# Keeway Cruiser

## Service Manual

# CONTENT

# PREFACE

This Service Manual describes the technical features and servicing procedures for the Keeway Cruiser.

Service information contains the necessary safety precautions for all operations stated in this manual. Read them carefully before any operation is started.

Inspection/adjustment describes the inspection/ adjustment procedures, safety rules and service information for each part, starting from periodic maintenance.

Contents after section 1 give instructions for disassembly, assembly and adjustment of the engine, body and electrical system.

Most sections start with an assembly or system illustration and Troubleshooting for the section. The subsequent pages give detailed procedures for the section.

Caution:

The information and contents included in this manual may be different from the motorcycle in case specifications are changed.

**Keeway motor Co., Ltd.**

# General Information

## Motorcycle VIN number

VIN (vehicle identification number) is engraved on the steering head pipe.

Frame Number

## Engine Number

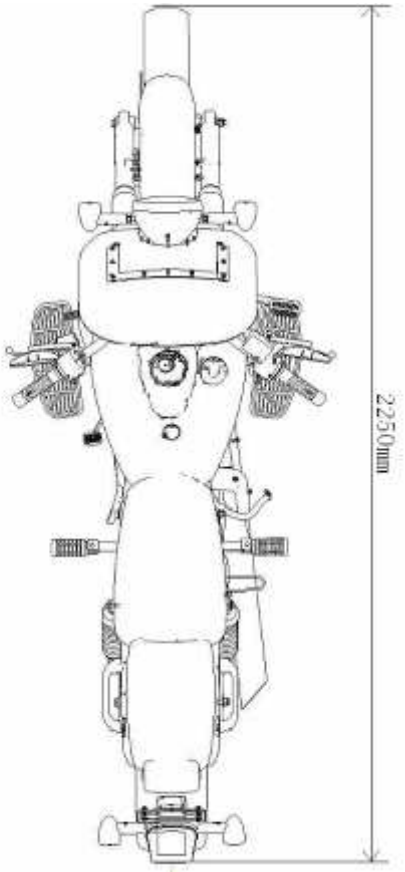
Engine number is engraved on the crankcase of the engine.

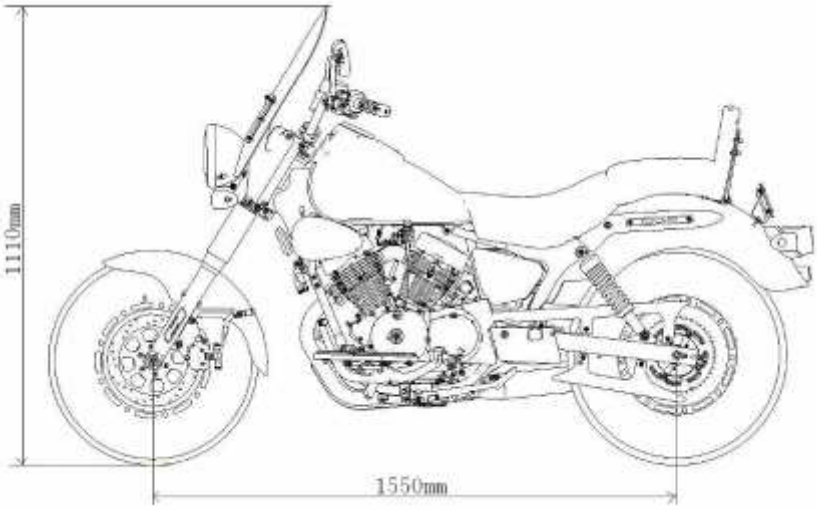
Engine Number

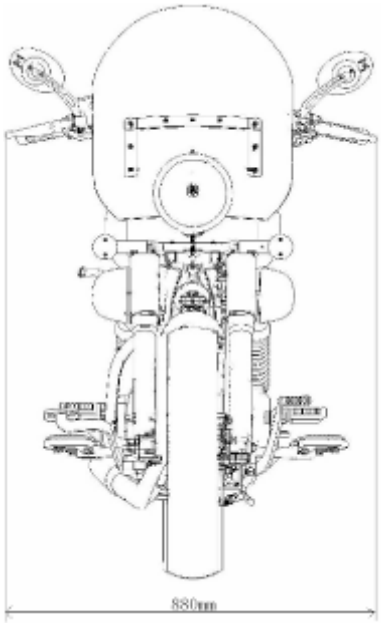
# Specification

| | | | | | |
|---|---|---|---|---|---|
| **Model** | | **Cruiser** | | **Engine Type** | Air cooled 4-stroke, SOHC engine |
| **Overall length** | | 2250 mm | | **Fuel Type** | 92#/95# unleaded Petrol |
| **Overall width** | | 880 mm | | **Cylinder arrangement** | 2-v configuration |
| **Overall height** | | 1110 mm | | **Bore*Stroke (mm)** | 49*66 |
| **Wheel base** | | 1550 mm | | **Displacement** | 250 ml |
| **Net weight (kg)** | Front wheel | 86 | | **Starter type** | Electric start |
| | Rear wheel | 93 | | **Cooling Type** | Air cooled |
| | **Total** | 179 | | **Lubrication Type** | Forced pressure & wet sump |
| **Tires** | **Front wheel** | | | **Air Cleaner** | Paper element, wet |
| | 110/90-16 | | | **Fuel capacity** | 13.5±0.2L |
| | **Rear wheel** | | | **Max. Speed** | 100km/h |
| | 120/90-16 | | | **Engine oil capacity** | At disassembly: 1.6L; At replacement: 1.3L |
| **Transmission** | **Clutch Type** | Wet | | **Idle-rpm** | 1400±100rpm/min |
| | **Transmission** | Chain drive | | **Max. Torque** | 18.7N.m/5750rpm |
| **Electric** | **Battery Capacity** | 12V-9AH | | **Max. Power** | 14.3kW/8500 rpm |
| | **Generator Type** | 2v49FMN | | **Compression** | 9.4: 1 |
| | **Spark Plug** | NGK CR6HSA | **Brake** | **Diameter of front disc brake (mm)** | φ270 mm |
| | **Gap of spark plug** | 0.7-1.0mm | | **Diameter of rear disc brake (mm)** | φ220 mm |
| | **Ignition Type** | Battery Ignition | | | |

# Cruiser



## Important information

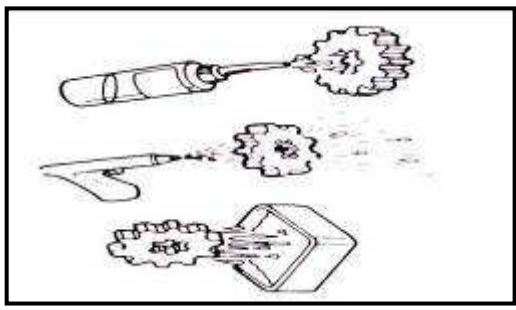
Use only Keeway genuine parts for all replacement to avoid the accelerated wear of parts and to reduce the risk of failure.

All gaskets, seals, clips and O-rings should be replaced when the engine is disassembled.

All lock washers and cotter pins should be replaced whenever they are removed.

Don’t use compressed air to rotate or dry the bearings, it will cause damage.

## Service precautions



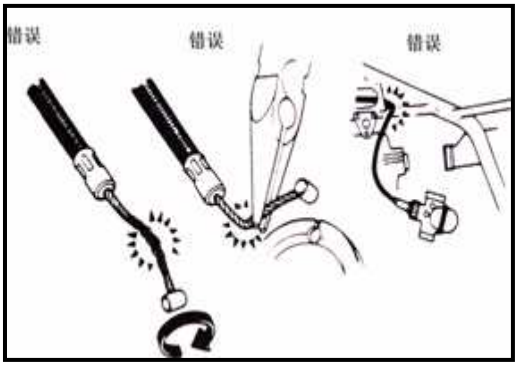
Use only metric tools to service the motorcycle.

Remove dust and dirt to avoid the foreign matter

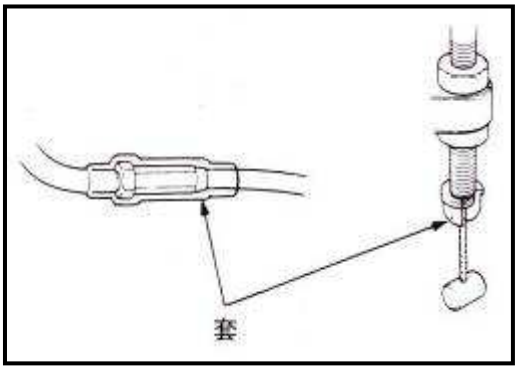
contamination of the engine, chassis and brake systems before removal and inspection.

Clean and dry all components with compressed air prior to inspection.

Be careful not to bend or twist parts while removing or installing, binding or excess wear will result.

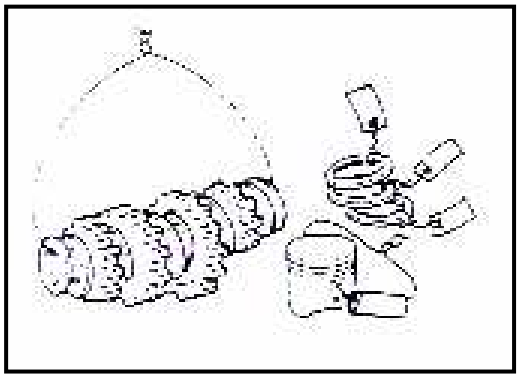



Rubber parts can deteriorate with age and are highly susceptible to damage from solvents and oil. Inspect all rubber parts and replace if necessary before re-installation.




Loosening a part with multiple fastener sizes should be done from the outside to inside in a crisscross pattern. Loosen the smallest fasteners first.

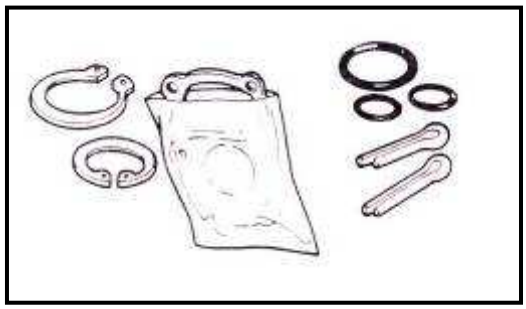
Complex assemblies such as the transmission, should be labeled and stored in the proper assembly order and



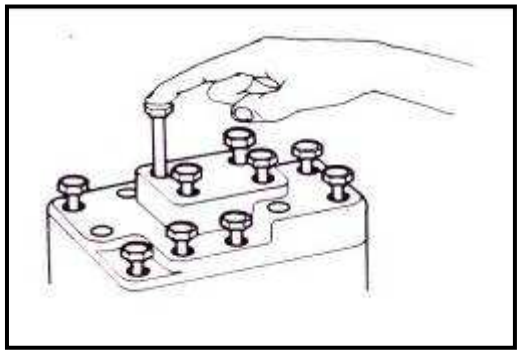
held securely with wire, this will simplify re-installation at a later date.

The position of critical parts should be noted/marked before the part is removed.

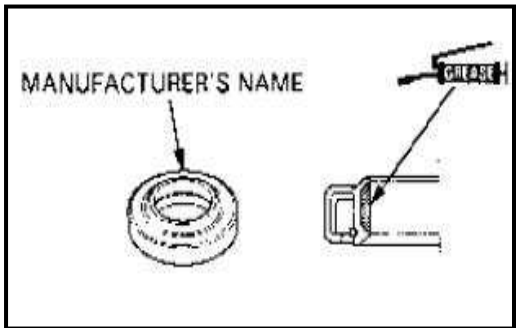
Certain parts are ALWAYS replaced after removal. These non-reuseable parts include: gaskets, metal sealing washers, O rings, oil seals, piston pin clips, ect... Prior too assembling the new parts, remove any probable residual material from the contact surfaces.



The length of the bolts and screws is different for different location, place the bolts into their holes and compare the exposed length.

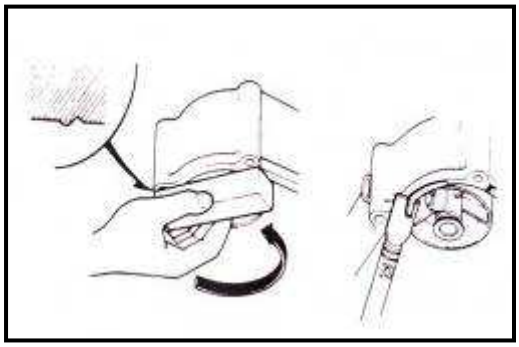


Apply grease to the oil seal before the installation.

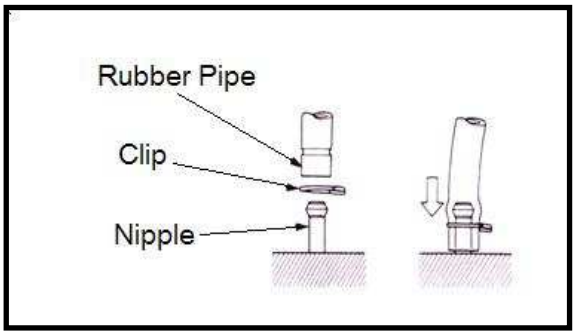


During installation ensure shaft surfaces are smooth and unworn and coat with grease as well.

Old gaskets or sealant must be completely removed before installation. Remove the gasket and sealant carefully to avoid the damage of the components.

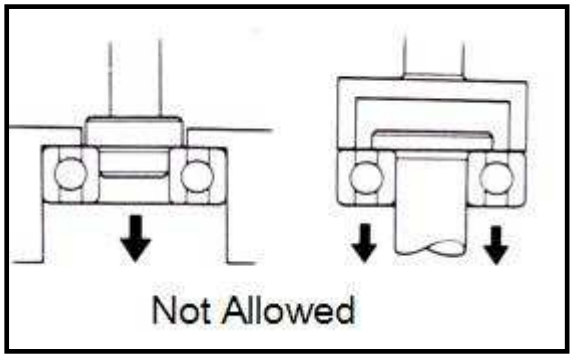


Rubber pipe (fuel, vacuum) should be installed so the fitting is completely covered to allow adequate area retainer clip installation.




Ball bearings are removed by special tools which apply force against one or both bearing

races. The bearing will be damaged if the force is applied against only one race during removal.




## Special removal tools

1. Tool list for engine removal and inspection refer to table 1-1, 1-2.

**Table 1-1**

| Tools | Remark |
|---|---|
| Socket spanner | Remove fly wheel mounting nut，FIG1-3 |
| Clutch Holder | FIG1-4 |
| Fly wheel puller | FIG1-5 |
| Feeler gauge | FIG1-6 |
| Bearing removal tool | FIG1-7 |
| Bearing install tool | FIG1-8 |
| Seal removal & install tool | FIG1-9 |
| Removal handle | FIG1-10 |
| Piston pin puller | FIG1-11 |
| Piston ring pliers | FIG1-12 |
| Spark plug socket | FIG1-13 |
| Vernier caliper | FIG1-14 |
| Internal Micrometers | FIG1-15 |
| Micrometer inside caliper | FIG1-16 |
| Micrometer, V block | FIG1-17 |
| Micrometer | FIG1-18 |
| Valve clearance adjustment tool | FIG1-19 |
| Valve spring removal & install tool | FIG1-20 |
| Valve guide tube reamer | FIG1-21 |
| Crankcase removal tool | FIG1-22 |

**Table 1-2**

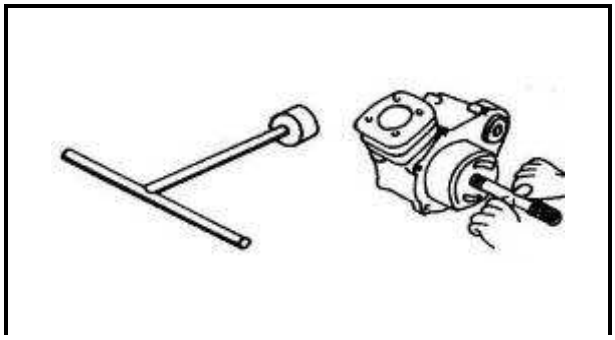


FIG1-3

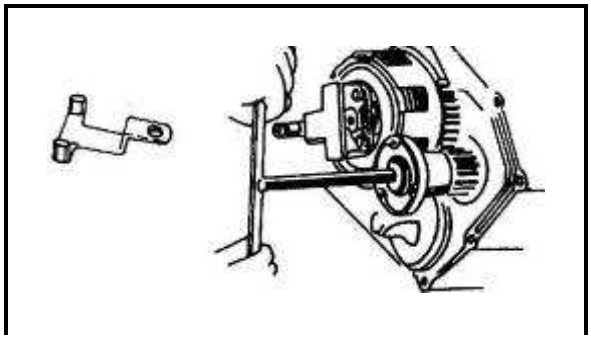


FIG1-4

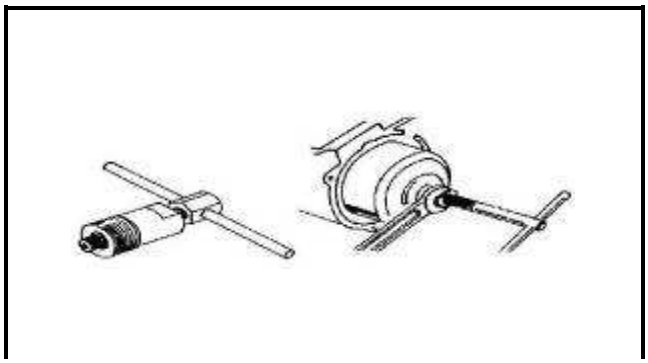


FIG1-5

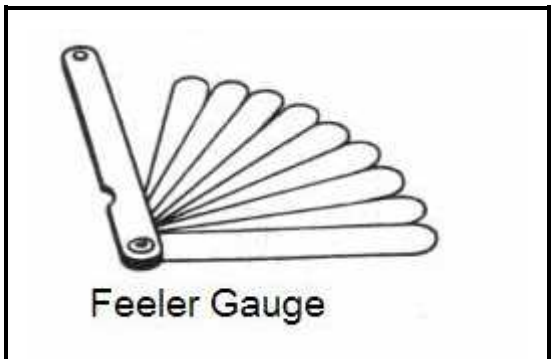



FIG1-6

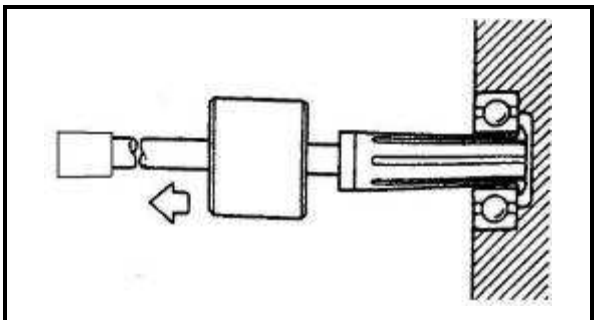


FIG1-7

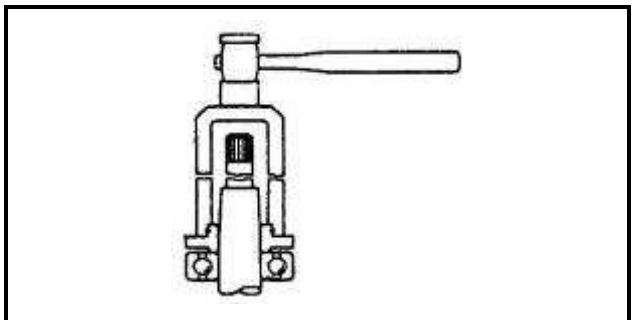


FIG1-8

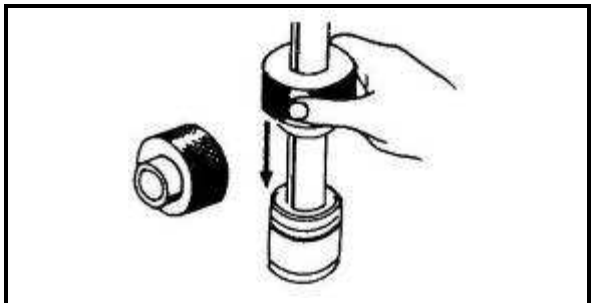


FIG1-9

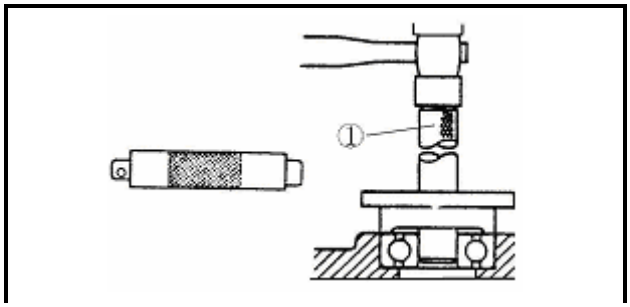



FIG1-10 ①Handle

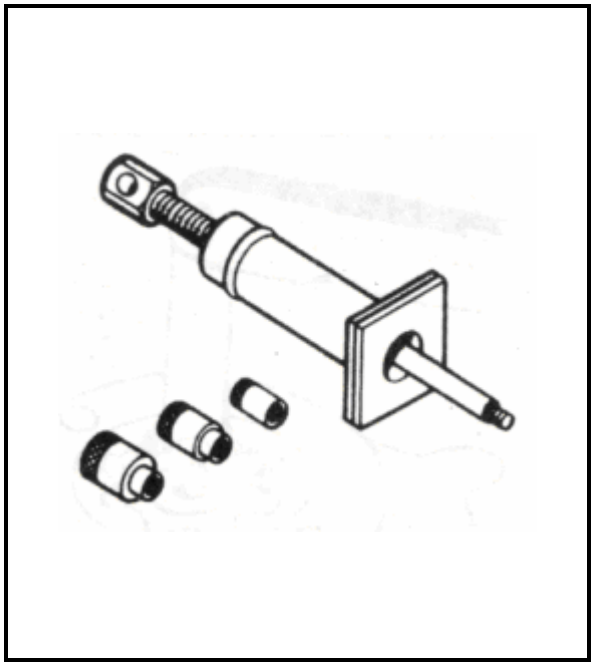


FIG1-11

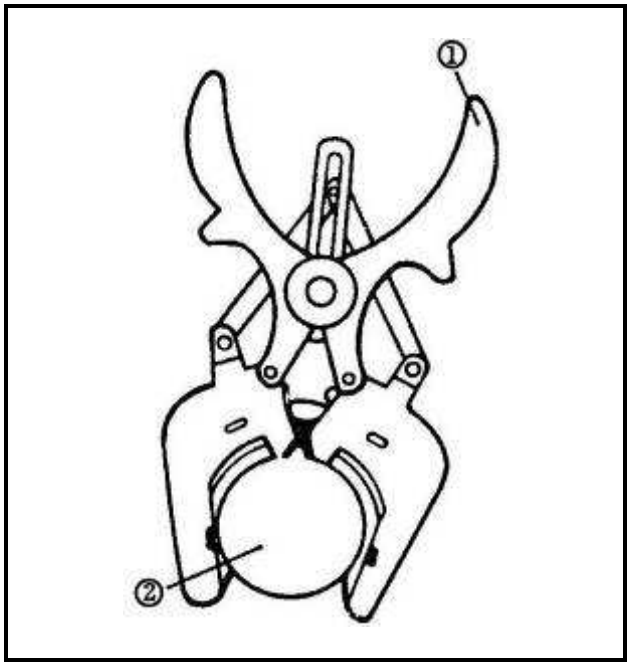



FIG1-12 ①Pliers ②Piston

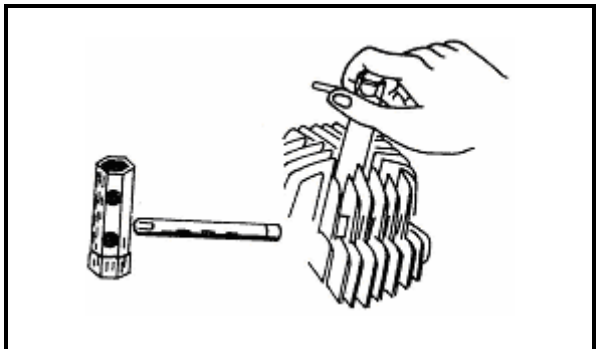


FIG1-13

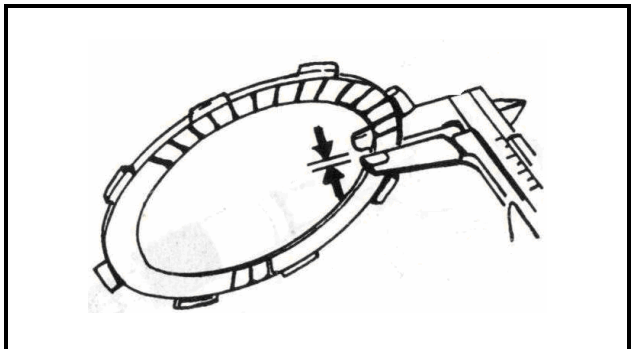


FIG1-14

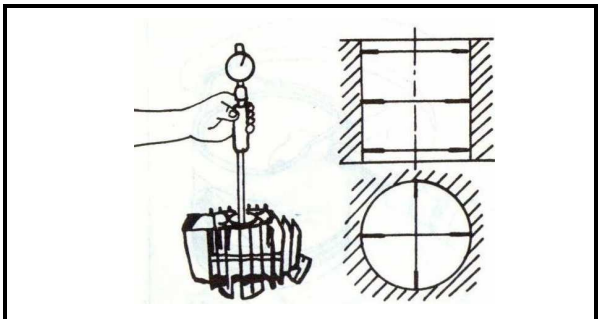


FIG1-15

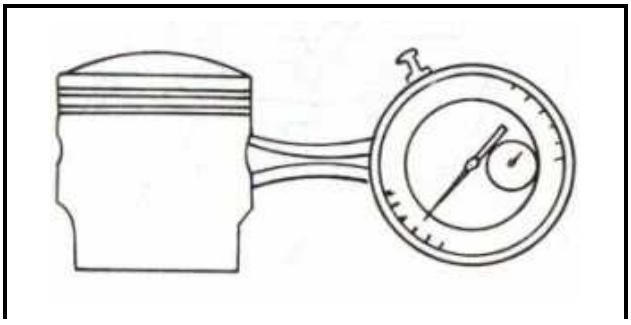


FIG1-16

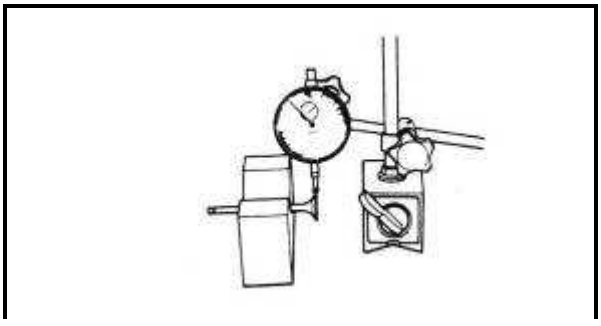


FIG1-17

FIG1-19

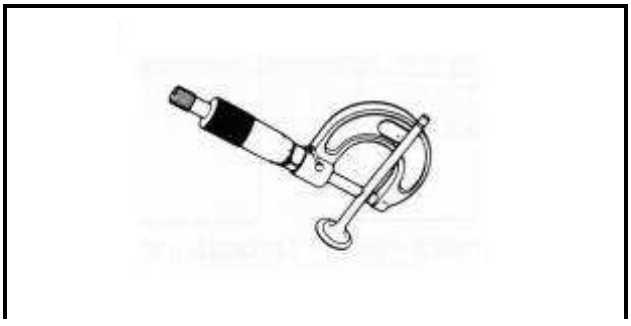


FIG1-18

FIG1-20

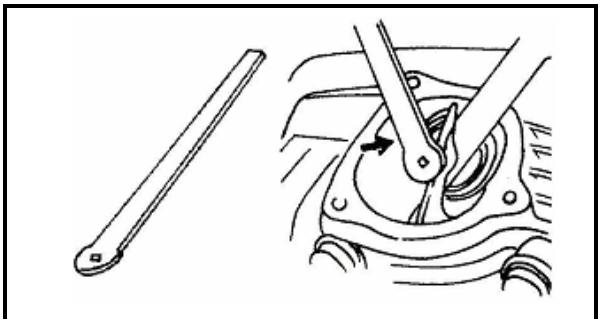


FIG1-21

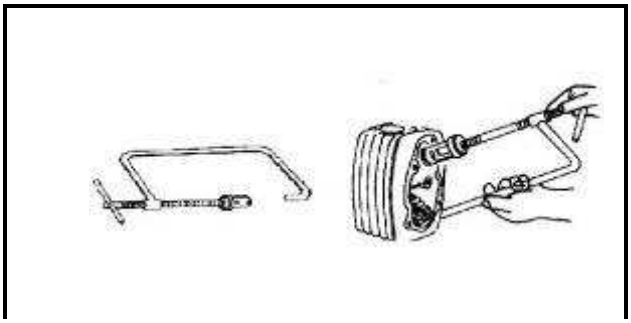


FIG1-22

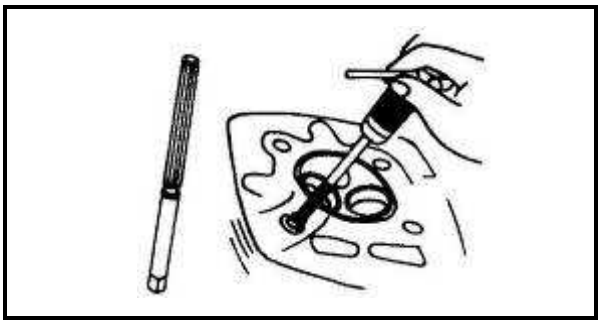


FIG1-23

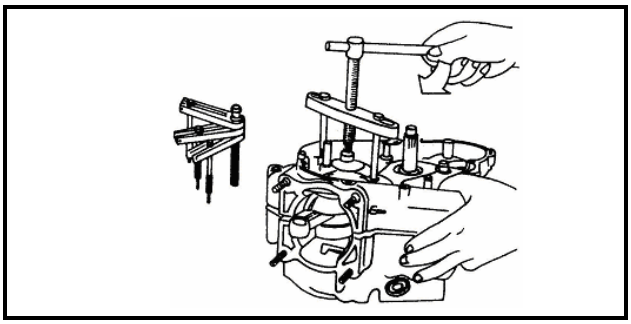


FIG1-24

2. Tools for chassis refer to Table 2-1, 2-2.

**Table 2-1**

| Tools | Remark |
|---|---|
| Torque Wrench | FIG2-1 |
| Hexagon socket screw keys | FIG2-2 |
| Socket spanner | FIG2-3 |
| Micrometer | FIG2-4 |
| Magnetic stand with fine adjustment, V block | FIG2-5 |
| Micrometer | FIG2-6 |
| Vernier caliper | FIG2-7 |
| Ring pliers | FIG2-8 |
| Front fork seal install tool | FIG2-9 |
| Front fork seal driver weight | FIG2-10 |
| Spanner wrench | FIG2-11 |

**Table 2-2**

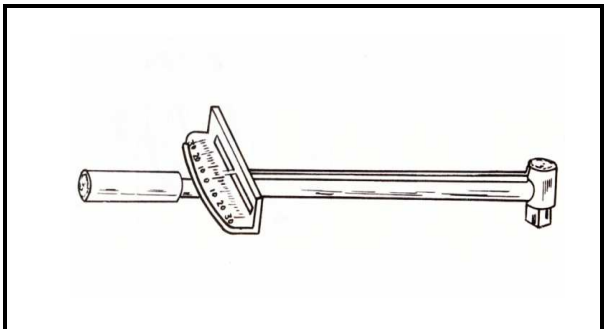


FIG2-1

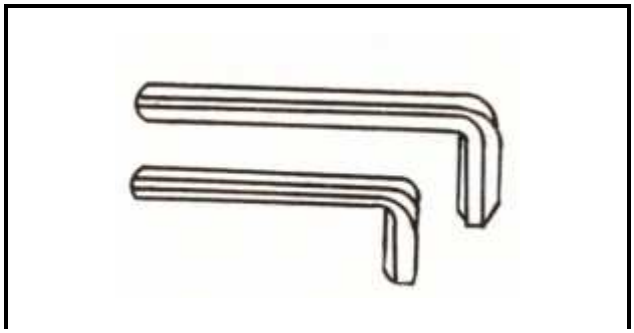


FIG2-2

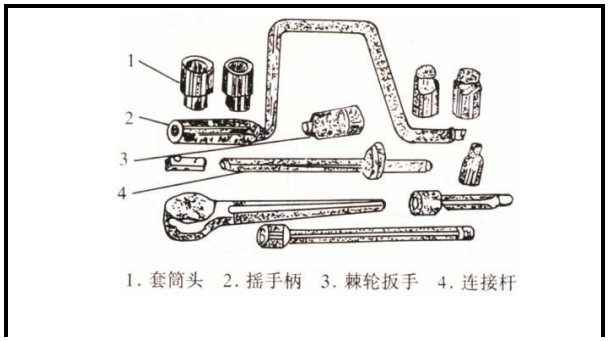



FIG2-3

FIG2-4

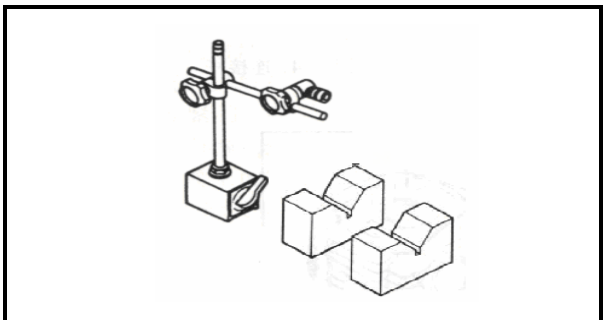


FIG2-5

FIG2-6

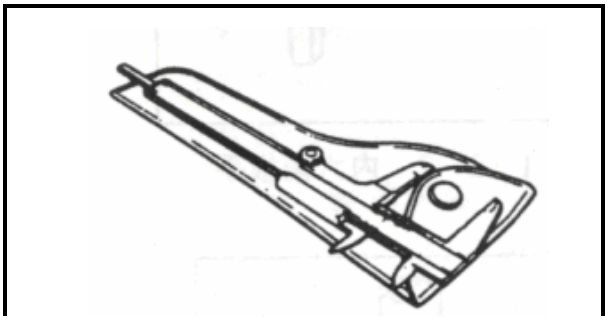


FIG2-7

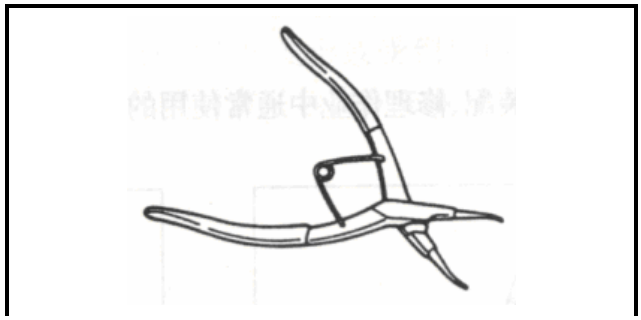


FIG2-8

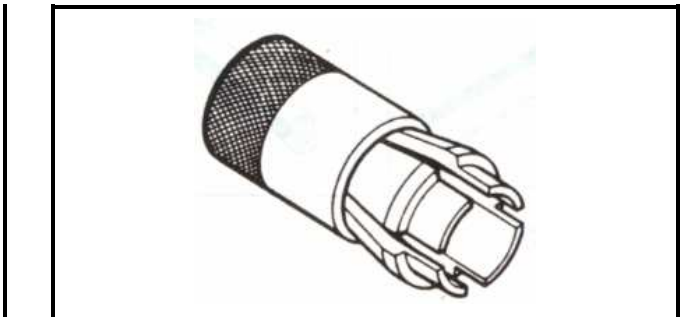
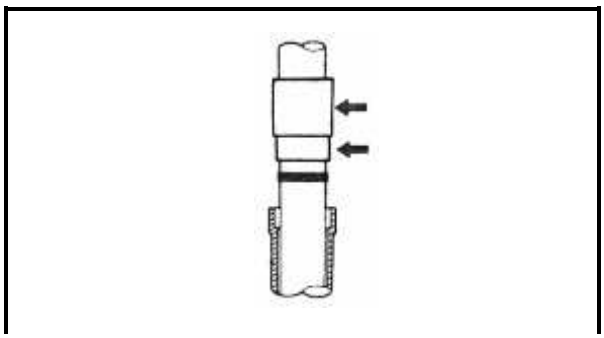


FIG2-9



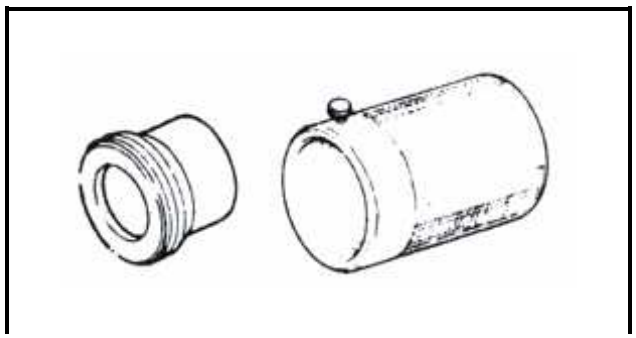
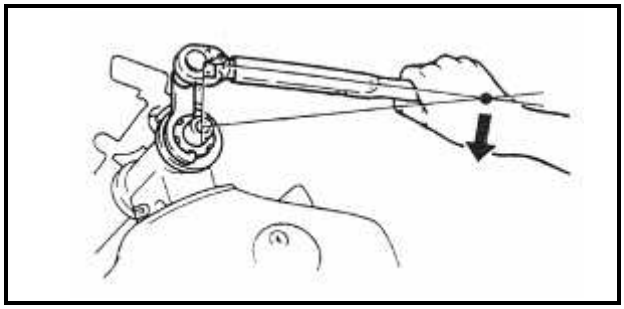


FIG2-10



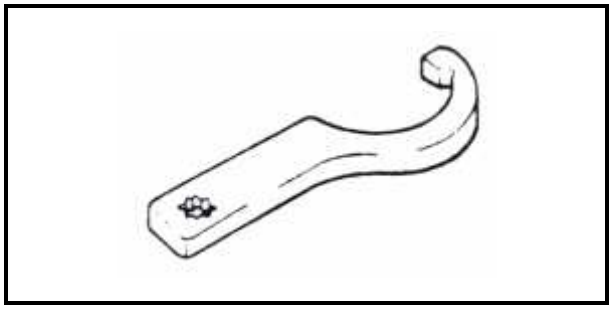


FIG2-11

3. Tools for electric refer to table 3-1, 3-2.

**Table 3-1**

| Tools | Remark |
|---|---|
| Multimeter | FIG3-1 |
| Inductive timing light | FIG3-2 |

**Table 3-2**

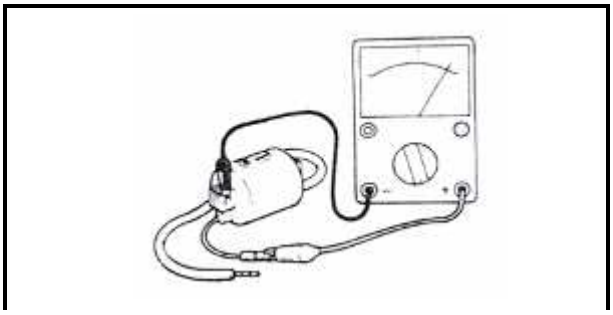


FIG3-1

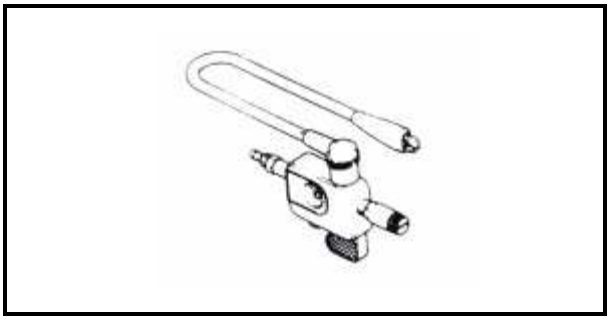


FIG3-2

## Service Information

**Safety** **Maintenance Guide**

**Specification** **Troubleshooting**

**Safety**

**Carbon monoxide**

Before running the engine, make sure that the working area is well-ventilated. Never run the engine in a closed area.

**Caution**

| |
|---|
| The exhaust contains poisonous carbon monoxide gas which may cause injury or death. |

Run the engine only in an open area or with an exhaust evacuation system installed.

**Fuel (petrol)**

Petrol is extremely flammable and is explosive under some conditions. The working area must be well-ventilated and do not smoke or allow flames or sparks near the working area or fuel storage area.

## Torque value of the fastener

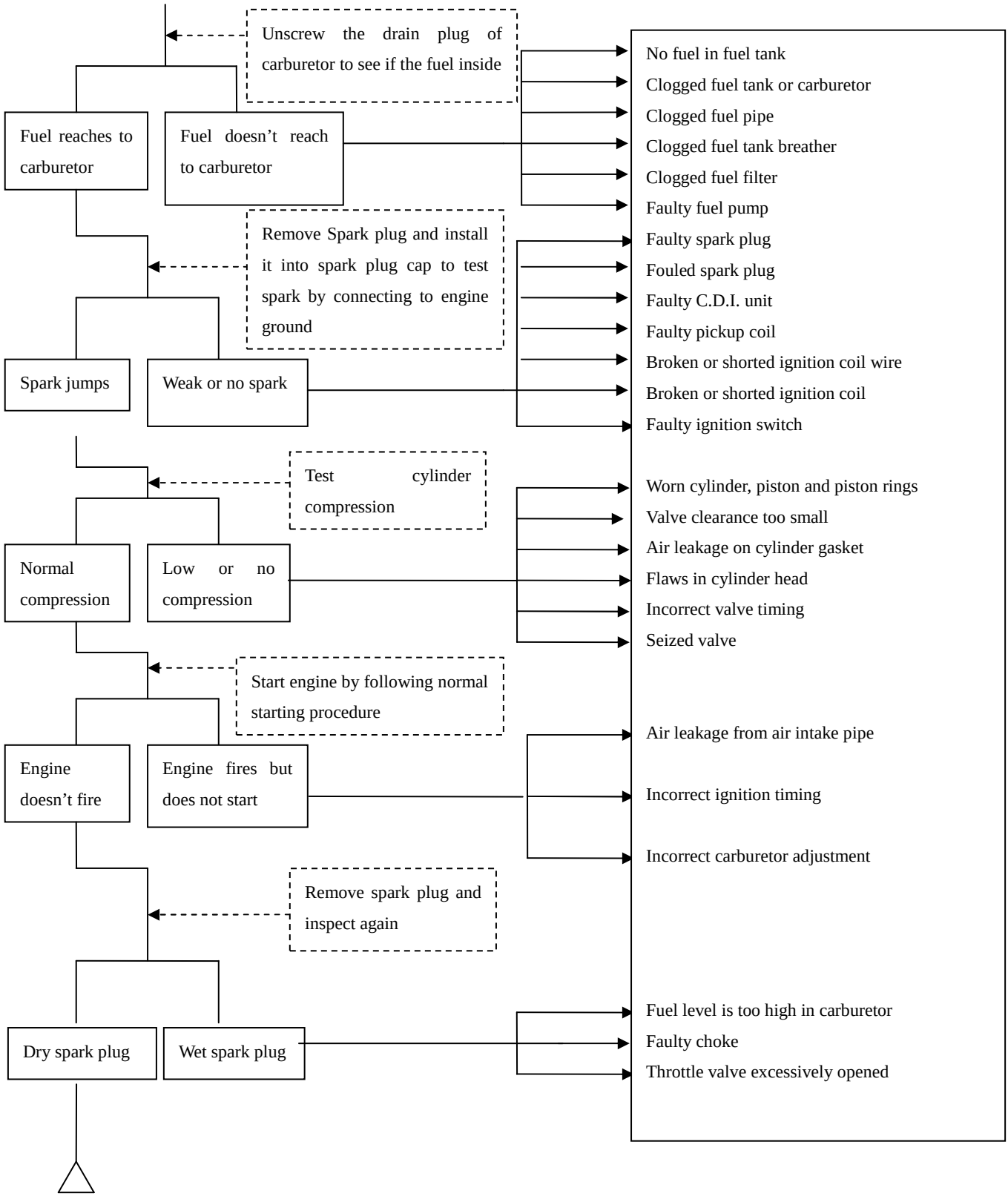
| Item | Torque(N·m) |
|---|---|

| | |
|---|---|
| Cylinder head | 22～25 |
| Cylinder | 10～12 |
| Side cover, cylinder head | 10～12 |
| Cylinder head side cover | 10～12 |
| Camshaft bearing holder | 10～12 |
| Neutral switch | 18～22 |
| Shift lever | 18～25 |
| Crankcase | 10～12 |
| Crankcase side cover | 10～12 |
| Stator | 10～12 |
| Oil filter cover | 10～12 |
| Oil pump | 10～12 |
| Oil gauge | 6～9 |
| Drain plug | 30～35 |
| Drain plug | 30～35 |
| Fly wheel | 55～60 |
| Clutch adjuster locknut | 8～10 |
| Drive sprocket | 10～12 |
| Spark plug | 10～15 |
| Start motor | 10～12 |
| Chain guide cover | 8～10 |
| Chain guide | 10～12 |
| Tensioner mounting bolt | 10～12 |

# Troubleshooting

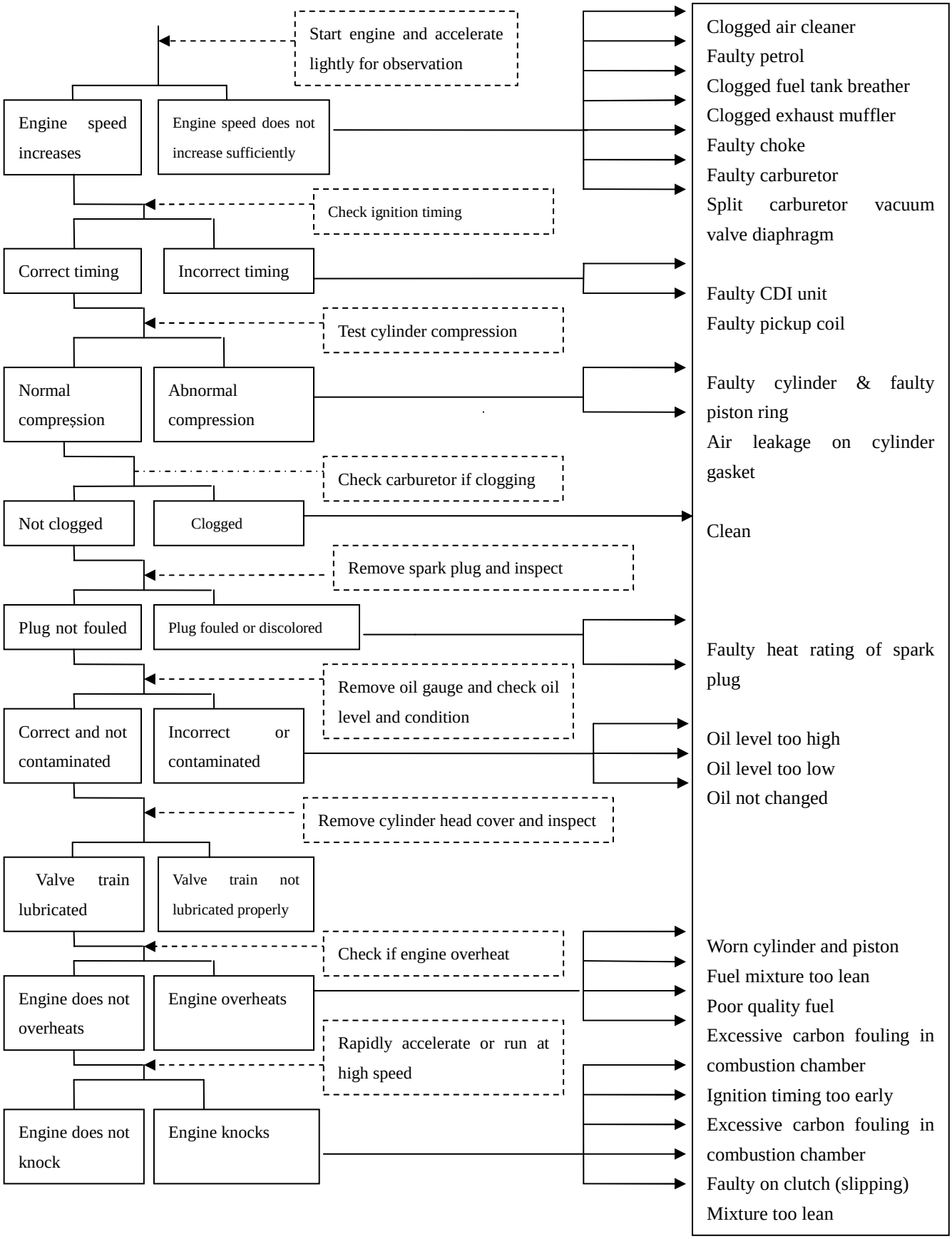
## Engine will not start or hard to start

| Inspection/Adjustment | Symptom | Probable Cause |
|---|---|---|

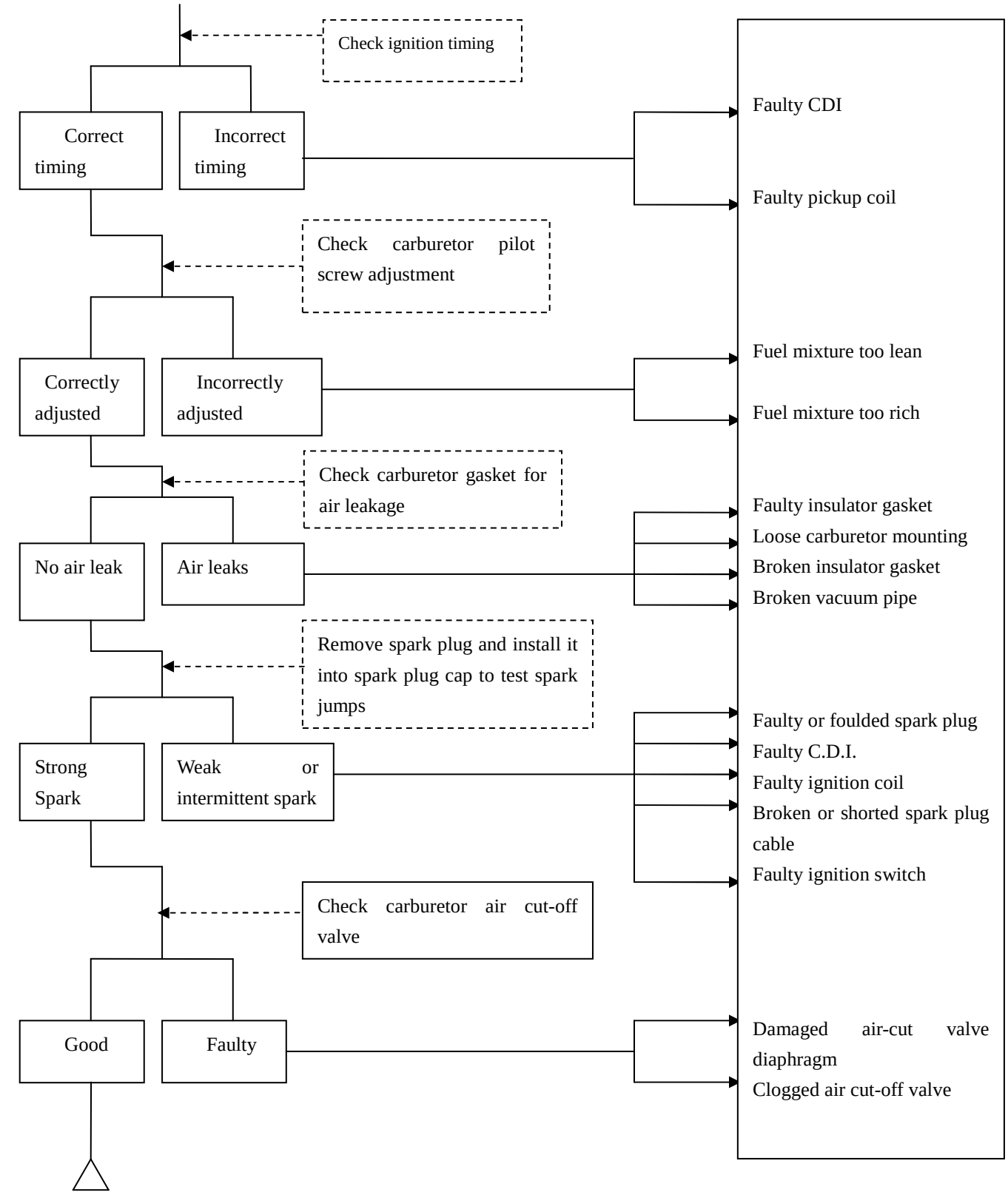



## Engine lacks power

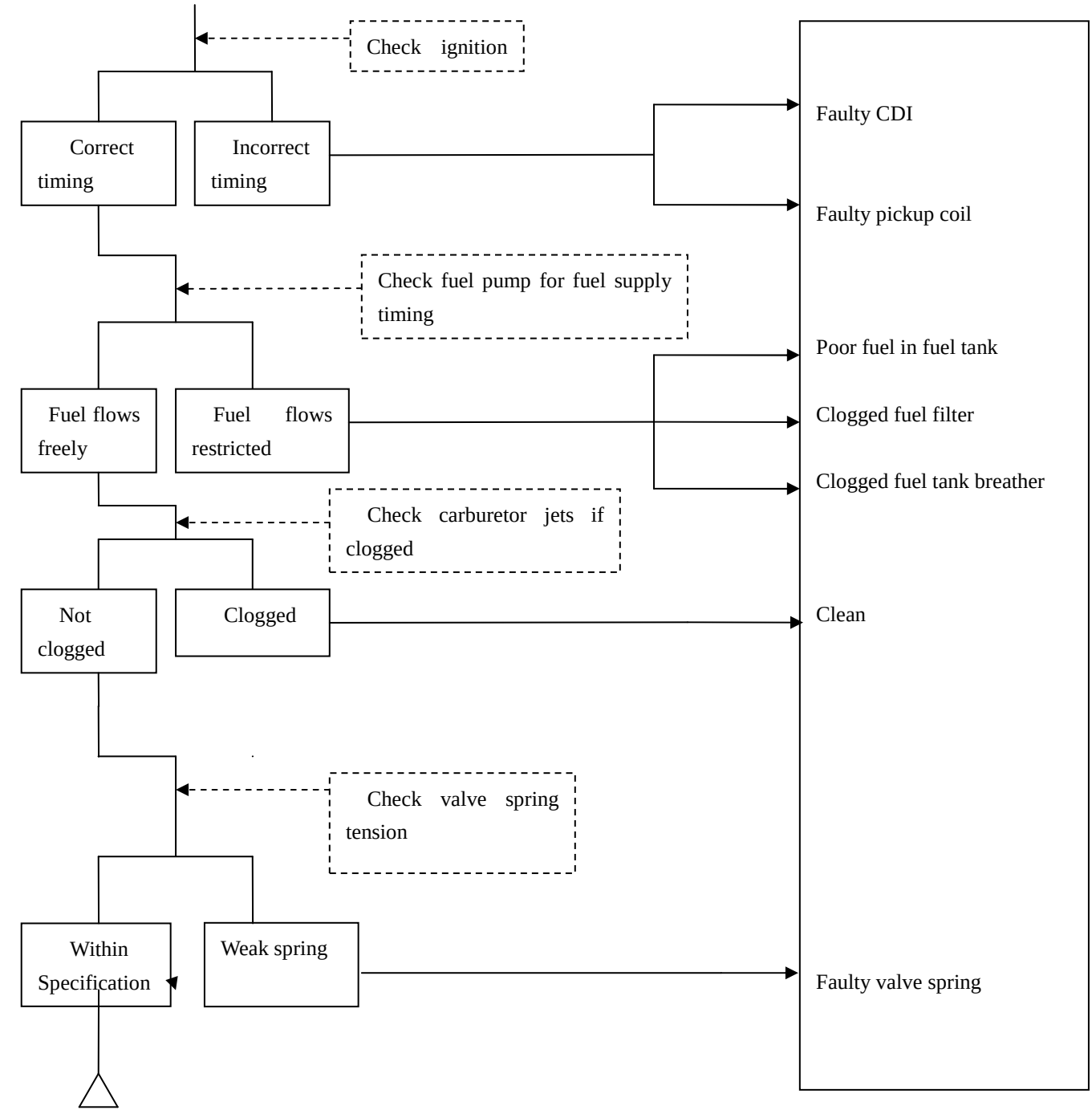
| Inspection/Adjustment | Symptom | Probable Cause |
|---|---|---|




## Poor performance (idle and low speed)

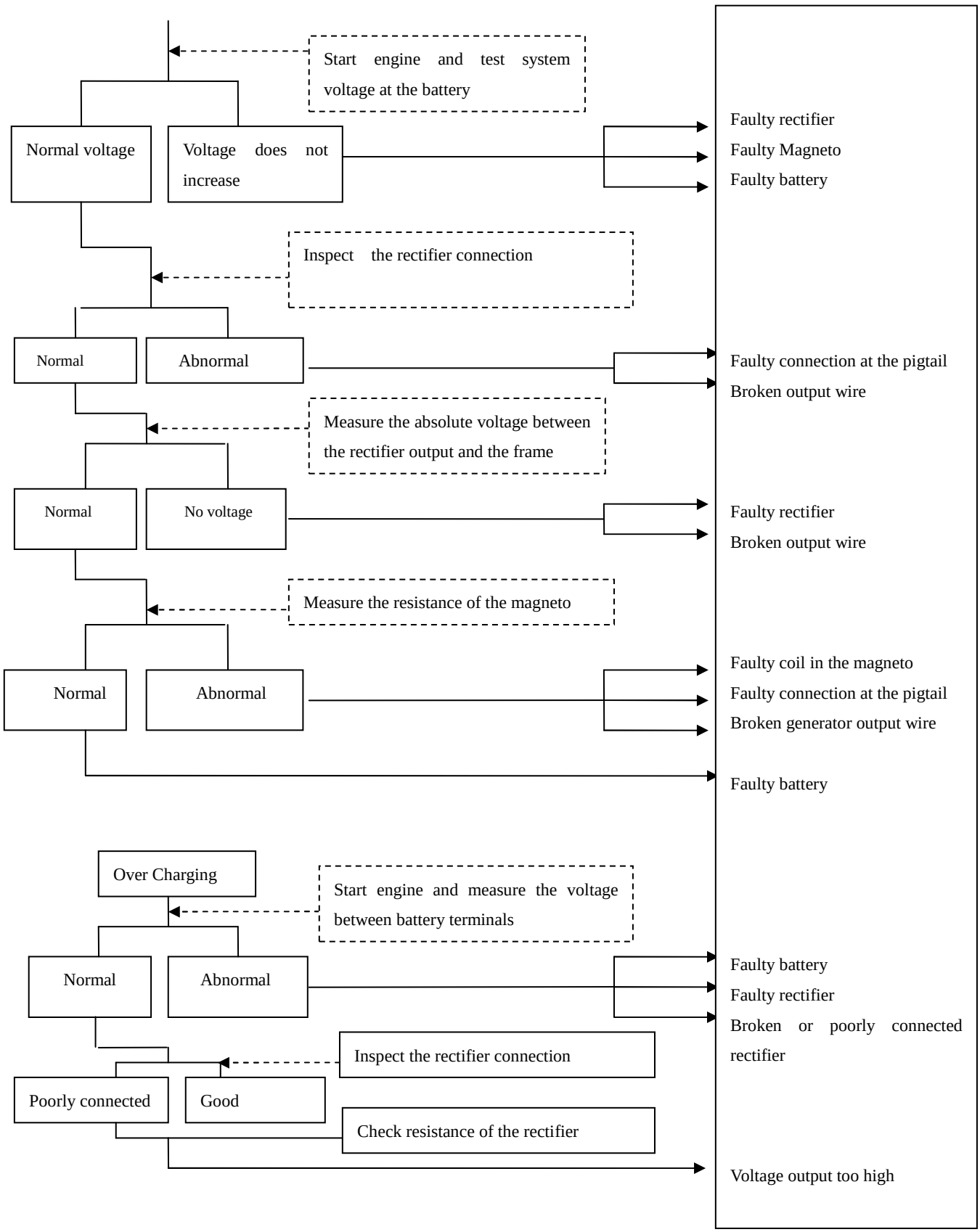



## Poor performance (high speed)



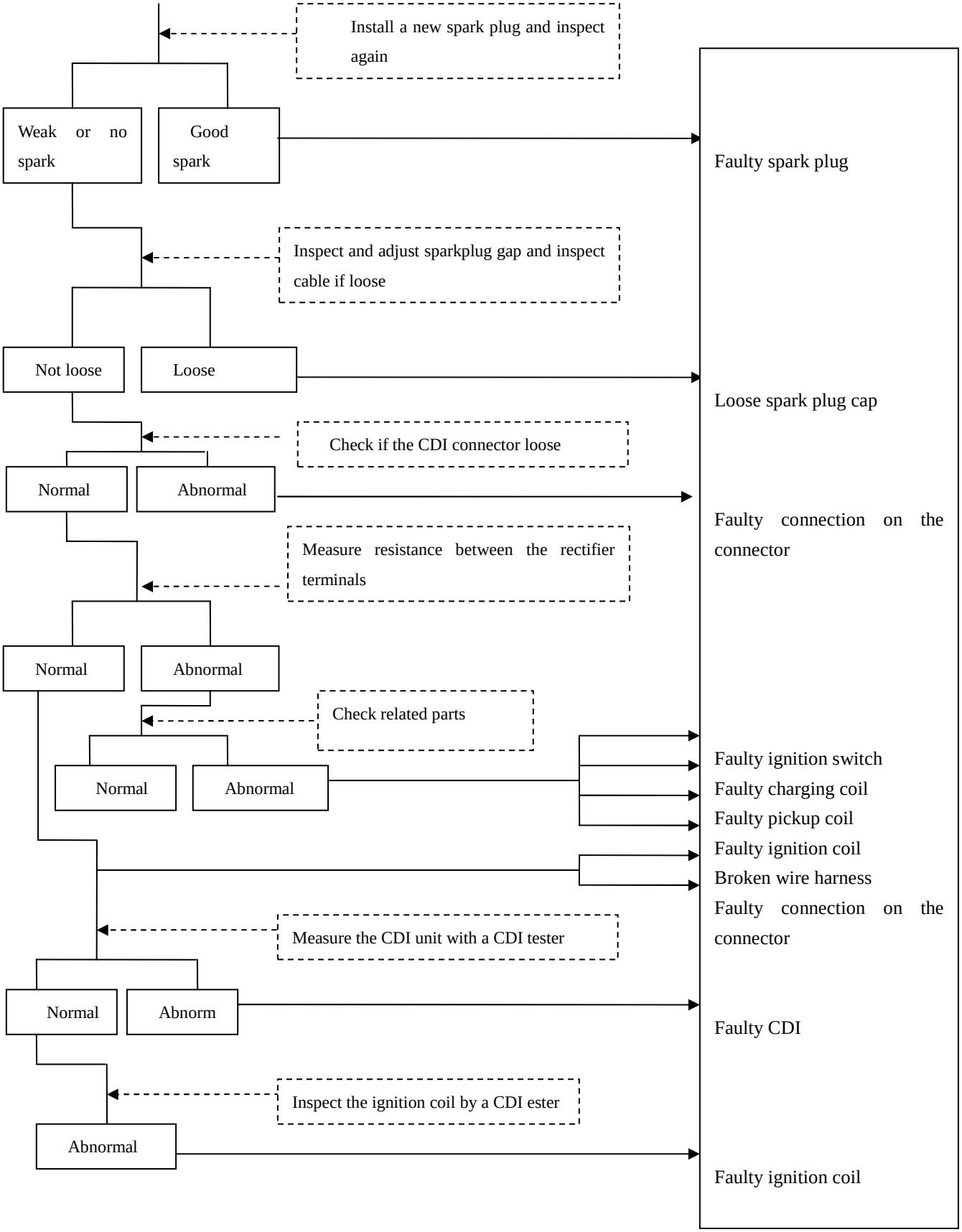

## Poor charging (battery discharging or over charging)

**Inspection/Adjustment** **Symptom** **Probable Cause**

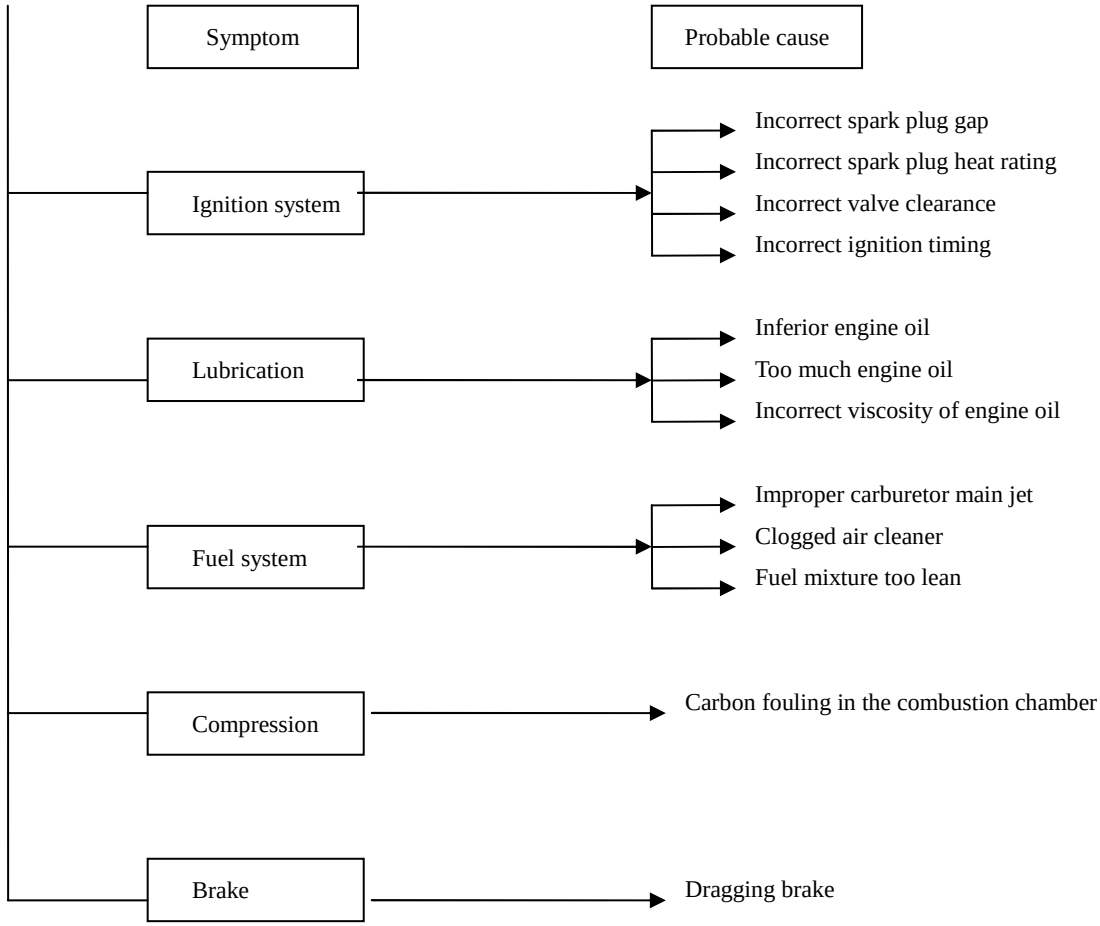



## No spark at spark plug

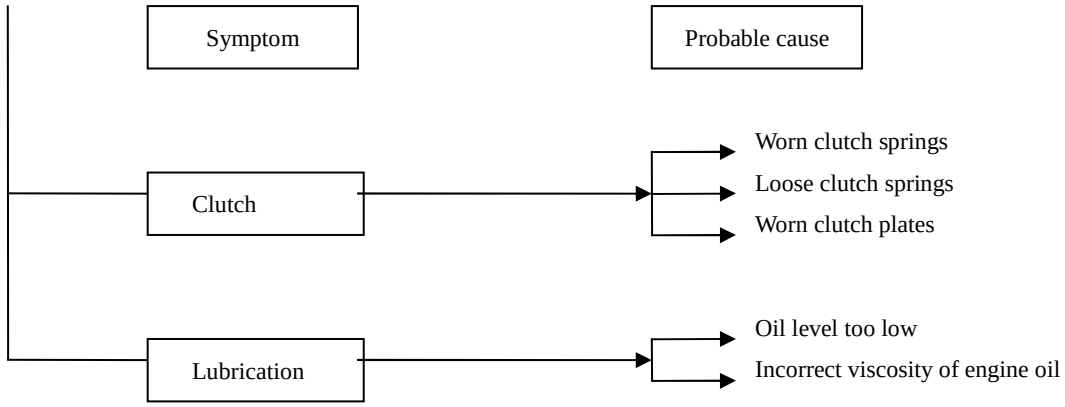
| Inspection/Adjustment | Symptom | Probable Cause |
|---|---|---|


Install a new spark plug and inspect again
Weak or no spark
Good spark
Faulty spark plug
Inspect and adjust sparkplug gap and inspect cable if loose
Not loose
Loose
Loose spark plug cap
Check if the CDI connector loose
Normal
Abnormal
Faulty connection on the connector
Measure resistance between the rectifier terminals
Normal
Abnormal
Check related parts
Normal
Abnormal
Faulty ignition switch
Faulty charging coil
Faulty pickup coil
Faulty ignition coil
Broken wire harness
Faulty connection on the connector
Measure the CDI unit with a CDI tester
Normal
Abnorm
Faulty CDI
Inspect the ignition coil by a CDI ester
Abnormal
Faulty ignition coil

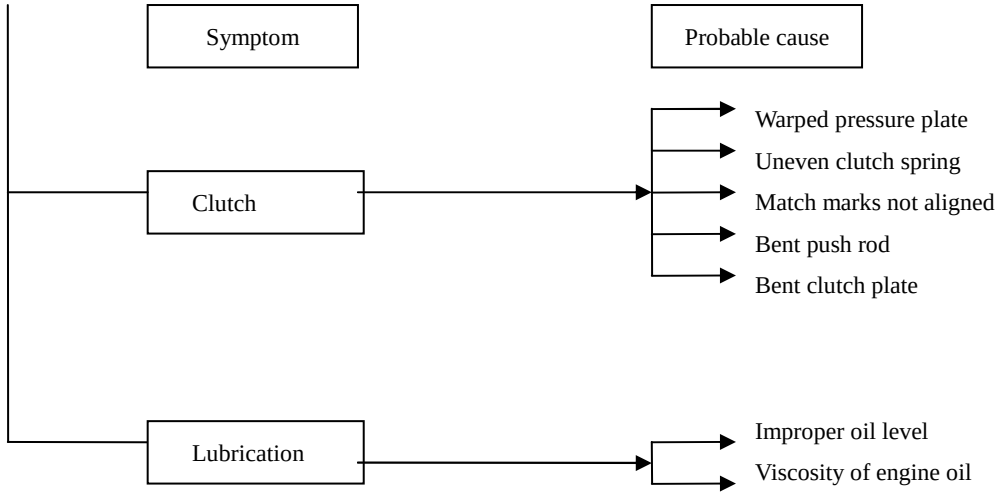
# Over heating




# Clutch Slipping



# Clutch Dragging



## Inspection/Adjustment

| | |
|---|---|
| Service Information | Compression of cylinder |
| Period schedule Inspection | |
| Engine oil/Filter | |
| Steering bearing & handlebar | Drive chain |
| Throttle cable inspection/adjustment | Front/Rear brake free play |
| Air cleaner | Brake fluid inspection |
| Spark plug | Headlight |
| Battery | Clutch |
| Carburetor | Front/Rear suspension |
| Ignition Timing | Bolts/Nuts/Fastener |
| Rim/Tire | |

## Service information

**Warning!**

• Before running the engine, make sure that the working area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas which may cause injury or death.

• Gasoline is extremely flammable and is explosive under some conditions. The working area must be well-ventilated and do not smoke or allow flames or sparks near the working area or fuel storage area.

# Specification

## Engine

| | | |
|---|---|---|
| Idle speed | 1400±100rpm/min | |
| Spark plug gap | 0.6-0.7 mm | |
| Spark plug type | NGK CR6HSA | |
| Engine oil capacity | At change: 1.3L | At disassembly: 1.6L |
| Ignition Timing | Before Top Dead Center 3-5° | |

## Frame

| | | | | |
|---|---|---|---|---|
| Free play of front brake lever | | 10-20mm | | |
| Free play of rear brake lever | | 10-20mm | | |
| Tire pressure: Kpa | | Specification | | Pressure |
| | | Front wheel | 110/90-16 | 200 |
| | | Rear wheel | 120/90-16 | 225 |
| Torque | Front wheel axle nut | 75-88 N·m | | |
| | Rear wheel axle nut | 100-113 N·m | | |

# Schedule Maintenance Guide

| | Item \ Frequency | 300 KM (187 MI) | 1000KM (622 MI) | 3000 KM (1864 MI) | 6000KM (3728MI) | 12000 KM (7457 MI) | 14500 KM (9009 MI) |
|---|---|---|---|---|---|---|---|
| | | New motorcycle | 1 month | 3 Months | 6 months | 12 months | 15months |
| * | Air Cleaner | I | | C | C | R | C |
| * | Fuel Filter | I | | | I | R | |
| * | Oil Filter | C | | | C | C | |
| * | Engine Oil | R | Replace every 2000KM (1243 MI) | | | | |
| | Tire Pressure | I | I | I | I | I | I |
| | Battery Inspection | I | I | I | I | I | I |
| | Operation Inspection | I | I | I | I | I | I |
| | Steering Inspection | I | | | I | I | |
| | Suspension Inspection | I | | | I | I | |
| | Fastener Inspection | I | I | I | I | I | I |
| | Oil Leaks | I | I | I | I | I | I |
| * | Spark Plug | I | | I | R | R | I |
| | Body Lubrication | | | | L | L | |
| | Exhaust | I | I | I | I | I | I |
| * | Ignition Timing | I | I | I | I | I | I |
| * | Carburetor | A | I | A | A | A | A |
| * | Idle Inspection | A | I | A | A | A | A |
| * | Throttle Inspection | I | | I | I | I | I |
| | Fuel Line Inspection | I | | I | I | I | I |
| | Light/Speedometer/Electrics | I | I | I | I | I | I |
| | Side Stand | I | | | I | I | |
| | Shock Absorber | | | I | I | I | I |
| * | Torque Of Engine Mounting Bolts | I | | I | I | I | I |

Schedule Inspection

| | |
|---|---|
| 1 | Ignition system—inspect the ignition system for faults in case of abnormal ignition, engine break down, or rear cylinder overheating. |
| 2 | Carbon clean--remove the carbon buildup on the cylinders, pistons, and mufflers if there is a significant loss of power. |
| 3 | Piston, cylinder—replace cylinder, piston, and piston rings for wear or physically damaged. |

In the interest of safety, we recommend these items be serviced only by an authorized

Keeway motorcycle dealer,

Perform the period maintenance at each scheduled period.

**I—Inspection A—Adjustment R—Replacement C—Clean L—Lubricate**

Note:

1. For higher odometer readings, repeat at the frequency interval established here.
2. Service more frequently when riding in dusty or rainy areas.
3. Service more frequently when riding in rain or at full throttle.

## Engine oil/Filter

Engine oil capacity

***Caution**

| |
|---|
| •Inspect the oil level on a smooth, flat, level surface.<br>•Delay inspecting the oil capacity after running the unit for at least 2~3 minutes to allow oil to return to the crankcase. |

Inspect the oil level.


Add the engine oil if it falls below the lower limit on the sight glass.

## Engine oil replacement

**Engine oil capacity:**

**At replacement: 1.3L At disassembly: 1.6L**

***Caution**

| |
|---|
| Replace the engine oil after warming up the engine. |
| Place an oil catch pan under the engine. |

Shut down the engine and wait for the temperature of the engine drop below 35°C.

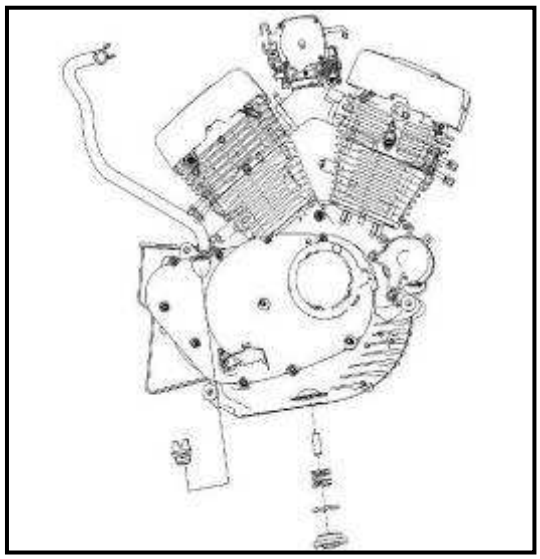
Remove the drain screw from the bottom left side of the crankcase and drain out the engine oil.

Clean the drain plug and oil filter after draining the oil.

Drain Screw

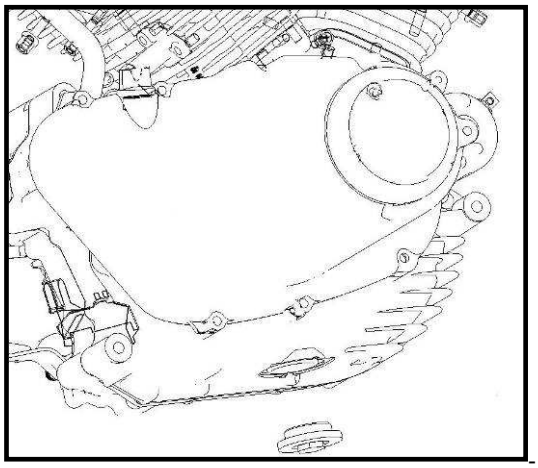
Refill the engine oil to the specified capacity.

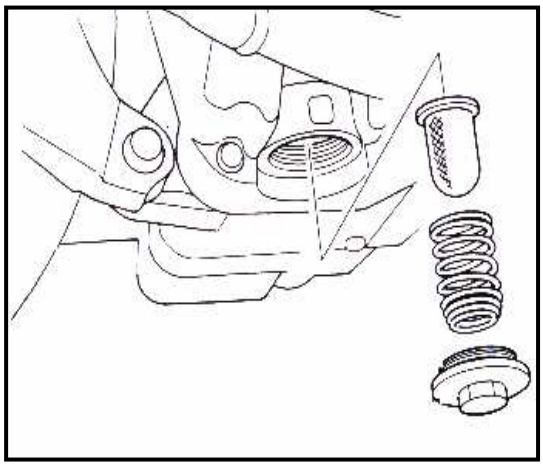
Inspect for leaks after the engine running the engine at idle speed for several minutes.



## Engine oil filter clean

1. Warm up the engine and place a drain pan under the engine.
2. Remove the drain plug and screen from the bottom center of the engine.
3. Clean the drain plug and screen and re-install. Please ensure the O ring of the drain plug is properly installed.





## Oil filter replacement

Remove the oil filter cap from the right engine cover.


**Note:**

This service can be completed on the vehicle.

Replace with a new filter. Before re-installation, ensure the O-ring on the oil filter cap is properly installed.

**Recommended Oil Type:**

4T (4 stroke motorcycle engine oil) SAE 15W40 Grade SF or higher.

**Note:**

Do not use automotive type engine oils in stead of motorcycle engine oils due to the increased demands placed on the oil by the engine and transmission assemblies.

## Valve clearance adjustment Guide

### Caution

| |
|---|
| The engine must be cool (below 35C°) before the measuring and adjusting the valve clearance. |

Removal

Remove seat, fuel tank and air cleaner (right) and decorating cover (left).

Remove decorating cover of cylinder head.

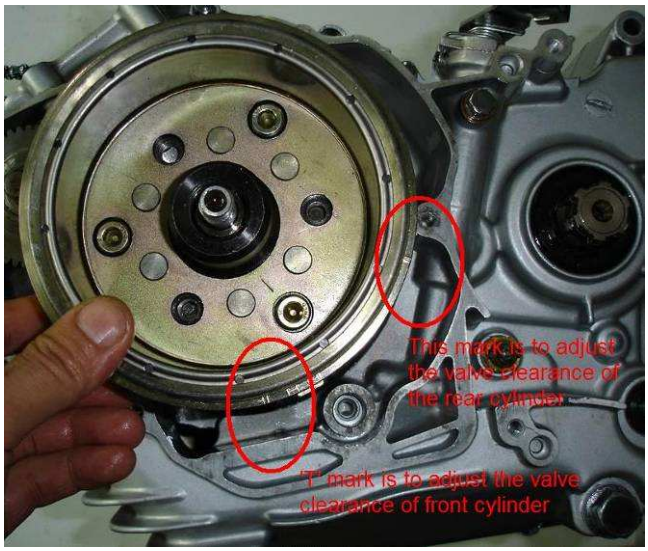
Remove spark plug.

Remove tappet cover of engine.

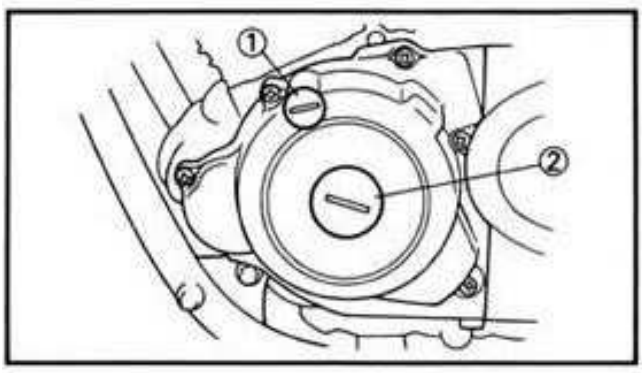
Note the 2 marks on the flywheel.

'T' mark is to adjust the valve clearance of the front cylinder.

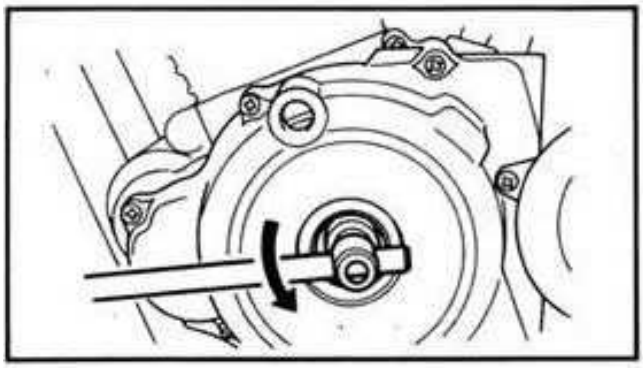
The secondary mark is to adjust the rear cylinder head valve clearance.



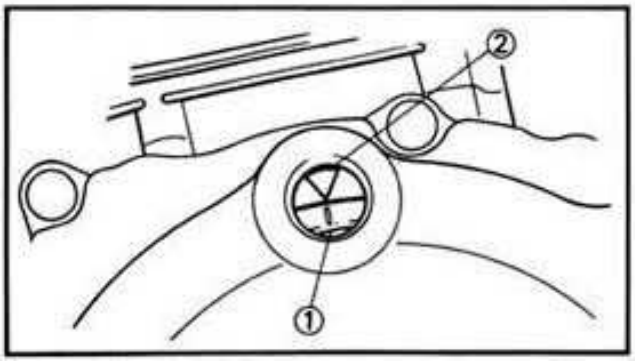

Unplug the 2 caps on the left side cover of the engine.



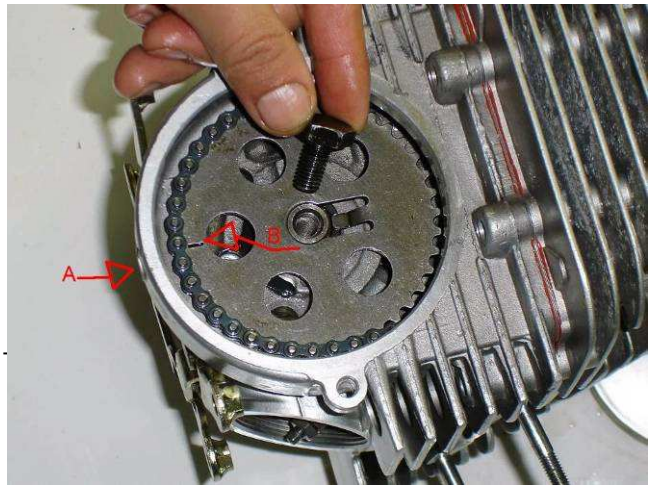
Turn the crankshaft anti-clockwise by wrench.



Align the 'T' mark on the flywheel with the stationary pointer on the left crankcase cover.




Make sure the piston is at top dead center (T.D.C.) on compression stroke, check the rocker by hand, and check if the rocker moves freely, if not then turn the crankshaft anti-clockwise 360°




Make sure the mark 'B' on the chain sprocket

is toward with the stationary pointer 'A' on the cylinder head.

Disassembly the chain tensioner on the cylinder, unscrew the bolt on the tensioner and take out the spring, adjust the lock pin on the tensioner and press the one-way rod, re-assembly the tensioner body then fix the spring and bolt then adjust the chain sprocket and reassemble the tensioner.

Turn the crankshaft anti-clockwise 300°, align the secondary mark on the flywheel with the stationary pointer on the left cover.

Repeat the same process as above check and adjust the rear cylinder.

Turn the crankshaft through several rotations and recheck all the alignment marks are in the right position.

Rotate the engine to T.D.C. for the front cylinder, loosen the locknut and insert a feeler gauge between the rocker arm adjuster and the valve cap, adjust the clearance of the valve.

**Specification: Intake valve 0.08~0.12mm (cold)**

**Exhaust valve 0.10~0.14mm (cold)**

Rotate the engine to T.D.C. for the rear cylinder, adjust the valve clearance for the rear

cylinder.

If the clearance is incorrect, repeat the steps as above until the correct clearance is obtained.

## Idle speed

### Idle speed adjustment

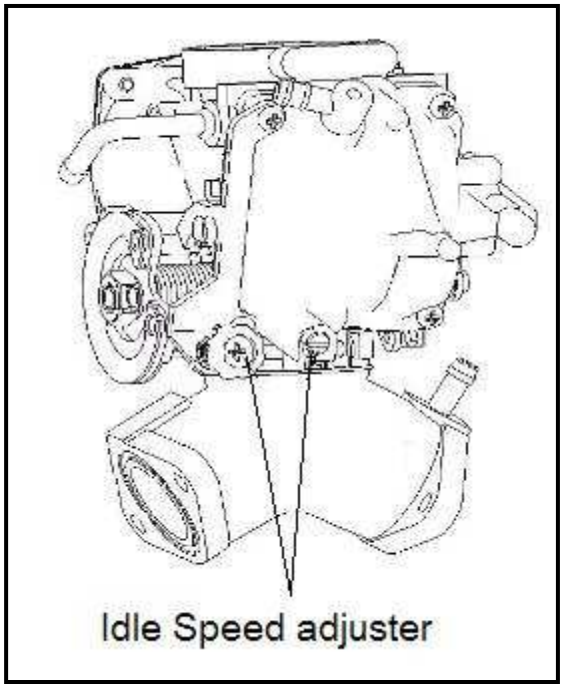
***Caution**

| |
|---|
| Idle speed adjustment after the engine warmed up. |

Warm up the engine before performing this procedure.

Start the engine and connect a tachometer.

Turn the throttle stop screw to obtain the specified idle speed.



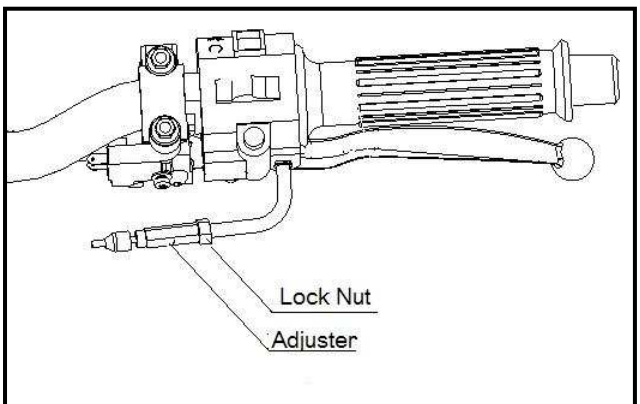

**Idle speed: 1400±100rpm/min**

Adjust the pilot screw when the engine misses or runs erratically.

**Note:**

Idle speed should be adjusted only after the engine valve clearance is adjusted, the spark plug gap is adjusted correctly, the air cleaner is cleaned or replaced, and the carburetor is in good condition.

### Inspection/Adjustment of throttle



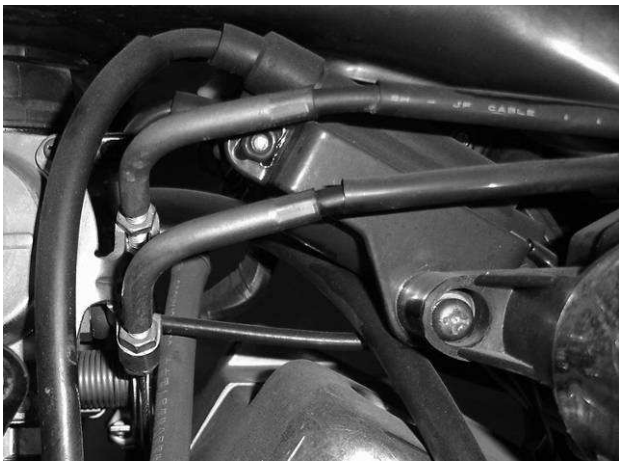
Check if the throttle moves smoothly.

Check the free play of the throttle.

**Free Play: 3-10mm**

If correct free play adjustment cannot be obtained at the throttle grip, larger adjustments can be made at the carburetor.

Loosen the lock nut on the throttle then adjust the adjustable nut.



**Note:**

Throttle lever free play adjustment should be done after the idle speed is adjusted.

## Air cleaner

Remove the mounting screw of the air cleaner cover.

Loosen the screw of the filter fixing plate.

Remove the air filter from the air cleaner base.

Inspection:

Check if the filter is damaged or dirty.

Replace with a new filter if necessary.

Inspect and clean air filter element

Wash the air filter gently but thoroughly in solvent.

Use soap or parts cleaning solvent to clean the air filter, do not use petrol or low flash point solvents which may cause a fire or explosion, or damage the filter.

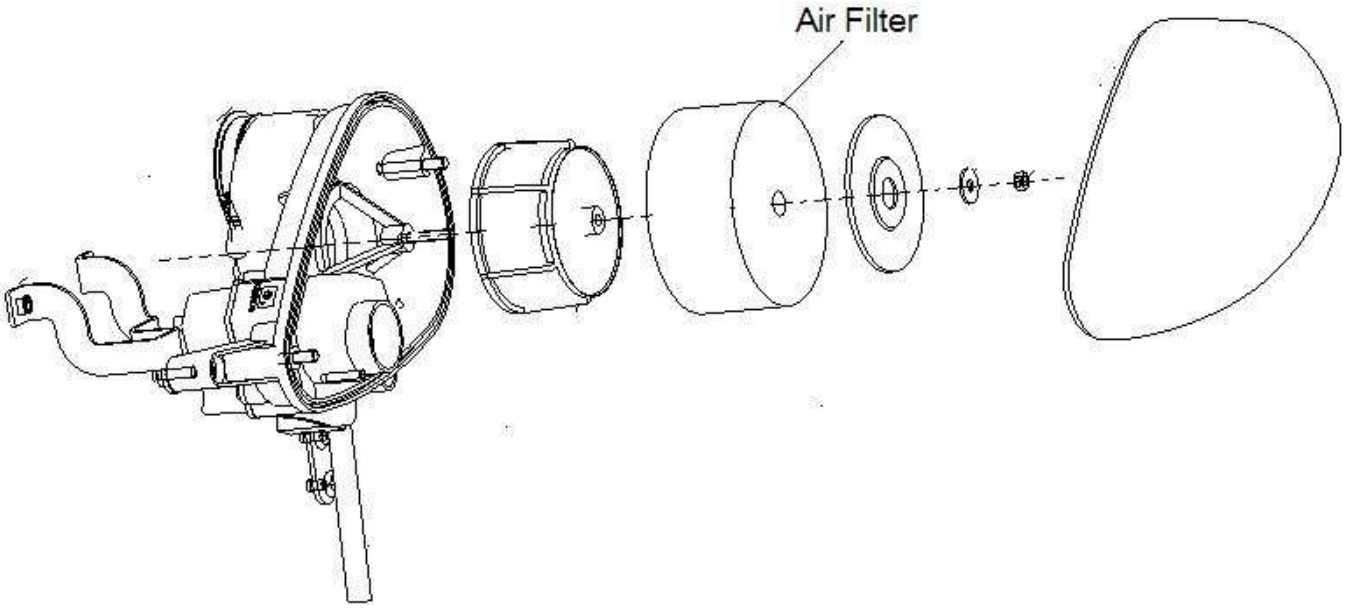
Remove excess solvent and dry the filter.

Apply clean engine oil (SAE 15W40) to the filter and wring out any excess. The air filter should be wet but not dripping.

Re-install the air cleaner reversing the order of removal.

Clean or replace the ail filter frequently if the motorcycle is frequently used in dusty or rainy areas.

Schematic drawing of rear disc brake



## Spark plug

**Warning:**

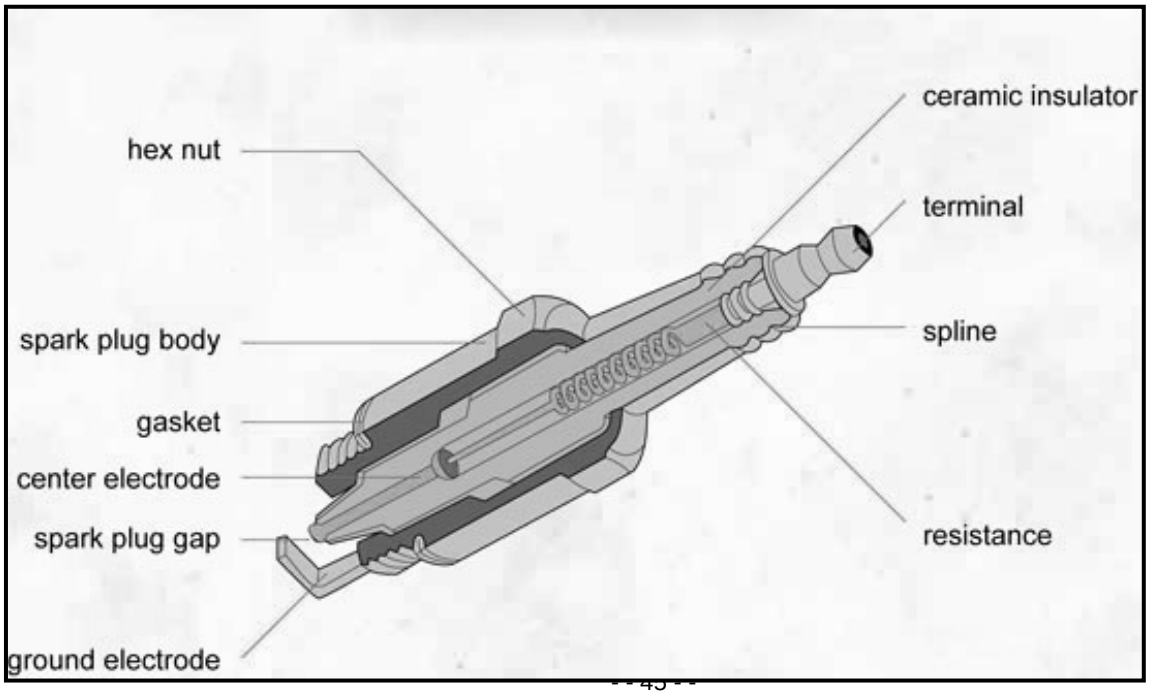
Replace and inspect the spark plug after the engine has cooled (below 35°C).

Clean any dirt from around the spark plug before removing it from the engine.

Remove the Spark Plug cap

**Caution:**

| |
|---|
| Clean the spark plug and surrounding area using an air gun and ensure that no foreign matter drops into the combustion chamber. |



Remove the Spark Plug using a spark plug socket with the rubber plug protector installed.

## Inspection

Inspect as outlined below and replace new if necessary

* Check for insulator damage

* Check electrode for wear or gap erosion

* Check the color of the spark plug


Engine works well if the spark plug color is light brown.

White color of spark plug shows the fuel mixture is too lean.

Wet or carbon clogged shows the fuel mixture too rich.

Complete a visual inspection of the spark plug.

Replace with a new spark plug if the insulator is damaged or worn.

**Spark plug reuse**

Remove the spark plug cap and spark plug. Check the spark plug for wear and fouling deposits. Clean any fouling deposits with a spark plug cleaner or a wire brush.

Measure the spark plug gap.

**Spark Plug Gap: 0.6～0.7 mm**

Re-install the spark plug and tighten it to the specified torque.

**Torque: 12 N.m**

***Caution:**

| |
|---|
| When installing, always screw the spark plug in by hand, then tighten it with the spark plug socket to avoid damaging the cylinder head. |

**Spark Plug replacement**

Adjust the spark plug gap using a round feeler gauge to the appropriate specification.

***Caution**:

| |
|---|
| Do not over-tighten the Spark Plug to avoid damaging the cylinder head. |

## Battery

Battery removal:

Remove the seat.

Remove the negative (-) cable first, then remove the positive (+) cable.

Remove the battery from battery case.

**Warning!**

| |
|---|
| Do not allow the tool to make contact with the frame while removing the positive cable. Otherwise it will cause a short circuit and sparks, damaging the motorcycle and battery, and could result in a fire. |

The installation sequence is the reverse order of removal.

**Warning!**

| |
|---|
| First install the positive (+) cable then install the negative (-) cable to avoid any possibility of a short circuit. |

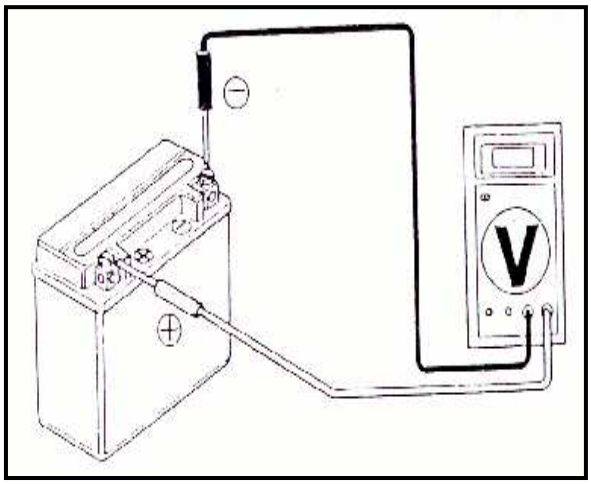
**Battery voltage inspection (closed circuit voltage)**

Remove the seat.

Remove the battery from the battery case.

First disconnect the battery negative cable then disconnect the positive cable.

Measure the voltage between the battery terminals.




**Full charged: 13.1V**

**Undercharged: 12.3V**

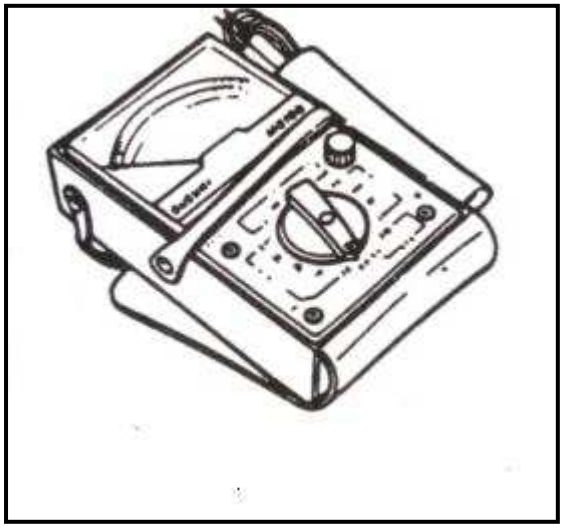
**Caution**

| |
|---|
| Battery charging inspection must be completed by using a voltmeter. |

## Battery charging

Connect the charger's positive cable to the battery's positive terminal.

Connect the charger's negative cable to the battery's negative terminal.



**Warning!**

| |
|---|
| •Keep Battery away from excess heat or ignition sources.<br>•Power off the battery charger before connecting and charging the battery and when charging is complete, to avoid potential sparking or other dangers.<br>•Fully charging the battery to the specifications outlined in the battery guide. |

**Caution**

| |
|---|
| • Quick charging should be done only in an emergency.<br>•Verify battery voltage is still within acceptable range 30 minutes after the battery has been fully charged. |

**Charging current:**

**Standard: 0.9A**

**Quick Charging: 9.0A**

**Charging Time: Standard: 10~15 hours**

**Quick Charging: 30 minutes**

**Charging complete:**

**Ensure available battery voltage is 12.8V minimum.**

**Current test**

Use a fully charged battery (12.8 V min.) to check the charging system.

Warm up the engine before completing this procedure.

Connect a voltmeter across the battery terminals.

Disconnect the red wire from the fuse terminal and connect an ammeter between the red wire lead and the fuse terminal.

Start the engine and gradually increase the engine speed to measure the absolute voltage and current.

# Carburetor

# Ignition timing

## Caution

| |
|---|
| Inspect the ignition system for incorrect ignition timing.<br>Complete this procedure only after reading the user's manual for the timing light. |

Warm up the engine after 3~5 minutes, connect the timing light with ignition coil wire and check the ignition timing.

# Engine Compression

Warm up the engine before completing this procedure.

Remove spark plug.

Install the cylinder compression gauge.

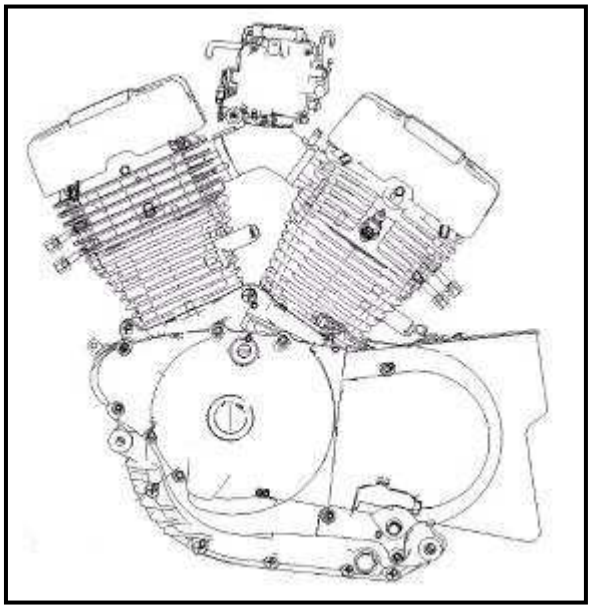
Use the starter motor to rotate the engine and check the compression at full throttle.

**Compression Pressure Specifications**

**Standard: 1100Kpa**

**Minimum: 1000Kpa**

**Maximum: 1200Kpa**



If compression is low, put 10cc's of clean engine

oil into the combustion chamber through the spark plug opening, measure the compression again and compare the difference. If there is a large difference between the 2 measurements, the probable reason is worn cylinder, piston and piston rings.

Inspect the points outlined below if the compression is too low:

—Cylinder head gasket for failure or damage

—Piston rings for damage

—Piston rings for wear

—Piston, cylinder, valves for wear

Inspect the combustion chamber and the top of piston for excessive carbon buildup when the compression is too high.

Repeat the same procedure for both cylinders.

## Engine oil

Inspection

**Caution**

| |
|---|
| Place the motorcycle on a smooth, level surface and hold it upright via the handlebars. |

Remove the oil fill plug after the engine has been stopped for at least 10 minutes.

Inspect the oil level via the sight glass on the right engine cover.

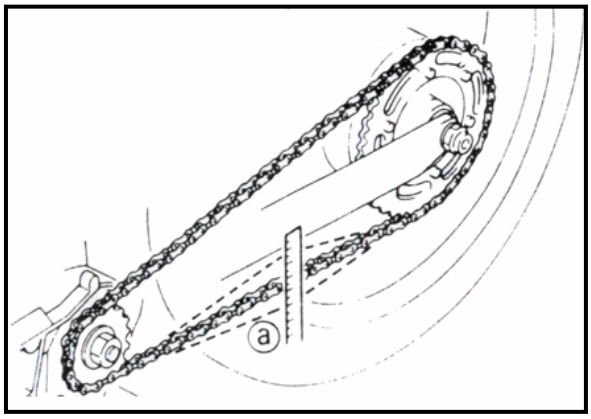
Check if oil level is between the upper and lower limits.

Add oil to the upper limit if oil is below the lower limit. (Check cylinder, crankcase …etc for any leaks)

**Caution**

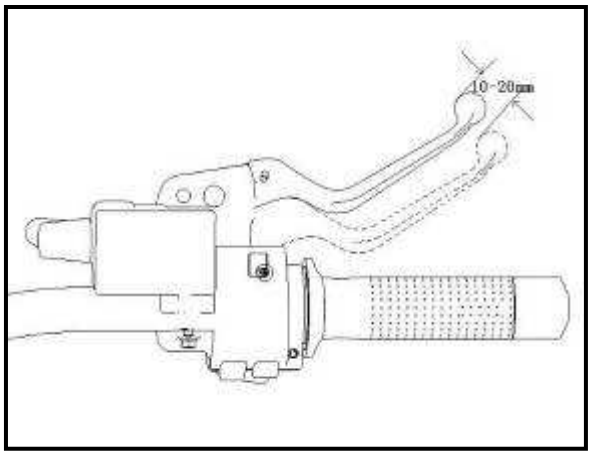
Inspect the oil fill plug O-ring and thread for damage or leaks. Replace as necessary.

Primary Drive chain




Stop the engine and park the vehicle on the side stand, shift the engine into neutral then check the chain slack between the front and rear sprockets.

**Slack: 20-30mm**

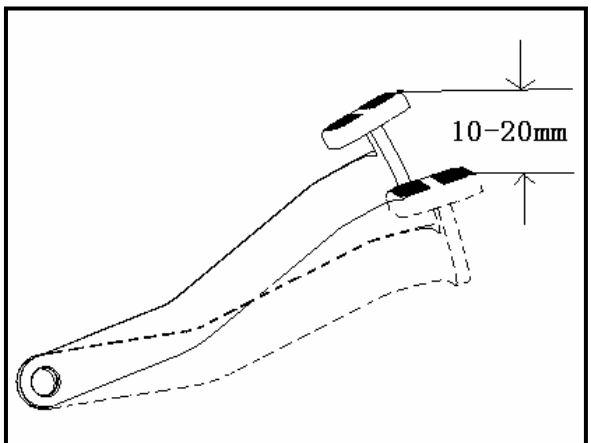



**Free play of front & rear brake**

Free play (the stroke of brake lever from no braking to initial braking)

Front brake level free play

**Free play: 10-20mm**



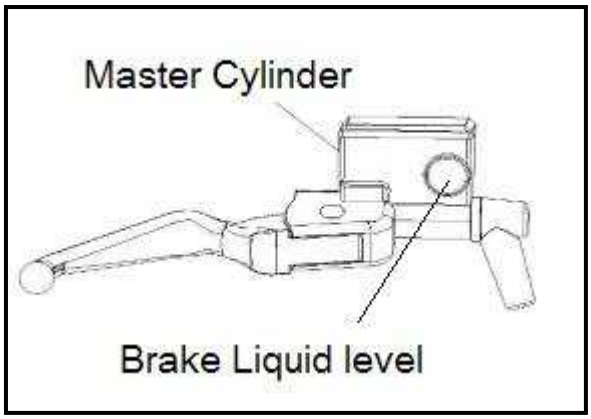

Free play of brake pedal

**Free play: 10-20mm**

**Note:**

Inspect the brake light function while adjusting the brake pedal height.

## Brake Fluid




Capacity inspection

Inspect the Brake fluid using the inspection window of the master cylinder while fully applying the brakes. Refill the master cylinder to the upper level of the sight glass with new brake fluid from a sealed container if the level is low.

If brake fluid level is low, check for leaks, as well as pad wear.

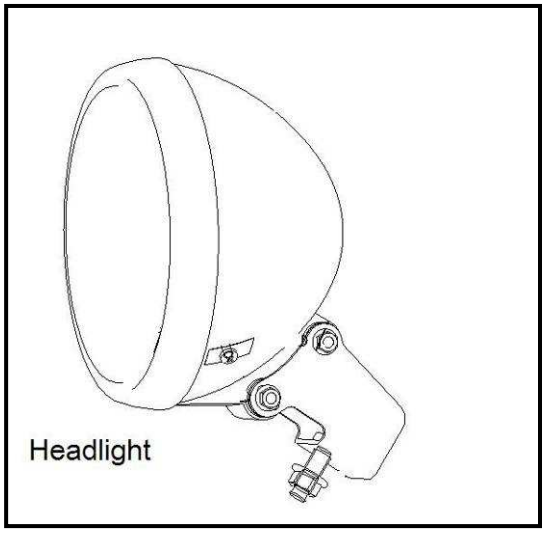
Repair leaks or replace pads as necessary.

**Note:**

Perform this procedure while the master cylinder is parallel with the ground.

**Brake fluid Type: Use DOT4 brake fluid only.**

## Headlight

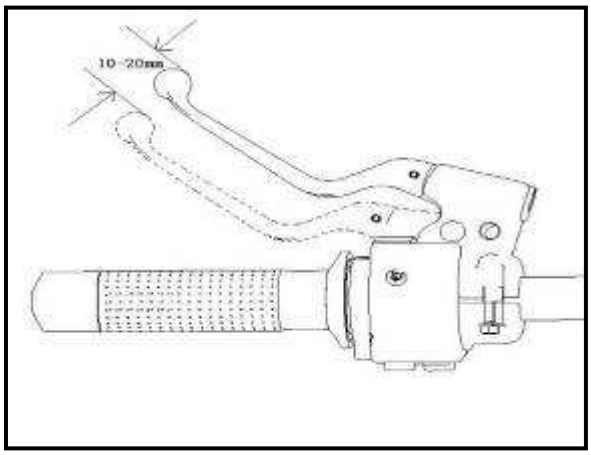



Remove the mounting bolts of headlight.

Unplug the connector of the headlight wire and main wire harness.

Remove the headlight.

## Clutch




Start the engine, squeeze the clutch lever and shift into 1st gear. Release the clutch lever slowly and increase the speed of motor by turning the throttle smoothly and slowly, inspect the clutch plates if the clutch “slips” or the engine stalls.

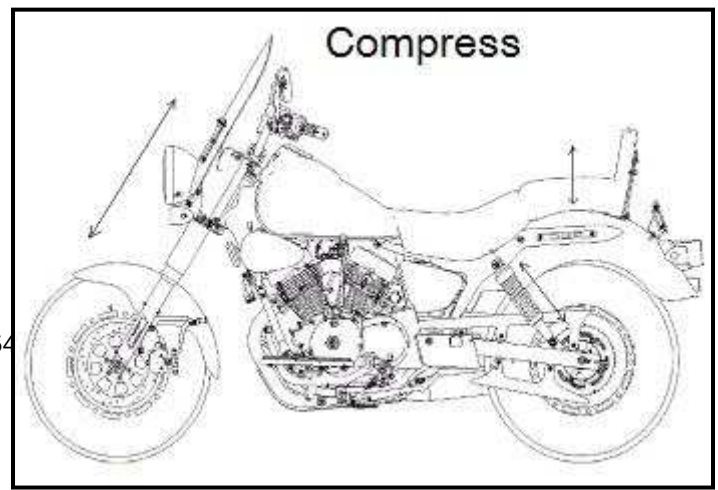
Replace with new clutch plates if necessary.

**Free play of clutch lever: 10-20mm**

**Note:**

To get the proper clutch lever free play, turn the adjusting nut near the engine if necessary.

## Front & Rear shock absorber




**Front shock absorber**

Apply the front brakes and compress the

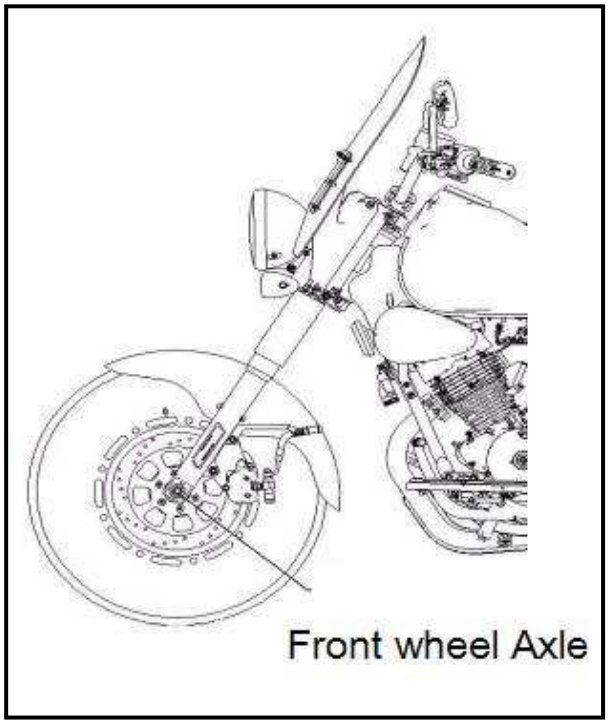
front shock absorber up and down to ensure smooth, supple operation.

Inspect for oil leakage on the front shock absorber or looseness or wear of the shock body.

**Rear shock absorber**

Compress the rear shock absorber and check for smooth, supple operation, check for any defects or damage to the shock body.

Inspect the swing arm pivot point for excessive play or wear. Lubricate or replace bearings and bushings as needed.


Front wheel Axle

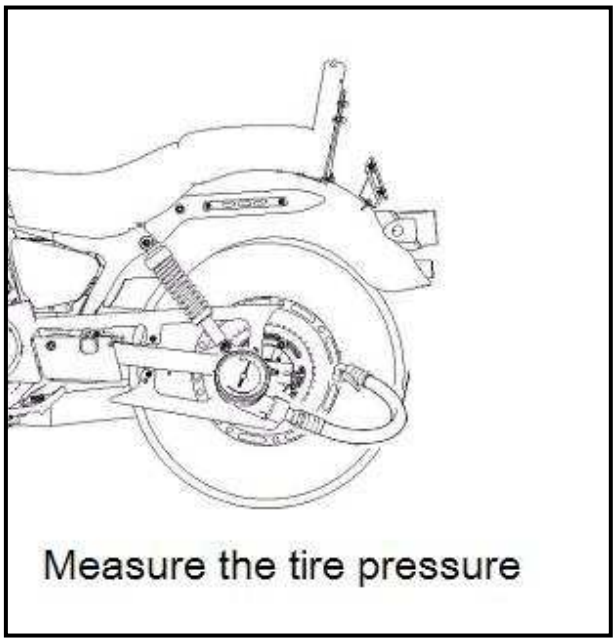
## Bolts/Nut/Fastener

Inspect the bolts, nuts and fasteners for proper torque, tighten to specification if necessary.

## Rim/Tire

Inspect the tire tread depth, replace tire for wear.

Check the tires for cuts, abrasions, imbedded


Measure the tire pressure

nails or other damage.

Check the tire pressure.

***Caution**

| |
|---|
| Inspect the tire pressure when the tire is cold. |

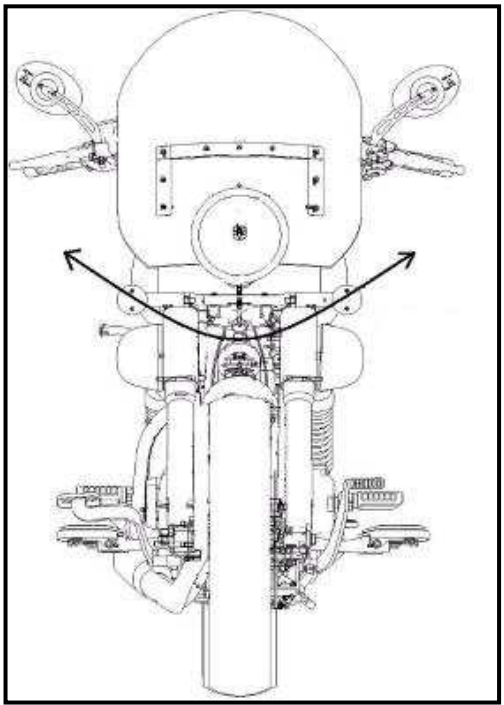
**Tire pressure: Kpa**

| Cold Tire Pressure | SOLO RIDING | | DUAL RIDING | |
|---|---|---|---|---|
| | One people | | Two peoples | |
| | Kpa | PSI | Kpa | PSI |
| FRONT | 200 | 29 | 220 | 31 |
| REAR | 225 | 32 | 250 | 36 |
| TIRE SIZE | FRONT | 110/90-16 | | |
| | REAR | 120/90-16 | | |

Inspect torque of the front axle nut.

Inspect torque of the rear axle nut.

Tighten the nuts to specification.



**Torque:**

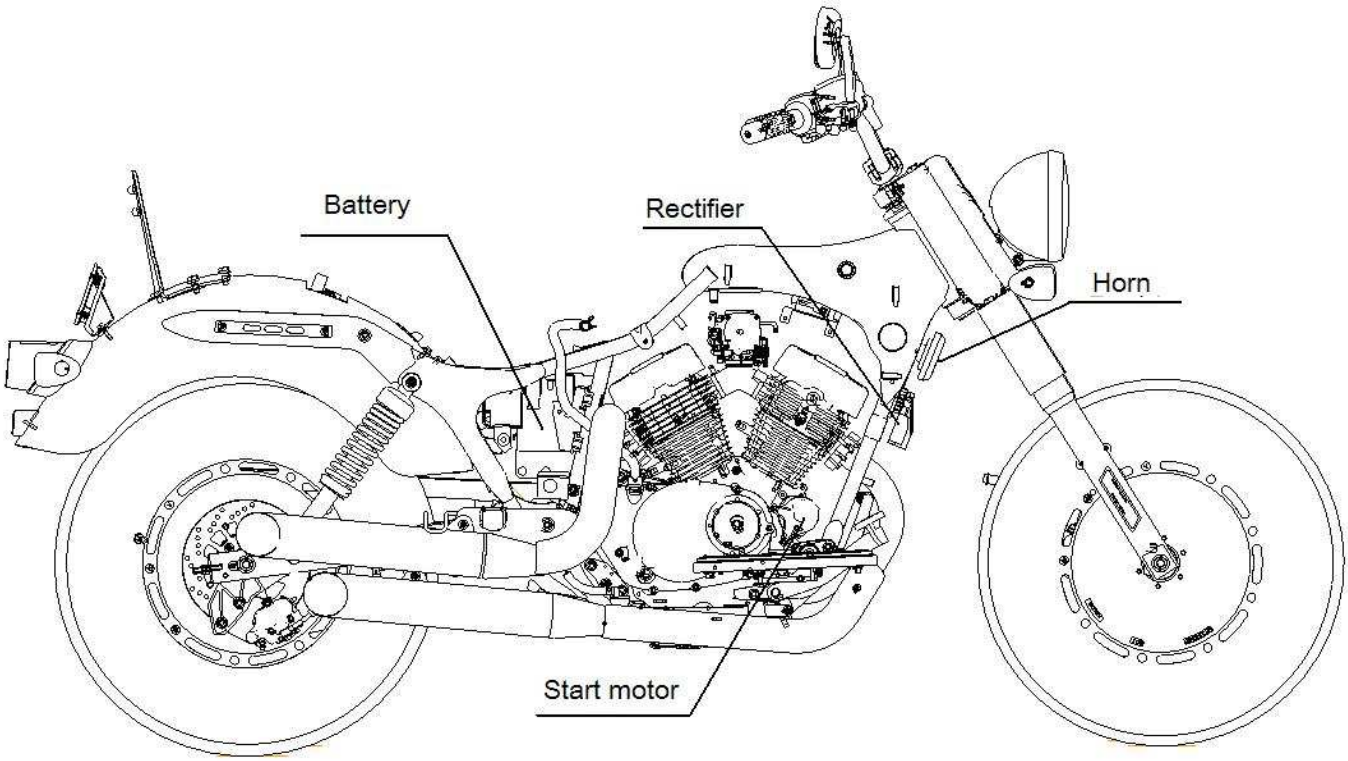
**Front wheel axle nut 75-88 N·m**

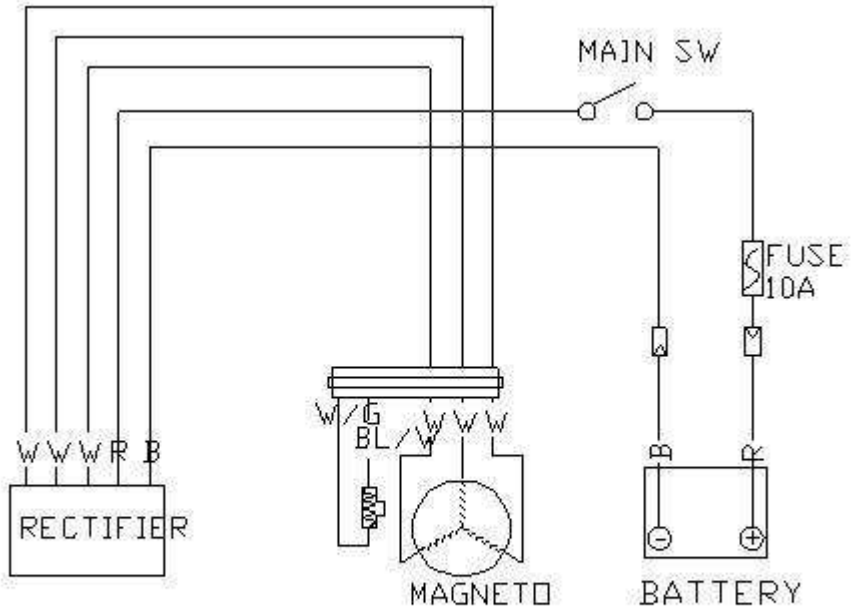
**Rear wheel axle nut 100-113 N·m**

## Steering, bearings and handlebar

Rotate the handlebars to left and right absolute limits to ensure movement isn't restricted by the cables or wires.

Inspect the steering stem bearings (steel ball) if the handlebars are loose.

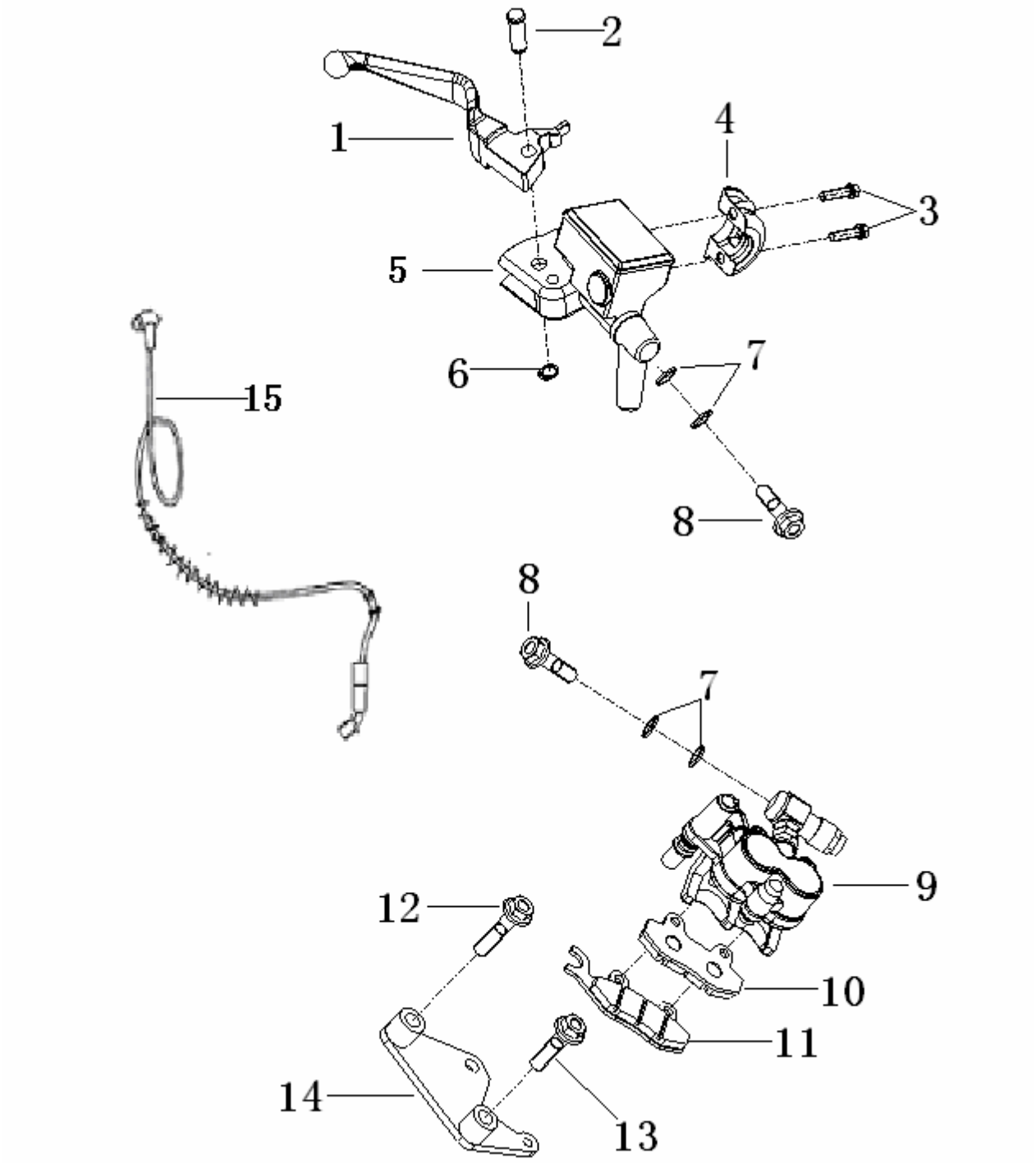





Charging System

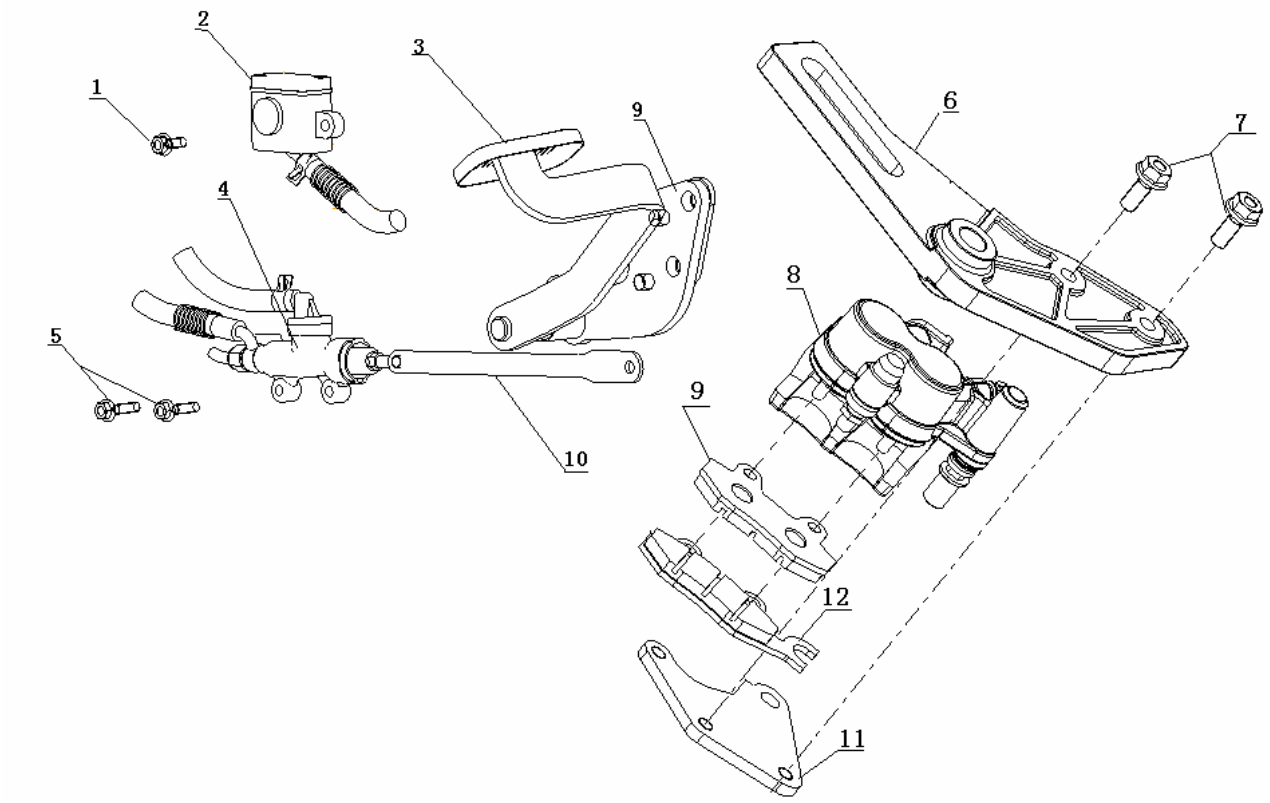
## 1. Brake

## Front disc brake




1. Disc brake lever 2. Pivot screw 3. Screw 4. Fixing cap 5. Master cylinder 6. Circlip 7. Crush Washer
8. Banjo Bolt 9. Caliper 10. Brake pad II 11. Brake Pad I 12. Bolt M10X1.25X45 13. Bolt M10X1.25X40
14. Caliper mounting bracket 15. Brake hose

# Rear disc brake




1. Bolt M6X12 2. Brake fluid cup 3. Brake pedal 4. Master cylinder 5. Bolt M6X25 6. Caliper mounting bracket 7. Bolt M8X16 8. Caliper 9. Brake pad II 10. Connect-rod, rear brake 11. Caliper mounting plate 12. Brake pad I

## 1.1 Service Information

***Caution**

| |
|---|
| •Keep oil or grease off the brake disc, and brake pads during installation or removal.<br>•Use special (brake parts cleaning) solvent to avoid any reduction in the brake's performance. |

***Always inspect the brake system before riding***

### 1.1.1 Specification

| Item | Standard (mm) | Minimum (mm) |
|---|---|---|
| **Width of front brake disc** | 4.0 | 3.0 |
| **Thickness of front brake pad** | 6.0 | 3.0 |
| **Width of rear brake disc** | 4.0 | 3.0 |
| **Thickness of rear brake pad** | 6.0 | 3.0 |

**Diameter of front brake disc: φ270mm**

**Diameter of rear disc brake: φ220mm**

### 1.1.2 Torque

**Front/Rear brake disc mounting bolts: 22-32 N·m**

**Note:**

Apply some thread lock agent when re-installing the brake disc.

**Front brake caliper mounting bolts: 40-60 N·m**

**Rear brake caliper mounting bolts: 22-29 N·m**

## 1.2 Troubleshooting

Brake

Poor brake performance

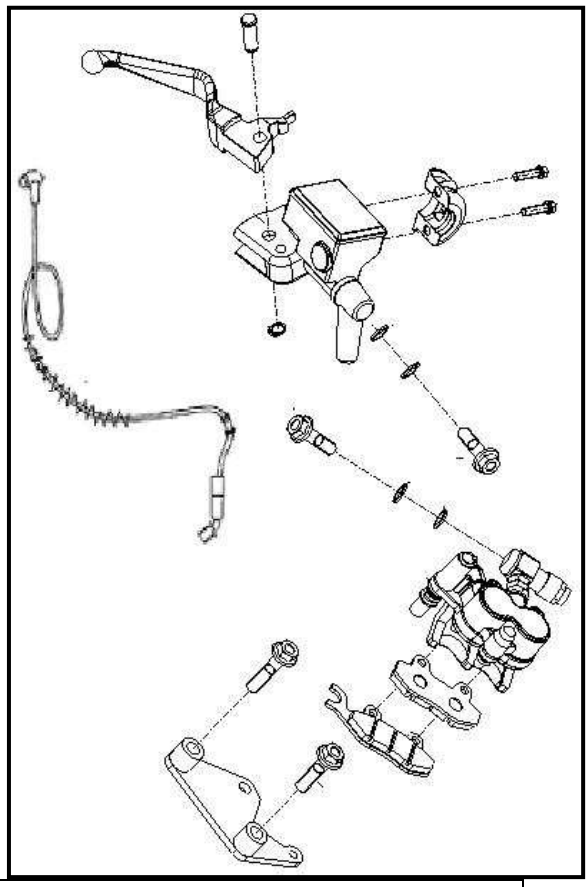
1. Incorrectly adjusted brake
2. Worn brake pads
3. Incorrect brake pads mounting
4. Contaminated brake disc and pads
5. Air in brake system
6. Deteriorated brake fluid

Brake slow or hard operation

1. Incorrectly adjusted brake
2. Worn brake pads
3. Incorrect brake pads mounting

Brake noise

1. Worn brake pads
2. Contaminated brake disc and pads



## 1.3 Front Disc Brake

### 1.3.1 Removal

**Caution**

• Always replace the brake pads as a set if either of the pads are worn.

Remove the parts as outlined below from the front shock absorber.

Front brake:

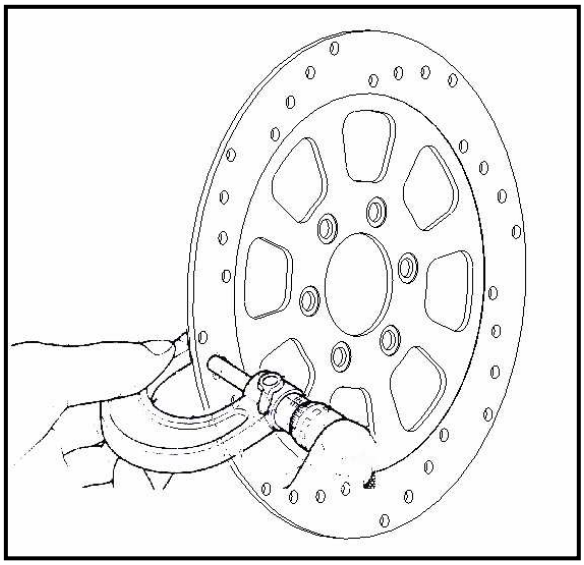
1. Front caliper mounting bolts M10X1.25X43.
2. Remove front brake hose from the clip attached to the front fork.
3. Front brake pads.

**Caution**

• Do not allow any grease or oil to splatter on the brake pads.

• Use brake parts cleaning solvent to clean all brake components.

Removal



Unscrew the front caliper mounting bolts.

Remove the front caliper from front shock absorber.

Remove front wheel axle.

Remove front wheel.

Remove the front brake disc from the front wheel.

**1.3.2 Inspection**

Measure and inspect the brake pads, for wear, replace with a new set as needed.

Measure brake pad and brake disc thickness.

**Specification**

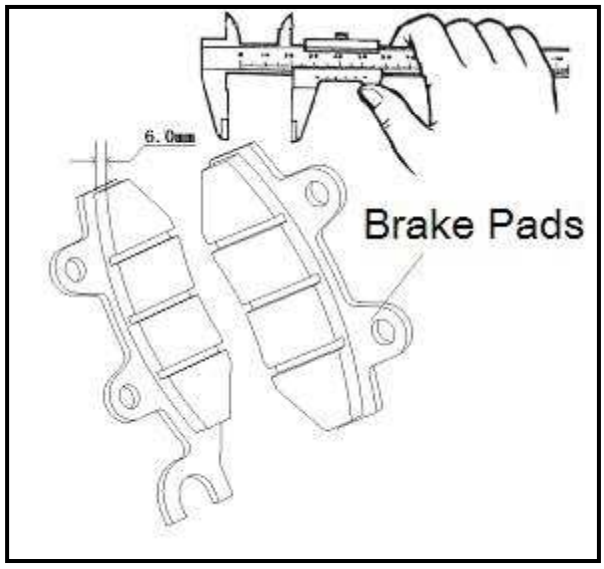
**Front Disc Dia.: φ270mm**

**Thickness: 4.0mm**

**Caution**

| |
|---|
| •Measure the brake pads thickness using vernier calipers. Check across the entire surface to ensure even wear. |

Replace either pads or rotor with new if they are worn or contaminated.




**Limit: Brake pad: 3.0mm**

**Brake disc: 3.0mm**

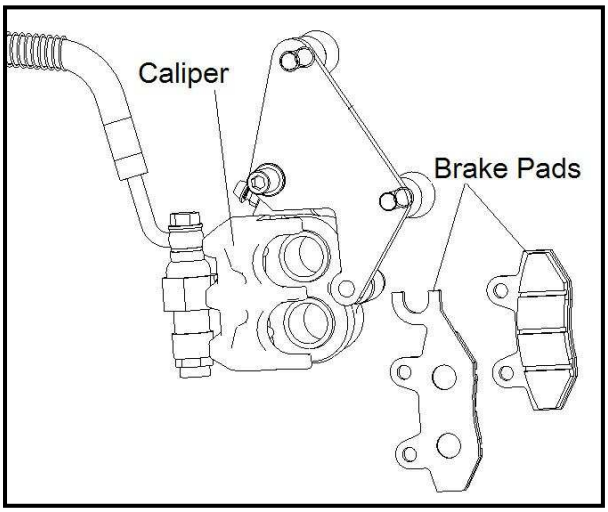
**Note:** Always replace the brake pads as set.

1.3.3 Installation

Apply some thread locking agent on the brake disc mounting bolts then install the brake disc on the front wheel.

Install the front wheel.

Install the front brake caliper and brake hose.




**Caution**

| |
|---|
| Keep grease or oil off the brake pads to avoid brake failure. Spilled brake fluid, grease or oil on the brake disc or brake pads reduces braking power. |

Tighten the mounting bolts and nuts to the specified torque.

**Torque**

**Front/Rear brake disc mounting bolts: 22-32 N·m**

**Front brake pads mounting bolts: 40-60 N·m**

Clean the brake pads and brake disc with a high performance brake degreaser.

## 1.4 Rear Disc Brake

### 1.4.1 Removal

Unscrew the mounting bolts of rear caliper.

Remove the rear brake caliper.

Remove the rear wheel axle.

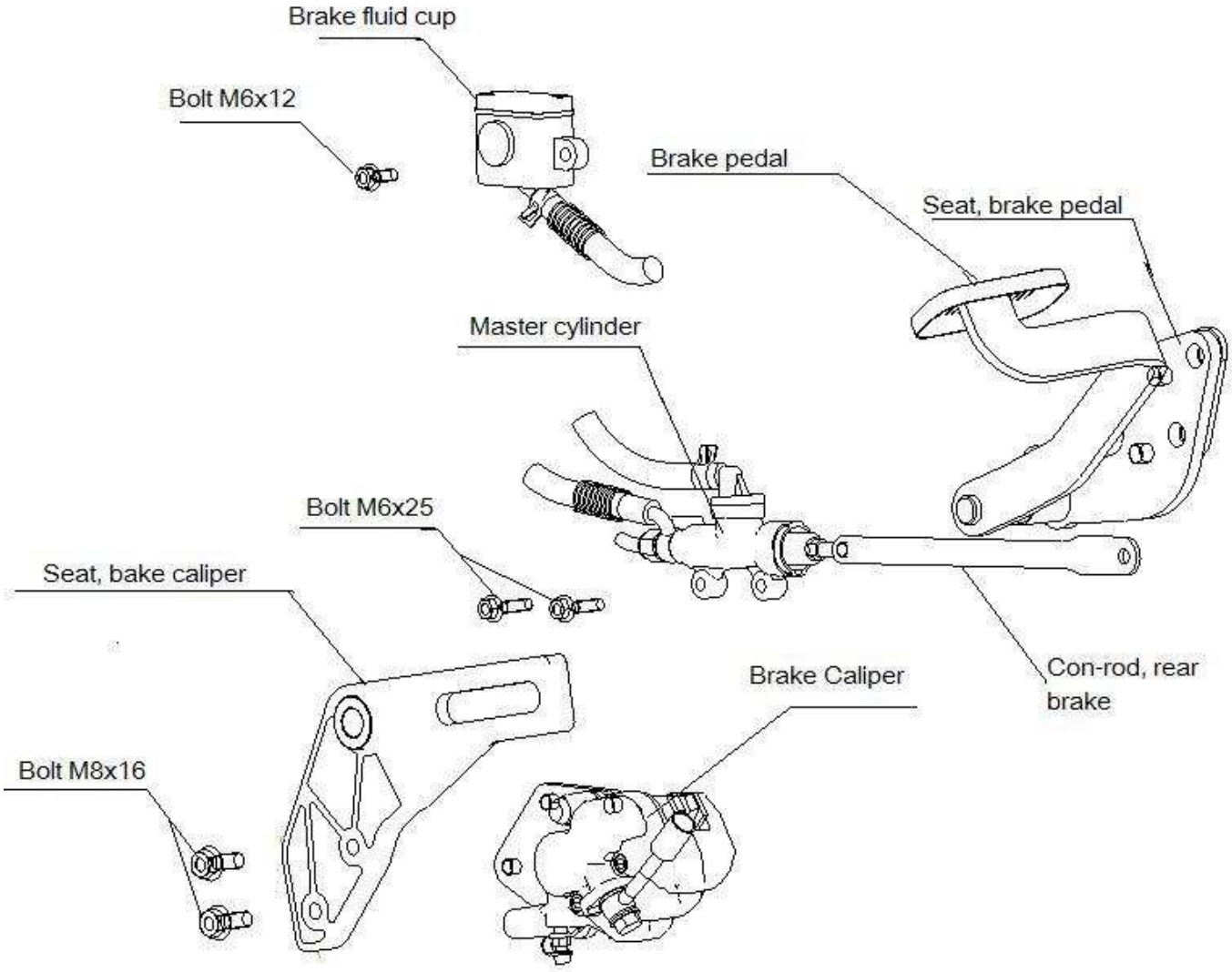
Remove the rear wheel.

Remove the brake disc from the rim.

**Caution**

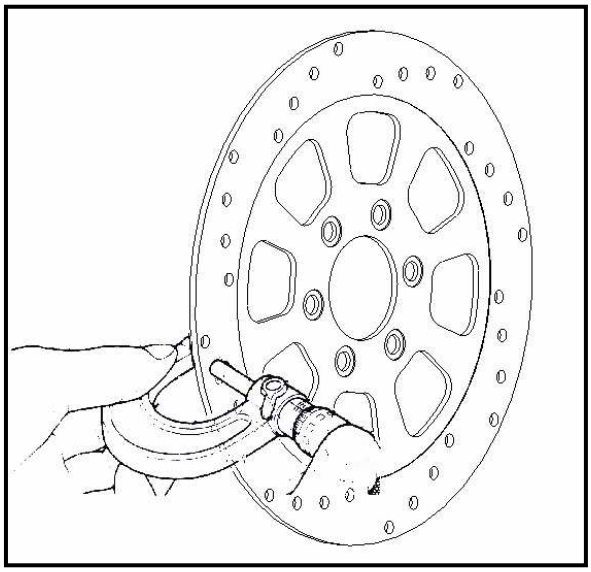
Keep grease or oil off the brake pads to avoid brake failure.

**Schematic drawing of rear disc brake**




## 1.4.2 Inspection

Inspect brake disc, brake pads for wear, replace either if necessary.



**Caution**

•Measure using vernier calipers.

Measure the thickness of brake disc and brake pads.

Replace if worn or damaged.

**Note:**

**The brake pads must be replaced as a set.**

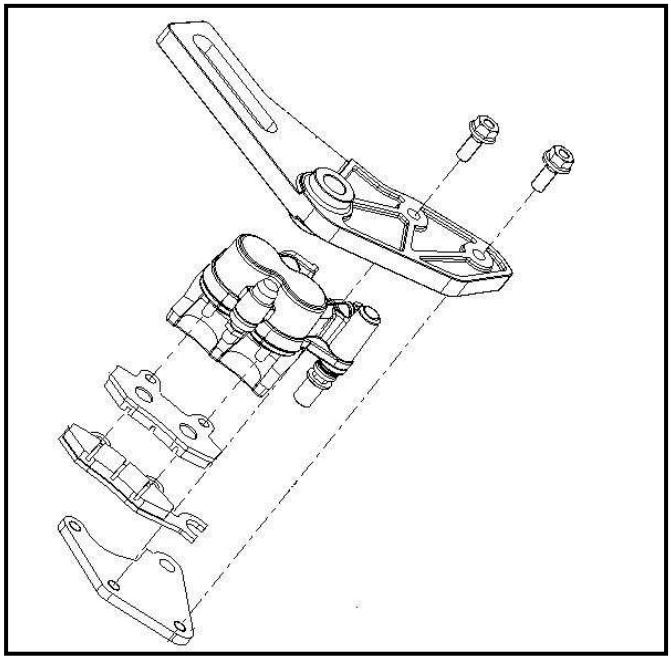
**Diameter of rear brake disc: φ220mm**

**Thickness of rear brake disc: 4.0mm**

**Limit:**

**Brake pad: 3.0 mm**

**Brake disc: 3.0 mm**



**1.4.3 Installation**

1. Apply some thread lock agent on the brake disc mounting bolts then install the brake disc on the rear wheel.
2. Install the rear wheel.
3. Install the rear brake caliper.

**Caution**

Keep grease or oil off the brake pads to avoid brake failure. Spilled brake fluid, grease or oil on the brake disc or brake pads reduces braking power.

Tighten the mounting bolts and nuts to specification.

**Torque:**

**Rear brake caliper mounting bolts: 22-29 N·m**

# 2. Battery/Charging system



## 2.1Service Information

The battery electrolite is poisonous and may seriously damage the skin and eyes. Do not allow contact with skin, eyes or clothing. In case of contact, flush with water and get prompt medical attention.

Procedural Caution

**Caution**

1. The battery can be charged and discharged repeatly. The service life will be shortened if the discharged battery is not used for a long time. Generally, the capacity of battery will decrease after 2~3 years of use. A damaged or weak battery will reflect correct voltage after it is recharged, but the voltage will decrease suddenly when a load is added.
2. When a battery is overcharged, some symptoms can be found by examining the battery. No voltage can be found on the battery terminals if there is a short circuit

inside the battery. The voltage will be too high and dramatically shorten the battery life if the rectifier/regulator is damaged.

3. The battery will discharge by itself if the battery is not used for long time, it should be recharged every 3 months, or put on a “trickle charger” for extended storage periods.
4. Inspect the charging system according to the sequence specified in Troubleshooting.
5. Do not disconnect any electric parts from the vehicle when the engine is running, the electronic parts inside the rectifier will be damaged. Turn off the ignition switch before removing the battery, or replacing electrical components.
6. Maintenance free batteries should never be opened as battery damage will result.
7. When charging, check the voltage with an electric tester.
8. Do not charge the battery using a quick charging cycle. Quick charging should be used in an emergency only. Remove the battery from the vehicle for charging.

Specification

| Item | | | Specification |
|---|---|---|---|
| Battery | Capacity | | 12V-9AH |
| | Voltage (20℃) | Full charged | 13.1V |
| | | Under charged | 12.3V |
| | Charging current | | Standard: 0.9A，Quick: 9A |
| | Charging time | | Standard: 10-15hr，Quick: 30 min |
| Magneto | Charging coil resistance (20℃) | | White-White 1.5-2Ω |
| Rectifier | Limit voltage | | 14.5±0.5V/5000rpm |

| Torque | | Tools |
|---|---|---|
| **Regulator/Rectifier mounting bolts** | **5.0 N·m** | Socket wrench |
| **Ignition coil mounting bolts** | **9.0 N·m** | Fly wheel removal tool |
| **Fly wheel mounting bolt** | **5.0 N·m** | |
| **Side cover mounting bolts** | **9.0 N·m** | |

## 2.2 Troubleshooting

### No Power

Battery over discharged
Disconnected battery cable
Fuse burned out
Faulty ignition switch

### Intermittent Power

Loose battery cable connection
Loose charging system connection
Loose connection or short circuit in ignition system

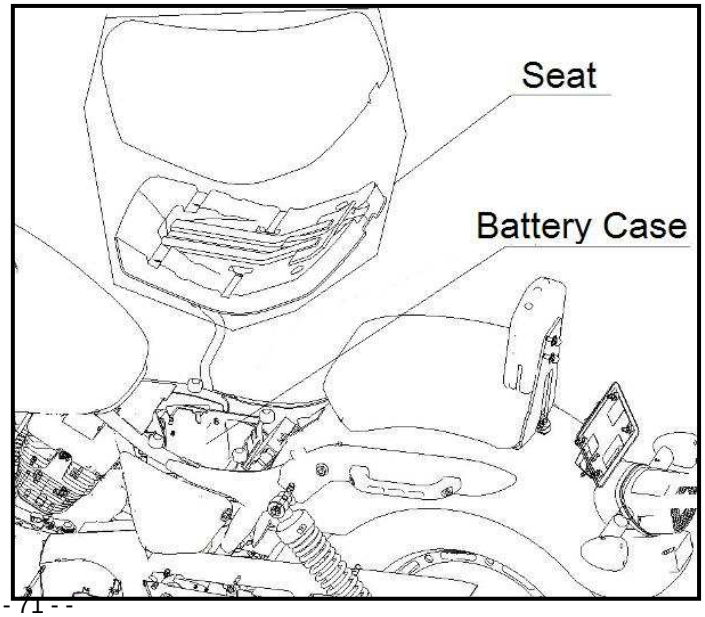
### Low Power

Weak battery
Loose battery connection
Faulty charging system
Faulty rectifier

### Charging System Failure

Loose, broken or short circuit wire or connector
Faulty rectifier
Faulty generator

## 2.3 Battery




### 2.3.1 Battery removal

Remove the seat.

Remove the battery from battery case.

Disconnect the negative terminal first

then remove the positive terminal.

Remove the battery.

**Warning!**

| |
|---|
| Do not allow the tools to contact the frame while remove the positive cable, otherwise it will cause a short circuit and sparks which could result in a fire. |

The installation sequence is the reverse of removal.

**Caution**

| |
|---|
| First connect the positive cable then connect the negative cable to avoid a short circuit. |

Battery voltage inspection (open circuit voltage)

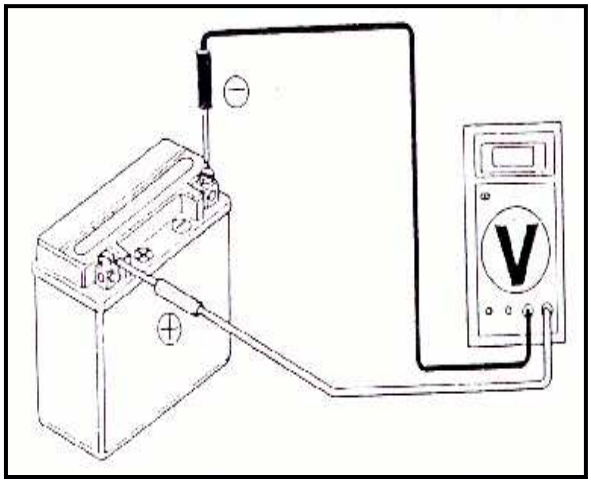
Remove the seat.

Remove the battery from the battery case.

Remove the negative clamp first then remove the positive clamp

Remove the battery.

Measure the voltage of the battery by a voltmeter.




**Fully charged: 13.1V**

**Under charged: 12.3V**

**Caution**

| |
|---|
| Battery charging inspection must be performed with a voltmeter. |

2.3.2 Charging

Connect the charging positive cable to battery positive terminal; connect the charging negative cable to battery negative terminal.

**Warning!**

• Keep fire and sparks away from a charging battery.

• Turn power On/Off at the charger prior to connecting/disconnecting at the battery terminals to prevent sparks near the battery.

• Charge the battery according to the current specified on the battery.

**Caution**

• Quick charging should be done only in an emergency.

• Measure the voltage 30 minutes after the battery is fully charged to ensure proper charge retention .

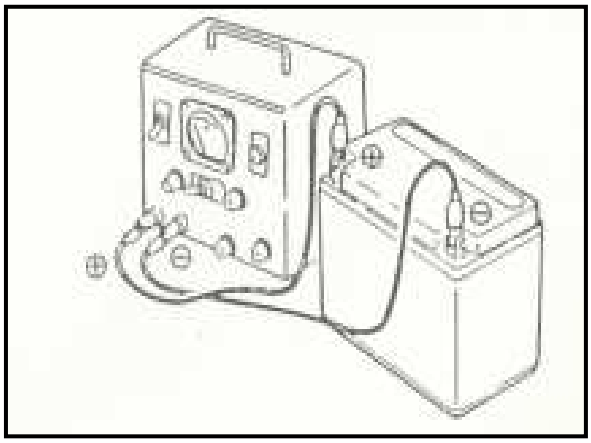
**Charging current: Standard: 0.9A**

**Quick: 9.0A**

**Charging time: Standard: 10-15Hr**

**Quick: 30minutes**

**After charging open circuit voltage: 12.8V minimum**



## 2.4 Charging System

### 2.4.1 Short circuit Test Procedure

Remove the negative cable from the battery, measure the voltage between the battery negative terminal and the ground wire. There should be no voltage read if all wires are properly connected.

**Caution**

| |
|---|
| Connect the positive terminal of voltmeter to the battery's negative terminal. |

Check the ignition switch or the wire harness for faults if voltage is shown during this test.

### 2.4.2 Inspection for an under charging condition

Use a fully charged battery (12.8V min.) to check the charging system.

Warm up the engine before completing this procedure.

Connect a voltmeter across the battery terminals.

Disconnect the red wire from the fuse terminal and connect an ammeter between the red wire lead and the fuse.

Verify the engine speed using a tachometer.

Start the engine and increase the engine speed gradually to measure the maximum voltage and current flow.

**Limit Voltage/Current: 14-15V (5.000rpm)**

Check the rectifier if the maximum voltage is not within the specified range.

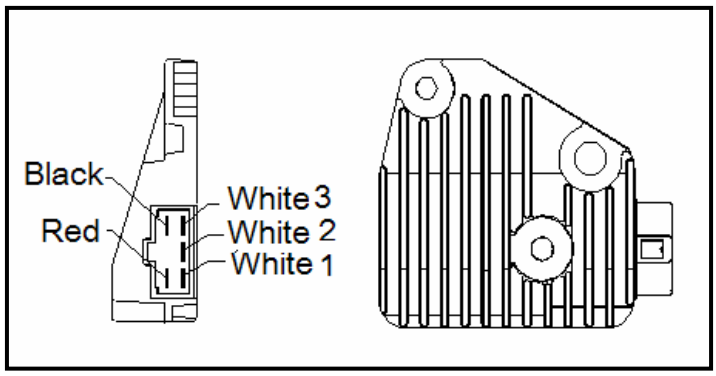
## 2.5 Regulator/Rectifier

### 2.5.1 Wire harness terminal inspection

Remove the connector from the rectifier and inspect it as outlined below:

Inspect the lead wires and the terminal.

| Item(Color of wire ) | Measurement |
|---|---|
| Battery(Red) to frame ground wire | The voltage of the battery |
| Ground wire(Black) to frame | The connection is good |
| Charging coil(White) to frame ground wire | With resistance |




### 2.5.2 Rectifier Inspection

- Use the multimeter to test the diode.
- Connect the black voltmeter contact to the red terminal of rectifier and the red voltmeter contact to the white terminal. If the measurements fall outside the specified range the rectifier is damaged and needs replaced.
- Connect the red voltmeter contact to the black terminal of the rectifier and the black contact to the white terminal. If the measurements fall outside the specified range, the rectifier is damaged and needs replaced.

**Caution**

• Do not connect the multimeter test leads together by hand.

• Please be aware that measurements may vary due to the multimeter's variance in internal resistance.

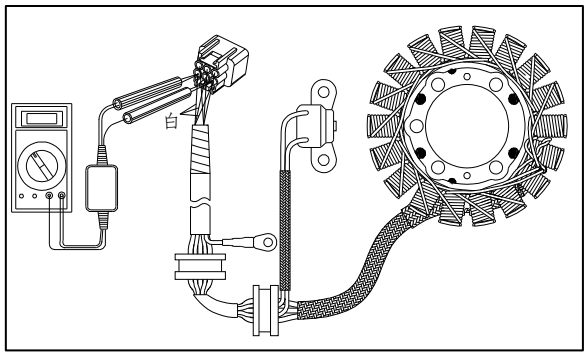
## 2.6 Inspection of stator windings

**Caution**

| |
|---|
| Stator inspection can be completed while installed on the engine. |

Inspection

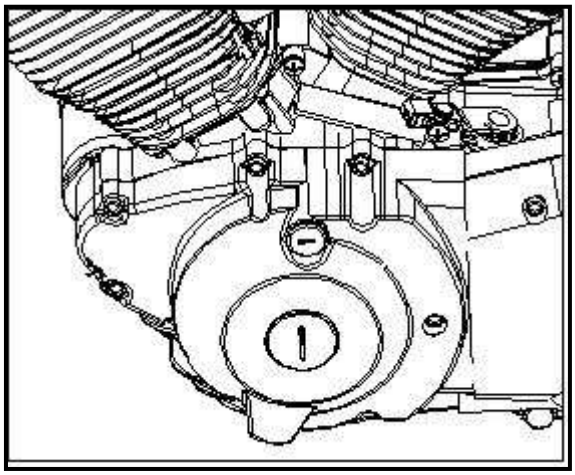
Unplug the connector of the stator and main wire harness, inspect the resistance across every 2 of 3 output white wires on the stator's connector.




**Specification: 1.5-2Ω(20℃)**

Replace the stator if this reading is out of specification.

## 2.7 Magneto removal



2.7.1 Removal

1. Remove the left side cover.
2. Unplug the wire connector from the main wire harness and magneto, loosen the wire for the neutral switch.

3. Remove the shift lever.

4. Remove the rear left engine cover.
5. Remove the left engine cover.

6. Loosen the fly wheel lock nut and remove the fly wheel using the special removal tool.
7. Remove the woodruff key.

2.7.2 Installation

Clean the left end of the crankshaft.

Align the groove of the fly wheel and the woodruff key on the crankshaft.

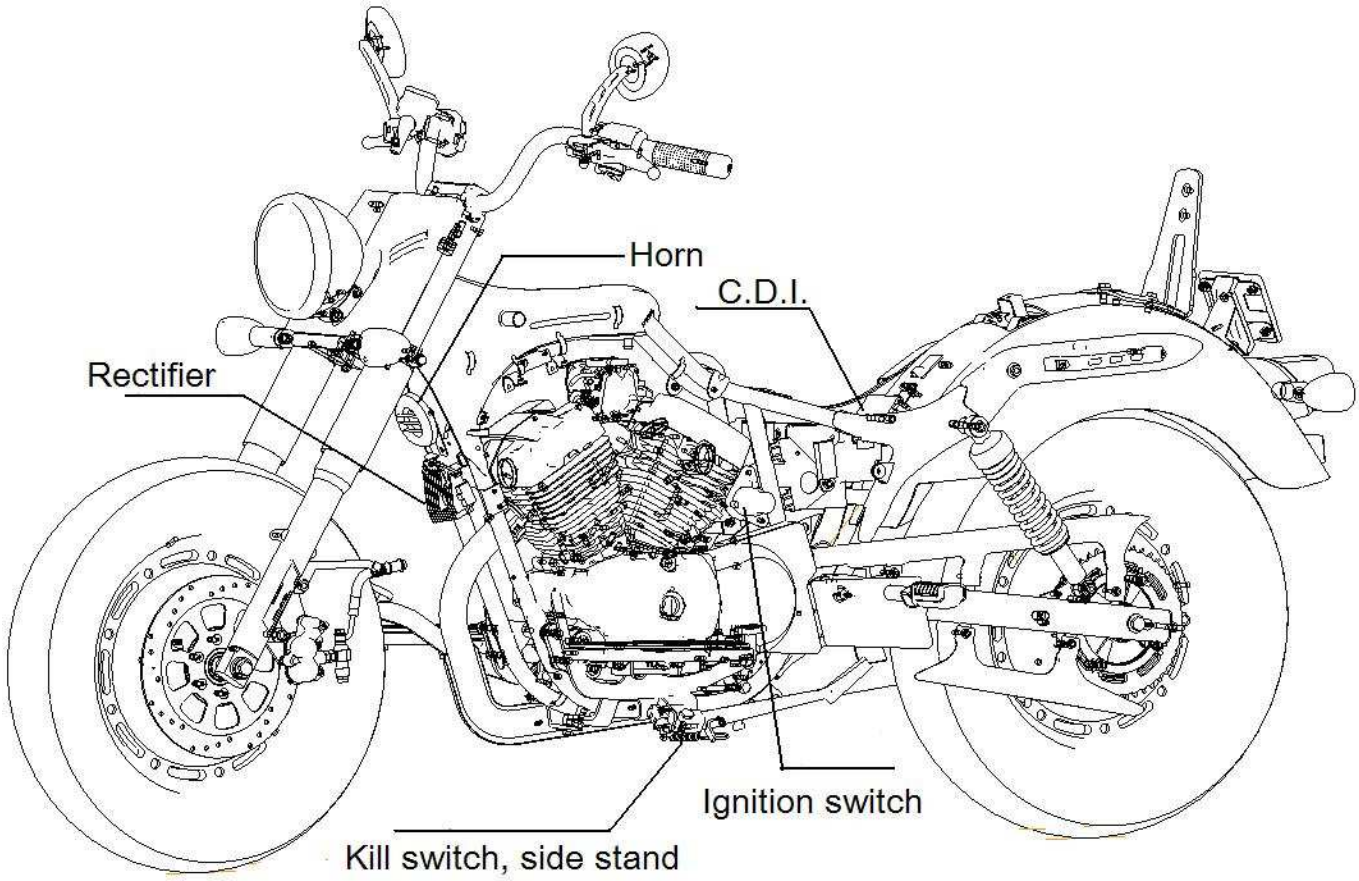
**Caution**

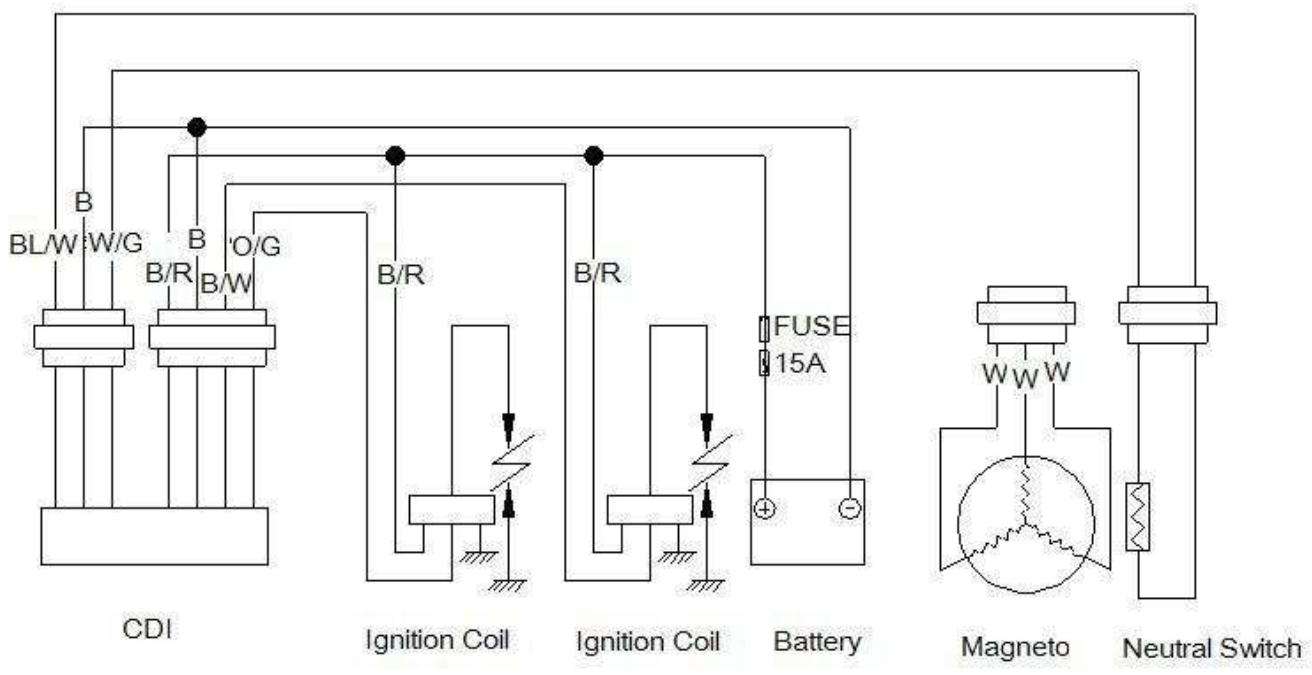
| |
|---|
| The flywheel is magnetized. Remove any debris or bolts from inside the fly wheel before installation. |

Secure the flywheel lock nut using a torque wrench to the outlined specification.

**Torque: 9.0 N·m**

The installation sequence is the reverse order of removal.






Ignition System

## 3. Ignition system



## 3.1 Service Information

Operation precautions

1. Inspect the ignition system according to the sequence specified in Troubleshooting.
2. The ignition system uses a C.D.I. unit and the ignition timing cannot be adjusted.
3. If the timing is incorrect, inspect the C.D.I. unit and A.C. generator and replace any faulty parts. Inspect the C.D.I. unit with a C.D.I. tester
4. Loose connectors and poor wire connections are the main causes of a faulty

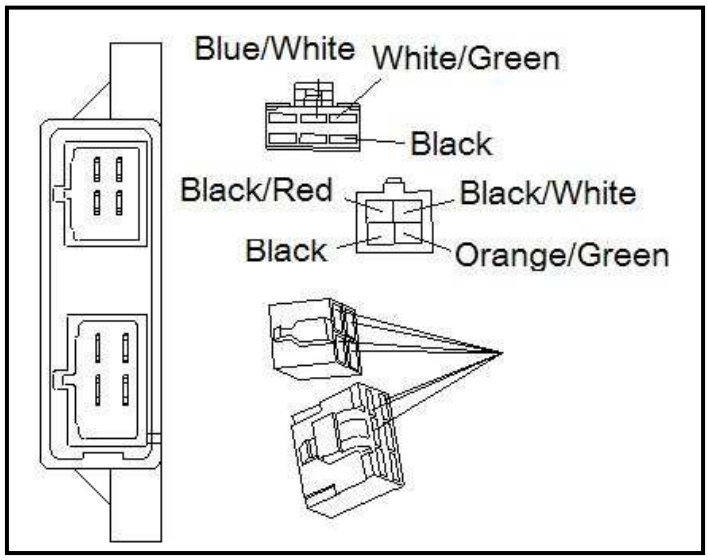
ignition system. Check each connector before performing further tests.

5. The inspections in this section are focused on maximum voltage. The inspection of ignition coil resistance is also described in this section.
6. Inspect the heat rating of the spark plug. Incorrect spark plug use is one of the main causes of poor engine performance and spark plug failure.

Specification

| Item | | | Standard |
|---|---|---|---|
| Spark Plug | Standard Type | | C6HSA(NGK) |
| Spark Plug Gap | | | 0.6-0.7 mm |
| Ignition coil resistance (20℃) | Primary coil | | (4±0.2)Ω |
| | Secondary coil | With spark plug cap | (19±2)KΩ |
| | | Without spark plug cap | 10-15KΩ |
| Pickup coil coil resistance (20℃) | | | 100-300Ω |
| Ignition coil primary side maximum voltage | | | 95-400V |
| Pickup coil coil maximum voltage | | | 1.7V minimum |

## 3.2 C.D.I.




Inspection

Remove the C.D.I. unit and inspect the connection points of the ignition system as outlined below.

Remove the C.D.I. completely and inspect the connectors for oxidation and proper snug fitment.

| Item | Measure terminal | Standard(20℃) |
|---|---|---|
| Ignition switch | Red-Red/White | Lead (Ignition switch 'ON') |
| Pickup coil | Blue/White-Green/White | 100-300Ω |
| Primary coil | Black/White-Black/Red(Orange/Green-Black/Red) | (4±0.2)Ω |
| Secondary coil | Black/Red-Spark plug cap (Spark plug included) | (19±2)KΩ |

## 3.3 Ignition Coil

### 3.3.1 Removal

Remove the speedometer cable , the seat and the fuel tank.

Remove the decorating cover of the cylinder head.

Remove the spark plug cap.

Remove the ignition coil under the frame pipe on the fuel tank section.

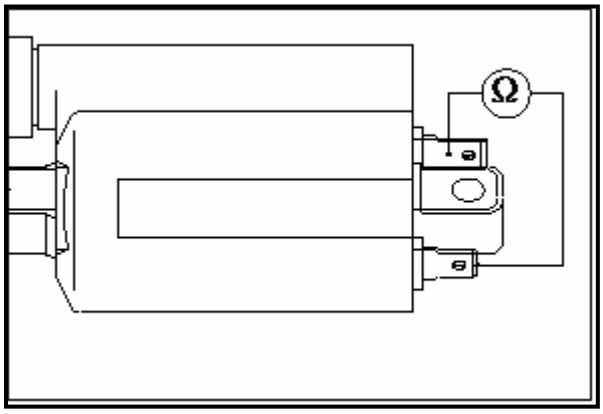
Assembly

The installation sequence is the reverse of removal.

**Caution**

| |
|---|
| The positive connection wire is black/red for the primary coil. |

### 3.3.2 Primary coil inspection



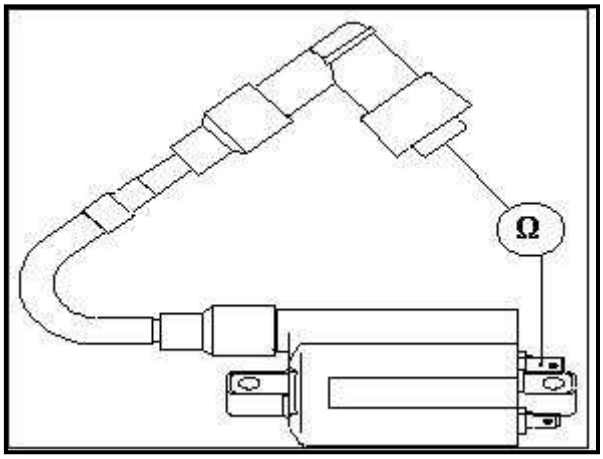

Measure the resistance of the primary coil.

**Standard: (4±0.2) Ω (20℃)**

The resistance measured should be within specification, otherwise replace the coil.

The resistance reading of '∞' shows that a winding is broken inside the coil. Replace the coil if a winding has failed.

3.3.3 Secondary coil




Measure the resistance between the spark plug end and the positive terminal.

**Standard: (19±2) KΩ (20℃)**

The resistance should be in specification.

The resistance reading of '∞' shows that a winding is broken inside the coil.

Remove the spark plug cap, measure the resistance between the ignition wire and the positive terminal.

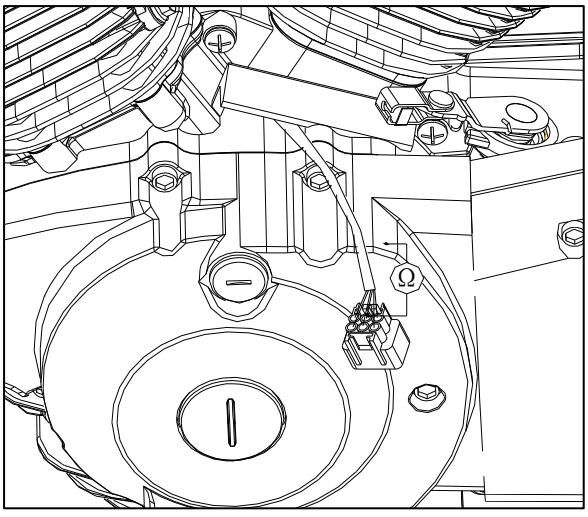
**Standard: 10-15 KΩ (20℃)**

## 3.4 Pickup coil

**Caution**

| |
|---|
| The pickup coil inspection can be performed while mounted on the vehicle. |

Inspection




Remove the left side cover.

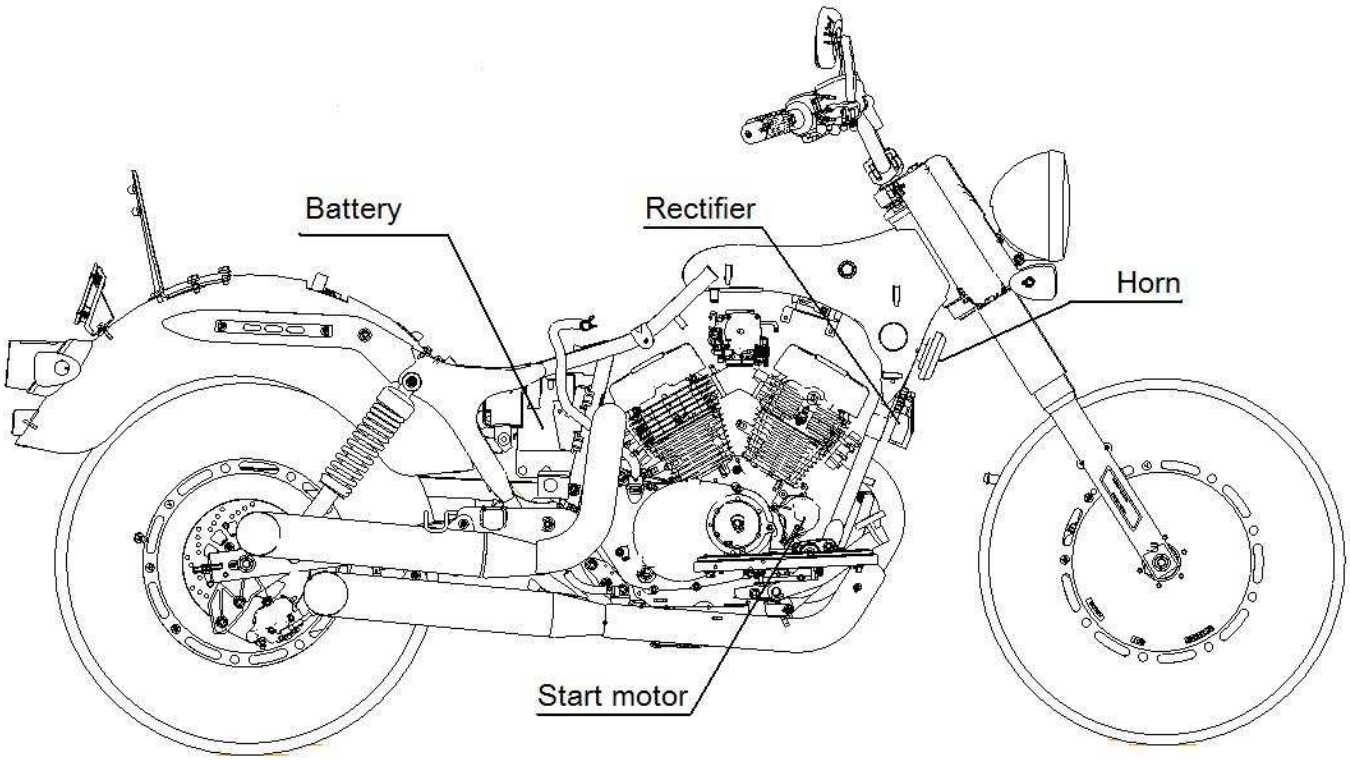
Unplug the connector between the magneto and main wire harness.

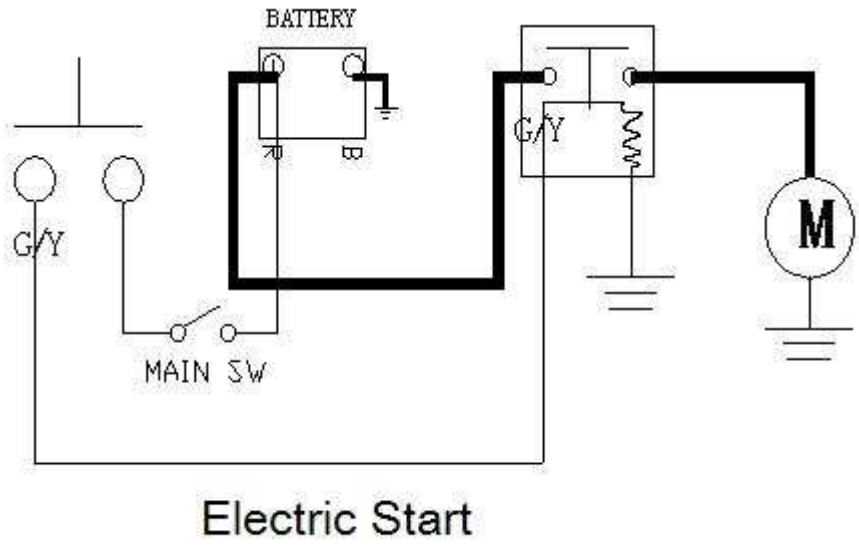
Measure the resistance between the Blue/White

wire and the ground wire.

**Standard: 100-300 Ω (20℃)**

Replace the stator if the measurement is out of specification.






Electric Start

# 4. Starting System



## 4.1 Service Information

General Instructions:

The removal of start motor can be accomplished with engine still in the frame.

Specification

| Item | Standard | Service limit |
|---|---|---|
| Start motor brush length | 12.5 mm | 8.5 mm |
| Starting idle gear I.D. | | 8.3 mm |
| Starting idle gear axle O.D. | | 7.94 mm |

## 4.2 Troubleshooting

### Start motor won't run

•Fuse burned out
•Weak battery
•Faulty ignition switch
•faulty starter clutch
•Faulty kill switch on side stand
•Faulty starter relay
•Poor connection, broken or shorted wire
•Faulty starter motor

### lack of power

•Weak battery
•Loose wire or connection
•Foreign matter stuck in start motor or gear

### Start motor rotates but engine does not start

•Faulty starter pinion
•starter motor rotates in reverse
•Weak battery

## 4.3 Start Motor

### 4.3.1 Removal

**Caution:**

Before removing the starter motor, turn off the ignition switch and remove the battery ground wire, then turn on the ignition switch and press the starter button to see if the start motor operates to ensure proper disconnection.

Remove the waterproof rubber jacket and disconnect the starter motor cable.

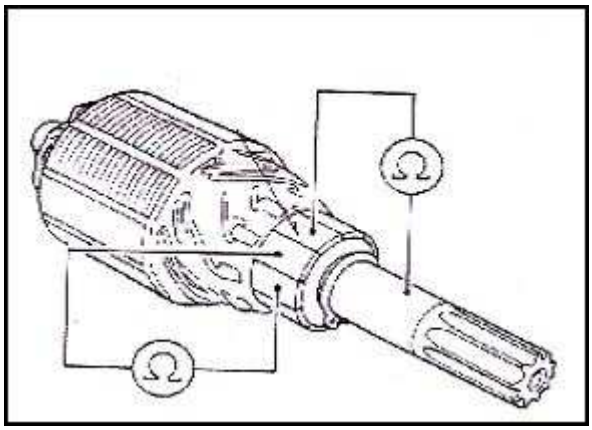
Remove the 2 starter motor mounting bolts and the motor.

### 4.3.2 Removal

Remove the two starter motor case screws, front cover, rear cover, motor case and other

parts.

### 4.3.3 Inspection



Inspect the removed parts for wear, damage or discoloration. Replace if necessary.

Clean the commutator if there is metal powder between the segments.

Check the continuity between pairs of the commutator segments, there should be continuity.

Check the continuity between individual commutator segments and the armature shaft, there should be no continuity.

Between the starter motor wire terminal connection, and the motor front cover should be no continuity.

Between the starter motor wire terminal and each brush inside the motor should be no continuity.

Measure the length of the brushes.

**Service limit: Replace if below 8.5 mm**

Inspect the needle bearing ensuring it turns freely and has no excessive play, replace if necessary.

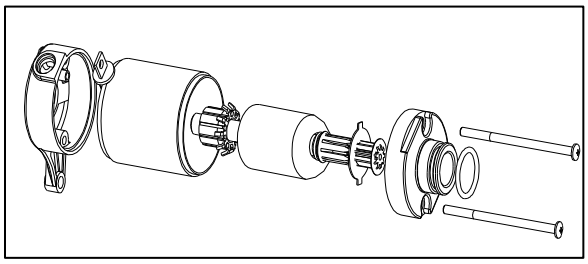
Check the dust seal for wear or damage.

4.3.4 Assembly

Apply lithium grease to the seal and needle bearing.

Install the brushes onto the brush holders.

Apply some grease to the two ends of the armature shaft.



Insert the commutator into the front cover.

Install the start motor case, aligning the marks on the motor case and covers.

Tighten the starter motor mounting bolts.

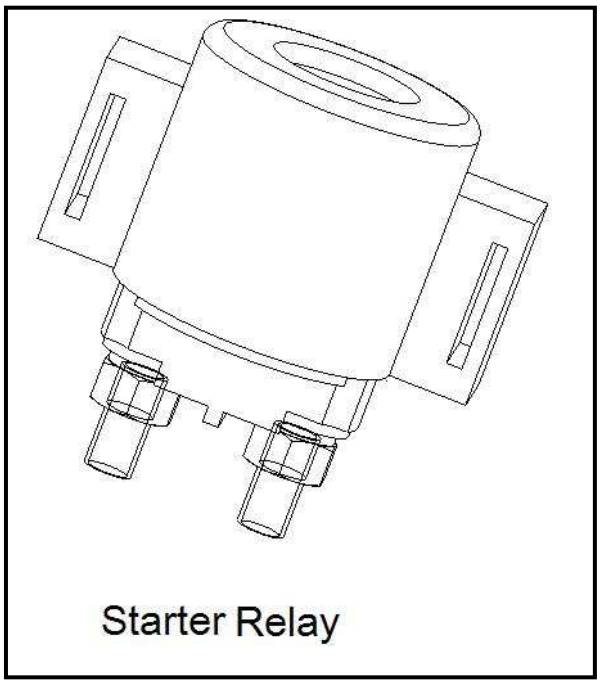
**Caution**

•Be careful to avoid damaging the mating surface of the brushes and armature shaft.

•Be careful to avoid damaging the dust seal.

4.3.5 Installation

Install the wire of starter motor on the jacket.




## 4.4 Starter relay

4.4.1 Operation Inspection

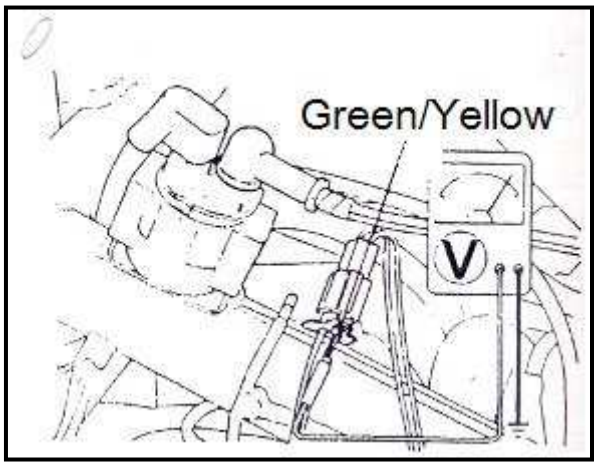
Shift the engine in neutral, turn on the main switch and press the starter button, the starter

relay works well if can hear the click from the start relay.

**No sounds: •Inspect the voltage of the starter relay.**

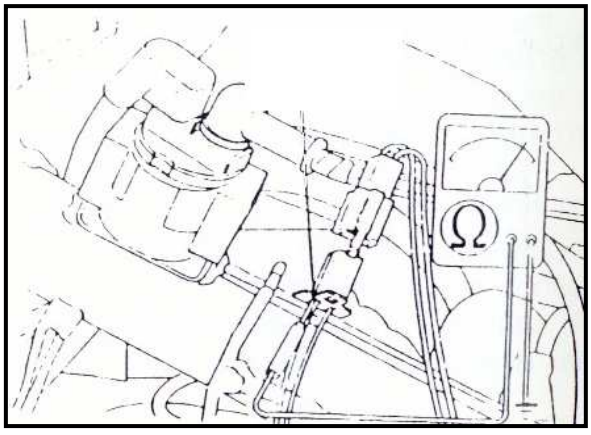
**•Inspect the ground circuit of the starter relay.**

**•Operation of starter relay.**




4.4.2 Voltage of starter relay inspection

Disconnect the starter relay wire connector. Check for continuity between the yellow/red wire terminal and ground. There should be continuity when the starter button is depressed. If there is no continuity, check the starter button for continuity and inspect the wire. Connect the electrical tester to the starter relay's larger terminals that connect to the battery positive cable and the starter motor cable. Connect a fully charged battery across the starter relay black and green/yellow wire terminals. Check for continuity between the starter relay's large terminals. The relay is functional if there is continuity.




4.4.3 Operation inspection

Connect the electrical tester to the starter relay larger terminals that connect to the battery positive cable and the starter motor cable. Connect a fully charged battery across the starter relay yellow/red and green/yellow wire

terminals. Check for continuity between the starter relay large terminals. The relay is normal if there is continuity.

## 5. Bulbs/Switches/Speedometer



## 5.1 Service Information

Procedural caution

The measurement of the switch lead can be performed after the switch has been removed.

## 5.2 Troubleshooting

The bulb is not on when the ignition switch is ‘ON’.

• Faulty bulb.

• Faulty ignition switch.

• Loose connector or poor wire connection.

## 5.3 Headlight bulb replacement

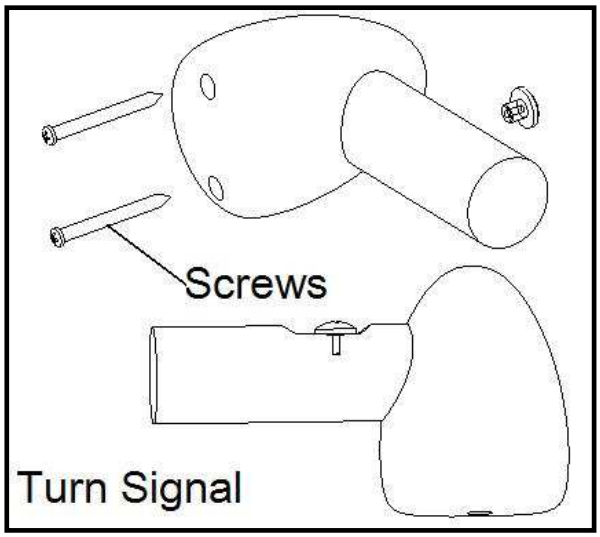
5.3.1 Removal

Remove the decorating cover.

Unscrew the retaining bolts of the headlight lens and remove the headlight from the seat.

Unplug the wire connector for the headlight.

Remove the headlight bulb and replace it.




5.3.2 Installation

The installation sequence is the reverse order of removal.

## 5.4 Front turn signal bulb replacement

5.4.1 Removal

Unscrew the two screws on the turn signal lens.

Remove the bulb from the seat.

5.4.2 Installation

The installation sequence is the reverse order of removal.

## 5.5 Taillight bulb replacement

5.5.1 Removal

Remove the taillight mounting screws.

Remove the taillight cover.

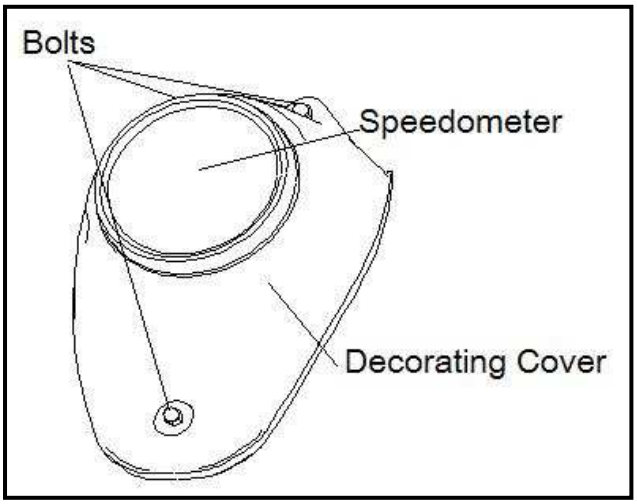
Remove the bulb and replace it.

Bulb type:

12V 21W/5W

5.5.2 Installation

The installation sequence is the reverse order of removal.




## 5.6 Speedometer

Remove the mounting bolts.

Remove the decorating cover with speedometer.

Unscrew the speedometer cable.

Remove the speedometer.

Installation of the speedometer is the reverse order of removal.

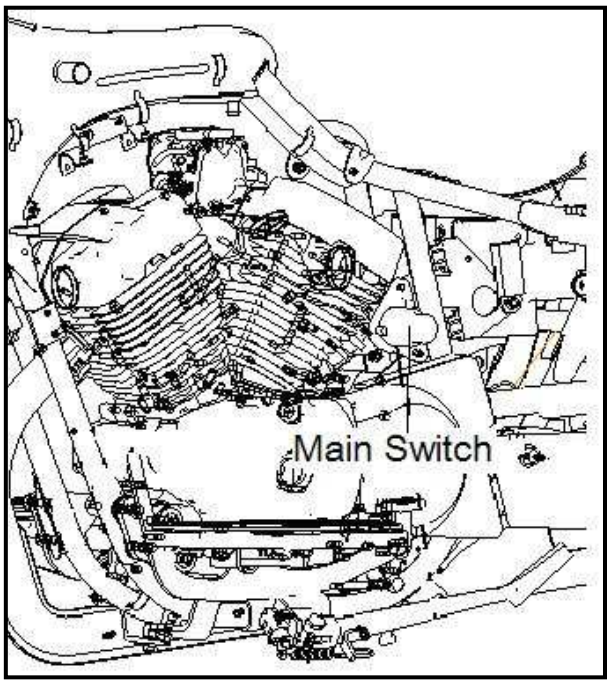
## 5.7 Ignition switch

5.7.1 Inspection

Remove the left side cover.

Unplug the ignition switch connector.

Check the resistance of the ignition switch terminal.



POWER LOCK

| | | | | |
|---|---|---|---|---|
| ON | ○——○ | | | |
| OFF | | | | |
| LOCK | | | | |
| | R | R/W | | |

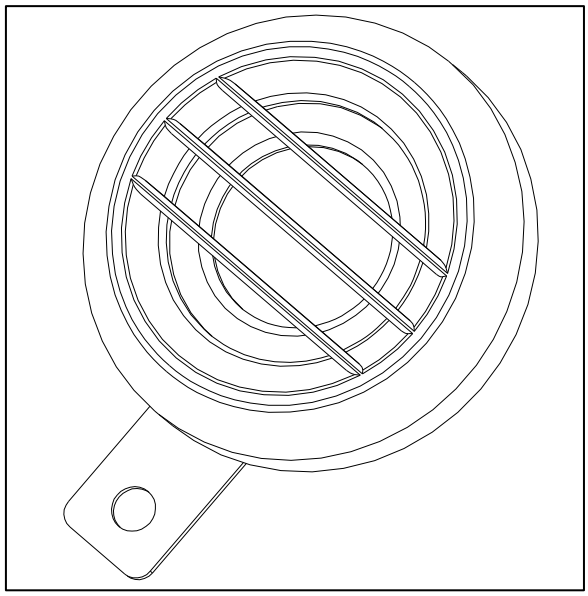
5.7.2 Ignition switch replacement

Turn off the ignition switch.

Unplug the ignition switch connector.

Unscrew the 2 ignition switch mounting bolts.

Replace the ignition switch and install the left side cover.



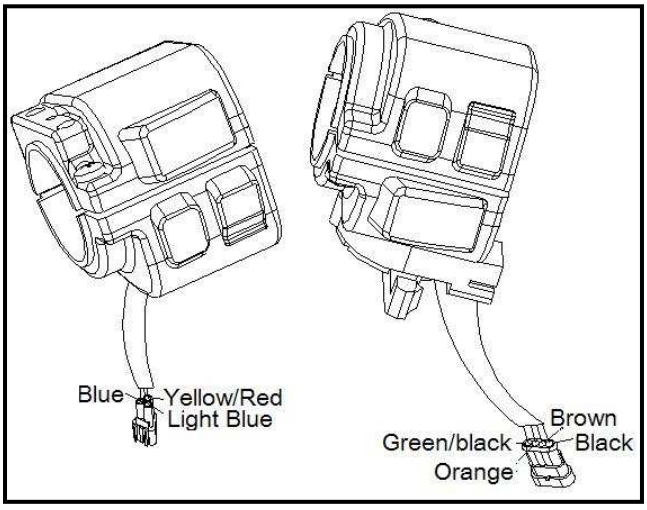
## 5.8 Horn

Inspection

Unplug the horn connector.

Connect a fully charged battery across the 2 terminals to check the horn function.

Alter the clearance of the centre adjustment screw if necessary, replace the horn if the horn still fails to operate.



## 5.9 Handle switches

### 5.9.1 Removal

Remove the headlight lens.

Unplug the connectors of left & right handle switches.

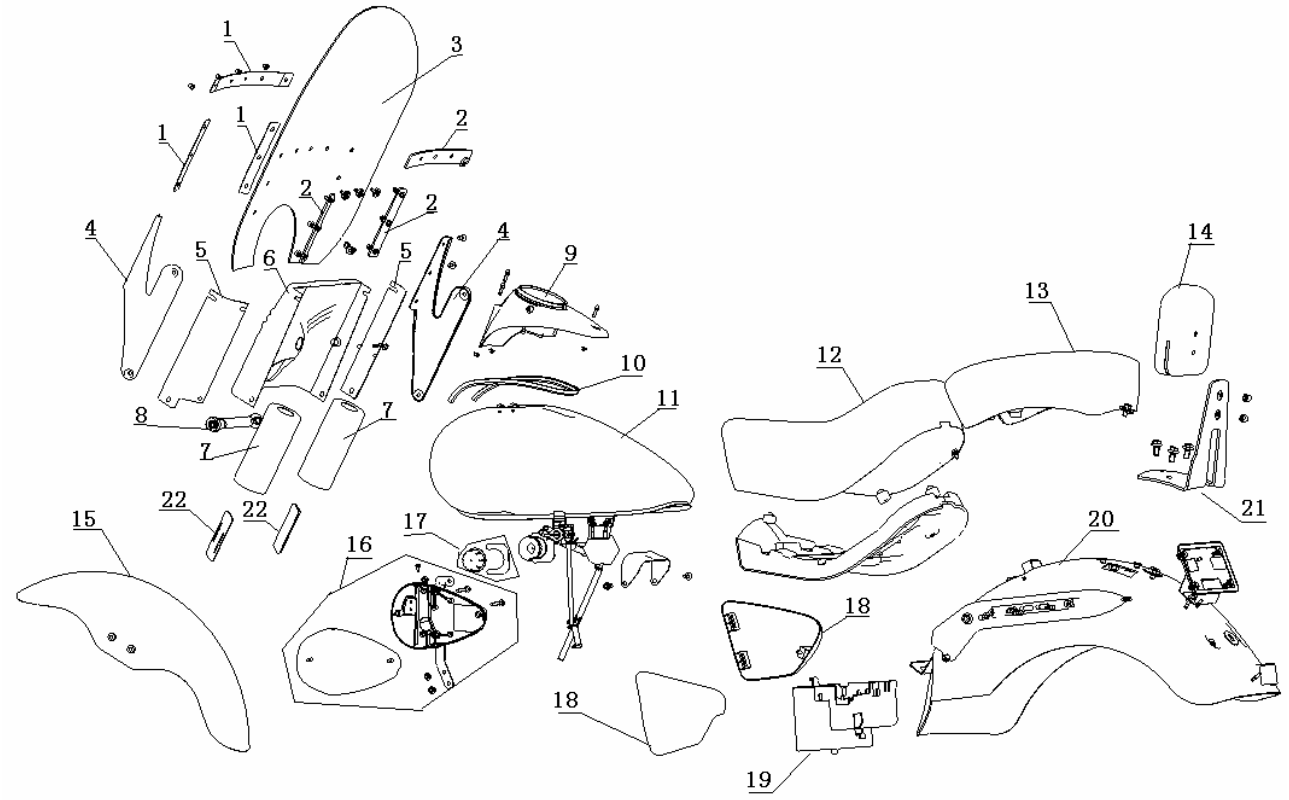
Unscrew the mounting screws of handle switches and remove the handle switches.

### 5.9.2 Installation

Install the handle switches in the reverse order of removal.

**Torque of the mounting screws**

**Torque: 5~9 N·m**




1. Mounting plate 2. Rubber 3. Windshield 4. Mounting bracket 5. Front shock absorber decorating cover 6. Decorating cover, front fork 7. L. & R. Decorating cover 8. Bracket, turn signal 9. Fuel tank decorating cover 10. Rubber seal of fuel tank decorating cover 11. Fuel tank 12. Seat I 13. Seat II 14. Seat III 15. Front fender 16. Decorating case 17. Rubber cushion, fuel tank 18. Side cover 19. Battery case 20. Rear fender 21. Back rest 22. Reflector

## 6. Body removal procedure

The body removal sequence is outlined below:

Mounting Plate→Rubber Seal→Wind Shield→Mounting Bracket→Front Shock Absorber Decorating Cover→Front Fork Decorating Cover→

↓

Front Fender→Fuel Tank Decorating Cover→Rubber Seal of Fuel tank Decorating Cover→Fuel Tank→Decorating case→Seat II

↓

→Seat III→Seat I→L. & R. Side cover→BatteryCase→Rear backrest→Rear Fender

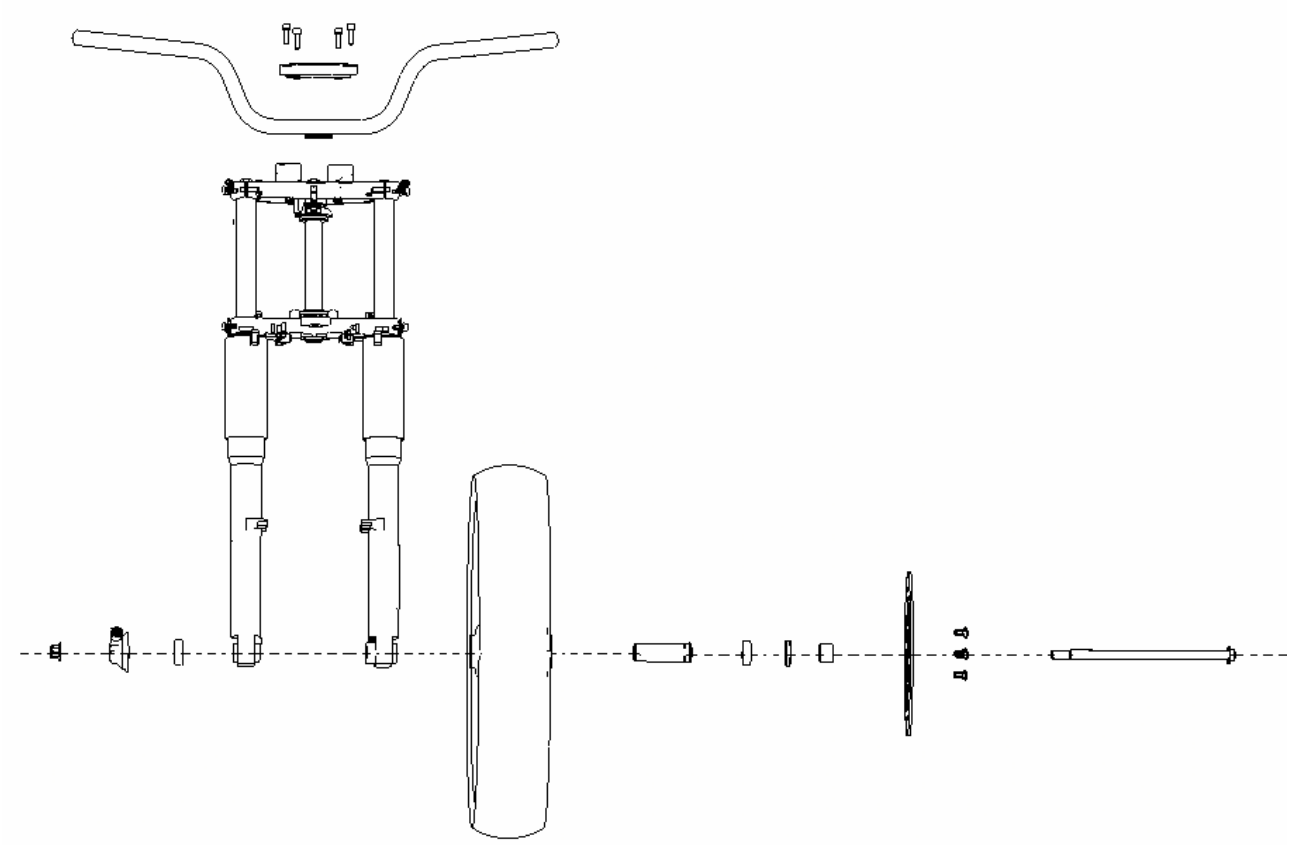
**Caution**

When removing the frame covers, be careful not to use excess force to pull the covers off to avoid damaging the components.

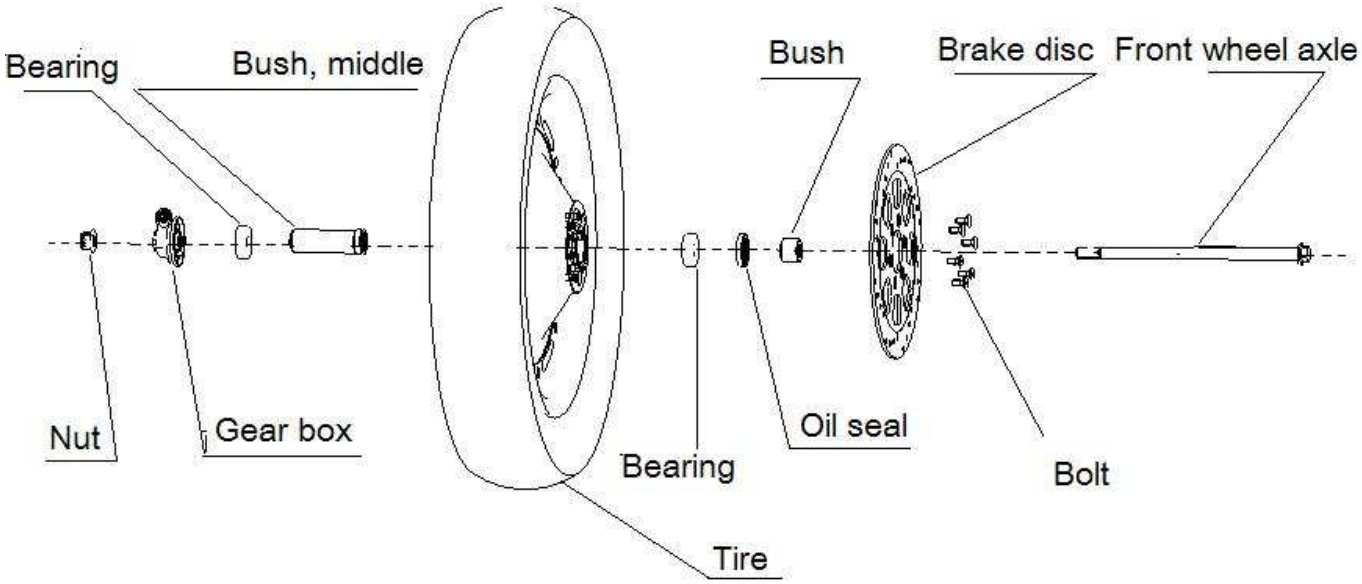
Make sure to route the cables and harness properly.

# 7. Front Wheel/Front Suspension

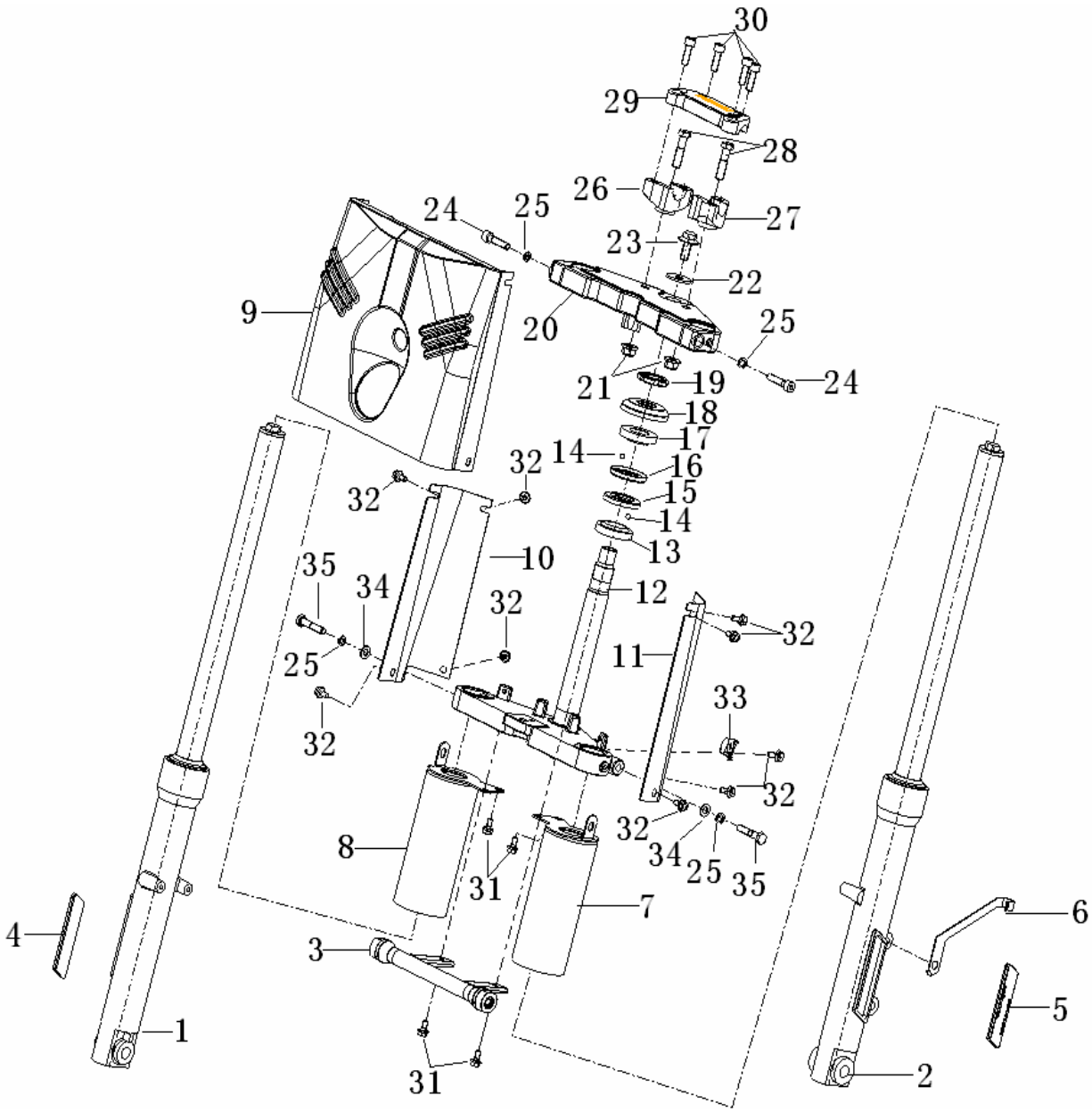
## Front wheel/Front suspension



## Front Wheel


Bearing
Bush, middle
Bush
Brake disc
Front wheel axle
Nut
Gear box
Bearing
Oil seal
Bolt
Tire

# Front fork




1. Right front shock absorber 2. Left front shock absorber 3. Bracket, turn signal 4. Right reflector 5. Left reflector 6. Hook, brake hose 7. Left decorating cover 8. Right decorating cover 9. Decorating cover, front fork 10. Right cover, front shock absorber 11. Left cover, front shock absorber 12. Lower bracket 13. Lower race, lower steering 14. Steel ball Φ6.35 15. Upper race, lower steering 16. Lower race, upper steering 17. Upper race, upper steering 18. Dust cover 19. Lock nut 20. Upper bracket 21. Nut M10 22. Washer 23. Bolt 24. Bolt M8X35 25. Spring washer 26. Right lower bracket, handlebar 27. Left lower bracket, handlebar 28. Bolt 29 Upper bracket, handlebar 30. Bolt M8X25 31. Bolt M6X12 32. Bolt M6X10 33. Clamper, brake hose 34.

Washer 35. Bolt M8X40



## 7.1 Service Information

Operation precaution

Securely place the motorcycle on a horizontal ground surface and raise the front wheel off the ground before removing the front wheel.

Do not allow any grease splatter on the brake pads and the brake disc during the operation.

Specification

| Measure Section | Item | | Standard (mm) | Service limit (mm) |
|---|---|---|---|---|
| Front Wheel axle | Camber | | | 0.2 |
| Front Wheel | Rim wobbling | Vertical | | 2.0 |
| | | Horizontal | In 1.0 | 2.0 |

Torque

**Handlebar mounting bolts 40-60 N·m**

**Front wheel nut 75-88 N·m**

## 7.2 Troubleshooting

7.2.1 Steering handlebar is hard to turn

- Faulty steering races.

- Tire pressure too low.

### 7.2.2 Steering wobbling

- Faulty steering races.
- Tire pressure too low.
- Bent front fork, bent front axle.
- Front Wheel tire distortion.

### 7.2.3 Front wheel wobbling

- Rim distortion.
- Excessive wheel bearing play.
- Faulty tire.

### 7.2.4 Front wheel is hard to rotate

- Faulty front wheel bearing or gear box.

### 7.2.5 Front shock absorber noise

- Damage to decorating cover.
- Damage to fork legs.
- Loose fork fasteners.

## 7.3 Front Wheel

### 7.3.1 Removal

Raise the front wheel off the ground.

Remove the front wheel lock nut.

Remove the front wheel axle, speedometer gear box and the front wheel.

Remove the bearing and dust seal if necessary.

## 7.3.2 Inspection

### 7.3.2.1 Front wheel axle camber inspection

Place the axle on V block and measure it using a micrometer.

**Service limit: 0.2mm**

**Replace if outside this specification.**

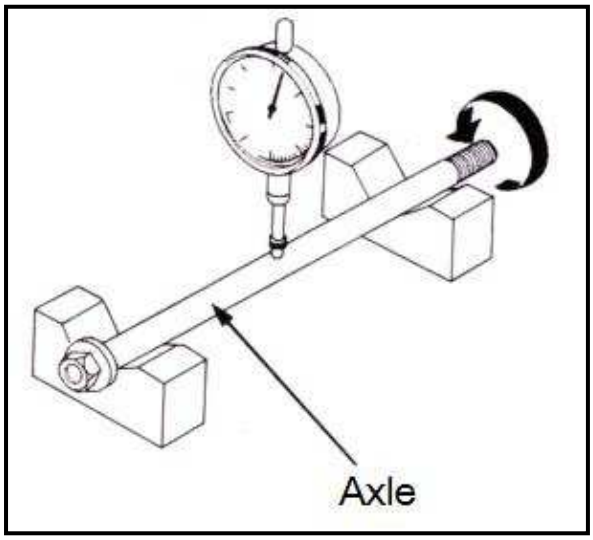
### 7.3.2.2 Rim wobbling inspection

Place the rim on support bracket, rotate the rim and measure the change in rim deflection.

**Service limit:**

**Vertical: 2.0mm if over**

**Horizontal: 2.0mm if over**



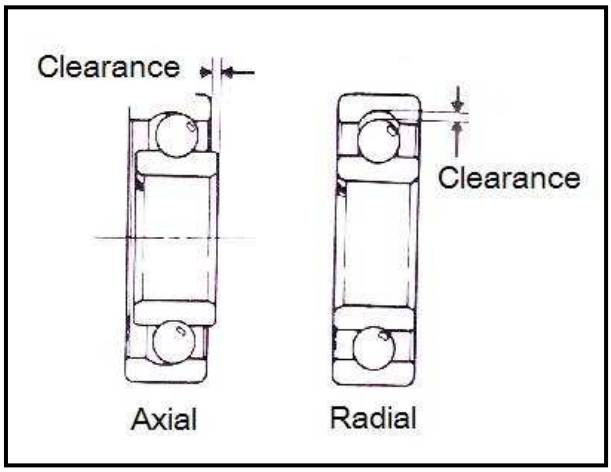

### 7.3.2.3 Front wheel bearing inspection

Remove the front wheel dust seal.

Remove the bearing.

Rotate the bearing and check for smooth operation.

Replace the bearing for wear or if it has excessive play.



7.3.3 Bearing replacement

Remove front wheel axle, front wheel middle bushing and outer bushing.

Remove the dust seals and bearings by using special removal tools.

**Note:**

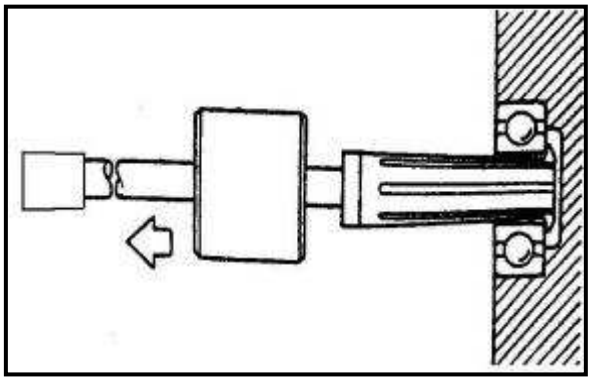
Replace with new bearings whenever originals are removed.

Apply some grease to the bearing before installation, then install the bearing using special tools.

**Caution**

| |
|---|
| • The bearing should be installed using special tools and proper installation techniques.<br>• Bearings with seals should be installed with the seal towards the outside. |

7.3.4 Installation



Apply some grease to the dust seal.

Apply some lithium grease to the wheel hub.

Install the bushing, bearing and dust seal.

Install the front wheel reversing order of removal.

**Caution**

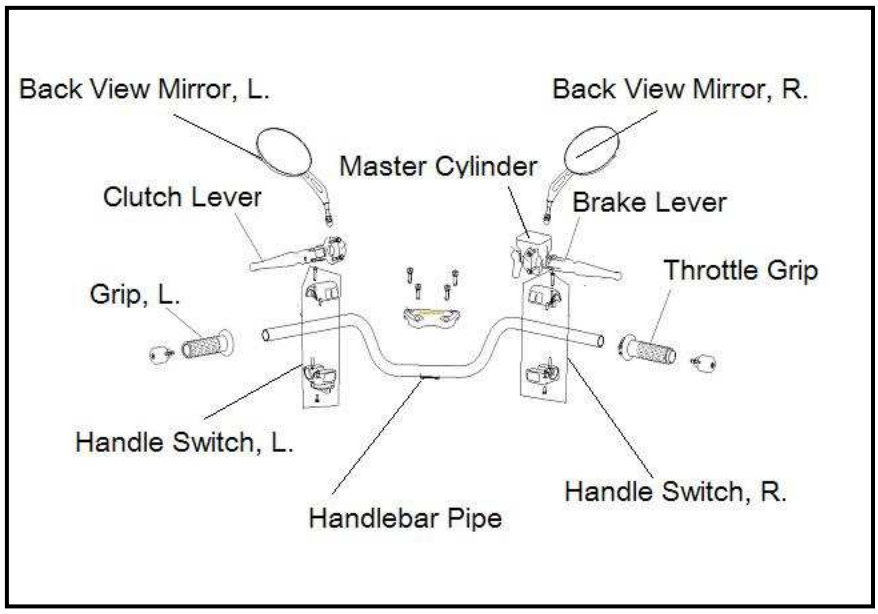
| |
|---|
| • Wheel hub will be destroyed if bearings are improperly installed in the hub center.<br>• Rotate the front wheel to check if the speedometer cable turns freely. |

Torque:

**Front wheel axle lock nut 75-88 N·m**

## 7.4 Steering Handlebar

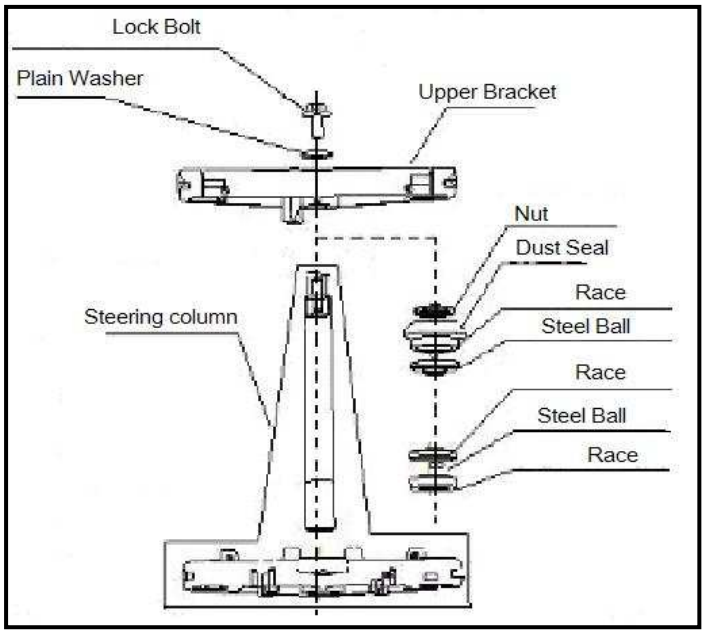
7.4.1 Removal procedure




- Remove the brake lever and clutch lever assy.
- Remove the handle switches.
- Remove the left grip and throttle grip.
- Remove the handlebar pipe.

7.4.2 Assembly

Re-installation is reverse order of removal.




**Mounting bolts:**

**Torque: 40-60 N·m**

## 7.5 Front fork

7.5.1 Removal procedure

- Remove the wind shield, headlight and front turn signals.

- Remove the decorating cover of front fork and front shock absorber.
- Remove the front caliper and speedometer cable.
- Remove the front fender.
- Remove the front wheel axle and the front wheel.
- Loosen the front fork mounting bolt and remove the upper bracket of steering column.
- Remove the dust seal, steering races from steering column then remove the front fork from the body.

7.5.3 Assembly

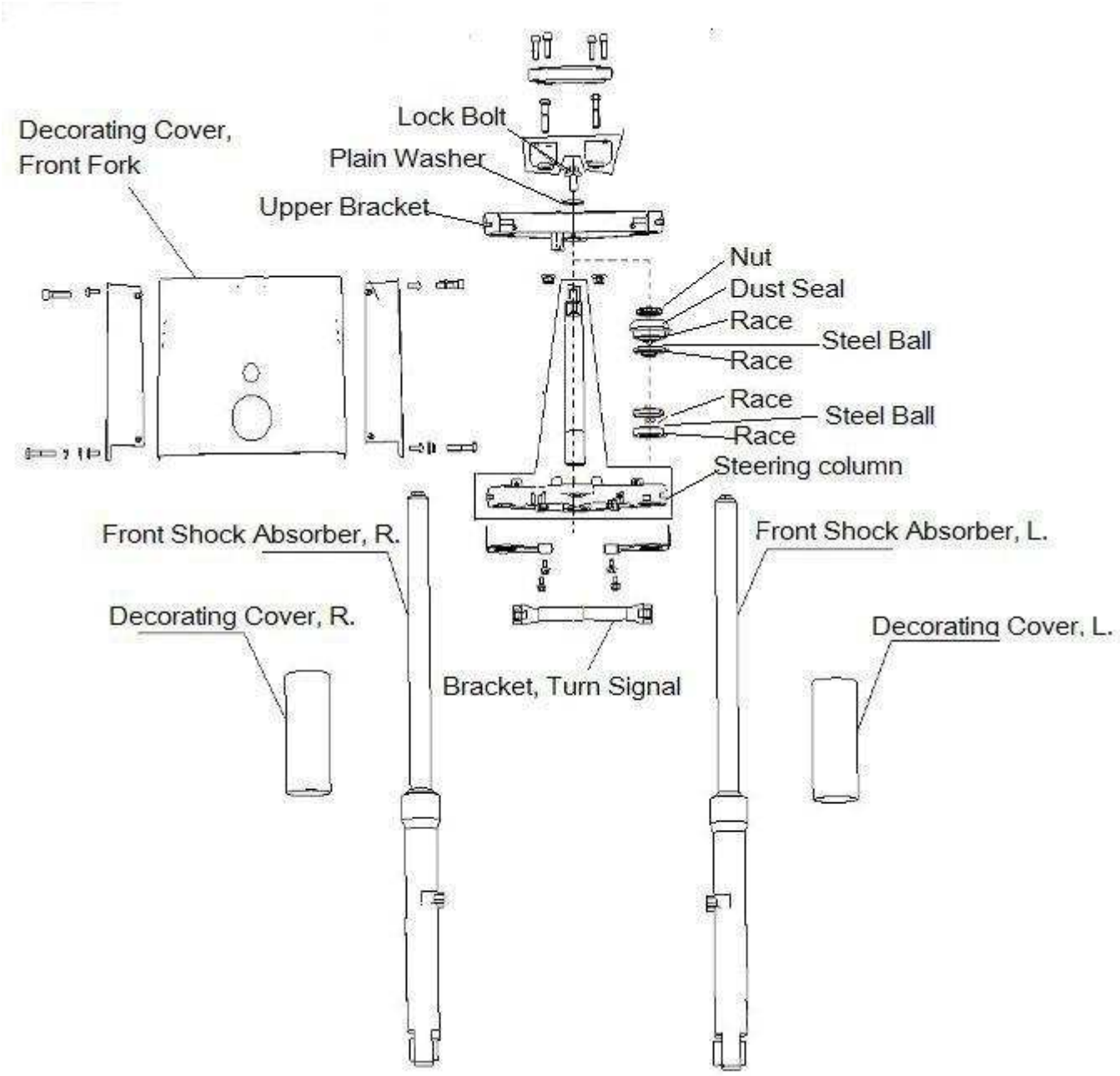
Apply some lithium grease on the lower race and install the steel balls (19 pcs).

Apply some lithium grease on the upper race and install the steel balls (19 pcs).

Install the front fork with steering pipe into the frame, do not rotate the fork to prevent the steel balls from dropping into the frame.

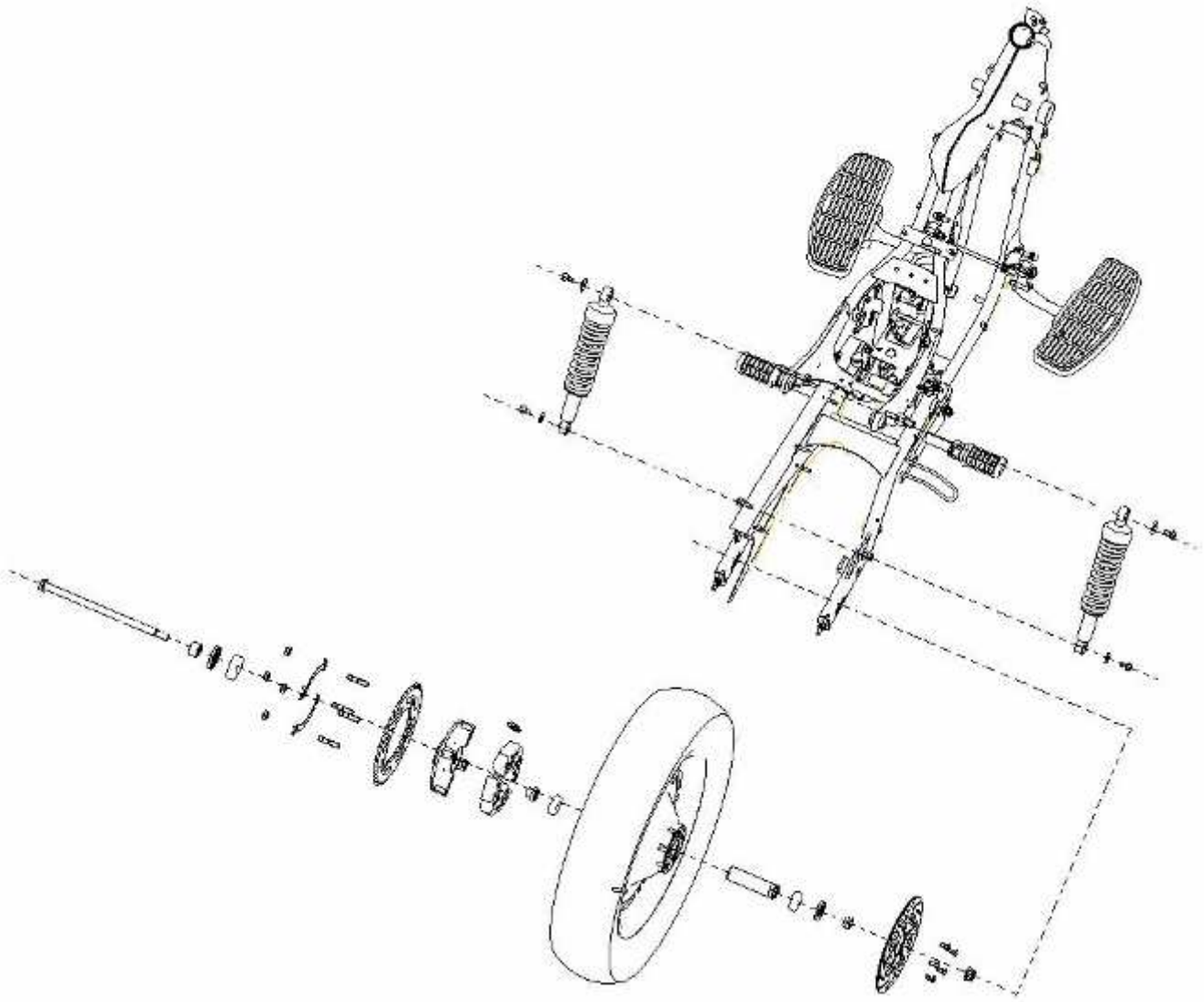
Install the lock nut, check the movement after the installation. The front fork should rotate freely.

Install the other parts reversing order of removal.

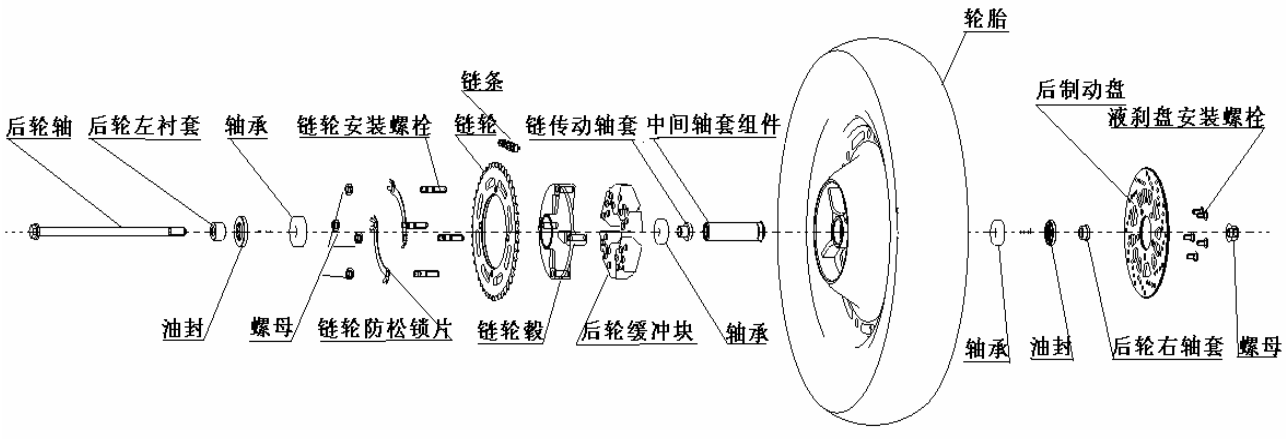



# 8. Rear wheel/Rear suspension

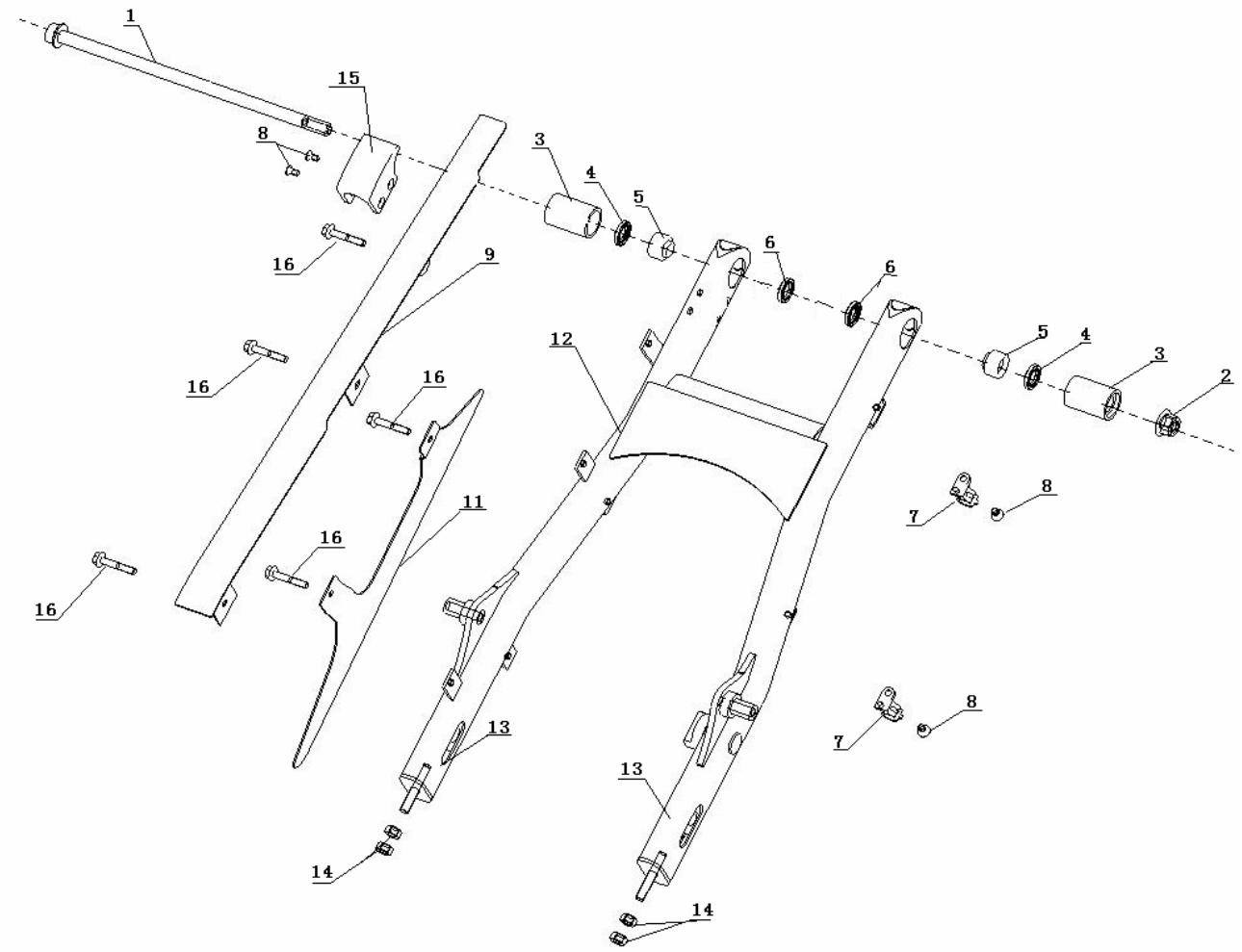
# Rear Wheel/Rear suspension



# Rear Wheel


后轮轴
后轮左衬套
轴承
链轮安装螺栓
链条
链轮
链传动轴套
中间轴套组件
轮胎
后制动盘
液刹盘安装螺栓
油封
螺母
链轮防松锁片
链轮毂
后轮缓冲块
轴承
轴承
油封
后轮右轴套
螺母

# Rear Swing Arm




1. Swing arm axle 2. Nut M12X1.25 3. Bushing 4. Oil seal 5. Needle bearing NA4901 6. Oil seal 7. Hook, brake hose 8. Bolt M6X10 9. Chan cover (upper) 11. chain cover (lower) 12. Swing arm 13. Chain adjustor 14. Nut M8 15. Cushion, drive chain 16. Bolt M6X10

## 8.1 Service Information

Procedural Caution

Do not allow any grease to splatter on the brake pads and the brake disc during the procedure.

Specification

| Item | | Standard (mm) | Service limits (mm) |
|---|---|---|---|
| Out of round service limit of rear wheel | Vertical | | 2.0 |
| | Horizontal | | 2.0 |

Torque:

**Rear wheel axle lock nut** **100-113 N·m**

**Rear shock absorber mounting nuts** **22 - 29 N·m**

## 8.2 Troubleshooting

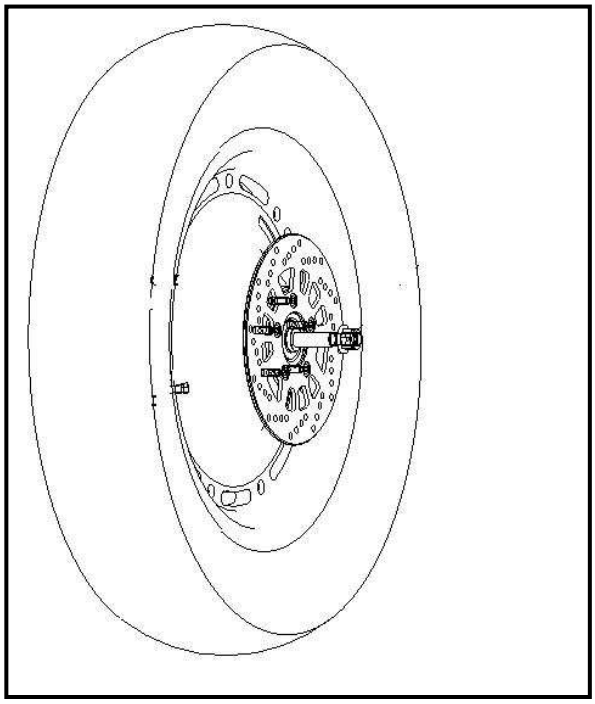
8.2.1 Twist or warp of rear wheel

- Distortion of rim
- Faulty tire
- Loose rear wheel mounting
- Tire pressure too low

8.2.2 Rear shock absorber too soft

- Weak shock absorber spring.
- Insufficient damper oil.

## 8.3 Rear wheel



### 8.3.1 Removal

Securely park the motorcycle and place a jack under the engine.

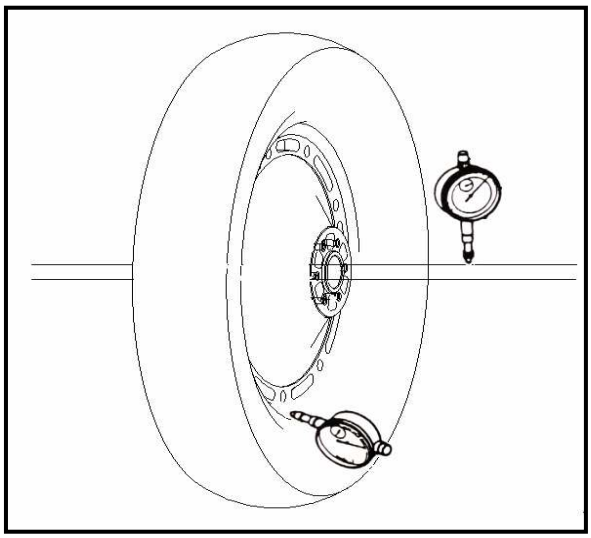
Remove the rear brake caliper lock bolts.

Remove the rear brake caliper.

Remove the rear wheel lock nut.

Remove the drive chain from the sprocket.

Remove the sprocket, rubber cushion and brake disc.



### 8.3.2 Inspection

Rotate the rear wheel, measure the eccentricity using a micrometer.

**Service limit:**

**Vertical: 2.0mm if over**

**Horizontal: 2.0mm if over**

Replace the bearing if the measurement is greater than the specified service limit.

### 8.3.3 Assembly

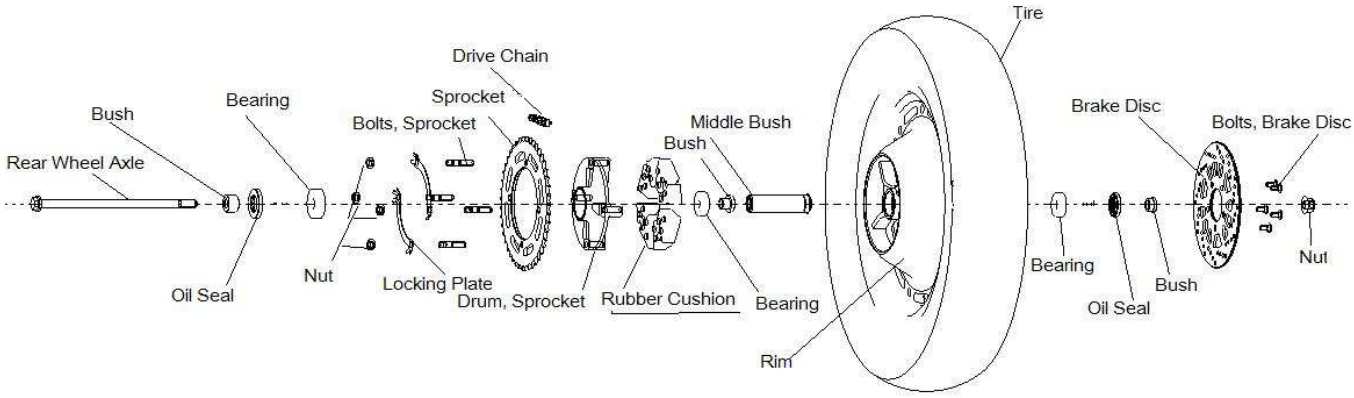
The installation sequence is the reverse of removal.

Torque of rear wheel lock nut

**Torque: 100-113 N·m**

# Rear

# Wheel

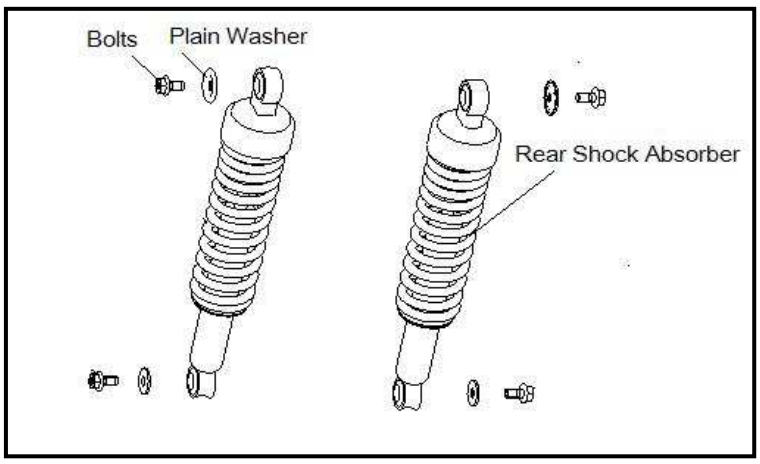



## 8.4 Rear shock absorber/Rear swing arm

### 8.4.1 Removal

Securely support the motorcycle to avoid tip over.

Remove the rear shock absorbers.



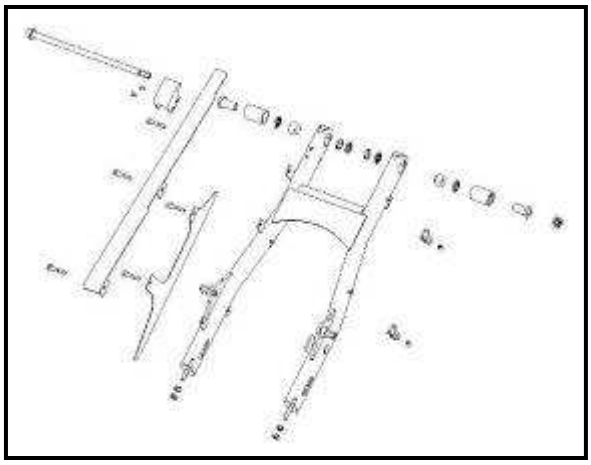

### 8.4.2 Assembly

Tighten the mounting nuts to specification.

**Torque**

**Upper nuts: 22-29 N·m**

**Lower nuts: 22-29 N·m**



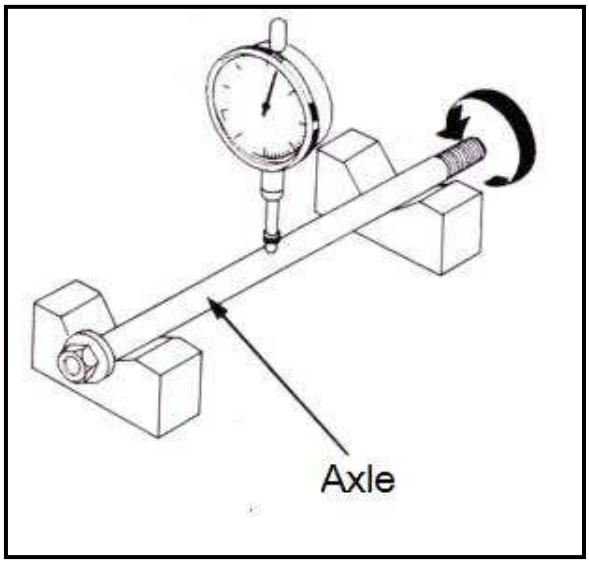
8.4.3 Swing arm removal

Remove chain cover.

Remove chain adjuster, rear wheel axle, rear wheel, and rear shock absorber.

Unscrew the mounting nut and remove the swing arm axle bolt.

Remove the rear swing arm.




8.4.4 Rear swing arm inspection

Inspect the rear swing arm axle bolt using a V block and micrometer, replace the axle if it bends.

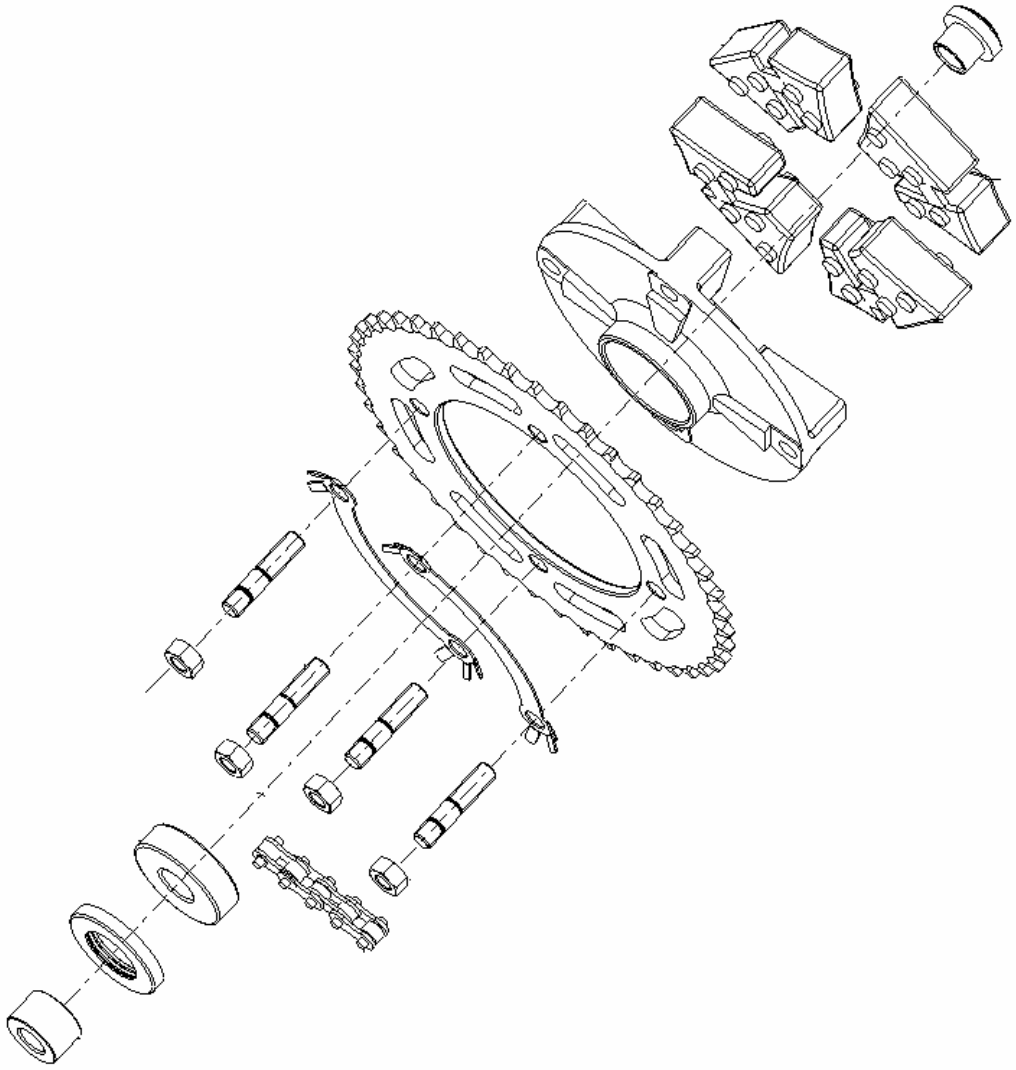
**Caution**

| |
|---|
| Do not attempt to straighten the axle if it is bent. |

Clean the individual parts using solvent before inspection. Replace if necessary.

## 8.5 Driving Chain

### 8.5.1 Removal



Securely place the motorcycle on flat, level ground.

Remove the shift lever.

Remove the left rear engine cover.

Remove the chain cover, rear shock absorber and the rear wheel.

8.5.2 Inspection

Clean the drive chain using solvent and brushing off dirt and debris. Remove the chain from the solvent and dry the chain.

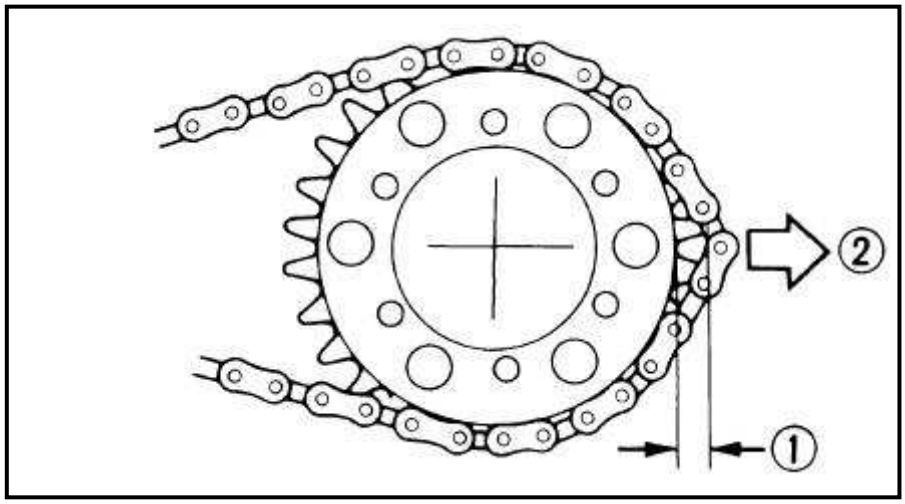
Stretch

Inspect the drive chain rollers, replace the drive chain for wear.

Inspect the driven sprocket, replace the driven sprocket for wear.

Replace the chain sprocket if more than ¼ teeth wear.

Replace all components as a set (chain and both sprockets) to avoid accelerated wear.




Inspect the wheel bearings, replace the bearings if the clearances are out of specification; replace the dust seals if damaged or worn.

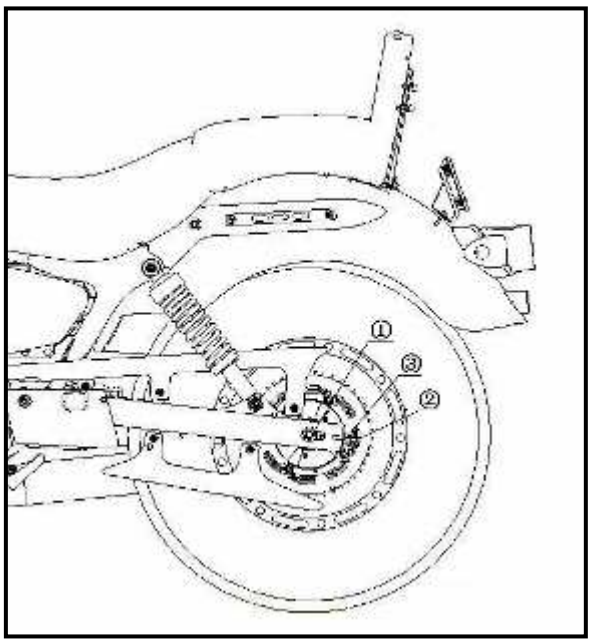
8.5.3 Slack of the driven chain

Park the motorcycle on level ground, inspect and adjust the drive chain tension.

**Slack: 10-20mm**

Procedure for adjusting the drive chain tension.

Loosen the rear wheel lock nut.



Adjust the drive chain tension evenly.

Loosen the lock nut on the chain adjusters, turn in or turn out to alter the chain tension.

Tightening the chain adjuster (turning in) decreases slack; loosening (turning out), the chain slack is increased.

Note:

There are marks on each side of rear swing arm adjusters, check the wheel alignment by verifying both adjusters are in identical positions.

**Caution:**

| |
|---|
| Too little chain slack will overload the engine and damage the cush drive.<br>Keep the chain tension within specifications. |

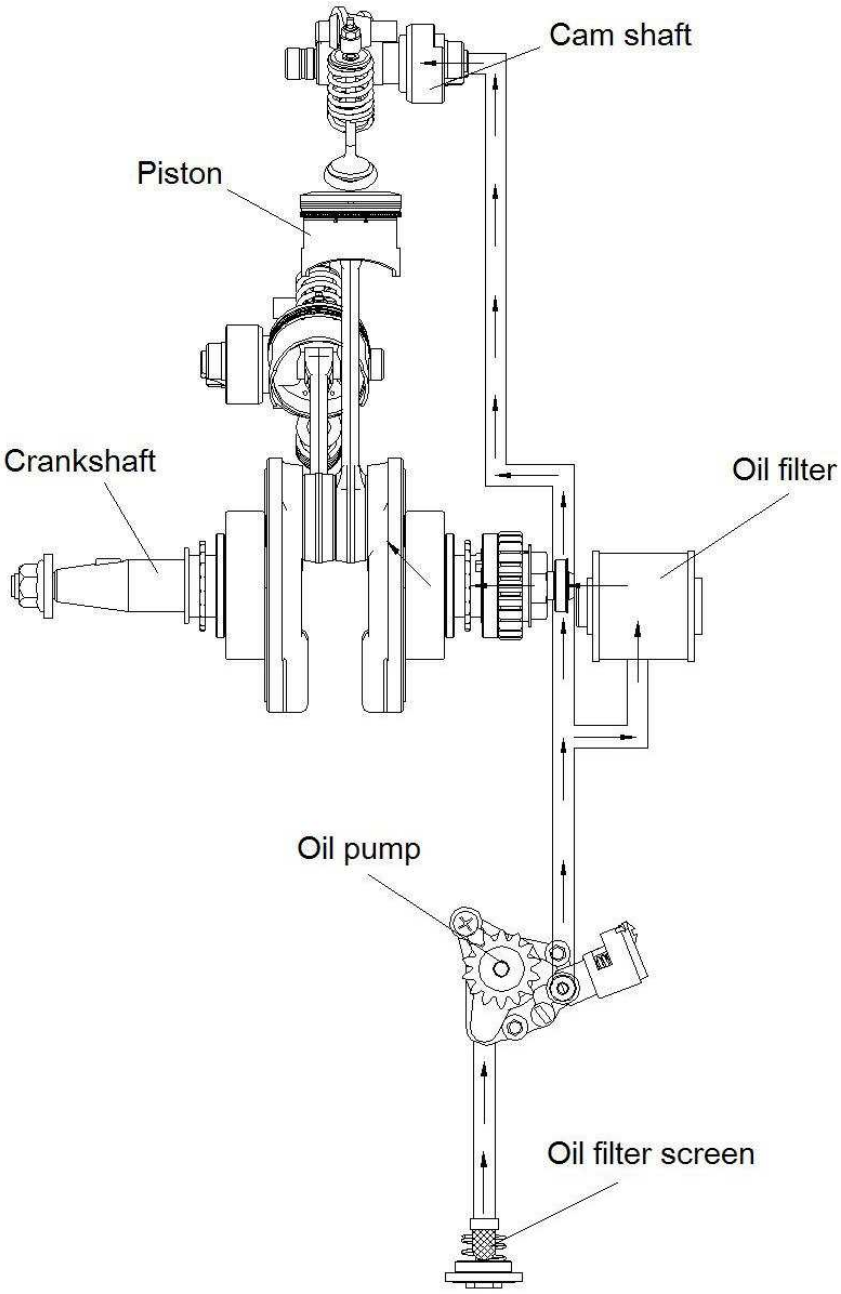
Tighten the rear wheel axle nut to specification.

## 8.5.4. Assembly

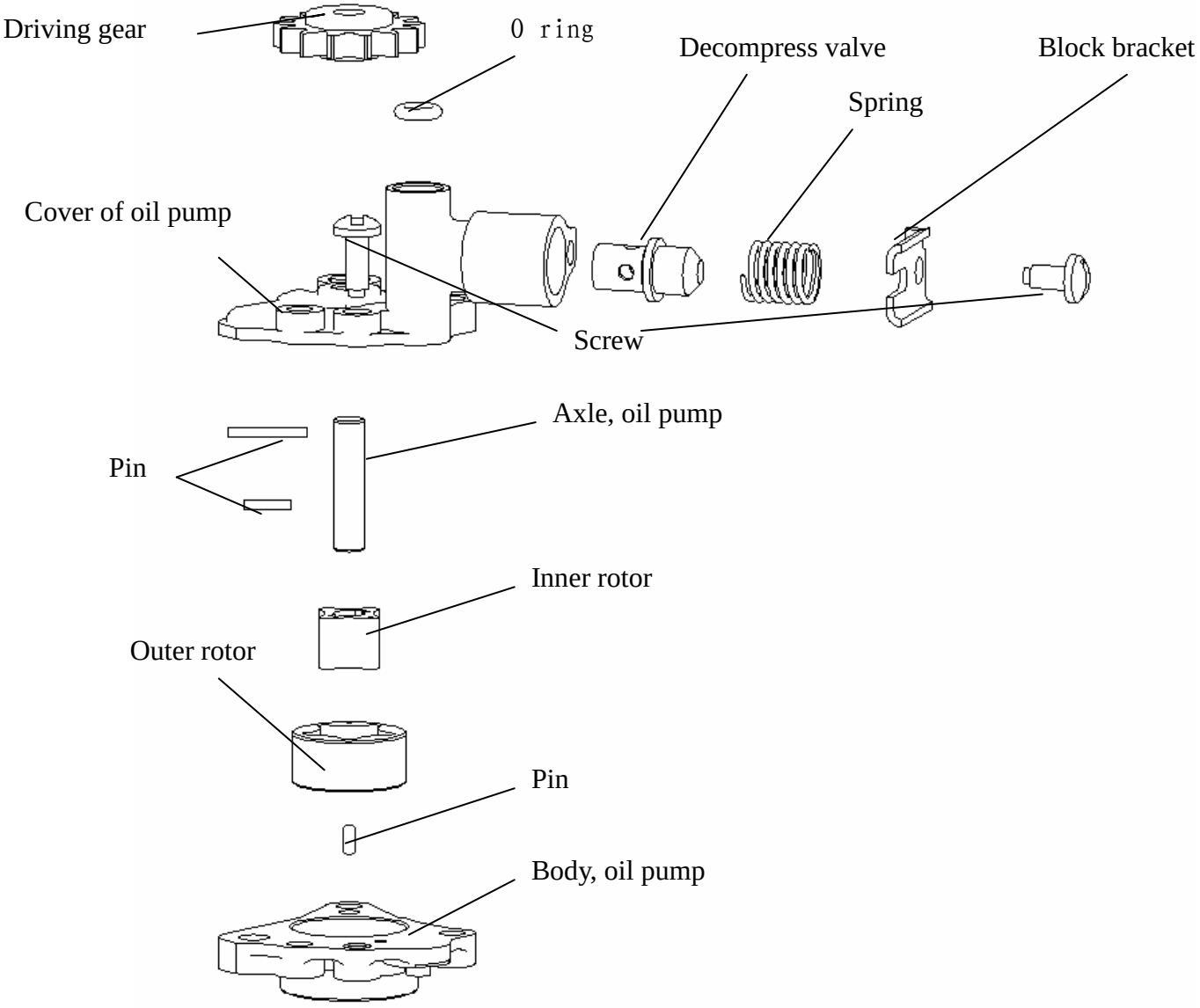
The installation sequence is the reverse of removal.

# 9. Lubrication system

## Lubrication



Schematic of oil pump



## 9.1 Service Information

Procedural caution

After the removal, clean all individual components and dry them using compressed air. During removal, avoid allowing any foreign material to enter the crankcase.

Specification

| Item | | Standard | Limit |
|---|---|---|---|
| Engine oil capacity | At replacement | 1.3L | / |
| | At disassembly | 1.6L | / |
| Rotor | Inner rotor to outer rotor clearance | 0.115-0.175 | 0.25 |
| | Outer rotor to pump body clearance | 0.065-0.119 | 0.18 |
| | Rotor end to pump body clearance | 0.05-0.1 | 0.15 |

## 9.2 Troubleshooting

Engine oil quantity reduced

Normal oil consumption/use
Oil leakage
Worn or faulty piston rings

Engine overheating

No engine oil or oil pressure is too low
Blocked lubrication passageway

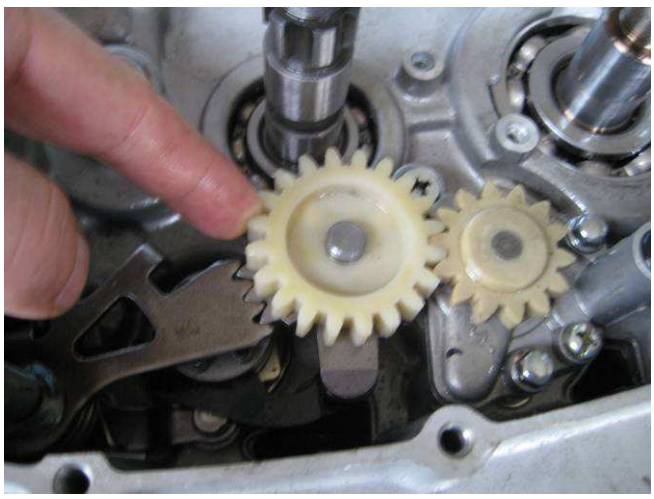
## 9.3 Oil pump

9.3.1 Removal Procedure

Unscrew the bolts and remove the right engine cover.


Remove the clutch.

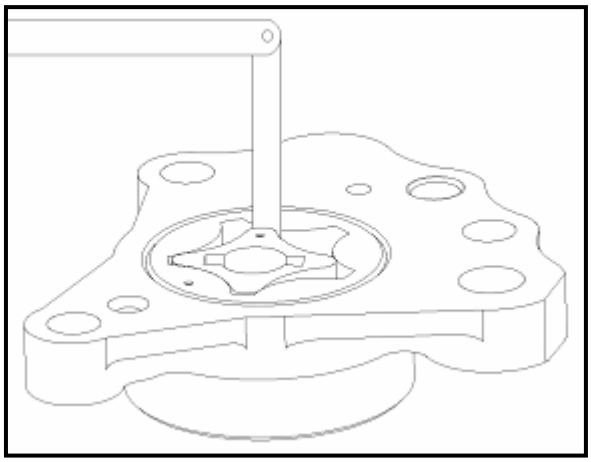
Remove the driving gear circlip.



Remove the oil pump and disassemble the oil pump.

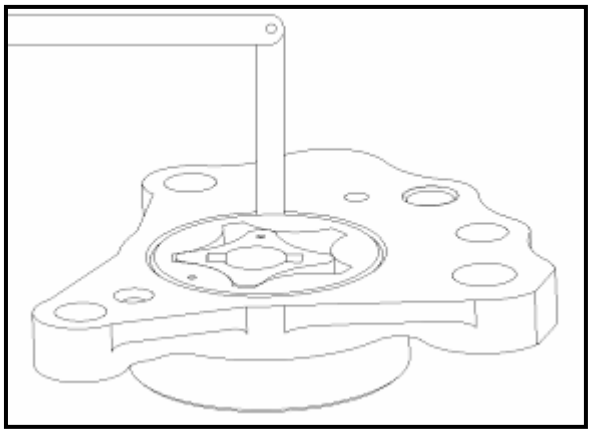
Measure the inner rotor to outer rotor clearance by feeler gauge.

**Limit: 0.25 mm**



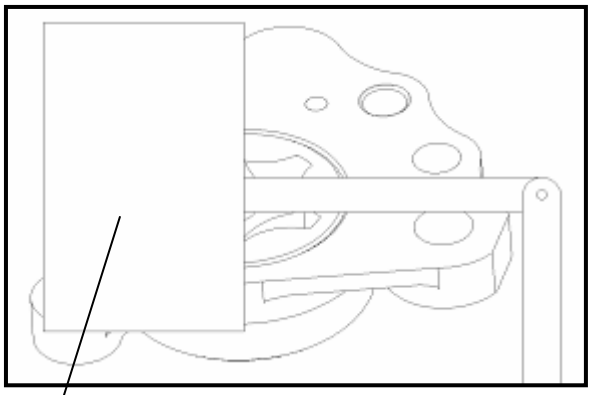
Measure the outer rotor to the pump body clearance.

**Limit: 0.18 mm**



Measure the outer rotor end to the pump body clearance.

**Limit: 0.15 mm**



**Straight edge**

9.3.2 Assembly

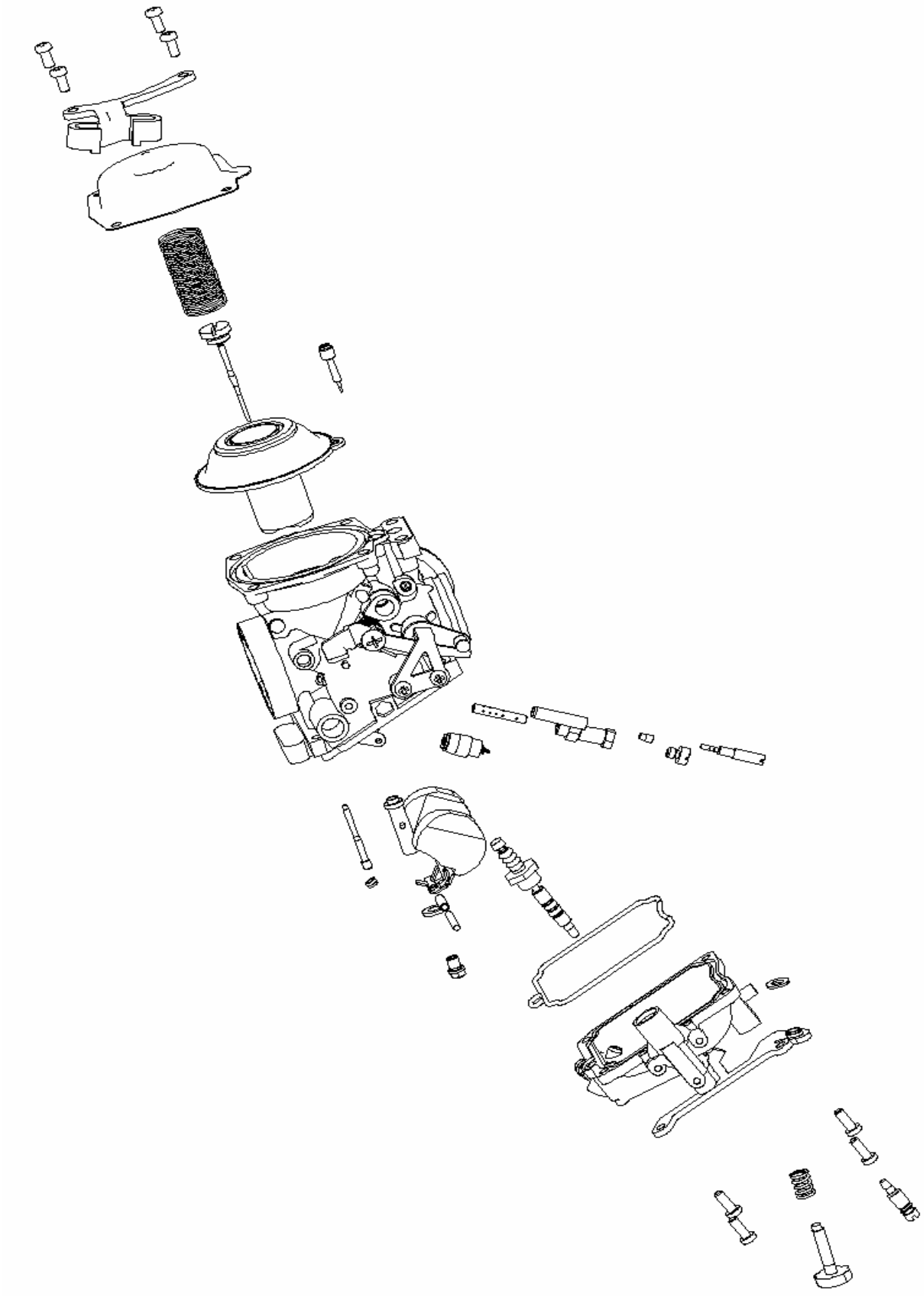
Install the oil pump in the reverse order of removal.

**Caution:**

After the installation, make sure the rotor rotates freely.

# 10. Carburetor

## Carburetor



Service Information----------10.1

## 10.1 Service Information

Procedural caution

***Caution**

·Fuel (Petrol) is highly flammable. Do not smoke or allow flames or sparks in the working area.

·Do not bend or twist cables, damaged cables will not operate freely and smoothly

·After carburetor removal, plug the intake pipe using a clean towel to prevent contaminants entering the cylinders.

·When the motorcycle is not used for over one month, drain the fuel (petrol) from the carburetor via the drain screw. This will prevent fuel breakdown and the resultant clogging and varnish build up inside the carburetor.

Specification mm

| Item | Standard |
|---|---|
| Main Jet | 92.5 |
| Idle jet | 50 |
| Needle | A01-0 |

## 10.2 Troubleshooting

Engine is hard to start Engine idles roughly, stalls or runs poorly

· No spark at spark plug
· Compression too low
· No fuel to carburetor
-Clogged fuel filter
-Clogged fuel line
-Clogged needle valve in carburetor
-Incorrect float level
·Clogged in fuel system
· Faulty ignition
·Fuel mixture is too rich/lean
· Inferior fuel quality
· Improper oil level
· Incorrect idle adjustment

## Excessive fuel in engine

-Clogged air cleaner
-excessive fuel

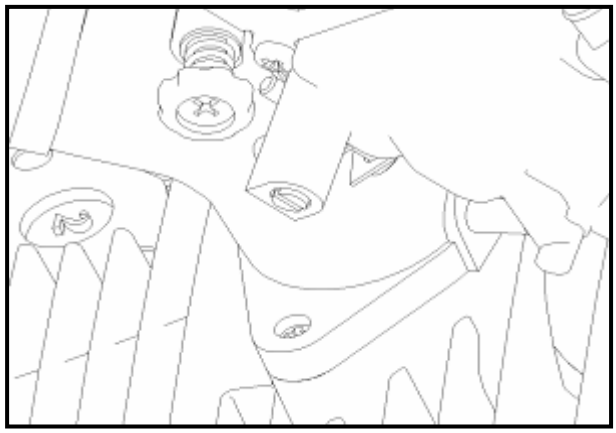
## Lean Mixture

· Clogged fuel jets
· Air leakage on the intake pipe
· Float level too low
· Clogged fuel filter
· Clogged air cleaner
· Faulty float valve

## Rich Mixture

· Faulty enrich valve
· Faulty needle valve
· Fuel level in carburetor is too high
· Excessive fuel in carburetor
· Blockage in air intake
· Fouled air cleaner

## 10.3 Carburetor removal



### 10.3.1 Removal

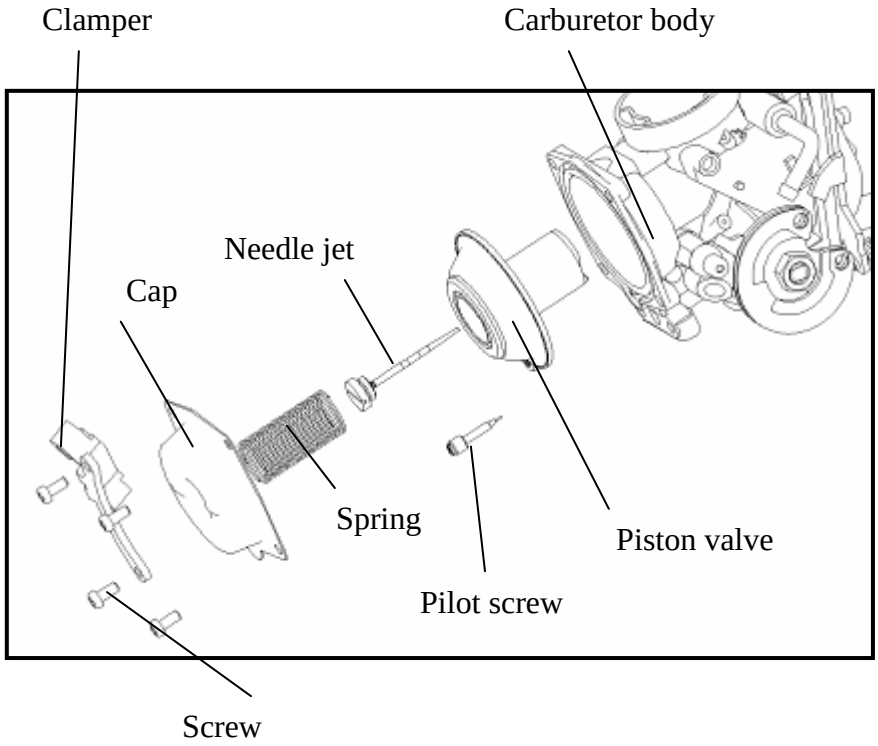
Unscrew the throttle cable lock nuts.

Unscrew the carburetor intake clamps.

Remove the carburetor from the motorcycle.

## 10.3.2 Carburetor disassemble

Remove the carburetor cap and remove the spring and the piston valve.



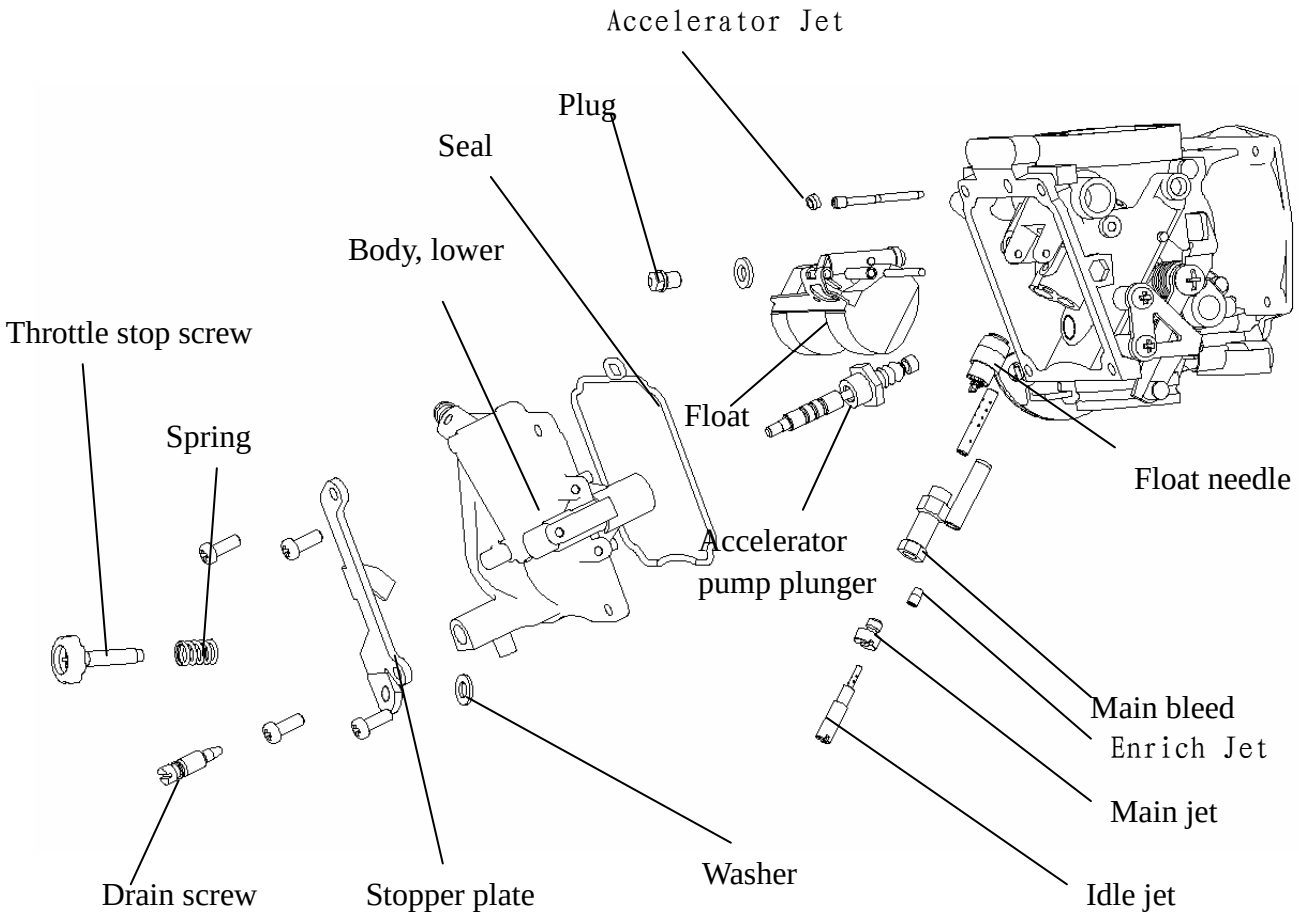

Inspect the piston valve and the needle jet for wear, replace if necessary.

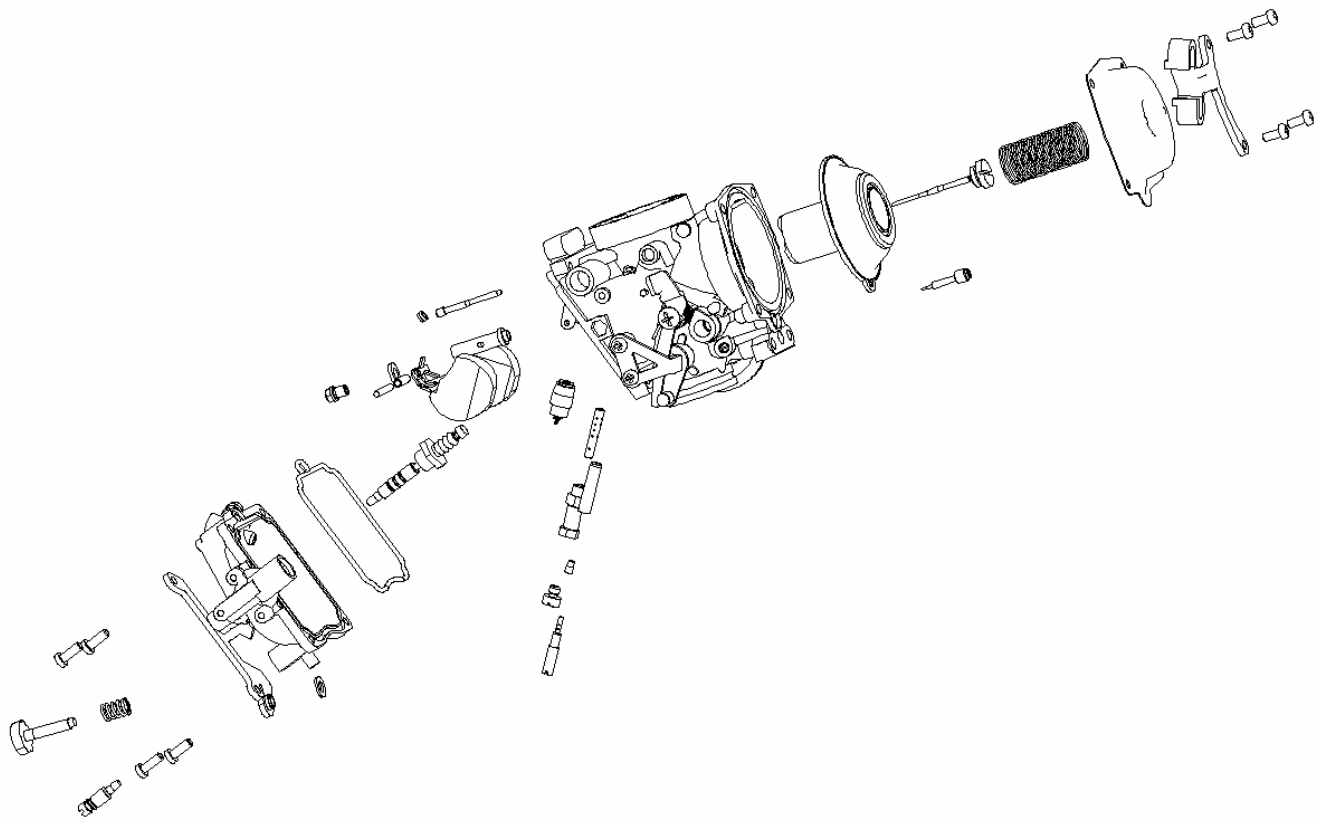
Remove the lower body and drain screw.

Remove the float pin, float needle and the float.

Remove the idle jet, main jet, accelerator jet, pilot jet.

Remove the idle adjuster screw and spring.


Accelerator Jet
Plug
Seal
Body, lower
Throttle stop screw
Spring
Float
Float needle
Accelerator
pump plunger
Main bleed
Enrich Jet
Main jet
Idle jet
Washer
Drain screw
Stopper plate



10.3.3 Inspection

Inspect the needle valve, the needle valve seat and float for wear or damage, replace it if necessary.

Replace the complete carburetor if the float valve seat is worn.

Inspect the idle jet, main jet, replace if worn.

Inspect the piston diaphragm for horizontal grooves or tears, replace it if necessary.

Clean the main jet, needle jet and other loose metal parts with a specially formulated carburetor solvent.

## 10.4 Assembly

Install the idle jet, main jet.

Install the float, the float pin and the needle valve.

Install the carburetor gaskets, remaining carburetor body components.

Note:

The installation sequence is the reverse order of removal.

# 11. Fuel Pump

Fuel pump operation inspection:

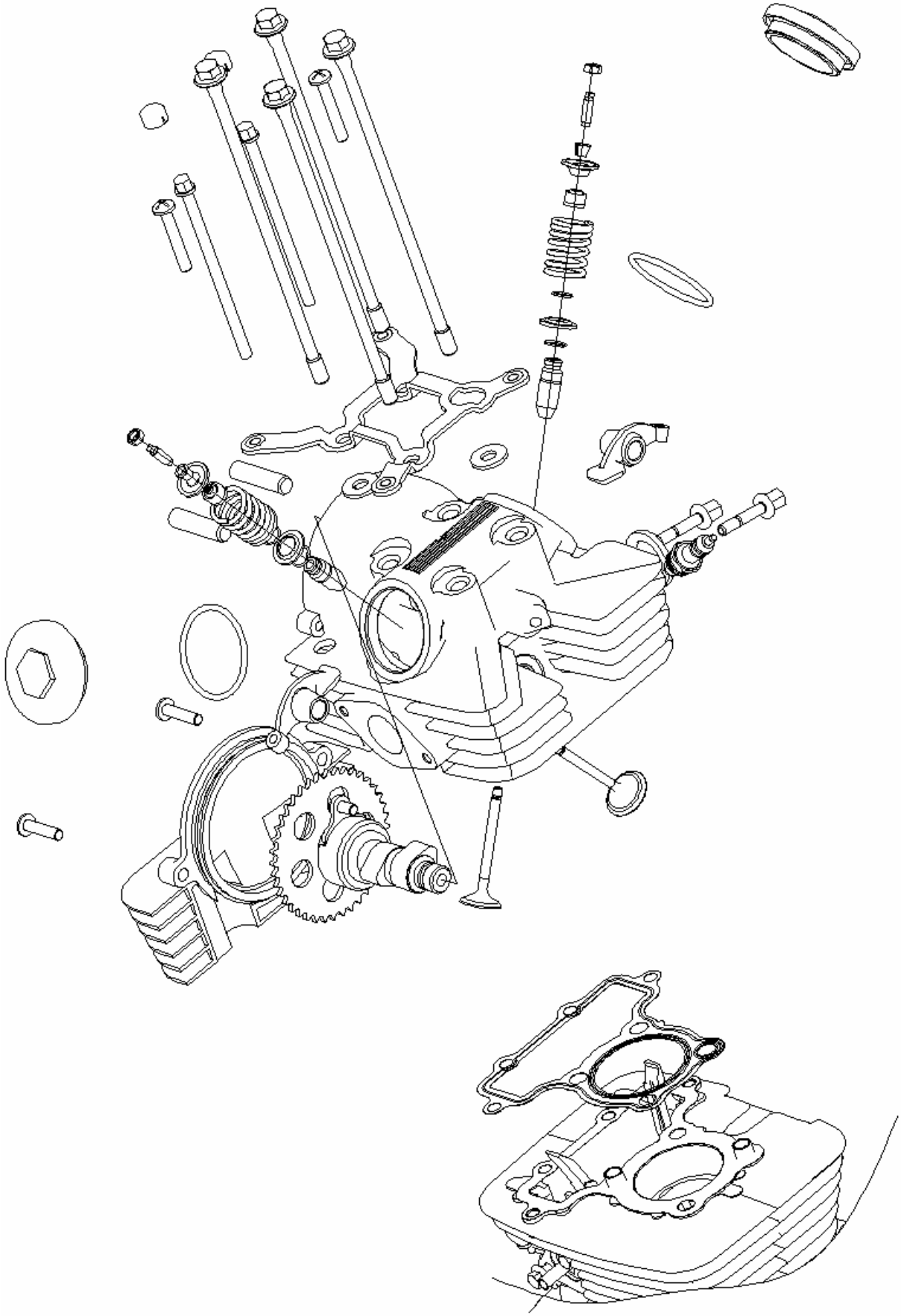
1. Ensure enough fuel is in the fuel tank.
2. Turn the fuel cock to ‘on’.
3. Disconnect the fuel hose from the fuel pump to the carburetor.
4. Turn on the main switch.
5. Shift the transmission to neutral, release the single stand (single stand kill switch).
6. Press the ‘start’ button, check if the fuel flows out from the fuel pump.

**Note:**

Do not attempt to repair the fuel pump if the pump is damaged or leaking.

Be sure to connect the hoses correctly.

Check the fuel line circlips for proper positioning and tension. Replace if worn.



# 12. Cylinder head/Valve



## 12.1 Service Information

### Procedural Caution

Clean all the individual parts before inspection and dry using compressed air.

Specification mm

| Item | | | Standard | Limit |
|---|---|---|---|---|
| Cylinder Head Flatness | | | 0.015 | 0.02 |
| Valve Guide tube | Valve clearance | In. | 0.08-0.12 | __ |
| | | Ex. | 0.1-0.14 | __ |
| | OD of valve | In. | 4.965-4.975 | 4.925 |
| | | Ex. | 4.955-4.965 | 4.915 |
| | ID of valve guide tube | In. | 5-5.012 | 5.03 |
| | | Ex. | 5-5.012 | 5.03 |
| | Valve to guide tube clearance | In. | 0.025-0.047 | 0.08 |
| | | Ex. | 0.035-0.057 | 0.10 |
| | Width of valve seat | In./Ex. | 0.9-1.1 | 1.6 |
| Valve spring | Free length | In./Ex. | 29.75 | 27.85 |
| Rocker | OD of rocker arm shaft | In./Ex. | 9.982-9.988 | 9.95 |
| | ID of rocker arm | In./Ex. | 10-10.015 | 10.05 |
| | Arm to shaft clearance | In./Ex. | 0.012-0.033 | 0.08 |
| Camshaft | Cam height | In. | 26.155-26.185 | 26.055 |
| | | Ex. | 26.155-26.185 | 26.055 |

## 12.2 Troubleshooting

### Compression too low

Incorrect valve clearance
Burn or bent valve
Air leakage at valve seat
Air leakage at cylinder head gasket
Faulty spark plug

### Cylinder head noise

Incorrect valve clearance
Damaged valve spring
Worn or damaged camshaft
Worn camshaft and rocker arm

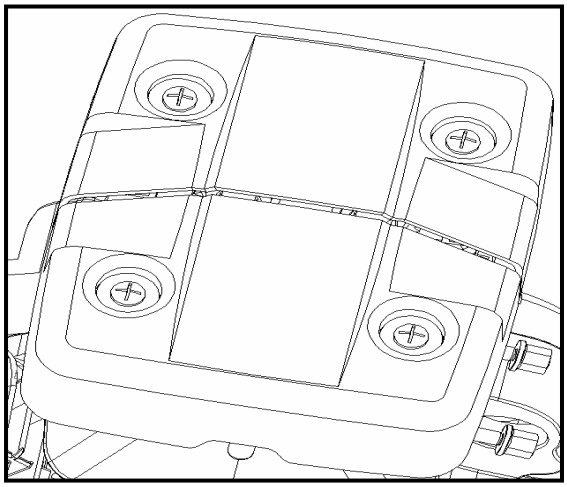
### Compression too high

Carbon formed in combustion chamber

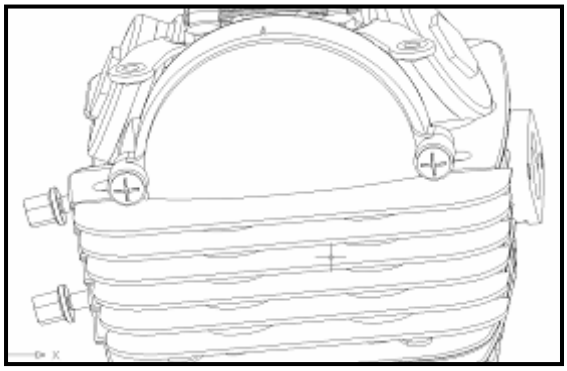
## 12.3 Cylinder head

### 11.3.1 Removal procedure

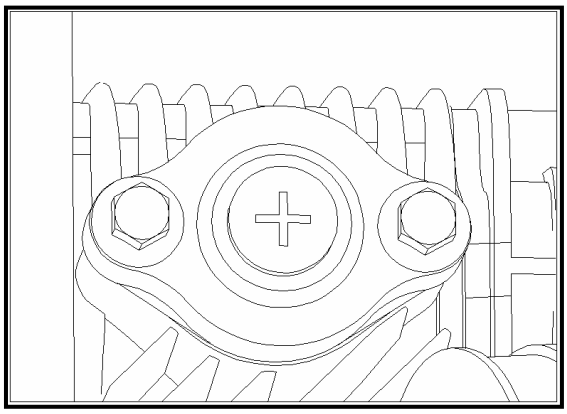
Unscrew the four bolts and remove the decorating cover from the cylinder head.



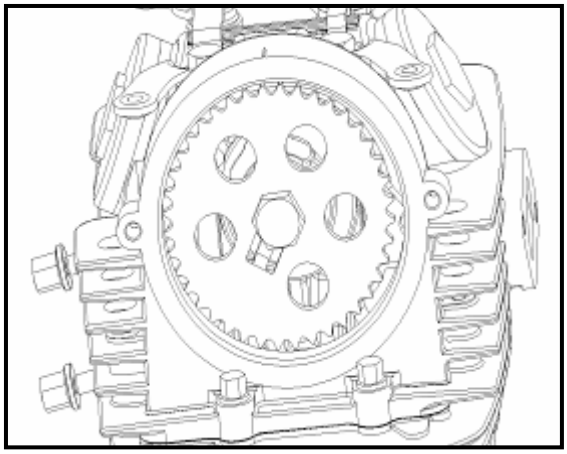
Unscrew the bolts, remove the side cover from the cylnder head.



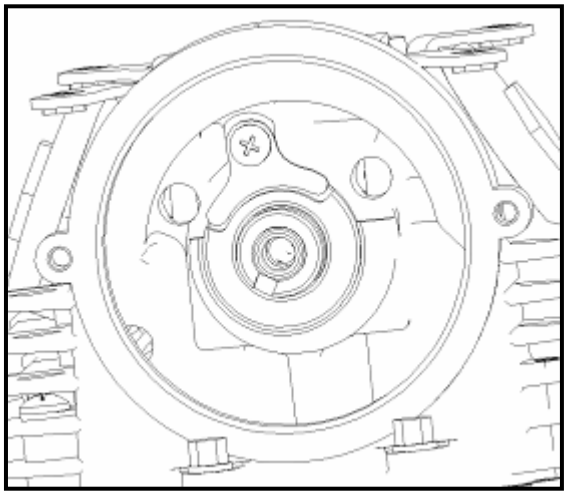
Unscrew the bolts and remove the chain tensioner



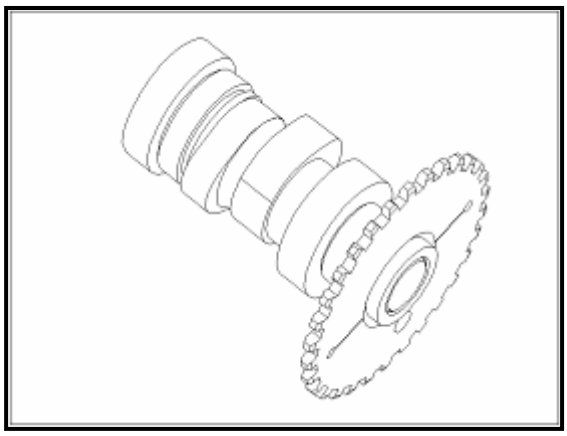
Remove the locking screw and the timing sprocket.



Remove the lock plate and remove the camshaft.



## 12.4 Camshaft inspection



Inspect the working area of camshaft, replace it if worn or overheated.

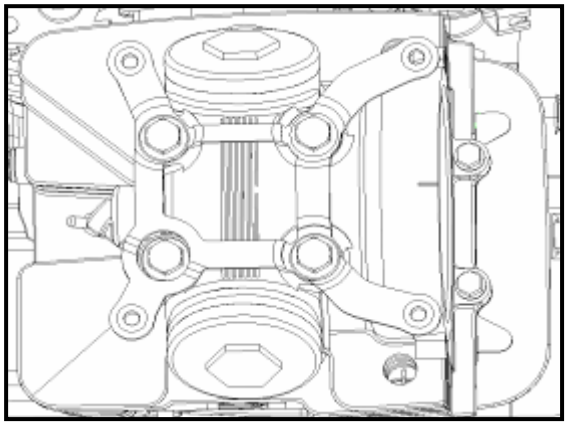
Inspect the height of the cam lobe for wear, replace it if necessary.

**Limit**

**Height of cam lobe**

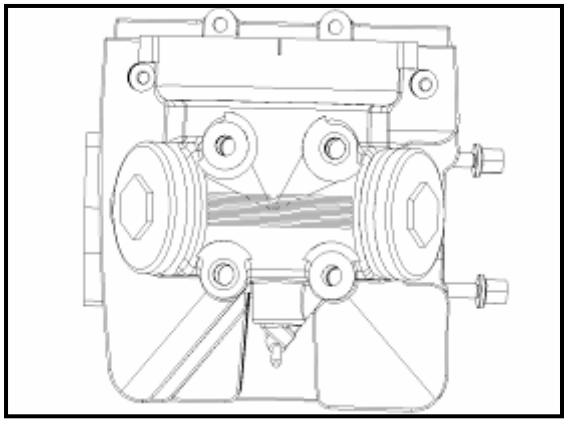
**In.: 26.090mm**

**Ex.: 26.055mm**



Unscrew the bolts in a crisscross pattern, remove the cylider head from the engine.

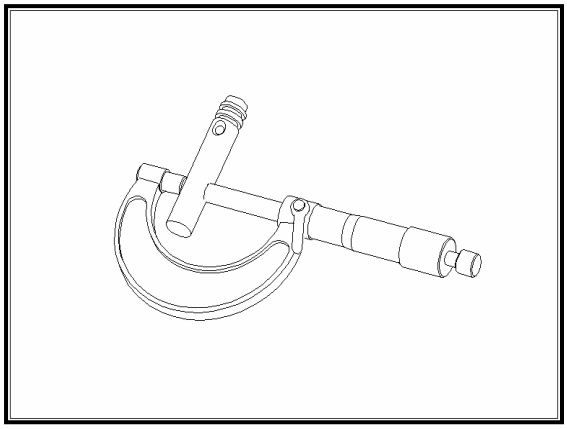
Remove the cylinder head tappet caps.



Screw a 6 mm bolt to the rocker arm shaft then remove the rocker arm shaft from the cylinder head, remove the rocker arm.

Inspect the OD of the rocker arm shaft

**Limit: 9.95mm**

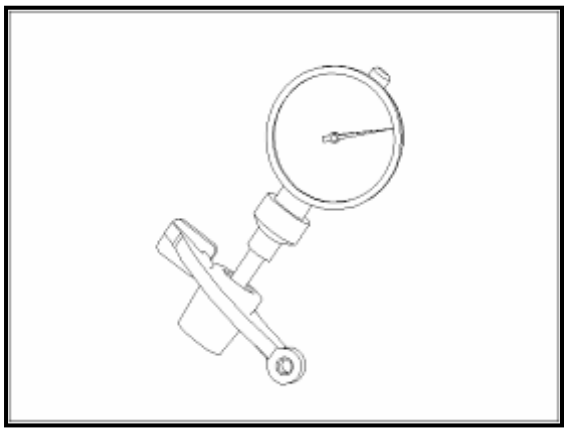


Inspect the ID of the rocker arm

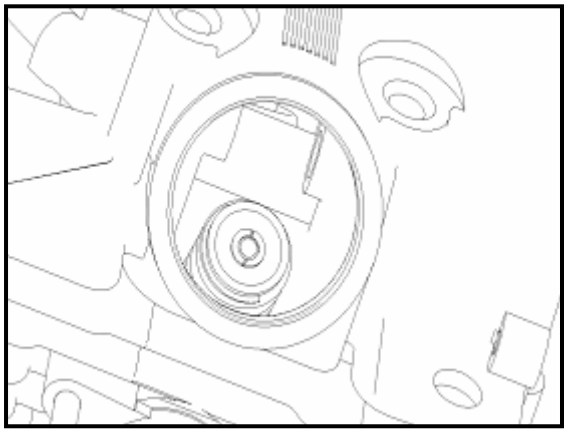
**Limit: 10.05mm**

Arm to shaft clearance

**Limit: 0.08mm**

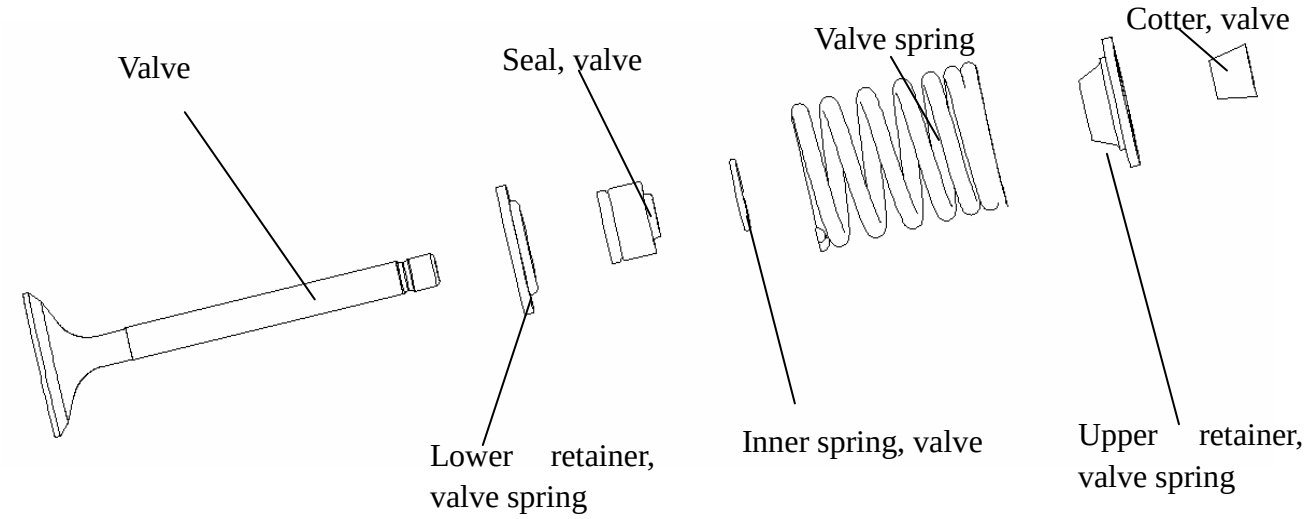


Remove the valve cotters, spring and retainer using a valve spring compressor.



## 12.5 Valve

Valve System removal



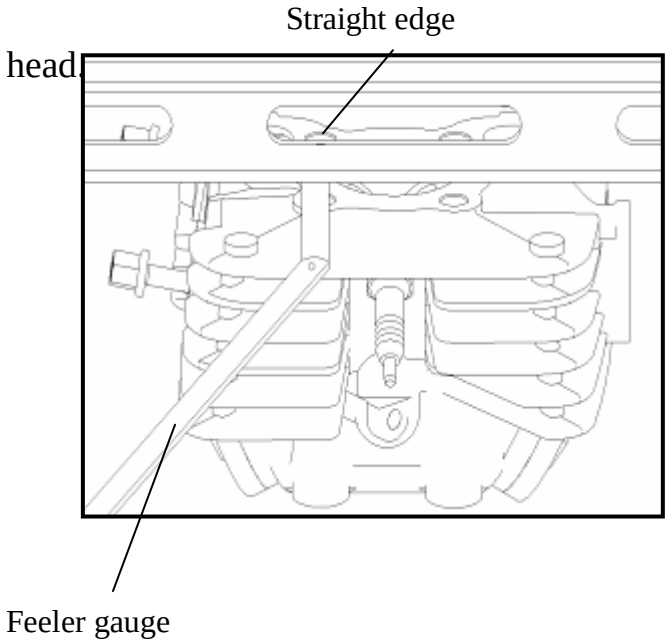

Remove the valve system using a valve spring compressor.

## 12.6 Valve clearance inspection and adjustment

Remove the carbon buildup from the cylinder head.

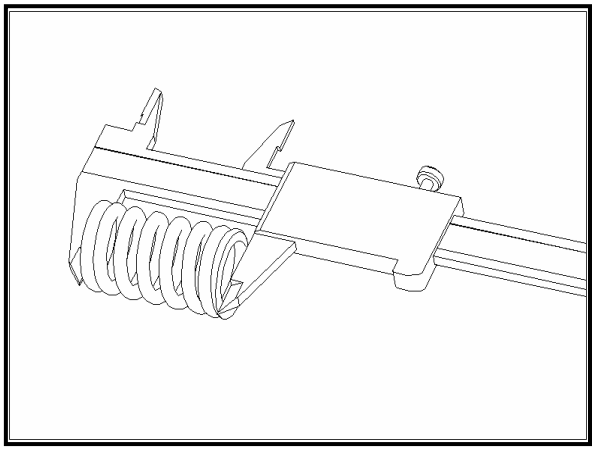
Inspect the flatness of cylinder head bottom.

**Limit: 0.02mm**



Inspect the free (uncompressed) length of the valve spring

**Limit: 27.85mm**

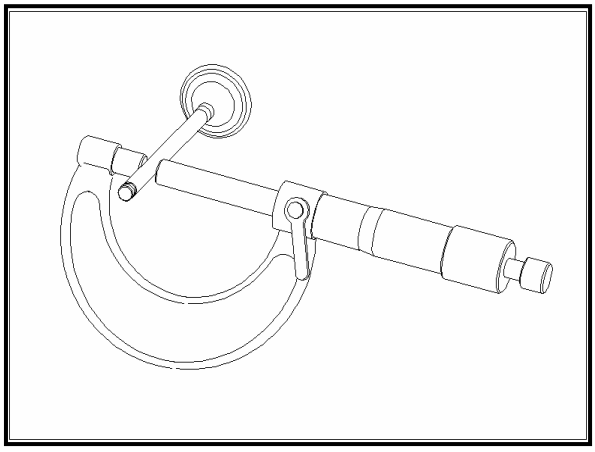


Inspect the OD of the valve

**Limit:**

**In.: 4.925mm**

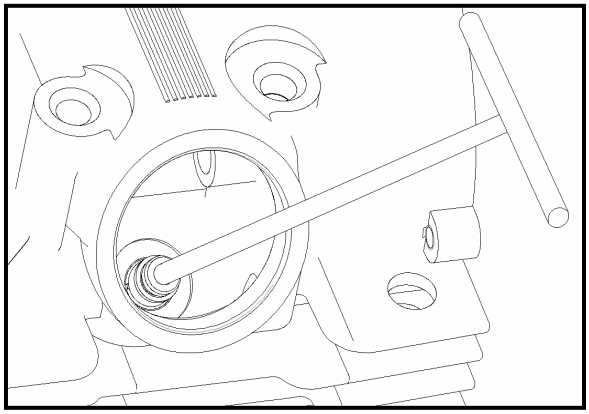
**Ex.: 4.915mm**



Inspect the valve guide

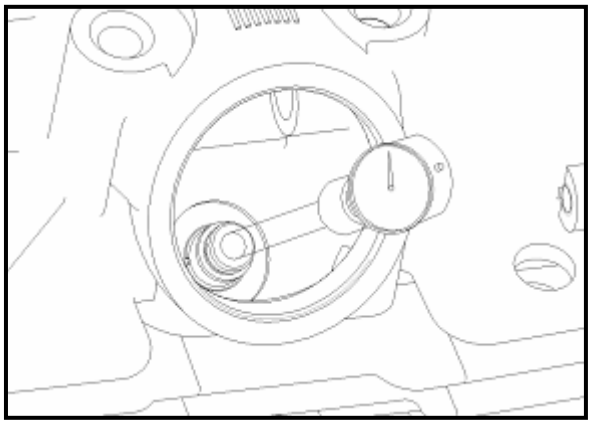
Remove carbon fouling with a bore reamer before performing the inspection.

Caution: Turn the reamer in a clockwise direction



only, do not turn the reamer anticlockwise.

Inspect ID of valve guide



**Limit**

**In./Ex.: 5.03mm**

Clearance between the valve and valve guide

Limit:

**In.: 0.08~0.12mm (cold)**

**Ex.: 0.10~0.142mm (cold)**

## 12.9 Assembly

The installation sequence is the reverse order of removal.

**Caution:**

The shorter valve guide end should be towards the combustion chamber while re-installing.

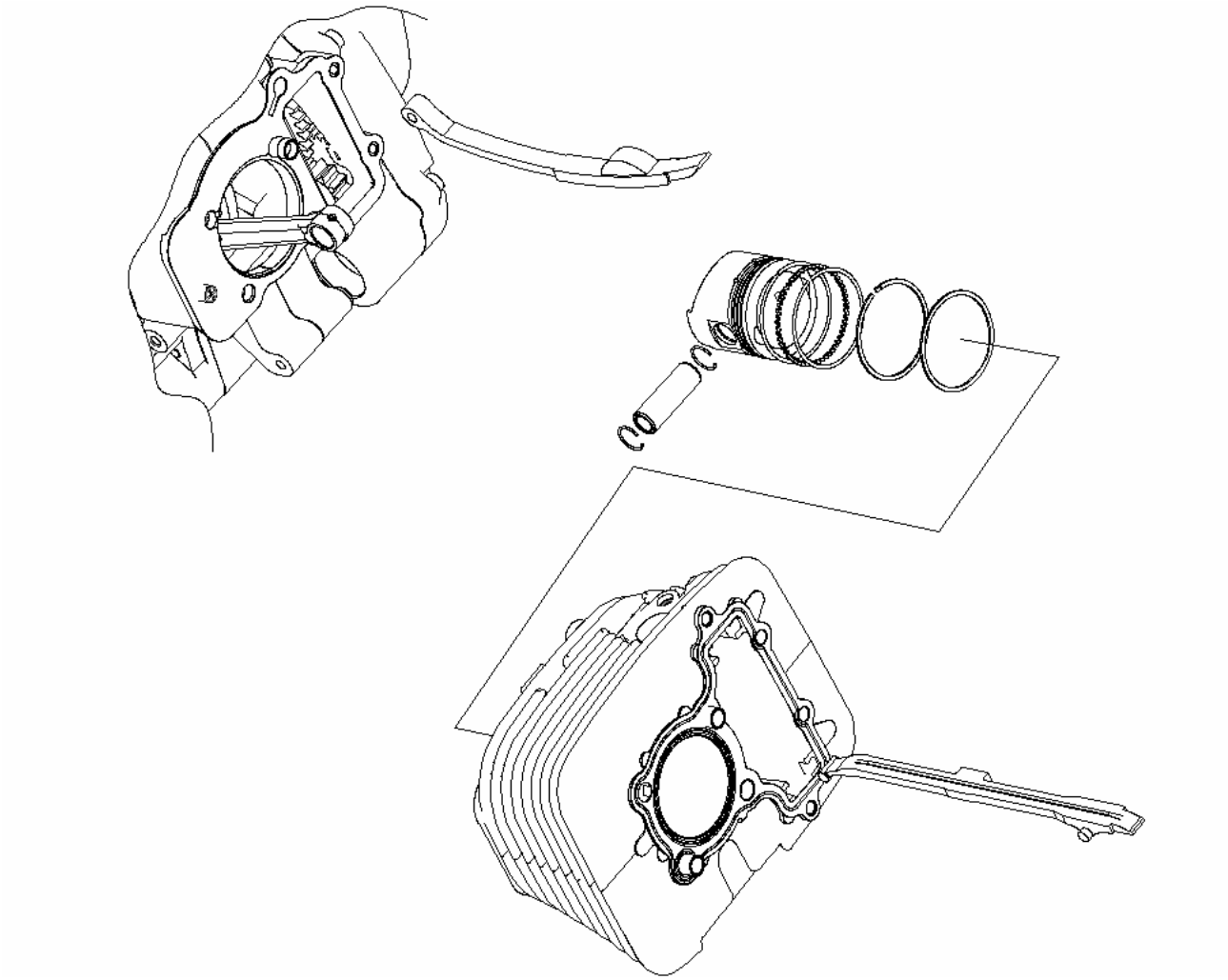
Be sure to install new valve stem seals.

Install the valve cotters using a valve spring compressor.

Apply some engine oil to the valves before inserting the valves into the valve guides.

# 13. Cylinder/Piston

## Cylinder & piston



## 13.1 Service Informaion

Proceedural Caution

Clean all the individual parts and dry them using compressed air.

Specification mm

| Item | | | Standard | Limit |
|---|---|---|---|---|
| Cylinder | ID(inner diameter) | | 49-49.011 | 49.08 |
| | Cylindricity | | - | 0.04 |
| | Roundness | | - | 0.04 |
| | Flatness | | 0.02 | 0.04 |
| Piston<br>Piston ring<br>Piston pin | Mark on piston | | Towards to Exhaust valve | / |
| | OD of piston | | 48.97-48.98 | 48.92 |
| | ID of piston pin bore of piston | | 13.002-13.008 | 13.04 |
| | OD of piston pin | | 12.995-13 | 12.96 |
| | Clearance between cylinder and piston | | 0.02-0.041 | 0.10 |
| | Clearance between the piston ring and the piston groove | Top ring | 0.01-0.04 | 0.07 |
| | | Second ring | 0.01-0.04 | 0.07 |
| | Piston ring clearance (installed) | Top ring | 0.10-0.25 | 0.50 |
| | | Second ring | 0.10-0.25 | 0.50 |
| | | Oil ring | 0.2-0.7 | / |
| | Clearance between piston and piston pin | | 0.002-0.013 | 0.02 |
| | ID of con-rod small end | | 13.010-13.018 | 13.05 |
| | Clearance between con-rod and piston pin | | 0.010-0.023 | 0.06 |

## 13.2 Troubleshooting

### Compression is too low

Worn or damaged piston
Worn or damaged cylinder and piston ring
Broken gasket, air leakage at crankcase and cylinder

### Excessive smoke from exhaust muffler

Worn or damaged piston rings
Worn or damaged cylinder and piston

### Compression is too high

Excessive carbon build up in combustion chamber or on piston crown

### Abnormal noise from piston or cylinder

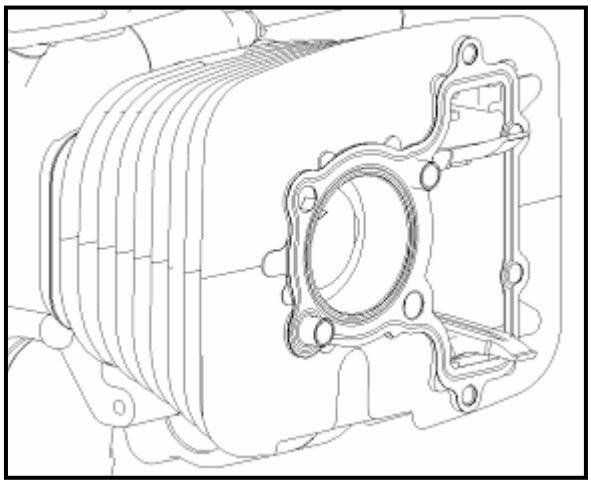
Worn cylinder, piston and piston rings
Worn piston pin bore and piston pin
Incorrectly installed piston

## 13.3 Cylinder

### 13.3.1 Removal

Remove the chain guide II and gasket.

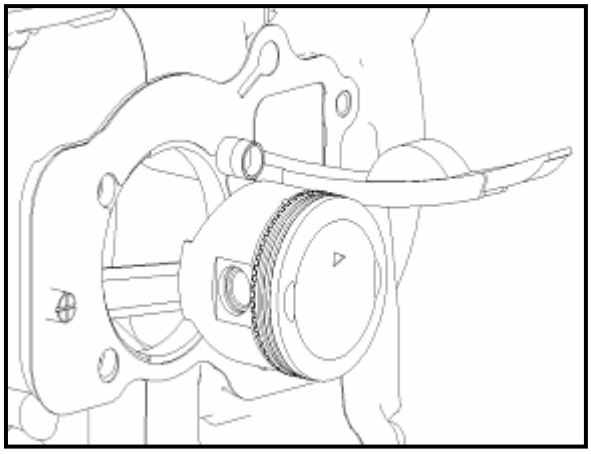
Remove the cylinder.



### 13.3.2 Cylinder inspection

Inspect the cylinder bore for wear or damage.

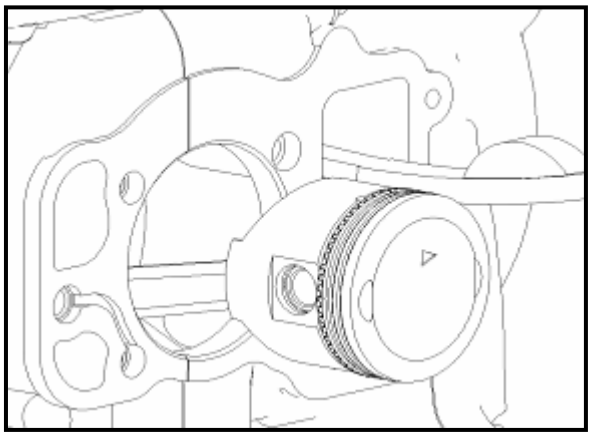
Replace it if out specification.



Remove the gasket and dowel pin.

## 13.4 Piston

### 13.4.1 Removal

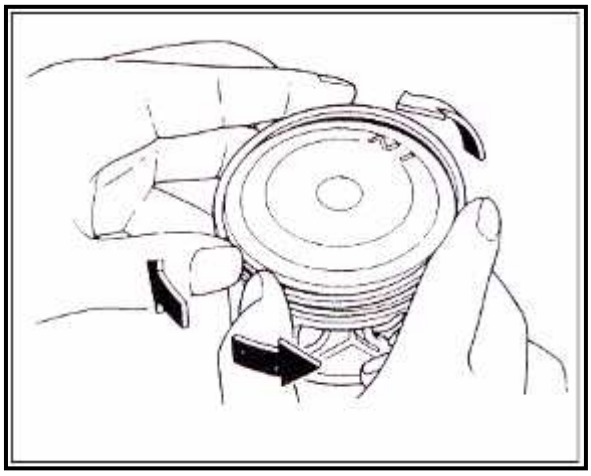


Remove the piston pin clip.

Caution:

Before removing the piston pin clip, cover the crankcase with a clean rag to prevent the clip or other foreign objects from dropping into the crankcase.

Remove piston pin and piston.



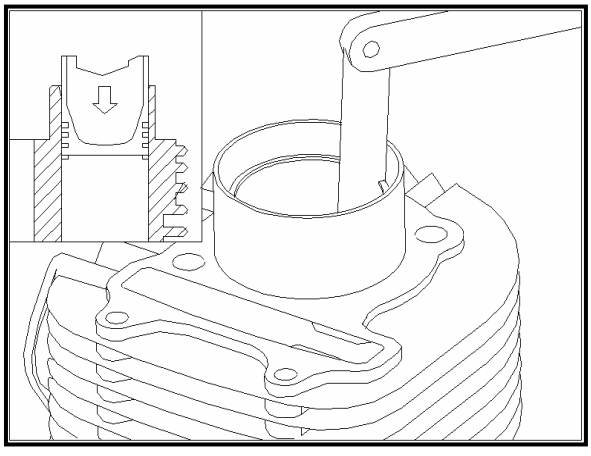
Remove piston ring.

Inspect piston, piston pin and piston rings,

**Caution:**

Be careful not to break the piston rings.

Clean the carbon formed in the piston grooves.



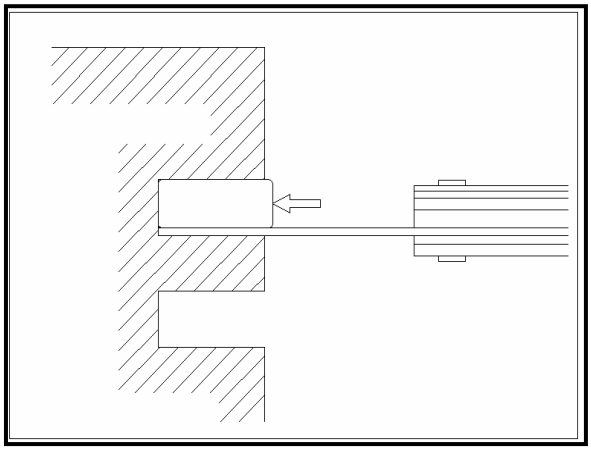
Remove the piston ring and insert the piston ring into the bottom of the cylinder.

Inspect the piston ring gap using a feeler gauge.

**Limit: 0.4.mm**

Install the piston ring.

Measure the clearance between the piston ring and the piston ring groove using a feeler gauge.



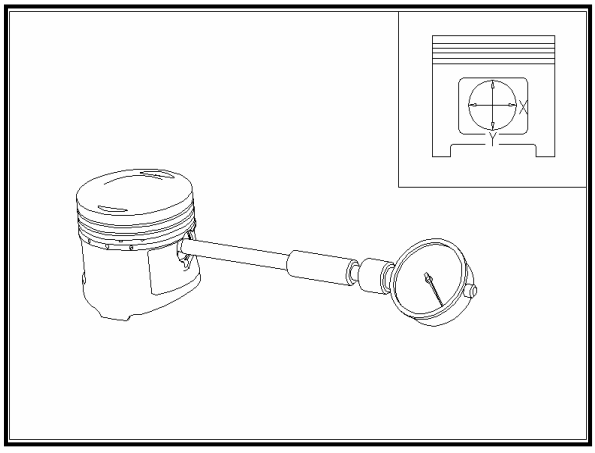
**Limit:**

**Top ring: 0.07mm**

**Second ring: 0.07mm**

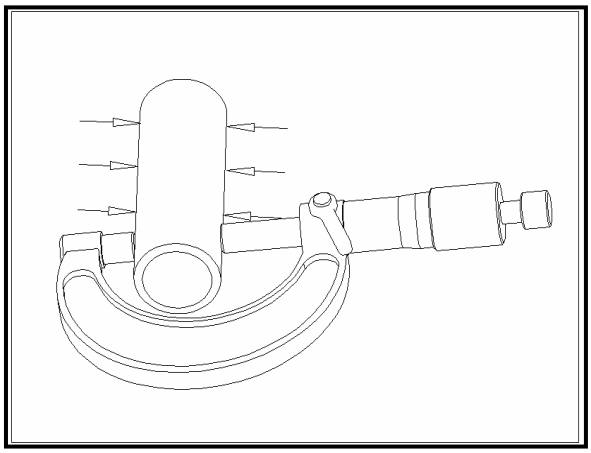
Measure the piston pin bore ID.

**Limit: 13.04mm**



Measure the piston pin OD.

**Limit: 12.96mm**

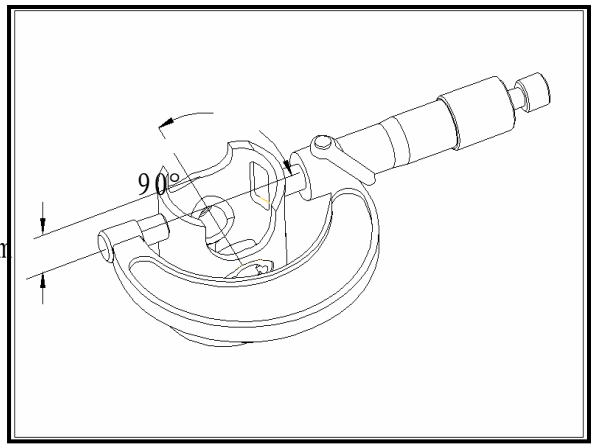


Measure the clearance between the piston pin bore and the piston pin.

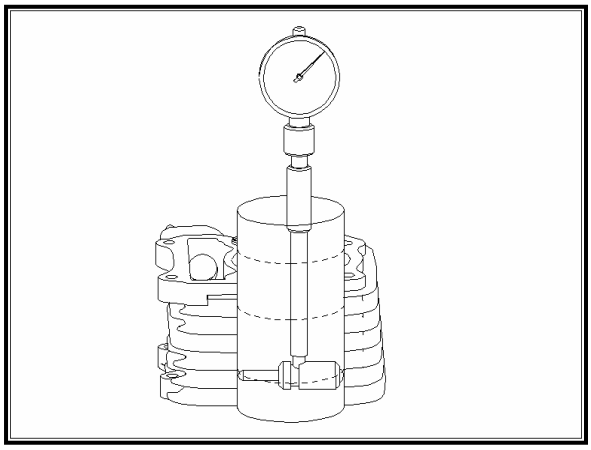
**Limit: 0.04mm**

Measure the OD of the piston.

**Caution: Proper** measurement position is at 90°to the piston pin bore and 11mm in from the bottom of the piston skirt**.**



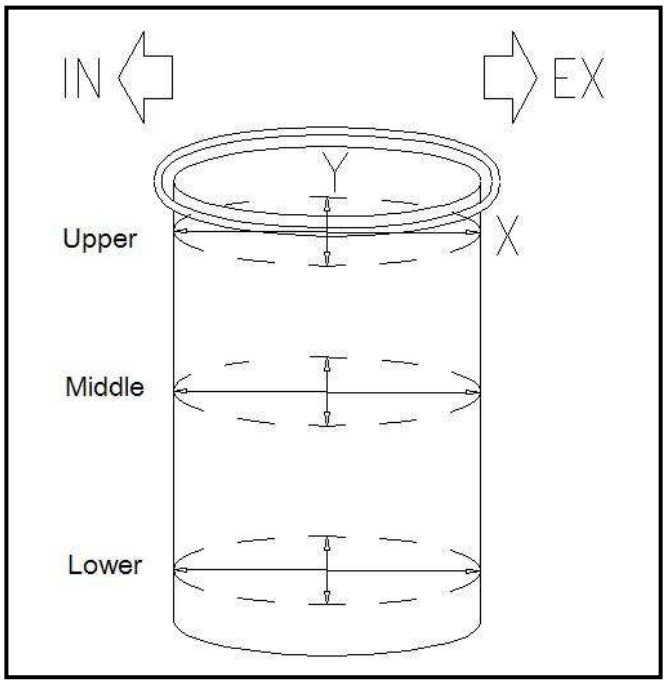

**Limit: 48.92mm**



Inspect the cylinder bore for wear or damage.

Measure the cylinder ID at 3 levels: top, middle, and bottom at 90°to the piston pin location.

**Limit: 49.08mm**



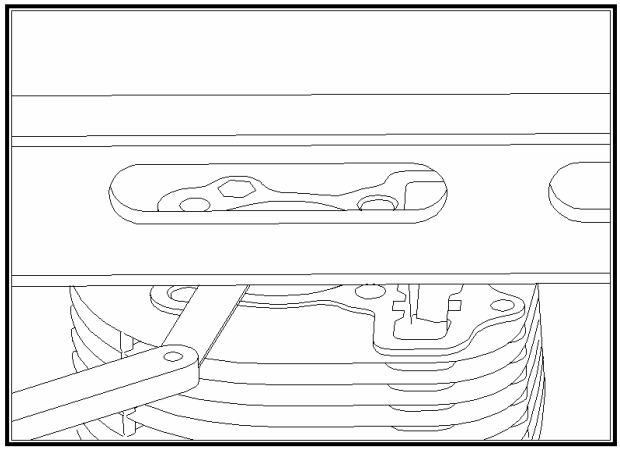

Measure the cylinder to piston clearance.

**Limit: 0.10mm**

Measure the length of the cylinder to ensure uniform diameter throughout. This is the difference between the values measured in X and Y directions. If the cylinder exceeds the following specification it is ovaled, or out of round and should be replaced.

**Limit: 0.04mm**

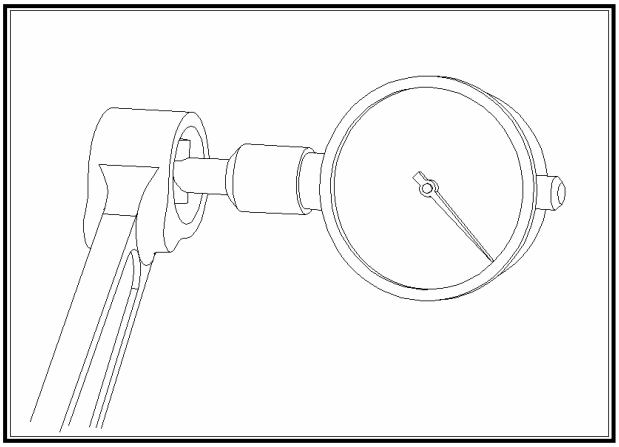
Measure the cylinder diameter at least 3 levels across both X and Y axis at the top, middle and bottom. The cylindricity is different between the values measured at the 3 levels.



**Limit: 0.04mm**

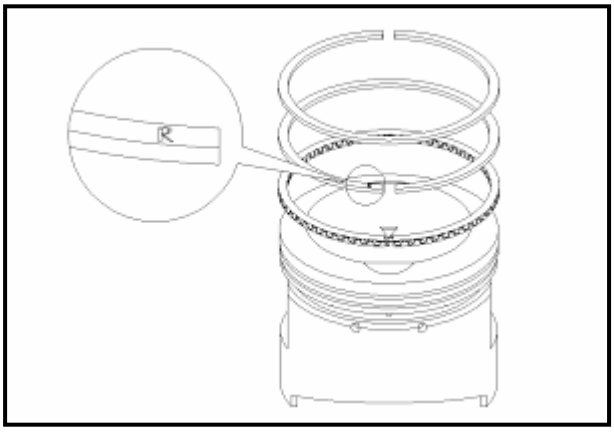
Inspect the top of the cylinder for warpage.

**Limit: 0.04mm**



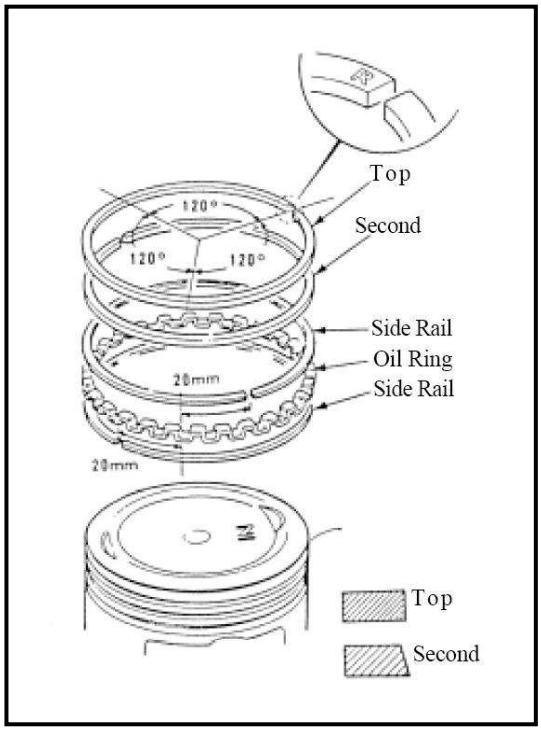
Inspect the diameter of the con-rod small end.

**Limit: 13.05mm**



## 13.5 Piston installation

Apply some engine oil to the piston rings and piston, install the piston ring onto the piston groove.




The mark stamped on the side of the piston ring should face up.

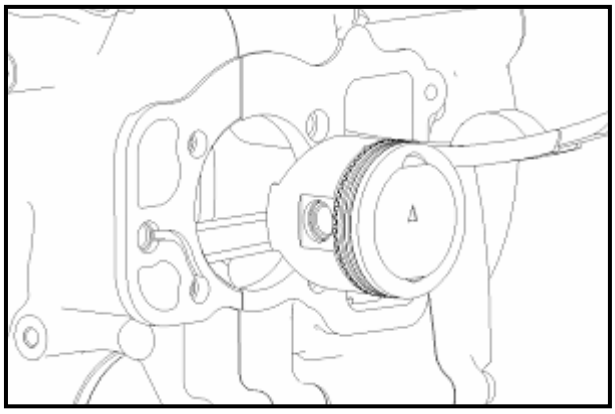
**Caution:**

Be careful not to damage the piston and piston rings during assembly.

The piston rings should rotate freely after installation.

Stagger the piston ring as outlined in the figure below.

Remove any gasket material from the crankcase surface.



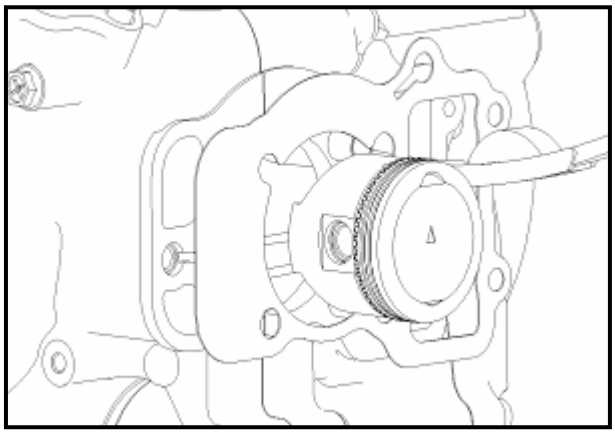
**Caution:** Be careful not to drop any foreign matterial into the crankcase.

Install the piston, piston pin and a new piston pin clips.

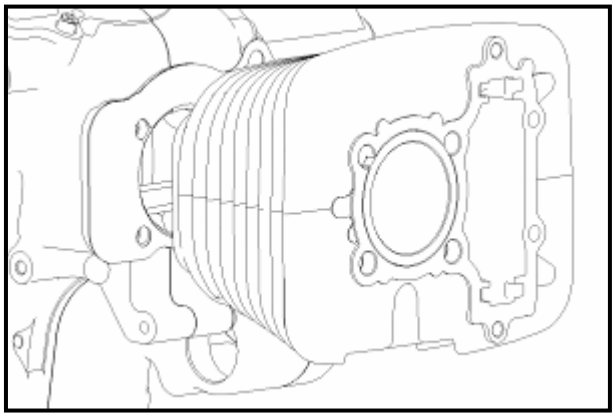
**Caution**: The mark on piston top should point toward the exhaust valve.

## 13.6 Cylinder installation

Install the dowel pin and a new cylinder gasket on the crankcase.



Apply some engine oil to the cylinder, piston and piston rings then install the piston assembly into the cylinder.



**Caution:**

Be careful not to damage or break the piston rings.

# 14. Clutch/Transmission

## Clutch



### 14.1 Service Information

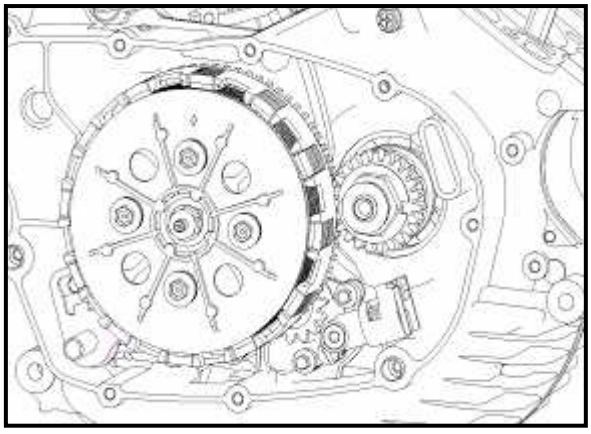
Caution

All the individual components should be cleaned and be dried using compressed air before the inspection.

### 14.2 Troubleshooting

Clutch Troubleshooting please refer to the clutch slipping and dragging.

### 14.3 Clutch



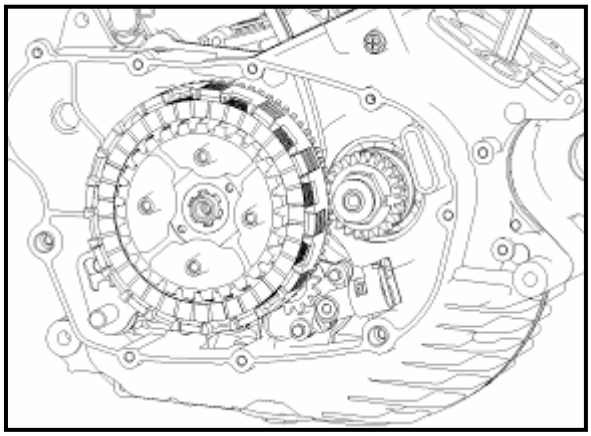
14.3.1 Removal

Loosen the clutch bolts diagonally and remove the clutch spring, the hub seat, the handspike and

the steel ball.

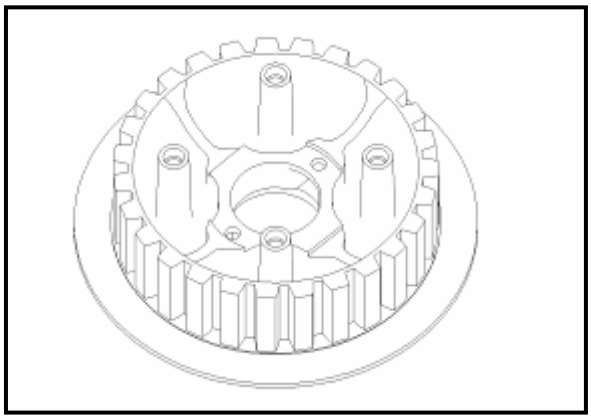
Remove the clutch plate.

Remove the lock nut, washer and clutch hub.



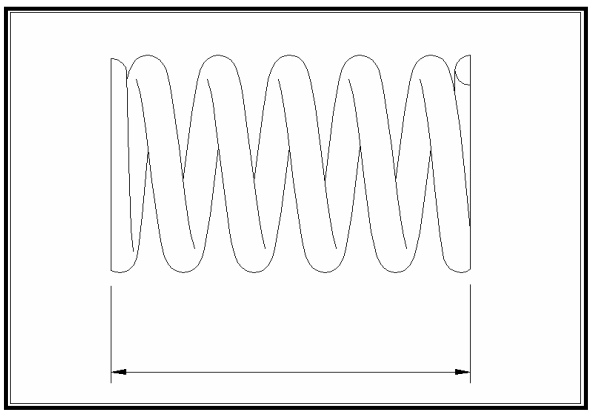
14.3.2 Inspection

Inspect the clutch hub groove for wear, replace if necessary.



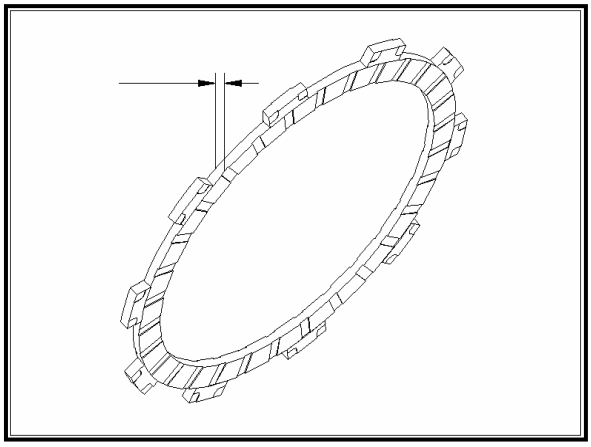
Measure the free length of the uncompressed clutch spring.

**Limit: 35.00mm**

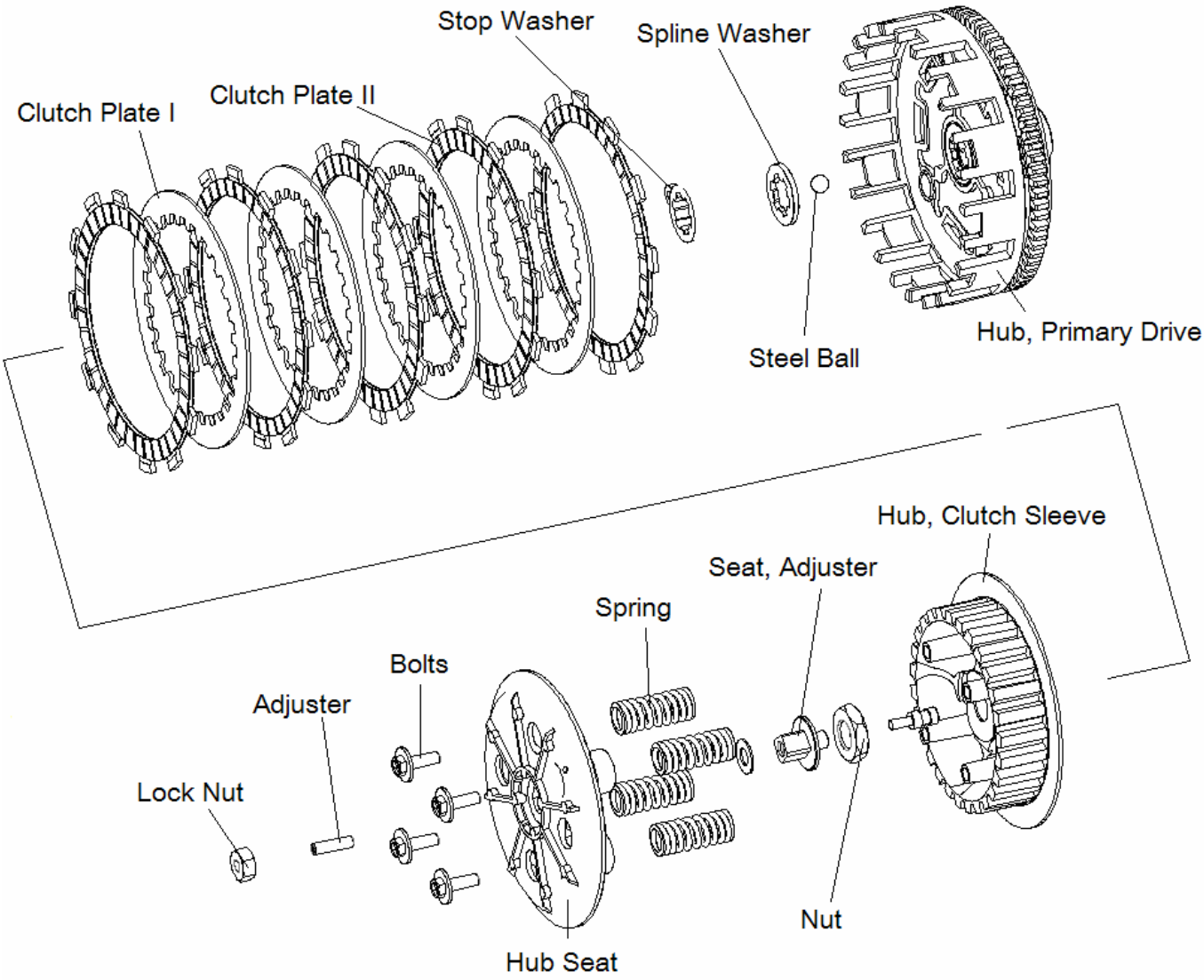


Inspect the width of clutch plates using vernier calipers.

**Limit: 2.5mm**



## Schematic drawing of clutch



### 14.3.3 Installation

The assembly sequence is the reverse order of removal.

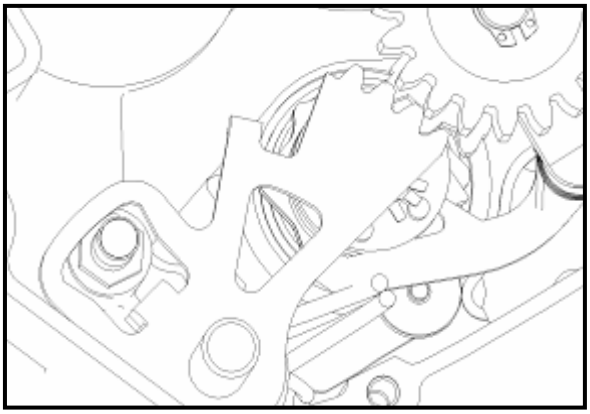
## 14.4 Transmission

### 13.4.1 Removal

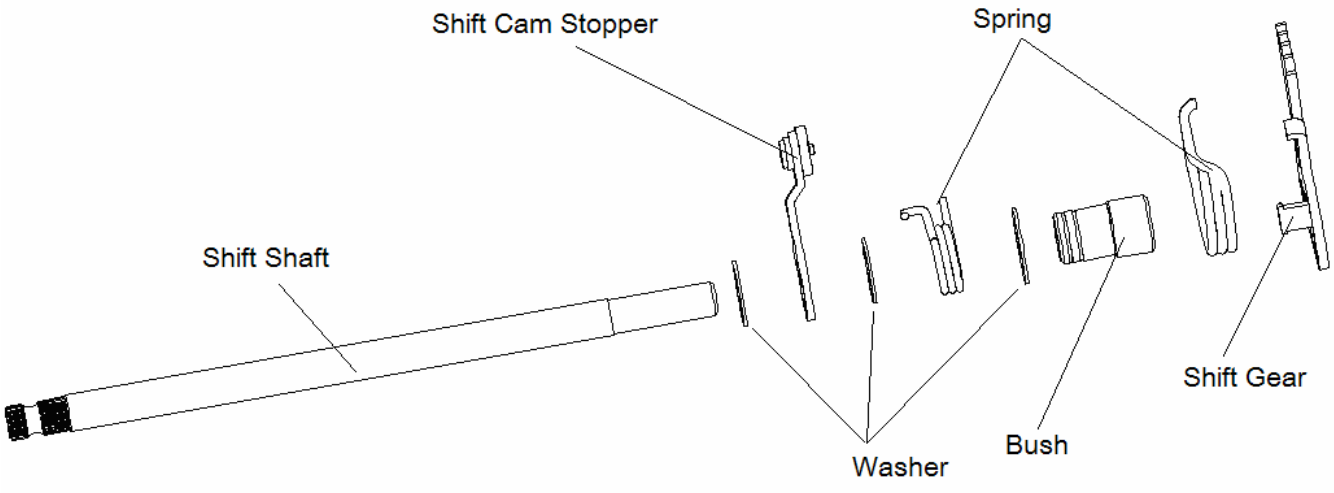
Remove the shift axle assy.

Remove the shift inhibitor.

Remove the needle.



**Schematic drawing of Shift shaft assembly**



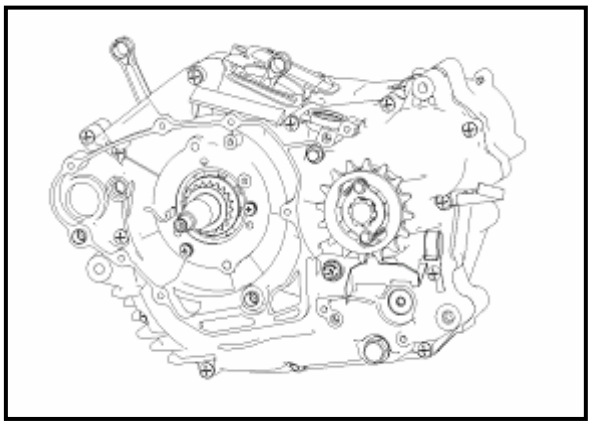

### 14.4.2 Inspection

The shift lever should move freely before removal.

Inspect if the shift lever for damage or wear, replace if necessary.

Inspect the shift axle id bends, replace if out of specification.

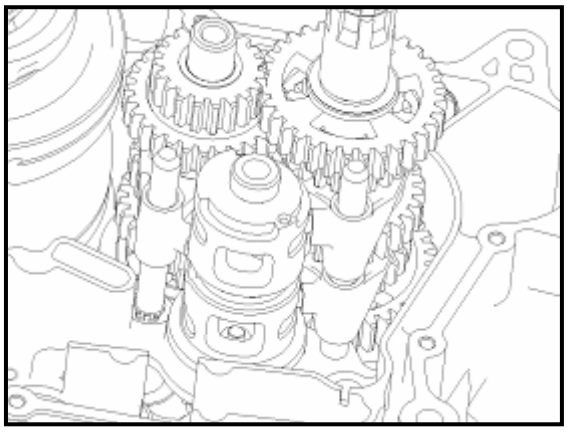
Inspect the spring tension, replace if the spring is weak.



Remove the crankcase mounting bolts.

Caution: Be careful not to damaged the mating surfaces of crankcase.

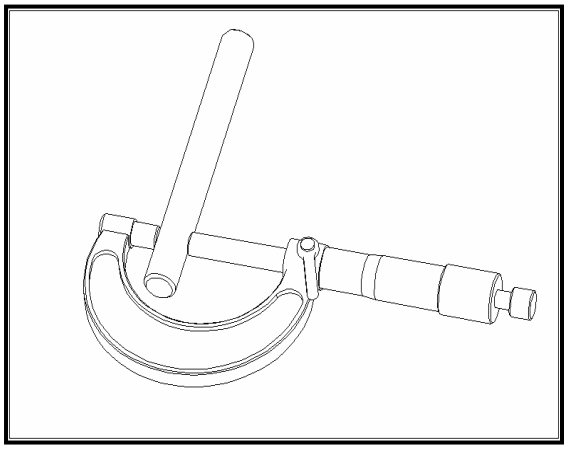
Remove the left crankcase.



Remove the shift fork shaft.

Remove the shift drum.

Remove the shift forks.

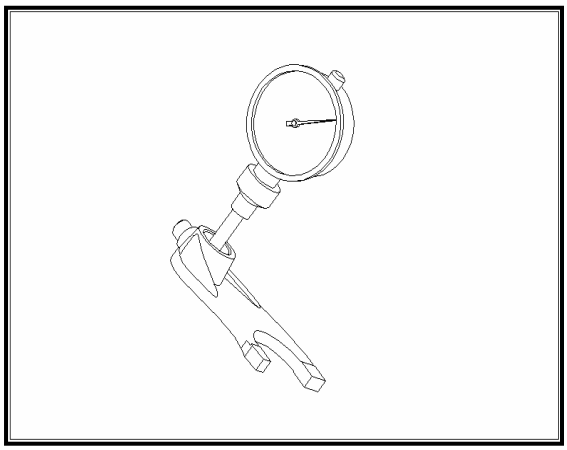


Inspect the shift fork shaft OD.

**Limit: 9.971mm**

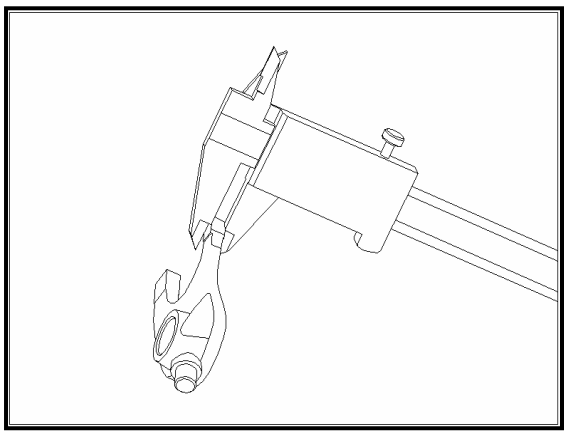
Measure the ID of shift forks.

**Limit: 10.065 mm。**



Measure the width of shift forks.

**Limit: 4.7mm**

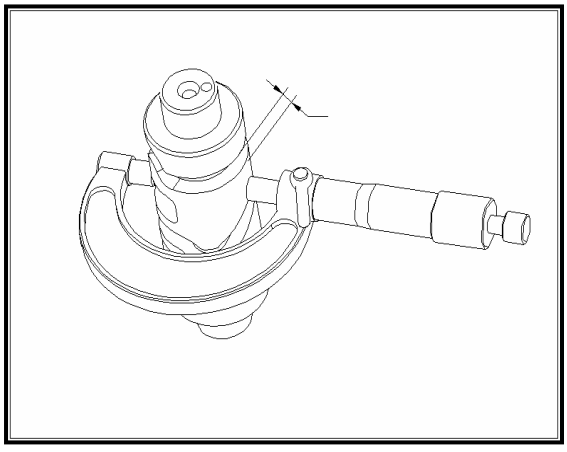


Measure the shift drum OD.

**Limit: 35.25mm**

Measure the width of shift drum grooves.

**Limit: 6.3mm**



14.4.3 Installation

Installation is the reverse order of removal.

# 15. Crankcase



## 15.1Service Information

### Procedural Caution

- All the individual parts should be cleaned and dried using compressed air prior to inspection.
- Be careful not to damage the mating surfaces.
- Drain out the engine oil before completing this procedure.
- Do not use an iron hammer to tap the crankcase during installation.

Specification mm

| Item | | Standard | Limit |
|---|---|---|---|
| Crankshaft | Con-rod big end side clearance | 0.5-0.8 | 1 |
| | Con-rod big end radial clearance | 0.02-0.041 | 0.07 |
| | Runout | | 0.1 |
| Clutch | Width of clutch plates | 2.9-3.1 | 2.5 |
| | Free length of clutch springs | 36.5 | 35.5 |
| Transmission | OD of shift fork shaft | 9.991-10 | 9.971 |
| | ID of shift forks | 10.016-10.034 | 10.065 |
| | Width of shift forks | 4.93-5.0 | 4.7 |
| | OD of shift drum | 35.75-35.959 | 35.25 |
| | Width of shift drum groove | 6.1-6.2 | 6.3 |

Tools

Socket spanner

## 15.2 Troubleshooting

### Compression too low

Air leak into crankcase

### Noise in crankcase

Loose or broken part in crankcase

### Engine overheats

Clutch slipping
Faulty lubrication

### Engine stops

Clutch locked

### Hard shifting

Broken or distorted shift fork
Broken shift fork guide pin
Worn gear engagement dog

### Clutch dragging

Faulty shift lever spring
Worn shift drum groove

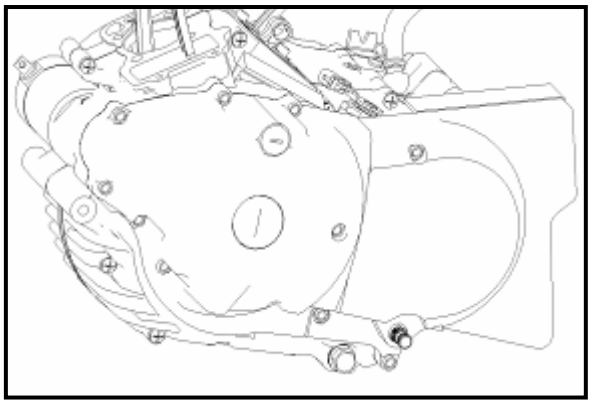
### Jumping out of gear

Worn gear engagement dog
Weakened shift spring
Worn spline on the shaft or gear
Worn shift drum or shift fork

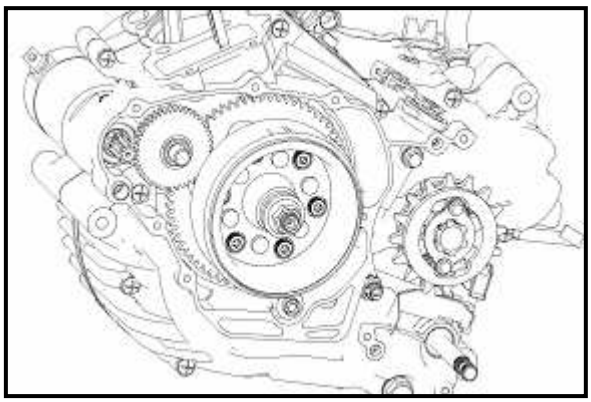
## 15.3 Crankcase

### Removal of left & right crankcase side covers

Unscrew the left cover bolts, remove the front side cover and rear cover.



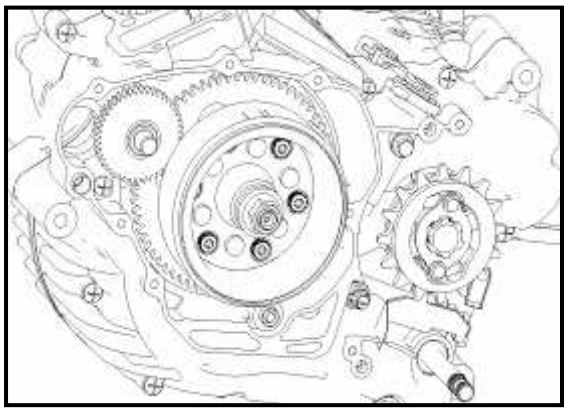
Remove the front side cover gasket.



Uncrew the starter motor bolts, remove the

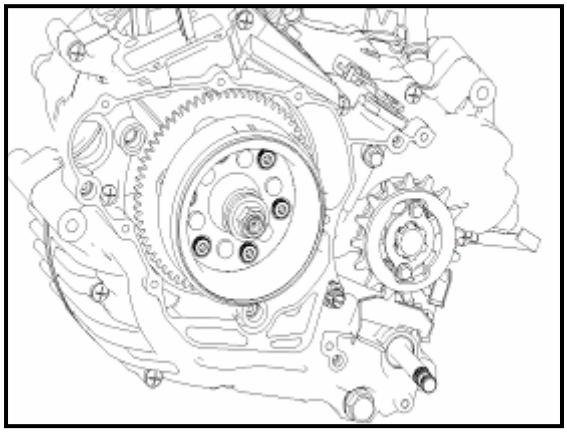
starter motor from crankcase.

Remove the startedr gear and needle bearing.

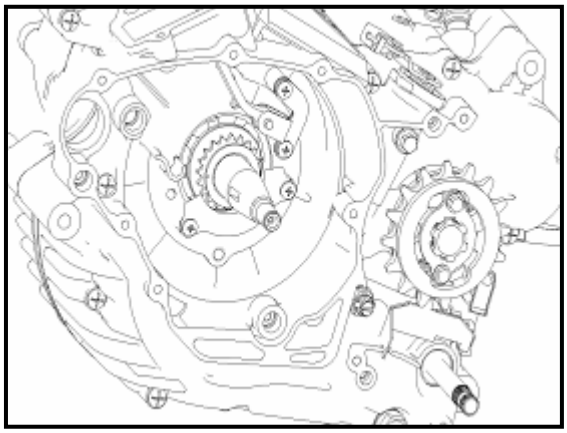


Remove the starter gear.

Remove the dowel pin.



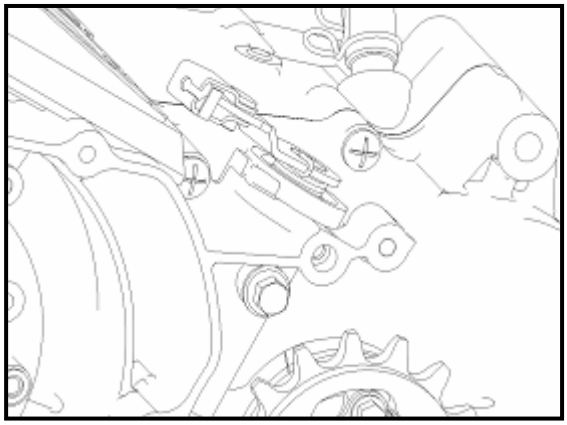
Unscrew the flywheel retaining bolt of and remove the fly wheel using special tools.



Unscrew the bolts and remove the chain cover and chain guide.

Procedure to remove the right crancase cover.

Remove the clutch pulling rod from the left cover.



## 15.4 Assembly

Installation of the crankcase is the reverse order of removal.

Caution:

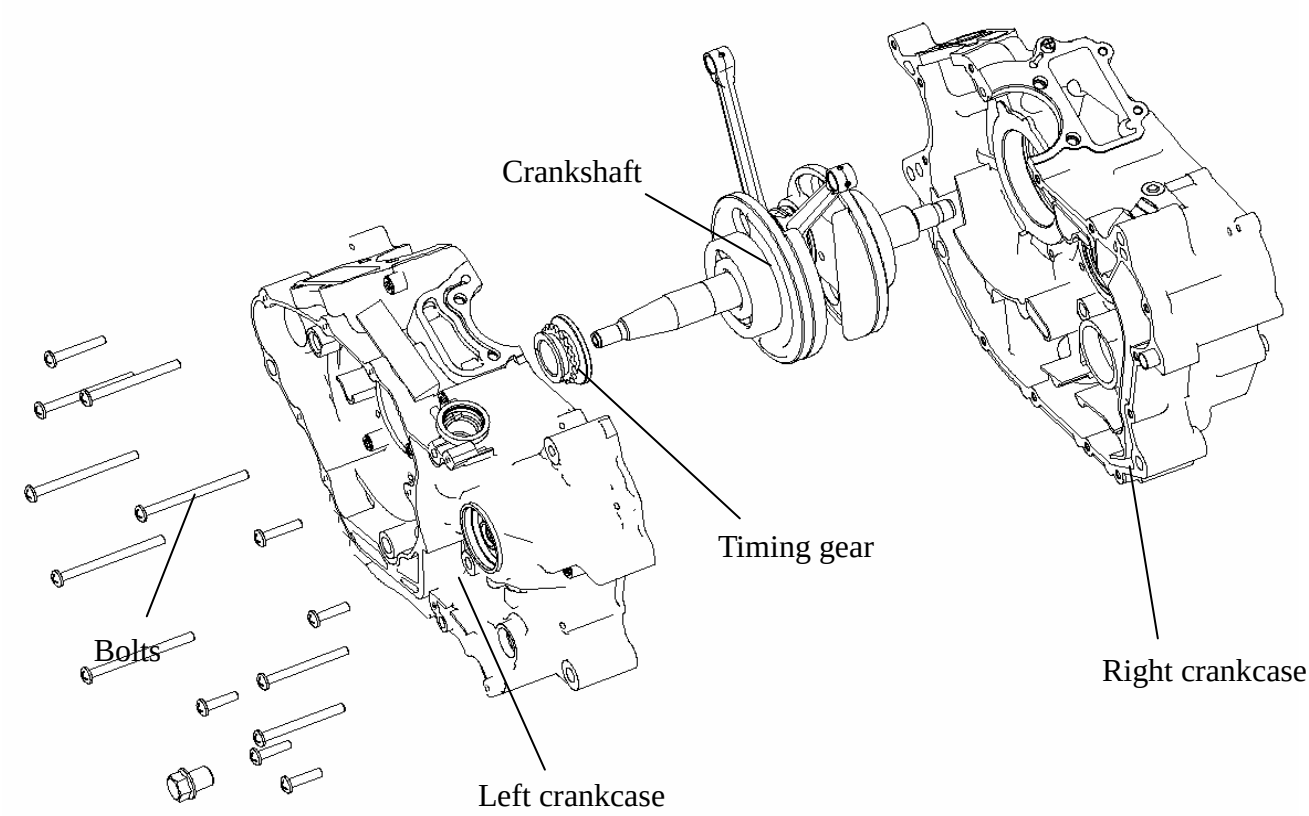
Install the oil seals using special tools to avoid damage.

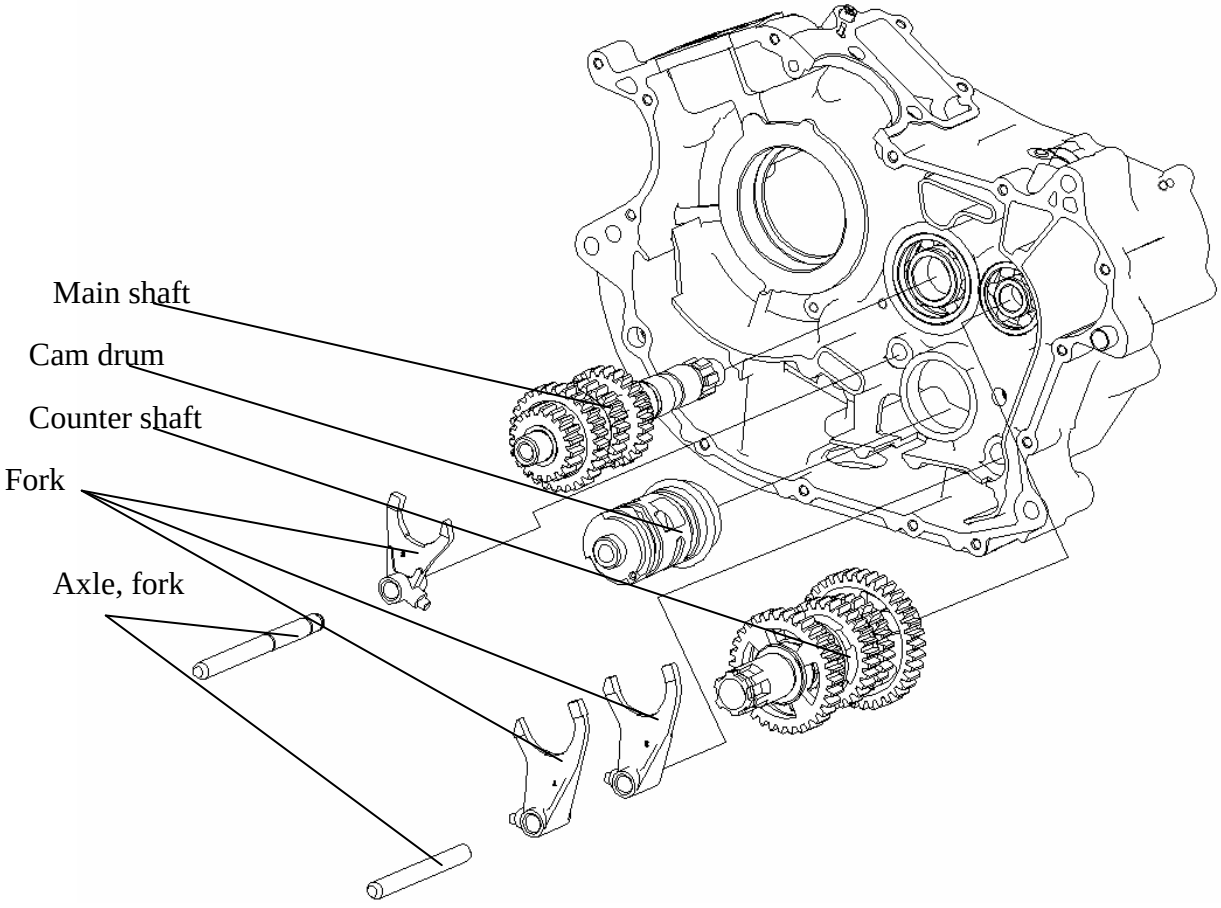
Apply lithium grease to the seal before installation.

Always replace oil seals and gaskets when the crankcase is disassembled.

# 16. Crankshaft And Transmission Gear

## Crankcase & transmission



## 16.1 Service Information

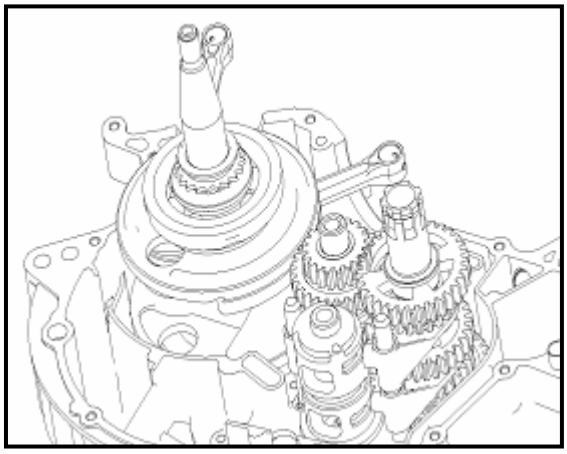
Procedural Caution

Drain the engine oil prior to performing the operation.

Individual components should be cleaned and dried using compressed air prior to inspection.

Be careful not to damage the crankcase.

## 16.2 Crankshaft



16.2.1 Removal

Disassemble the left crankcase and remove the timing gear from the crankshaft.

Remove the crankshaft from the right crankcase.

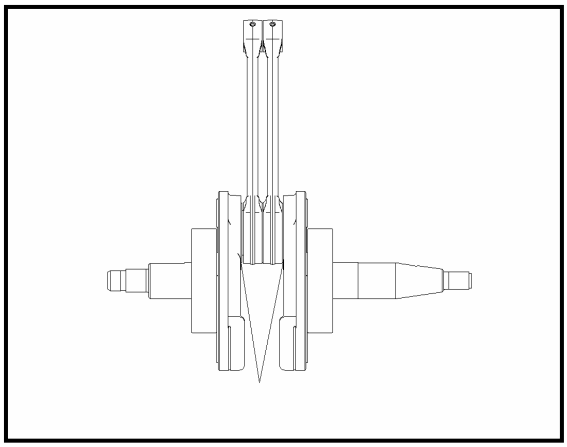
Caution:

Be careful not to damage the crankcase mating surfaces.

## 16.2.2 Inspection

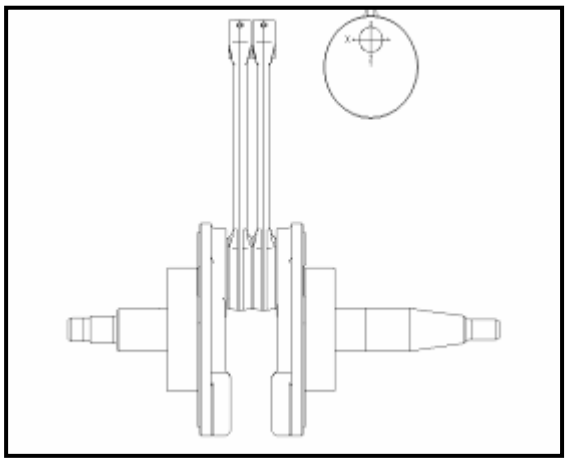
Measure the side clearance between the connecting rods and crankshaft weight using a feeler gauge.

**Limit: 1mm**



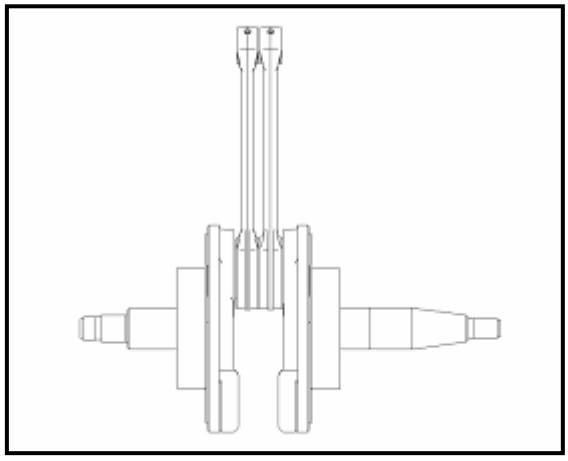
Inspect the radial clearance between the connect rod big end and crankshaft pin.

**Limit: 0.07mm**

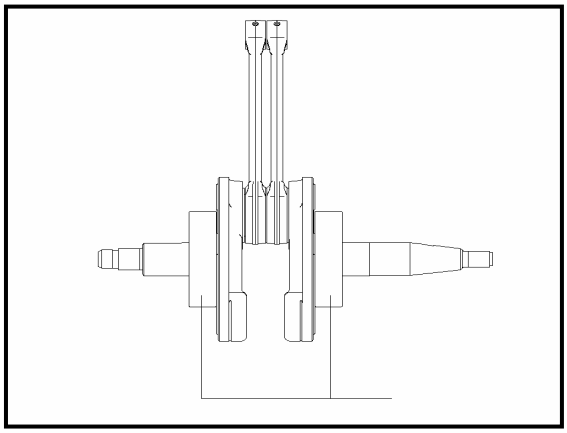


Place the crankshaft on a V block to check the runout (coaxiality) of the crankshaft.

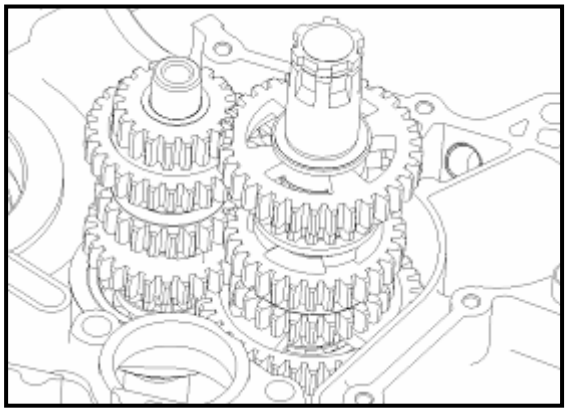
**Limit: 0.1mm**



Rotate the crankshaft main bearings. Check for noise, dragging, or wear. Replace if necessary.



## 16.3 Installation

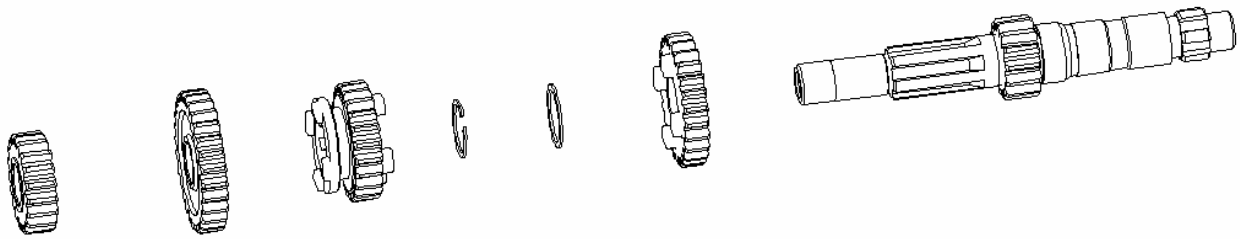


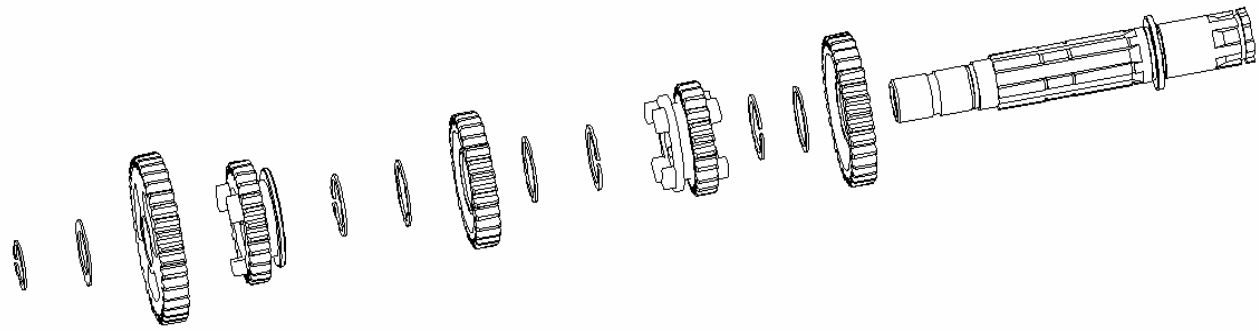
Installation is the reverse of removal.

Remove the main shaft.

**Remove the counter shaft.**

## 16.4 Main shaft and counter shaft removal

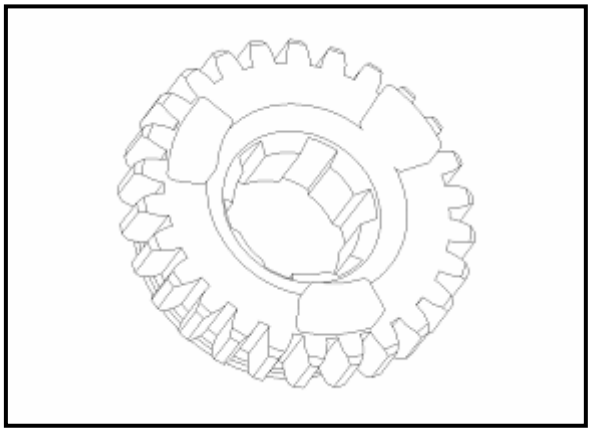




## 16.5 Inspection

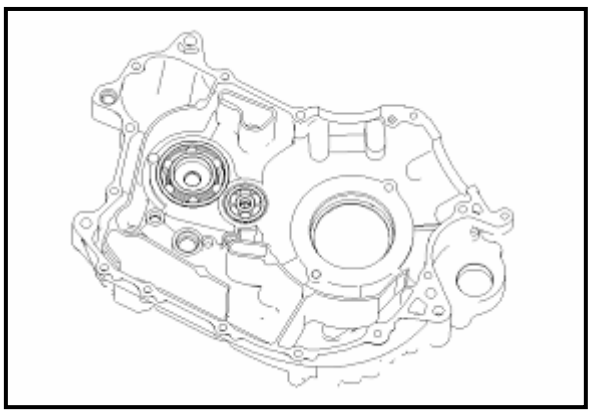
Inspect the teeth and engaging faces of the gears.

Replace the gears if worn or damaged.



Remove the bearing and oil seal on the left crankcase.

Inspect the bearing and seal for wear or damage, replace with new if necessary.

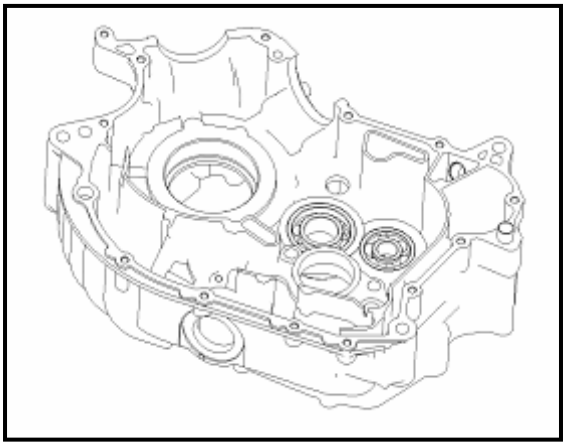


**Caution:**

Replace with a new bearing if the original is removed from the crankcase.

Remove the bearing and seal using special removal tools.

Inspect the bearing after removal from the right crankcase, replace it if worn or damaged.



## 16.6 Main shaft & counter shaft assembly

**Caution**：Apply some engine oil to the gears and shaft. Rotate the counter shaft, the gears should turn freely and smoothly.

**Note:**

Installation is the reverse order of removal.

# 17. Exhaust Emission System

To prevent further environment pollution, every product has passed strict inspection after the assembly line before the delivery ensuring that production conforms to standards.

Since the difference use, we've established the following regular inspection table for exhaust emission to ensure normal emission. Please inspect, adjust or service the motorcycle at schedule time.

·For special problems of use，please inquire the authorized dealers or service centers of Keeeway.

·Related emission regulations are as follows：

| Emission regulation | CO | HC | $NO_X$ |
|---|---|---|---|
| Emission standard | ≤2.0g/km | ≤0.3g/km | 0.5 g/km |

※If there is any change to the emission standard, take the up-to-date state regulation as final.

Note:

- Increase cleaning times of air filter if the motorcycle is used on sandstone roadways or in severely polluted environment, so that service life of the engine may be extended.
- When the vehicle is driven at high speed or in frequent use with considerable service kilometers, its maintenance degree should be increased.

**Ensure the emission standards and pay attention to the following matters:**

- Please use 93 or upper unleaded gasoline only.
- Please use machine oil of specified Standard only.

- Please maintain the motorcycle according to stipulations in the regular maintenance table.
- As to exhaust control system, random adjustment or replacement （including use of spark plug, idle adjustment, ignition timing, carburetor adjustment）is strictly forbidden.
- Matters needing attention：

·The disorder of ignition, charge and fuel system will have great impact on the catalyzer device, therefore, if you feel disorder of the engine, please go to designated dealers or service centers of our Company for inspection, adjustment or service.

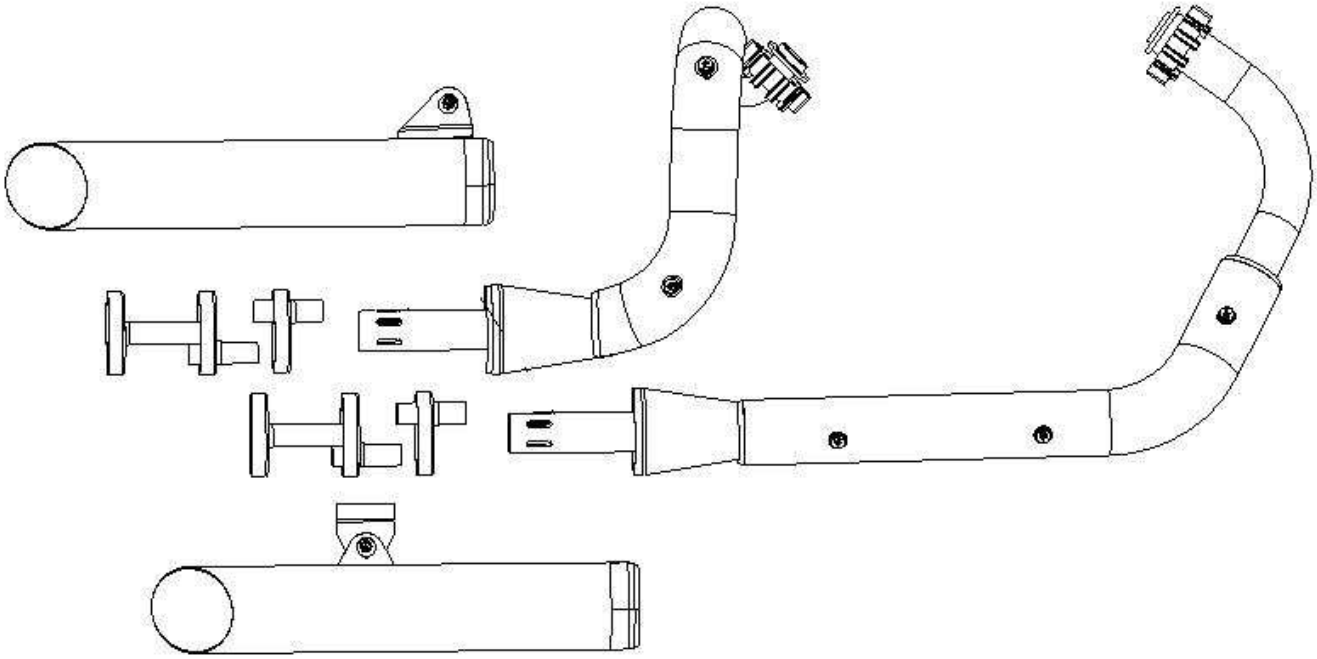
· Please use 93 or upper unleaded gasoline only otherwise the catalyzer device （four-stroke system）will be damaged.

- Use only Keeway genuine parts for all replacement to avoid the accelerated wear of parts and to reduce the risk of failure. And the maintenance should be operated in authorized dealers or service centers.

# Exhaust muffler

# Catalyzer

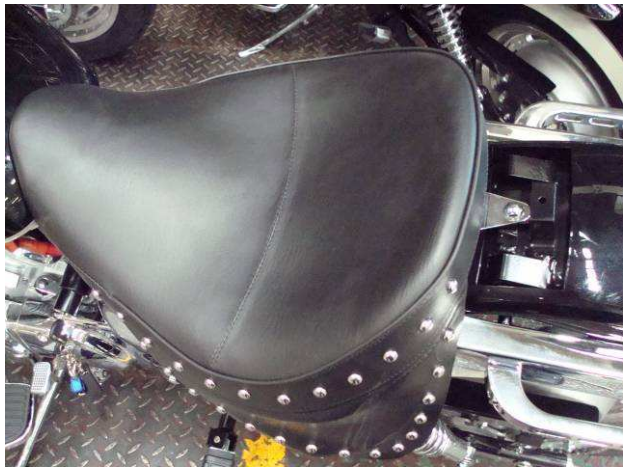
### Schematic drawing



## 18. Removing The Engine From The Motorcycle

Secure the motorcycle on flat, level ground.

Remove the seat, speedometer cable, fuel tank and side covers.



**Note:**

It is not necessary to remove the speedometer and decorating cover from the fuel tank.

Disconnect the speedometer pigtails before removing the fuel tank from the motorcycle.

Disconnect the battery, magneto connector, spark plug cap, ground wire and the starter motor lead.

**Note:**

Disconnect the negative terminal from the battery first.

Drain the engine oil.

Remove the air cleaner and the decorating cover on the left.

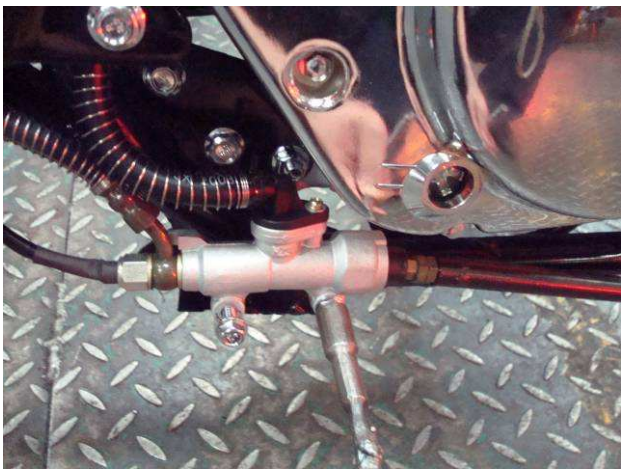
Remove the Fuel pump, throttle cable, choke cable and fuel pipes.

Loosen the clamps and remove the carburetor from the motorcycle.

Remove the exhaust muffler from the motorcycle.

Remove the footrest, brake pedal and rear brake switch.

Remove the rear disc brake master cylinder.

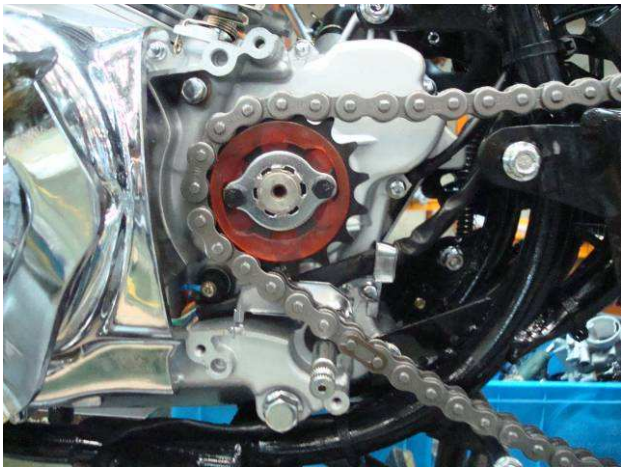


Disconnect the clutch cable from the left side of the engine.

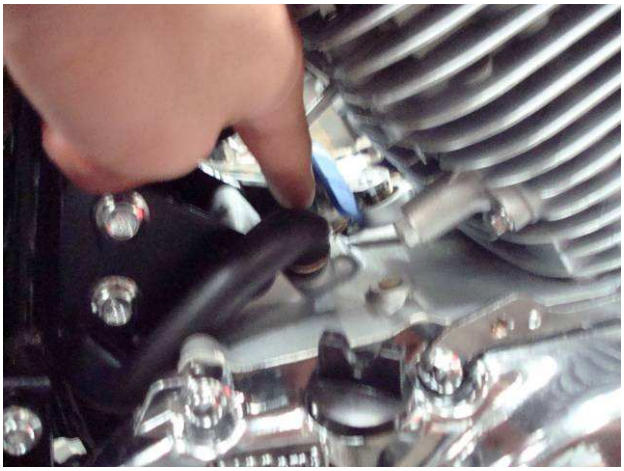
Remove the shift lever.

Remove the rear left engine cover,

Remove the drive chain from the sprocket.

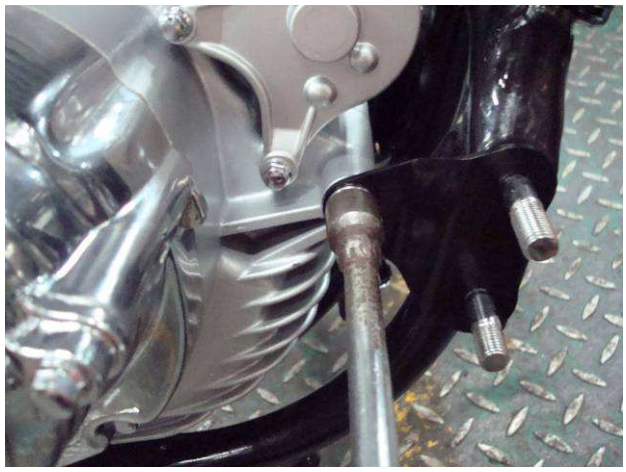


Disconnect the breather.



Loosen the engine mounting bolts and Remove the engine mounting plate.

Remove the engine assembly from the right side.



## 19. Engine Assembly

### Transmission and crankshaft

Install the circlip on the shift fork shaft.

Apply some engine oil to the shaft then install it in the right crankcase half.

**Note:**

The bearing on the crankcase should be inspected and lubricated before installation.

Main shaft assembly

Shift forks

**Note:**

Before installation, inspect the shift forks for wear.

Apply some engine oil to the shift forks before installation.


Insert the shift fork II (YP2 mark on the shaft) with main shaft.

Counter shaft assembly

Align the main shaft and counter shaft and install them into the right crankcase.

**Note:**

Before installing the main shaft and counter shaft, apply some engine oil to the gears and bearings.

Check the gear teeth for wear, replace if

necessary.

Don’t use compressed air to rotate and dry the bearings before installation. Damage will occur.

Install the other 2 shift forks, please note the marks on the forks.

Shift drum

Please note the copper pin on the shift drum.

Apply some engine oil to the grooves of the drum.

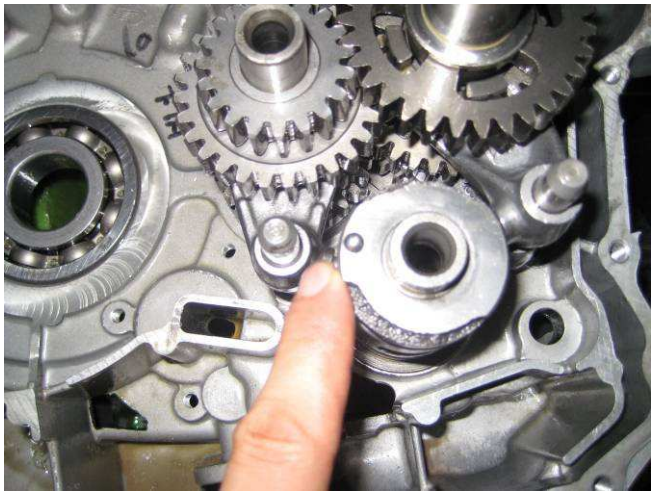
Install the shift drum aligning with the shift forks.

Apply some engine oil to the shift fork shaft then insert it through fork I and fork III and into the crankcase.

Align the copper pin with the shift fork shaft.

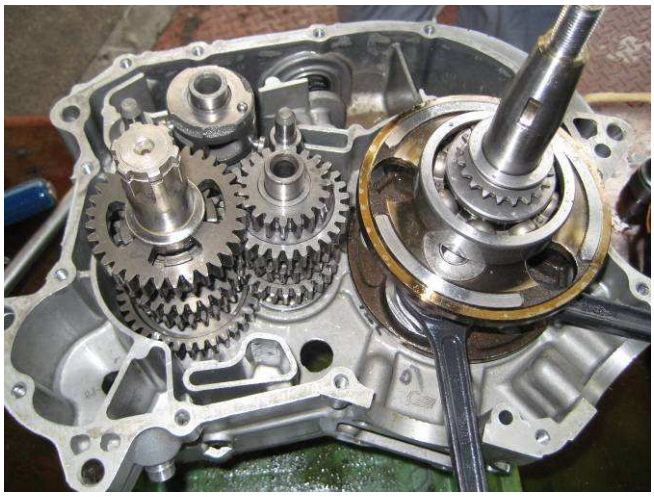
This gear position is neutral.

Rotate the counter shaft. The gears should turn freely and smoothly.



Oil the big end of the connect rod and crankshaft bearings.

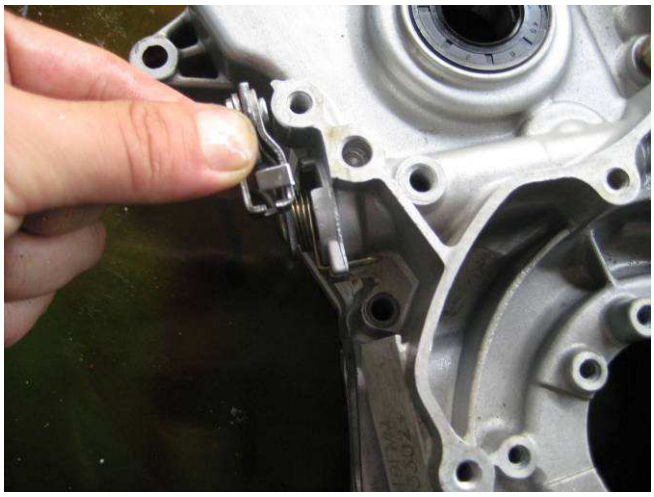
Install the crankshaft into the right crankcase. Please ensure the connecting rods are installed properly.



Apply some engine oil to the clutch pulling stick and install it into left crankcase.

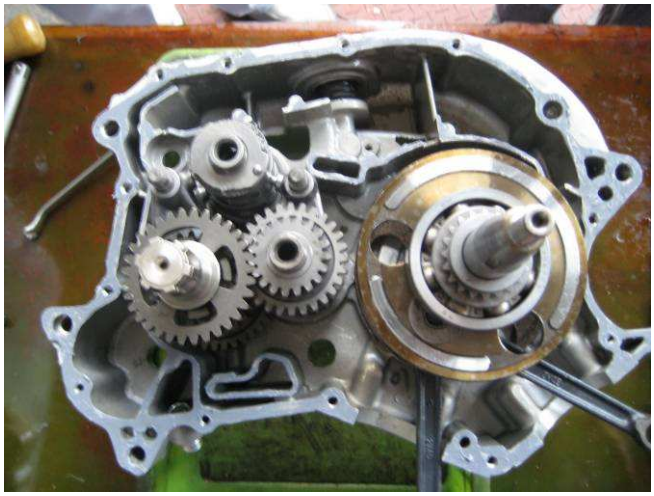
**Note:**

Inspect the oil seal for wear and replace it if necessary.

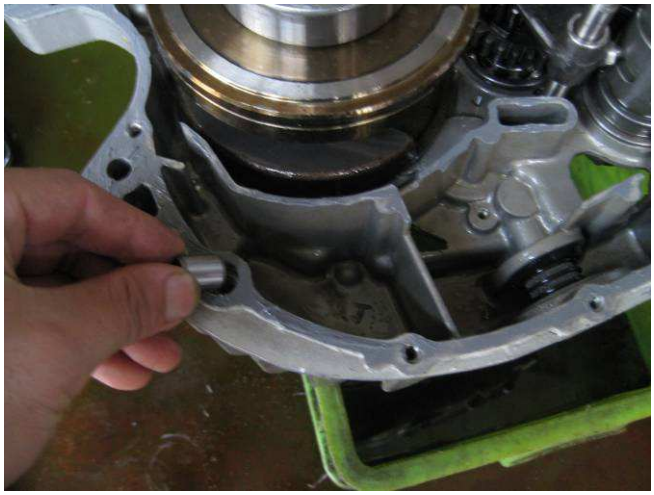


Apply sealant to the mating surfaces of both crankcase halves.

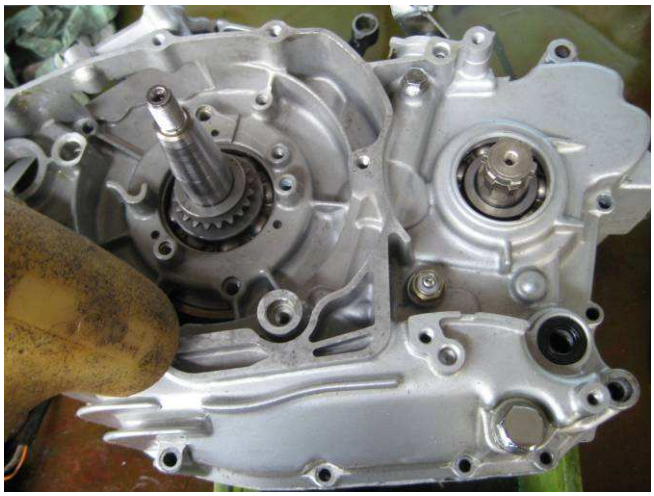
Use an “anaerobic” sealant or appropriate oil and airproof ‘quick gasket’.



Install the dowel pin on right crankcase.



Install the left crankcase half, tap lightly using a soft hammer or mallet.



Install the mounting bolts in a diagonal pattern.

Install the wire retainer bracket.

Tighten the mounting screws and torque to specification using a torque wrench.

Apply grease to the oil seal and install it into the crankcase.

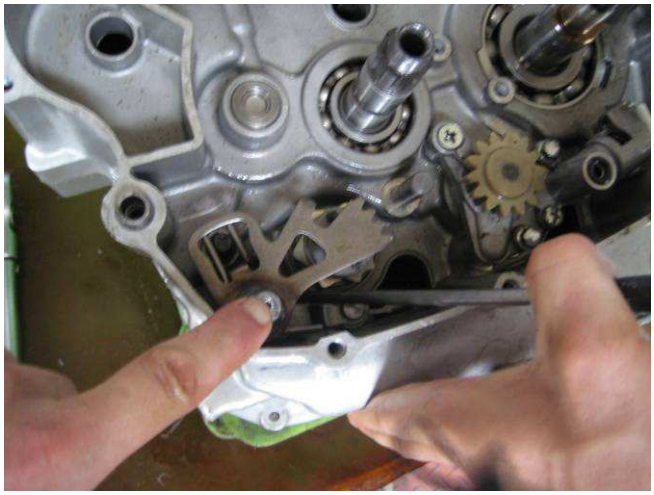
Install the O ring on the case.

Be carefully not to drop the O ring, bolts or any other foreign materials into the crankcase.

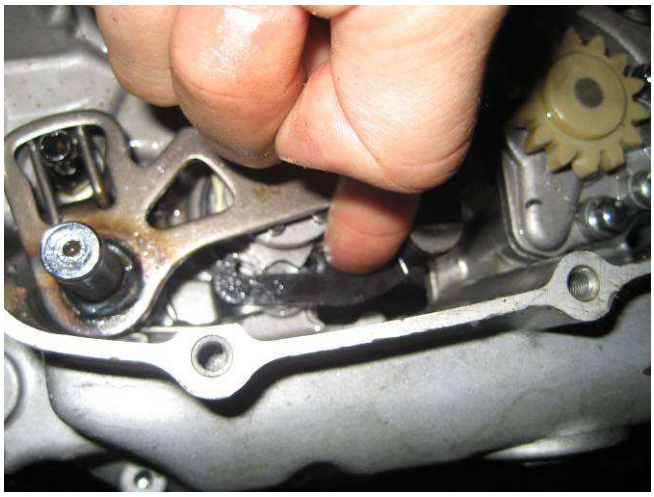
Apply some engine oil to the mating surfaces of the oil pump and install the oil pump.

Apply some engine oil to the shift shaft.

Align the shift cam stopper and install the shift shaft, the spring on the shift shaft should be mated to the stopper pin on the crankcase.

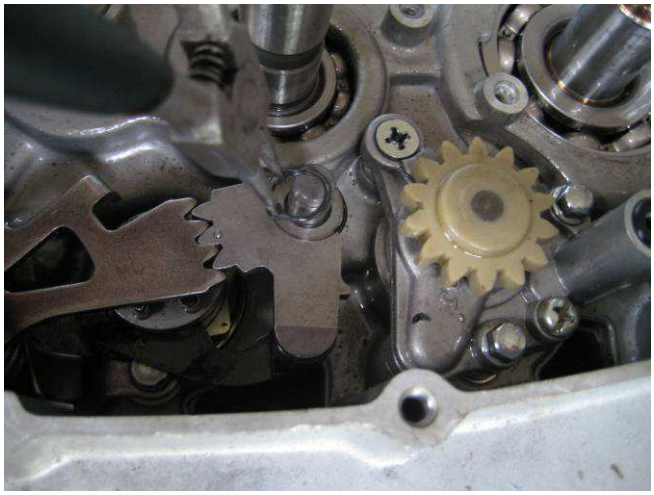


Shift lever.

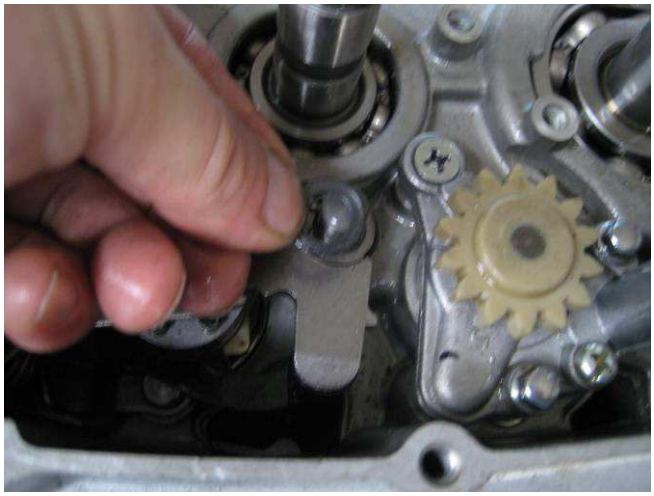


Install the shift lever on the shift fork shaft, align the match marks on the shift lever.

Install the circlip using circlip pliers.



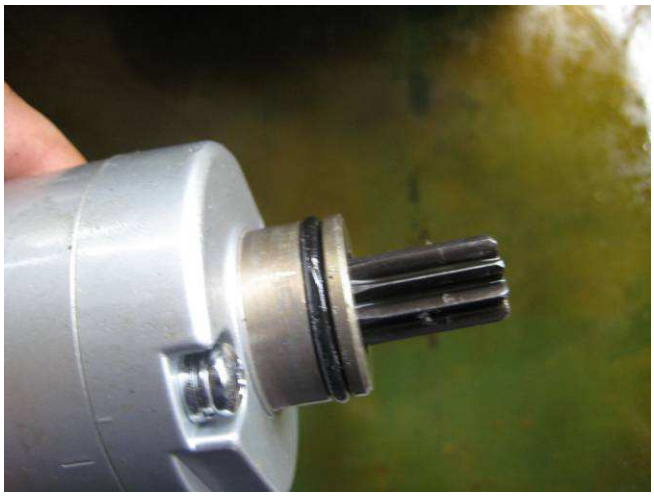
Install the plain washer.



Install the oil pump driven gear, plain washer and circlip on the shaft.

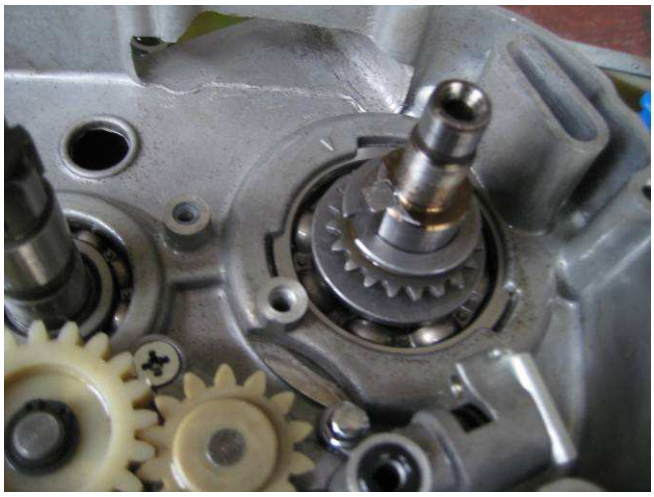
Install the O ring on the oil pump.

Apply some lithium grease to the O ring on the starter motor.



Install the starter motor on the engine and tighten the mounting bolts.

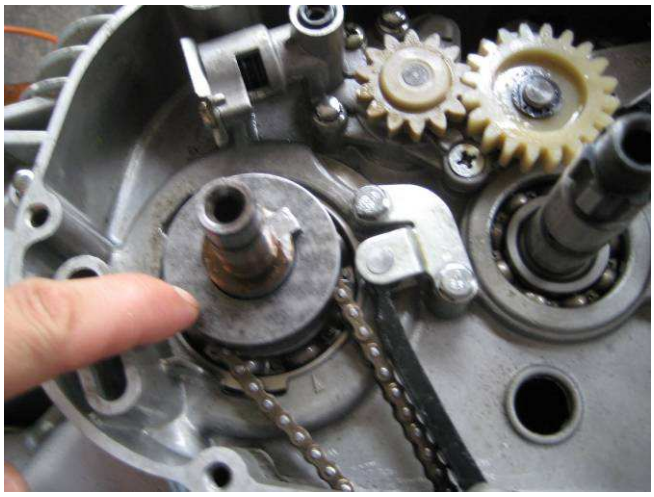
Install the timing gear and key on the crankshaft.



Install the chain on the timing gear.

Install the chain guide plate (apply some thread lock agent to the mounting screw before installation).

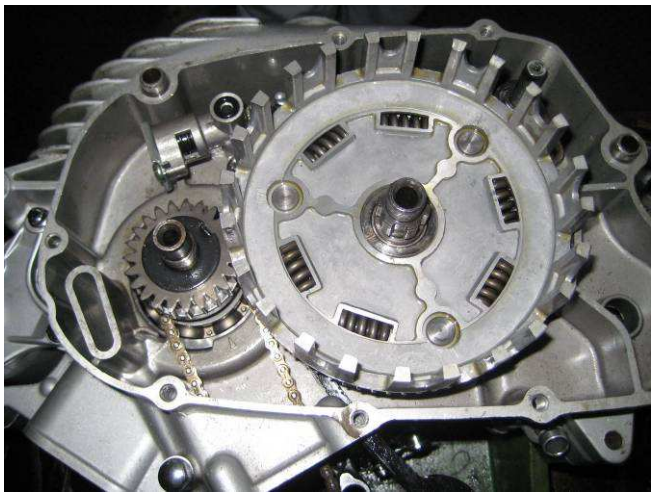
Install the washer.



Install the primary gear.

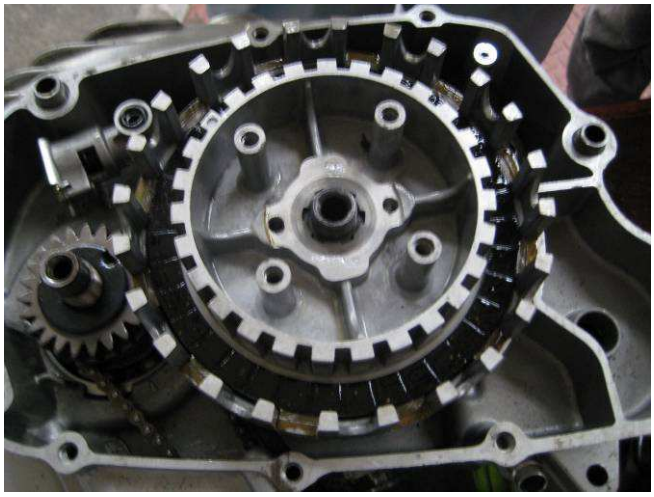
Install the lock washer II.

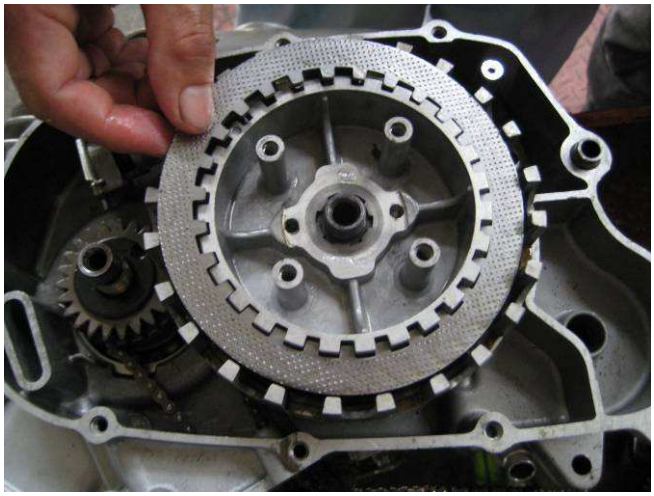
Install the clutch hub onto the primary shaft.

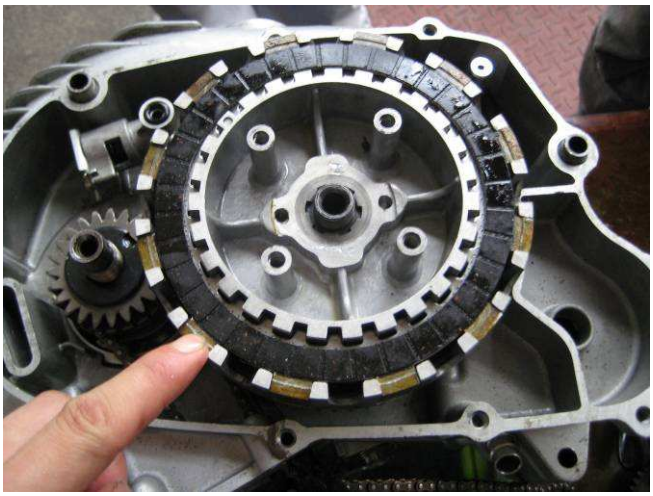


Install the splined washer (insert the spline washer and rotate it until is seats).

Soak the clutch plates in clean engine oil. Install the clutch hub center and clutch plates beginning with a “fiber” and alternating “fibers” and “steels”.

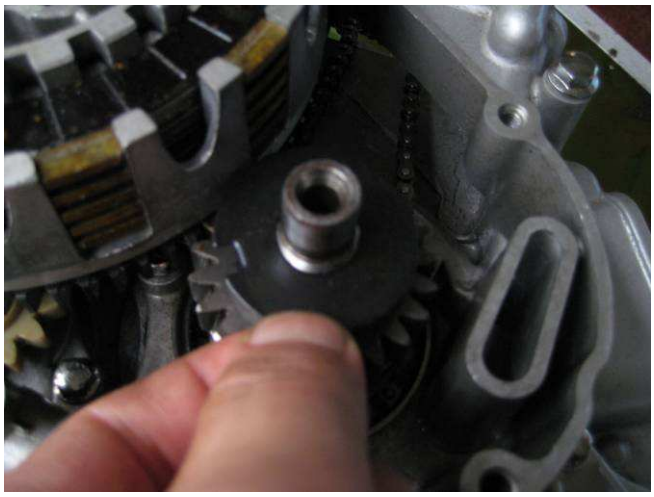




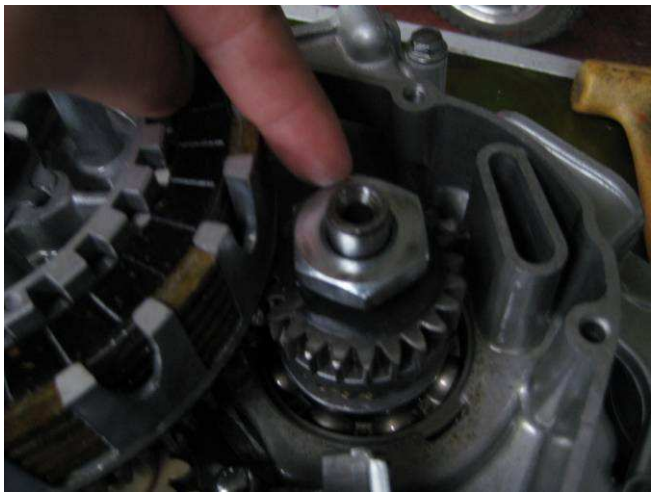


Install the clutch hub lock washer.

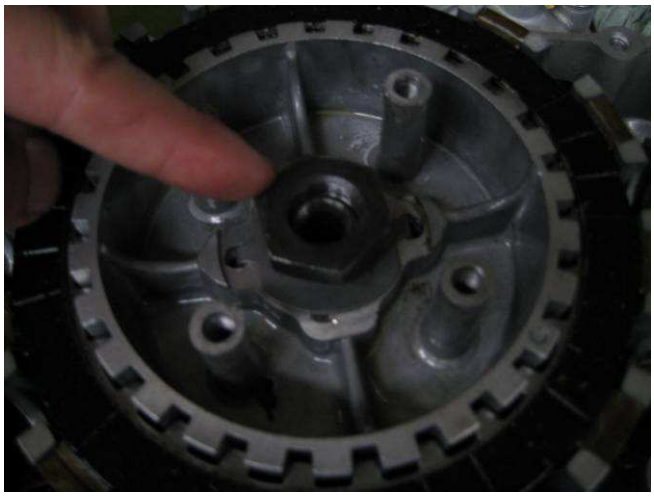
Install the primary gear lock washer I.

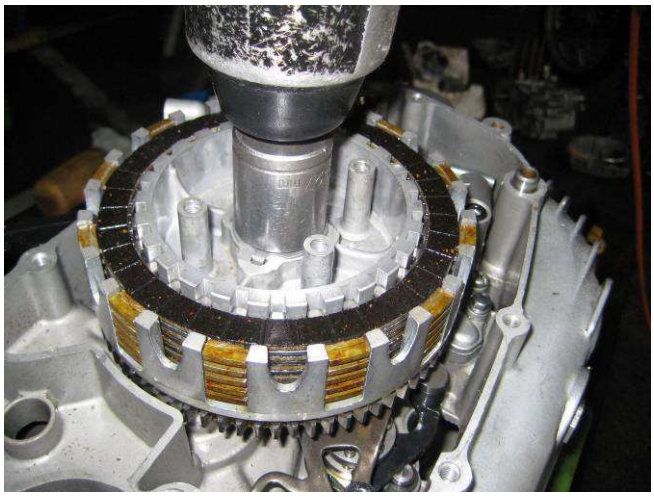


Install the primary drive gear nut.

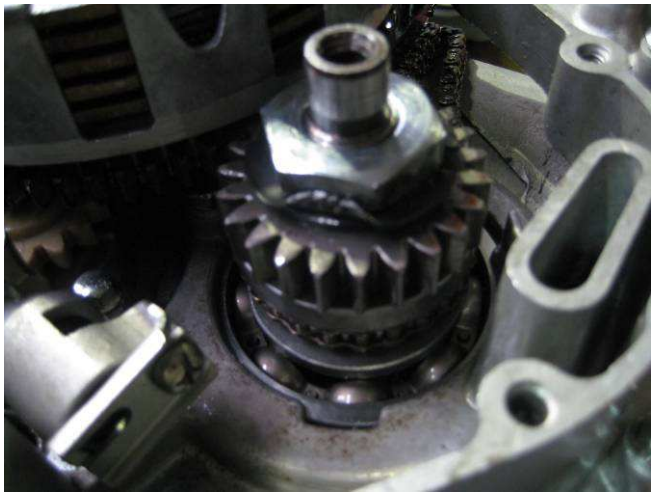


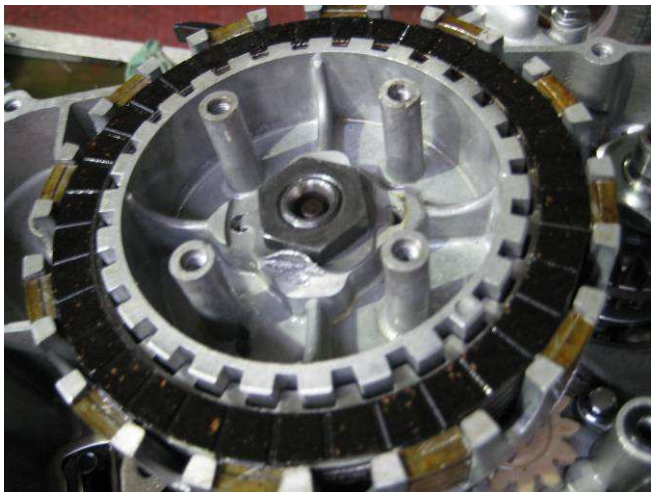
Install the clutch hub lock nut.



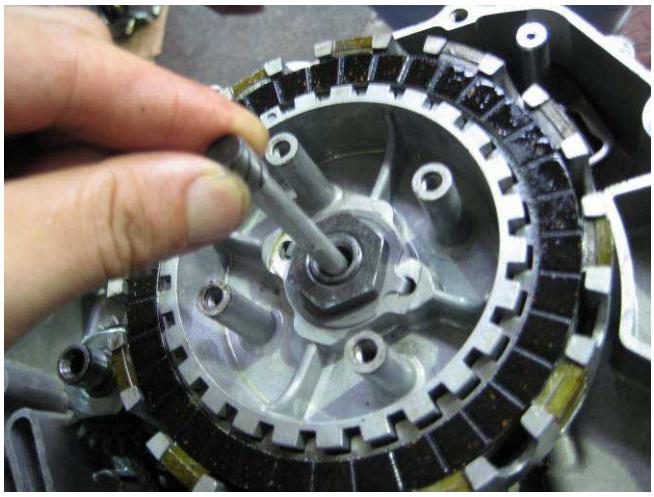


Bend the lock washer tabs to secure the nuts.



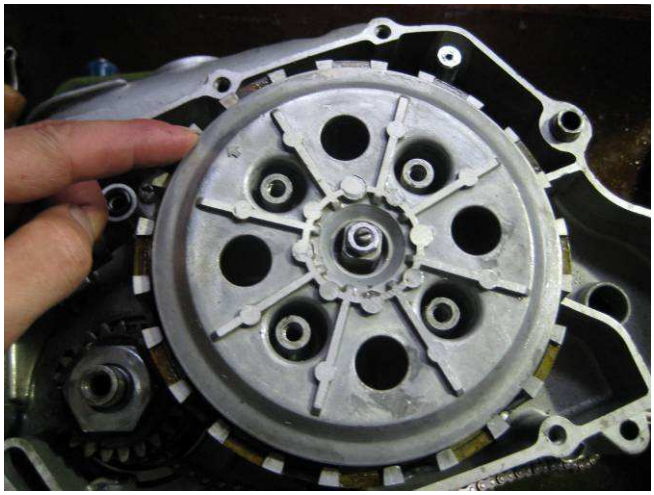


Apply some engine oil to the handspike (spreader rod) and steel ball then install it into the main shaft bore.



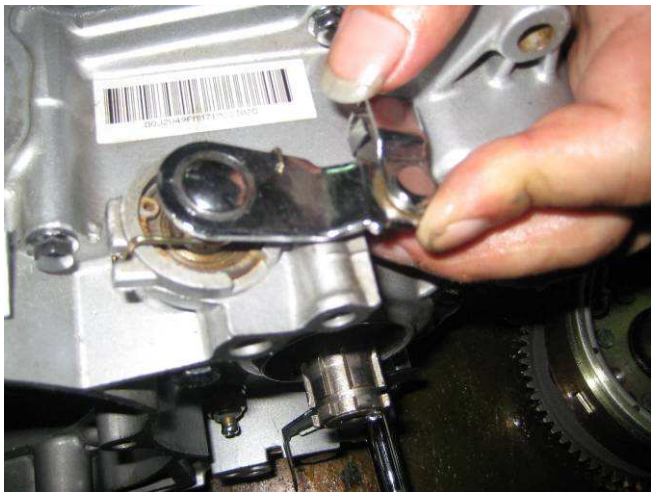
Install the handspike II (spreader pin) and adjuster assembly.

Align the match marks on the clutch hub (basket) and clutch face.

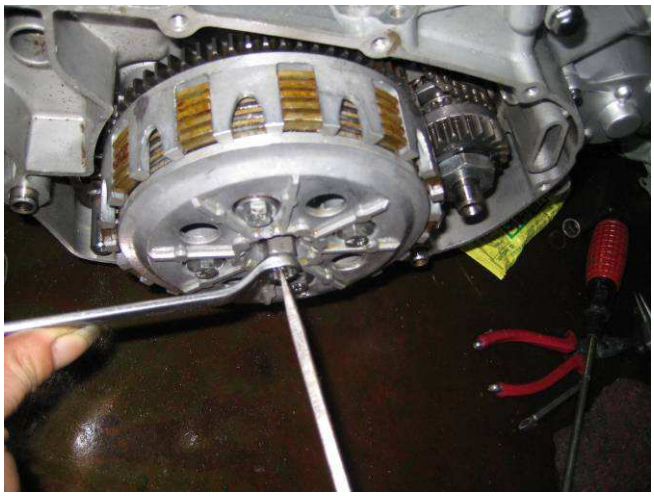


Install the springs and mounting bolts.

Rotate the clutch lever and align the marks on left crankcase.

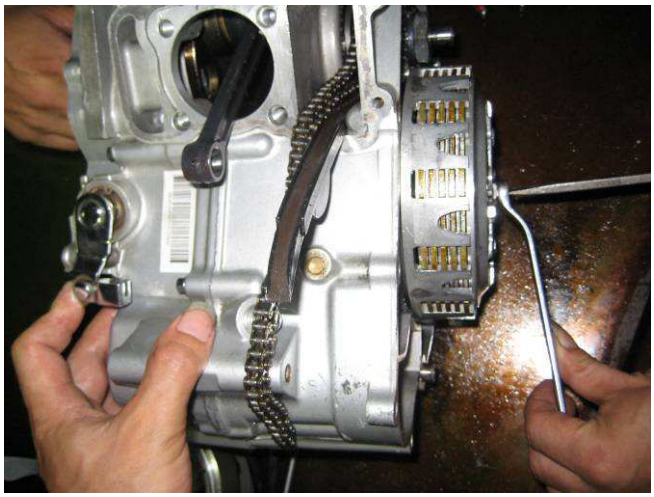


Loosen the lock nut and adjust the free play of the clutch, the adjuster in center should not move in or out when the marks are aligned as above.



Note:

The 2 Steps as above should be operated together.



Install the timing chain for front cylinder.

Install the chain plate.

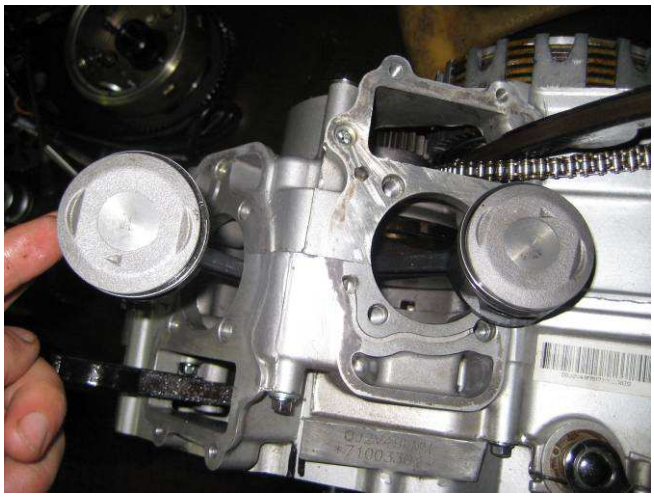
Install the chain guide plate.

Install the piston, piston pin and piston pin circlip.

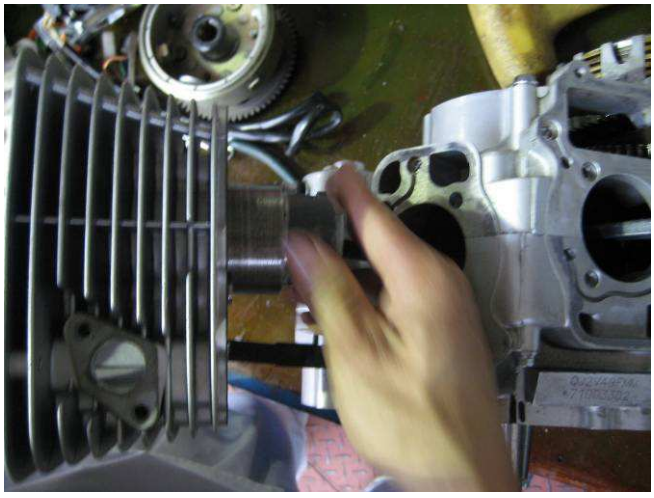
**Note:**

Replace the circlip if the circlip removed.

The mark on the piston crown should point towards the exhaust valve.

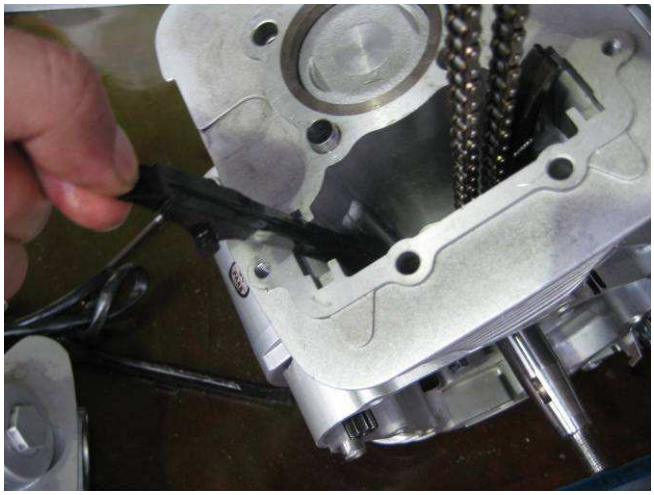


Apply some engine oil to the piston rings, piston and cylinder then install the piston into the cylinder. Gaskets between the cylinder and engine should be replaced. The 2 dowel pins should be installed before the cylinder



assembly is installed and seated.

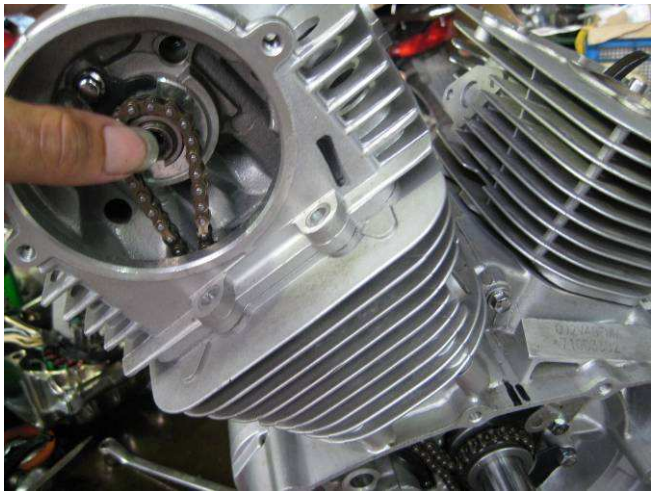
Install the chain guide II.



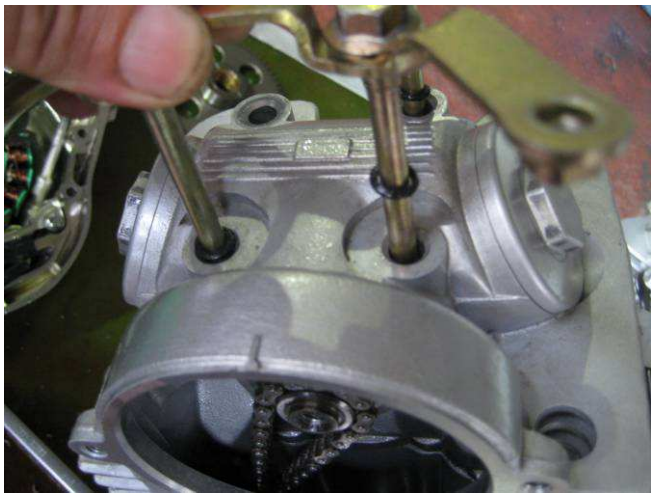
Install the dowel pins and head gasket.

Replace the gasket if the cylinder is removed.

Pull the chain from the bottom to the camshaft.



Install the cylinder head mounting bolts, please note the 3 O rings should be replaced before the installation.

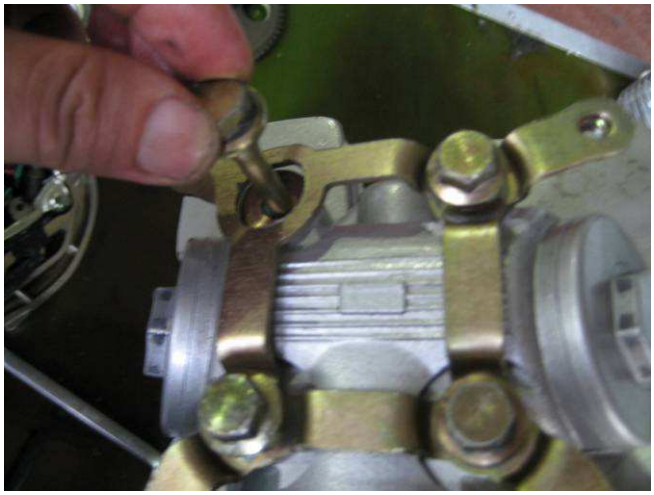


**Note:**

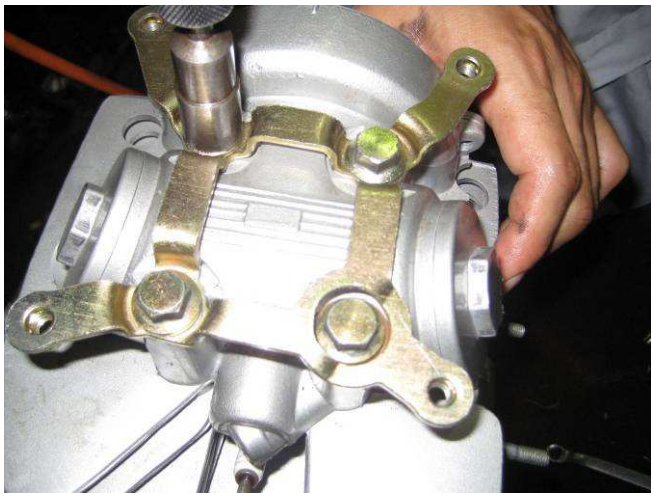
The front cylinder head and rear cylinder head can not be interchanged due to differences in the camshafts.

Make a mark on the cylinder heads before removal.

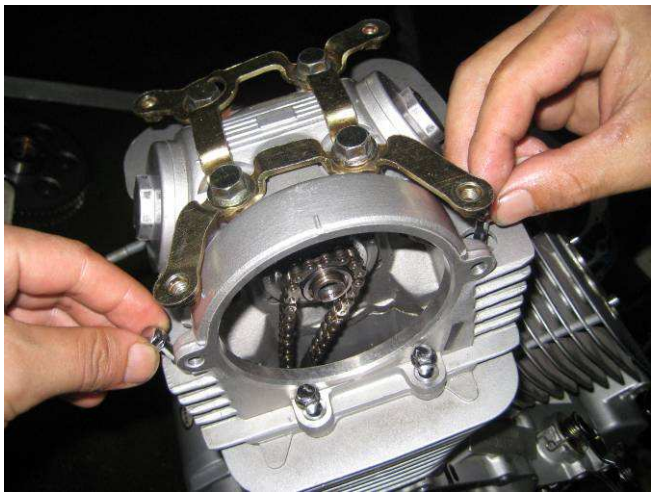
Install the front right mounting bolts with plain washer.



Tighten the mounting bolts diagonally, check the torque using a torque wrench.



Install the perimeter mounting bolts of the cylinder head.



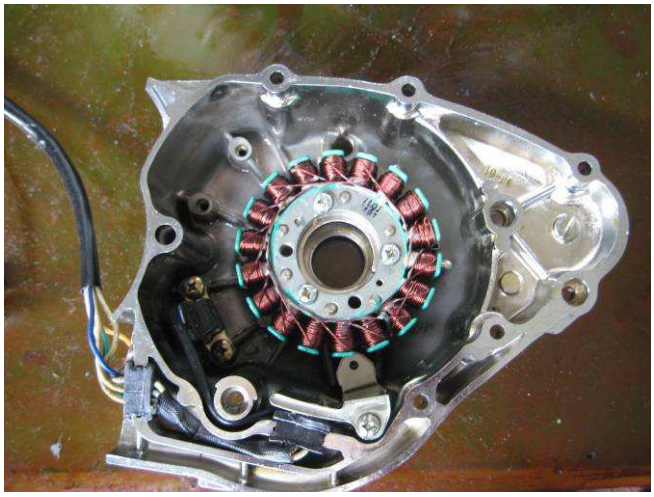
Apply some engine oil to the bushing in the gear then install it on the crankshaft.

Install the woodruff key on the crankshaft.

Install the fly wheel on the crankshaft and tighten it and secure using washer and lock nut.

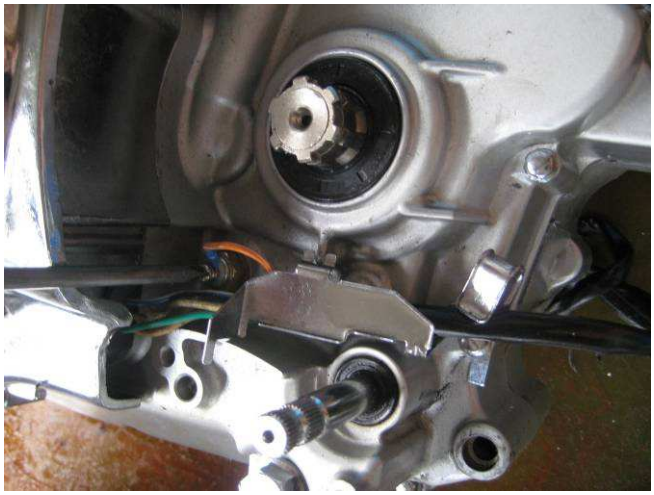
Apply some engine oil to the starter sprocket and the sprocket shaft then install it on the engine.

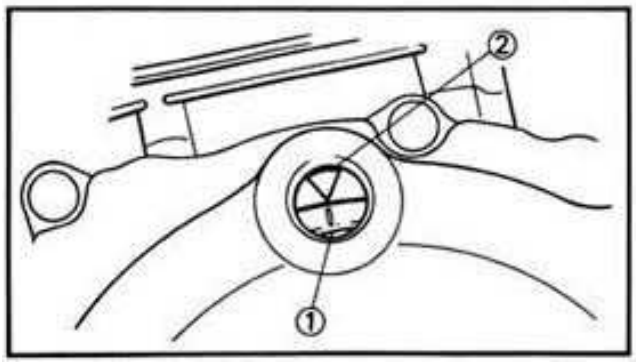
Apply some thread lock agent to the mounting bolts then install the stator on the left engine cover.



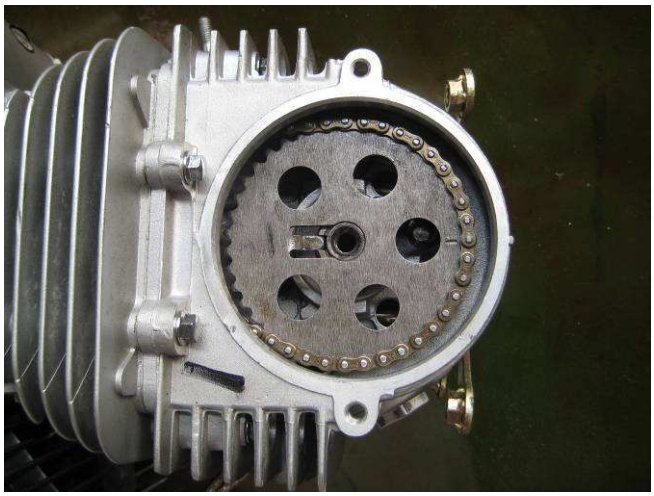
Install the left engine cover, please replace the gasket and note the dowel pin.

Install the neutral safety switch wire.



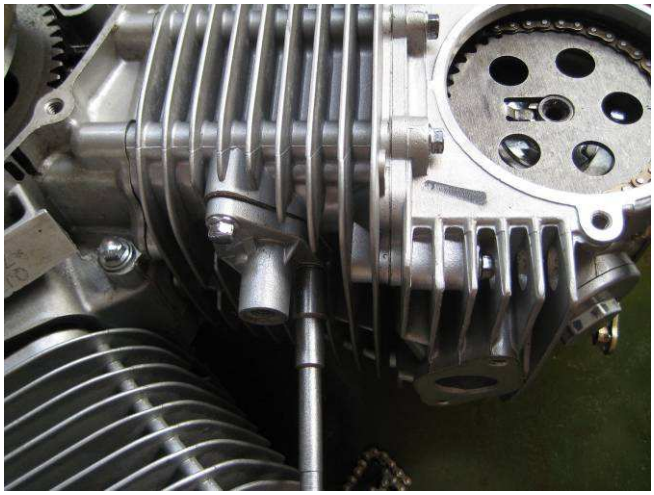



Align the marks on the cam shaft sprockets and cylinder head.

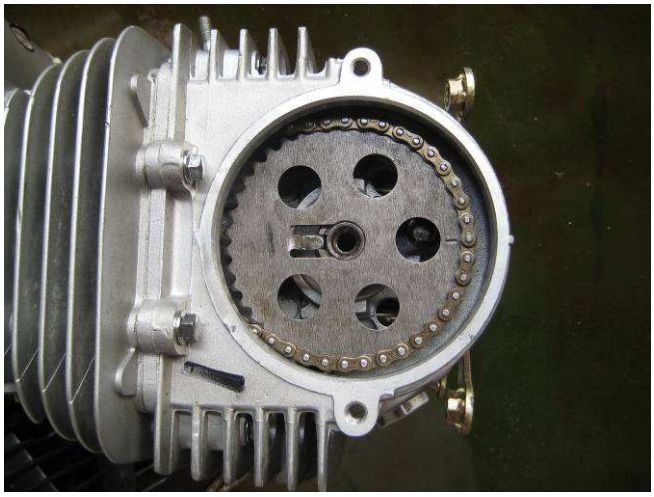


Unscrew the bolt on the tensioner and take out the spring, adjust the lock pin on the tensioner and depress the one-way rod.

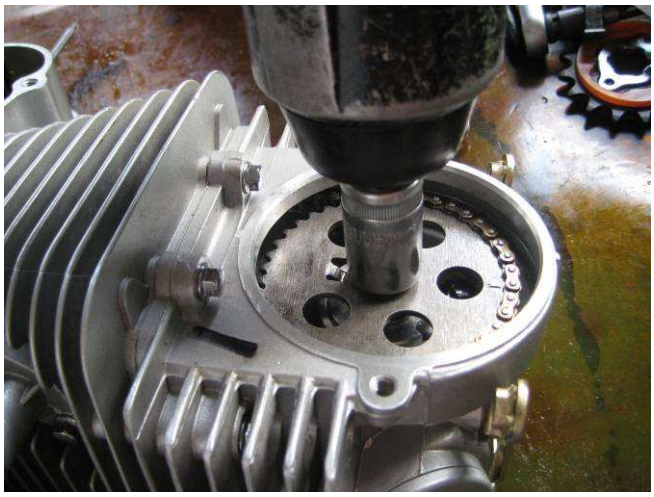
Install the tensioner on the engine.



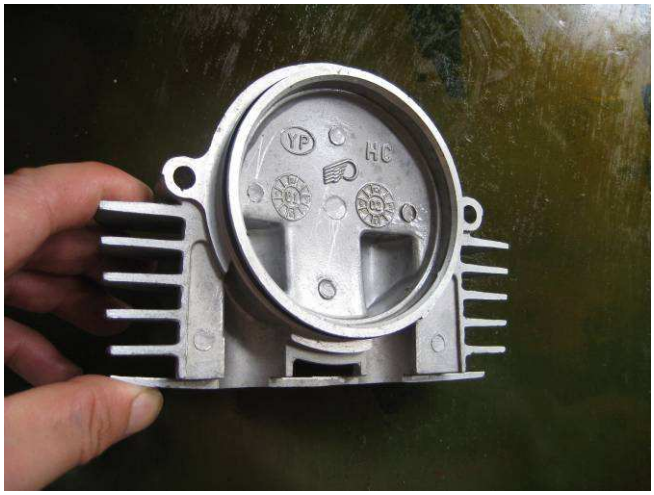
Align the marks on the cam chain sprockets and the cylinder head.



Tighten the timing sprocket lock bolts.



Apply some engine oil to the O ring.



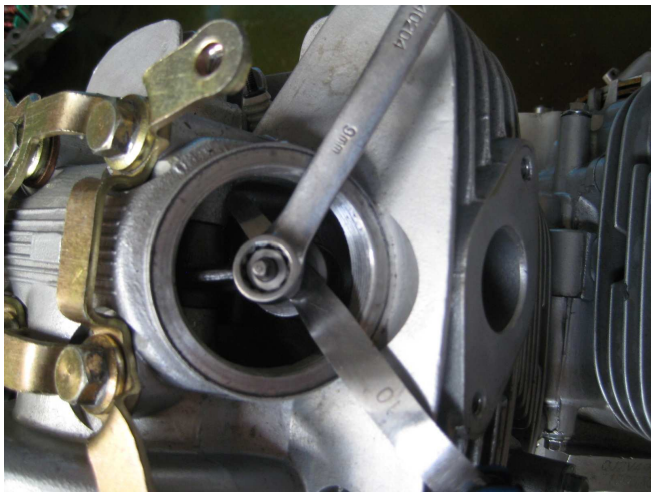
Install the sprocket cover using two screws.

Adjust the valve clearance using a feeler gauge.

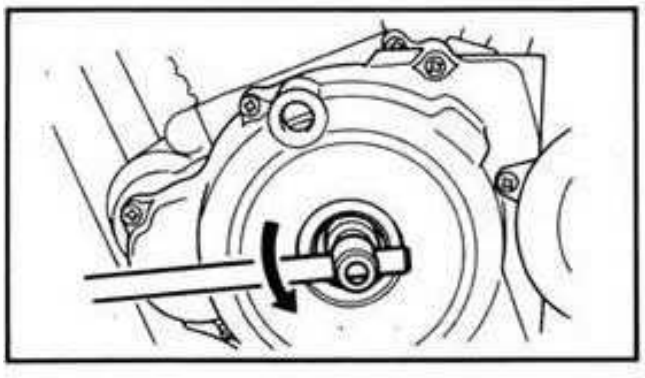
**Specification:**

**Intake valve 0.08~0.12mm (cold)**

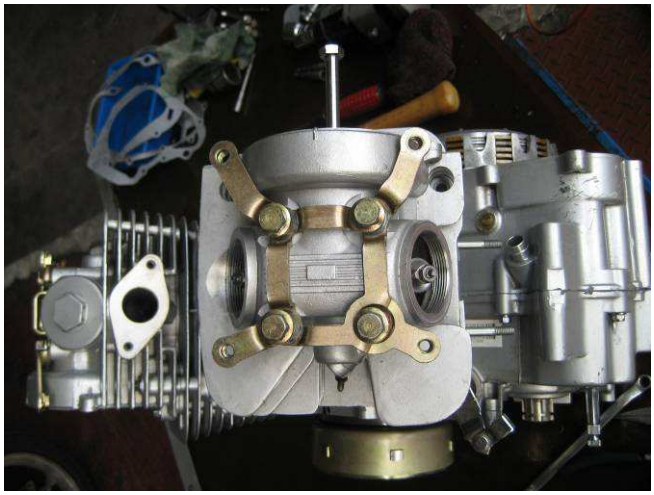
**Exhaust valve 0.10~0.14mm (cold)**



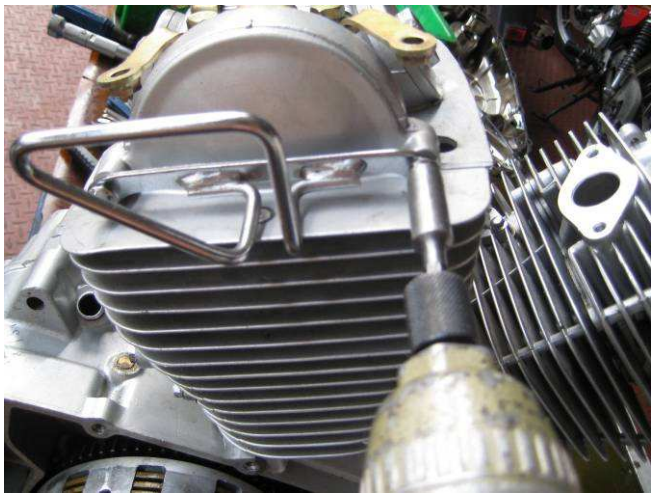
Turn the fly wheel 300°counter-clockwise, align the secondary mark on the flywheel with the stationary pointer on the left cover.



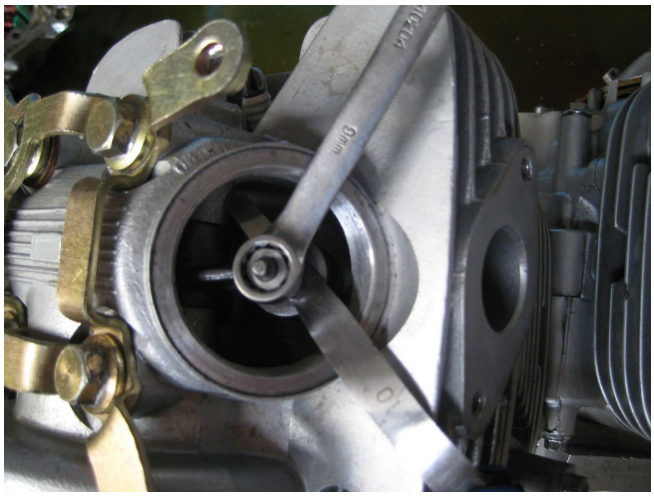
Install the rear cylinder and cylinder head using the same procedure for the front cylinder.



Install the rear sprocket cover and the bracket.



Adjust the valve clearance for the rear cylinder head using a feeler gauge.



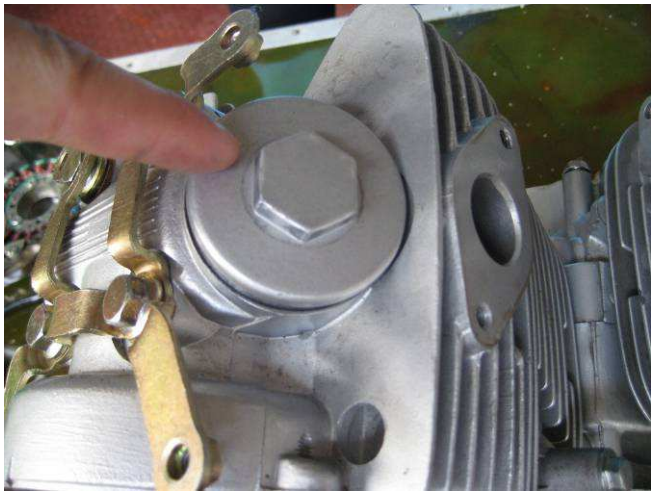
**Specification:**

**Intake valve 0.08~0.12mm (cold)**

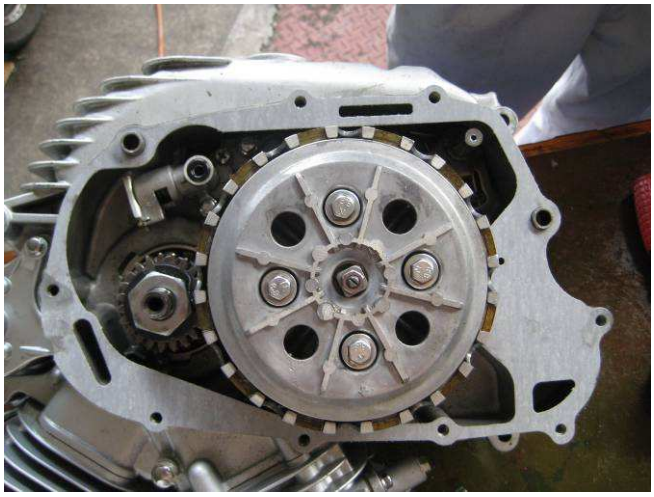
**Exhaust valve 0.10~0.14mm (cold)**

Install the tappet covers.

The O rings on the tappet covers should be installed properly.



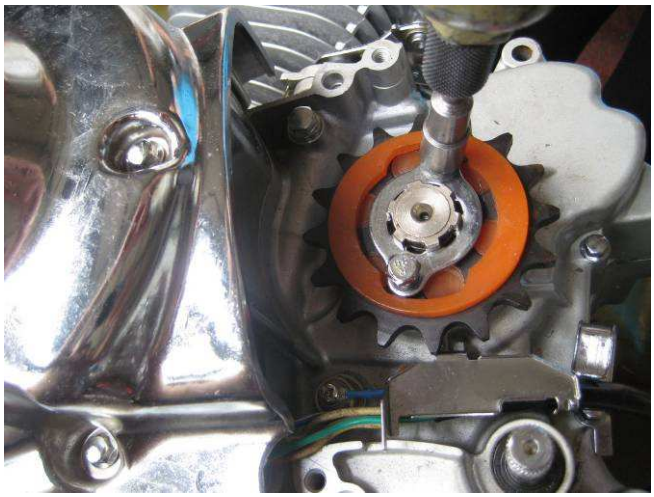
Using a new gasket for the right engine cover install the dowel pins, then install the right engine cover.



Tighten the bolts diagonally.

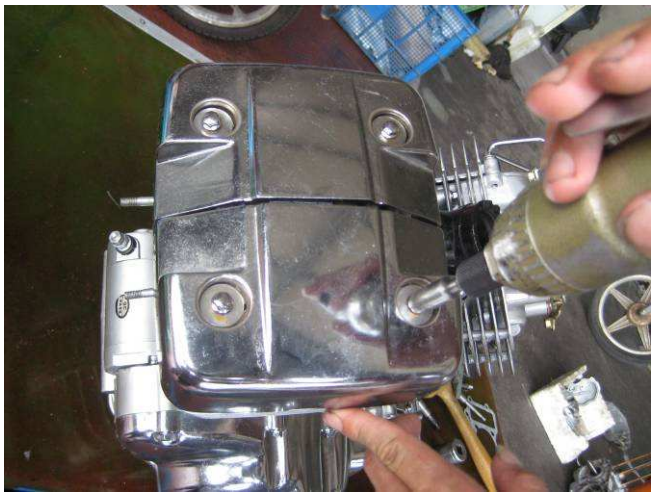
Torque bolts to specification.

Install the drive sprocket and secure it using the lock plate.



Install the air intake pipe, please note the vacuum pipe should point towards the rear cylinder.

Install the decorating covers on the cylinder heads.



Refill the engine oil to the specified capacity.


## Cam shaft removal

Remove the lock plate retaining the camshaft bushing (bearing).

Be careful not to damage the cylinder head, the bushing and the camshaft.

Please note the camshaft lobe is different for the front and rear cylinder heads.

**Note:**

Make a mark on the front and rear cylinder heads to avoid incorrect parts installation.

The engine will not start if the front and rear camshafts are installed incorrectly, even if the valve clearance is adjusted properly.

**Rocker arm removal**

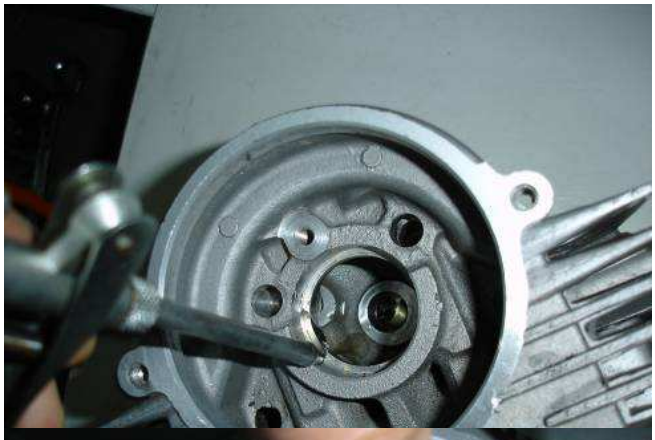
Screw a M6 bolt into the rocker arm shaft

and remove the rocker arm shaft from the cylinder head.

Remove the rocker arms from the cylinder head.

Camshaft installation

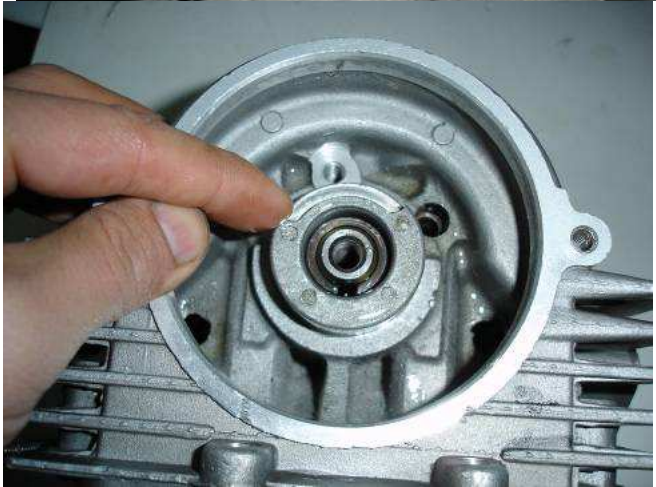
Apply some engine oil to the cylinder head and the camshaft then install the camshaft carefully.



Insert the rocker arm properly.

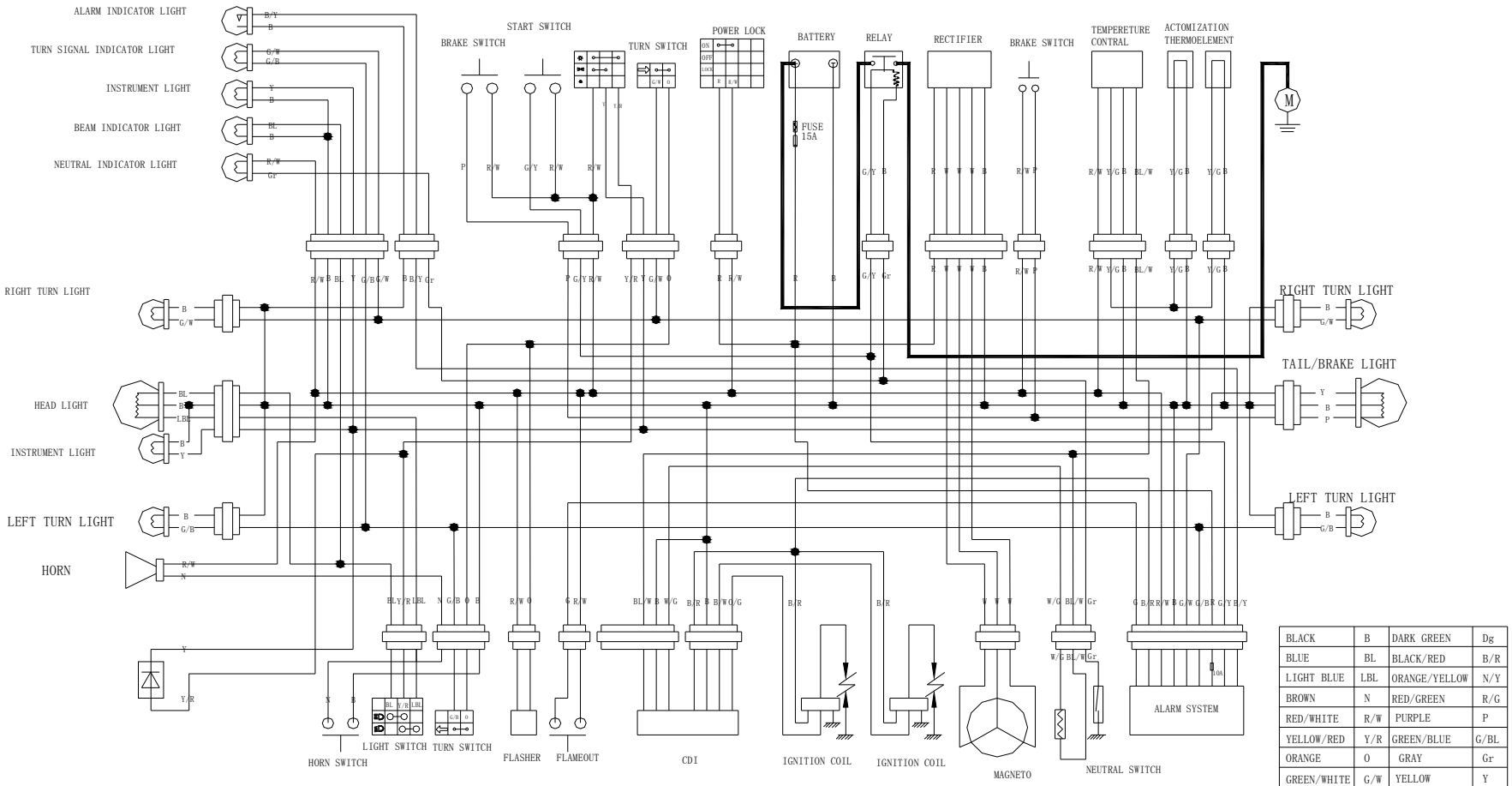
Screw a M6 bolt into the rocker arm shaft and install the rocker arm properly.

Install the camshaft bushing.



Put the plain washer in place and install the lock plate for the camshaft bushing.

# QJ250-L ELECTRICITY PRINCIPLE DIAGRAM




| | | | |
|---|---|---|---|
| BLACK | B | DARK GREEN | Dg |
| BLUE | BL | BLACK/RED | B/R |
| LIGHT BLUE | LBL | ORANGE/YELLOW | N/Y |
| BROWN | N | RED/GREEN | R/G |
| RED/WHITE | R/W | PURPLE | P |
| YELLOW/RED | Y/R | GREEN/BLUE | G/BL |
| ORANGE | O | GRAY | Gr |
| GREEN/WHITE | G/W | YELLOW | Y |
| GREEN/BLACK | G/B | RED | R |
| YELLOW/GREEN | Y/G | ORANGE/WHITE | O/W |