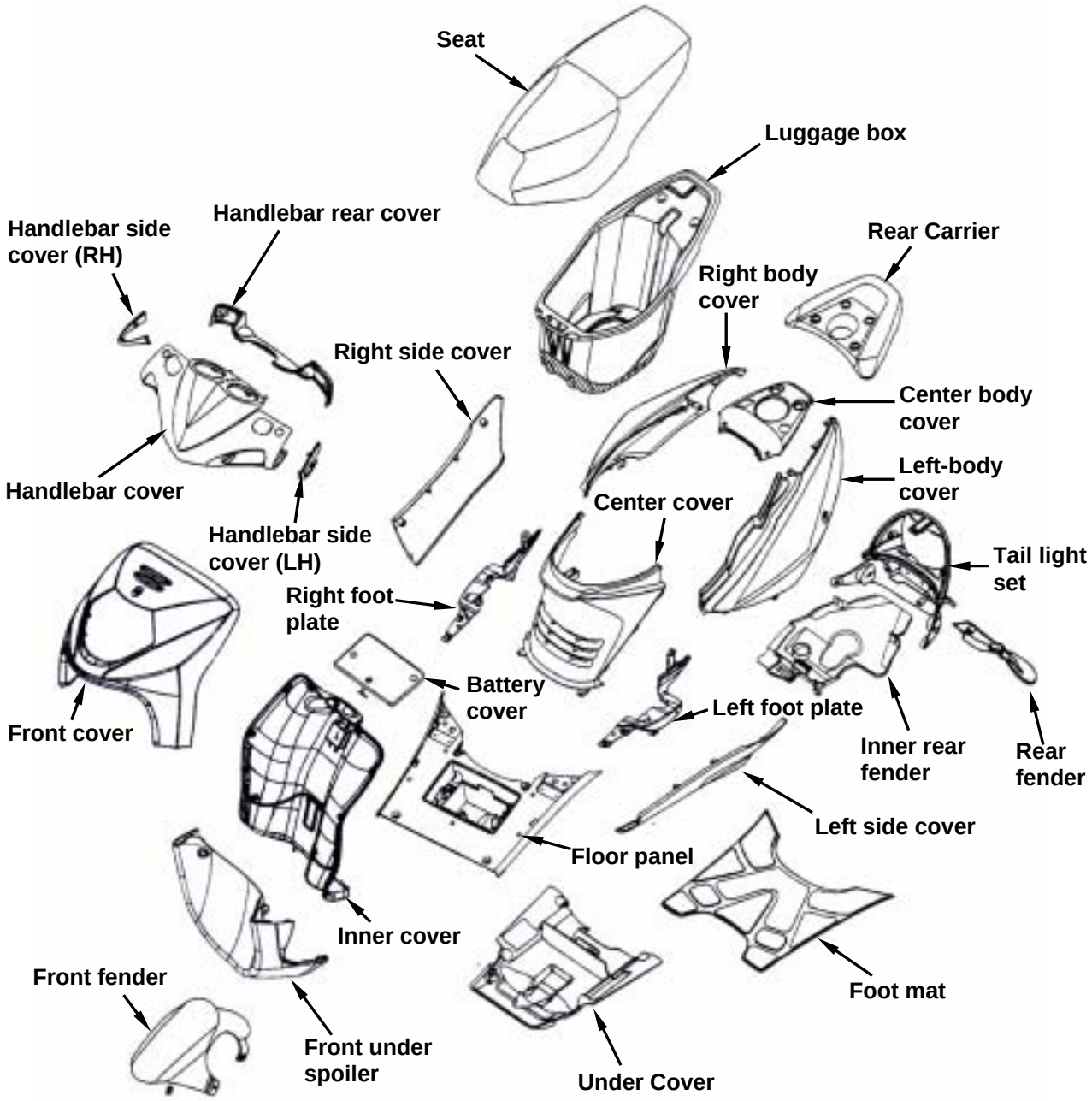
The O-ring must be installed into the bolt's groove.



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)

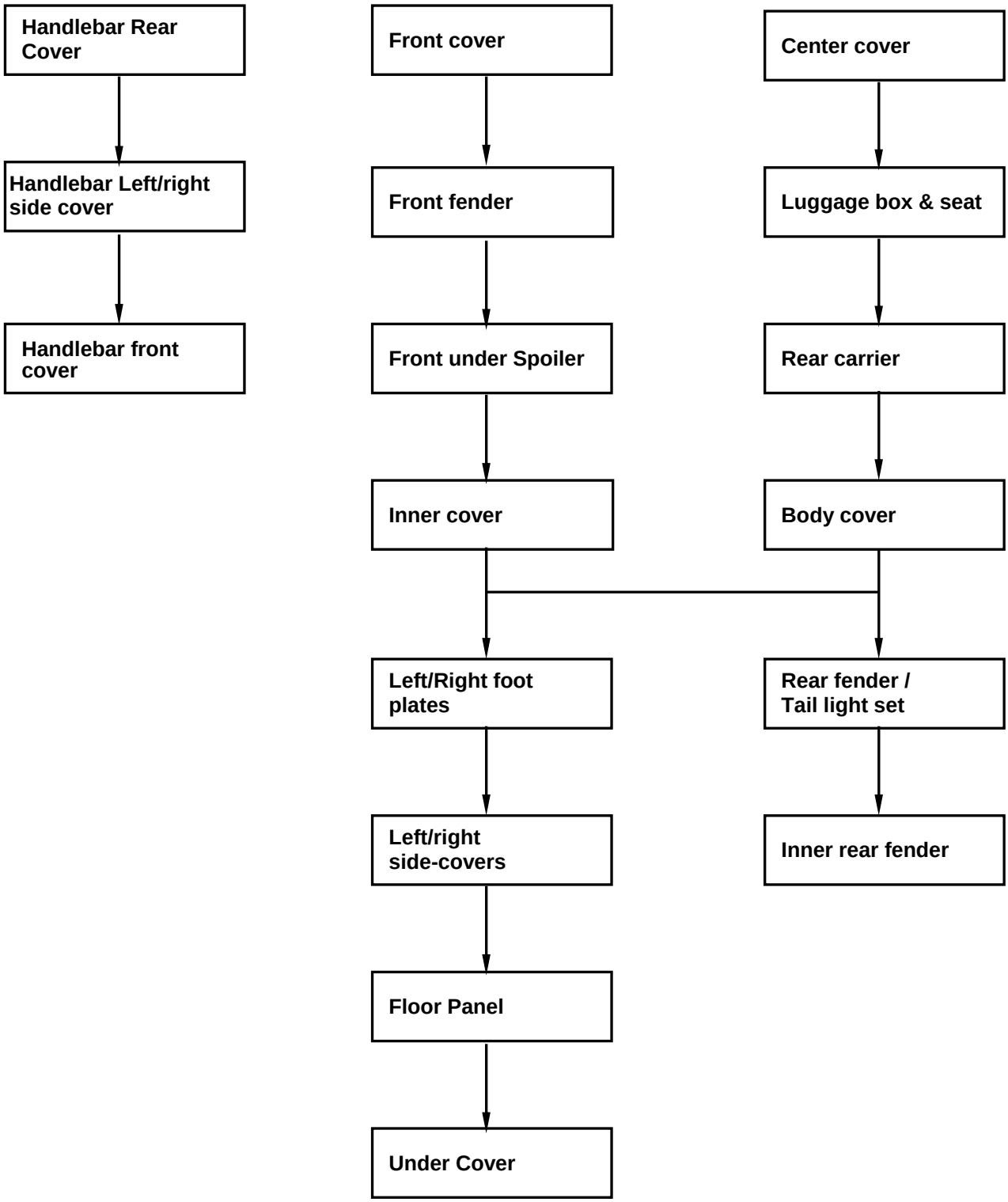
Mechanism Illustration



12. Body Cover

Maintenance Information

Body covers disassemble sequence:



- Be careful not to damage various covers in disassembly or re-assembly operation.
- Never injure hooks molded on the body covers in disassembly or re-assembly operation.
- Align the buckles on the guards with slot on the covers.
- Make sure that each hook is properly installed during the assembly.
- Never compact forcefully or hammer the guard and the covers during assembly.

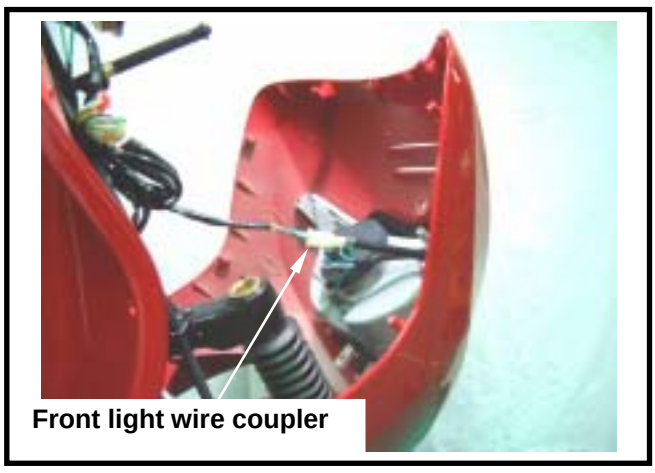
Front Cover

Removal

Remove the 8 mounting screws from the inside of front inner cover.

Remove the upper screw (screw x 1) from the front fender.

Remove the front light wire coupler.



Remove the front cover.

Installation

Install according to the reverse procedure of removal.

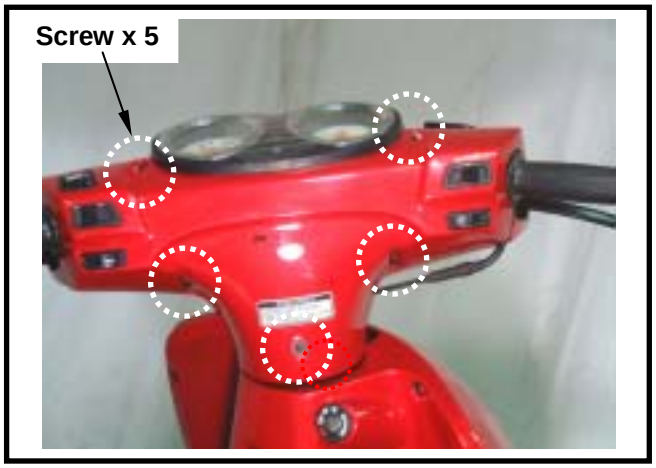
Handlebar Cover

Removal

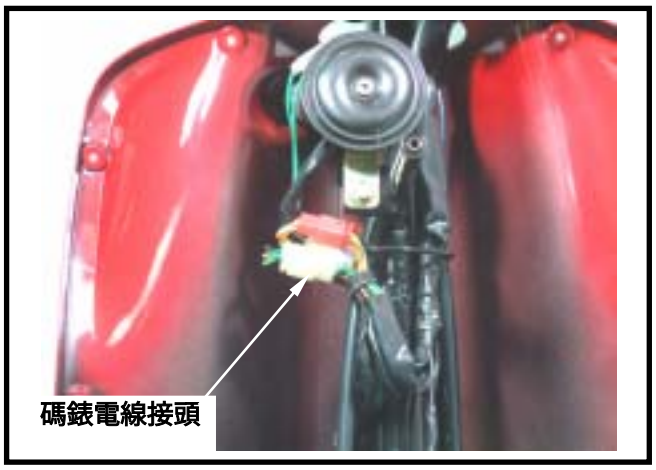
Remove the handlebar rear cover (screw x 5).
Disconnect the wire connectors of left & right switches.
Remove the handlebar rear cover.

Caution

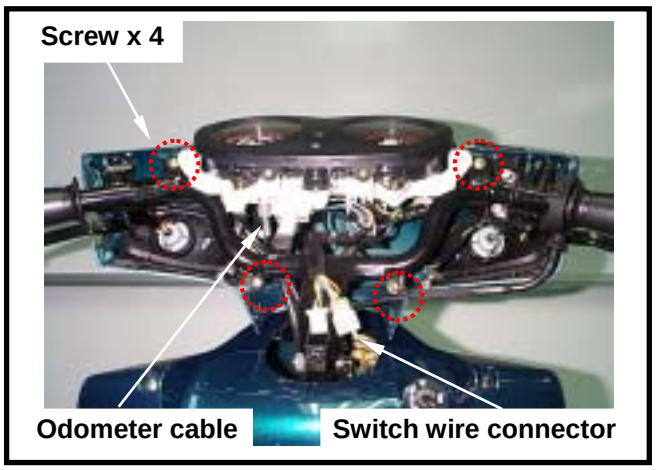
- Open the hooks on the two end-section of the handlebar cover as removing the cover. The, remove the handlebar cover. Do not pull it forcedly to avoid to breaking the hooks.



Remove the front cover, and odometer wire coupler.

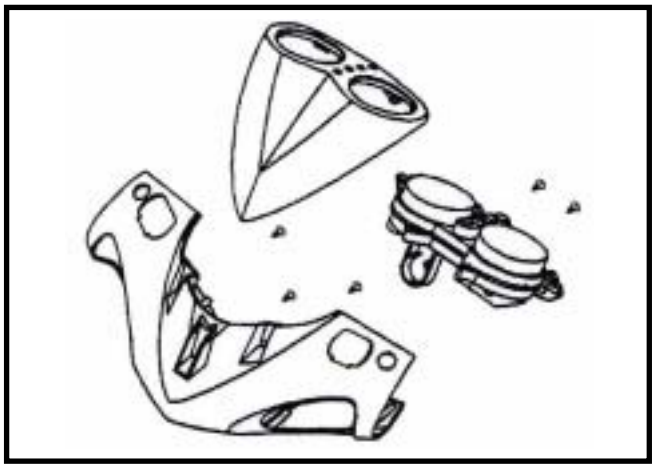


Remove the odometer cable.
Remove the handlebar front cover and odometer set. (screw x 4)
Remove the odometer cover. (screw x 3)
Disassemble the odometer cover and the odometer set. (screw x 2)



Installation

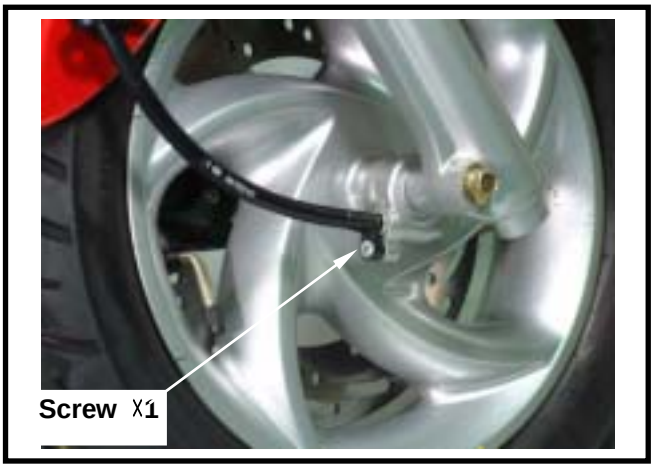
Install according to the reverse procedure of removal.



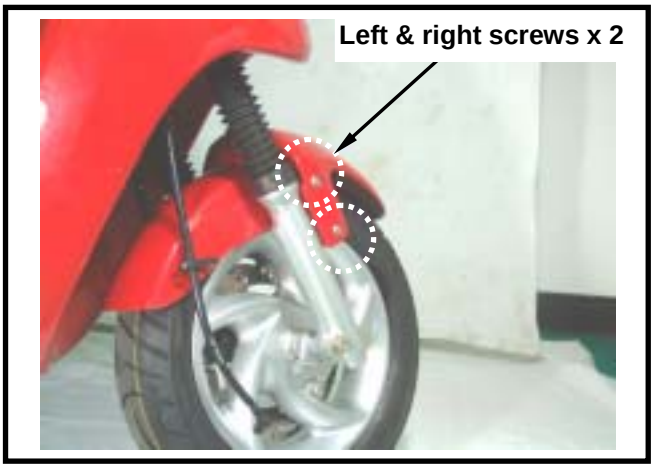
Front Fender

Removal

Remove the speedometer cable.(screw x 1)



Remove the front fender screws. (left & right x 2)



Remove the front fender.

Installation

Install according to the reverse procedure of removal.

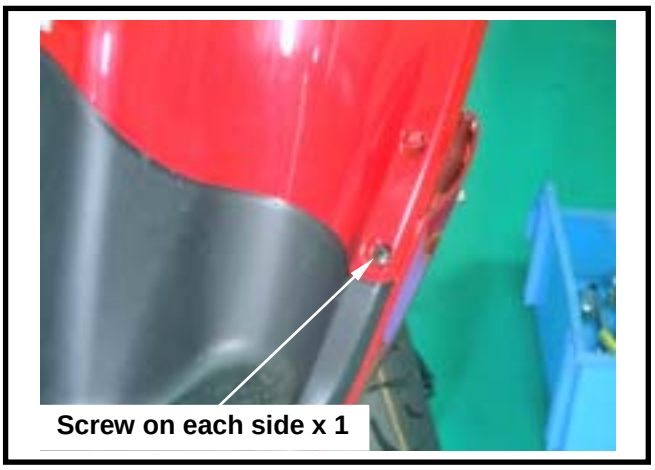
Front Under Spoiler

Removal

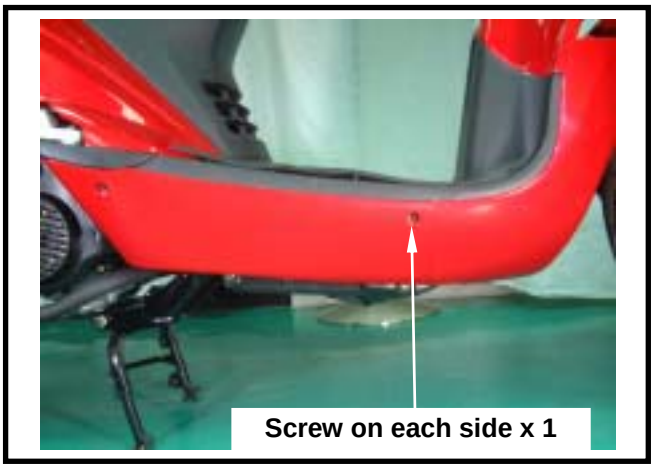
Remove the front fender, front cover.

Remove the screw (screw x 2) from the top-end of front under spoiler.

Remove the inner cover screw. (left & right each side x 1)



Remove 2 screws on the left & right each side of side cover.



Remove the front under spoiler.

Installation

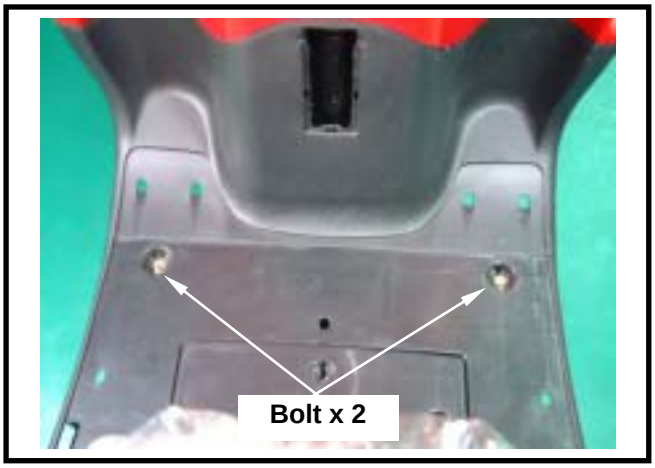
Install according to the reverse procedure of removal.

Inner Cover

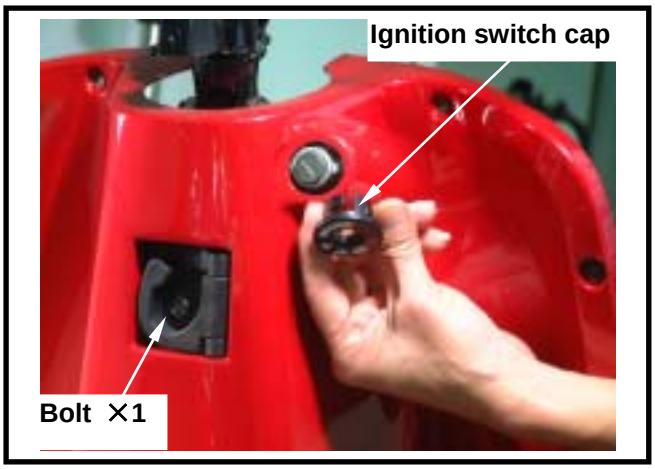
Removal

Remove the front cover and front under spoiler firstly.

Remove the mounting bolts (2 bolts) of floor Panel.



Remove 1 bolt and ignition switch cap.



Take out the front inner cover.

Installation

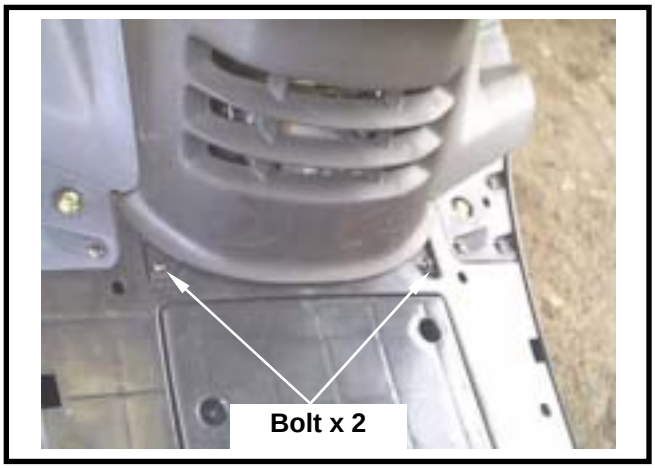
Install according to the reverse procedure of removal.

Center Cover

Removal

Remove the 1 upper screw inside of the luggage box.

Remove the lower 2-screws in front of the center cover.
Take out the center cover.



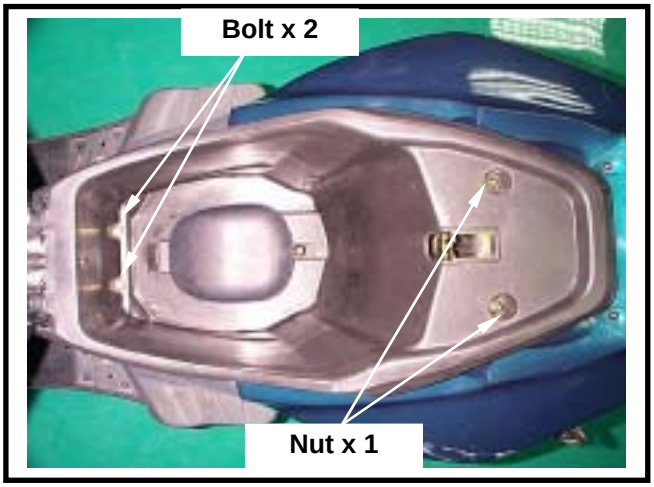
Installation

Install according to the reverse procedure of removal.

Luggage Box

Removal

Open the seat.
Remove the 1 upper screw inside of the front luggage box.
Remove the 2 mounting nuts and 2 bolts of the luggage box.

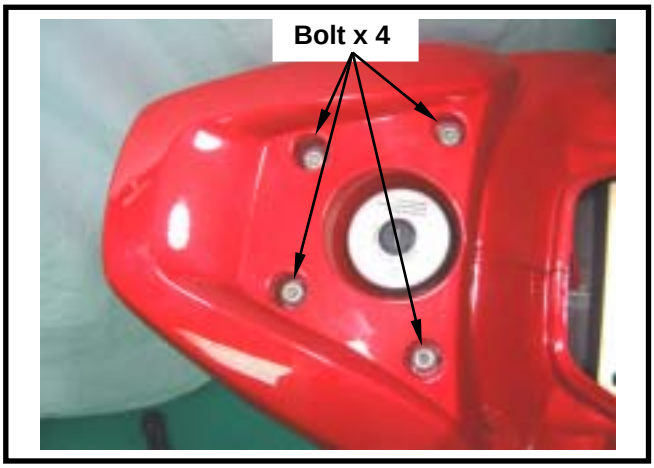


Lift the luggage box up by pushing the luggage box & seat upward.

Installation

Install according to the reverse procedure of removal.

Rear Carrier



Removal

Remove the hex-socket bolts (bolt x 4) of the rear carrier.

Caution

Do not open the fuel tank cap as removing the bolts so that prevent from bolts falling into the fuel tank.

Open the fuel tank cap with key.

Remove the rear carrier.

Installation

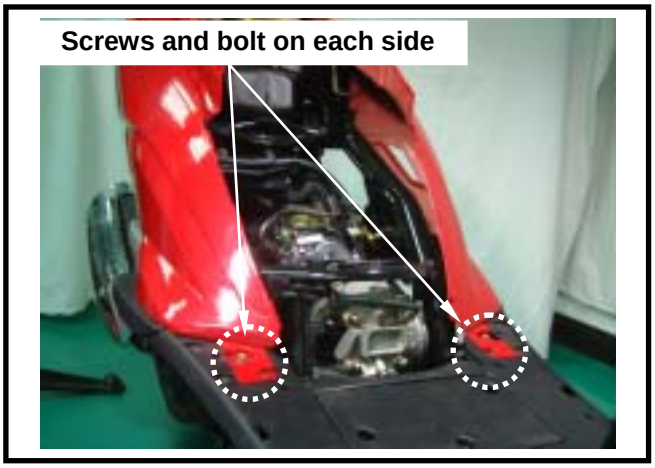
Install according to the reverse procedure of removal.

Body Cover

Removal

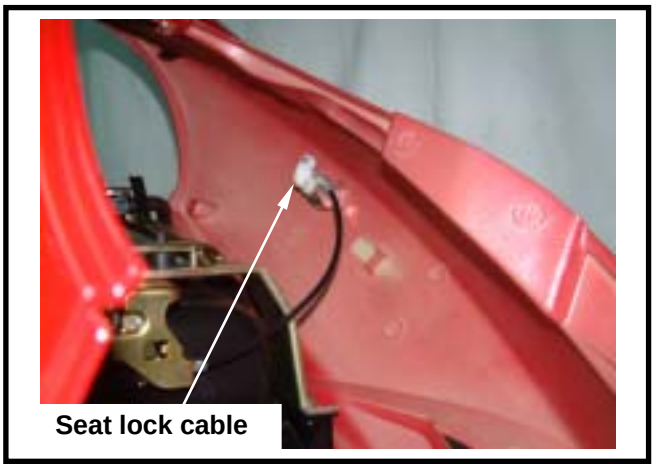
Remove the rear carrier, luggage box and seat firstly.

Remove the body cover mounting screws and bolts. (1 screw and 1 bolt on each side)



Remove 2 screw in rear of the body cover.

Remove the seat lock cable, then remove the body cover.



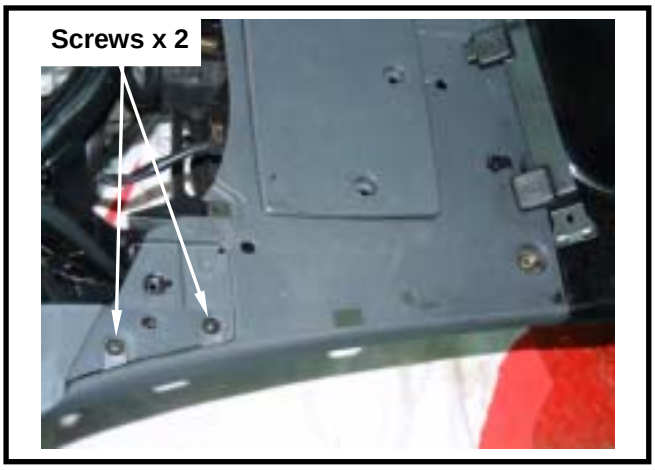
Installation

Install according to the reverse procedure of removal.

Left & Right Side-Foot Plate

Removal

Remove the foot plate connection screws. (2 screws on left & right each side)

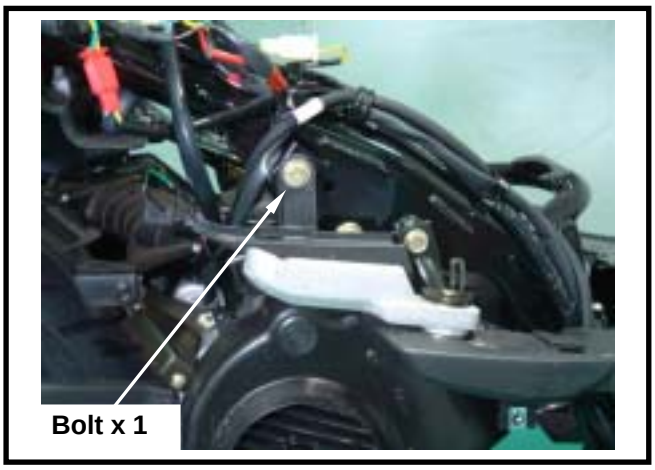


Remove the rear bolts. (1 bolt on left & right each side)

Remove the side foot plate.

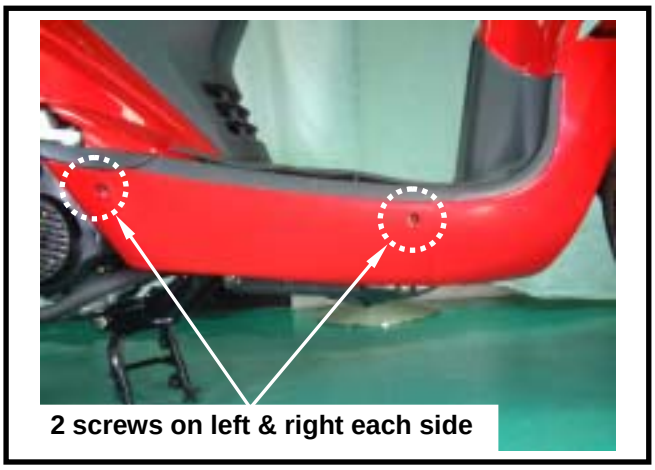
Installation

Install according to the reverse procedure of removal.



Left & Right Side-Covers

Remove the mounting screws. (2 screws on left & right each side)



Pull out the side-cover backward so that the front clipper can be separated.

Remove the side-covers.

Installation

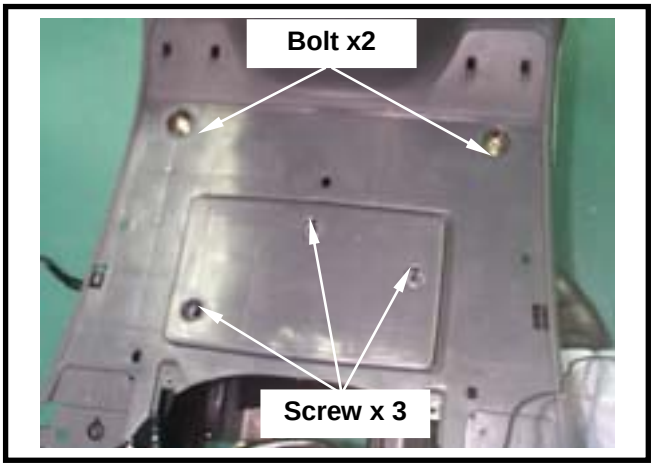
Install according to the reverse procedure of removal.

Floor Panel

Removal

- Remove the center cover, luggage box, body side covers, and body cover firstly.
- Remove the front mounting bolts (bolt x 2) of the floor panel.

Remove the battery cover. (screw x 3)

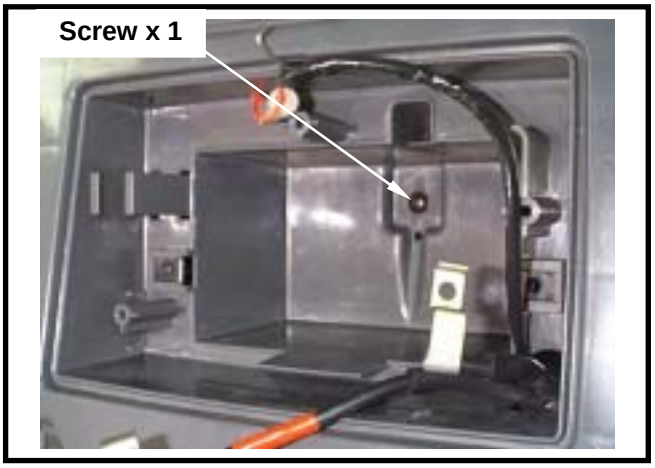


Remove the battery bracket (screw x 2) and power cables.
Take out the battery.

Remove the bottom mounting screws from the floor panel, and then the floor panel.

Installation

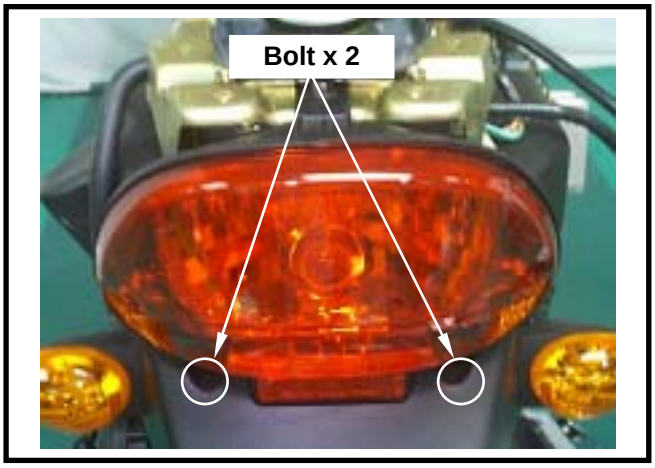
Install according to the reverse procedure of removal.



Rear Fender

Removal

Remove the upper bolts (bolt x 2) from the rear fender.



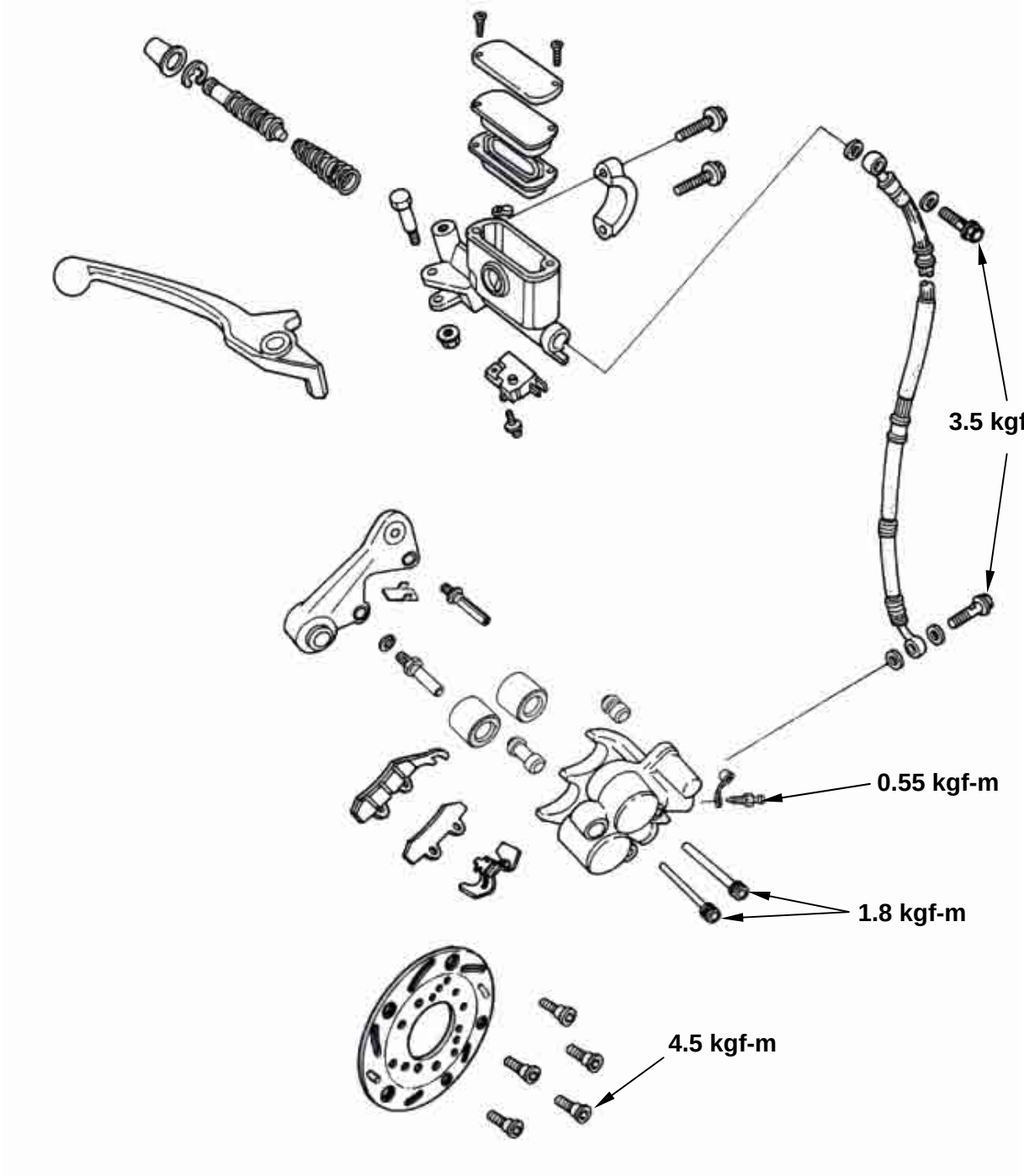
Remove the left & right side bolt (1 bolt on each side) from the rear fender.
Remove the rear turning signal lamp wire, and then the rear fender.

Installation

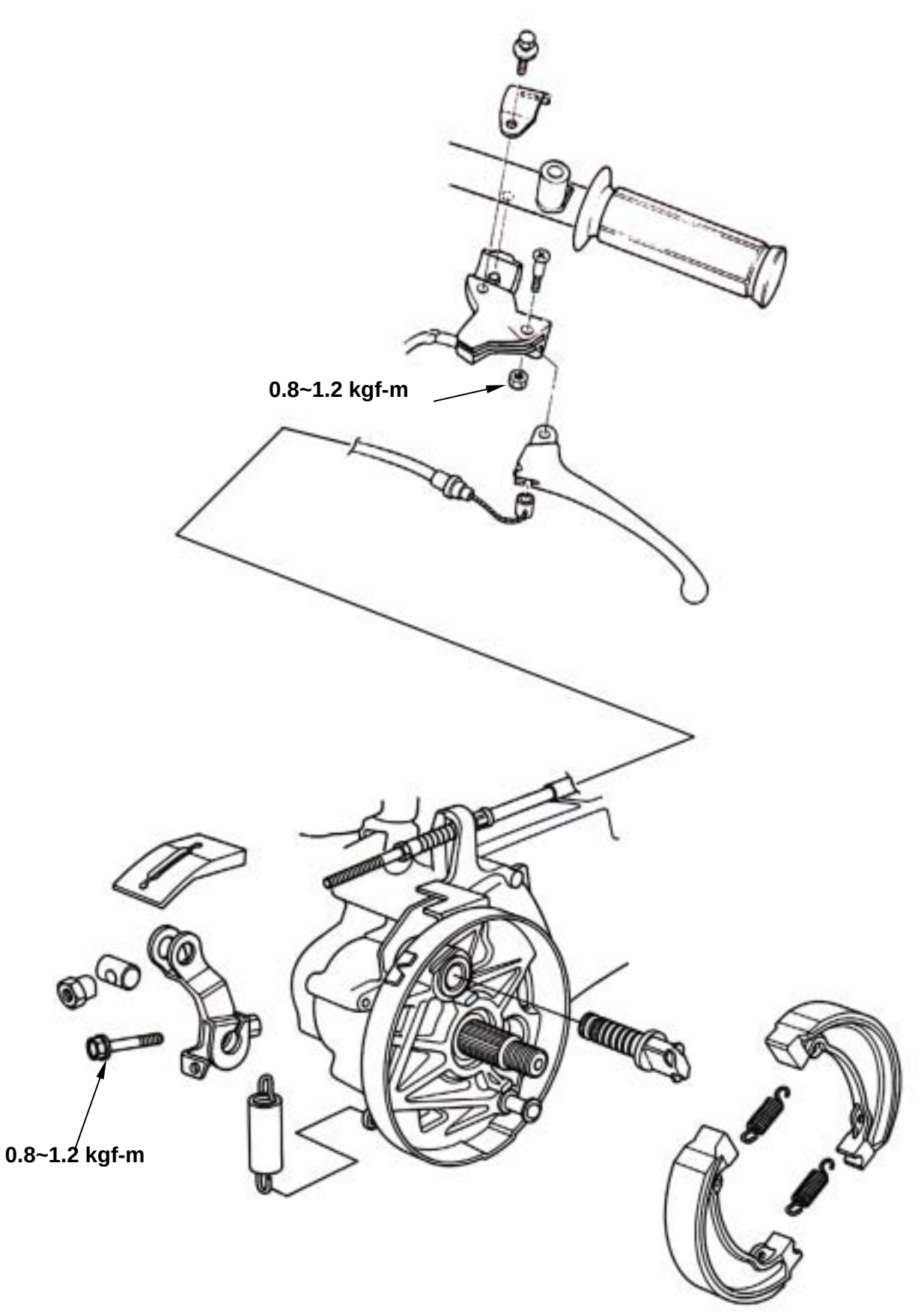
Install according to the reverse procedure of removal.

NOTES:

Front Disc Brake System



Rear Drum Brake System



Precautions in Operation

Caution

Inhaling asbestos may cause disorders of respiration system or cancer, therefore, never use air hose or dry brush to clean brake parts. Use vacuum cleaner or other authorized tool instead.

- The brake caliper can be removed without removing the hydraulic system.
- After the hydraulic system is removed, or the brake system is felt to be too soft, bleed the hydraulic system.
- While refilling brake fluid, care should be taken not to let the foreign material entering into the brake system.
- Do not spill brake fluid on the painted surfaces, plastic or rubber parts to avoid damage.
- Check the operation of the brake system before you go.

Specifications **Unit: mm**

Item	Standard	Limit
The thickness of front brake disc	4.000	2.500
Front brake disc eccentricity	0.100 or less	0.300
Master cylinder inner diameter	11.000~11.043	11.055
ID of master cylinder piston	10.957~10.984	10.945
Diameter of front disc	273.000	—
ID of front & rear brake drums	130.00	131.00
Thickness of front disc brake lining	5.100	2.000
Thickness of rear disc brake lining	5.100	2.000

Torque values

Brake hose bolt	3.50 kgf-m
Bolt for brake caliper	3.30 kgf-m
Brake lining pin bolt	1.80 kgf-m
Cap of Brake lining pin bolt	1.00 kgf-m
Air-bleed valve	0.55 kgf-m

Trouble Diagnosis

DISC BRAKE

Soft brake lever

1. Air inside the hydraulic system
2. Hydraulic system leaking
3. Worn master piston
4. Worn brake pad
5. Poor brake caliper
6. Worn brake lining/disc
7. Low brake fluid
8. Blocked brake pipe
9. Warp/bent brake disc
10. Bent brake lever

Hard operation of brake lever

1. Blocked brake system
2. Poor brake caliper
3. Blocked brake pipe
4. Seized/worn master cylinder piston
5. Bent brake lever

Uneven brake

1. Dirty brake lining/disc
2. Poor wheel alignment
3. Clogged brake hose
4. Deformed or warped brake disc
5. Restricted brake hose and fittings

Tight brake

1. Dirty brake lining/disc
2. Poor wheel alignment
3. Deformed or warped brake disc

Brake noise

1. Dirty lining
2. Deformed brake disc
3. Poor brake caliper installation
4. Imbalance brake disc or wheel

DRUM BRAKE

Poor brake performance

1. improper brake adjustment
2. worn brake lining
3. worn brake drum
4. worn brake cam
5. improper brake lining installation
6. seized brake cable
7. Dirty brake lining
8. Dirty brake drum
9. brake pad worn in brake cam area.
10. poor contact between brake arm and camshaft indent

Tight operation or low return speed of brake lever

1. worn/broken/crack return spring
2. worn drum
3. Dirty brake lining
4. brake seized caused from dirty brake drum
5. seized brake cable
6. worn brake cam
7. improper brake lining installation

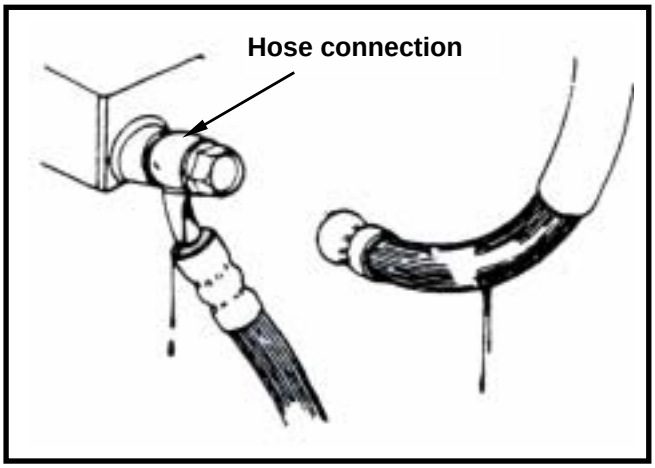
Brake noise

1. worn brake lining
2. worn drum
3. Dirty brake lining
4. Dirty brake drum

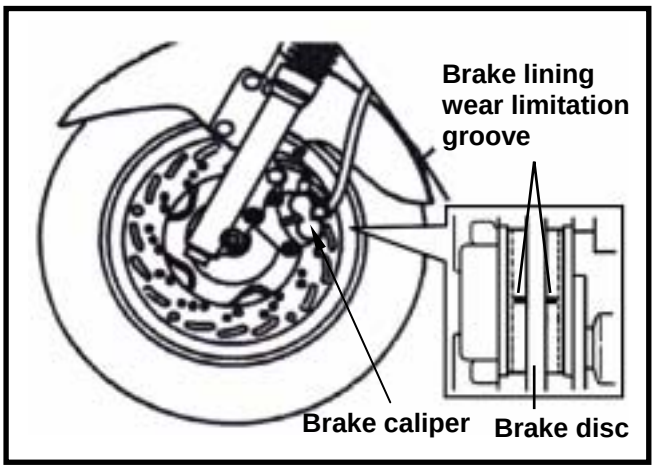
Hydraulic Brake System Inspection

Inspection

Visual inspect for brake fluid leaking or damage. Check if brake hose connection loosen with wrench and turn the handlebar from right to left motion or press down the shock absorber to check if there is something is interfered with the brake system or brake components.



Operate the brake system and check the brake lining. Check the front brake from front side, and replace the brake lining with new one when the brake lining wear limitation groove reaches to the brake disc.

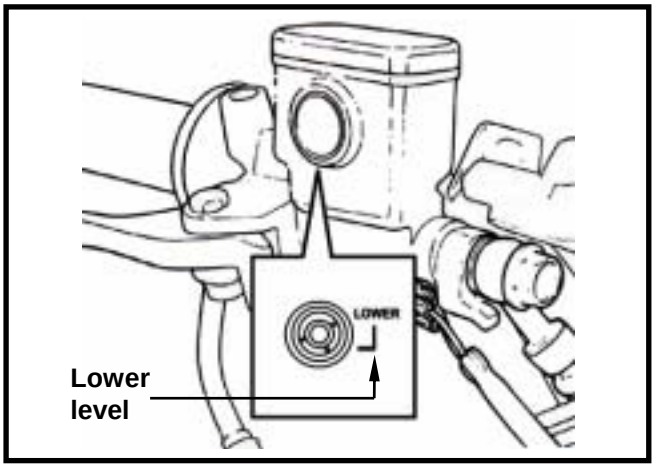


Park the motorcycle on a flat ground and check its brake fluid level.

Recommended brake fluid: WELL RUN (DOT 3) brake fluid

CAUTION

- The fluid level will not be correct if parking the motorcycle in title or just parking. It has to waiting for around 3~5 minutes.
- Never use faked brake fluid to prevent from chemical reaction.
- It has to apply with same brand brake fluid to sure the brake performance.



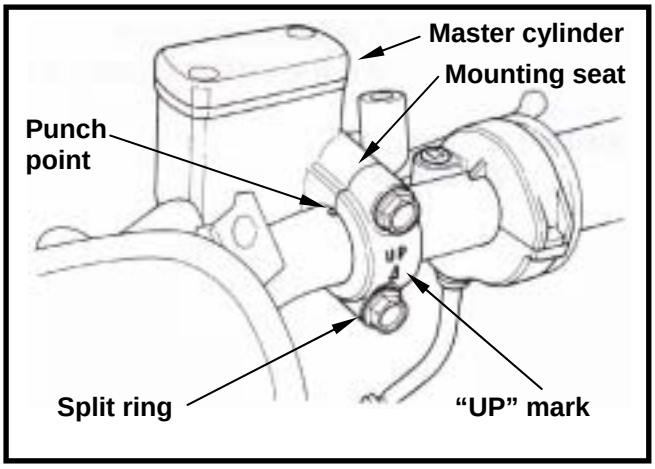
BRAKE FLUID ADD

Turn the handlebar to let the master cylinder in horizontal position before removed the master cylinder cap.

Place a rag onto painting, plastic or rubber components when conduct brake system maintenance.

CAUTION

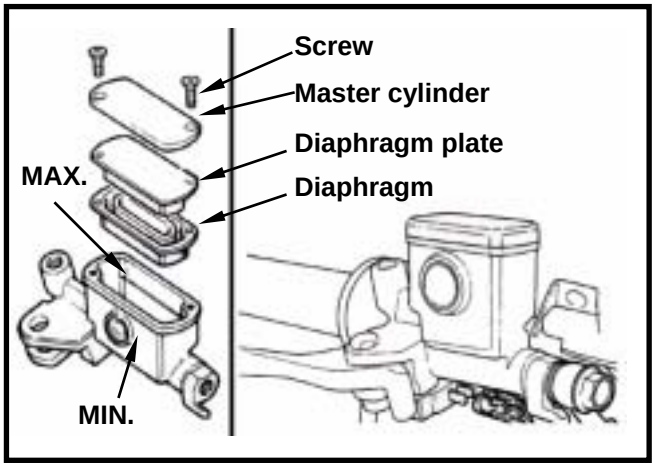
- Do not over the upper level when adding brake fluid and avoid to spilling brake fluid on painted surfaces, plastic or rubber components to result in their damages.



Remove the master cylinder cap and diaphragm. Add good quality brake fluid and it has to add same brand brake fluid into the master cylinder. Clean dirty brake disc.

CAUTION

The dirty brake lining or disc will reduce the brake performance. The mixed non-compatible brake fluid will reduce brake performance. Foreign materials will block the system causing brake performance to be reduced or totally lost.

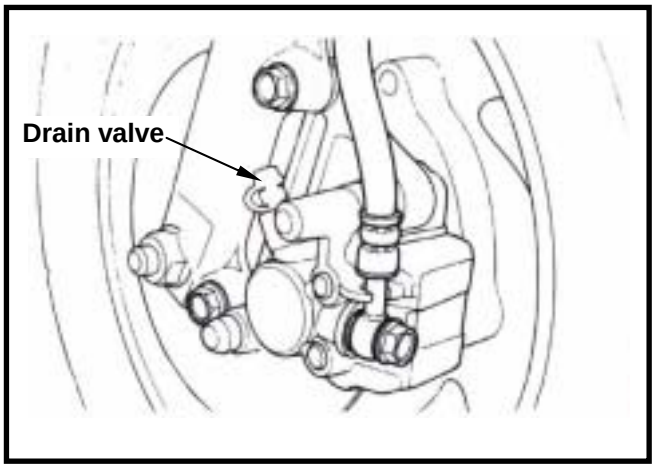


Brake Fluid Replacement/Air-Bleed

Connect drain hose to drain valve.
Open the drain valve on the caliper and hold and release the brake lever alternatively until the old brake fluid is entirely drained out. Close the drain valve and add specified brake fluid into the brake master cylinder.

CAUTION

To reuse the spent brake fluid will effect brake performance.

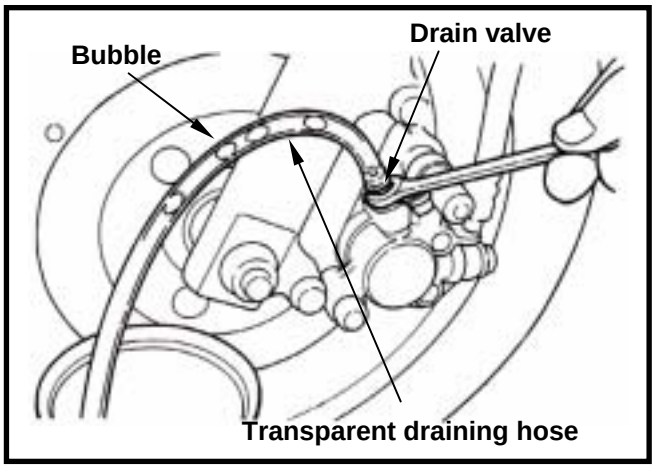


Connect one end of transparent hose to the drain valve, and put the other end into a container.
Open the drain valve around 1/4 turns, and at the same time hold the brake lever until the there is no air bubble in the drain hose and also feeling resistance on the brake lever.
Close the drain valve when finishing the brake system refilling fluid procedure, and operate the brake lever to check whether air bubble is in brake system or not. If brake is still soft, please bleed the system as described below.

1. Tightly hold the brake lever and open the drain valve around 1/4 turns, and then close the valve.

CAUTION

- Do not release the brake lever before the drain valve is closed.
- Always check the brake fluid level when carrying out the air bleeding procedure to avoid air entering into the system.



2. Slowly release the brake lever, and wait for a few seconds until it reaches its top position.
3. Repeat the steps 1 and 2 until there is no air bubble at the end of the hose. Tightly close the drain valve.
4. Make sure the brake fluid is in the UPPER level of the master cylinder, and refill the fluid if necessary.
5. Cover the cap.

Brake Caliper

Removal

Place a container under the brake caliper, and loosen the brake hose bolt and finally remove the brake hoses.

CAUTION

- Do not spill brake fluid on painted surfaces.
- The exhaust pipe has to be removed before remove the rear brake caliper.

Remove the bolt cap, and loosen the lining guide bolt.
Remove two caliper bolts and the caliper.

INSTALLATION

Install the brake caliper and tighten the attaching bolts securely.
Torque: 3.3 kgf-m

CAUTION

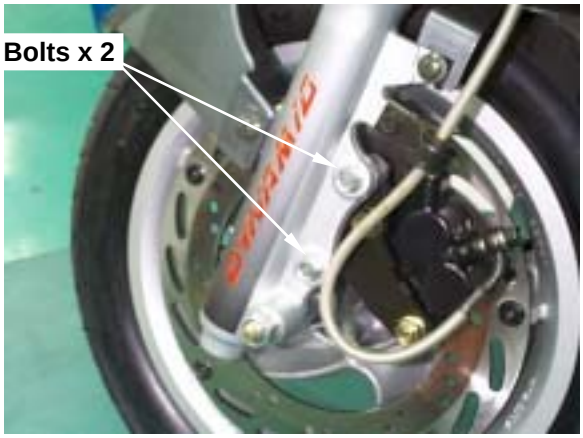
- Use M8 x 35 mm flange bolt only.
- Long bolt will impair the operation of brake disc.

Tighten the lining guide bolt.
Torque: 1.8 kgf-m

Install the bolt cap.
Torque: 1.0 kgf-m

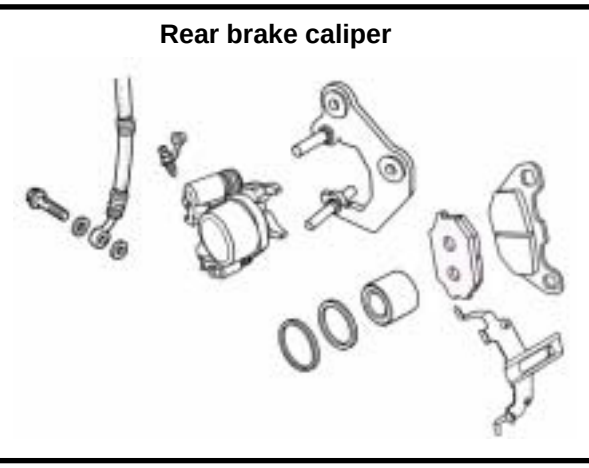
Use two seal washers and hose bolts to lock the hose and brake caliper in place.
Torque: 3.5 kgf-m

Refill up the brake fluid to the reservoir and make necessary air bleeding.



Front brake caliper

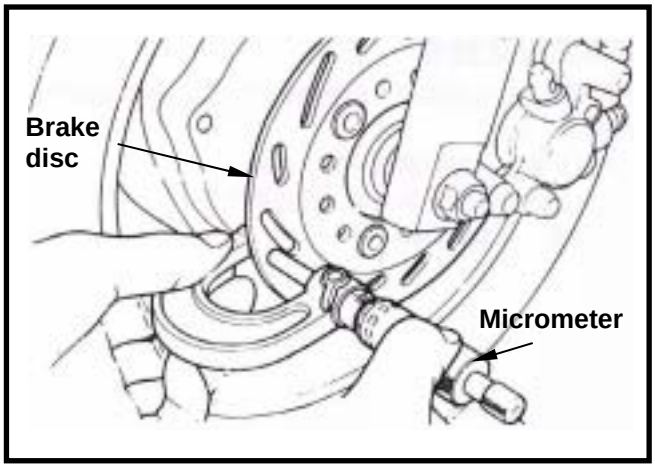
Rear brake caliper



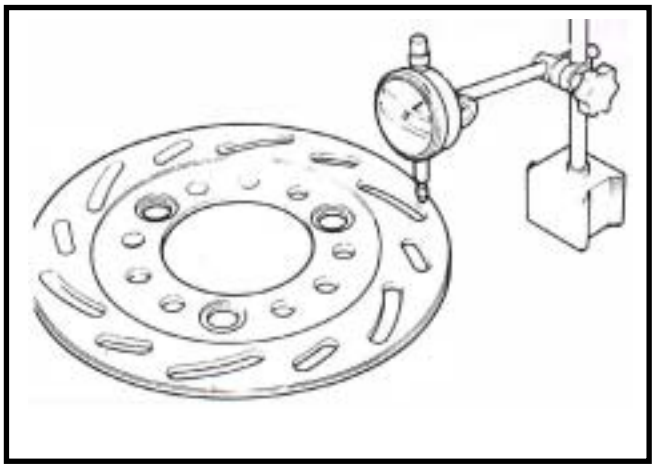
Brake Disc

Inspection

Visually check the brake disc for wear or break.
Measure the thickness of the disc at several places. Replace the disc if it has exceeded the service limit.
Allowable limit: 2.0 mm



Remove the brake disc from wheel.
Check the disc for deformation and bend.
Allowable limit: 0.30 mm



CAUTION

- Do not let grease touch to the brake disc that will cause brake performance.
- Do not clean the brake lining with air gun because the lining is contained asbestos. Operator should wear mask & glove and use vacuum cleaner to clean the brake lining.

Brake Master Cylinder

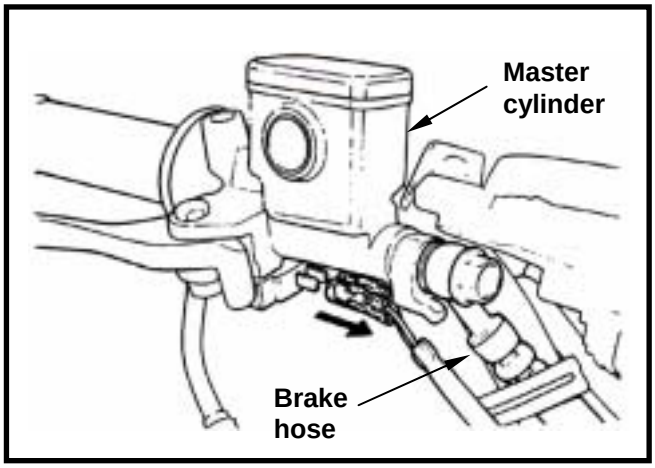
Removal

CAUTION

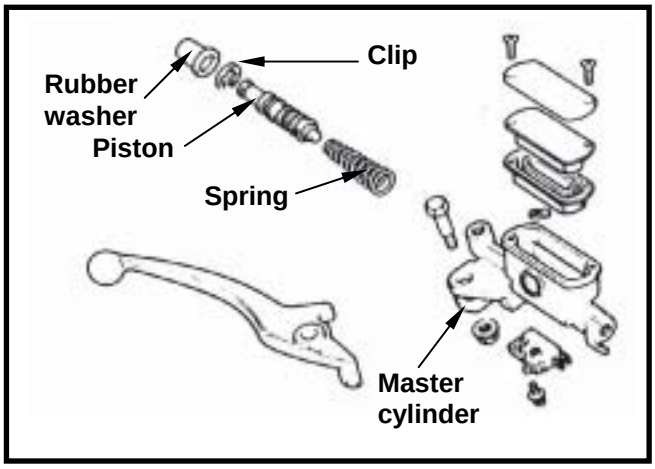
Do not let foreign materials enter into the cylinder.

CAUTION

The whole set of master cylinder, piston, spring, diaphragm and clip should be replaced after removal.



Remove the front and rear handlebar guards.
Remove the leads of brake lamp switch.
Drain out the brake fluid.
Remove the brake lever from the brake master cylinder.
Remove the brake hose.
Remove the master cylinder seat and the master cylinder.
Remove the rubber pad.
Remove the clip.
Remove the piston and the spring.
Clean the master cylinder with recommended brake fluid.



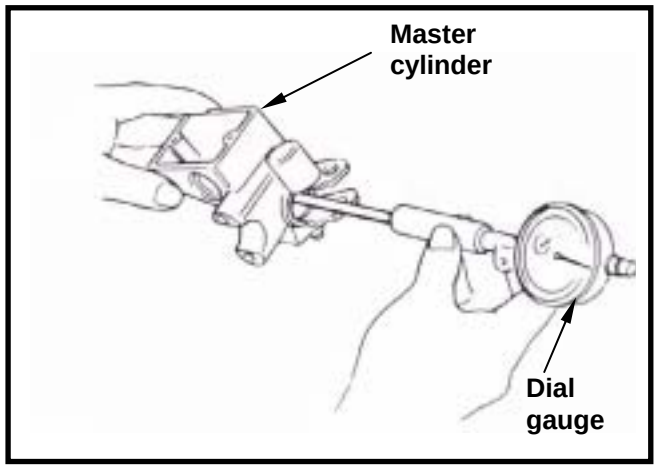
Inspection

Check the master cylinder for damage or scratch. Replace it if necessary.

Measure the cylinder inner diameter at several points along both X and Y directions.

Replace the cylinder if the measured values exceed allowable limit.

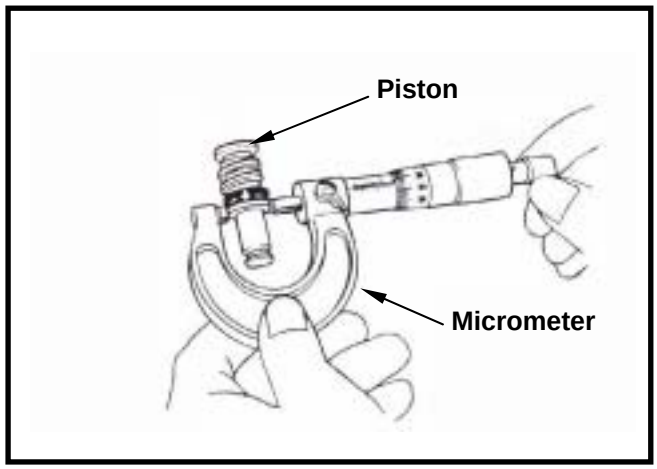
Allowable limit: 11.055 mm



Measure the outer diameter of the piston.

Replace the piston if its measured value exceeds allowable limit.

Allowable limit: 10.945 mm



Assembly

CAUTION

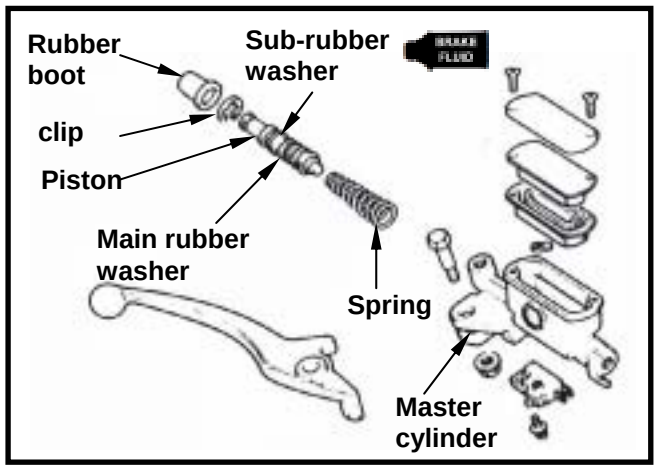
- It is necessary to replace the whole set comprising piston, spring, piston cup, and clip.
- Make sure there is no dust on all components before assembling.

Apply clean brake fluid to the piston cup, and then install the cup onto the piston.

Install the larger end of the spring onto the master cylinder.

The master cup's cavity should be face inside of master cylinder when installing the master cup.

Install the clip.



CAUTION

- Never install cup lip in the opposite direction.
- Make sure the clip is seated securely in the groove.

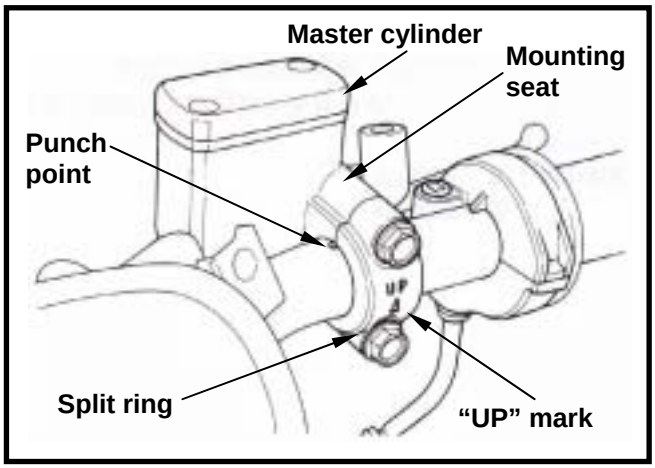
Install the rubber pad into groove properly.

INSTALLATION

Place the master cylinder onto handlebar, and install the split ring and bolts. The “UP” mark on the split ring should face upward.

Align the split ring on the master cylinder seat with the alignment point on the handlebar.

Tighten the upper bolt of the seat to specified torque value, and then tighten lower bolt to the same specified torque value.



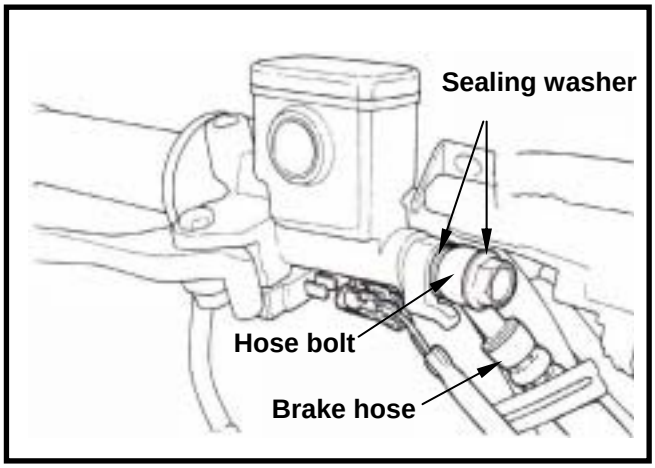
Install the brake lever, and connect leads to brake lamp switch.

Connect brake hoses with 2 new washes.

Tighten the brake hose bolt to the specified torque value.

Torque value: 3.5 kgf-m

Make sure the hose is installed correctly.



CAUTION

Improper routing may damage leads, hoses or pipes.

CAUTION

Kink of brake leads, hose or pipe may reduce brake performance.

Add specified brake fluid and bleed the system and conduct the air-bleeding job for the system.

DRUM BRAKE SYSTEM

INSPECTION

BRAKE DRUM

Removal

Use a vacuum cleaner and other suitable tools to clean the brake parts to minimize the hazard caused by the asbestos dust.

Caution

- Inhaling asbestos dust may cause respiration system disorder even cancer. Never use an air hose or a dry brush as to clean the brake parts.
- Grease on brake lining will reduce braking efficiency.

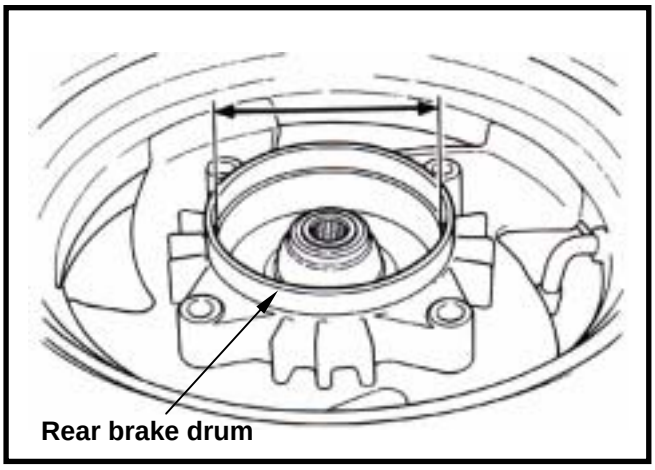
Remove wheel. Remove brake drum from wheel hub.

Inspection

Check the brake drum for wear and damage, replace wheel hub if necessary

Measure the ID of hub at several points and record the largest value.

Service limit : Rear 131.0 mm



Caution

- Remove the rust by using #120 sand paper.
- An inside micrometer must be used when measuring ID of brake drum because the brake drum has a friction back plate.

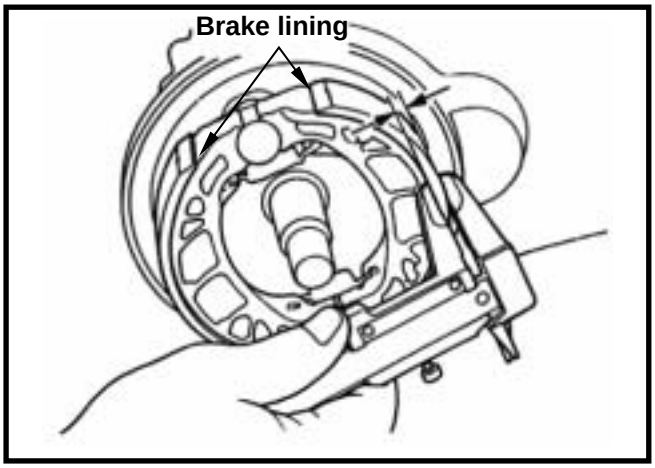
BRAKE LINING

Inspection

Measure the thickness of the brake lining at three points (both ends and center).

If the thickness is less than specified, or if it is contaminated by oil or grease, replace as a set.

Service limit : Rear 1.1 mm

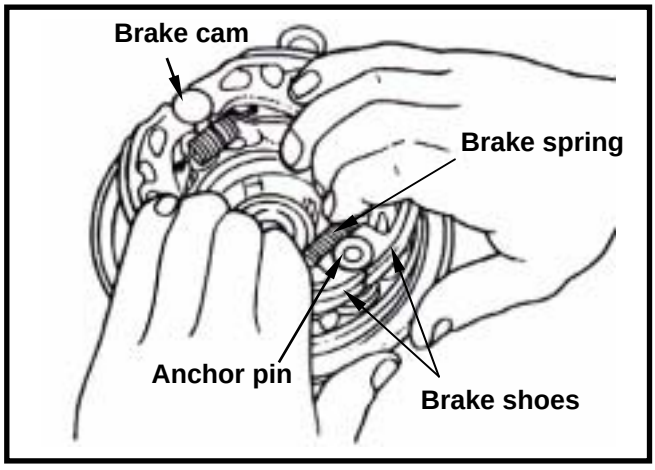


Removal

Caution

Brake linings must be replaced as a set.

Remove brake shoes from the brake panel by pulling out the brake linings with two hands.



Installation

Apply a thin coat of grease to the brake cam and the anchor pin.

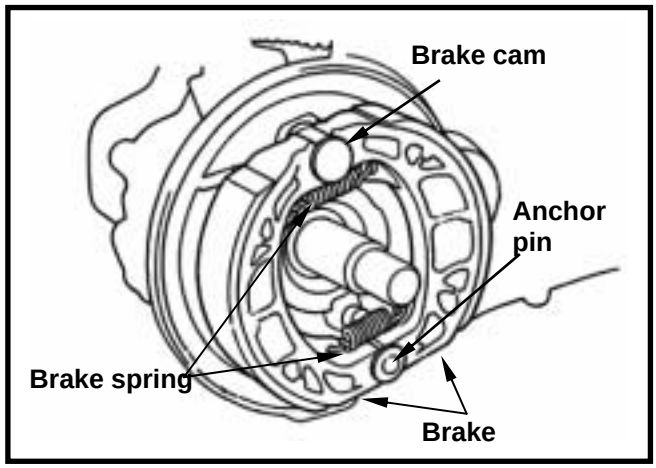
Hook the brake spring onto the brake cam.

Pull out the brake linings and install them onto the brake panel. Wipe off the excessive grease from the brake cam and the anchor pin after installation.

Slightly grind the brake lining surfaces with sand-paper to clean the surfaces.

Caution

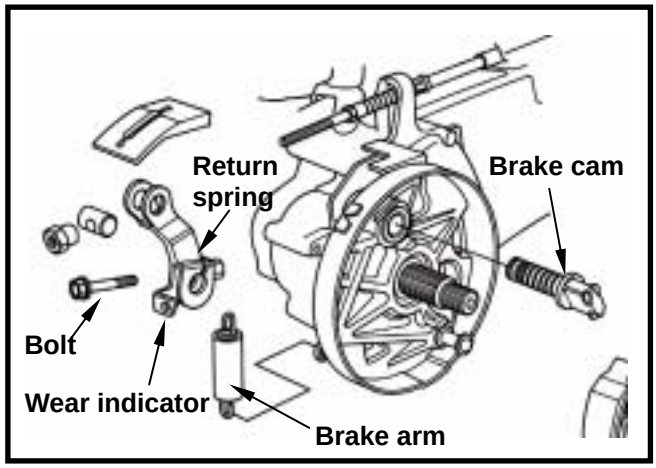
Braking efficiency will be reduced if brake lining is contaminated by oil or grease.



BRAKE PANEL

Removal

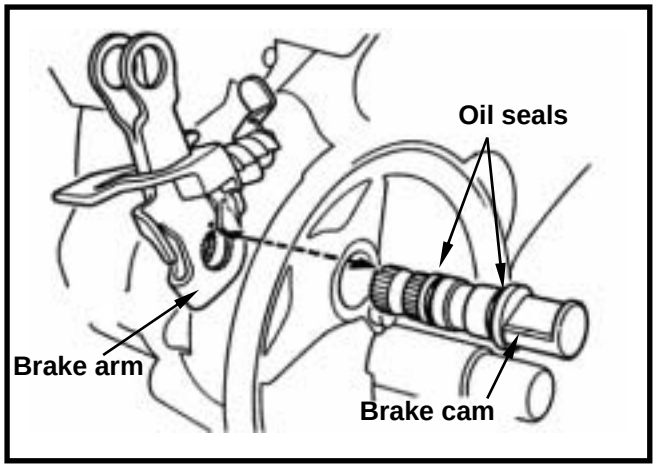
Remove the brake arm bolt and then remove the brake arm, wear indicator, brake return spring and brake cam as well as the oil seal from the brake panel.



Installation

Front brake panel

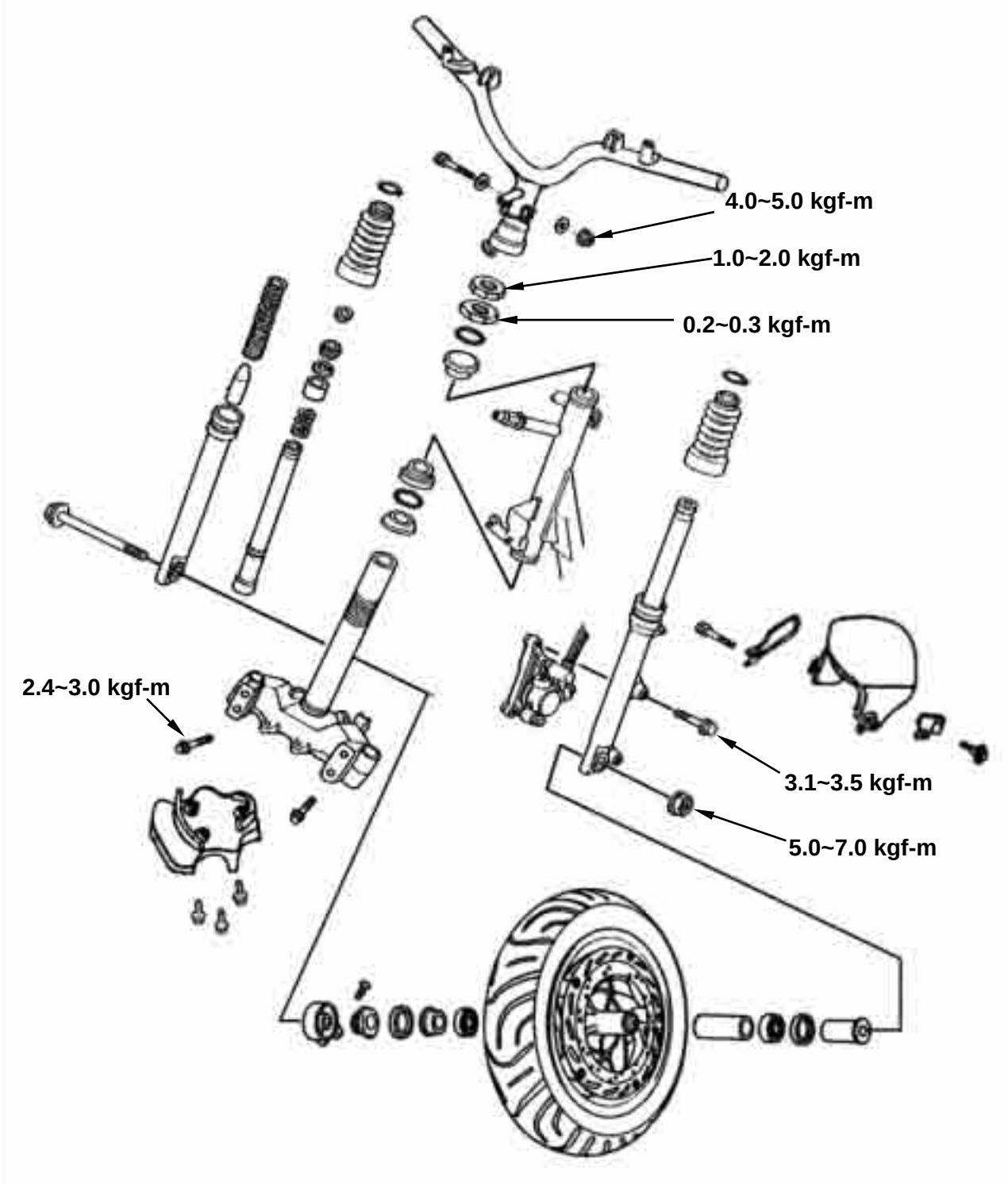
Apply a thin cost of grease onto the brake cam shaft.
Install the brake cam.
Apply a thin cost of grease onto the oil seal lip and then install the oil seal onto the brake cam shaft. Finally, install it on the brake panel.
Align the end-part of the brake return spring with the hole of brake panel.
Align both the inner gear of wear indicator and the mark on the brake arm with the indent gear of brake cam, and then install it.
Tighten the bolts and nuts to specified torque.
Torque: 0.8~1.2kgf-m



Rear Brake Panel

Apply a thin cost of grease between the oil seals on the brake cam shaft.
Install the brake cam.
Align the mark on the brake arm with the inner gear of the brake cam.
Tighten the bolts and nuts to specified torque.
Hook on the return spring.
Torque: 0.8~1.2kgf-m

Mechanism Illustration



14. Steering/Front Wheel/Front Shock Absorber

Precautions in Operation

General Information

- Before remove front wheel, use a jack to lift the body until front wheel free of ground, and take care not to rotate body in reverse.
- Be careful not to allow oil or grease get on brake drum or linings.

Torque values

Front wheel axle	5.0~7.0 kgf-m
Steering handlebar nut	4.0~5.0 kgf-m
Steering column top cone sliding ring	0.2~0.3 kgf-m
Steering column lock nut	1.0~2.0 kgf-m
Speedometer cable nut	0.15~0.3 kgf-m
Front shock absorber: Upper nut	2.4~3.0 kgf-m

Tools

Special service tools

Steering column wrench
Bearing remover
Inner type bearing remover
Attachment, 32×35 mm
Attachment, 42×47 mm
Steering column nut wrench
Steering column top cone ring nut wrench

Trouble diagnosis

Hard steering stem

- Over tightening of steering stem lock nut
- Damaged steering stem steel ball and steering stem bearing seat
- Insufficient tire pressure

Steering stem off center

- Uneven left/right cushion
- Bend fork
- Bent front wheel/tire offset

Front wheel wobbling

- Bent wheel rim
- Loose wheel axle nut
- Poor wheel or wearing
- Too much clearance on wheel bearing

Soft front suspension

- Front shock absorber spring worn out
- Oil leaking on cushion oil ring

Front suspension noise

- Bent shock absorber linkage
- Loosen shock absorber nut

Steering Handlebar

REMOVAL

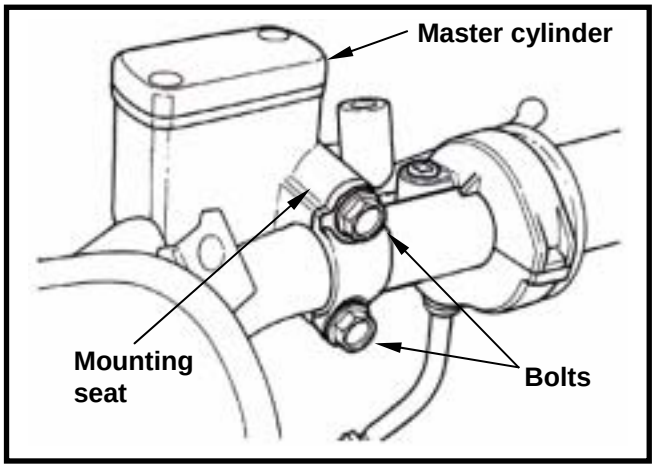
Remove handlebar front & rear cover and the front cover (refer to chapter 12).

Disc Brake

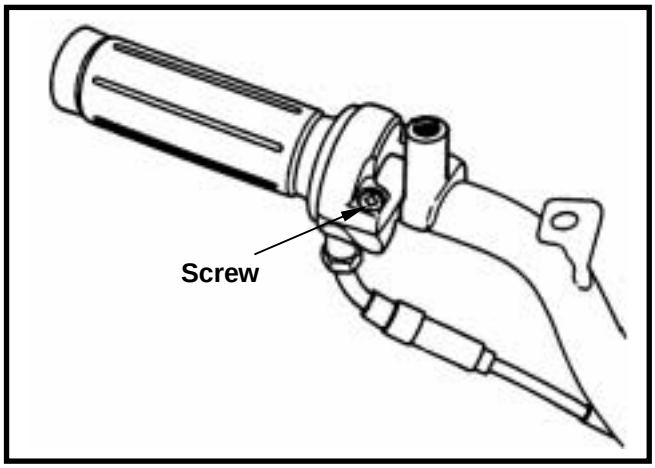
Remove the 2 bolts of the brake master cylinder, and then take out the master cylinder and the split ring.

Caution

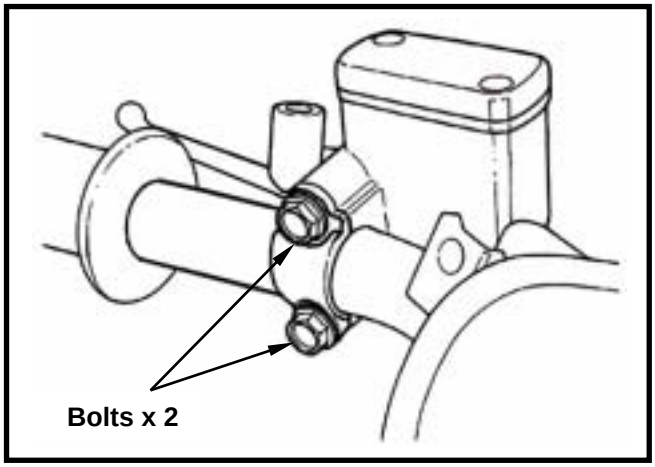
Do not operate the front brake lever to avoid to pressing out the brake lining when removing the master cylinder.



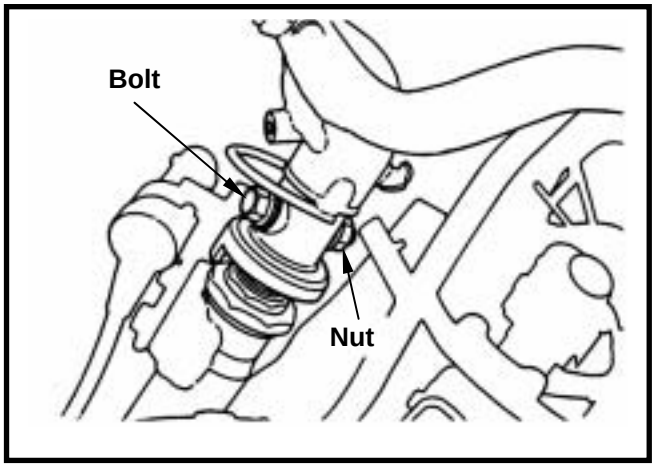
Remove throttle handlebar housing screw and then remove the handlebar, throttle cable, and handlebar upper housing & under housing.



Remove the mounting bolt of the rear brake cylinder. (bolt x 2)
Take out rear brake cylinder.



With a wrench to hold the handlebar bolt and then remove the nut.
Take out the handlebar after removed the bolt.



Installation

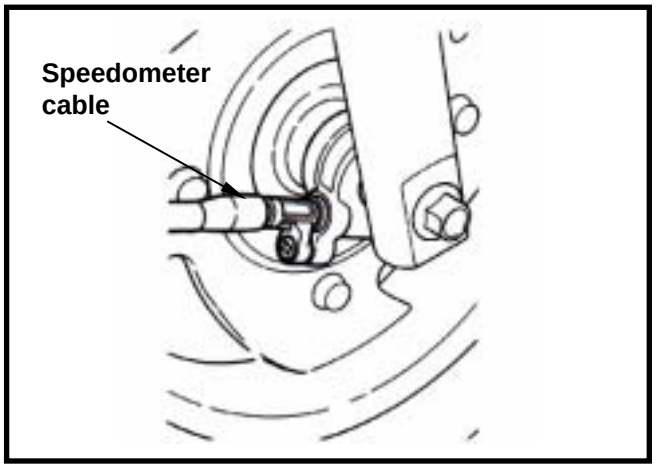
Install the handlebar according to the reverse procedure of removal.
Apply with some grease onto the handlebar moving parts when installing the throttle handlebar housing, throttle handlebar, and throttle cable.

Front Wheel

Removal

Support body bottom and lift front wheel free of ground.

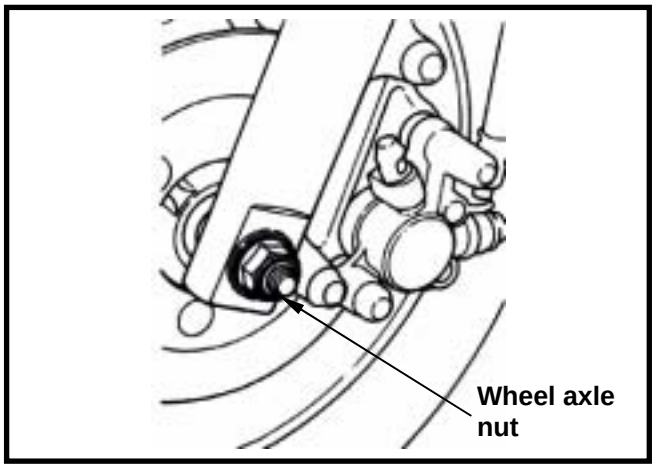
Remove the screw, and disconnect speedometer cable from the gear box.



Remove the wheel axle nut and pull out the axle. Then, remove the front wheel.

Caution

Do not operate the front brake lever to avoid to pressing out the brake lining when removing the master cylinder.

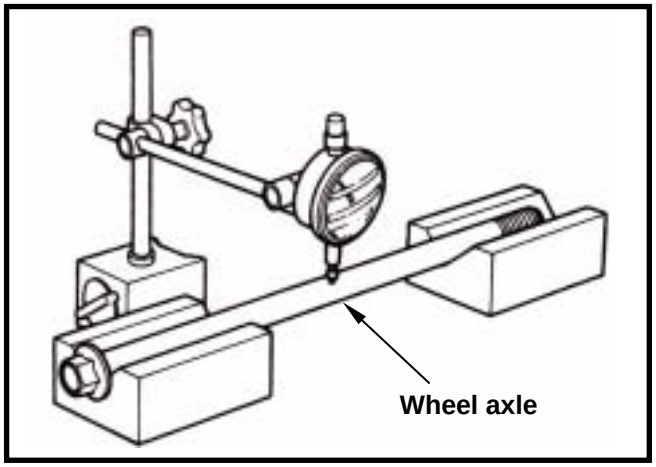


Inspection

Wheel axle

Set the axle in V-blocks and measure the run-out.

Service limit: 0.2 mm



Wheel Rim

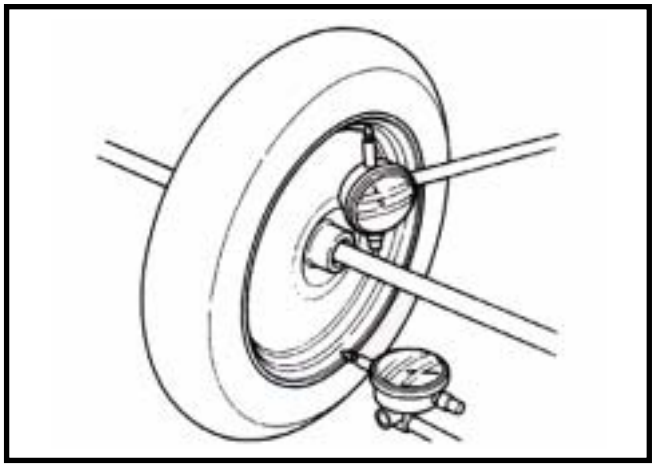
Place the wheel onto a rotated bracket.

Turn the wheel with hand and measure its wobble value with a dial gauge.

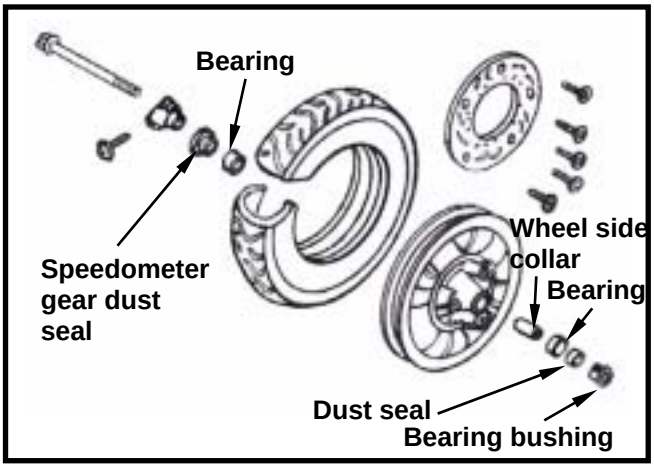
Service limit:

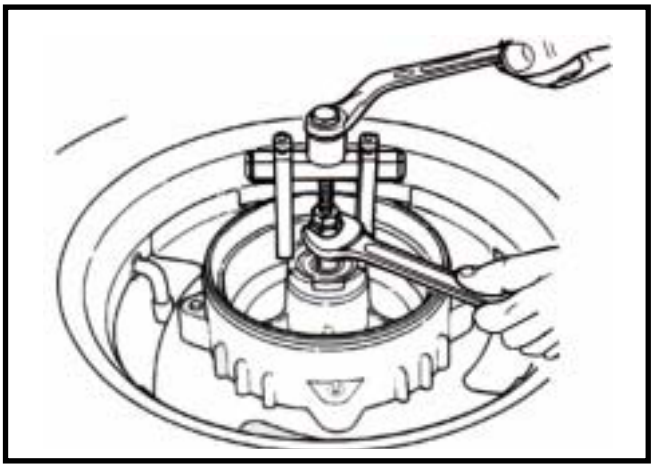
Radial : 2.0 mm

Axial : 2.0 mm



Disassembly
Remove the left axle ring and dust seal.
Remove the dust seal on the right side of speedometer gear.
Remove the bearing with the inner type bearing remover.
Take out the bearing spacer and then remove the other bearing.
Tool:
Inner type bearing remover.

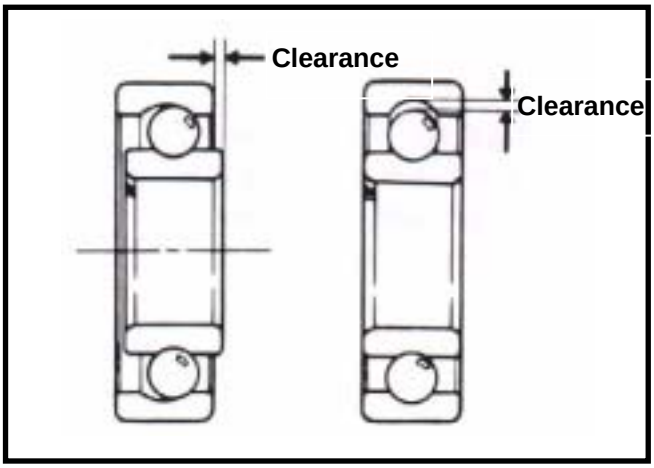




Bearing Inspection
Turn the inner race of bearing with fingers. The bearing should be turn smoothly. Also check if the outer collar is tightly connected to the wheel hub.
If the bearing do not turn smoothly, or if they are too loose in the races, or damaged, then, remove and replace the bearings with new ones.

Caution

The bearing must be replaced in pair.

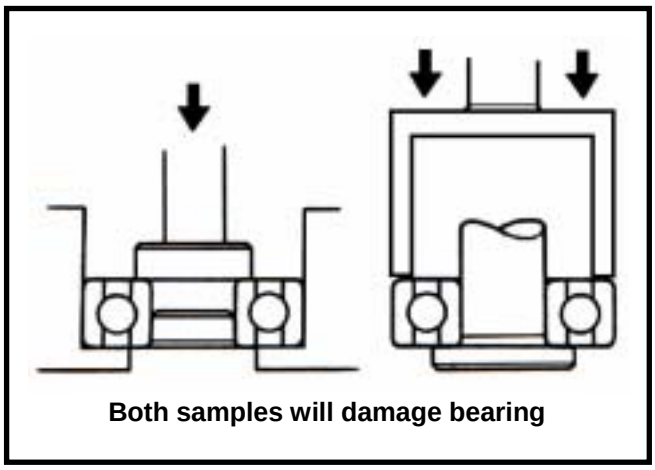


Installation
Install the bearing according to the reverse procedure of removal.
Apply some grease into the bearing seat of the wheel hub.
Install the left bearing onto the seat.
Install the bearing spacer and then install the right bearing onto the seat.

Caution

Do not install used bearing and replace the bearing once it has been removed.
Do not the bearing in tile motion when installing.

Tool:
C-type compressor or bearing compressor.

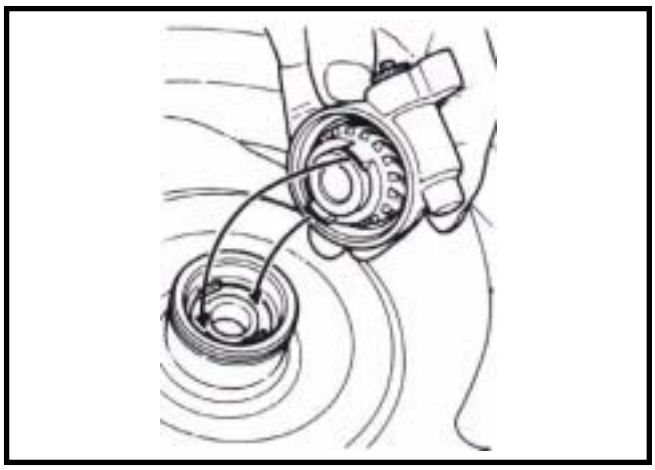


Both samples will damage bearing

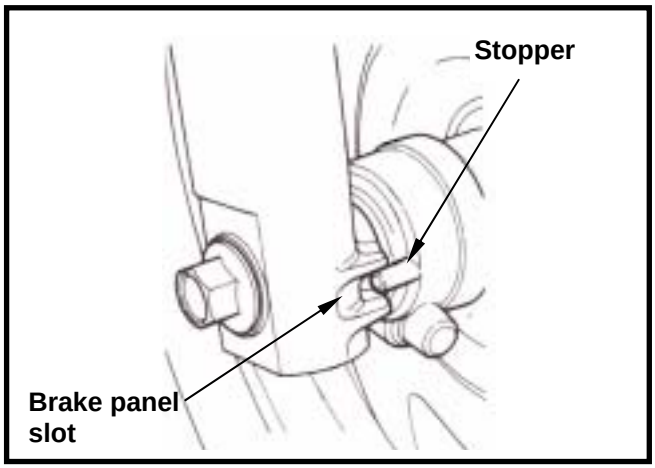
Align the flange part on the speedometer gear with the slot of wheel hub, and then install the speedometer gear box.

Caution

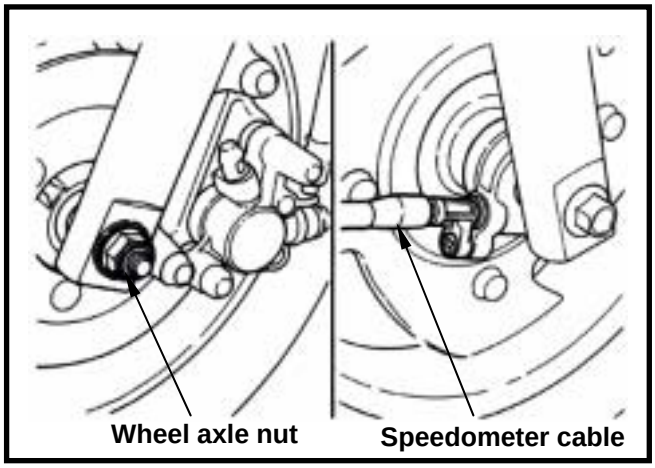
Contaminated brake lining will reduce brake performance so the brake lining, brake drum and disc must be free of grease.



Place the front wheel between the front shock absorbers.
Align the flange part on the speedometer gear with the slot of shock absorber stopper.



Install the front wheel axle from right shock absorber side.
Install the wheel axle nut, and tighten it to specified torque value.
Torque value: 5.0~7.0 kgf-m
Connect the speedometer cable to the speedometer gear box.



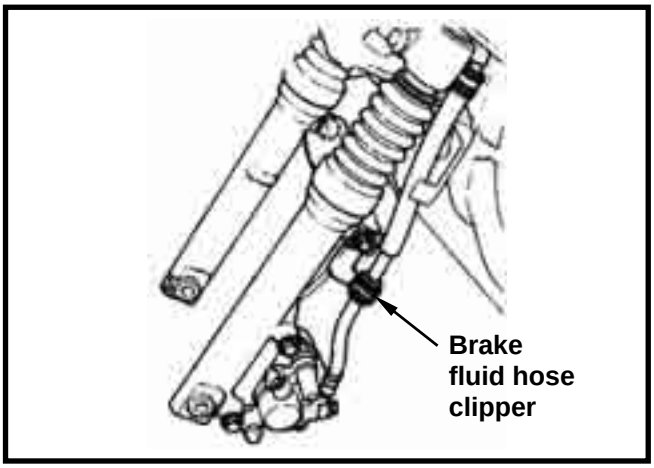
Front shock absorber

Removal

Remove the front fender, front under spoiler, front cover, and front wheel as well as front brake components.

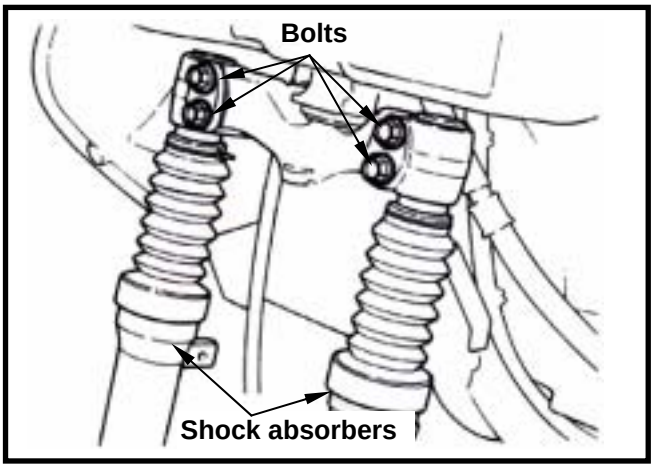
Remove the brake fluid hose clipper or cable guide on the left shock absorber. (bolt x 1)

As for disc brake, remove the cable guide on the right shock absorber. (bolt x 1)



Remove the top connection bolt of the right shock absorber. (bolt x 4)

Remove the shock absorber from the front fork.

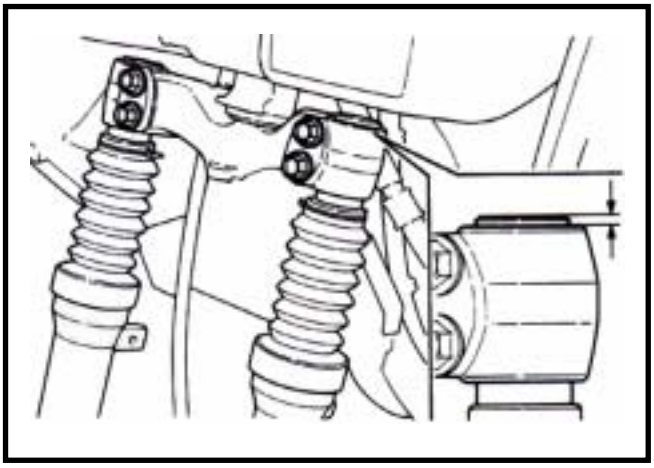


Installation

Install the shock absorbers according to the reverse procedure of removal.

Align the shock absorber top-edge with the top-end level of the front fork when installing the front shock absorber onto the front fork. Then, tighten the nut.

Torque value: 2.4~3.0 kgf-m



Front fork/steering column

Removal

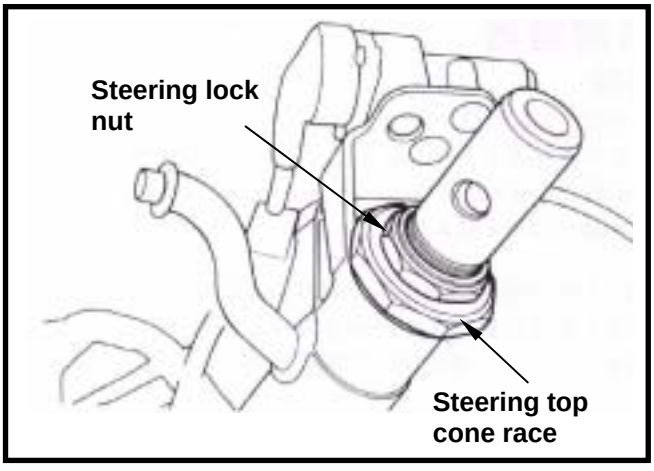
Firstly, remove the handlebar, front wheel, front brake set, and front shock absorbers.

Remove the steering lock nut.

Remove the top cone race, and then remove the steering column.

Caution

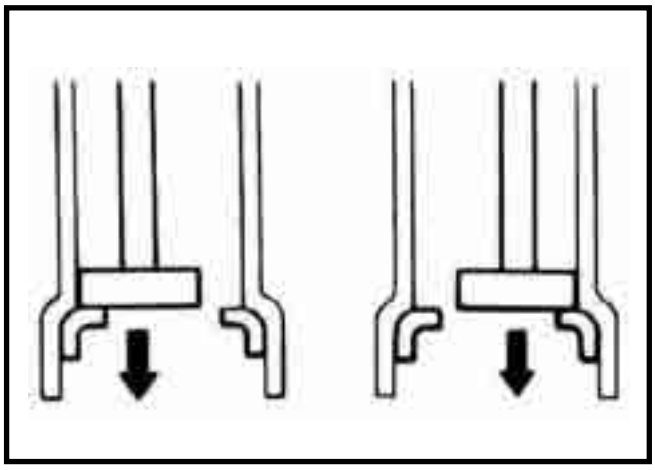
Place the steering column bearing balls into a parts container to avoid to missing or shortage.



With a plastic hammer to tap the steering ball race slightly, and then remove the top ball bearing race.
Remove the lower-end cone bearing race on the frame with a punch.

Caution

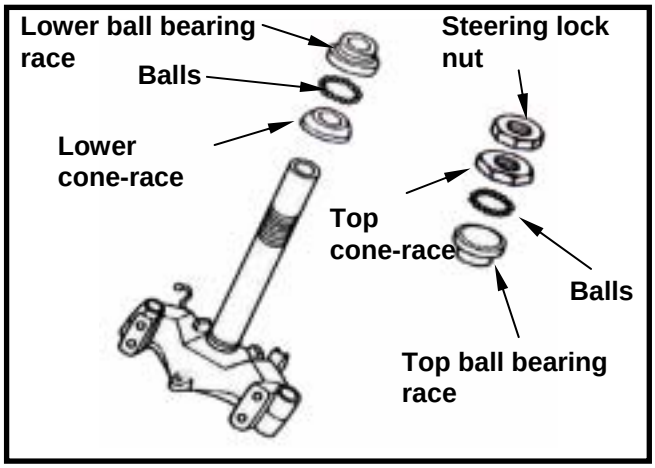
Do not damage the frame and the steering race.



Installation
Install a new top-cone bearing race onto the top of steering column.
And then, push the lower-cone bearing seat from bottom until to locking position.

Caution

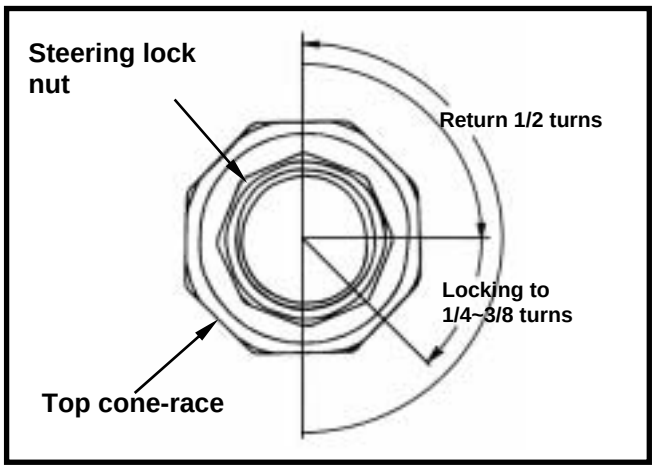
Do not let the ball bearing in title motion as installation.



Apply with some grease onto the top & bottom bearing balls, and then install the balls into bearing race.
Press in a new lower cone-race onto the steering column, and lubricate it with grease.
Install the steering column.
Lubricate the top-cone race with grease.
Drive the cone-race into the steering column until contact with the top bearing seat no clearance.
Note, return 1/2 turn and then tighten the top cone race to specified torque. (tighten the race around 1/4~3/8 turn more.)
Torque value: 0.2~0.3 kgf-m

Caution

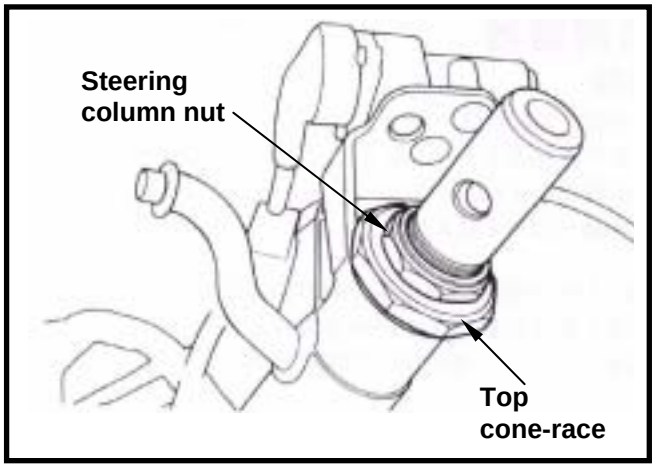
Do not tighten the top cone race too tight to prevent from damage the ball bearing seat when tightening the top cone race.



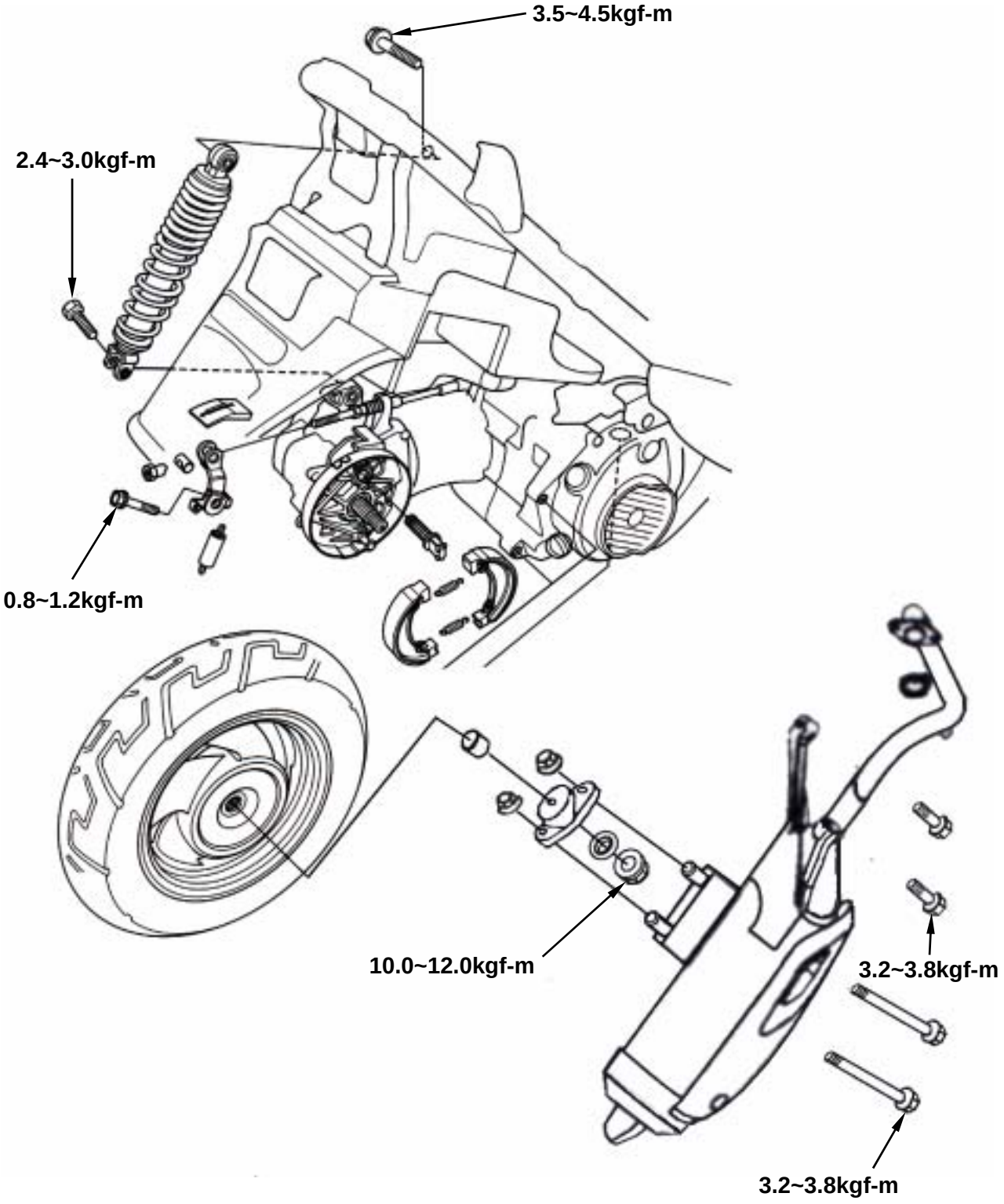
Install the steering lock nut and lock the top cone race. Then, tighten the nut.
Torque value: 1.0~2.0 kgf-m
Install the bearing seat according to the reverse procedure of removal.

Caution

Check the steering column if it can be turned freely and no clearance in vertical motion.



Mechanism Illustration



15. Rear Wheel / Rear Shock Absorber

Precautions in Operation

General Information

As for the wheel removal, service, and installation procedures, please refer to the service manual of high speed tire.

Specification **Unit: mm**

Items		Standard	Limit
Wheel wobbling	Radial	-	2.0
	Axial	-	2.0
Thickness of rear brake lining		4.0	2.0

Torque values

Rear axle nut	10.0~12.0 kgf-m
Rear brake arm bolt	0.8~1.2 kgf-m
Rear shock absorber upper mount bolt	3.5~4.5 kgf-m
Rear shock absorber lower mount bolt	2.4~3.0 kgf-m
Exhaust pipe connection nut	1.0~1.2 kgf-m
Exhaust pipe connection bolt	3.2~3.8 kgf-m

Trouble Diagnosis

Rear wheel wobbling
- bend wheel rim
- poor tire
- loosen wheel shaft

Shock absorber too soft
- insufficient shock absorber spring force

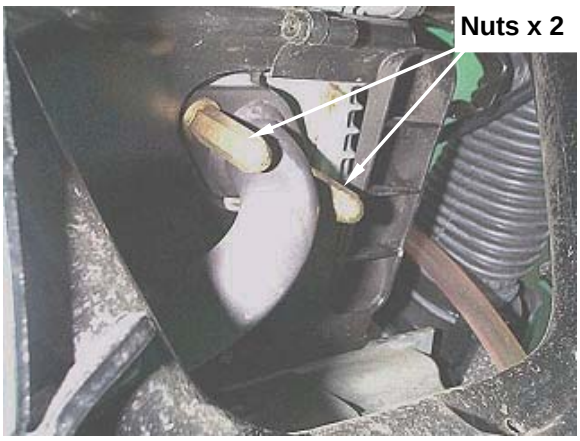
Braking Noise
- worn brake lining
- brake drum deformation
- improperly brake panel installation
- unparalleled brake drum or wheel unparallel.

Poor brake performance
- Poor brake adjustment
- contaminated brake lining
- worn brake lining
- Air inside of the brake hose/pipe
- greased brake disc
- Clogged brake pipe
- Bent brake pipe
- Insufficient brake fluid

Exhaust Muffler

Removal

Remove the front-end nut of the exhaust muffler. (nut x 2)
Remove the bolts. (bolts x 3)
Remove the exhaust muffler.

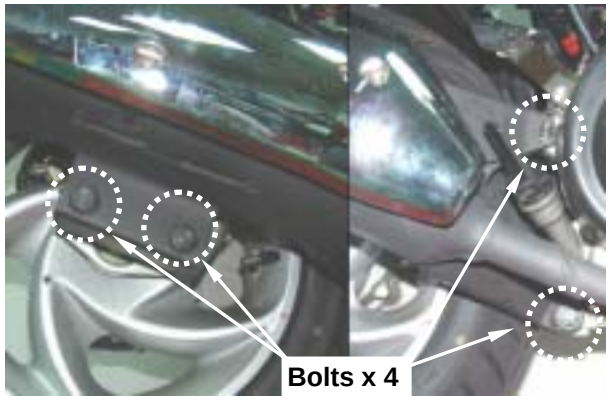


Installation

Install the exhaust muffler according to the reverse procedure of removal.

Caution

Replace the exhaust muffler gasket if it is broken or deformed.



Torque value:

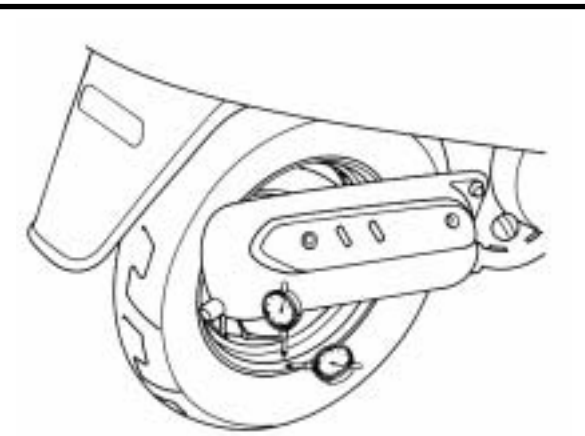
Exhaust muffler connection bolt: 3.2~3.8 kgf-m
Exhaust muffler connection nut: 1.0~1.2 kgf-m

Rear Wheel

INSPECTION

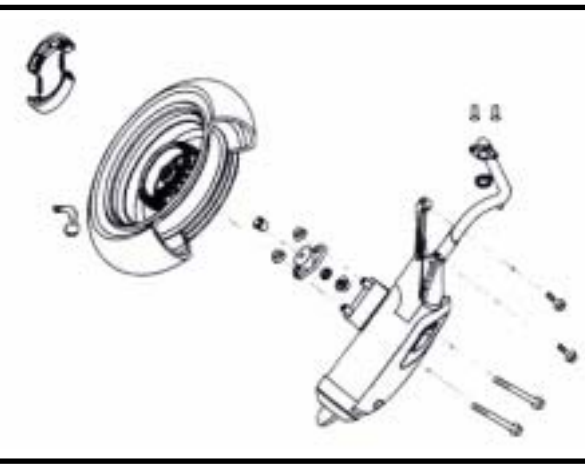
Measure wheel rim wobbling.
Service limit:
Radial: 2.0 mm
Axial: 2.0 mm

- If the wheel rim wobbling out of the specification, except resulted from the wheel rim deformation, it might be loosen or worn final driving shaft bearing or bend, deformed driving shaft.



Removal

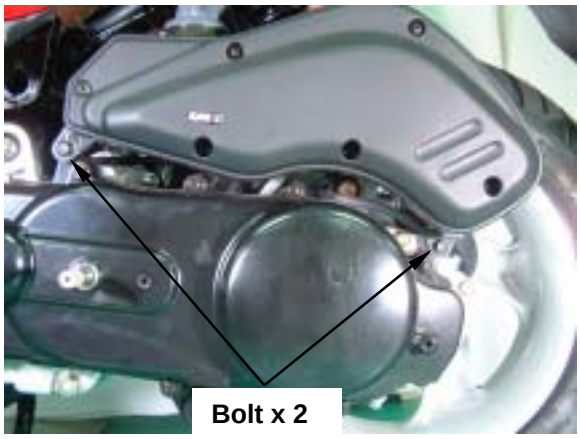
Remove the exhaust muffler. (bolt x 4 & nut x 2)
Remove the rear wheel nut. (nut x 1)
Remove the rear wheel nut and exhaust muffler rear mount.



Rear Shock Absorber

Removal

Remove the luggage box. (bolt x4, screw x1)
Remove the body cover. (screw x 4)
Remove the air cleaner. (bolt x2)



Remove the under bolt of the rear shock absorber. (bolt x 1)

Remove the upper bolt of the rear shock absorber. (bolt x 1)
Remove the rear shock absorber.

Installation

Install the rear shock absorber according to the reverse procedure of removal.

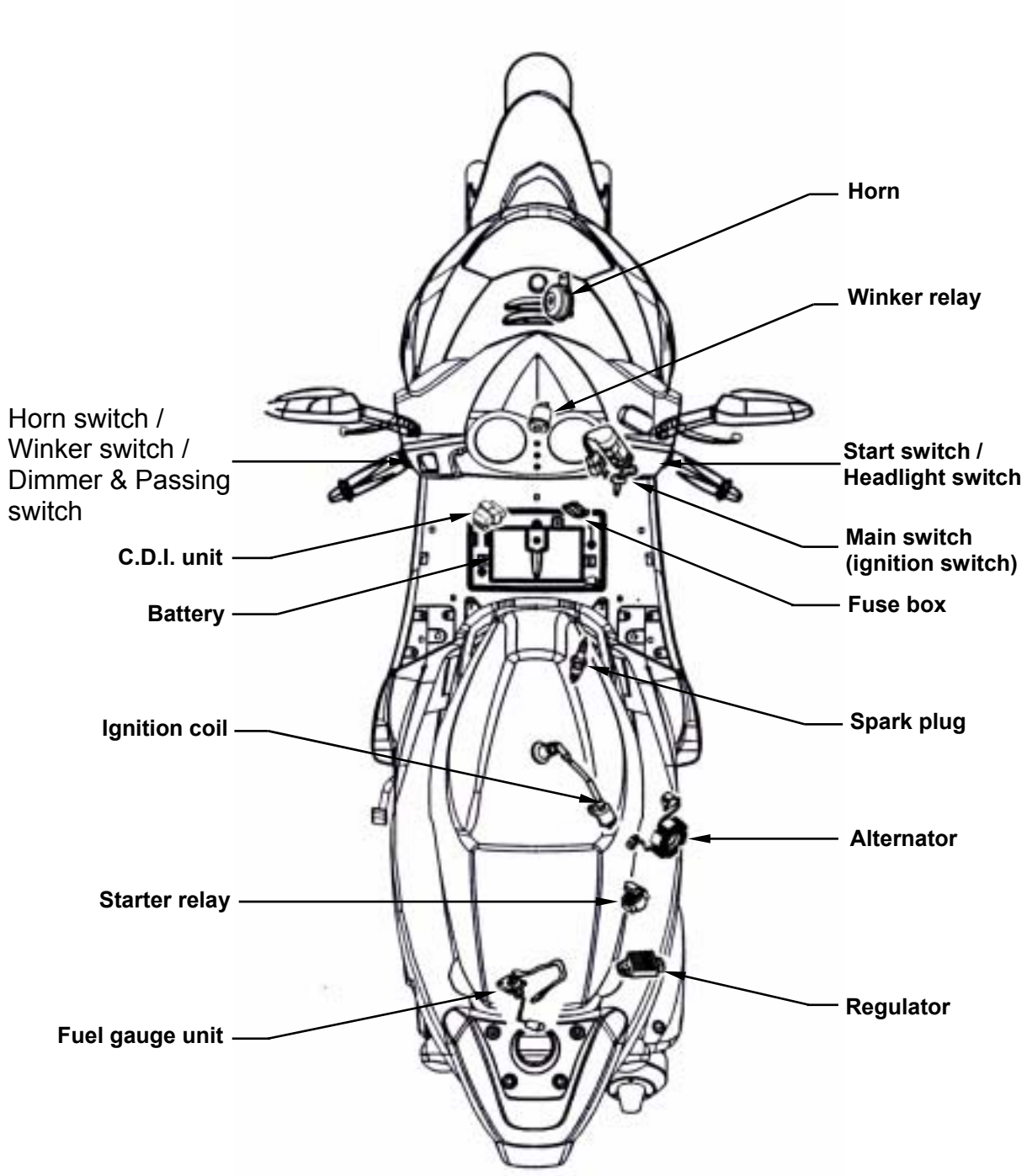
Caution

The rear shock absorber has to be replaced with one set and can not be replaced by unauthorized persons. Otherwise, it might damage the rubber bushing and construction.

Torque values

Rear shock absorber lower mount bolt:
2.4~3.0 kgf-m
Rear shock absorber upper mount bolt:
3.5~4.5 kgf-m

Mechanism Illustration



16. Electrical Equipment

Precautions In Operation

Charging System

- When remove the battery, the disconnection sequence of cable terminals shall be strictly observed. (First disconnect the negative cable terminal, next, the positive cable terminal.)
- MF (Maintenance Free) battery does not need to check, add electrolyte or distilled water.
- Battery must be taken out from scooter when charging the battery. But do not open the battery caps.
- Do not quick charge the battery unless in emergency.
- A voltmeter must be used when checking battery charging condition.
- Battery can be charged or discharged alternately. To set a discharged battery idle for a prolonged period will shorten its service life and reduce its capacity. Usually, battery's capacity will reduce after 1~2 years. After low capacity battery was charged, its voltage will increase. If it connects to an additional load, the voltage will reduce suddenly, and then go up again.
- Over-charged battery. Usually, the over-charged battery can be seen externally. If a short circuit occurred inside the battery, there will be no voltage on the terminals of battery if voltage regulator does not operate. Then, the battery's voltage will be too high that may reduce battery's life.
- The battery will be self-discharged if it was set idle for a long time. An idle battery must be charged about every 2months.
- A new battery filled with electrolyte will generate a voltage after filled out electrolyte. The voltage should be in 12.5V or more after 10 minutes. When electrolyte is not enough, the battery must be filled with electrolyte and then charged to prolong the battery's life-span.
- Please check electrical device according to the procedure of diagnosis chart.
- Do not disconnect and connect the connector of electrical devices when current is passing these devices because this will generate high voltage and the electrical components in the voltage-current regulator will be damaged. The ignition switch must be turned OFF before performing any work.
- Please do not replace with traditional type battery as replacement.
- Please refer to the removal instruction when removing the alternator and the pulse generator.

Ignition System

- Please follow the procedure of trouble diagnosis chart to check ignition system.
- The ignition system equipped with a auto-advanced timing device in CDI unit. Thus, ignition timing need not to be adjusted. In case of incorrect ignition timing occurred, check the CDI unit or alternator system. It has to check the ignition timing with the ignition timing lamp if replaced these components.
- Do not hang or impact the CDI unit of ignition system because the major faulty of CDI unit is caused by impact. Therefore, take care when disassembling.
- Most of ignition system problems were resulted from poor connecting connector. Please check the connectors first when servicing.
- Make sure that the heat range of spark plug is suitable. Improper spark plug is the main cause of poor engine operation or combustion.
- Inspection procedures in this manual are based on Max. voltage. This manual also contains methods of how to check ignition coil resistance and component operation.
- Please follow the continuity chart to check ignition switch.

Starting System

- Starting motor can be removed directly from engine.
- Please refer to chapter 10 for starting clutch removal procedures.

Specification

Charging System

Items			Specification
Battery	Capacity/type		12V6Ah / YTX7A-BS
	Charging rate		STD:0.6A/5~10hrs, emergency charging: 6A/0.5hrs
	Voltage (20°C)	Full charged	13.1V
		Under charged	12.3V
Alternator	Capacity		12V / 6.2A
	Lighting coil resistance (20°C)		Between yellow-green: 0.1-0.8Ω
	Charging coil resistance (20°C)		Between white-green: 0.2-1.0Ω
Leaking current			Less 1mA
RPM for starting charging			2000rpm(headlamp ON)
Voltage controlled by regulator			14.0±0.5 V
Resistor	Resistance (20°C) 20W5.9Ω		7.0~8.0Ω
	Resistance (20°C) 5W5Ω		4.5~5.5Ω

Ignition System

Item		Specification
Spark plug	Standard	NGK C7HSA (Recommended usage)
	Hot type	NGK C8HSA
	Cold type	NGK C6HSA
	Spark plug gap	0.6~0.7 mm
Ignition coil resistance (20°C)	Primary	0.21±10%Ω
	Secondary	With plug cap : 3~5 KΩ
		Without plug cap : 7~12 KΩ
Ignition timing	"F" Mark	Before TDC 13° / 1700 rpm
	Timing advanced charactor	Before TDC 28° / 4000 rpm
		Before TDC 27° / 8000 rpm
Pulse generator resistance (20°C)		50~200Ω
Exciting coil resistance (20°C)		400~800Ω
Ignition coil-primary max. voltage		95~400 V
Pulse generator voltage		1.7 V above
Exciting coil voltage		95~400 V

Starting System

Item		Specification
Start motor	Type	DC TYPE
	Capacity	0.5 KW

Trouble diagnosis

No power supply
- Dead battery
- Disconnect battery cable
- Fuse burned out
- Faulty ignition switch

Low voltage
- Weak battery
- Loose battery connection
- Charging system failure
- Voltage-current regulator failure

Start motor does not work
- The fuse is blown
- The battery is not fully charge
- Poor main switch
- Poor start switch
- The front and rear brake switches do not operate correctly
- Starter relay is out of work
- The ignition coil is poorly connected, open or short-circuited
- The start motor is out of work

Intermittent power supply
- Loose charging system connection
- Loose battery cables
- Loose connection or short-circuit in discharging system
- Loose connection or short-circuit in lighting system

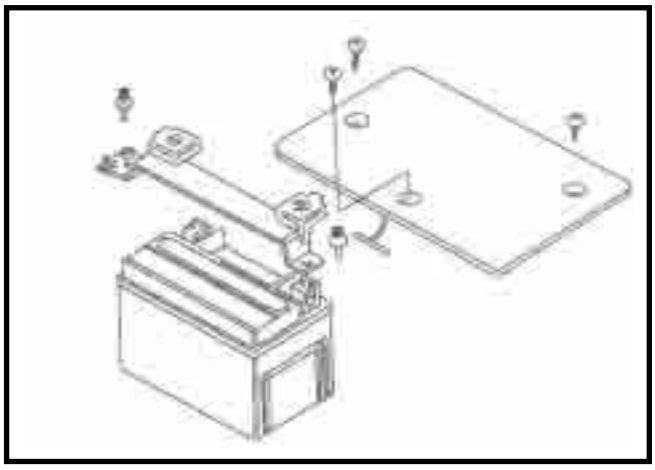
Charging system failure
- burn Fuse
- Loose, broken or shorted wire or wire connection
- Faulty voltage regulator
- Faulty alternator

Weak start motor
- Poor charging system
- The battery is not fully charged
- Poor connection in the windings
- The motor gear is jammed by foreign material

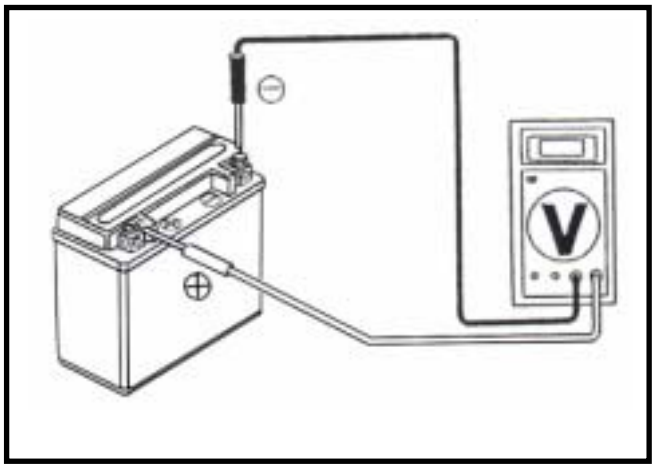
Starter motor is working, but engine does not crank
- Poor start motor pinion
- The start motor run in reverse direction
- Poor battery

Battery

Removal
Remove the rubber carpet.
Remove the battery cap. (screw x 3)
Remove the battery mounting bracket. (bolt x 2)
Firstly, remove the negative(-) post, and remove the positive (+) post.
Remove the battery.

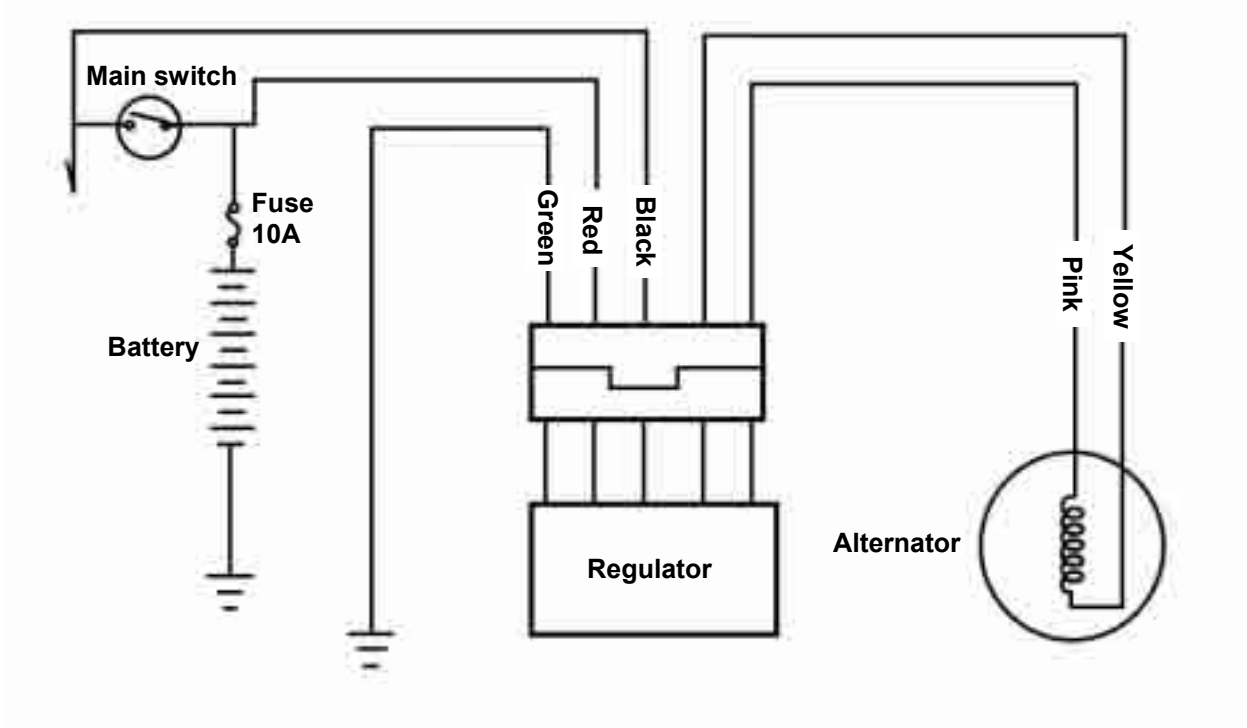


Voltage Inspection
Measure the voltage with a digital voltage meter.
Voltage Value:
Fully charged: 13.0~13.2V at 20°C
undercharged: less 12.3V at 20°C



Charging system

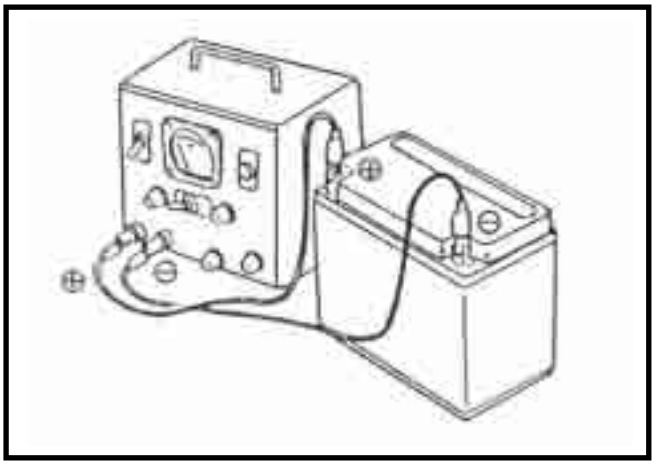
Charging wire circuit



Charging

Connect the battery charger's positive (+) terminal to battery's positive (+) post.
Connect the battery charger's positive (-) terminal to battery's positive (-) post.

	Standard	Max
Charging current	0.9A	16.0A
Charging time	5~10H	1H



Warning

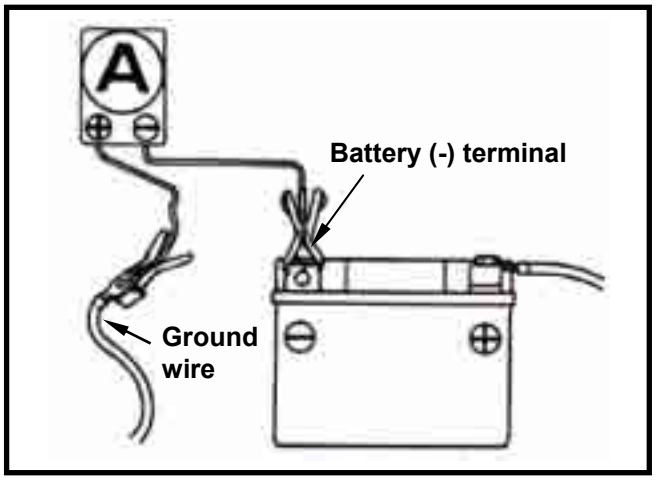
- Strictly keep flames away from a charging battery.
- The charging ON/OFF is controlled by the charger's switch. Do not control the charging by battery jump wires.

Caution

- Quick charge a battery should be used only in an emergency.
- Make sure the current and charging time of above description.
- The battery will be damaged by too much current or too rush charging.

After installing the battery, coat the terminals with clean grease.

Current Leakage Test
Current Leakage Inspection
Turn the main switch to OFF position, and remove the negative cable terminal (-) from the battery.
Connect an ammeter between the negative cable terminal and the battery negative terminal (as shown on left diagram).



Caution

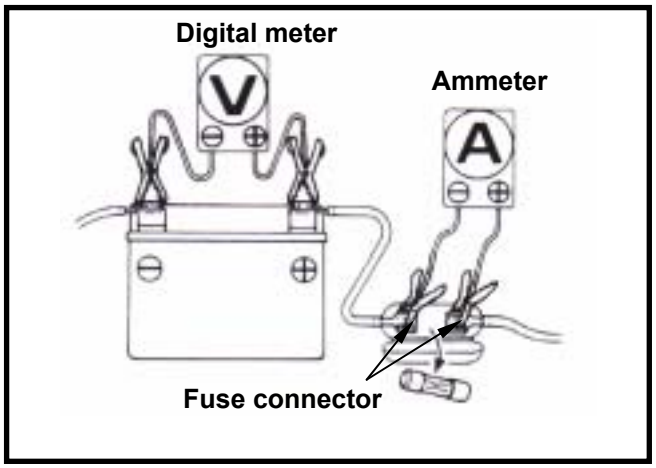
- In the current leakage test, set the current range at larger scale, then gradually decrease to the lower scale as the test process goes to avoid possible damage to the ammeter and the fuse.
- Do not turn the main switch to ON position during test.

If the leaked current exceeds the specified value, it may indicate a short circuit.
Allowable current leakage: Less than 1 mA
Disconnect each cable one by one and take measurement of the current of each cable to locate the short circuit.

Charging Voltage/Current Inspection

Caution

- Before conducting the inspection, be sure that the battery is fully charged. Use a fully charged battery having a voltage larger than 13.0 V. If undercharged, the current changes dramatically.
- While starting the engine, the starter motor draws large amount of current from the battery. Thus, do not start the engine with battery.



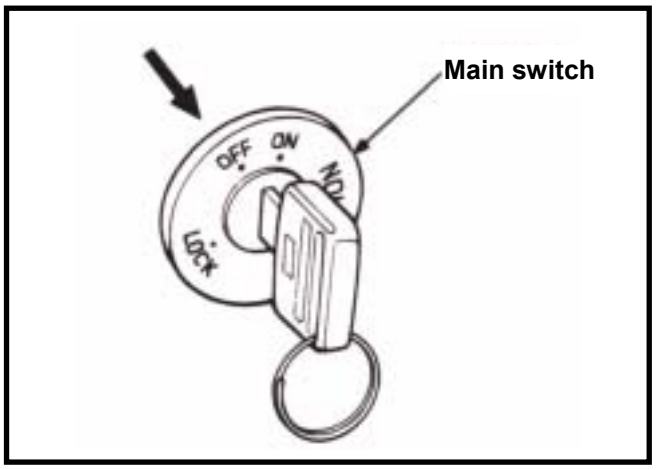
After the engine is warmed up, replace original battery with a fully charged battery.
Connect a digital voltmeter to the battery terminals.
Connect an ammeter between both ends of the main fuse.

Caution

When the probe is reversibly connected, use a voltmeter having an indication that the current flows from the positive or the negative direction and the measurement should be at zero, ammeter at one direction only.

Caution

- Do not use short-circuit cable.
- It is possible to measure the current by connecting an ammeter between the battery positive terminal and the cable position terminal, however, while the starter motor is activated, the surge current of the motor draws from the battery may damage the ammeter. Use the foot lever to start the engine.
- The main switch shall be turned to OFF position during the process of inspection. Never tamper with the ammeter and the cable while there is current flowing through. It may damage the ammeter.



Connect a tachometer.
Turn on the headlamp to high beam and start the engine.
Accelerate the engine gradually to the specified revolution per minute and measure the charging voltage/current.
Charging Current: 4.8A/1600 rpm
Control Charging Voltage:
14.0±0.5 V / 2000 rpm

Caution

To replace the old battery, use a new battery with the same current and voltage.

The following problems are related to the charging system, follow the instructions provided in the checking list to correct it if any one of the problems takes place.

(1) The charging voltage can not exceed the voltage between two battery terminals and the charging current is in the discharging direction.
(2) The charging voltage and current are too much higher than the standard values.

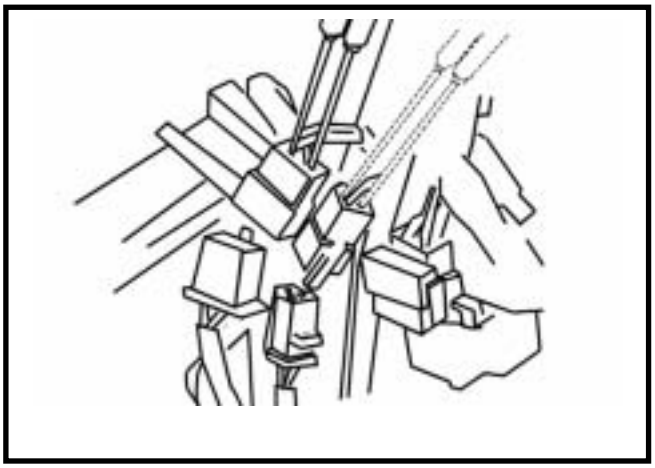
The following problems are not related to the charging system; correct it if any by following steps indicate in the checking list.

(1) The standard charging voltage and current can only reach when the revolution of the engine exceeds the specified rpm.
   - Bulbs used exceed their rate and consume too much power.
   - The replacement battery is aged and does not have enough capacity.
(2) The charging voltage is normal, but the current is not.
   - The replacement battery is aged and does not have enough capacity.
   - Battery used do not have enough electricity or is over charged.
   - The fuse of the ammeter is blown.
   - The ammeter is improperly connected.
(3) The charging current is normal, but the voltage is not.
   - The fuse of the voltmeter is blown.

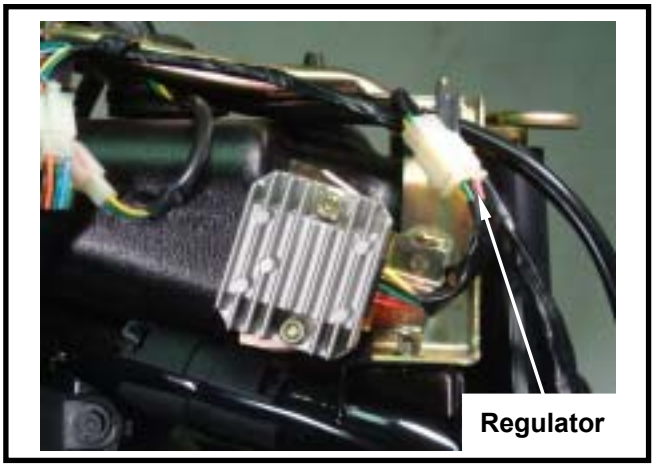
REGULATOR INSPECTION

Remove the rear carrier. (refer to chapter 12, section 8)
Remove the body cover. (refer to chapter 12, section 8)
Disconnect the 5P connector of the regulator.

Item	Measurement point	Standard Value
Main switch connection wire	**R~B**	Battery voltage (ON)
Battery connection wire	**R~G**	Battery voltage



Check the parts onto the abnormal wire circuit if the measured values are not within standards.
If the parts is OK, then it is the wire circuit abnormal.
Replace the regulator if both checks are OK.



CHARGING COIL INSPECTION

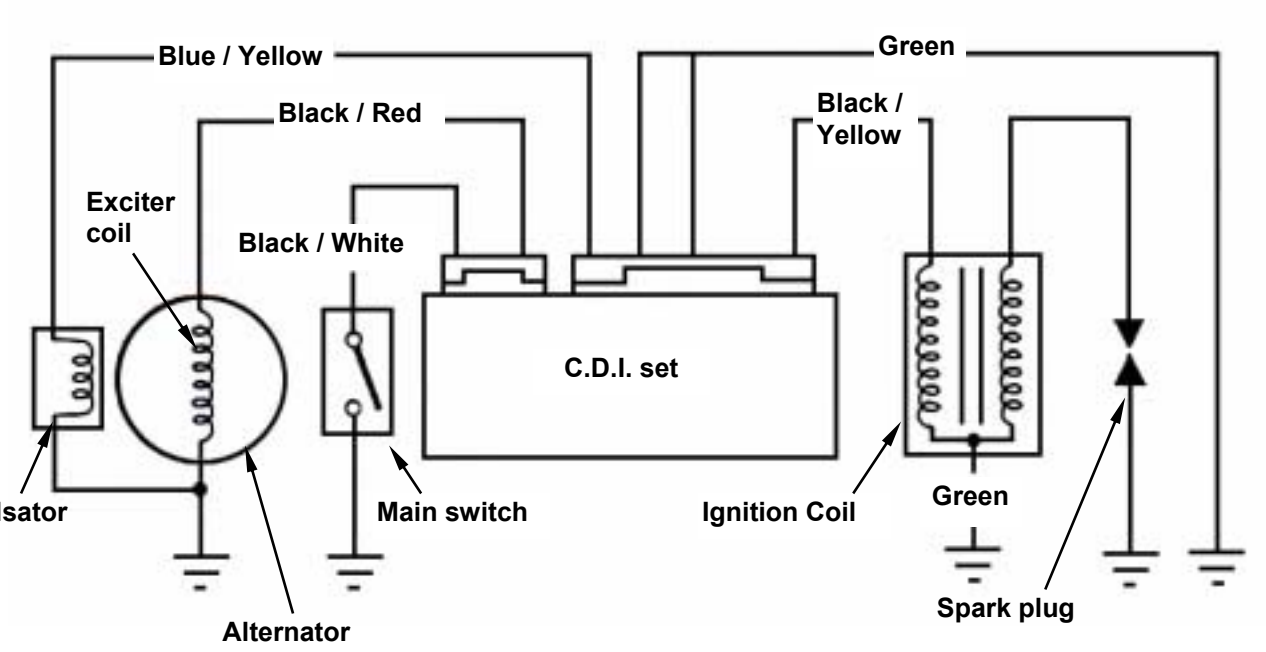
Caution

The coil need not be removed from engine as conduct this test.

At the alternator side from the regulator connector, measure the resistor between pink and yellow wires.
Standard value: 0.16~0.8Ω

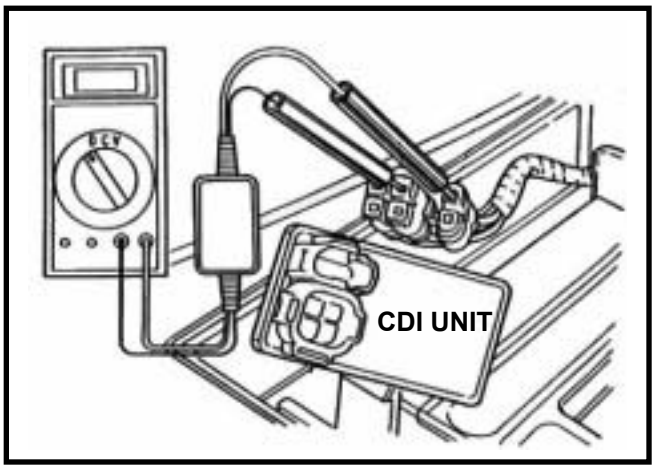
Ignition System

Ignition System Circuit



CDI UNIT
Removal

Remove the battery cover, then the CDI unit can be removed from the battery cover.



Check

Disconnect the connector from the CDI unit.
Make the following inspection at each terminal of the harness side connector.

ITEM		Measure at:	Standard (at 20C)
Main Switch		Black/white-green	Continuity as main switch OFF
Exciter Coil		Black/Red-Green	400 ~800Ω
Pulse Generator		Blue/Yellow-green	50 ~200Ω
Ignition Coil	Primary	Black/yellow-green	0.21Ω±10%
	Secondary	Green-high voltage cable -w/o Cap	3~5KΩ
		Green-high voltage cable - w/ Cap	7~12KΩ

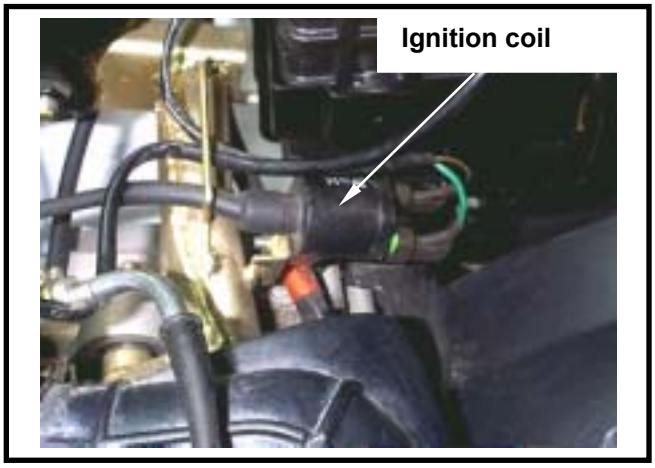
IGNITION COIL

Removal

Remove the luggage box, central cover.
Remove spark plug cap.
Remove the primary coil wire of ignition coil.
Remove the fix bolts for the ignition coil, and remove the coil.
Install the coil in reverse order of removal.

Caution

Install primary coil with black/yellow lead connected to black connector and green lead connected to green connector.

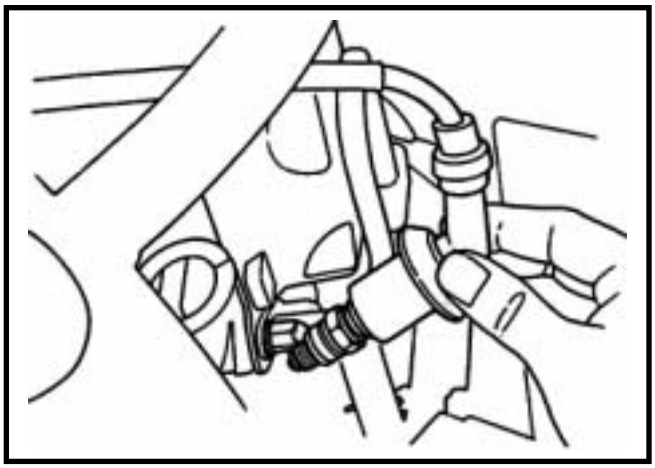


Spark plug confirmation

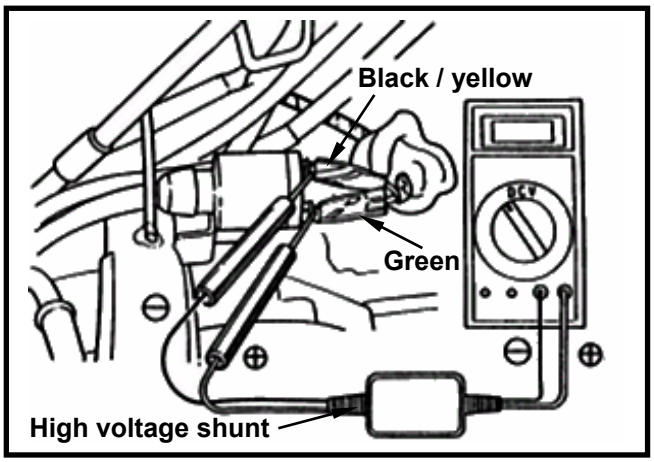
Remove the spark plug and install a good plug into plug cap, and then ground it to engine ground. Make sure its spark condition. If it is in not good or burnt spark plug, replace the spark plug with new one.

Caution

- Make sure each wire connection is correct, and test as required. Even the wire connection is in correct, sometimes, it might not be tested occurred.



Connect the high voltage shunt with a multi-meter or input a resistor in the 10M 10CV of voltage meter.
Connect ignition coil wires, and connect a shunt between primary terminal (black/yellow and green) and frame ground.
Press the starting motor button, or starting lever to test the max. primary voltage of ignition coil.
Connection: connect (+) terminal to green side, and (-) to black/yellow side.
Min. voltage: Above 95 V.

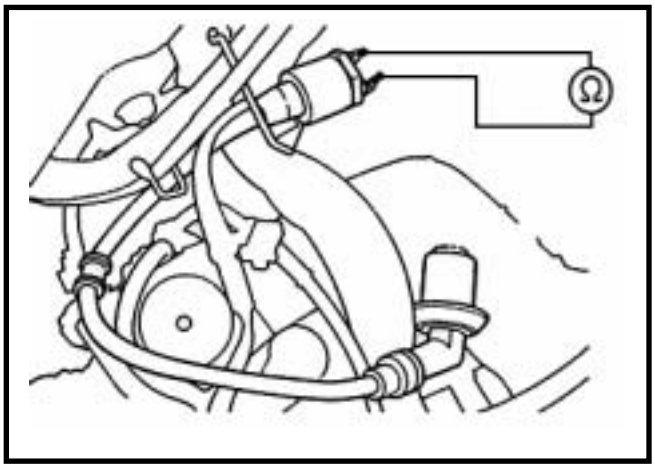


Caution

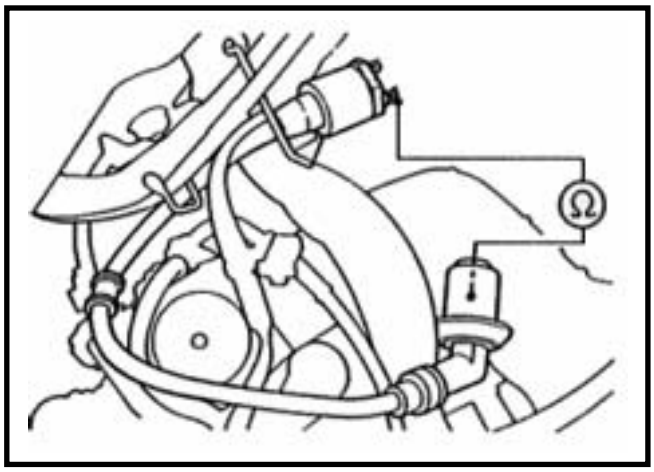
Do not touch metal parts on the test probe with fingers to avoid electric shock.

Primary coil check

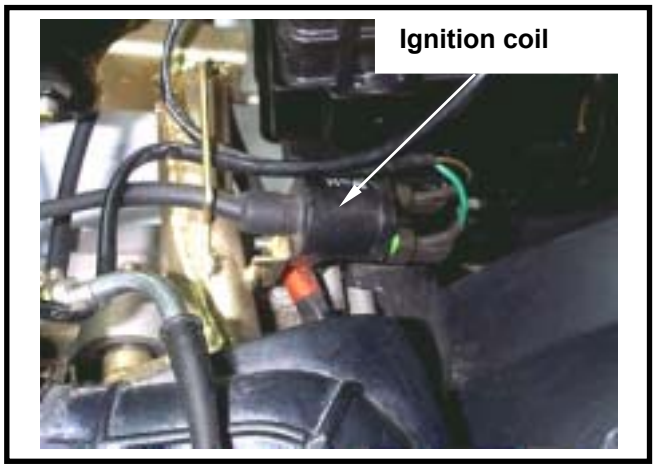
Disconnect the primary coil connector and check the resistance between primary coil terminals.
Standard: 0.21Ω±10%Ω(at 20℃)
Primary coil is good if resistance within standard.
Primary coil is broken if resistance is infinite.
Replace the coil.



Secondary coil
Attached the spark plug cap, measure the resistance between plug cap side and green terminal.
Standard value: 7-12 kΩ(20℃)
Remove the spark plug cap, measure the resistance between plug cap side and green terminal.
Standard value: 3-5 kΩ(20℃)
Secondary coil is good if resistance within standard.
Secondary coil is broken if resistance is infinite. If the spark plug cap attached and the measured value is exceed standard value, it means the spark plug cap is in not good.



Replacement
Remove the ignition coil bolt to replace the ignition coil if necessary.

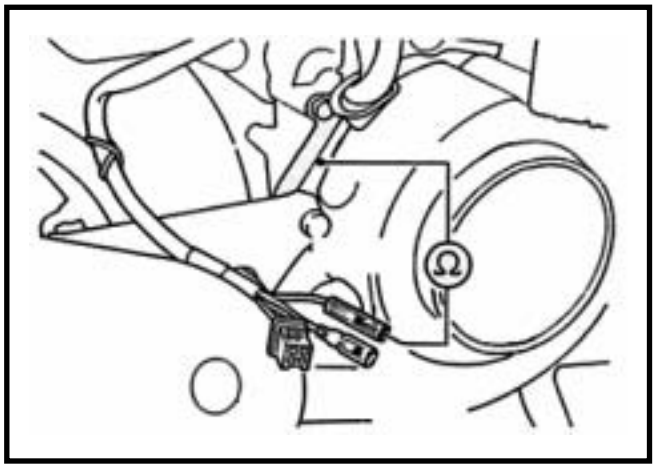


PULSATOR

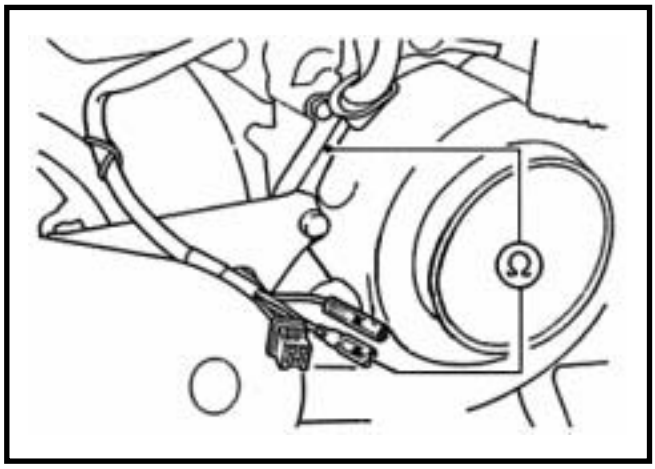
Caution

Checking pulsator can be done on engine. But, the spark plug must be installed onto the cylinder head, and cylinder compression pressure must be in normal condition.

Check
Remove body cover.
Remove the pulsator connector.
Measure the resistance between blue/yellow terminal on engine side and frame ground.
Standard: 50-200Ω(20℃)
Replace the alternator if the measured value exceeds standard value.

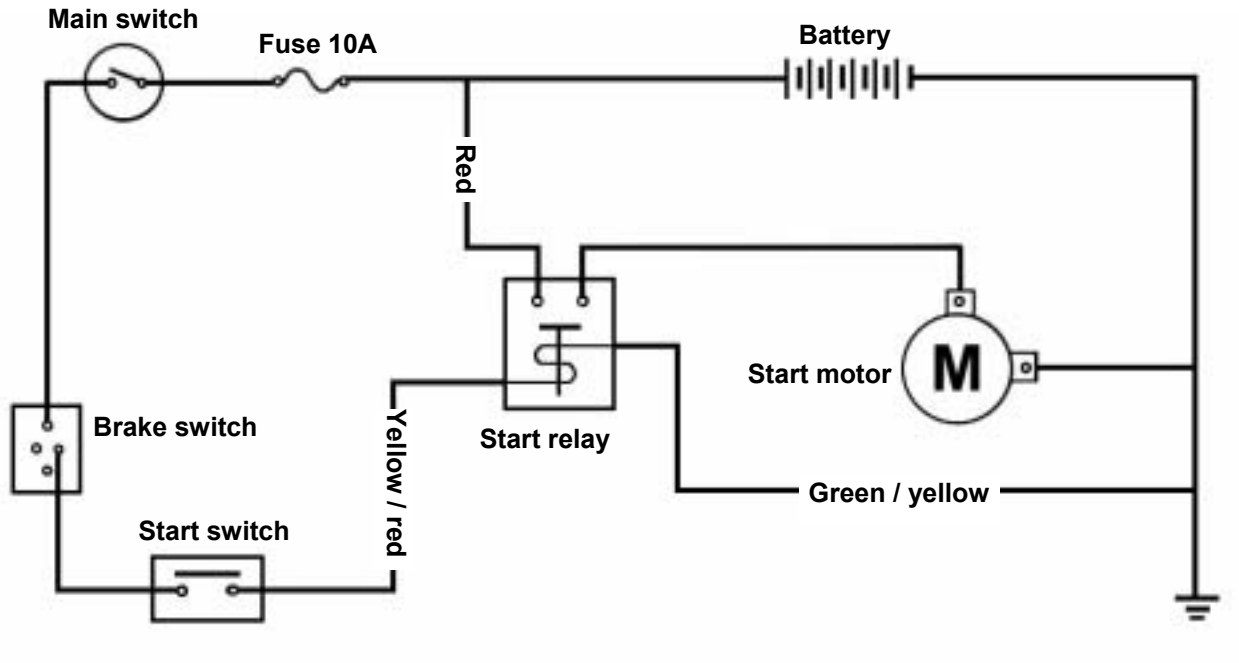


Exciting coil
Remove the exciting coil connector.
Measure the resistance between black/red wire on engine side and frame ground.
Standard: 400-800Ω(20℃)
Replace the alternator if the measured value exceeds the standard value.



Starting System

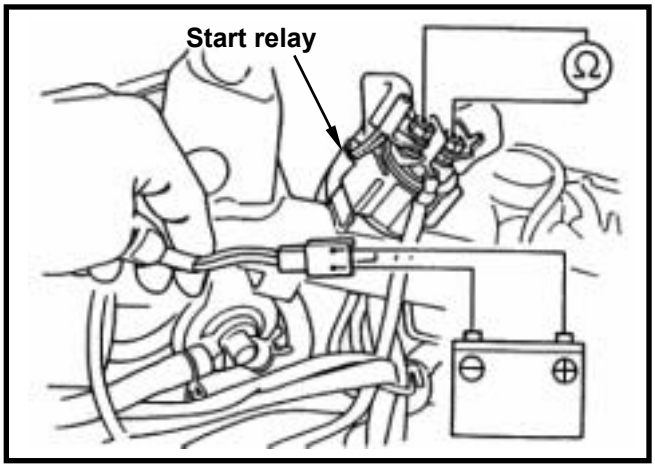
Starting Circuit



Start Relay Inspection

Turn main switch to "on", and operate the brake lever. Then press start button to check if there a click sound. It is normal if there is a click sound.

Remove the luggage box assembly.
Disconnect the battery negative (-) terminal.
Remove the battery positive (+) connection and starting motor wires from the start relay large pin.
Remove the power control connector of the start relay.
Connect a Ohmmeter between the start relay large pins.
Connect the green/yellow wire to battery positive (+) terminal, and the green/yellow wire to battery negative (-) terminal.
Check the continuity between the start relay large pins.
If it is not continuity, then replace the start relay.



START MOTOR REMOVAL
Remove the luggage box. (chapter 12, section 6)

Remove the air cleaner. (chapter 4, section 10)

Remove the battery negative terminal.
Remove the battery positive terminal and the start motor wire from the big terminal of start relay.
Remove the start motor mounting bolts and the motor.

Remove the start motor mounting bolts and the motor.

Starting Motor Installation
Install the motor and other components in reverse procedure of removal.

Meter

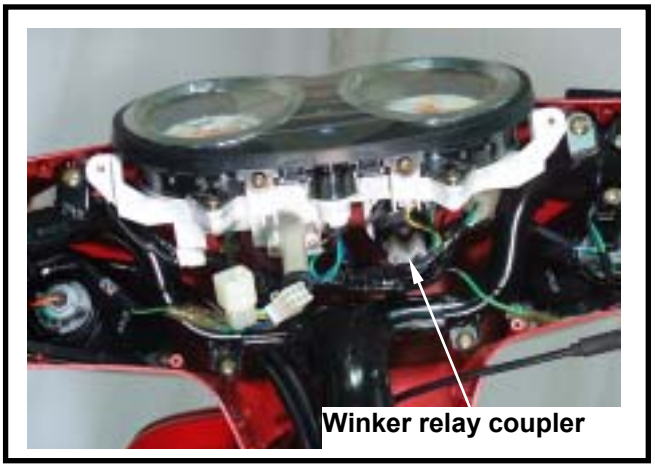
Removal

Remove the front cover. (chapter 12, section 4)

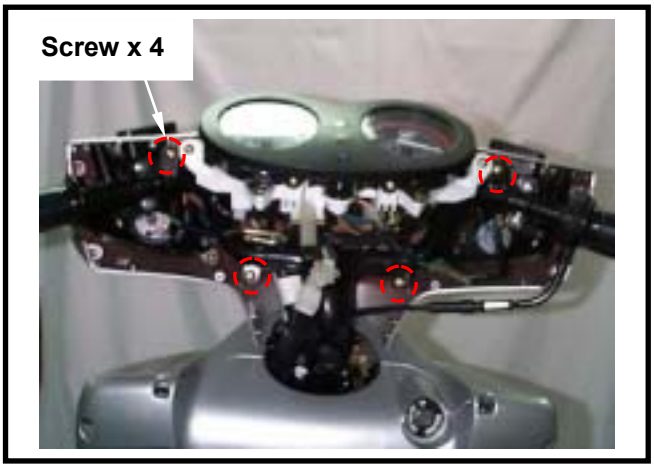
Remove the power coupler of the meter.

Remove the rear cover of the handlebar. (chapter 12, section 3)
Remove the odometer cable.

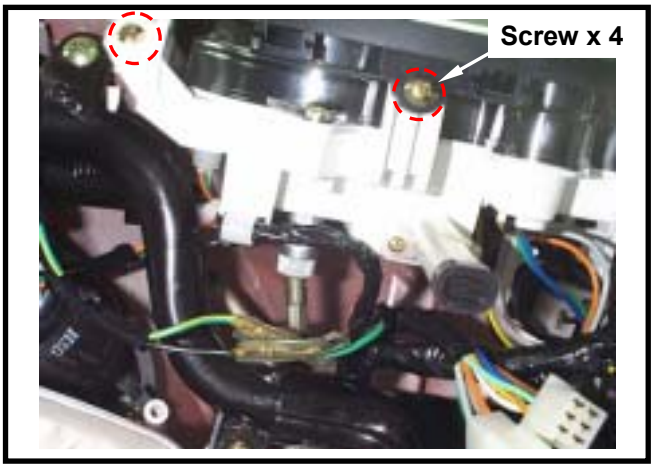
Remove the winker relay coupler.



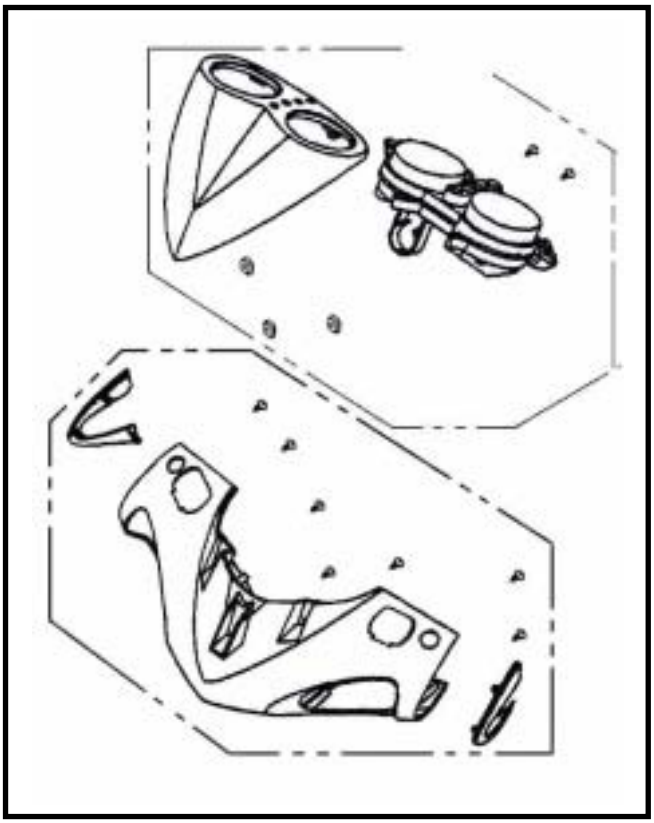
Remove the front cover of handlebar. (chapter 12, section 3)



Remove the instrument panel assembly. (screw x 4)



Disassemble the instrument seat and the instrument. (screw x 2)



Instrument Panel Installation
Install the panel in reverse procedure of removal.

Light / Light Bulb

Headlight Bulb Replacement

Remove the front cover. (chapter 12, section 4)
Disconnect the headlight wire connector, and then remove the rubber boot.
Press down the bulb spring locker and then remove the locker with turning it in CCW motion.
Replace the bulb with new one if necessary.

Caution

- Do not touch the bulb surface with fingers because the bulb will create hot-spot so that let it be burnt. It has to be package with cloth or wear glove as installing.
- Wipe the bulb with cloth to prevent from damaged if the bulb be touched by hands.

Install the bulb in reverse order of removal.
Connect power to check if the bulb has been installed properly after installation.
Please conduct the headlight beam adjustment job if replace the headlight bulb.

The headlight beam adjustment

Loosen the adjustment screw located under the headlight. Turn the screw to right or left to adjust the high or low beam of headlight.

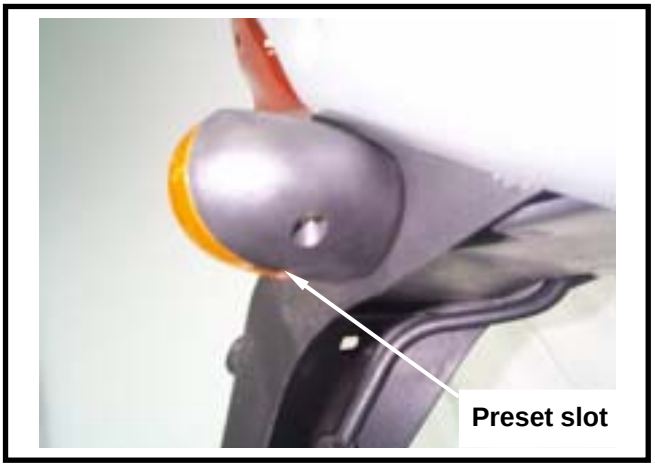
Caution

- This outer cover of headlight is a fixed type so that the lamp seat will be moved only when adjusting.

Front Turn Signal Light Bulb Replacement
Remove the light outer cover of the turn signal light. (screw x 2)

Remove the light inner cover of the turn signal lamp. (screw x 1)
Replace the bulb with new one.

Rear Turning Signal Light Replacement
Pry out the light cover from the preset slot onto the lower parts of cover.
Check if the bulb is burnt or damage, and replace it if necessary.
Connect power to check if the bulb has been installed properly after installation.



Taillight / Brake Light Replacement
Remove the outer cover of the tail & brake light. (screw x 2)
Check if the bulb is burnt or damage, and replace it if necessary.
Connect power to check if the bulb has been installed properly after installation.

Switch / Horn

Main Switch

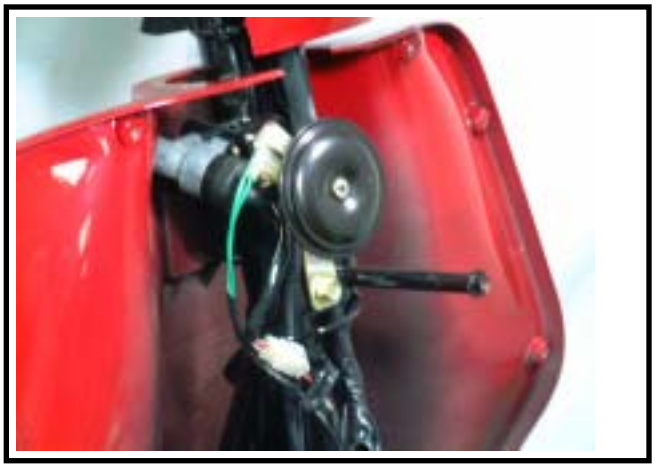
Inspection

Remove front fender. (bolts x2, screws x4)
Disconnect main switch leads connector.
Check connector terminals for continuity.

Pin / Location	BAT1	BAT2	IG	E
LOCK			●	●
OFF			●	●
ON	●	●		
Wire color	Red	Black	Black/ White	Green

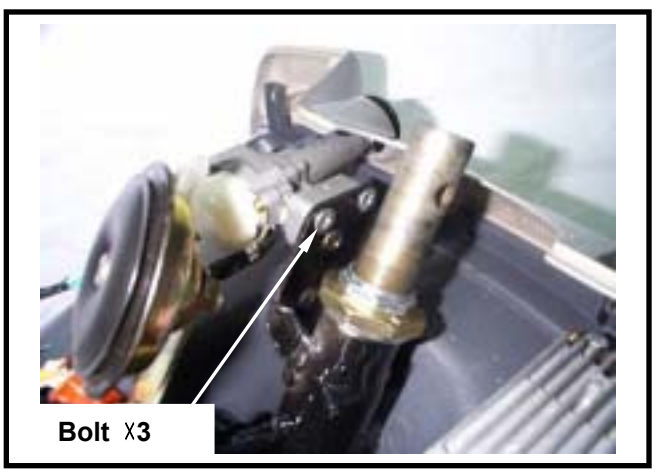
Replacement

Remove the handlebar bolt. (bolt x 1)



Remove the handlebar assembly.

Remove the main switch connector and bolts. (bolts x 3)
Remove the main switch.
Install a new main switch and tighten the bolts. (bolts x 3)



Handlebar switch

Remove the rear handlebar cover. (chapter 12, section 3)

Disconnect the connector of the handlebar switch.

Check the continuity of follow pins listed below columns.

Start switch

	ST	E
FREE		
	●	●
Wire color	Yellow/ Red	Green

Headlight switch

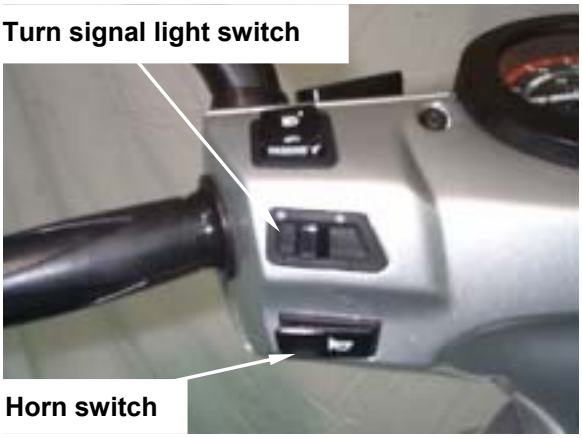
	CI	TL	HL
●			
	●	●	
	●	●	●
Wire color	Black	brown	Brown/ white

High/Low beam switch & Passing switch

	LO	HL	HI	PASS
		●	●	
	●	●		
PASSING	●	●	●	●
Wire color	White	Brown/ white	Blue	Black

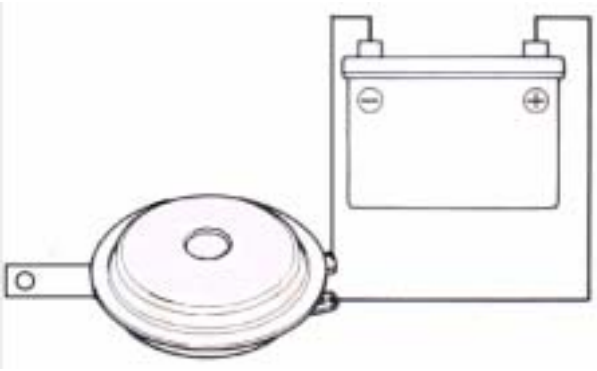
Turn signal light switch

		R	WR	L
➡		●	●	
N	FROM R	●	●	
	PUSH OFF			
	FROM L		●	●
⬅			●	●
Wire color		Light blue	Gray	Orange



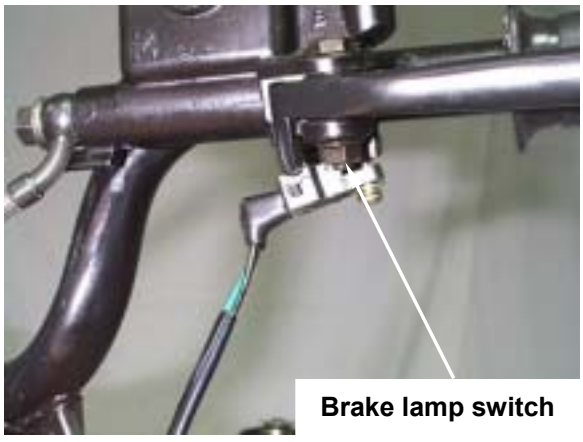
Horn

Remove the front fender.
Connect 12V power to the 2 pins on the horn.
Then, the horn should sound.
Replace it if necessary.



Brake light switch

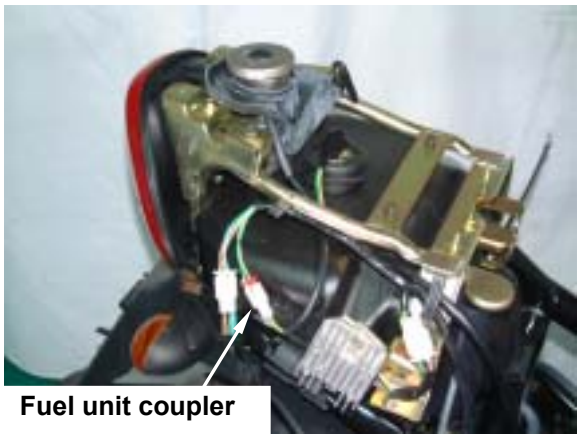
The circuit of black wire and the green/yellow wire on the brake light switch should be in continuity when operating the brake lever.
If the switch damaged, replace it with new one.



Fuel Gauge Unit

Fuel gauge unit remove

Open the seat cushion
Remove the luggage box assembly (bolts x4, screw x1)
Remove the rear carrier (bolts x4)
Remove the central cover (screws x 2)
Remove the left & right body covers (bolts x 2, screw x 4).
Disconnect the fuel gauge unit coupler.

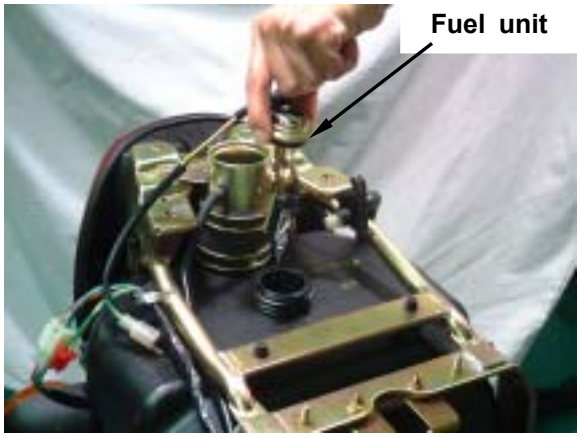


Turn the plastic cap in CCW direction and then remove the fuel unit plastic cap.

Remove the fuel gauge unit.

Caution

Do not damage or bend the float arm as removing.



Inspection

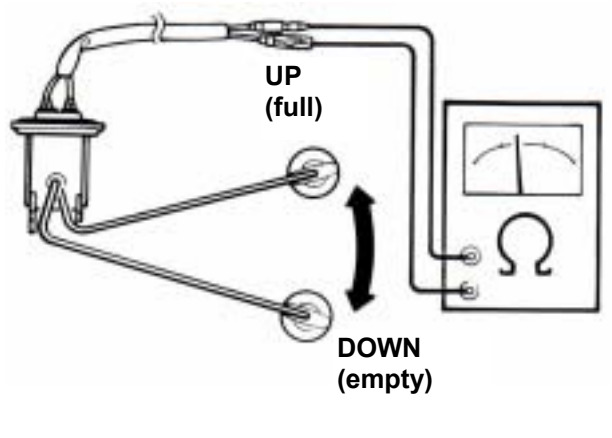
The resistance values are listed below when the float arm in F and E positions.

Float arm position	Resistance value
E(empty)	97.5~107.5Ω
F(full)	4~10Ω

DOWN(empty)Connect the fuel gauge unit to the main harness.
Turn the main switch ON.
Move the float arm in UP & DOWN, and then check if the fuel gauge indication needle is in correct position.

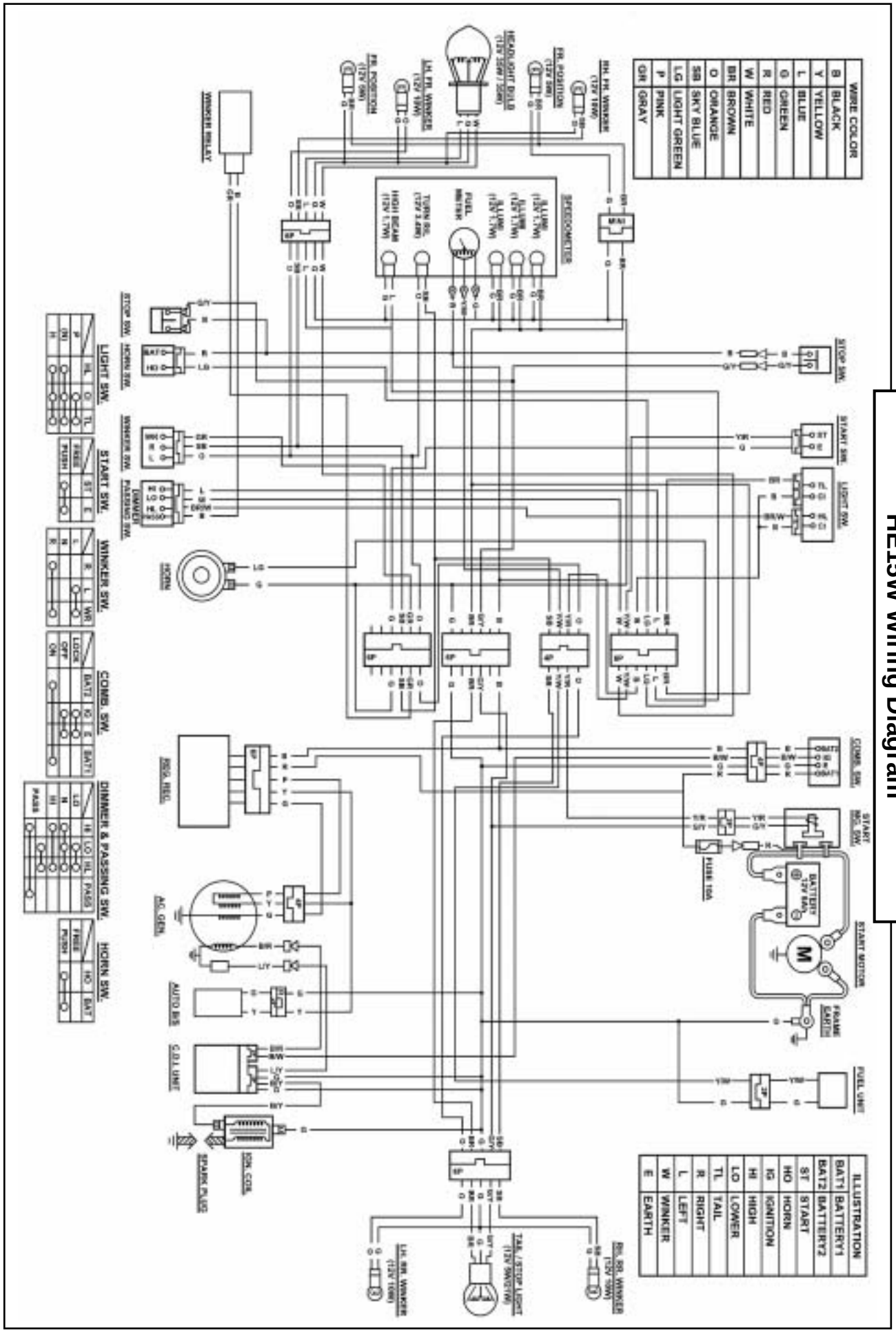
Caution

Turn on the turn signal light to make sure battery is in good condition before this test.



Float arm position	Indicator needle
UP(full)	E(empty)
DOWN(empty)	F(full)

NOTE:


WIRE COLOR
B BLACK
Y YELLOW
L BLUE
G GREEN
R RED
W WHITE
BR BROWN
O ORANGE
SB SKY BLUE
LG LIGHT GREEN
P PINK
GR GRAY
ILLUSTRATION
BAT1 BATTERY1
BAT2 BATTERY2
ST START
HO HORN
IG IGNITION
HI HIGH
LO LOWER
TL TAIL
R RIGHT
L LEFT
W WINKER
E EARTH
WINKER RELAY
SPEEDOMETER
FUEL METER
STOP SW.
HORN SW.
WINKER SW.
PASSING SW.
DIMMER
LIGHT SW.
START SW.
WINKER SW.
COMB. SW.
DIMMER & PASSING SW.
HORN SW.
HORN
REG. RECT.
A.C. GEN.
AUTO BIS
C.D.I. UNIT
IGN. COIL
SPARK PLUG
START MOTOR
FRAME EARTH
FUSE 10A
BATTERY 12V 9Ah
FUEL UNIT
TAIL/STOP LIGHT (12V 5W/21W)
RH. RR. WINKER (12V 10W)
LH. RR. WINKER (12V 10W)

17. Wiring Diagram

NOTE: