

# Maintenance Manual of Two-wheeled Motorcycle (K-LIGHT125)



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# Preface

This Maintenance Manual is the explanation for the maintenance essentials of dealers.

Preparatory information includes all matters needing attention for operation in the Maintenance Manual. Please read this Manual carefully before operation.

Inspection and adjustment is the explanation for the essentials of inspection and adjustment, as well as the safety of motorcycles and performance maintenance methods of parts, which should be implemented from the time of regular inspection.

Chapter II and subsequent chapters are the explanations for the decomposition, combination and inspection of the others of electrical equipment, motorcycle and engine.

Exploded diagrams and system diagrams, maintenance fault diagnosis and instructions are provided above all chapters.

Note:

The style or structure of the motorcycle and the photographs, pictures or instructions on the Manual are subject to change without further notice.

# Preparatory information

General safety

Maintenance rules

Motorcycle identification

Important notes

## General safety

Special tools

Specification table

Fault diagnosis

### Carbon monoxide

If the engine must be started, ensure that the workplace is well-ventilated and do not operate the engine in a closed place.

#### Notes

Exhaust gas contains carbon monoxide, a kind of toxic gas, which may cause people to lose consciousness and possibly lead to death.

It is necessary to operate the engine in an open place, and exhaust cleaning system should be used when the engine is operated in a closed place.

### Gasoline

Workers should operate in a well-ventilated workplace. Smoke and fire are strictly prohibited in the workplace or the place where gasoline is stored.

### Battery

Battery may emit explosive gas. Keep it away from spark, open flames and smoking area. Keep it well ventilated when it is being charged.

Battery contains sulfuric acid (electrolyte). Burns may be caused when it contacts with skin or eyes. Therefore, workers should wear protective clothing and mask.

——If electrolyte splashes on the skin, rinse it immediately with fresh water.

——If electrolyte splashes in the eyes, rinse them with fresh water immediately for more than 15 minutes and consult a doctor.

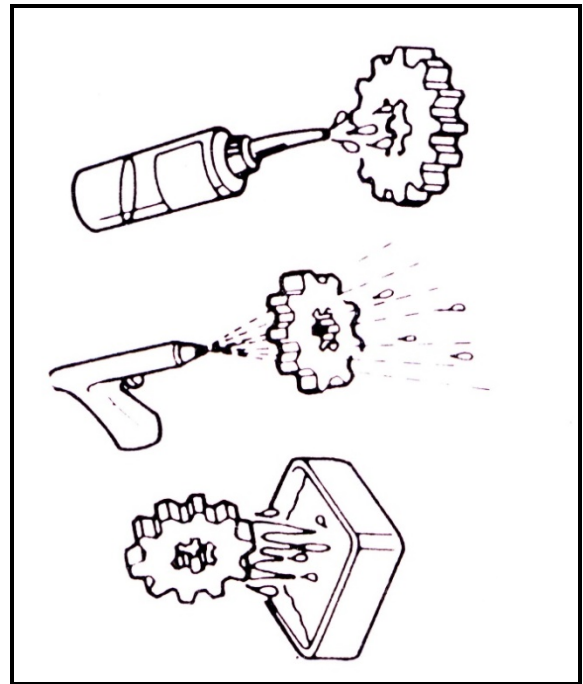
The electrolyte is toxic. If you accidentally drink electrolyte, you should immediately drink plenty of water, milk and magnesium oxide milk (a laxative antacid) or vegetable oil, and consult a doctor. Keep it out of the reach of children.

## Maintenance rules

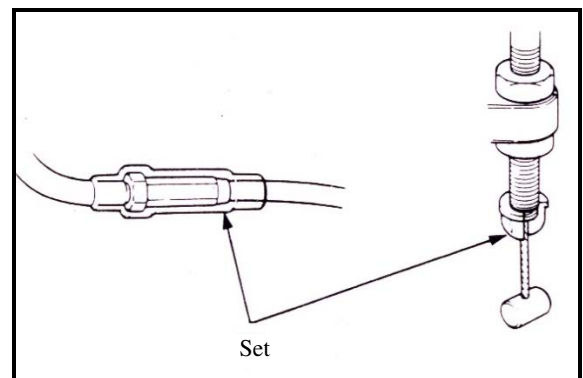
During the maintenance of the motorcycle, use metric tools as much as possible. The motorcycle may be damaged due to the use of incorrect tools.

Before removing or opening the fender for maintenance, clean the dirt from the outside of part or assembly, to prevent the dirt from falling into the engine, chassis or brake system.

After disassembling and before measuring the wear value, clean the parts and blow them with a compressed air machine.

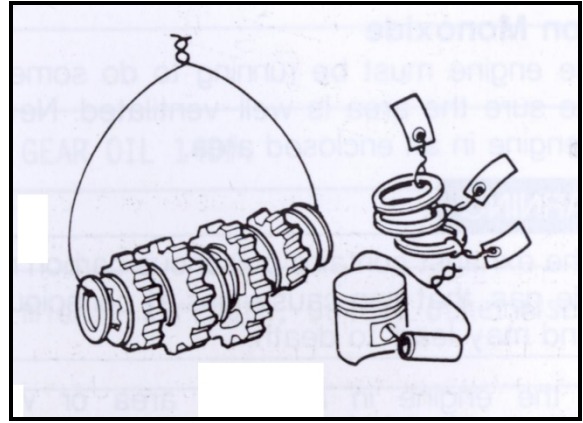


The rubber parts may deteriorate due to aging and are easily damaged by solvents or oils. They should be inspected before reassembly and replaced if necessary.

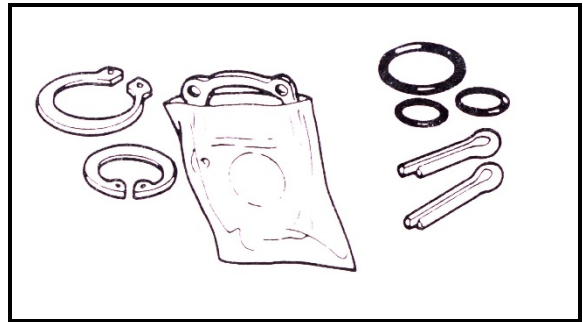


Loosen parts with multiple assemblies from outside to inside. First loosen small assemblies.

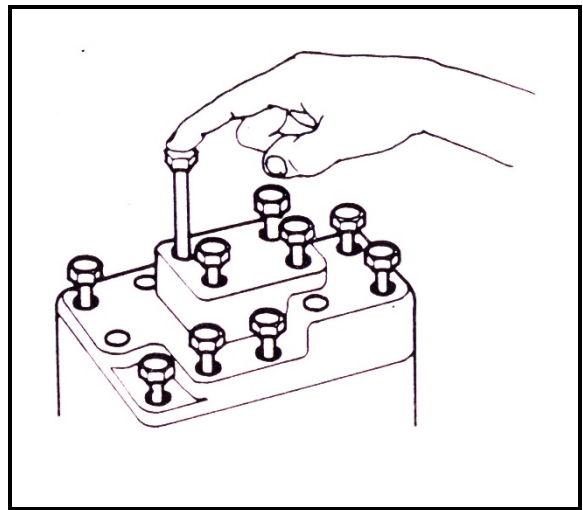
Complex assemblies such as gearboxes should be stored in the proper assembly order for future assembly.



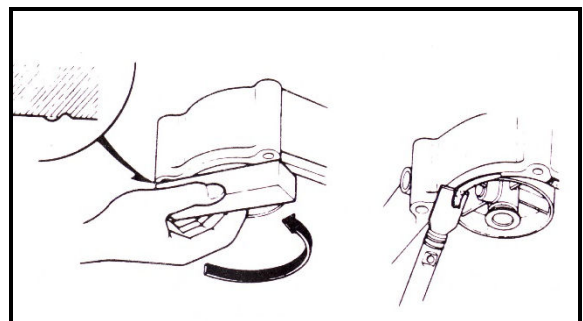
Complex assemblies such as gearboxes should be stored in the proper assembly order for future assembly. The parts that will no longer be used should be replaced promptly before dismantling.



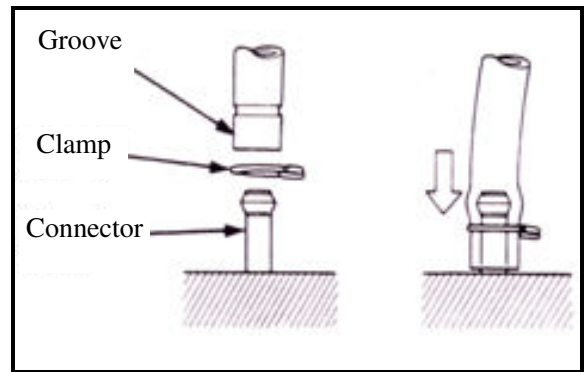
The lengths of bolts or screws are different for assembly and fender, and they must be installed in the proper positions. If they are mixed, put the bolt in the hole and check whether it is proper.



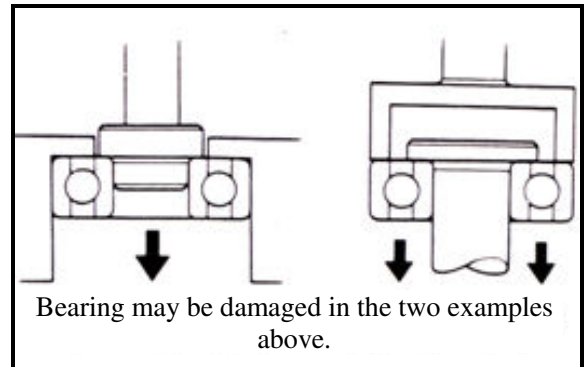
Installation of oil seal: the oil seal groove should be filled with lubricating grease, check whether the oil seal is smooth and may be damaged.



Installation of rubber hose (fuel, vacuum, or coolant): its end should be plugged into the bottom of connector, so that there is enough place at the hose to clamp the connector. Rubber or plastic dirt-proof boots should be fitted at the original design position.



Disassembly of ball bearing: use tools to support one or two (inner and outer) bearing rolling rings. If the force is applied to only one rolling ring (either inside or outside), the bearings may be damaged when being disassembled and they must be replaced.



Loose cable is a potential safety hazard of electrical safety. Check the next cable after clamping the cable, to ensure electrical safety;

Wire clamps are not allowed to bend in the direction of the solder joint;

Bundle the cable at the designated location;

Cables are not allowed to be placed at the end of frame or at the corners;

Cables are not allowed to be placed at the ends of bolts or screws;

Keep cables away from heat source or the position where the cable may be caught during movement;

Cables should not be kept too tight or loose when being placed along the faucet handle, and must not interfere with adjacent parts in any steering position;

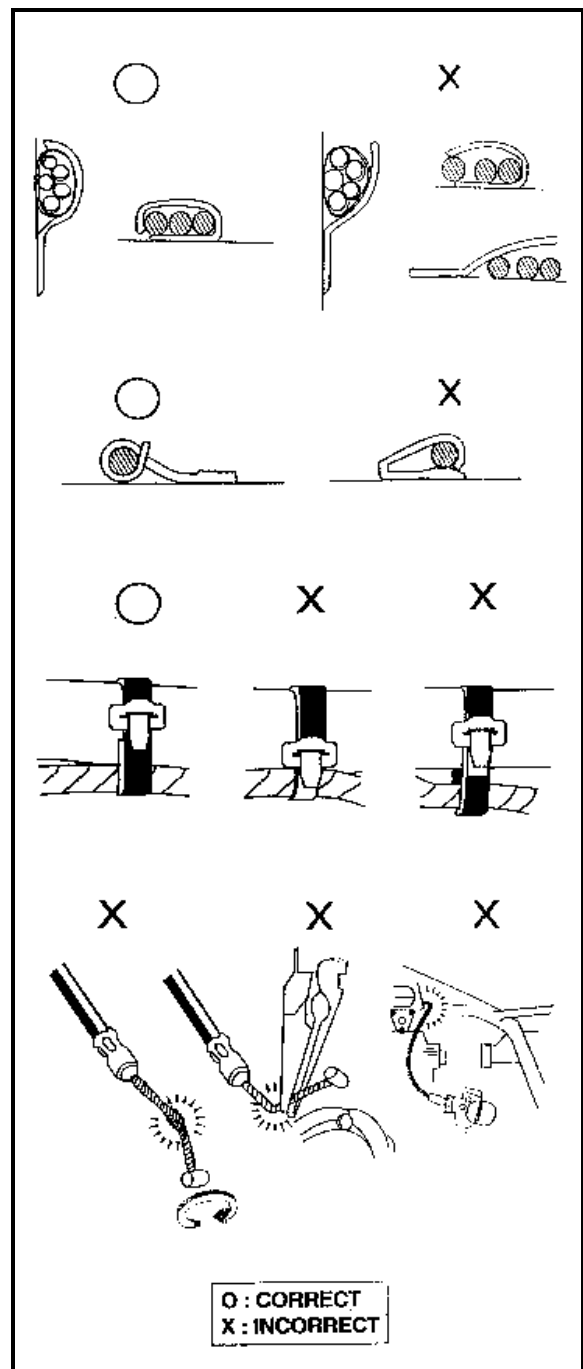
Cables should be smoothly placed and must not be twisted or knotted;

Before connectors are mated, check whether the connector sheath is damaged and the connector is opened excessively;

If the cable is at a sharp or corner, please protect it with tape or a hose;

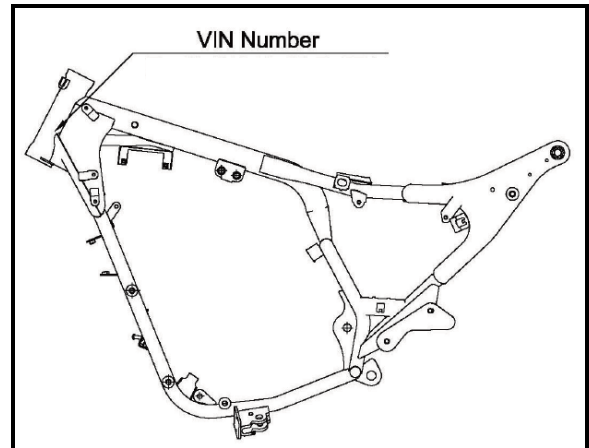
After the cable is repaired, please bind it up reliably with tape;

The control wire must not bend or twist. If the control line is damaged, inflexible operation may be caused;



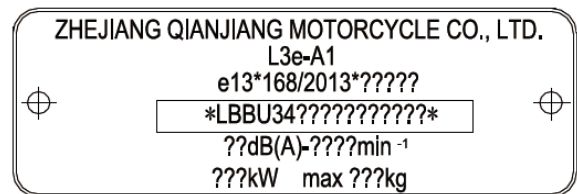
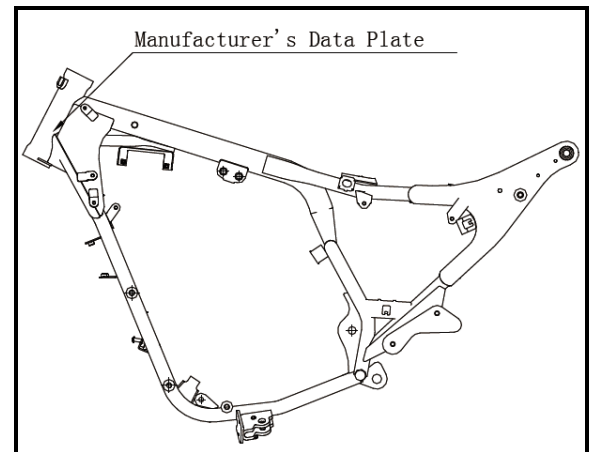
# Motorcycle identification

1. The frame serial number ① is: \*LBBU3400?????????\*, as shown in the figure. The 10th digit of vehicle identification code is the year, the 11th digit is the production factory code, and a “\*” mark is added at the beginning and the end of the frame number.



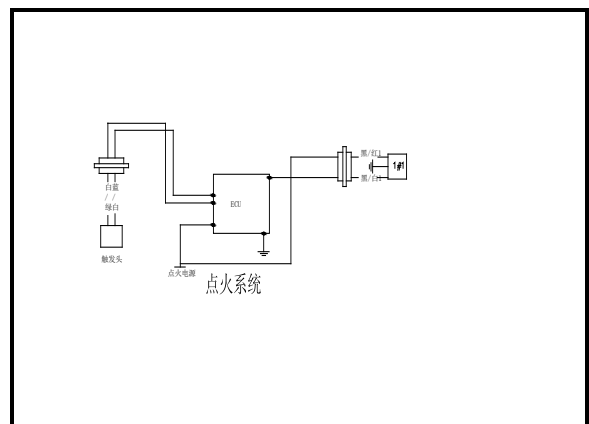
2. Frame nameplate riveting position, as shown in the figure.

Frame nameplate, as shown in the figure.



3. Serial number of engine ① is marked at the housing of crankcase, as shown in the figure.

Engine number: QJ157FMI-A\*□□□□□□\*



## Important notes

1. Please use the parts from dealers. Damage may be caused to the engine when the parts that do not meet the design specifications of dealers used.
2. Only metric tools can be used for maintenance work. Metric bolts, nuts and screws are not interchangeable with imperial fasteners.
3. During reassembly work, use new washers, O-rings, split pins and locking plates.
4. When tightening bolts or nuts, first tighten the bolts with large diameter or leaning to the inner side, and then gradually tighten them to the specified torque in the diagonal order, unless otherwise specified.
5. Wash the removed parts with a cleaning solution. Lubricate all sliding surfaces before assembly.
6. After assembly, check whether all parts have been correctly installed and operated.
7. Degrease and remove oil before measurement. Add recommended lubricant to the lubrication location during assembly.
8. When the engine and drive system need to be stored for a long time after being disassembled, please apply lubricant to the surface of the parts to prevent rust and dust.

## Special tools

Special tool refers to a tool specially designed for assembling or disassembling some parts of motorcycle and using it on a specific location. Appropriate special tools are indispensable for complete and accurate adjustment and assembly operations. Parts should be disassembled and assembled safely, reliably and quickly using special tools, so as to improve work efficiency and save labor.

### 1. Tools for maintenance of engine

When disassembling the engine, certain parts can be smoothly assembled and disassembled only using specially designed tools.

The list and pictures of special tools for the disassembly and assembly of engine parts are shown in Tables 1-1 and 1-2.

**Table 1-1**

Name	Remarks
Special socket wrench	Used to remove the flywheel bolts, Fig. 1-3
Clutch holder	Fig. 1-4
Flywheel puller	Fig. 1-5
Feeler gauge	Fig. 1-6
Bearing removal tool	Fig. 1-7
Bearing installation tool	Fig. 1-8
Oil seal replacer	Fig. 1-9
Disassembly tool handle	Fig. 1-10
Piston pin pull-out device	Fig. 1-11
Piston ring opening clamp	Fig. 1-12
Spark plug socket wrench	Fig. 1-13
Measuring clutch thickness	Fig. 1-14
Cylinder diameter tester	Fig. 1-15
Dial gauge	Measure inner diameter of piston pin, Fig. 1-16

**Table 1-2**



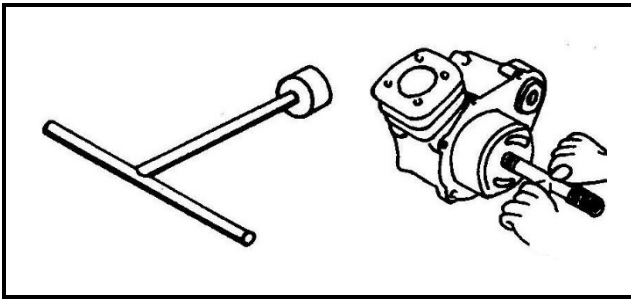


Fig. 1-3

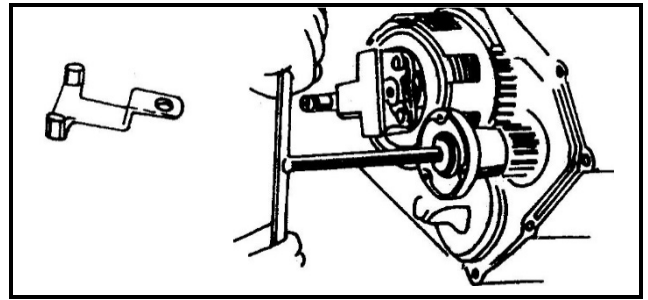


Fig. 1-4

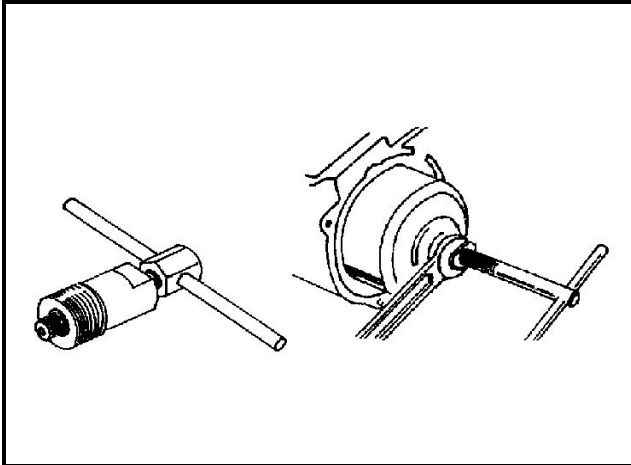
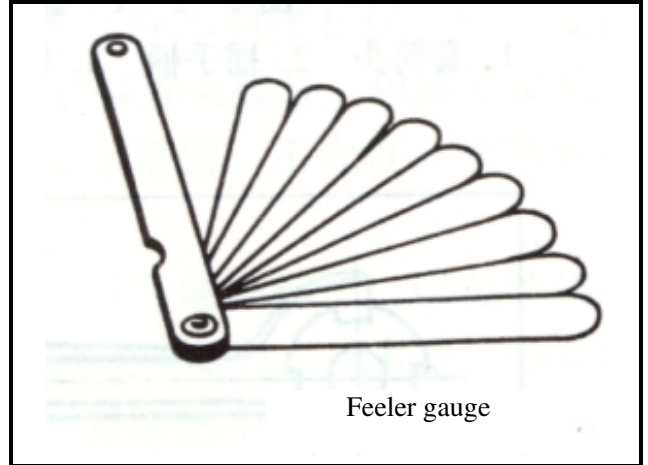


Fig. 1-5



Feeler gauge

Fig. 1-6

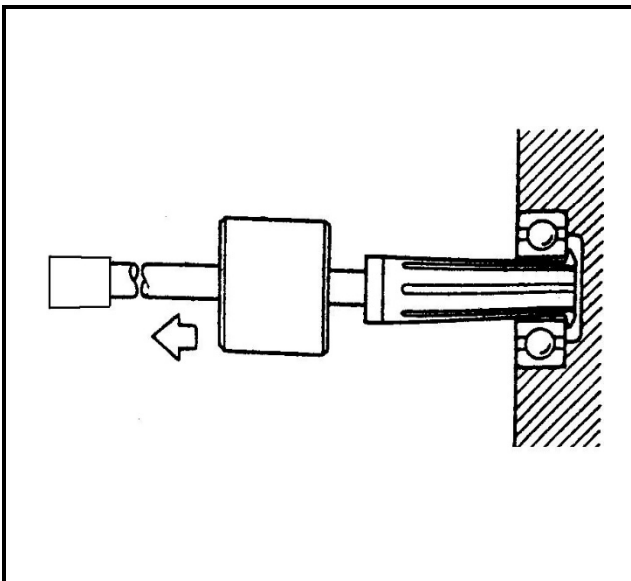


Fig. 1-7

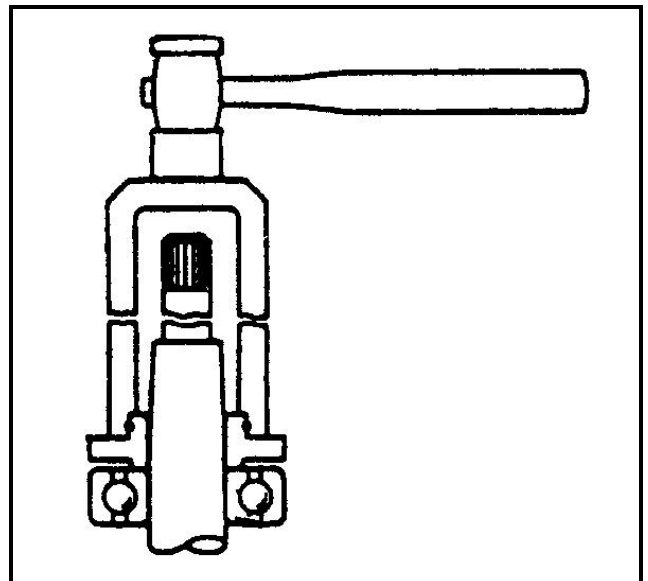


Fig. 1-8

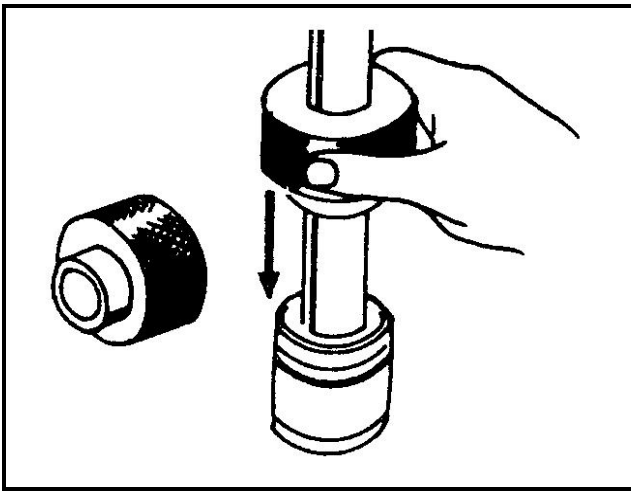


Fig. 1-9

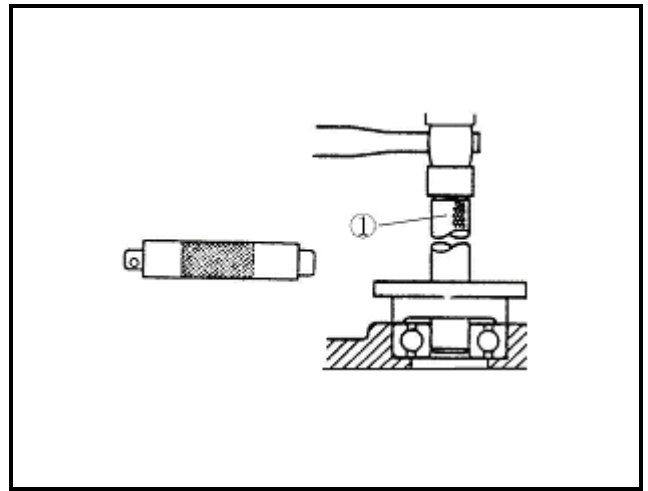


Fig. 1-10

① Handle

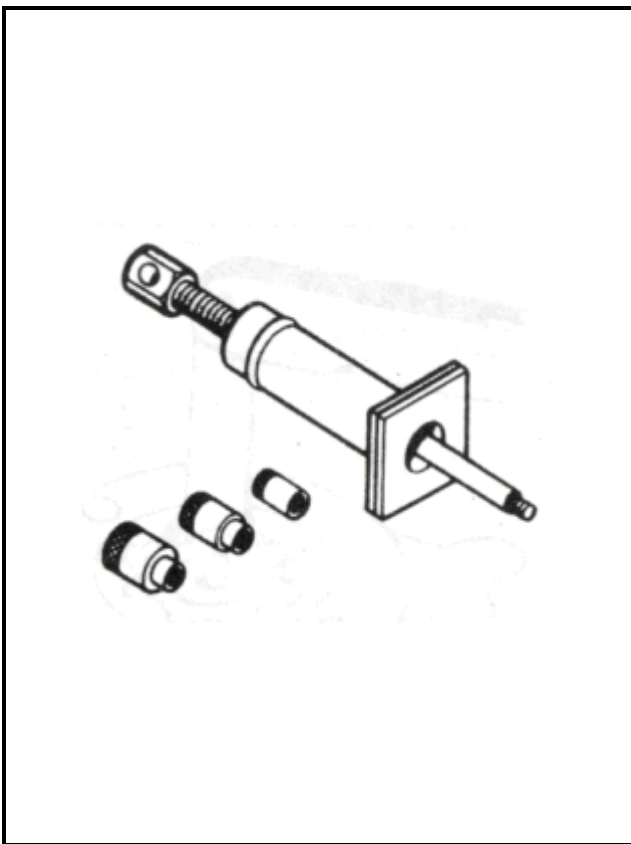


Fig. 1-11

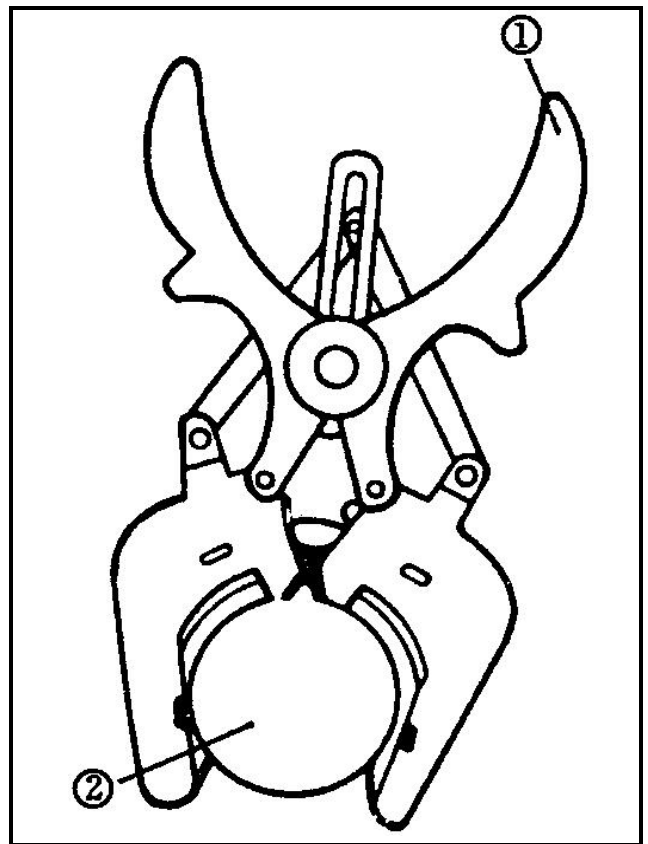


Fig. 1-12

① Opening clamp ② Piston

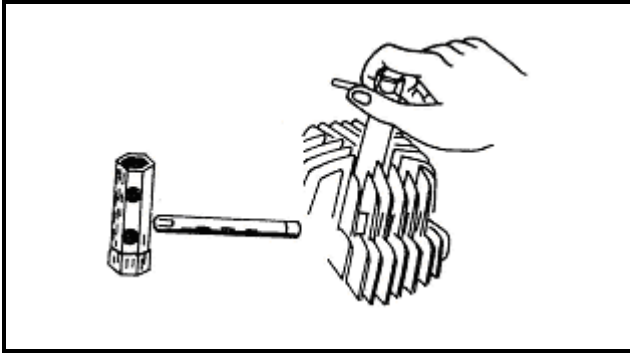


Fig. 1-13

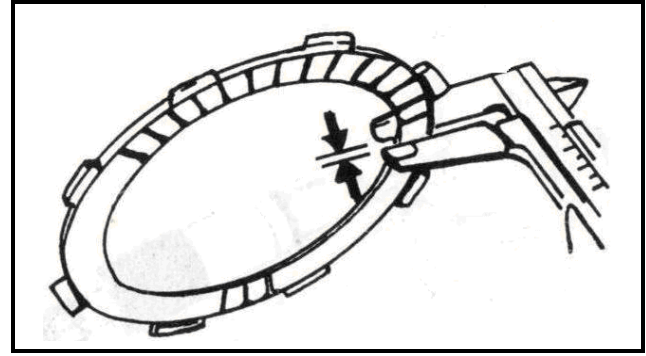


Fig. 1-14

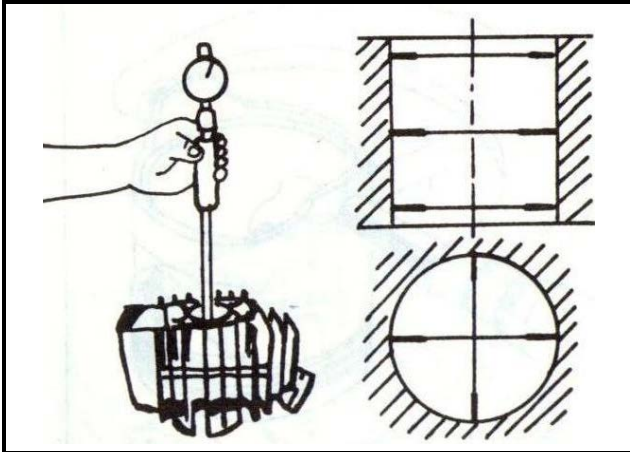


Fig. 1-15

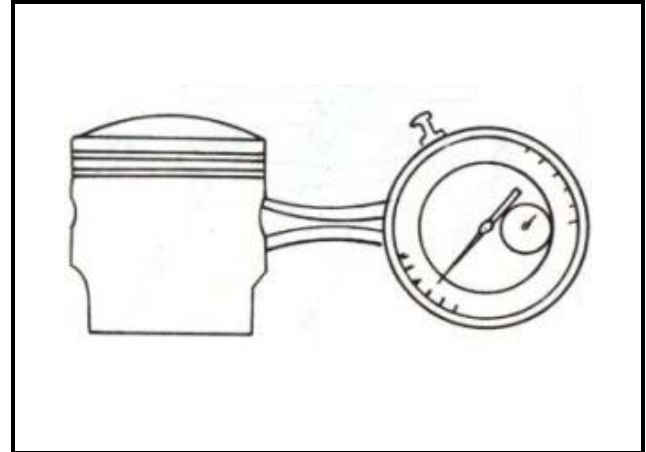


Fig. 1-16

## 2. Tools for chassis Maintenance

The list and pictures of common and special tools for the disassembly and assembly of chassis parts are shown in Tables 1-17 and 1-18.

Table 1-17

Name	Remarks
Torque wrench	Fig. 1-19
Allen wrench	Fig. 1-20
Socket wrench	Fig. 1-21
Micrometer	Fig. 1-22
Magnetic frame, V-shaped block	Fig. 1-23
Dial gauge	Fig. 1-24
Vernier caliper	Fig. 1-25
Spring snap ring pliers	Fig. 1-26
Knock-on screwdriver	Fig. 1-27
Front fork oil seal installation tool	Fig. 1-28
Front fork seal driving tool	Fig. 1-29
Steering nut wrench	Fig. 1-30

(1) Common tools for chassis maintenance

**Table 1-18 (continued)**

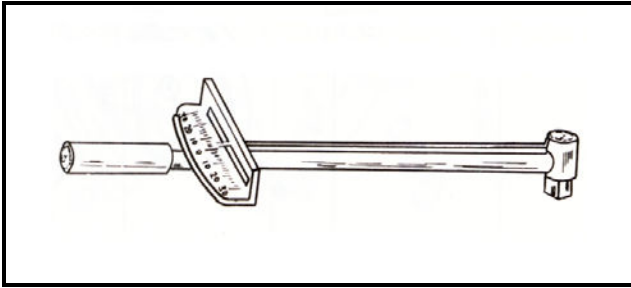


Fig. 1-19

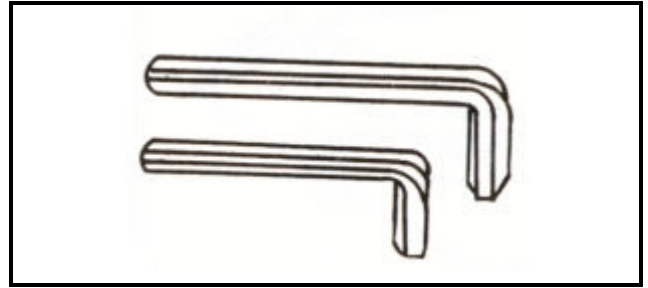


Fig. 1-20

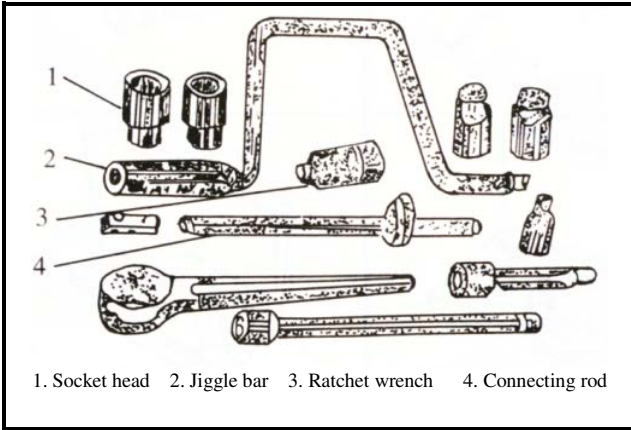


Fig. 1-21

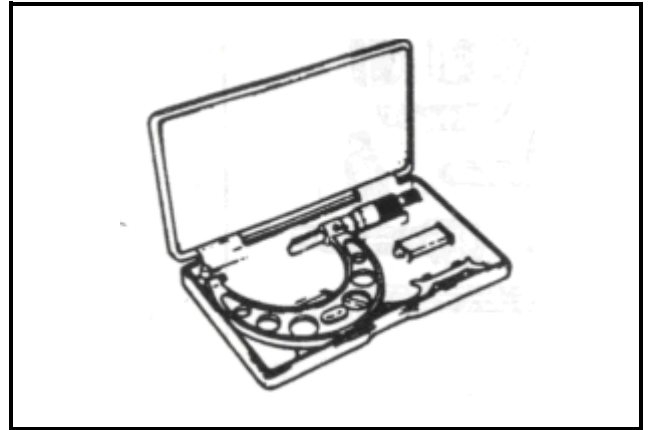


Fig. 1-22

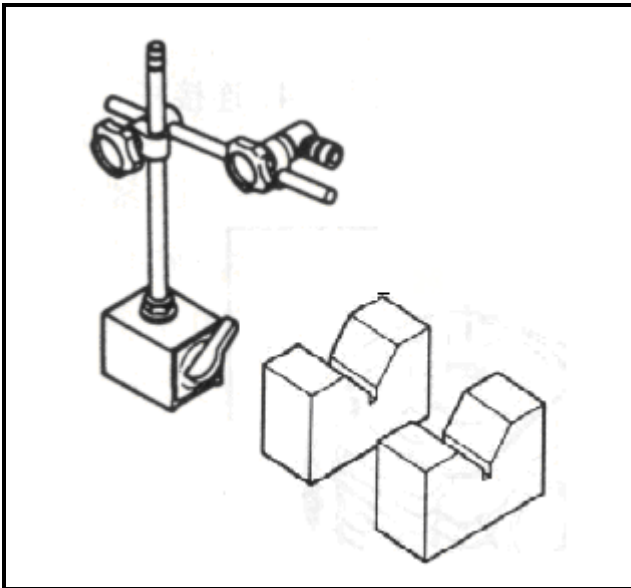


Fig. 1-23



Fig. 1-24

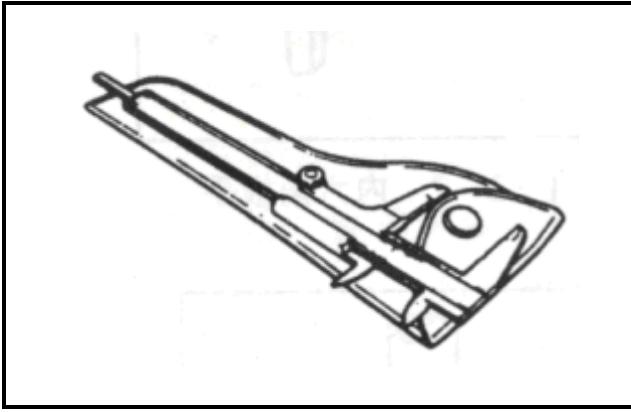


Fig. 1-25

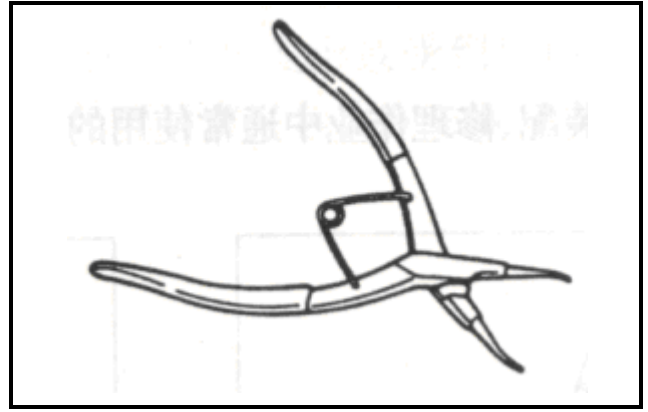


Fig. 1-26

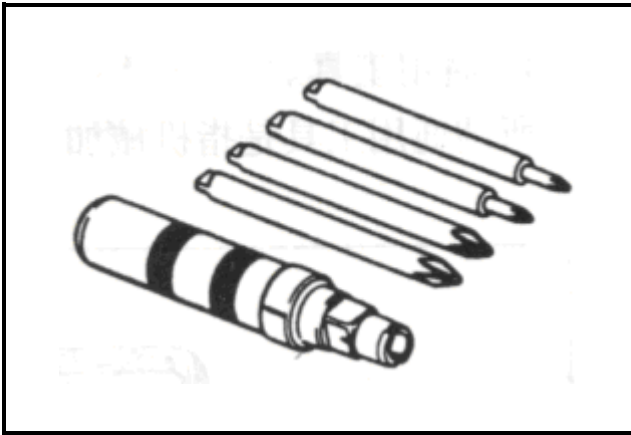


Fig. 1-27

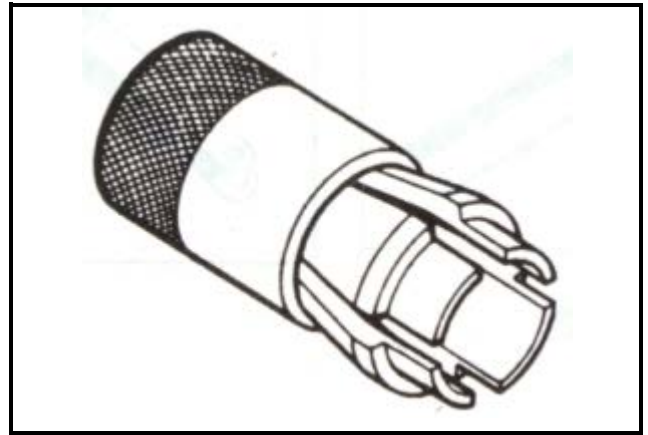


Fig. 1-28

(2) Special tools for maintenance of chassis: Front fork seal driving tool.

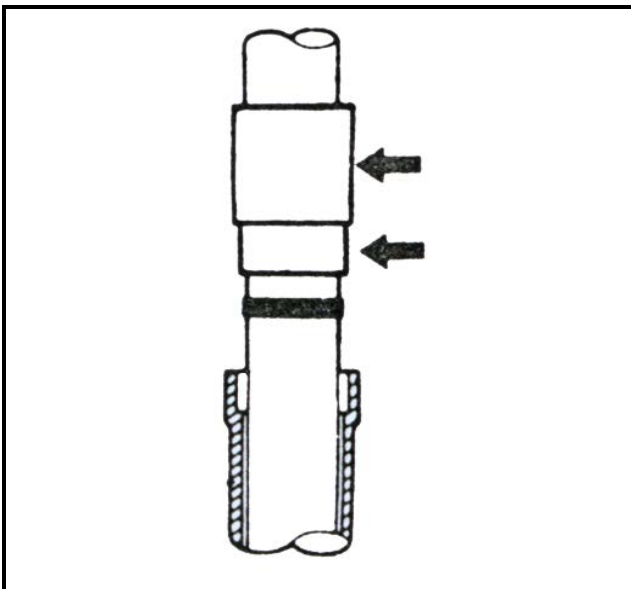
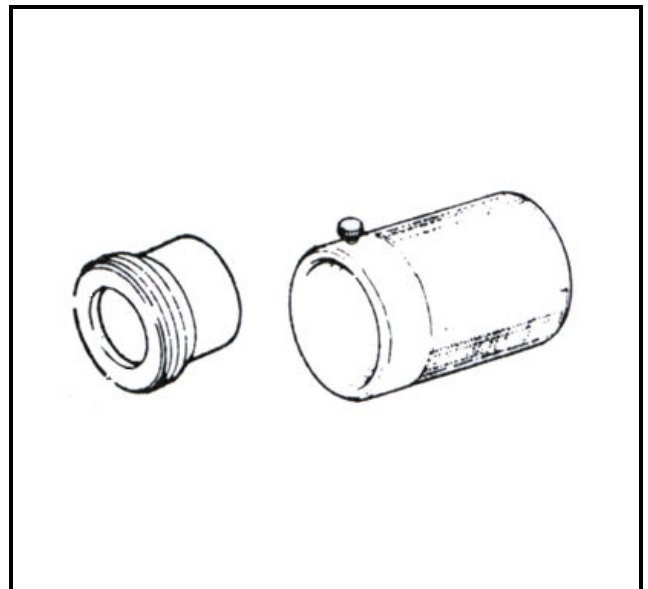


Fig. 1-29



(3) Steering nut wrench.

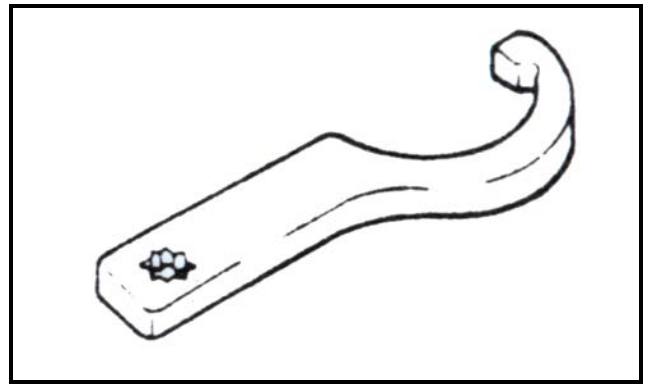
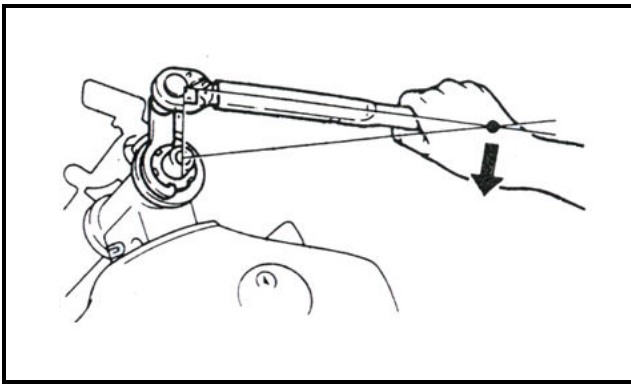


Fig. 1-30

### 3. Tools for electrical parts

The list and pictures of special tools for the testing of electrical parts are shown in Table 1-31 and 1-32.

**Table 1-31**

Name	Remarks
Multimeter	Fig. 1-33
Ignition tester	Fig. 1-34

**Table 1-32 (continued)**

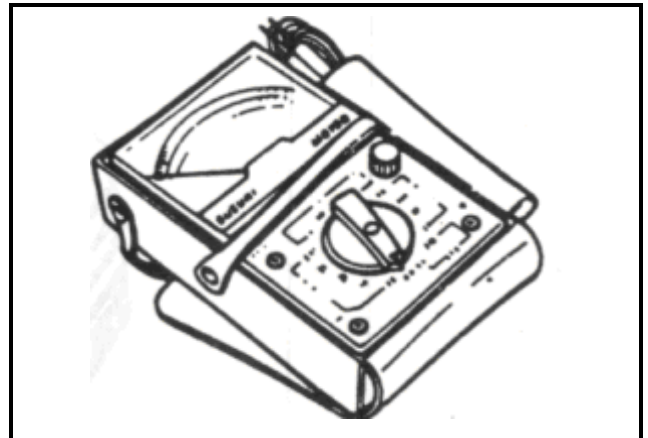
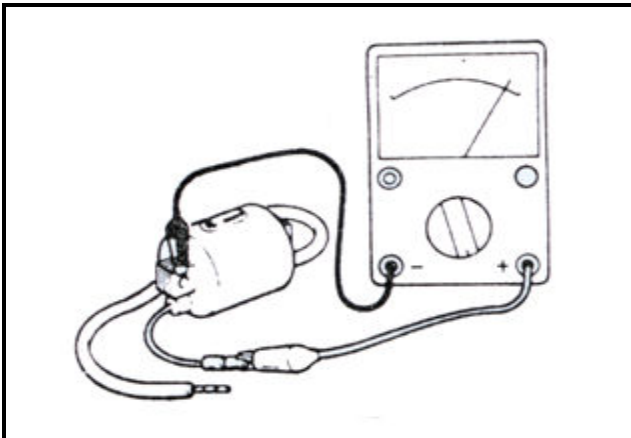


Fig. 1-33

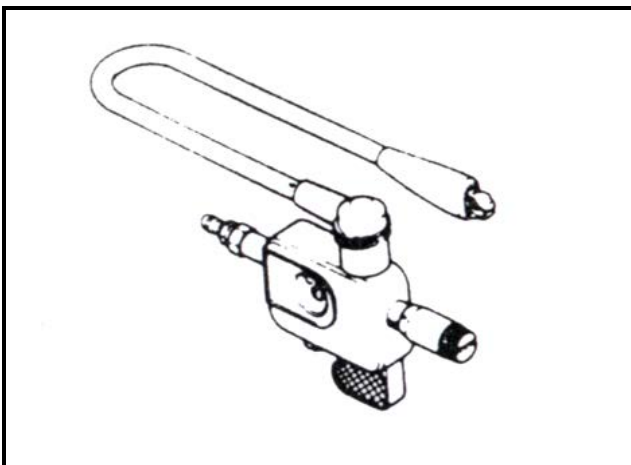
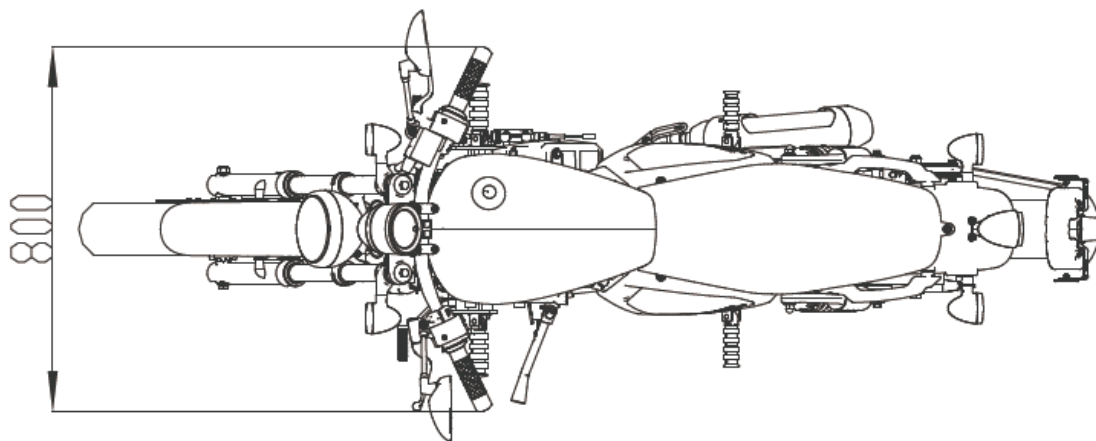
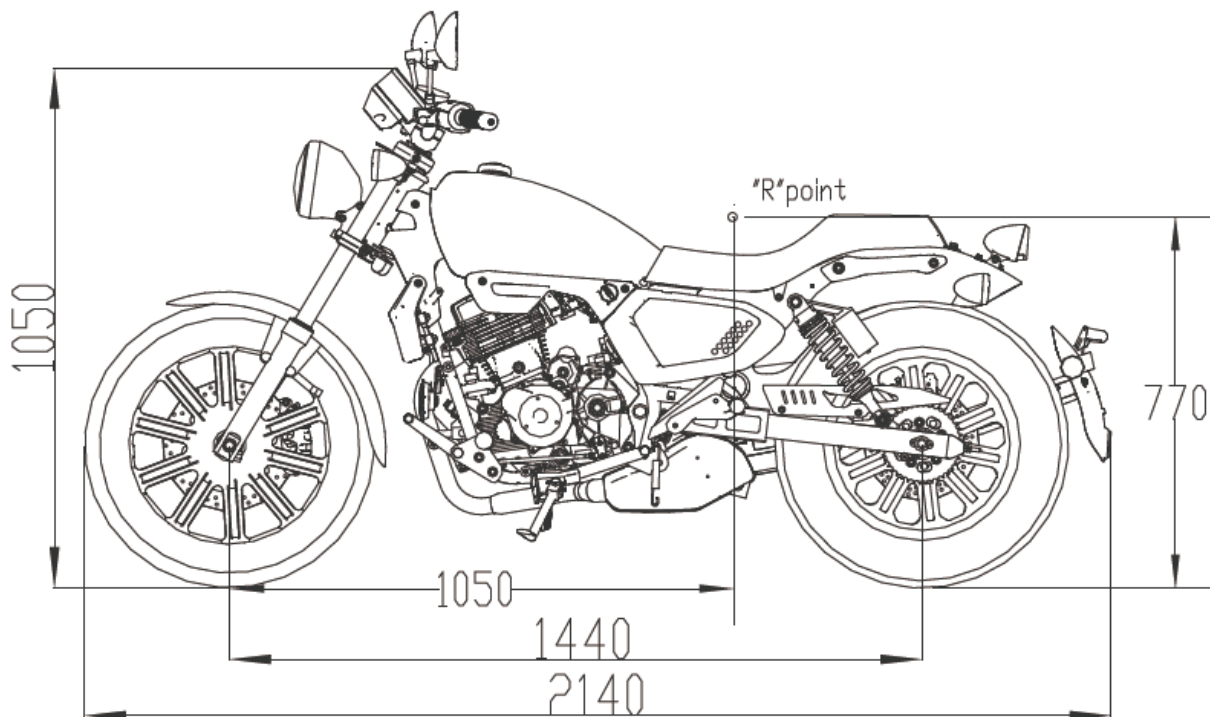


Fig. 1-34

## Specification table

Model		K-LIGHT125		Engine	Engine type	QJ157FMI	
L (mm)		2140			Fuel type	Unleaded gasoline	
W (mm)		800			Number of cylinders	1	
H (mm)		1050			Inner diameter * stroke	φ56.5×49.5	
Wheelbase mm		1440			Total displacement	124cm <sup>3</sup>	
Weight (kg) (Curb weight)		Front axle	69		Starting mode	Electric / kickstarter	
		Rear axle	76		Cooling mode	Air-cooled	
		Total	145		Lubrication mode	Pressure and splash lubrication	
Tire Specifications		Front tire	90/90-17		Air filter	3XG/sponge	
		Rear tire	130/90-15		Tank capacity	11.8L±0.5L	
Transmission gear	Clutch type	Wet multi-plate friction type		Performance	Throttle valve:	30C-21	
	Speed-varying mode	Five-speed transmission			Idle speed	1500±100rev/min	
	Drive mode	Chain drive			Maximum torque	8.9Nm/7500rev/min	
Electric equipment	Battery capacity/type	12V6Ah (YTX7A-BS)			Maximum horsepower	7.8kw/9000rev/min	
	Alternator capacity	100W/5000rpm			Compression ratio	9: 1	
	Spark plug	D7RTC			Maximum speed	90km/h five-speed	
	Spark plug gap	0.7±0.1mm			Brake	Diameter of front brake disc	φ280mm
	Ignition mode	ECU				Diameter of rear brake disc	φ240mm

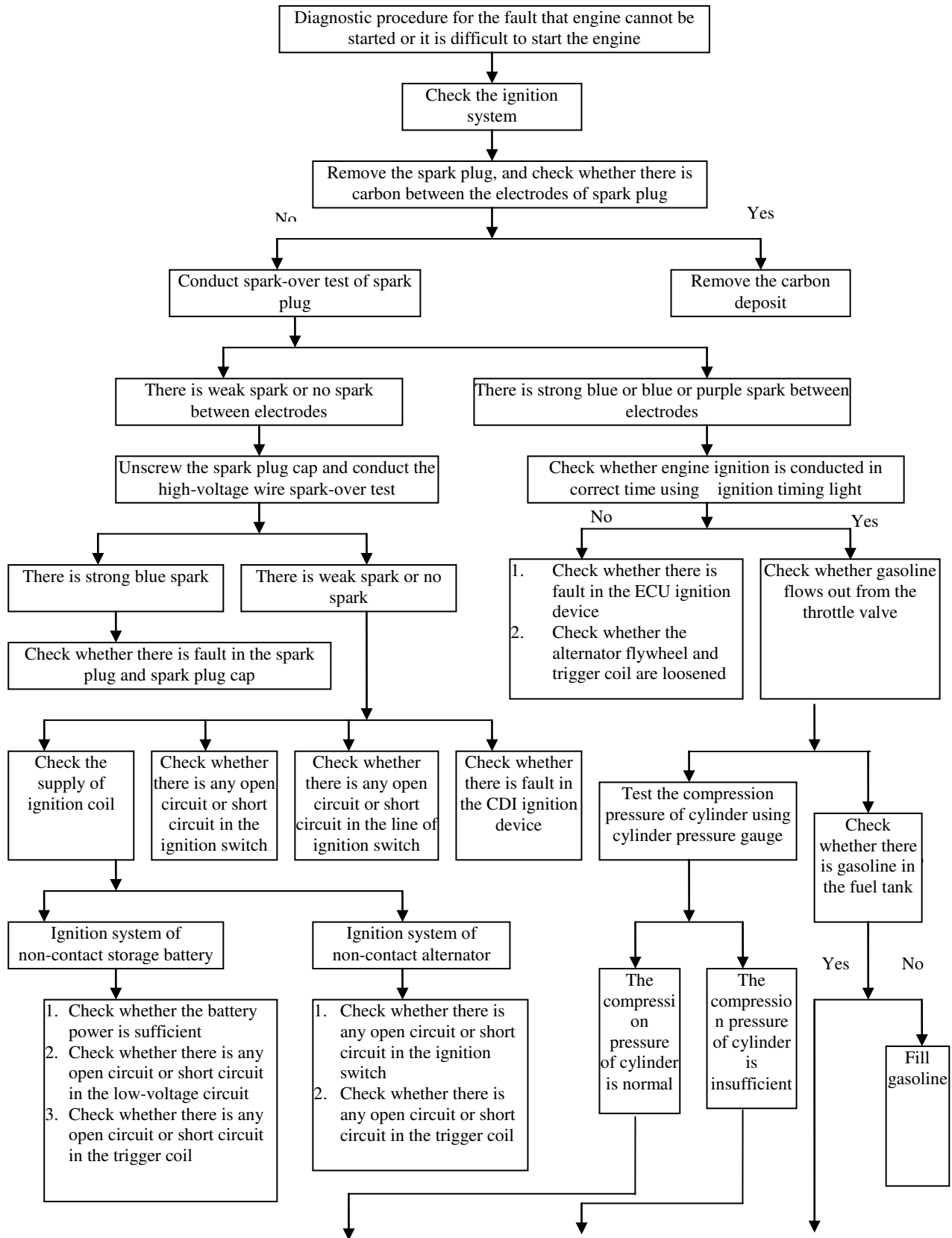


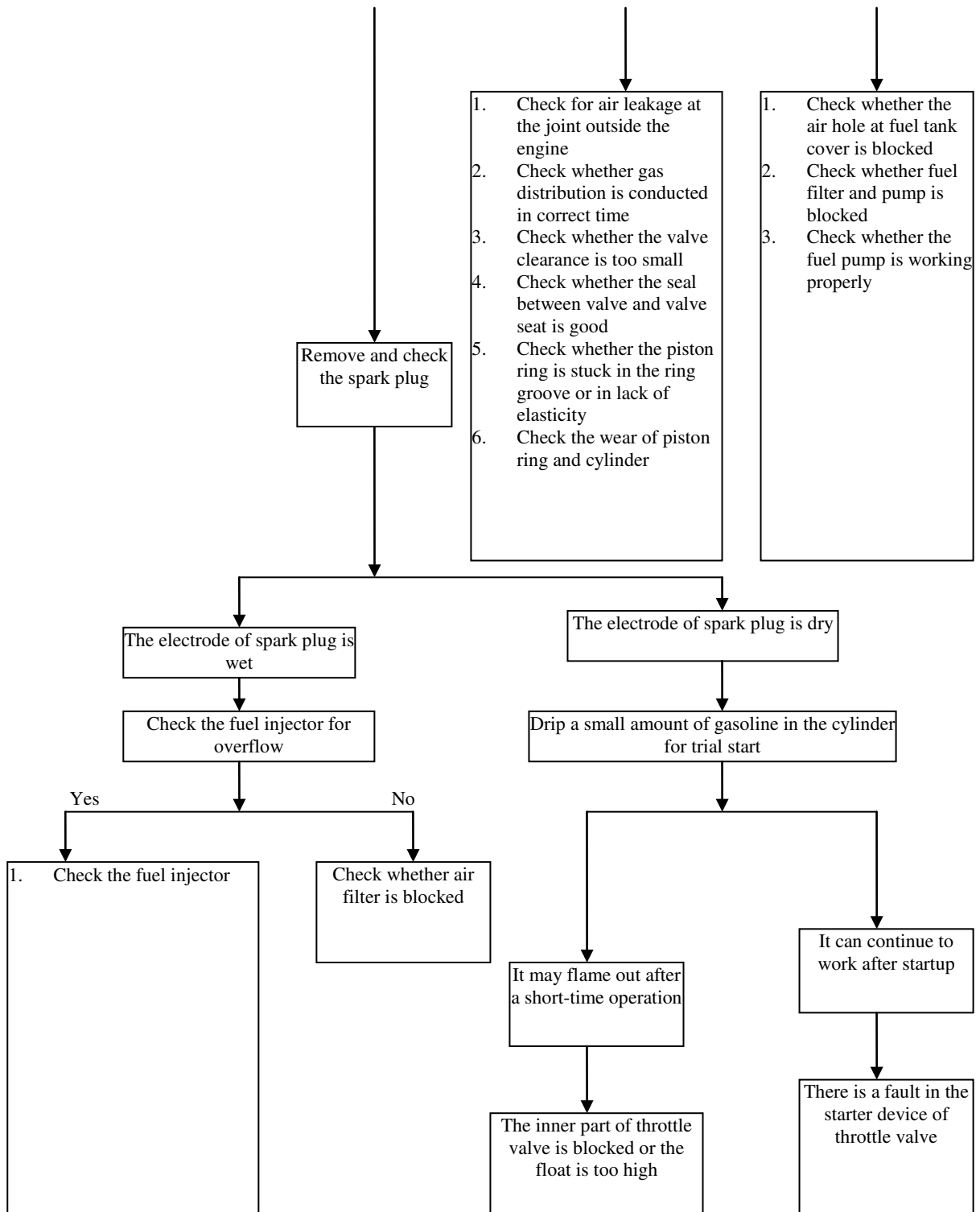




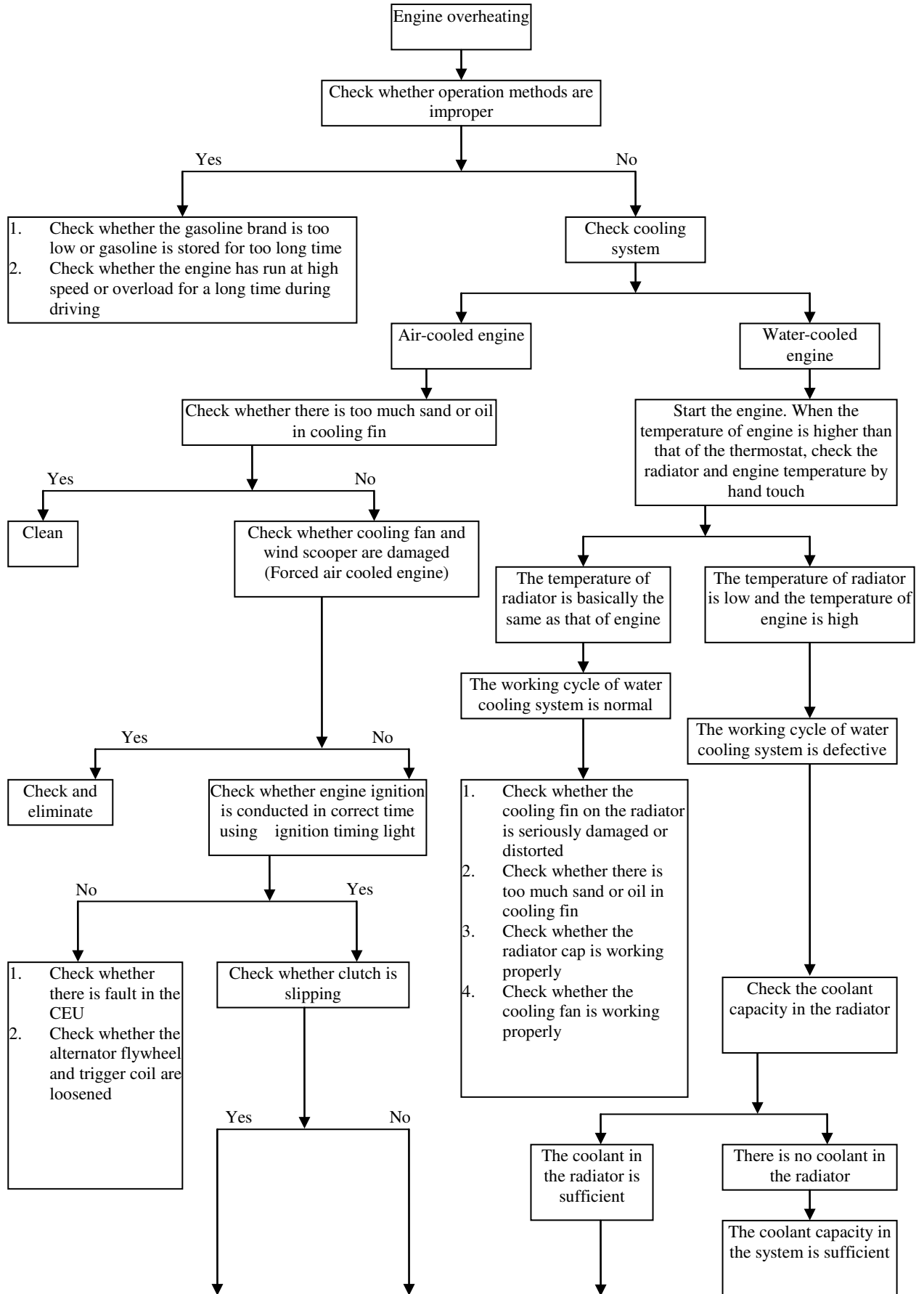
Fault diagnosis

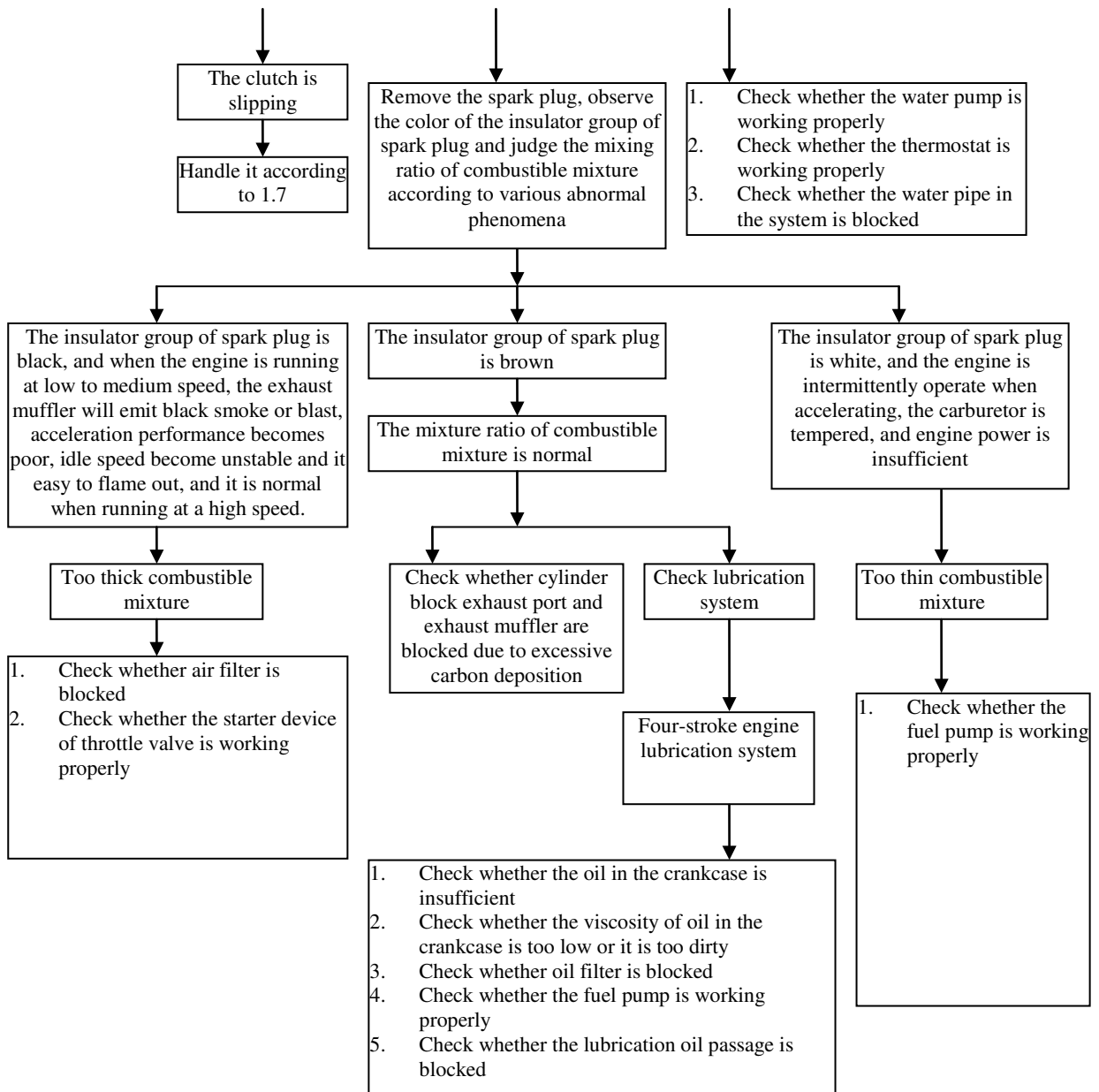
Diagnostic procedure for the fault that engine cannot be started or it is difficult to start the engine



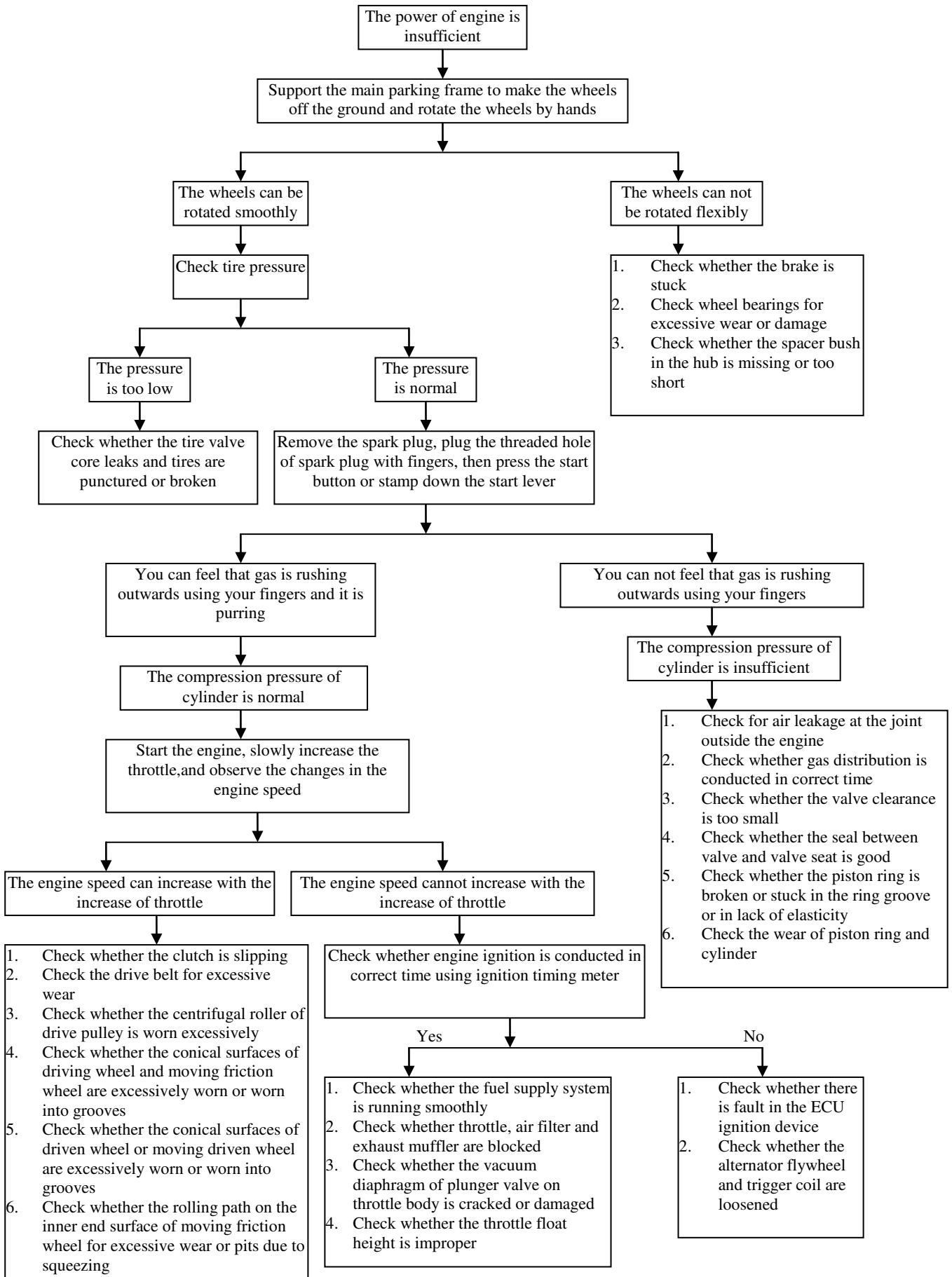


Engine overheating fault diagnosis procedure

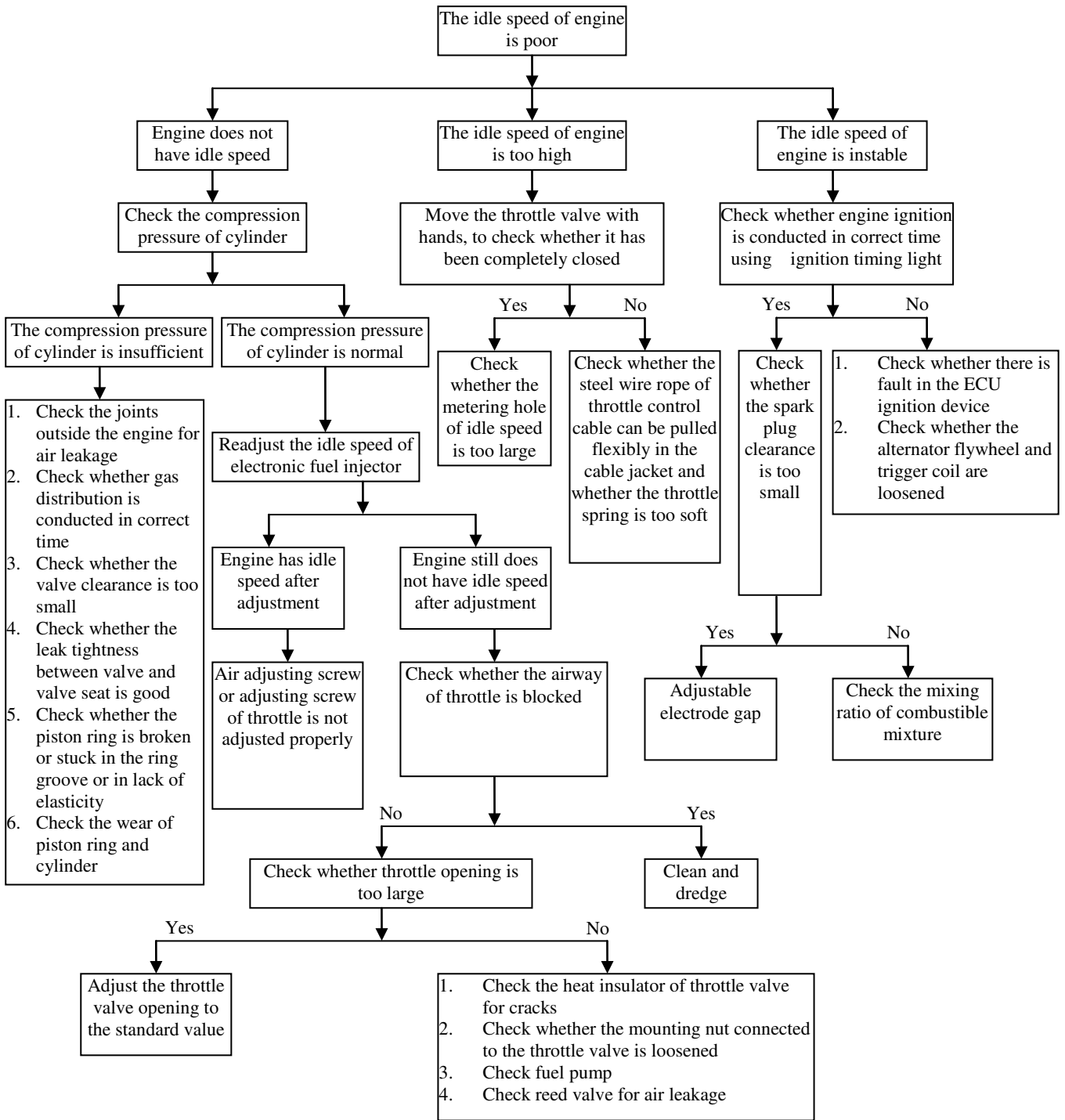




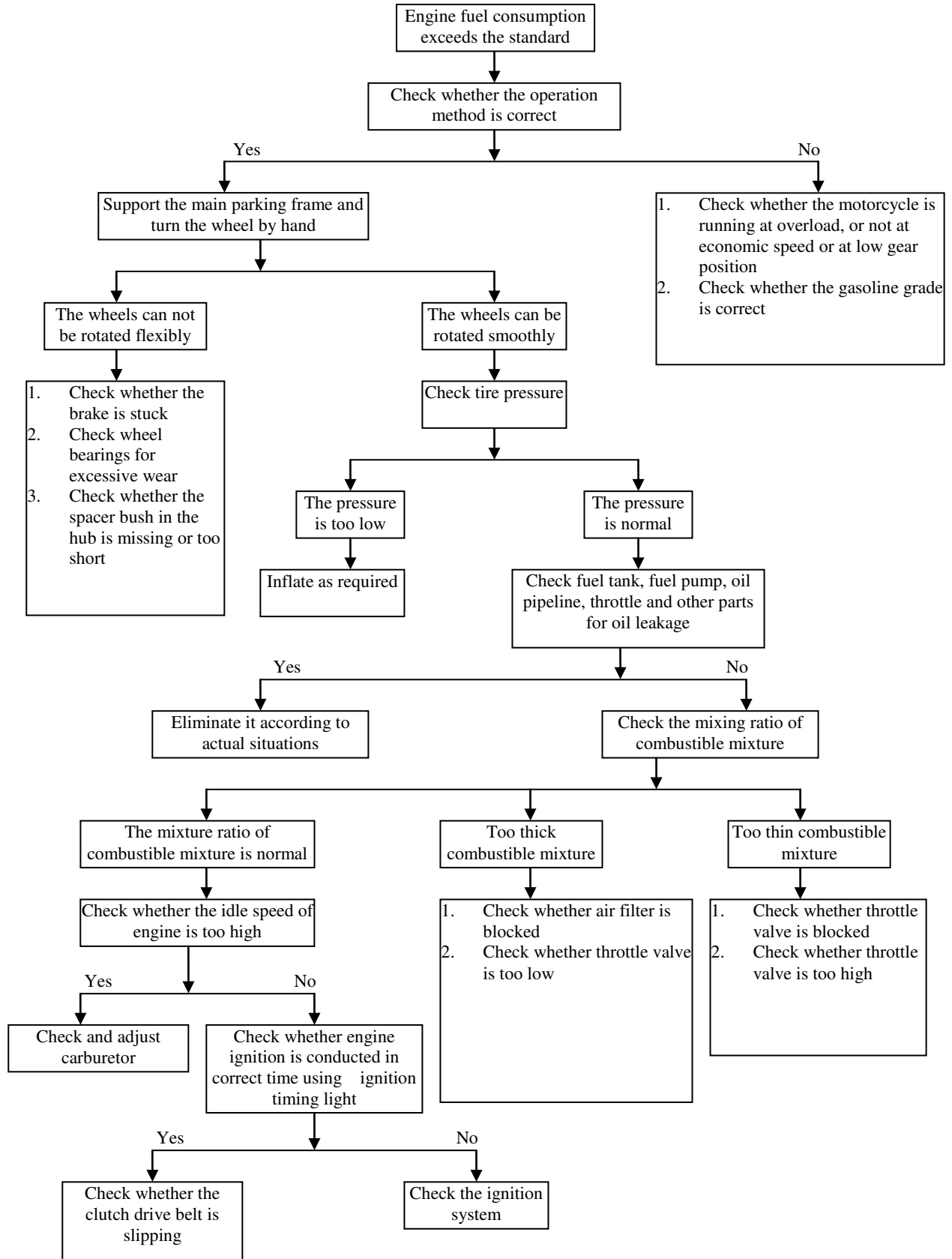
## Fault diagnostic procedure for insufficient power of engine



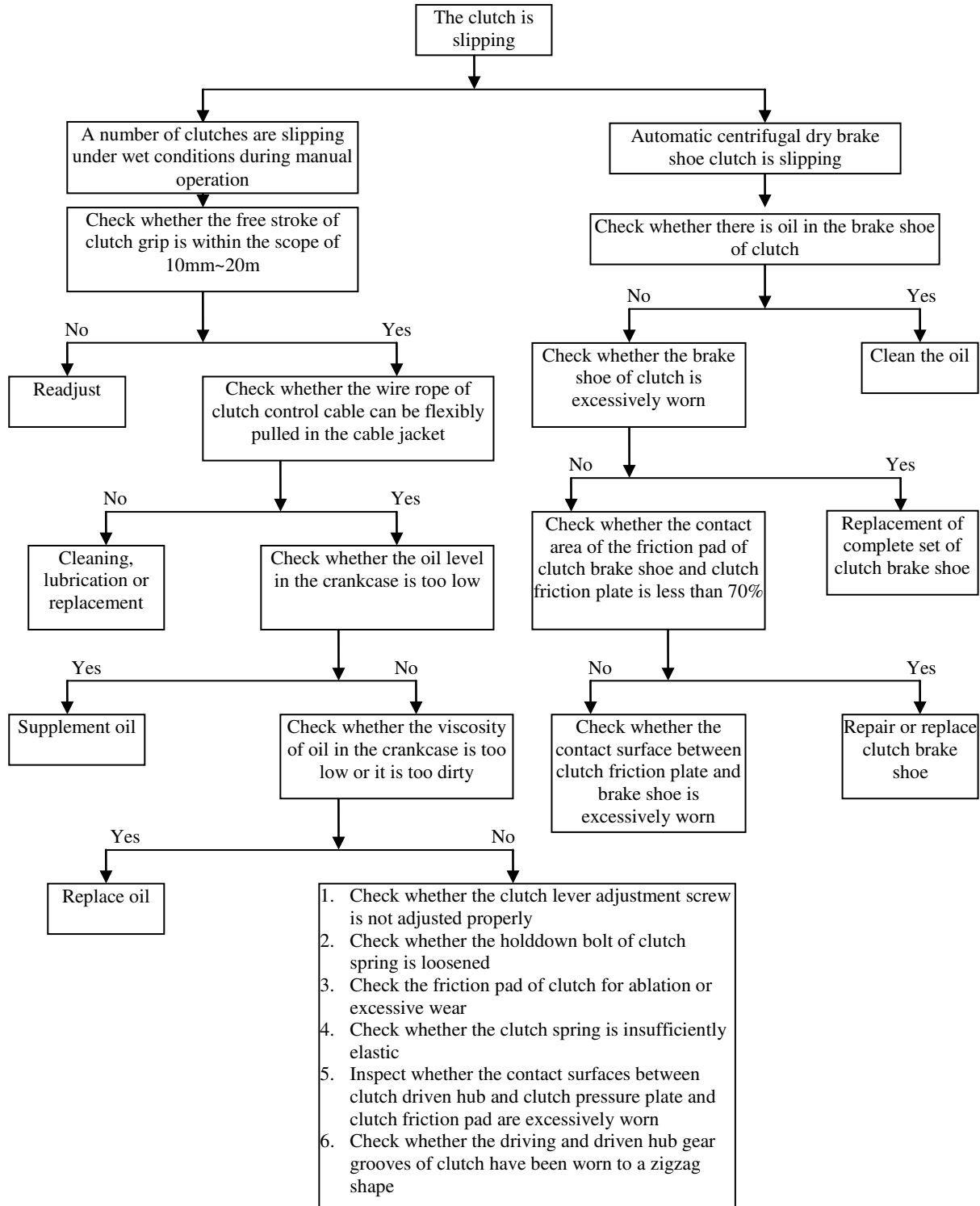
**Fault diagnostic procedure for poor idle speed of engine**



**Fault diagnostic procedure for excessive oil consumption of engine**

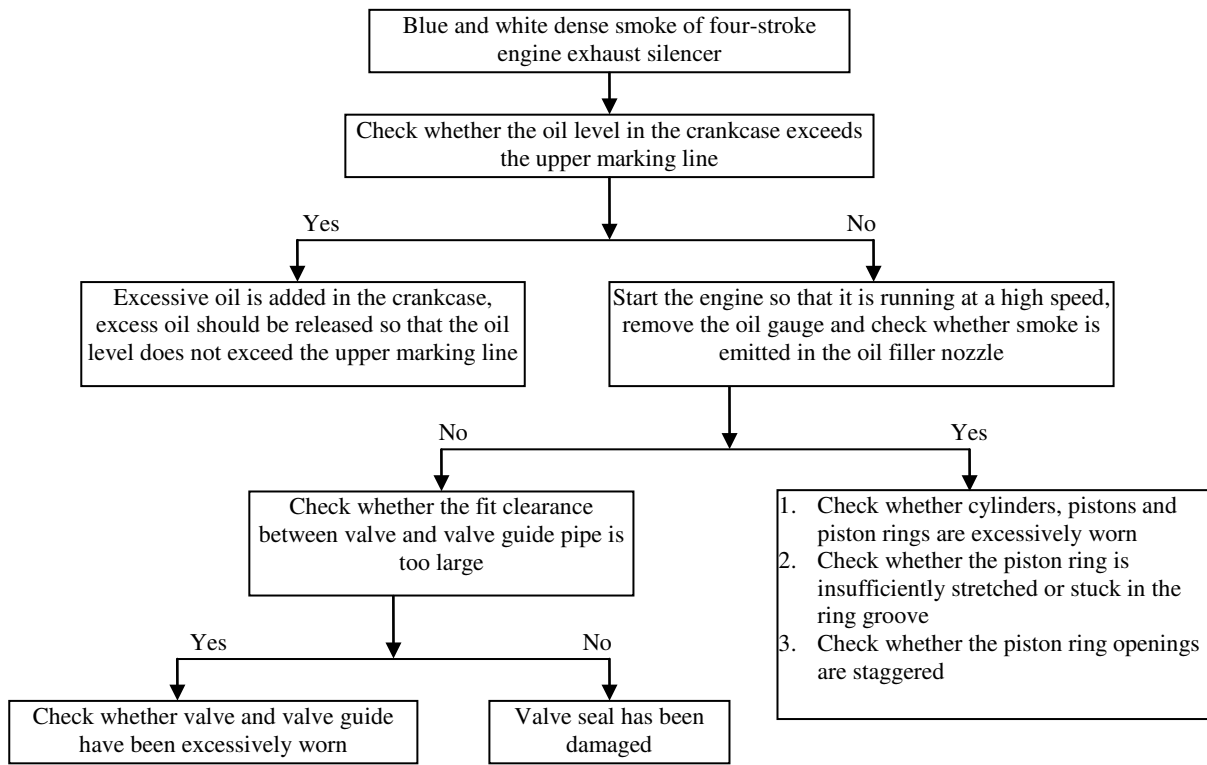


## Fault diagnostic procedure for clutch slipping

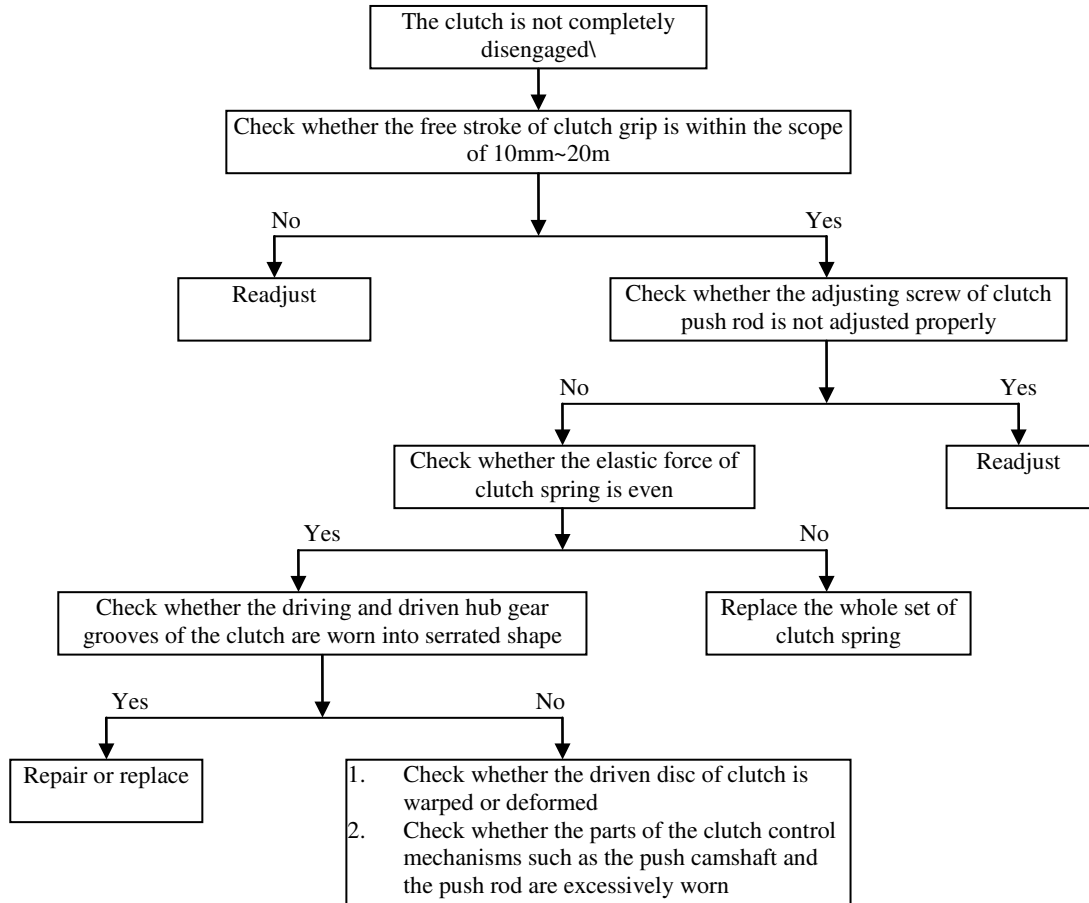




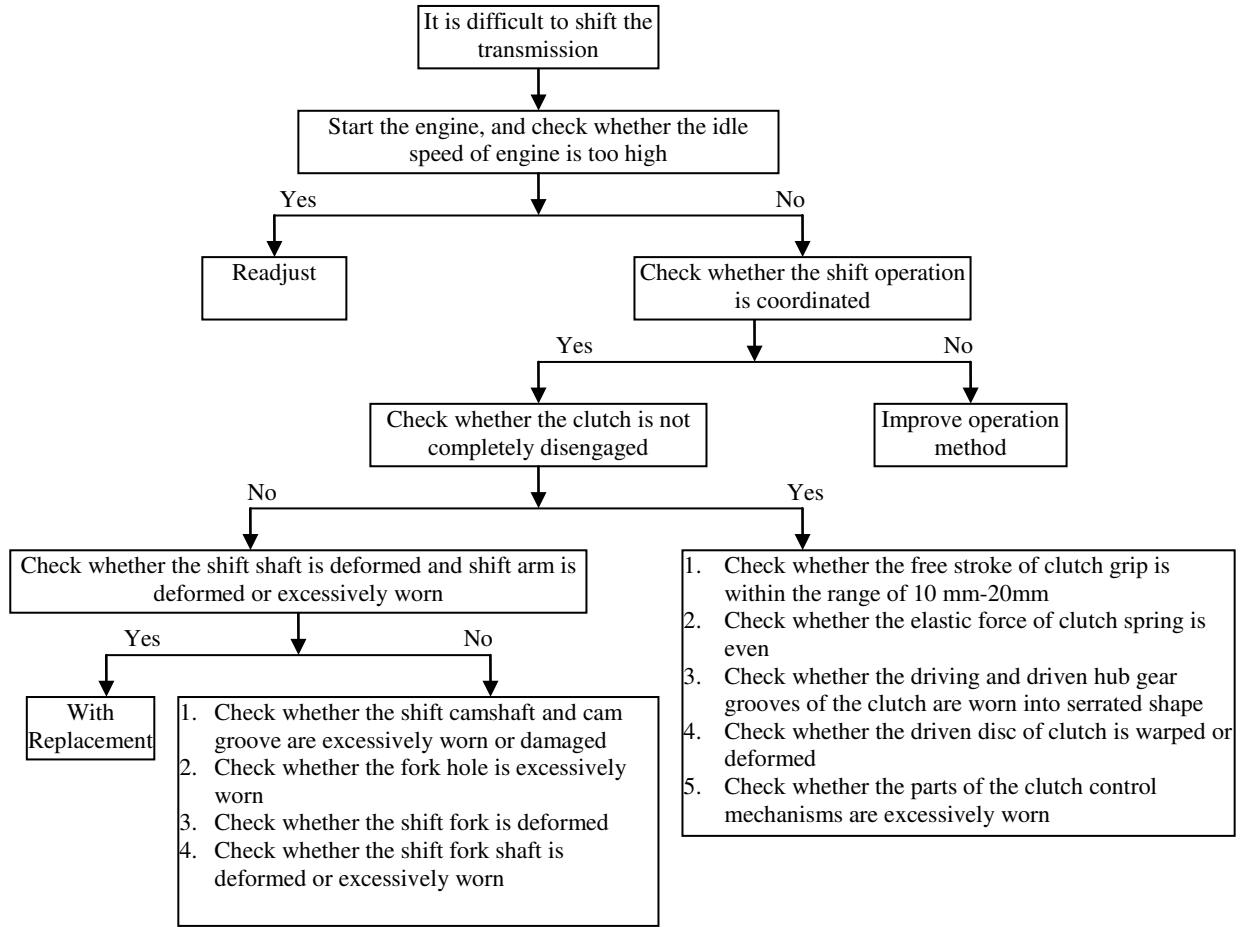
### Fault diagnostic procedure for blue and white dense smoke of four-stroke engine exhaust silencer



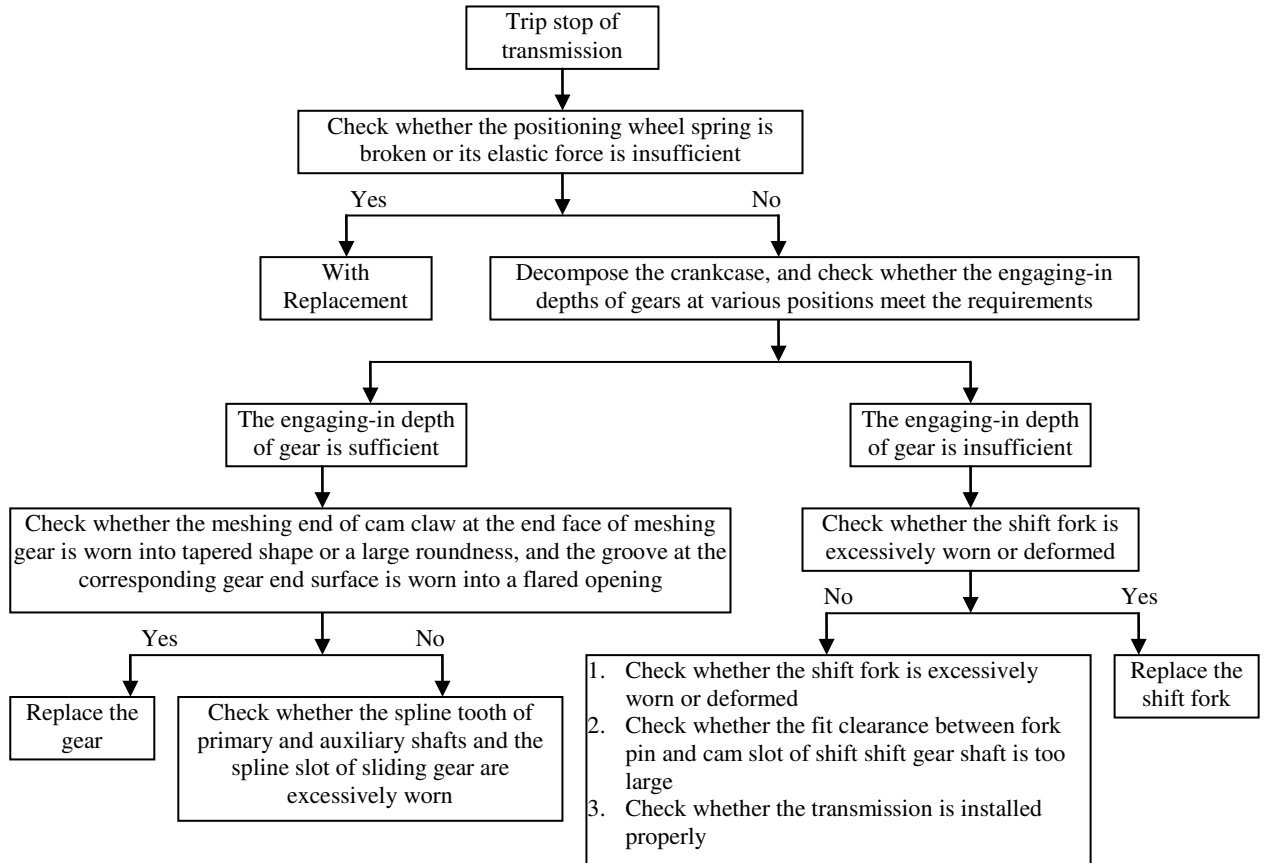
**Diagnostic procedure for the fault that the clutch is not completely disengaged**



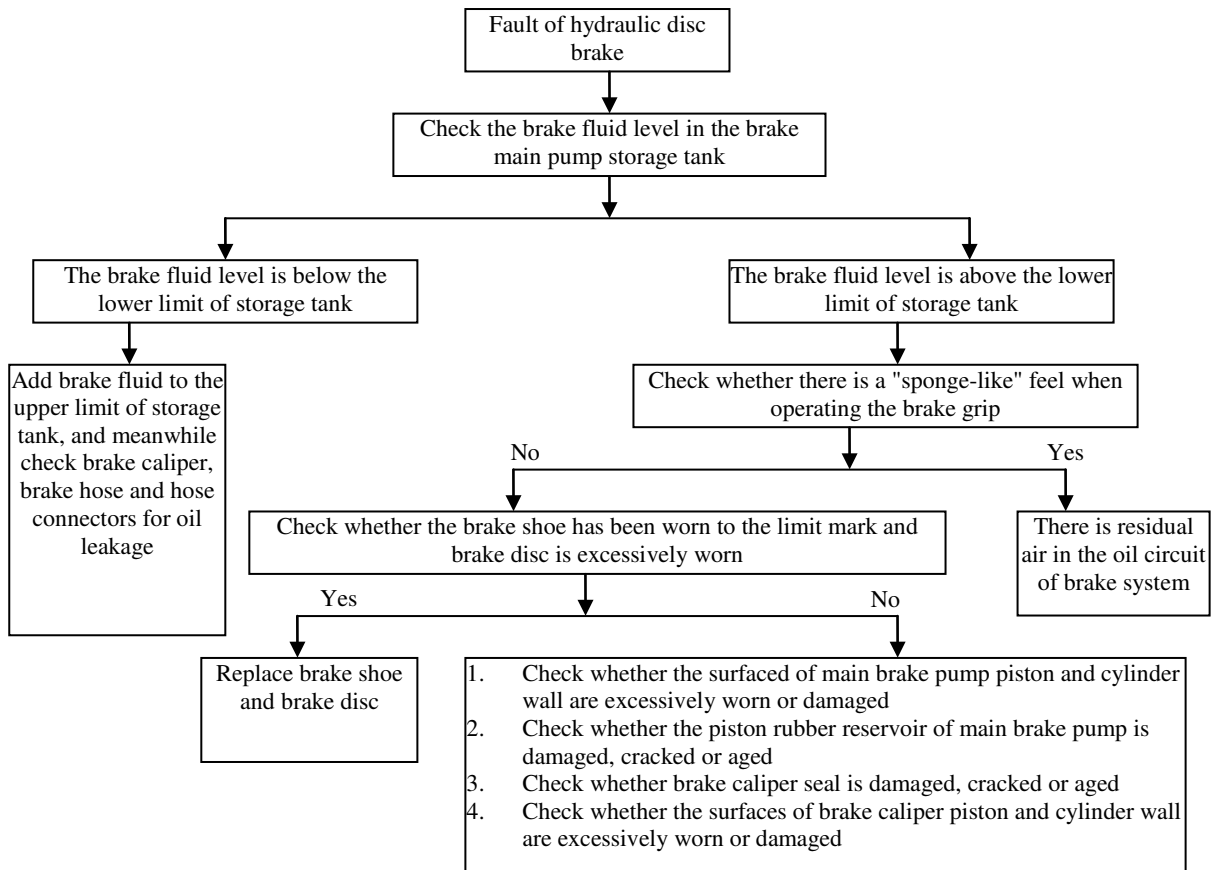
**Diagnostic procedure for the fault that it is difficult to shift the transmission**



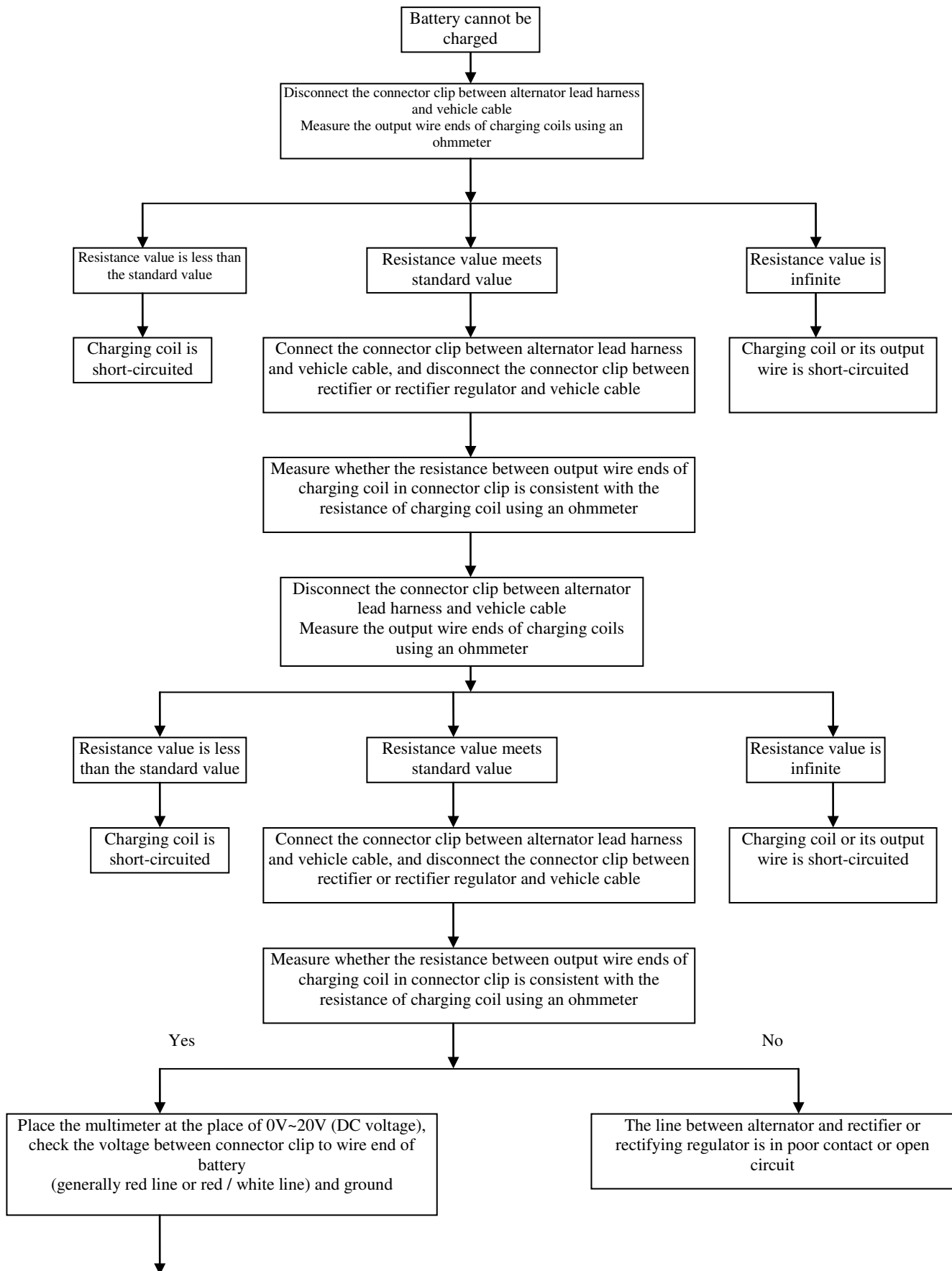
**Diagnostic procedure for trip stop fault of transmission**

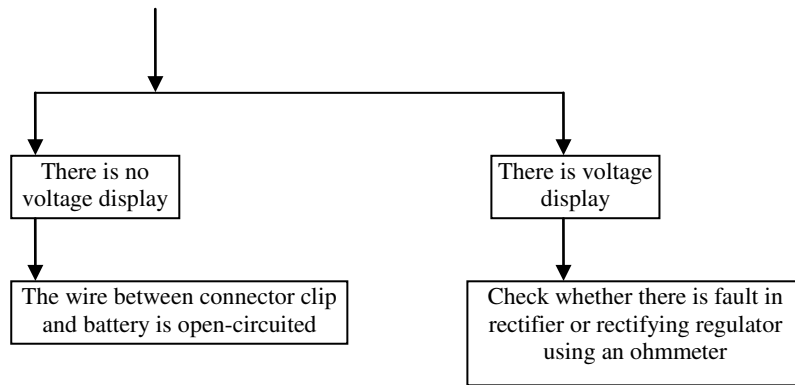


**Diagnostic procedure for the fault that hydraulic disc brake does not work**

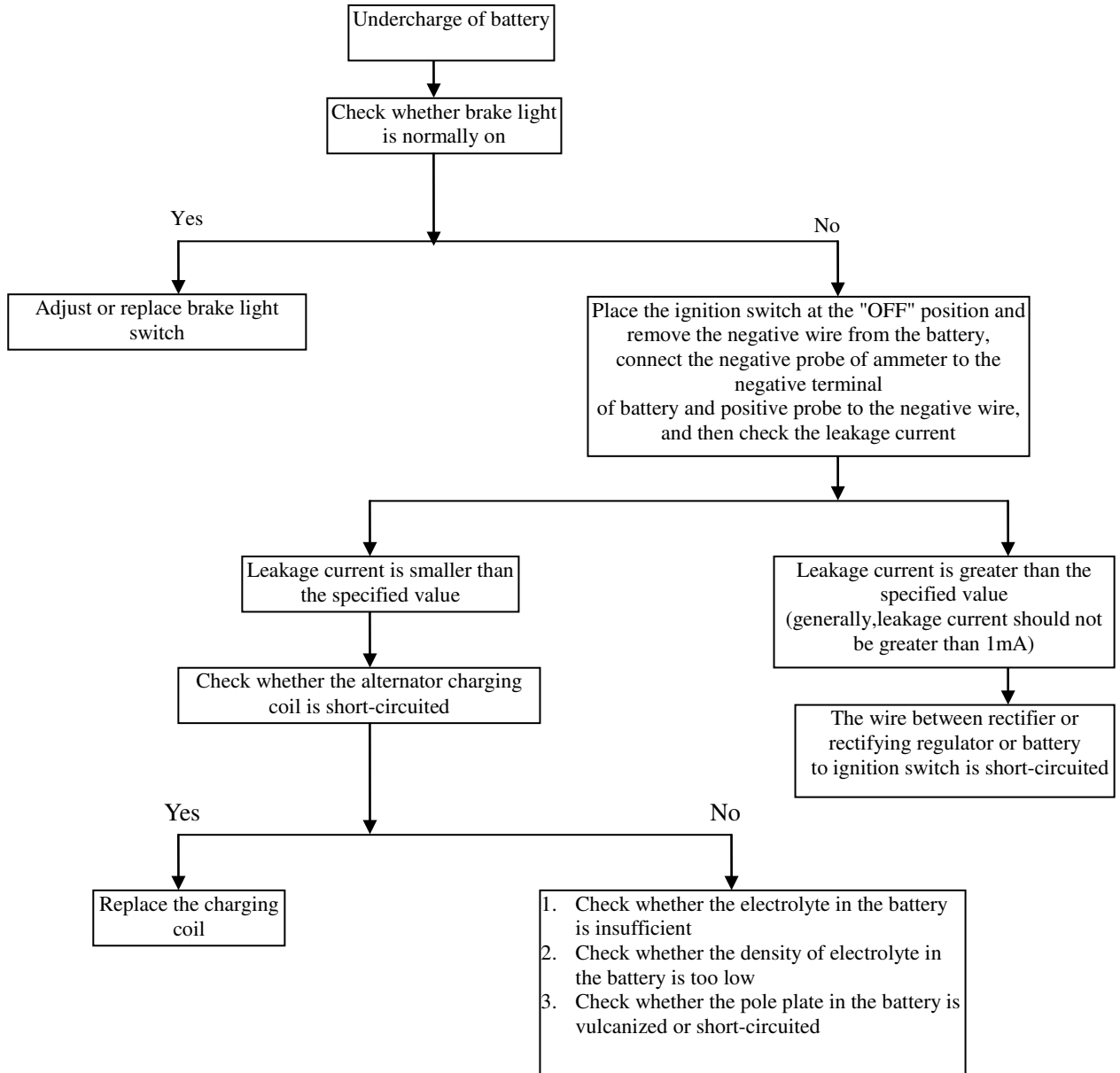


## Diagnostic procedure for the fault that battery cannot be charged



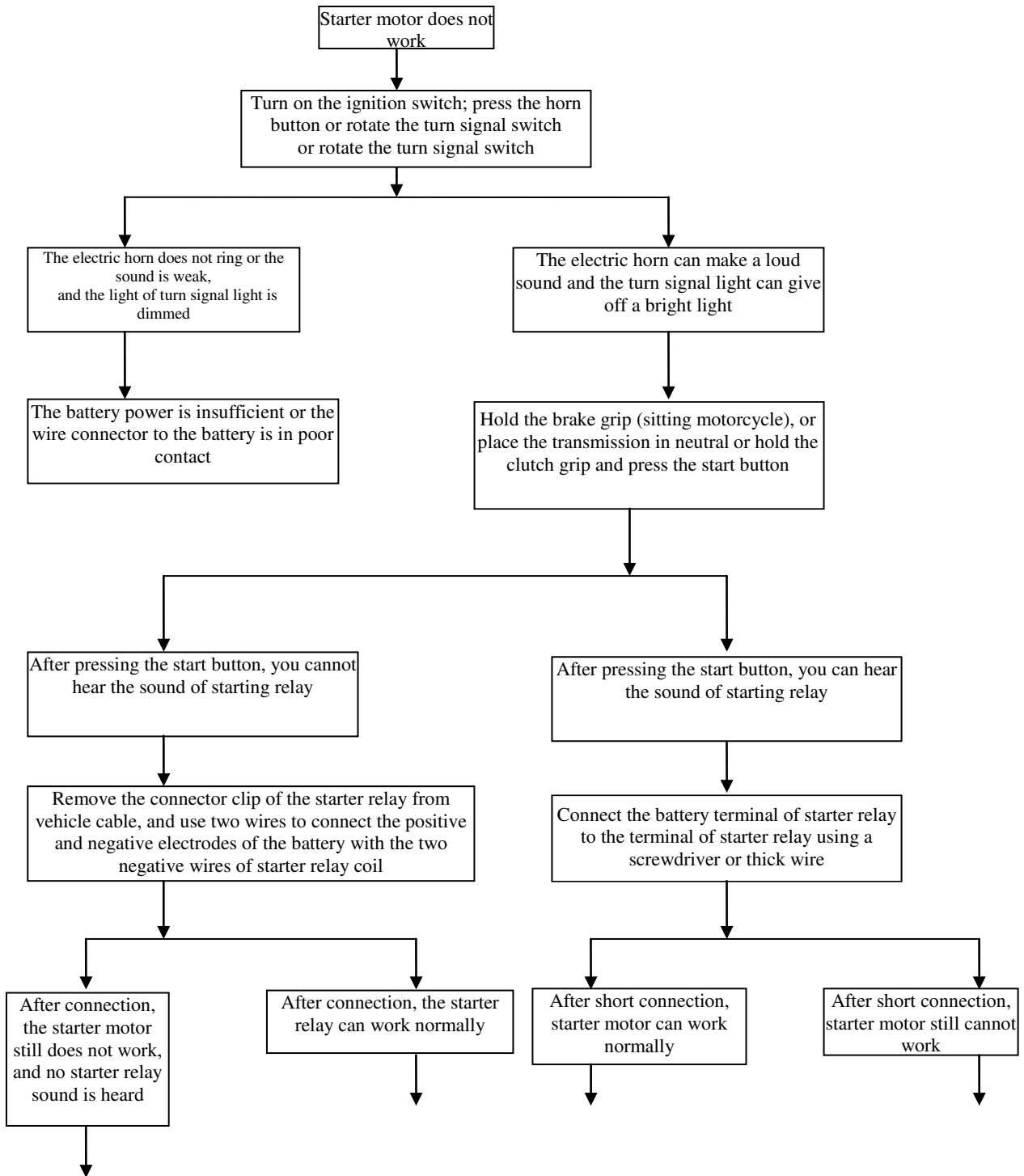


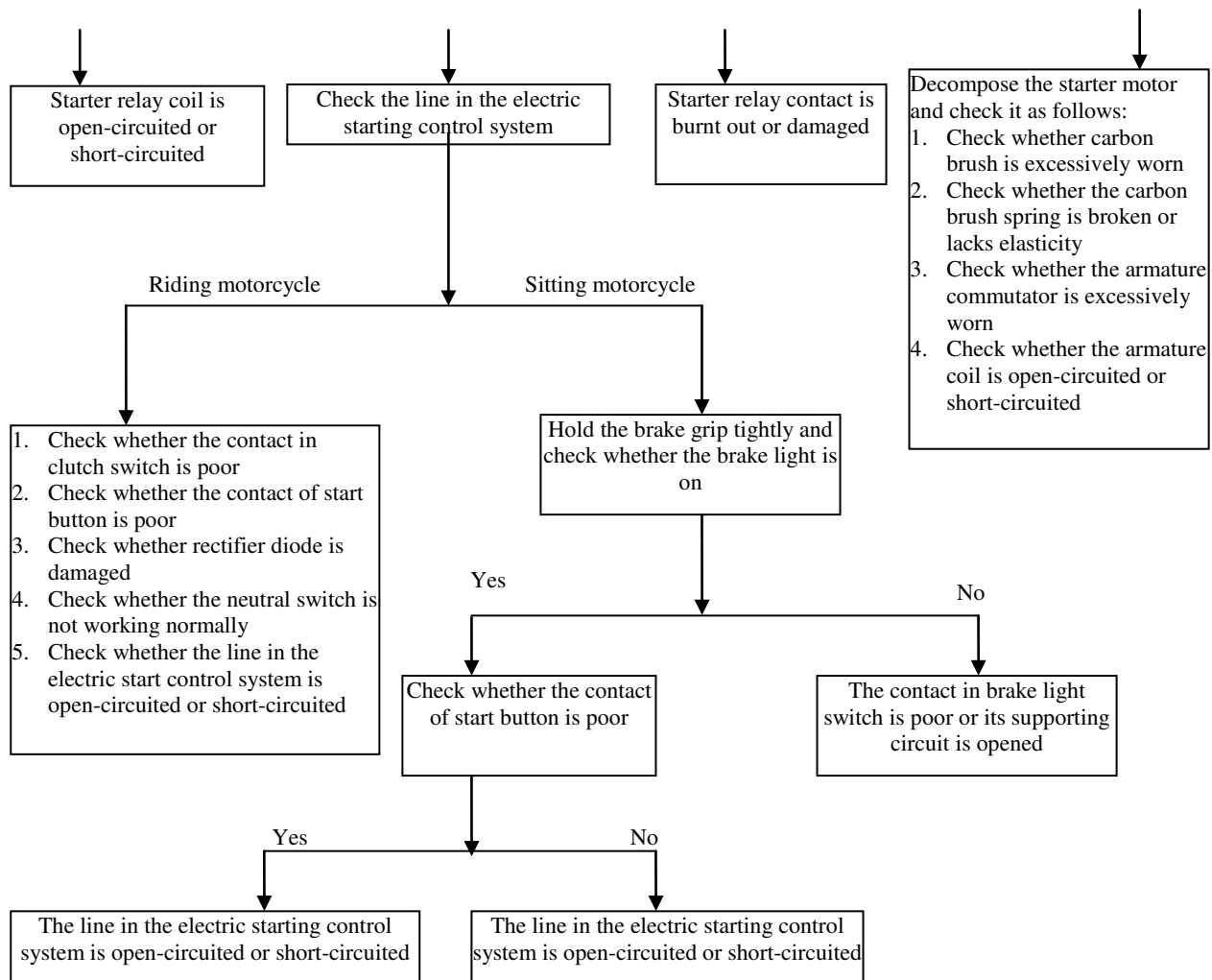
## Diagnostic procedure for undercharge of battery



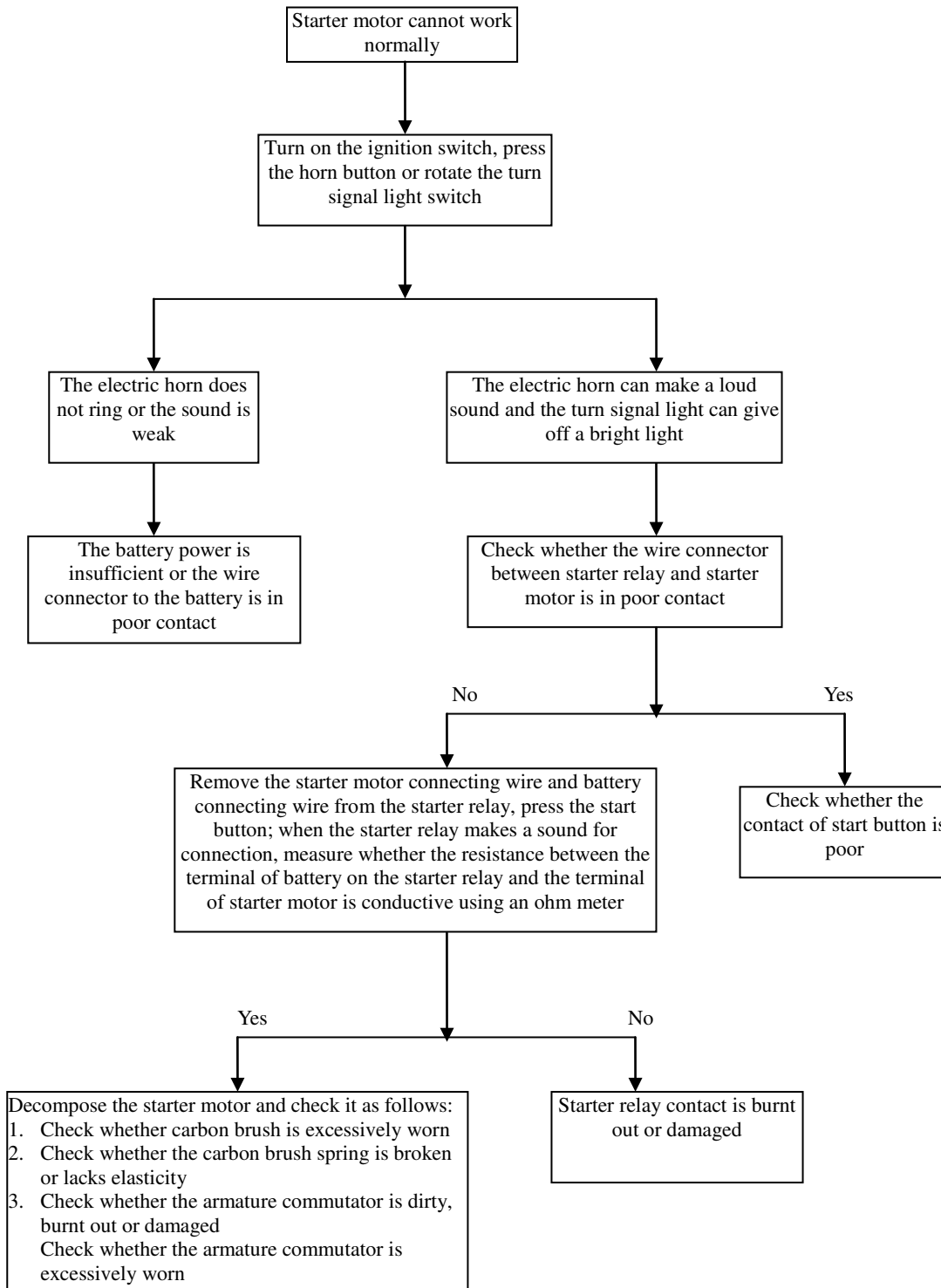


## Diagnostic procedure for the fault that starter motor does not work

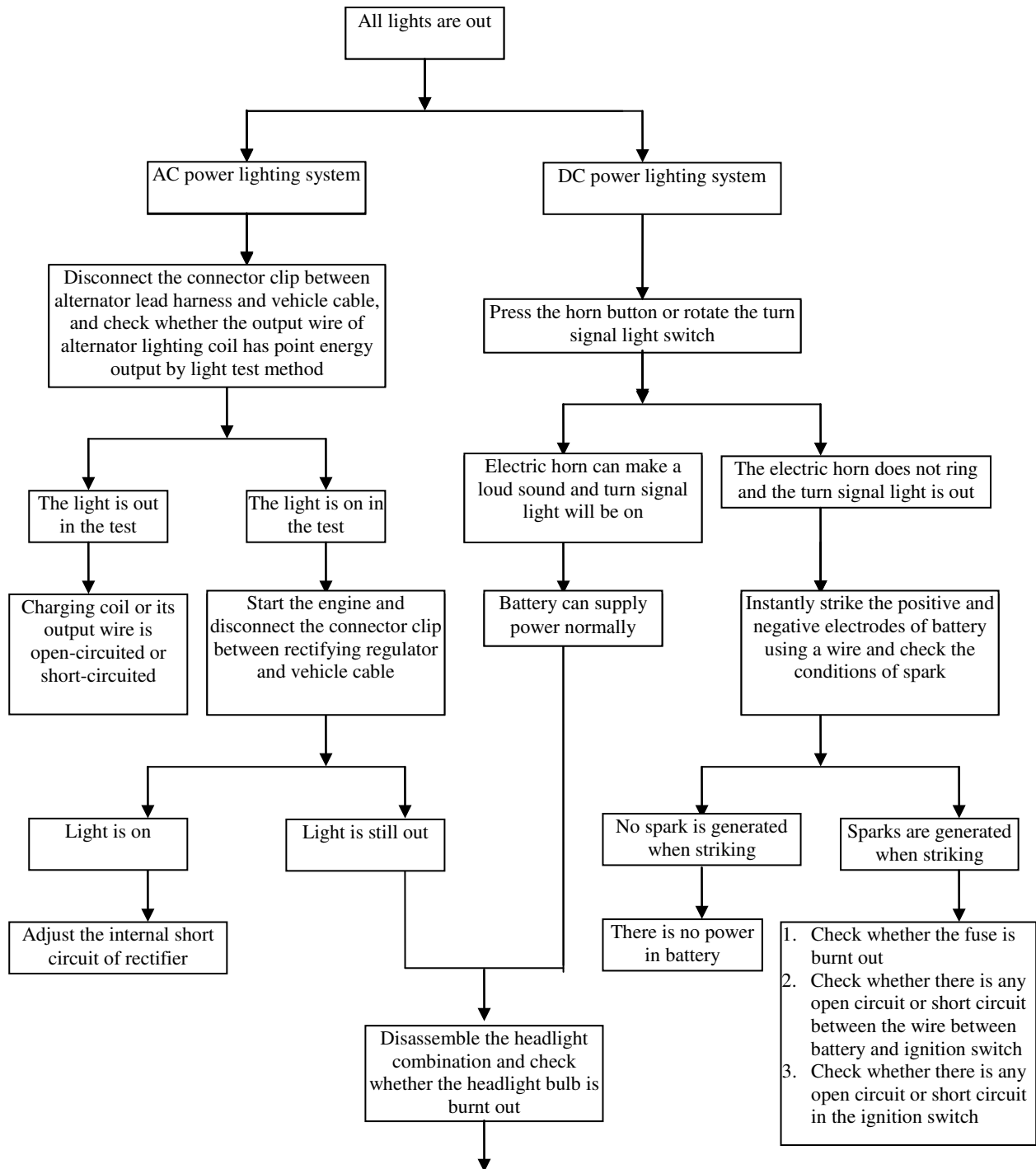


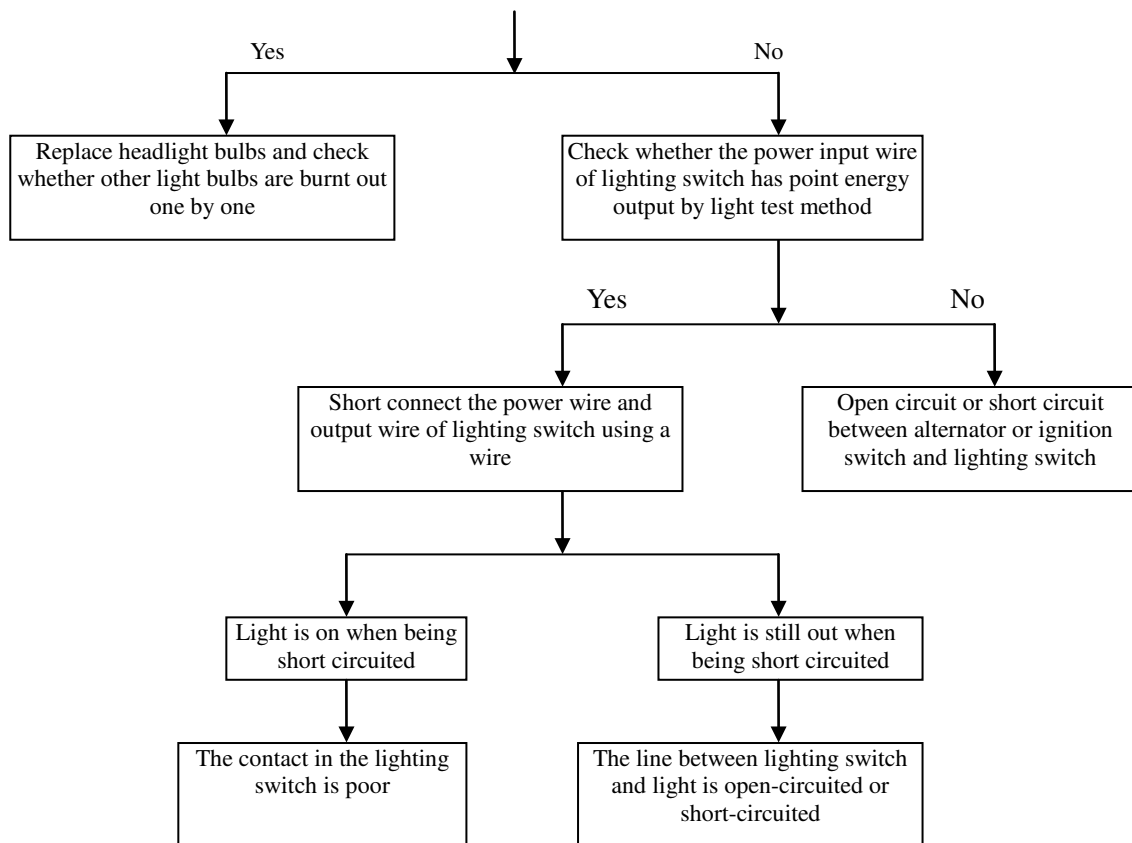


**Diagnostic procedure for the fault that starter motor cannot work normally**

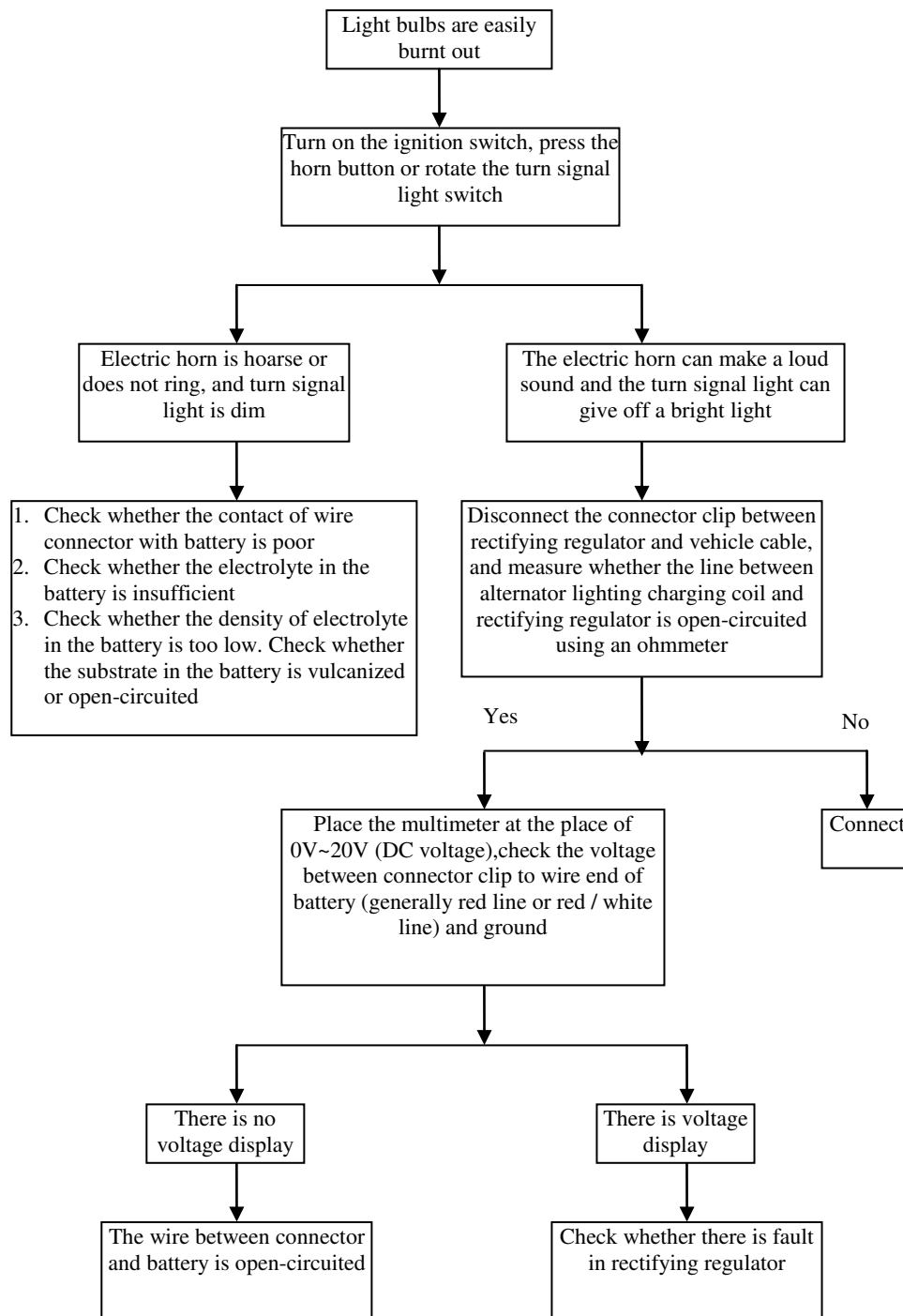


**Diagnostic procedure for the fault that all lights are out**

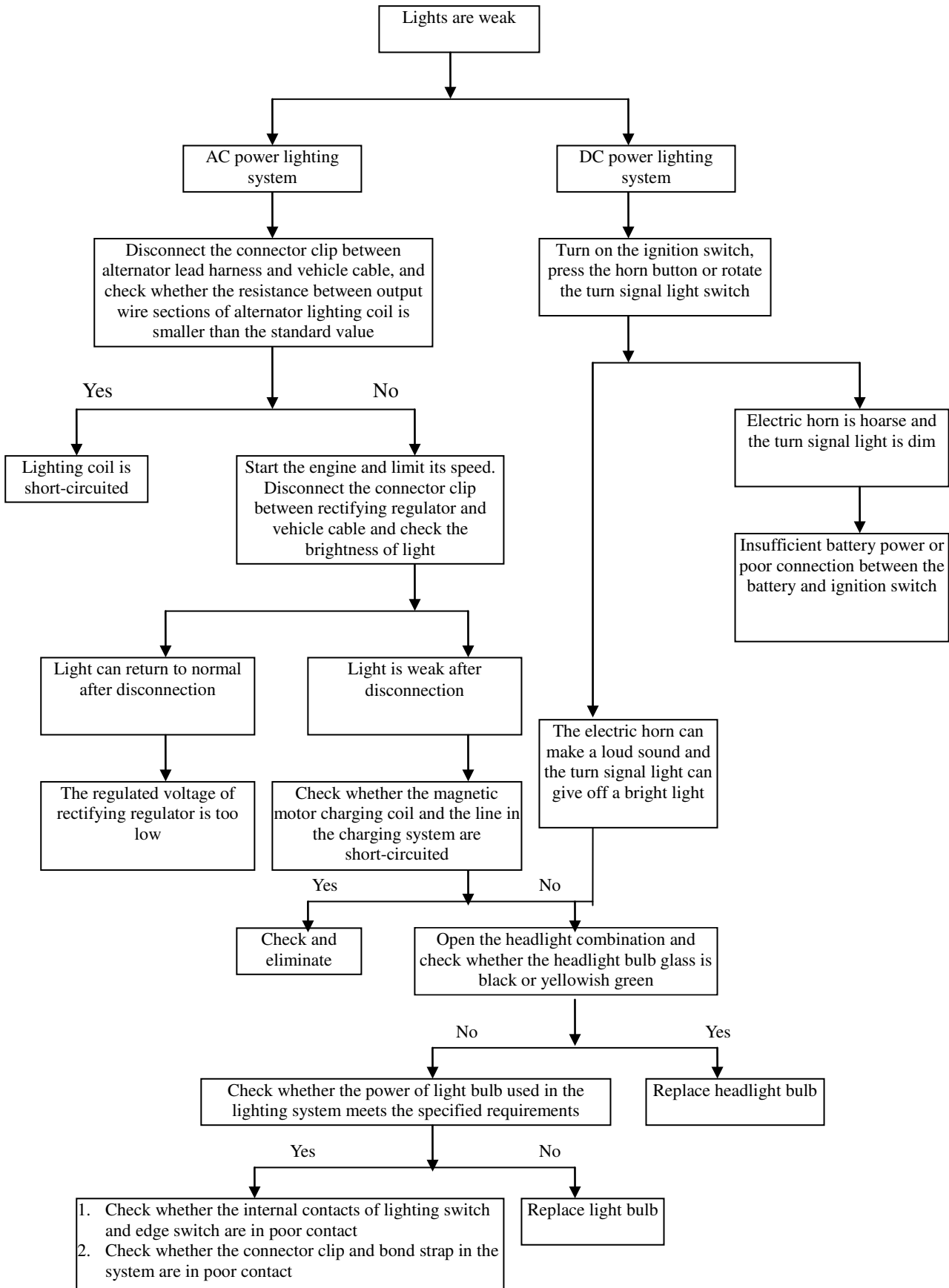




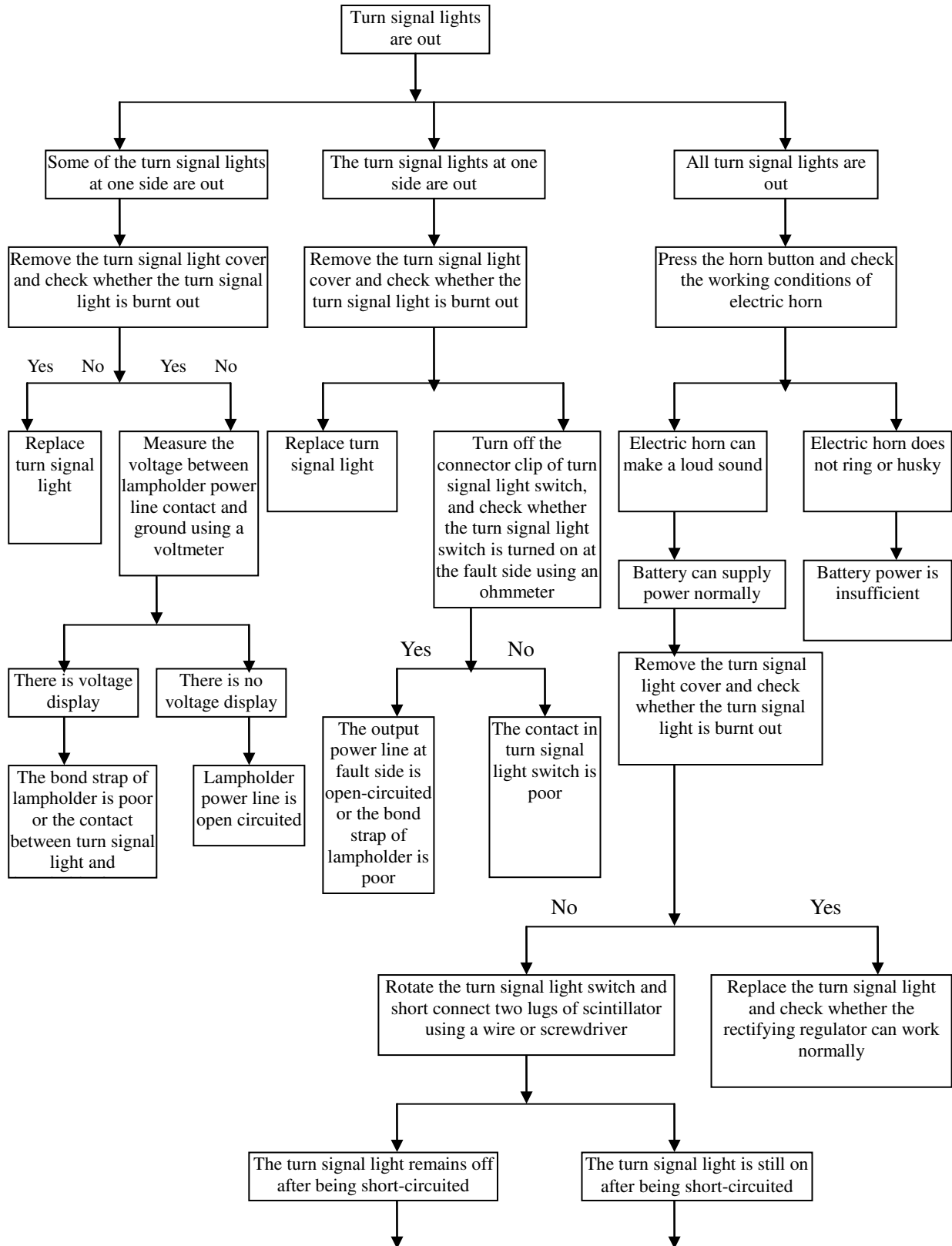
**Diagnostic procedure for the fault that light bulbs are easily burnt out**



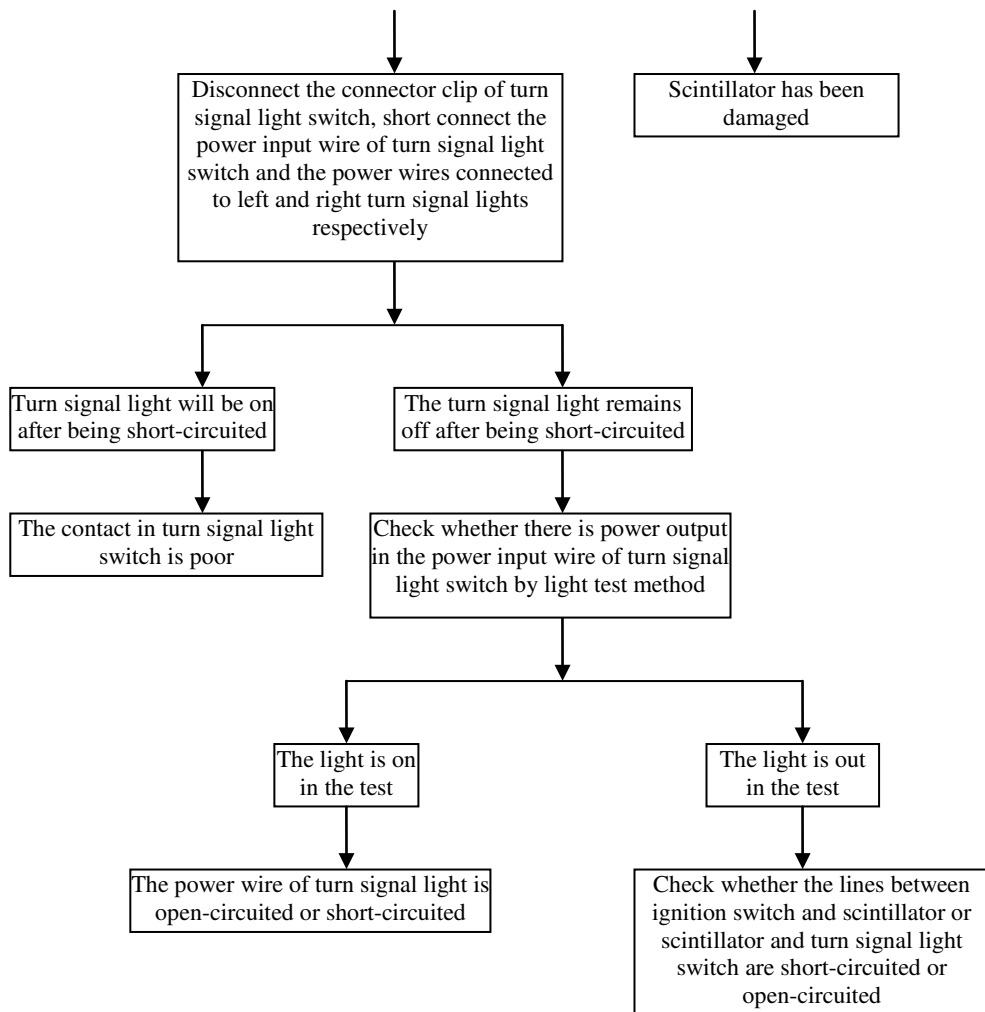
**Diagnostic procedure for the fault that lights are weak**



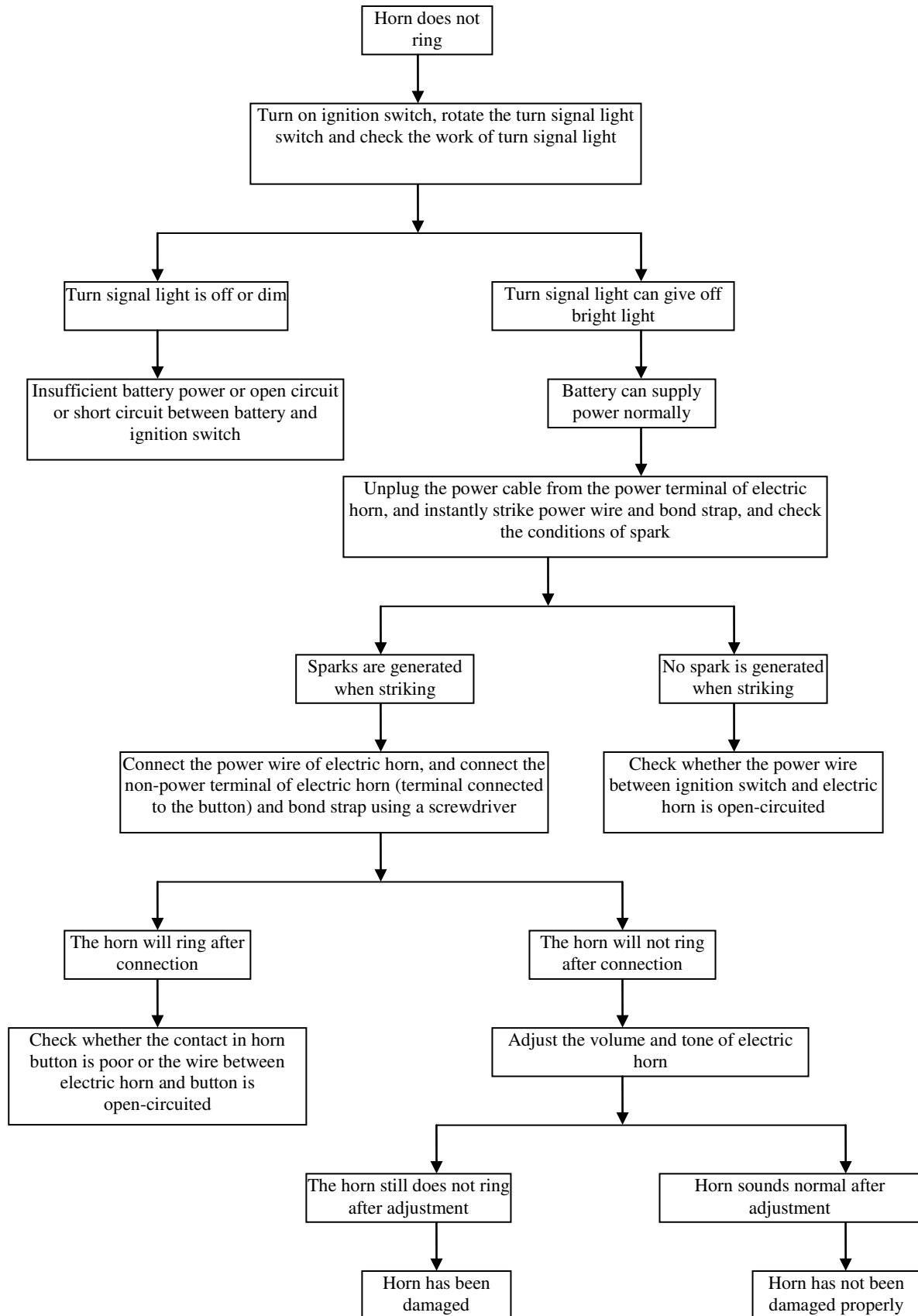
**Diagnostic procedure for the fault that turn signal lights are out**



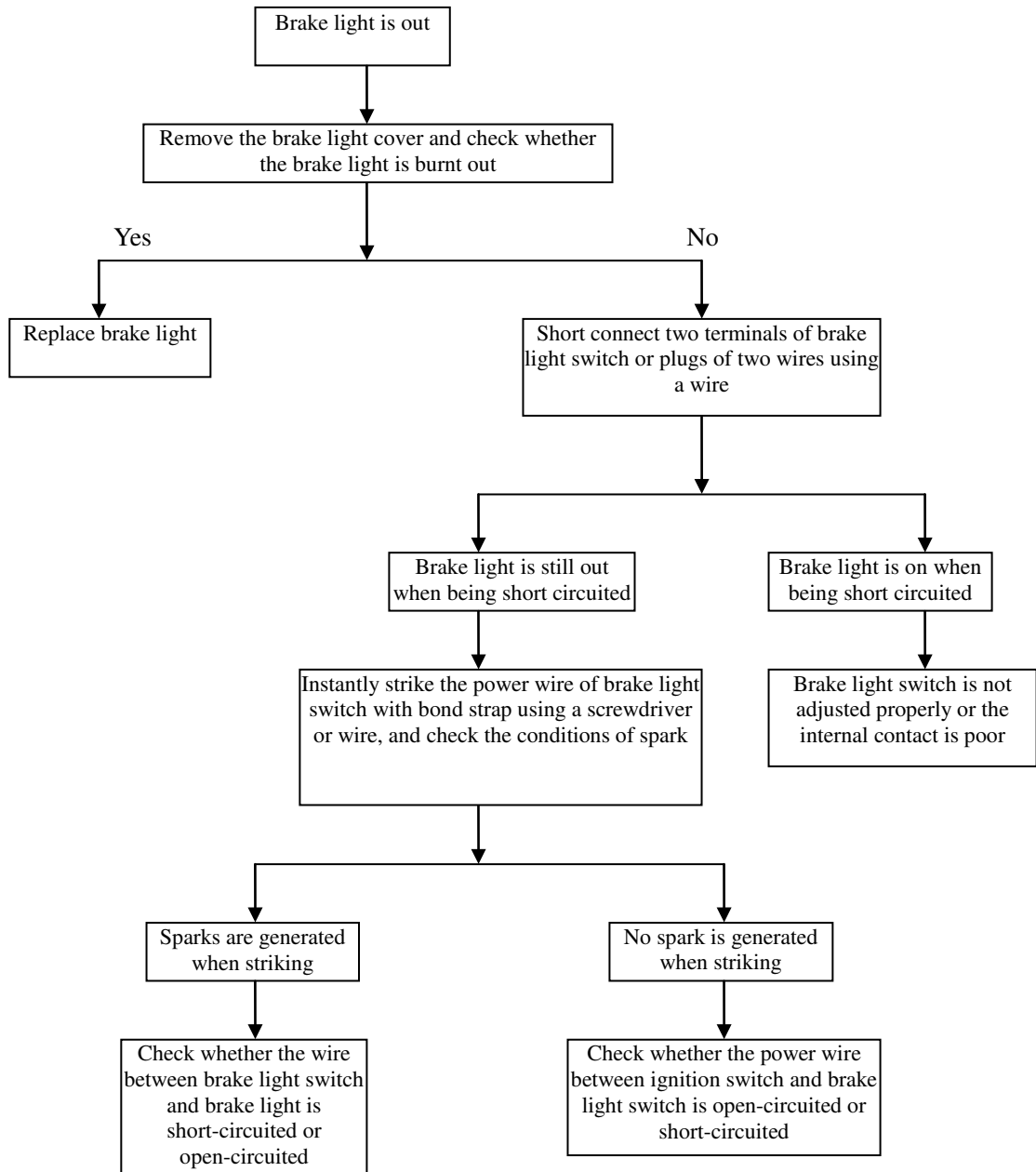




## Diagnostic procedure for the fault that horn does not ring



### Diagnostic procedure for the fault that brake light is out



## **Inspection / adjustment**

Preparation standard

Regular maintenance checklist

Engine oil/filter

Inspection/adjustment of throttle cable

Air filter

Spark plug

### **Battery**

Ignition timing

Cylinder pressure

Drive chain slackness

Free stroke of front/rear brake

Inspection of brake fluid for leakage

Inspection of brake

Inspection of brake fluid level

Inspection of wear of brake pad

Inspection of CBS

Inspection of brake light switch

Headlight

Clutch cable

Front/rear suspension system

Bolt/nut/fixture

Tire specifications

Rim / tire

Steering column bearing and handlebar fixator

## **Preparation standard**

Satisfactory

### **Warning!**

- Before the engine is running, make sure that the surrounding air is well ventilated. Do not start the engine in a confined place, because exhaust gas contains carbon monoxide which may cause people to lose consciousness or die.
- Under certain conditions, gasoline is volatile and explosive. Workplaces must be ventilated and flame should be extinguished. Smoke and fire are strictly prohibited in the workplace or the place where gasoline is stored.

## Specifications

### Engine

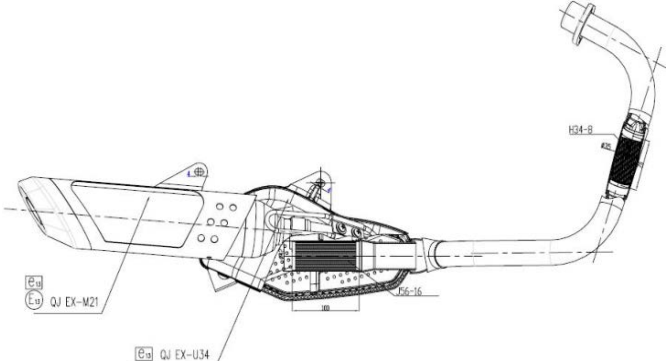
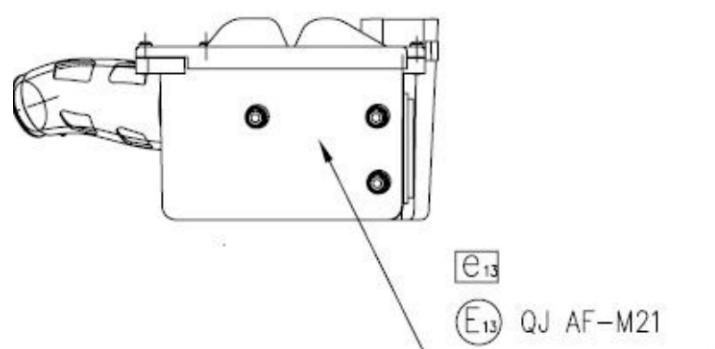
Idle speed	1500±100rpm/min
Spark plug gap	0.7±0.1mm
Spark plug specifications	D7RTC
Combustion chamber type	Spherical
Ignition time	BTDC 15degrees ±1 degree 1500±100rpm

### Motorcycle body

Free stroke of front brake lever	10-20mm		
Free stroke of rear brake pedal	20-30mm		
Tire pressure unit: Kpa	<b>Specifications</b>		Tire pressure
	Front tire	90/90-17	190±10kpa
	Rear tire	130/90-15	210±10kpa
Torque value	Front axle locknut	75-88 N·m	
	Rear wheel mounting nut	100-113 N·m	

### Relevant component certifications

Model	Name	Certification number	Remarks
Tire	Front tire	E4 75R-0009994	Use environment-friendly tubeless tire
	Rear tire	E4 75R-0005095	
Lights	Headlight	E11 50R-00 0257	
	Front position light	E11 50R-00 0257	
	Taillight/brake light	E9 50R-00 11969	
	Front turn signal light	E9 50R-00 11967	
	Rear turn signal light	E9 50R-00 11967	
	Rear license plate light	E9 50R-00 1493	
Rear view mirror	Rear view mirror	E7 000501	
Horn	Horn	E4 000148	
Reflector	Side reflector	E11 020614	Amber (round)
	Rear reflector	E9 021664	Red (round)

<p><b>Muffler</b></p>		<p>Mark on main cylinder:  <b>e13</b> QJ EX-U34</p> <p>Mark on auxiliary cylinder:  <b>e13</b>  <b>E13</b> QJ EX-M21</p>
<p><b>Air filter</b></p>		<p>e13 QJ AF-M21</p>

## Regular maintenance checklist

	Maintenance mileage and time	300KM	1000KM	Every 3000 KM	Every 6000 KM	Every 12000 KM	Every 15000 KM	Tools	
	Inspection item	New motorcycle	One month	Three months	Six months	Twelve months	Fifteen months		
*	Air filter	I		C	C	R	C	General tools	
*	Gasoline filter	I			I	R		General tools	
*	Oil filter	C			C	C		General tools	
	Engine oil change	R	Replaced once every 3000KM						General tools
	Tire pressure	I	I	I	I	I	I	Tire pressure gauge, inflator	
	Storage battery check	I	I	I	I	I	I	Hydrometer, multimeter	
	Actuation clearance inspection	I	I	I	I	I	I	General tools	
	Handlebar loosening inspection	I			I	I		General tools	
	Shock absorber actuation inspection	I			I	I		General tools	
	Inspection of bolt loosening at all parts	I	I	I	I	I	I	Torque wrench	
	Inspection of gearbox for oil leakage	I	I	I	I	I	I	General tools	
*	Inspection or replacement of spark plug	I		I	R	R	I	General tools	
	Lubrication of parts of body				L	L		Oil lubricator	
	Muffler	I	I	I	I	I	I	General tools	
*	Ignition timing	I	I	I	I	I	I	Timing light	
*	Throttle valve:	A	I	A	A	A	A	Tachometer CO HC analyzer	
*	Idle exhaust gas inspection	A	I	A	A	A	A		
*	Throttle inspection	I		I	I	I	I	General tools	
	Fuel pipeline inspection	I		I	I	I	I	General tools	
	Electrical equipment of lighting instrument	I	I	I	I	I	I	Visual multimeter	
	Side stand of main footpeg	I			I	I		General tools	
	Shock absorber			I	I	I	I	General tools	
*	Engine bolt torque	I		I	I	I	I	Torque wrench	
	Front/rear brake			I	I	I	I	General tools	
	Drive chain		I	I	I	I	A	General tools	
	Clutch			I	I	I	I	General tools	
*	Valve		I	I	I	I	I	Feeler gauge	

## Expected inspection

1	Ignition system – If there is obviously abnormal continuous ignition, engine misfire, post-ignition overheating or other phenomena, conduct maintenance inspections.
2	Carbon removal – If there is an obvious lack of horsepower, remove the carbon from cylinder head, piston head and exhaust system.
3	Piston, cylinder – If cylinder is excessively worn, please replace it with a new one.

Please go to dealers regularly for inspection and adjust it to ensure the best conditions. The table above is based on the monthly mileage of 1,000 kilometers.

### **I—Inspection A—Adjustment R—Replacement C—Cleaning L—Lubrication**

- Note: 1. “\*” is the item in which exhaust emissions are involved. Normal maintenance must be conducted in accordance with the provisions of the State Environmental Protection Agency and the Company’s operating instructions, and it should not be adjusted and repaired without approval, otherwise, we will not assume any responsibility for it.
2. When riding on gravel roads or under severe environmental pollution conditions, add the number of cleaning air filter to extend the service life.
3. Maintenance frequency should be added to the motorcycles which often run at a high speed and have a large mileage.



# Engine Oil/Filter

## Oil level

\*Note

- When checking the oil level, the motorcycle must be parked on a flat surface.
- Check the oil level after the engine has run for 2-3 minutes or been parked for about 2-3 minutes.

Check the oil level.

When the oil sensor gives an alarm, replenish the oil to the upper limit.



## Inspection of oil level

\*Note

When checking oil level, do not tighten the oil level gauge.

When checking the oil level, place the center stand at the flat floor and make the motorcycle body vertical.

When the oil is continuously consumed, check the oil amount regularly and add it to the appropriate location.

**Oil capacity: 1.1±0.1L when changing oil  
1.2±0.1L when disassembling**

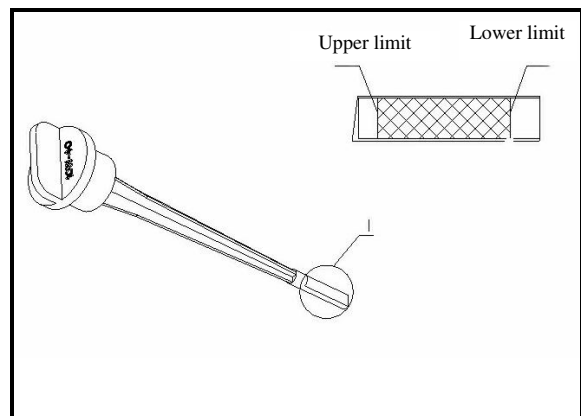
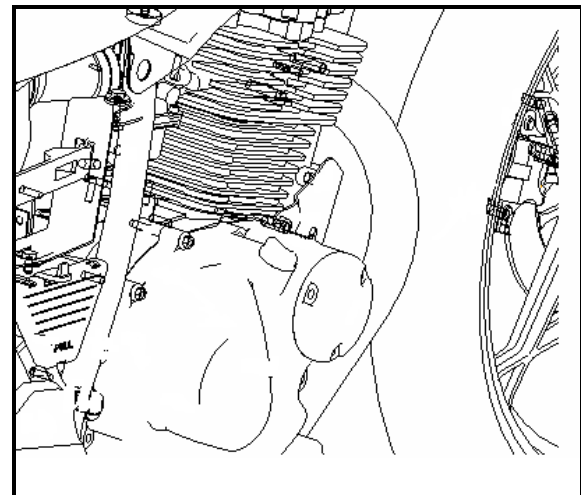
If the oil level is too high, the operation of engine and clutch may be affected; if it is too low, engine overheating may be caused and thus components are worn seriously.

If you add inferior or other brands and grades of oil, the lubrication effect may be reduced.

After the engine stops, clean the dust on the oil level indicator at the right cover with a clean cloth.

Put the engine on a level surface, and check the oil level position at the oil level indicator.

If the oil level is below or near the lower limit, add the recommended oil to the upper limit mark.



## Replacement of engine oil level gauge

Warm up the engine.

Place a oil receiver under the engine to collect oil, and remove oil drain screw and oil

Backwash the starter motor for several times to completely drain the oil.

After draining the oil, check and clean the oil filter screen.

Make sure that the filter screen, spring, oil drain screw cap (1) and O ring (2) are intact before installing.

### \*Note

The oil should be changed when warming up the engine and the engine should be supported on the side bracket to ensure that the oil is completely discharged.

When the oil drain cap is removed, the oil filter and spring may pop out.

Tighten oil drain screw.

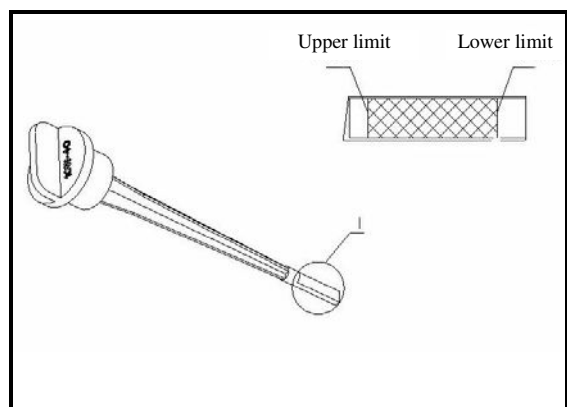
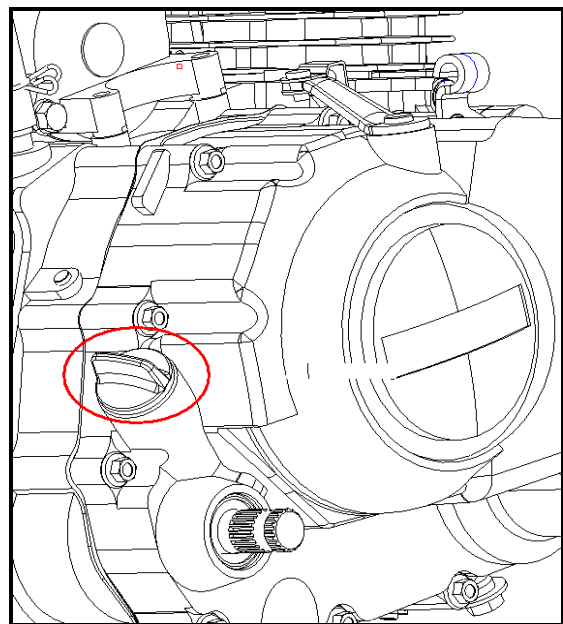
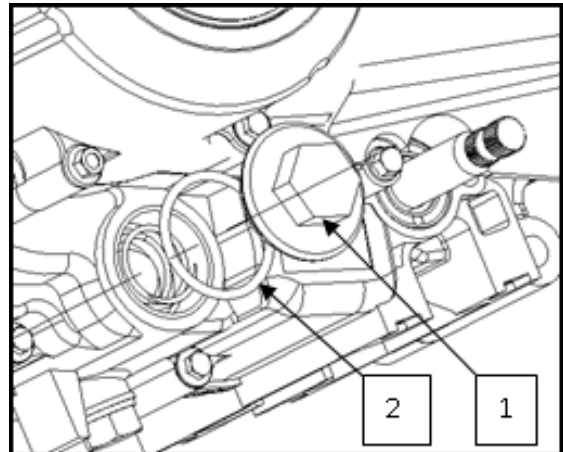
Add the recommended oil to the crankcase .

Install the oil level gauge. Start the engine, and idle for 2-3 minutes.

Stop the engine and check whether the oil level is marked at the upper limit of oil level gauge after a few minutes.

When checking, the engine should stand upright on the ground.

Make sure there is no oil leakage.



## Inspection/adjustment of throttle cable

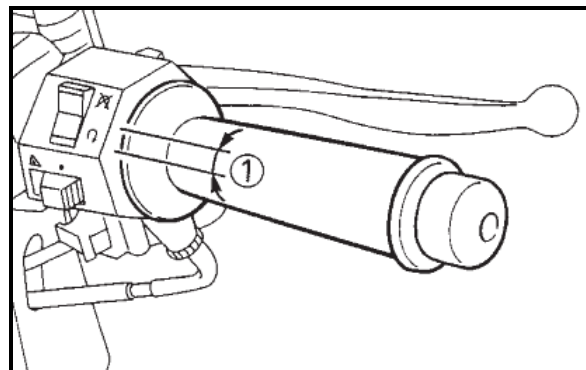
### \*Note

The engine idle speed should be properly adjusted before adjusting the stroke of throttle cable.

Check the free stroke [1] of throttle cable

**Free stroke: 3-5mm.**

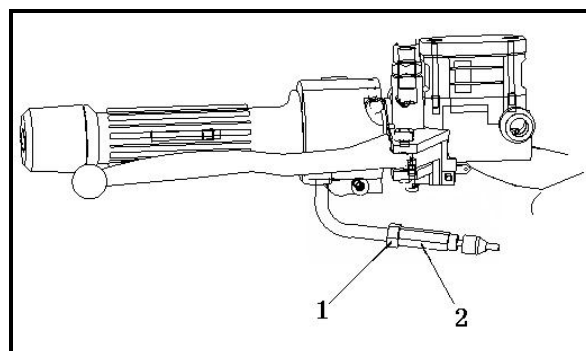
If it is inconsistent with the specified value, make adjustment.



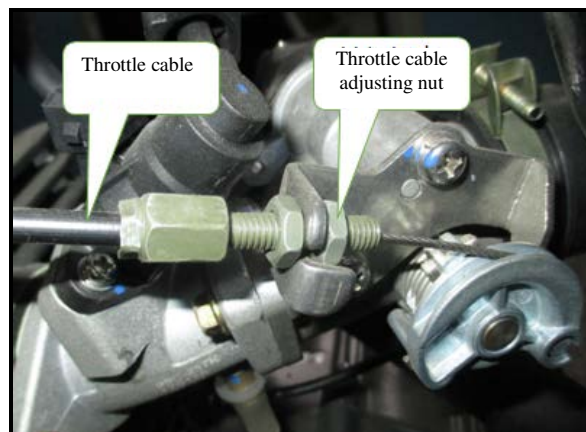
Adjust the free stroke of throttle cable.

Adjustment steps:

- Loosen the locknut [1].
- Screw the adjusting nut [2] inward or outward until the specified free stroke is reached. If it is screwed in, the free stroke will increase; if it is screwed out, the free stroke will decrease.
- Tighten the locknut.
- After adjusting the free stroke, rotate the lever to the left and right to confirm whether the idle speed of engine has changed.



If the upper end of adjusting throttle cable cannot reach the specified free gap, adjust the lower end of throttle cable. The steps are the same as the procedures for adjusting the upper end of throttle cable.



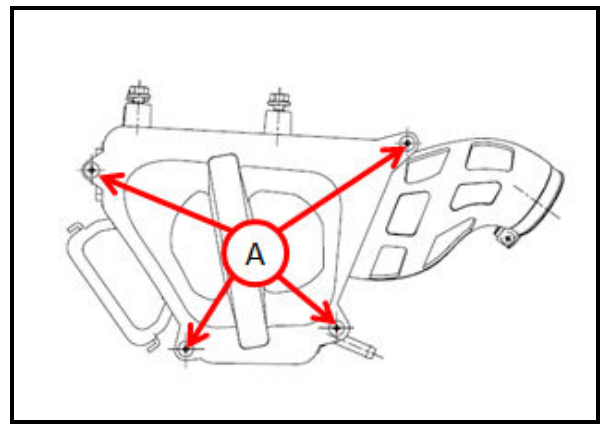
## Air filter

### Filter element replacement

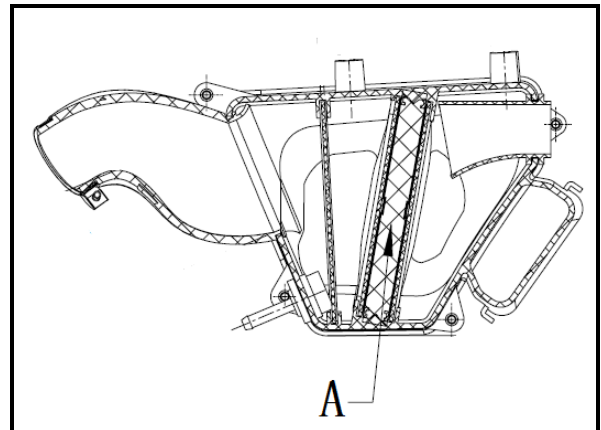
Remove the left protector [A].



Remove the mounting screw [A] at air filter cover.



Remove  
Filter element assembly



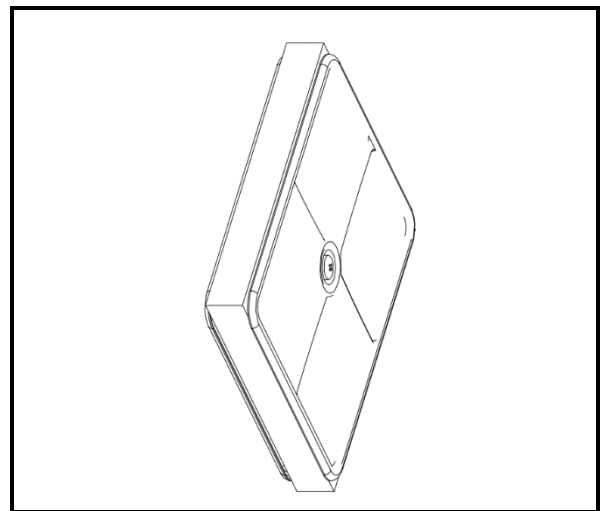
Check whether the filter element is contaminated or damaged.

If there is any contamination and damage, please replace it with a new one.

Clean the air filter element.

**\*Note**

Do not use the gasoline so as not to cause fires.



## Replacement time

If motorcycle often runs on bad roads or in rainy days, it should be replaced ahead of time.

**\*Note**

When disassembling the air cleaner core, do not rotate the engine. Otherwise, unfiltered air may enter the engine, thus causing rapid wear of its components and possibly damaging the engine. In addition, operation without the filter element may affect subsequent adverse operation of throttle and may cause the engine to overheat. In addition, operation without the filter element may affect subsequent adverse operation of throttle and may cause the engine to overheat.

## Installation

It should be conducted in the reverse order of disassembly

**\*Note**

•Make sure whether the air filter has been installed before installing air filter cover.

## Spark plug

Remove the connecting wire of spark plug cap.

Remove spark plug using spark plug wrench or alternative tool

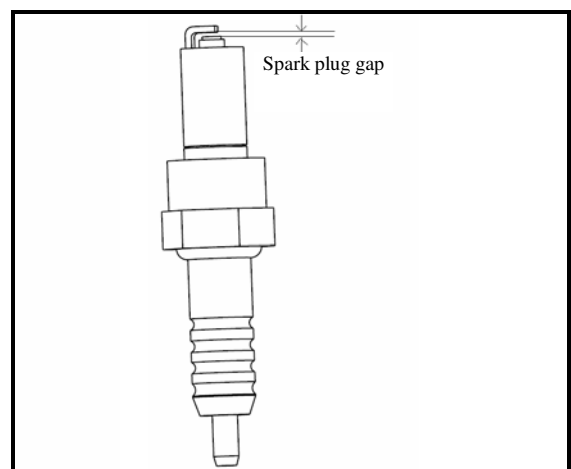
**Check**

- Whether insulator is cracked or damaged
- Whether electrode is worn
- Burning conditions, color

If it is light gray, combustion conditions are good.

If it is pale white, ignition system is out of order or the mixture is too thin.

If it is damp or black with carbon deposit, the mixture is too thick.



In the above cases, clean it a wire brush or spark plug cleaner,  
and replace it when necessary.  
Check the spark plug visually.  
If there is crack or wear in the insulator, please replace it with a new one.

Check the gap of spark plug.  
Clearance:  $0.7\pm 0.1\text{mm}$

\*Note

Reinstall the spark plug on the cylinder head and tighten it according to the specified torque.

Torque value: 15N.m

Install the spark plug with hands and then tighten it using spark plug sleeve.

## Battery

### Battery disassembly

Remove the left protector.

1. First remove the negative cable.
  2. Remove the positive cable.
- Remove the air pipe of battery from the battery.  
Remove the battery holder [A].  
Remove the battery [B].

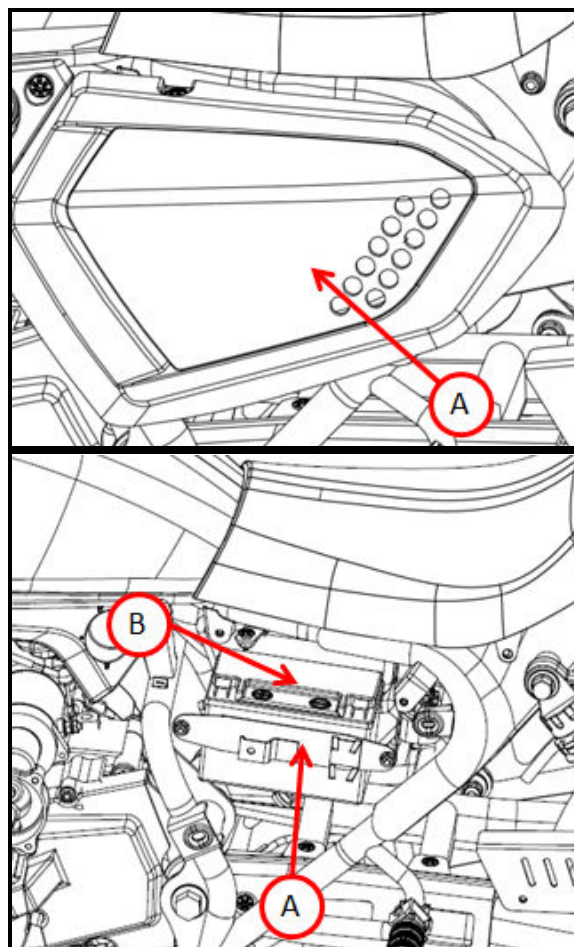
#### Warning!

When disassembling the positive electrode, tools should not touch the frame, otherwise, short circuit and sparks may be caused and thus gasoline may ignite, and battery may be damaged, which are very dangerous.

#### Warning!

The positive and negative electrodes should be removed in the operation order.  
When installing the battery, first connect the positive electrode and then negative electrode.

### Installation





It should be conducted in the reverse order of disassembly.

### Warning!

To prevent short circuit, first connect the positive electrode and then the negative electrode.  
Do not disengage the battery during the commissioning of motorcycle; otherwise, the internal components may be damaged.

## Inspection of charging state (closed-circuit voltage)

Open the seat mat and remove the right protector.  
Remove the battery from the battery box.  
Remove the negative lead and then the positive lead.  
Take out the battery.

Measure the voltage between battery terminals.  
Fully charged: 13.1V  
Undercharge: 12.3V (the battery has not worked for 1 hour)

### \*Note

Inspection under the charged state must be conducted using a voltmeter.

## Charging

**Connection method:** The positive electrode of charger is connected to the positive electrode of battery.  
The negative electrode of charger is connected to the negative electrode of battery.

### Warning!

- Never use a source of ignition near batteries.
- First turn off the charger switch before starting charging or after completing charging.  
to prevent sparks at the connection position and avoid the danger of explosion.
- In the process of charging, conduct the standard operation according to the current time marked on the battery.

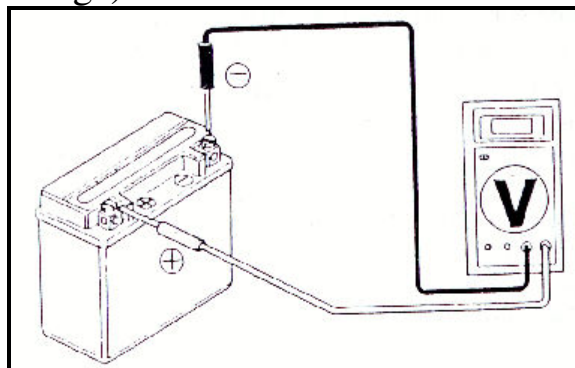
### \*Note

- Battery cannot be used generally during the quick charging of battery, except in emergencies.
- Measure the voltage 30 minutes after charging.

**Charging current: Standard: 0.6A**  
**Quick: 6.0A**

**Charging time: Standard: 10-15 hours**  
**Quick: 30 minutes**

**Completion of charging: open circuit voltage: 12.8V or more**



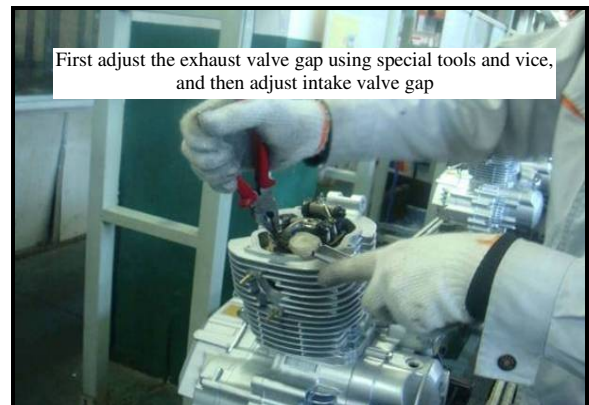
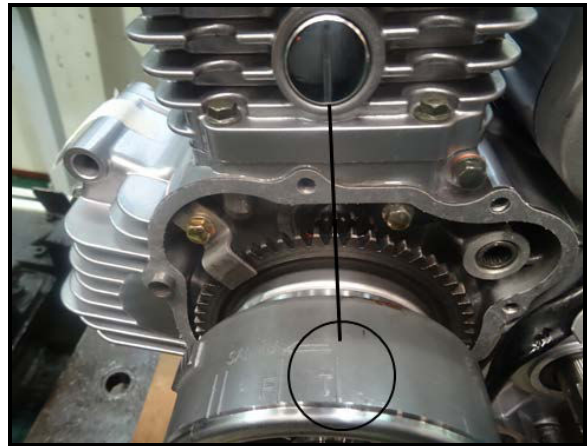
## Ignition timing

\*Note

Check the ignition system when the ignition timing is incorrect.

Rotate the flywheel counterclockwise with a special wrench and No. 14 sleeve. When the intake valve rises to the highest point, slowly rotate the flywheel so that the T mark line on the flywheel is aligned with the center line of the rocker arm shaft under the cylinder body.

First adjust the clearance of exhaust valve with a special wrench and a pincer pliers and lock the nut of exhaust valve. Then adjust the intake valve clearance and lock the intake valve nut.



## Cylinder pressure

Warm up the engine.

Insert a pressure gauge.

Move the choke handle to the fully open position.

● Rotate the throttle handle to the fully open position, and backflush to start the engine.

**Cylinder pressure: 1 ~ 1.2mpa**

\*Note

Start the engine until the meter reading no longer rises.

### Reasons for low pressure:

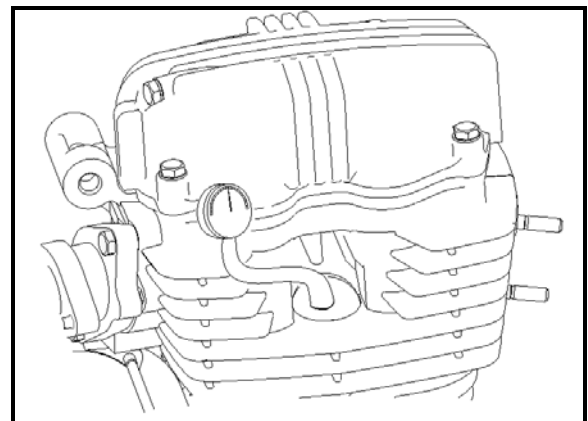
- . Improper valve adjustment
- . Valve leakage
- . Wear of piston ring or cylinder
- . Washer of cylinder head for damage

### Reasons for high pressure:

- . Reasons for high pressure

Turn off the engine and remove the spark plug/spark plug cap

It should be conducted in the reverse order of disassembly.



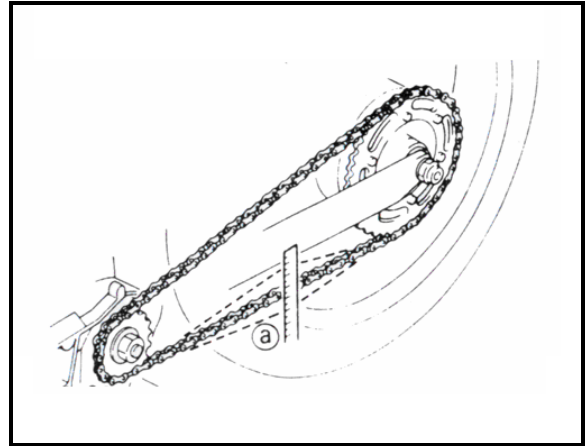


## Drive chain slackness

Park the motorcycle in a flat position to keep it in an upright position.

Check the slackness of drive chain@.

Slackness of drive chain: 20-40mm.



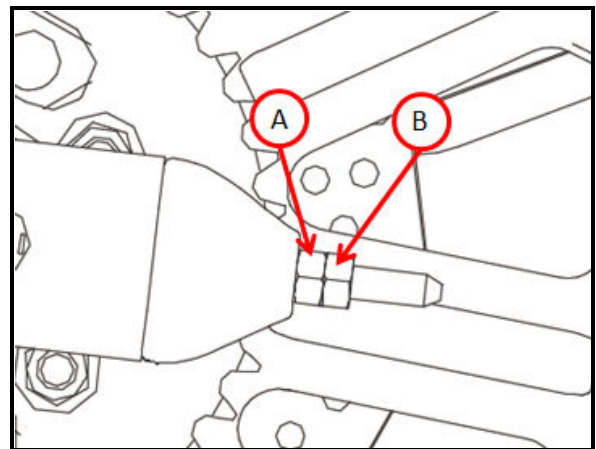
Adjust the slackness of drive chain:

- Loosen the locknuts [B] of rear axle nut and two drive chain adjusting nuts [A].
- Rotate the adjusting nuts [A] at both sides of rear rocker arm, until the slackness of chain is normal.

\*Note

Do not install the new drive chain on a worn sprocket or install the worn chain on a new sprocket.

Both the sprocket and the chain must be in good conditions; otherwise, the replaced chain or sprocket may be worn soon.

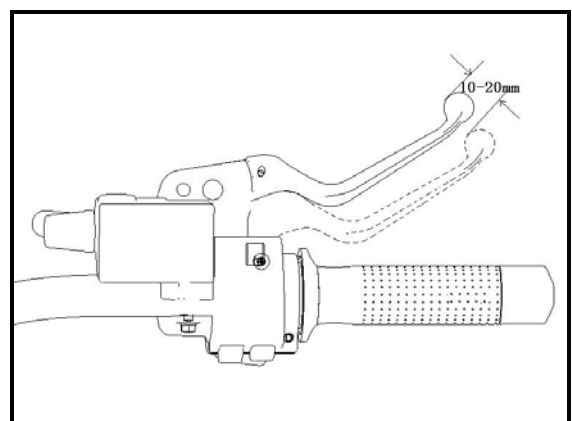


## Free stroke of brake

### Free stroke of front brake

Measure the free stroke of front brake lever at the tip of brake lever.

Free stroke: 10-20mm

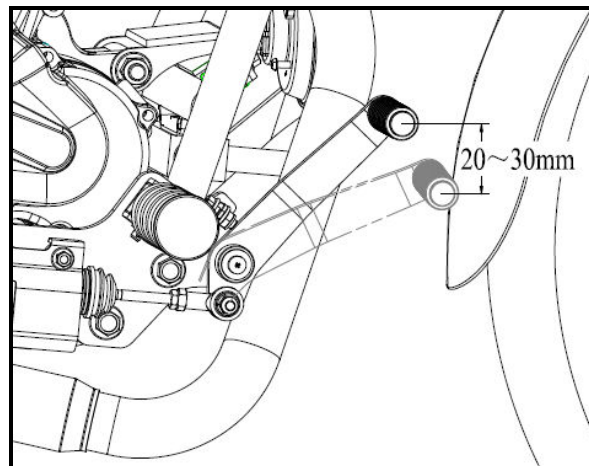


### Free stroke of brake pedal

Measure the free stroke of brake pedal.

**Free stroke: 20-30mm.**

Adjust if it does not meet the specified value.



Adjust the free stroke of brake pedal.

Loosen the locknut [A]

Screw in or screw out the adjusting device [B]

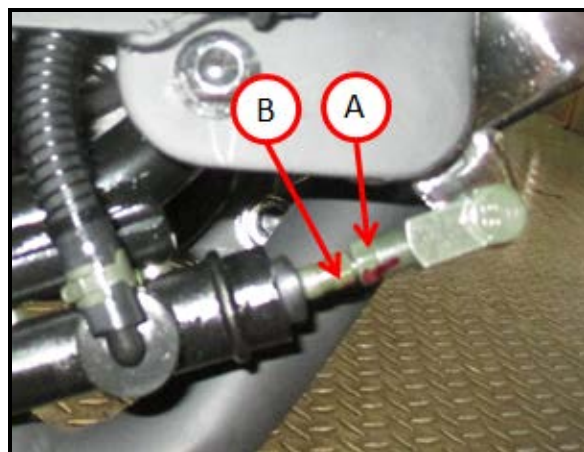
If the adjusting device is screwed in, the free stroke will be reduced;

If the adjusting device is screw out, the free stroke will be increased.

Screw in or screw out it until the free stroke meets the specified value.

Tighten the locknut [A].

After adjustment, the brake dragging phenomenon shall be avoided.

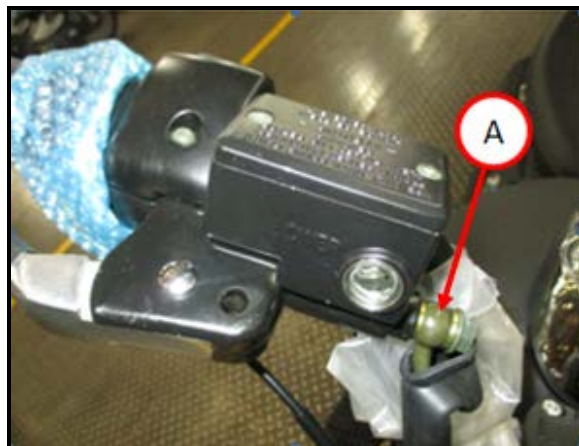


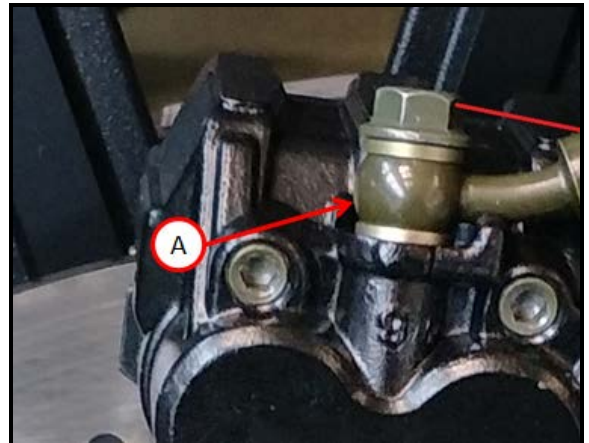
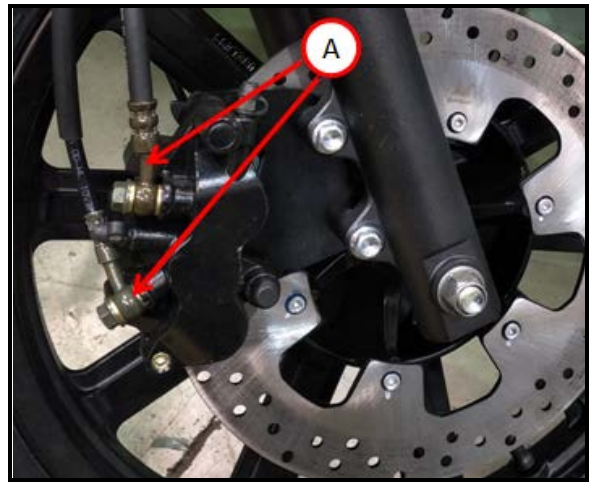
## Inspection of brake fluid for leakage

The precautions for models equipped with CBS are as follows:

Rotate the brake lever or pedal to check whether brake fluid leaks from the brake hose [A] and brake line [B] (model equipped with CBS).

★If brake fluid leaks from any position, check or replace the defective part.





Check brake hoses and brake lines for damage and ensure their installation status

The precautions for models equipped with CBS are as follows:

- Check brake hoses, brake lines and fittings for corrosion, cracks or leaks.

- If the brake hoses and brake lines are not properly serviced, the high pressure inside the brake lines may cause brake fluid to leak [A] or the brake hoses and the brake forming tubes to burst. When checking rubber hoses, bend and twist them. When checking rubber hoses, bend and twist them.

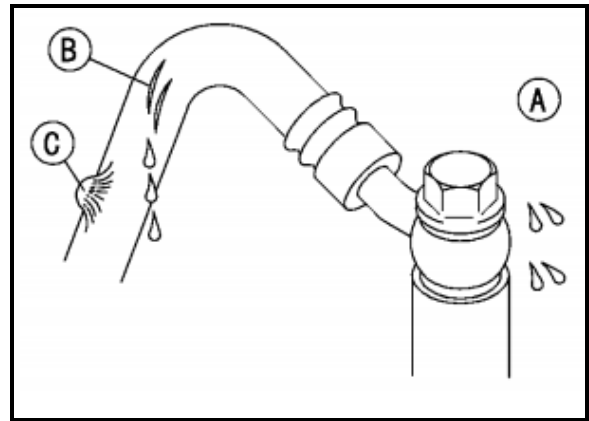
- ★ If any cracks [B], swelling [C] or leaks are found on the brake hose or brake forming tube, they must be replaced.

- Tighten all hollow bolts and nuts of brake hose.

**Tightening torque for hollow bolt of brake hose: 30 N•m**

- Check the winding method of brake hose.

- ★ If the brake hoses and brake lines (models equipped with CBS) are not wound correctly, please discharge brake hoses and brake lines by correct winding method.



## Inspection of brake

- Check whether front brake and rear brake are normal when riding a motorcycle on a dry road.

- ★ If the brake is abnormal, check the brake system.

### **⚠ WARNING**

If you need to test-ride a motorcycle during the inspection, make sure to do it at a place under safe traffic conditions.

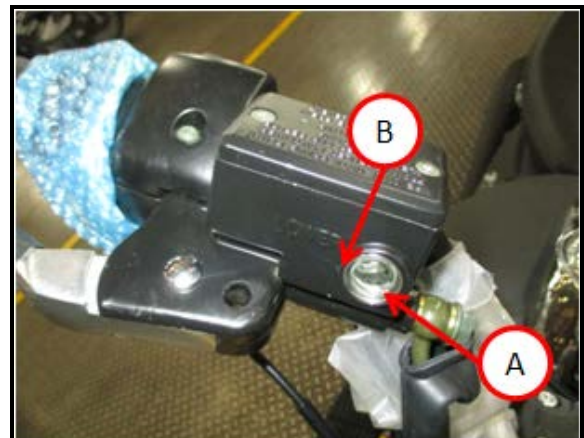
## Inspection of brake fluid level

- Check whether the level of brake fluid in the front brake fluid reservoir [A] is higher than the lower limit [B].

### **Remarks**

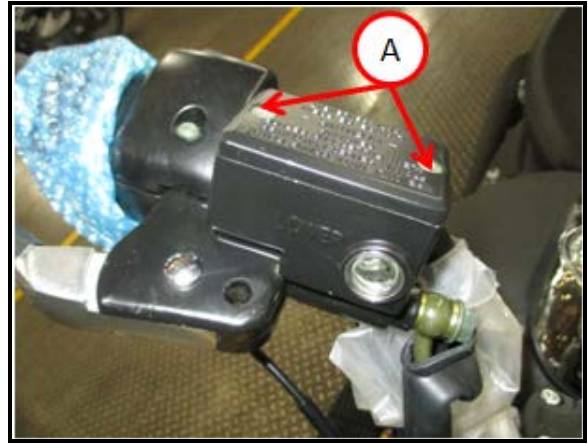
- When checking the brake fluid level, make the brake fluid reservoir level.

- ★ If the level is lower than the lower limit, add brake fluid to the reservoir until the liquid level reaches the high liquid level line.





- Follow the following procedure to properly install the cover of the front brake fluid cup.
  - After aligning the reservoir cover, tighten the two screws [A] of the reservoir cover with a screwdriver.



- Check whether the brake fluid level in the rear brake fluid reservoir [A] is higher than the lower limit [B].
  - ★ If the liquid level is lower than the lower limit, add brake fluid to the reservoir until the liquid level reaches the high liquid level line [C].

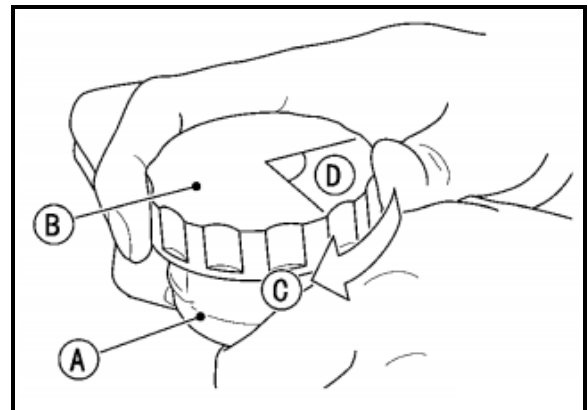
**⚠ WARNING**

If you need to add brake fluid but are not sure about the type and brand of brake fluid in the brake fluid reservoir, you must replace the brake fluid in the brake fluid tube. □ After replacing brake fluid, use only brake fluid of the same type and brand.

**Recommended disc brake fluid**  
**Grade: DOT4**



- Properly install the cover of rear brake fluid reservoir according to the following procedures.
  - First, tighten the cover [B] of rear brake fluid reservoir with your hands clockwise [C] until you feel a little resistance, indicating that the cover has been fixed on the reservoir, then hold the reservoir [A] and rotate it by 1/6 turn [D].



## Inspection of wear of brake pad

- Remove the brake pads (see “Disassemble front/rear brake pad” in chapter “Brake” for details).
- Check the thickness of friction plate of brake pad inside the caliper [A].
- ★ If the thickness of friction plate of any brake pad is lower than the operating limit [B], replace the two brake pads inside the caliper simultaneously.

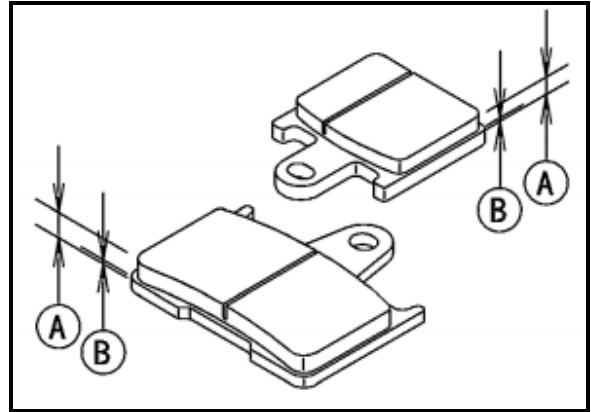
### Thickness of friction plate of brake pad

**Standard:**

**Front wheel brake pad: 6.0 mm**

**Rear wheel brake pad: 6.0 mm**

**Operating limit: 3 mm**



## Inspection of CBS

### Inspection of CBS

- Check whether the brake fluid in the CBS reservoir is above the level line.



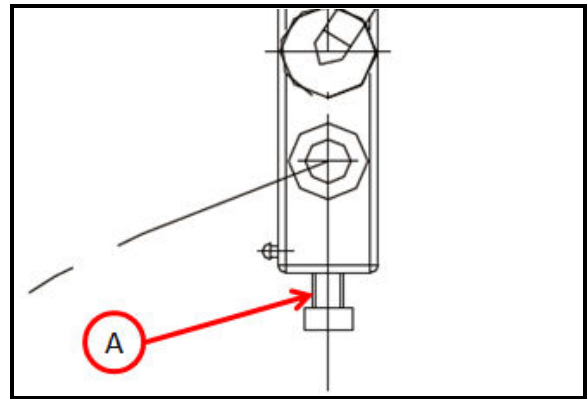
### Check whether there is inner leakage in CBS

- Loosen the adjusting bolt lock screw.
- Make the adjusting bolt screwed and unscrewed using adjusting bolt.
- Screw adjusting bolt with hands while holding down the brake pedal. If it can be screwed, there may be inner leakage, please replace CBS or CBS plunger assembly; if it cannot be screwed, there is no inner leakage in CBS. (See “disassemble and assemble CBS pump” for details)



### ***Fully screw CBS adjusting bolt***

- When linked brake fails due to oil leakage of current caliper, fully screw CBS adjusting bolt, and at this time rear brake can be used alone.



## **Inspection of brake light switch**

- Open the electric door lock.
- When the brake lever is pulled by about 15 mm, the brake light is on.



★ If the brake light is off, check whether the brake light switch plug is inserted properly.

★ If the brake light is off, check or replace the following parts:

Battery;

Brake light;

Fuse;

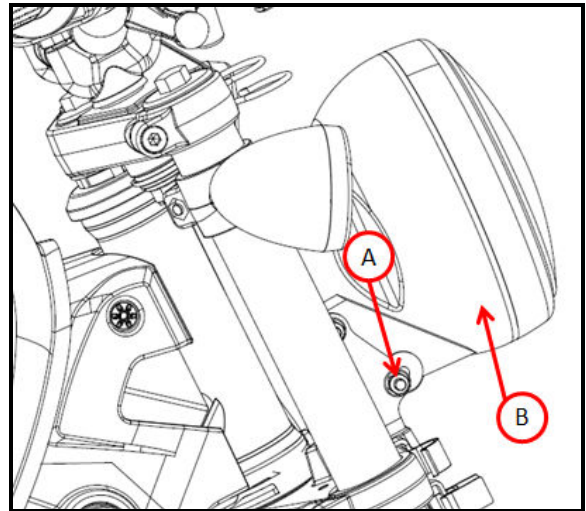
Front brake light switch;

Rear brake light switch;

Cable harness.

# Headlight

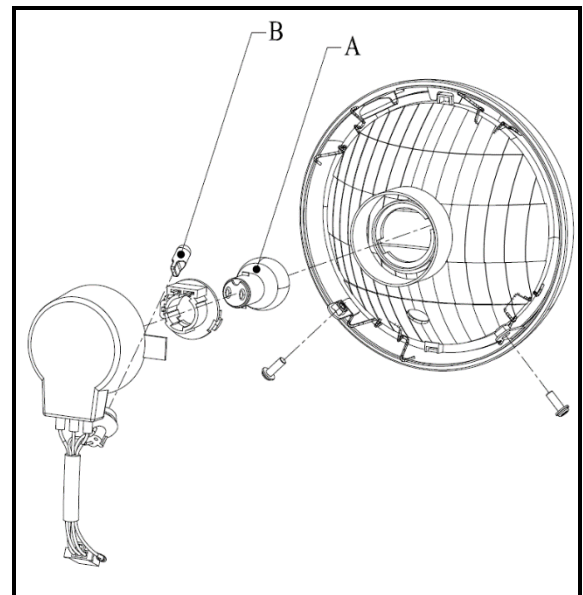
Remove  
Locknut [A]  
Headlight [B]



Remove the headlight  
Take out  
Headlight bulb [A]  
Front position light bulb [B]

## \*Note

When the bulb is on, keep the flammable product and your hand at a distance from the bulb, because the bulb is hot and should be cooled before it can be touched.



Install the front headlight bulb and front position light bulb in the reverse order of disassembly.

## \*Note

Avoid touching the glass part of the bulb directly and do not expose it to oil during installation.

Otherwise, it may affect the transparency, life and luminous flux of bulb.

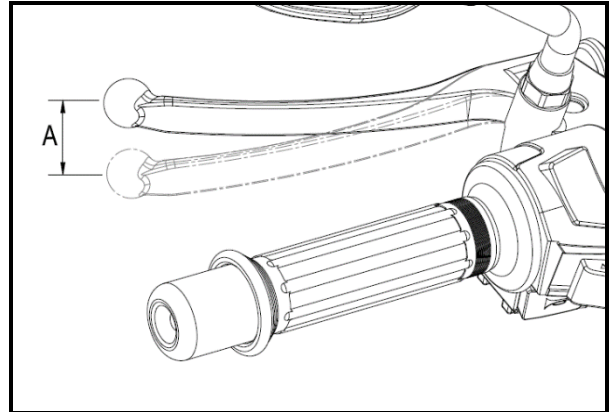
If it is stained with oil, wipe it thoroughly with a cloth dampened with alcohol or volatile rubber water.



## Clutch cable

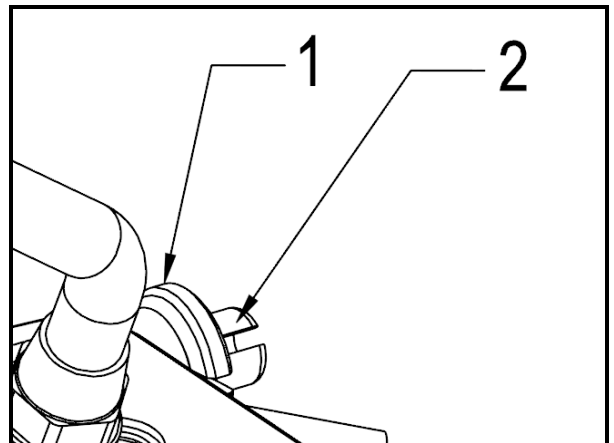
Check the free stroke [A] of clutch cable.

**Free stroke: 10-15mm.**



Check the free stroke of clutch cable.

- Loosen the fastening nut [1] first.
- Screw in or screw back the adjusting device[2].
- Screw in or screw out it until the free stroke meets the specified value.
- Finally tighten the fastening nut.



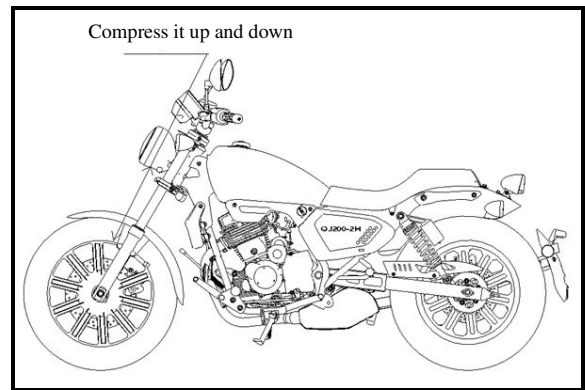
If the specified free clearance cannot be reached by adjusting the clutch handle, adjust the lower end of clutch cable. The steps are the same as the process of adjusting the clutch handle end.



## Front/rear suspension system

Front part

Tighten the front brake and compress the front shock absorber up and down to check the operation.  
Check whether the front shock absorber leaks and its parts are damaged and loosened.

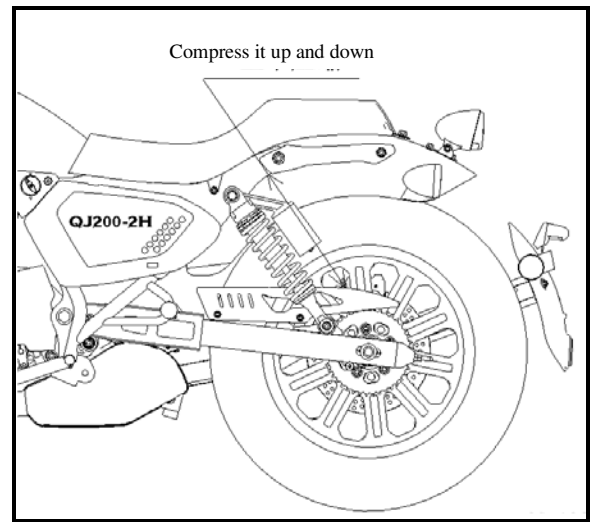


## Rear part

Compress rear shock absorber up and down to check the operation.

Check whether the parts of rear shock absorber are damaged and loosened.

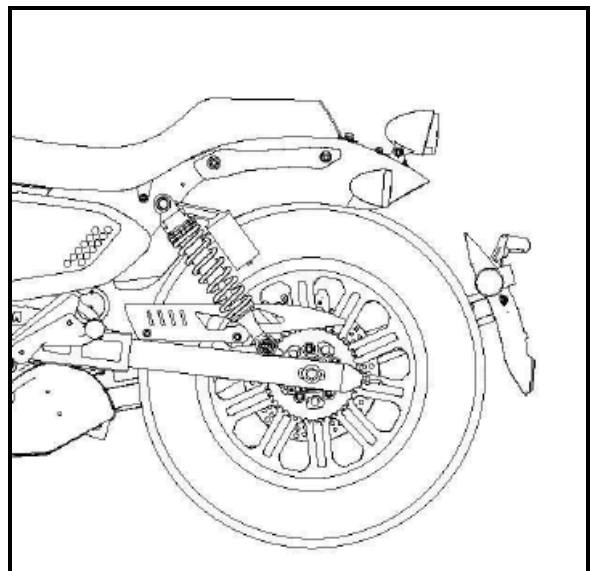
Suspend the rear wheel, and swing the rear wheel to check whether the engine suspension bushes are loosened.



## Bolt/nut/fixture

Check whether the bolts, nuts and fixtures of various parts of motorcycle are loosened.

If they are loosened, tighten it to the specified torque value.



## Front / rear tire

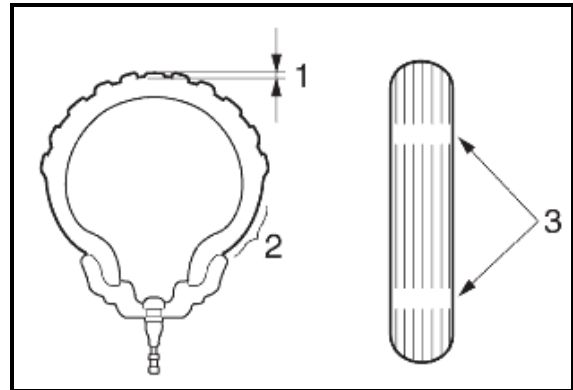
Check tires for cracks, iron nails or other damages.

Check tire surface

Wear → Replace

1. Tire tread depth
2. Side wall
3. Wear indication

**Wear limit: 1mm**



Check tire pressure.

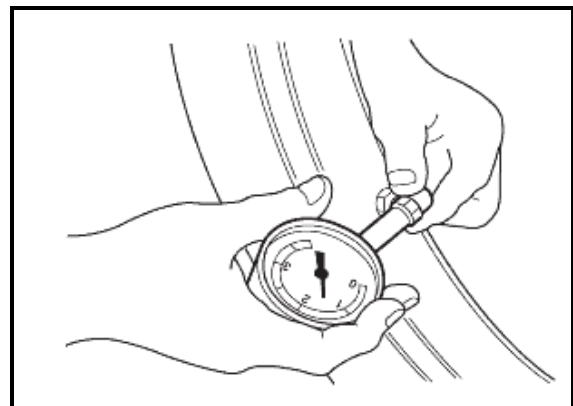
**\*Note**

Tire pressure measurement should be conducted at cold state.

**Specified air pressure**

**Unit: Kpa**

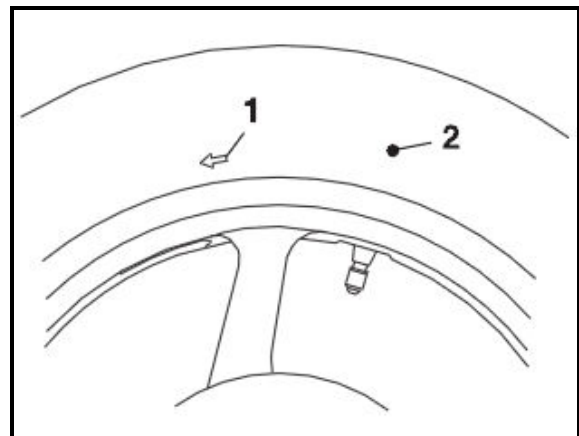
Tire specifications		Tire pressure
Front tire	90/90-17	190±10
Rear tire	130/90-15	210±10



**Notes**

If there is a rotation direction at the tire, mark it with "1"

- Point the mark to the rotation direction when installing the tire.
- Align mark "2" to the installation position of rim valve



## Rim / tire

Check whether the front axle mounting nut is loose.

Check whether the rear axle mounting nut is loose.

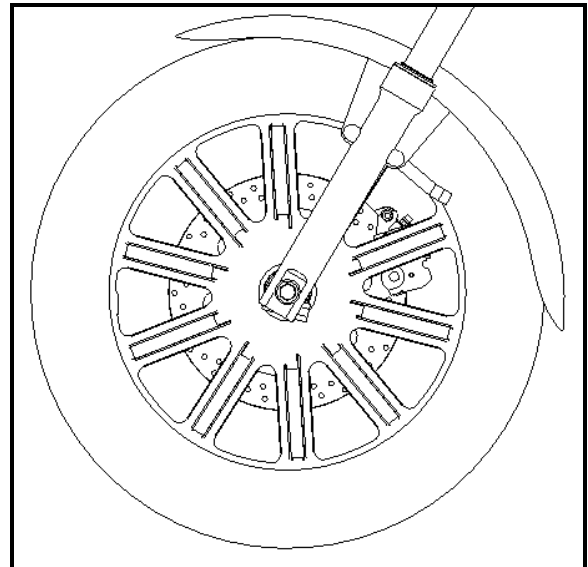
If loose, tighten it to the specified torque value.

**Torque value: Front axle fixing nut 75-88·m**

**Mounting nut of rear wheel**

**100-113·m**

Front rim	1.85×17
Rear wheel rim	3.00×15

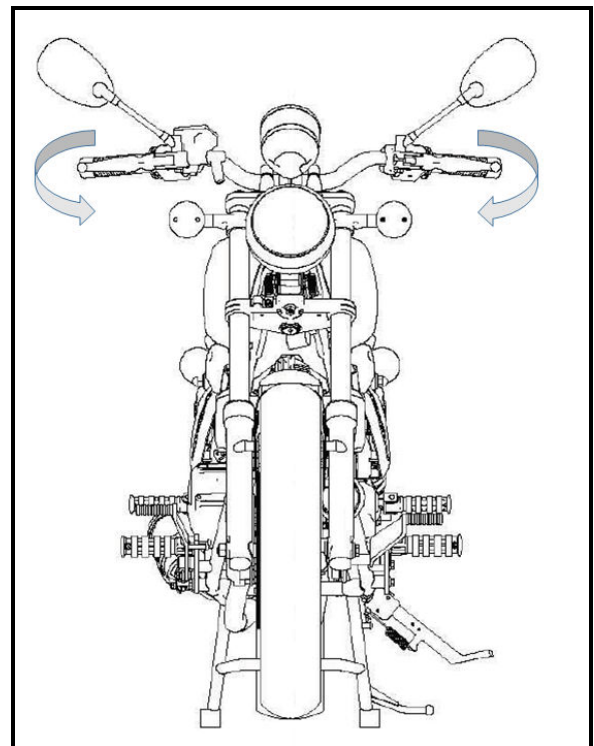


## Steering column bearing and handlebar fixator

Swing the handlebar from side to side, and check whether wires are involved.

Rotate the front wheel, and freely swing the handlebar to confirm.

If the handlebar cannot be swung smoothly, check the steering column bearing when it is loosened.

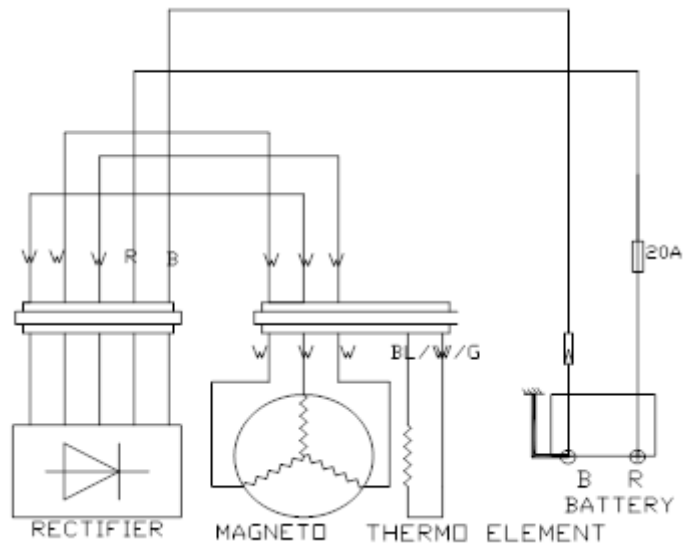


# Inspection and Maintenance of Electrical System

Torque Table of Fastener of Electrical System

Fastening location and fastener name	Tightening torque (N•m)
Starter motor clutch cover bolt	12
Starter motor clutch mounting bolt	95
Rectifier bolt	5.0
High-voltage coil mounting bolt	9.0
Flywheel mounting nut	50~60
Motorcycle protector bolt	9.0

# Charging System



1 Ignition switch 2 Electric horn 3 Ignition coil 4 Motor 5 Variable-frequency flasher 6 Fuse 7 Relay 8 ECU 9 Battery 10 Voltage regulator

# I. Battery/Charging System

Preparatory information.....	1.1
Fault Diagnosis.....	1.2
Battery.....	1.3
Charging System.....	1.4
Voltage and current Regulator.....	1.5
Alternator Charging Coil .....	1.6
Disassembly of Alternator .....	1.7

## 1.1 Preparatory Information

### Notes for operation

#### \*Note

1. The battery can be used repeatedly by charging and discharging. If the battery is placed after discharging, the service life will be shortened and the performance will be degraded. Generally, the performance of battery that has been used for about 2-3 years will be degraded. For the battery with degraded performance (reduced capacity), the voltage will recover but the voltage will drop rapidly when a load is applied.
2. Overcharging of battery: Generally, overcharging can be observed on the battery body. If the battery is short-circuited internally, no voltage is detected at the battery terminal or the voltage is low. Regulator fault: The battery voltage will be too high, and the battery life will be shortened.
3. If the battery is placed for a long time, the battery will discharge by itself, and the power capacity will be reduced, so battery must be charged once about every 3 months.
4. Charging system should be inspected in the order of fault diagnosis table.
5. If current flows through the electrical components, do not remove the connectors. Otherwise, the voltage may become too high and the electronic components in voltage regulator may be damaged. The main switch must be turned off before operation.
6. Maintenance-free (dry-charged) batteries do not need to be inspected, so electrolyte and distilled water are not required.
7. Check all electrical loads.
8. Emergency charging should not be used unless in an emergency.
9. When the battery is charged in an emergency, the battery must be removed from the motorcycle before charging.
10. Do not use liquid-filled batteries when the batteries are exchanged.
11. Use a voltmeter when checking the charging state of battery.

## Technical parameters

Item		Specifications	
<b>Battery</b>	Capacity/type	12V6Ah (YTX7A-BS)	
	Voltage (20 °C)	When fully charged	13.1V
		Must be charged	12.3V (Have not run for 1 hour)
	Charging current	Standard: 0.6A, quick: 6A	
	Charging time	Standard: 10-15 hours, quick: 30 minutes	
Alternator	Capacity	160W/5000rpm	
	Coil impedance (20 °C)	0.8±0.3Ω between white and white	
Rectifying voltage regulator	Type	Three-phase full-wave rectifying type	
	Battery charging voltage	14.5V±0.5V/5000rpm	

### Lock torque value Tool

<b>Rectifier bolt</b>	<b>5.0 N·m</b>	<b>Universal wrench</b>
<b>High-voltage coil mounting bolt</b>	<b>9.0 N·m</b>	<b>Flywheel puller</b>
<b>Flywheel mounting nut</b>	<b>50-60N·m</b>	<b>Testing instrument</b>
<b>Motorcycle cover bolt</b>	<b>9.0 N·m</b>	<b>Multimeter</b>

## 1.2 Fault Diagnosis

### No power

Battery overdischarging  
 Battery wire is not connected  
 Fuse is broken  
 Defective power switch

### Low voltage

Defective battery charging  
  
 Defective contact  
 Defective charging system  
 Defective rectifying voltage regulator

### Discontinuous current

Battery wire is not connected properly  
 Discharging system contact is defective  
 Lighting system is in poor contact or short circuit

### Defective charging system

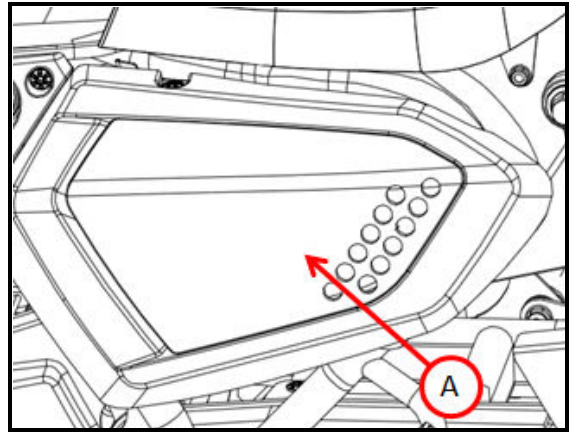
Defective contact, short wire or short circuit of wire connector  
 Defective voltage and current regulator  
 Defective alternator



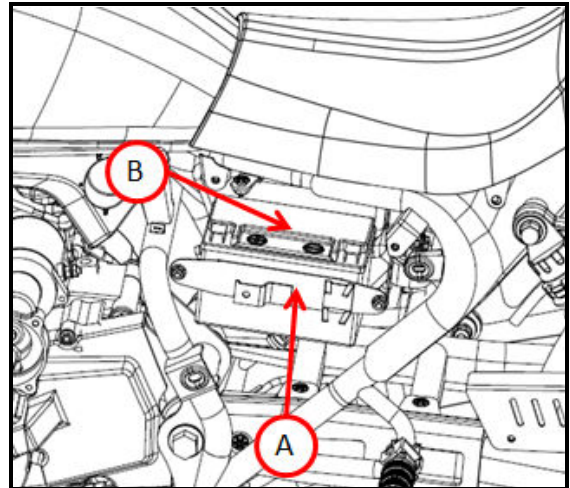
## 1.3 Battery

### 1.3.1 Battery Disassembly

Remove the left protector.



1. First remove the negative cable.
  2. Remove the positive cable.
- Remove the air pipe of battery from the battery.  
Remove the battery holder [A].  
Remove the battery [B].



#### **Warning!**

The positive and negative electrodes should be removed in the operation order.  
When installing the battery, first connect the positive electrode and then negative electrode.

### 1.3.2 Battery testing

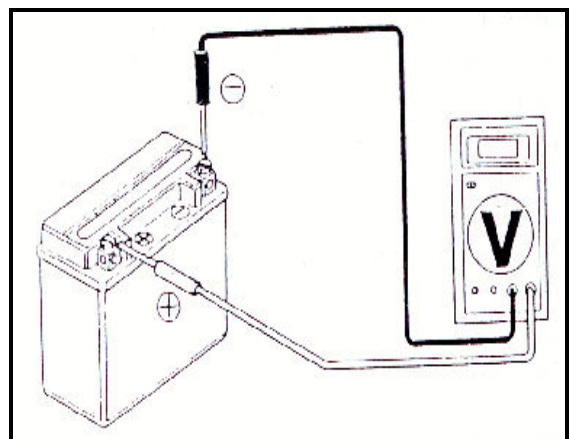
Check the charging state (open-circuit voltage).  
Open the battery cover and remove the battery pressing plate assembly.  
Remove the battery connector wire.  
Measure the voltage between battery terminals.

**Fully charged: 13.1V**

**Undercharge: 12.3V (the battery has not worked for 1 hour)**

#### **\*Note**

Check the charging state using a voltmeter.



## 1.3.3 Charging

**Connection method:** The positive electrode of charger is connected to the positive electrode of battery. The negative electrode of voltage regulator is connected to the negative electrode of battery.

### **Warning!**

- Batteries should be kept far away from the source of ignition.
- First turn off the power before starting charging or after completing charging. To prevent sparks at the connection position and avoid the danger of explosion.
- In the process of charging, conduct the standard operation according to the current time marked on the battery.

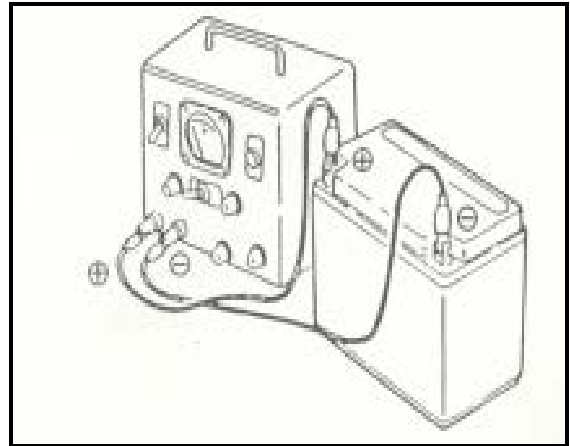
### **\*Note**

- Battery cannot be used generally during the quick charging of battery, except in emergencies.
- Measure the voltage 30 minutes after charging.

**Charging current: Standard: 0.6A**  
**Quick: 6.0A**

**Charging time: Standard: 10-15 hours**  
**Quick: 30 minutes**

**Completion of charging: open circuit voltage: 12.8V or more**



## 1.4 Charging System

### 1.4.1 Inspection of Charging State

Test the battery with a multimeter in a fully charged state.

After the engine is warmed up, install the fully charged batteries.

Connect a voltmeter between battery terminals. Remove the main fuse, and connect an ammeter between two terminals. Measure the current engine, slowly increase the speed and measure the limit voltage and current.

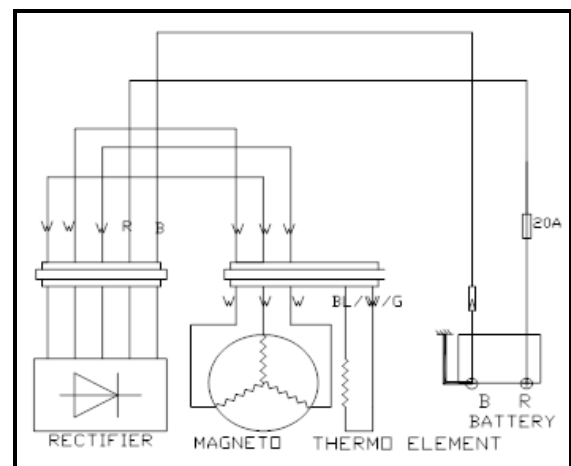
**Limit voltage/speed:  $14.5 \pm 0.5V$  (5.000rpm)**

When the limit voltage is not within the specified value range, check the rectifying voltage regulator and lighting system limiting voltage.

### **\*Note**

The multimeter is set to the position of DC voltage during voltage detection, and the limiting voltage will change slightly when the lighting system is turned on.

Charging simple function diagram (general version)



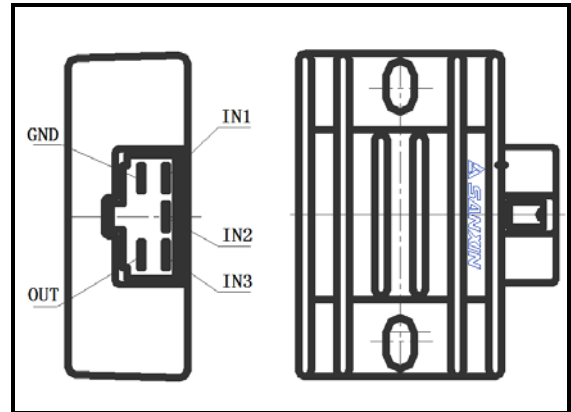
## 1.5 Disassembly of Voltage and Current Regulator

### 1.5.1 Inspection of Circuit at Main Wiring End

Remove the 6P plug of voltage and current regulator.

Check the continuity between main wiring terminals in the following way.

Item (wire color)	Judge
Between battery (red) and bond strap of body	There is battery voltage
Between bond strap wire (black) and bond strap of body	There is wire
Between charging coil (white) and bond strap of body	The alternator coil is not connected to the ground properly
Between charging coils (white 1 and white 2)	There is resistance in alternator coil



### 1.5.2 Inspection of Voltage and Current Regulator

- 1、 Rotate the multimeter to the position of diode;
- 2、 Connect the black probe to the red terminal of regulator, and connect the red probe to the white terminals (white 1, white 2, white 3) of regulator respectively. The pointer gauge will display a certain value, otherwise, it indicates that regulator is damaged and needs to be replaced.
- 3、 Connect the red probe to the black terminal of regulator port, and connect the black probe to the white terminals (white 1, white 2, white 3) of regulator respectively. The pointer gauge will display a certain value, otherwise, it indicates that regulator is damaged and needs to be replaced.

#### \*Note

- Do not touch the metal part of test rod of multimeter with fingers during inspection.
- Use a multimeter to check. The impedance values may be different when different multimeters are used, so the check may not be correct.

The voltage regulator should be replaced when the impedance between the terminals is abnormal.

## 1.6 Alternator Charging Coil

### \*Note

Check the alternator charging coil and operate at the engine.

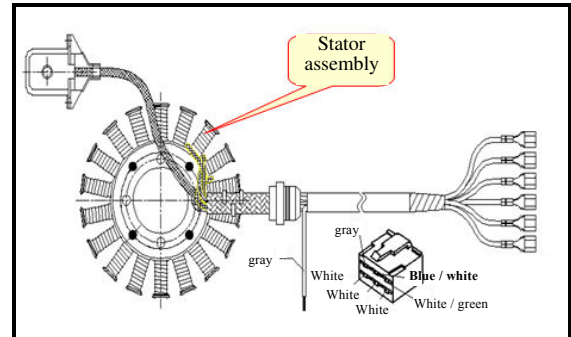
### Check

Remove alternator connector.

Use a multimeter to measure the impedance between the white coils of alternator.

**Standard value:  $0.8 \pm 0.3 \Omega$  (20°C)**

Replace the alternator coil when the measured value exceeds the standard value.



## 1.7 Disassembly of Alternator

### 1.7.1 Disassembly

Remove the starter gear cover of engine.



Remove the left cover of engine.



Use a universal mounting wrench to fix the flywheel.  
Remove the flywheel mounting bolt.  
Use a flywheel puller to remove the flywheel.  
Remove the mounting key.



Flywheel lock  
locking bolt

Remove the alternator wire connector.  
Remove the alternator stator (the stator inserts need to be picked out of the box with a needle).



Stator locking bolt

## 1.7.2 Installation

Clean the crankshaft and the taper of the flywheel.  
Install the flywheel fixed key is installed into the groove of upper key of the crankshaft and confirm it.  
Align the groove on the flywheel with the fixed key on the shaft.

### \*Note

The inner surface of flywheel is magnetic, so bolt should not be installed on it.

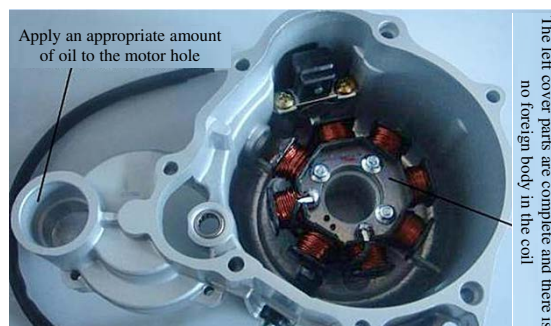
Use a universal non-adjustable wrench to secure the flywheel and then lock the retaining nut.

Install the alternator stator on the left cover of the engine, install the left cover to the engine, install the starter gear cover and connect the alternator connector.

**Flywheel locking torque value: 50-60 N·m**

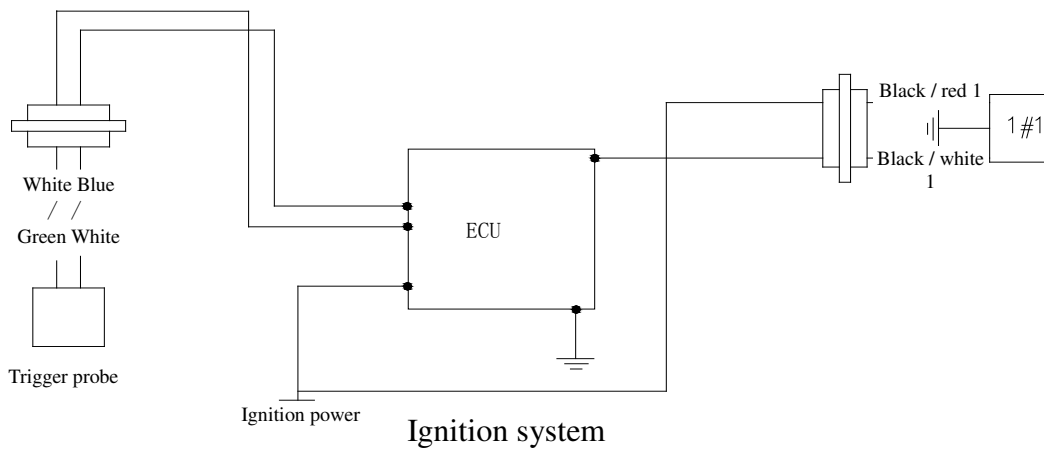
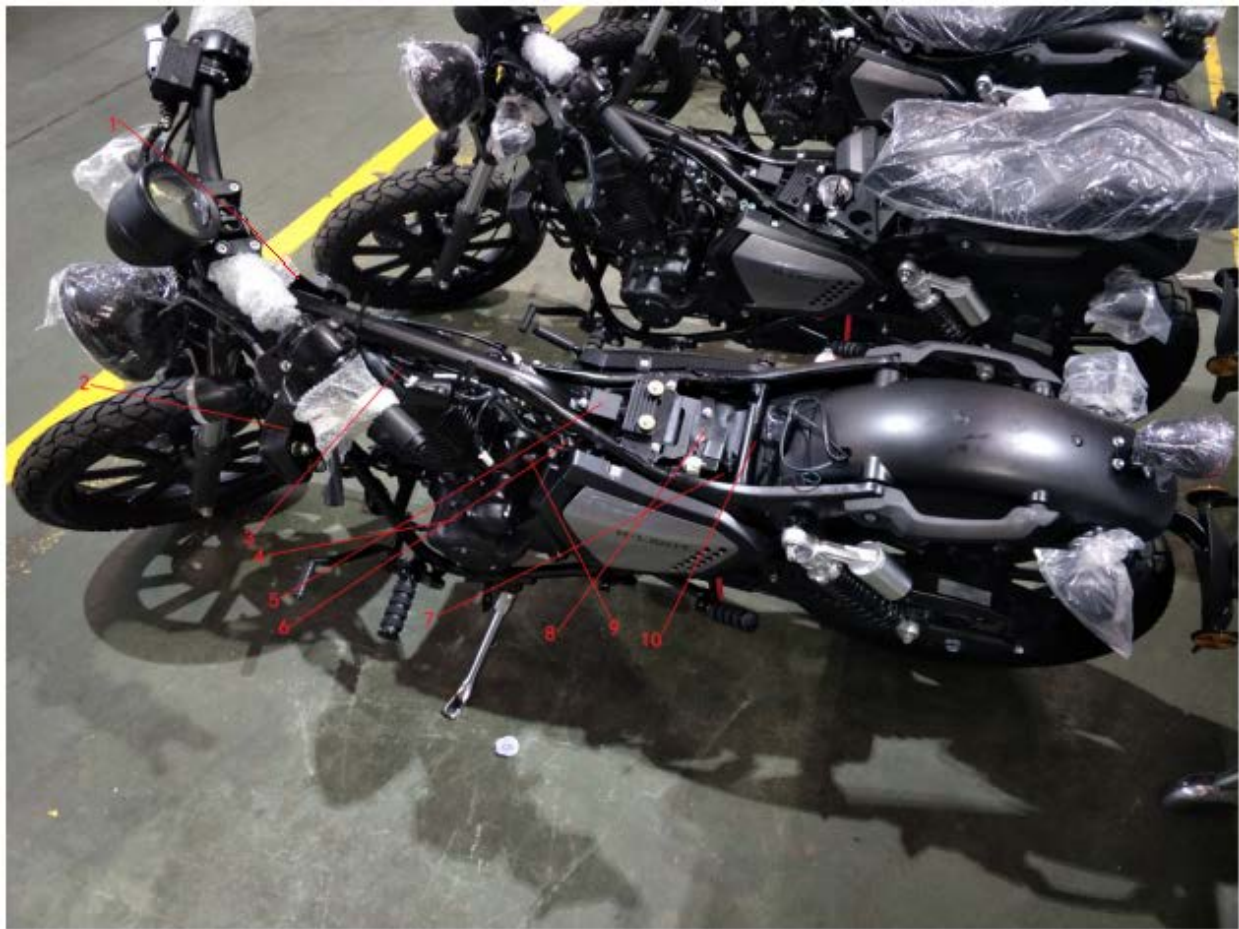
**Stator and box cover locking torque value: 10-12N·m**

**Trigger locking torque value: 6-9N·m**





# Ignition System



1 Ignition switch 2 Electric horn 3 Ignition coil 4 Motor 5 Variable-frequency flasher 6 Fuse 7 Relay 8 ECU 9 Battery 10 Voltage regulator

## II. Ignition System

Preparatory Information .....	2.1
Fault Diagnosis.....	2.2
Crankshaft sensor .....	2.3
Ignition Coil .....	2.4
Spark Plug .....	2.5
ECU .....	2.6

### 2.1 Preparatory Information

#### 2.1.1 Precautions for operation

1. Ignition system should be inspected step by step in the order of fault diagnosis table.
2. The ignition system is an electronic automatic angle feeding device and it has been solidified in the ECU group, so the ignition time does not need to be adjusted.
3. Ignition system should be inspected in the order of fault diagnosis table.
4. The main reason for ignition system fault is poor contact of connector, so first check whether the connectors are in poor contact.
5. Check whether the heat value of spark plug is appropriate, because improper spark plug may cause the engine to run unsmoothly or burn the spark plug.
6. Check the main switch according to the conduction table of switch part. (Attached)
7. Alternator and stator should be removed according to the disassembly instructions.

#### **⚠WARNING**

**Ignition system may generate an extremely high voltage. Do not touch the spark plug or coil while the engine is running; otherwise, you may be exposed to a serious electric shock.**

#### \*Note

Do not disconnect battery cable or any other electrical connections while the ignition is on or the engine is running. This is to prevent damage to ECU. Do not reverse the electrodes of battery. The side of negative electrode should be grounded. This is to prevent damage to ECU.



## Technical parameters

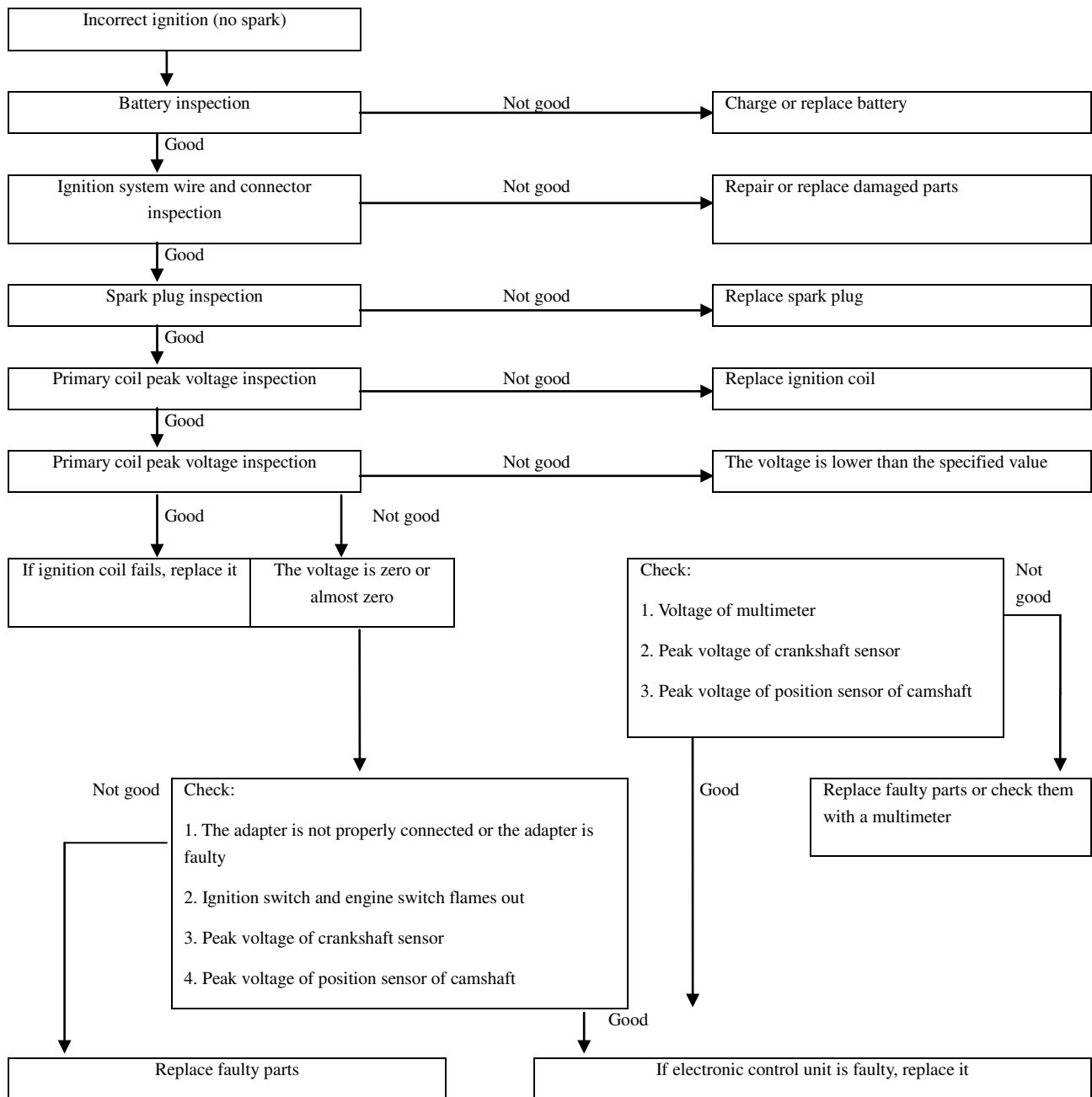
Item		Standard value
Spark plug	<b>Normal</b>	D7RTC
Spark plug gap		0.7±0.1mm
Impedance of trigger (20°C)	Primary coil	
	Secondary coil	There is a spark plug cover
		There is no spark plug cover
Impedance of trigger (20°C)		4Ω±15%
Maximum voltage in one measurement of ignition coil		18.6KΩ±15%
Trigger voltage		13.6KΩ±15%
Impedance of trigger (20°C)		150±10Ω
Maximum voltage in one measurement of ignition coil		15V
Trigger voltage		Above 1.7V

## Tools

Accessories of maximum voltmeter

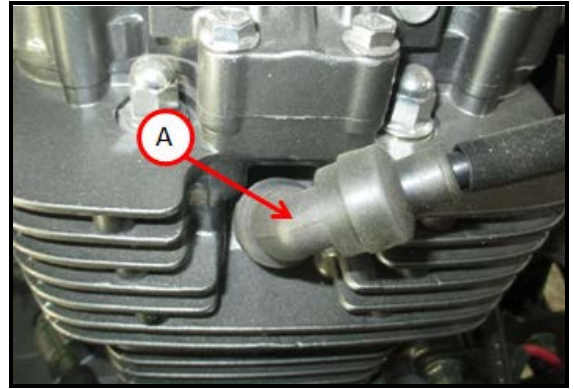
**Multimeter**

## 2.2 Fault Diagnosis

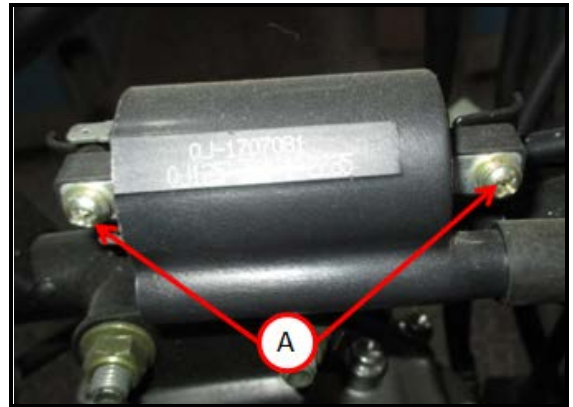




- Remove the spark plug cover [A]
- Remove the primary wire of ignition coil.



- Remove the ignition coil mounting screw.



- Install it in the reverse order of disassembly.

Torque value

Ignition coil fixing screw 5-7N•m

## 2.4.2 Inspection of Ignition Coil

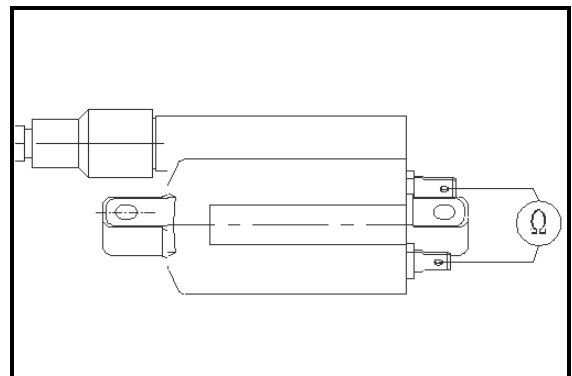
### \*Note

- When there is no spark in the spark plug, it is necessary to check whether the parts of wiring are loosened or in poor contact;
- There are many brands of multimeter, the internal impedances are different and the tested values are different.

- Check the primary coil
- Measure the impedance among the terminals of primary coil.

Standard value:  $(4 \pm 10\%) \Omega$  (20 °C)

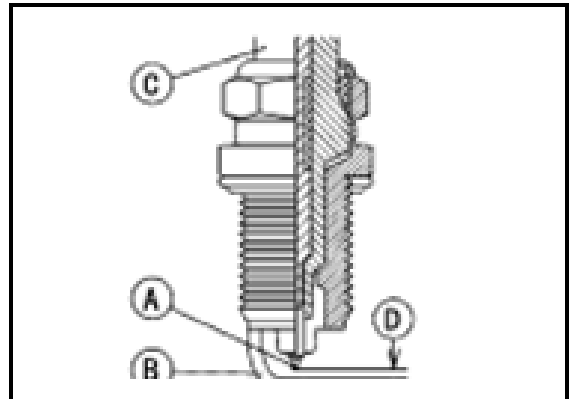
- ★ The impedance value is good in the standard value.
- ★ If the impedance value is “∞”, it indicates that the wire in the coil is disconnected and the ignition coil needs to be replaced.



## 2.5 Spark Plug

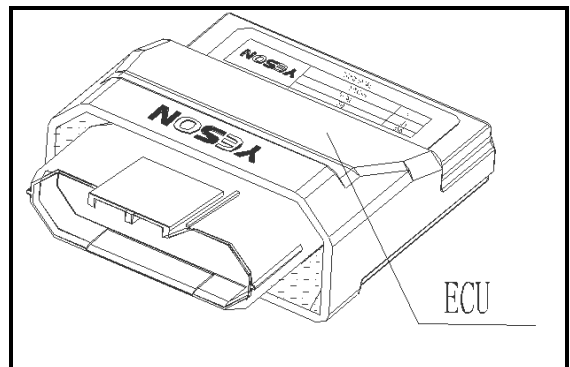
### 2.5.1 Inspection of spark plug

- Disassemble spark plug (see section “disassembly of spark plug”)
  - Visually inspect the spark plug
    - If the center electrode of spark plug [A] and/or side electrode [A] is corroded or damaged, or insulated terminal [C] is broken, replace the spark plug
    - ★ If the spark plug is dirty or there is carbon deposit, replace the spark plug
    - Use a wire feeler to measure the gap [D]
    - If the gap is incorrect, replace the spark plug
- Spark plug gap:  $0.7 \pm 0.1 \text{mm}$**
- Use standard spark plugs or their equivalents
- Spark plug: D7RTC**

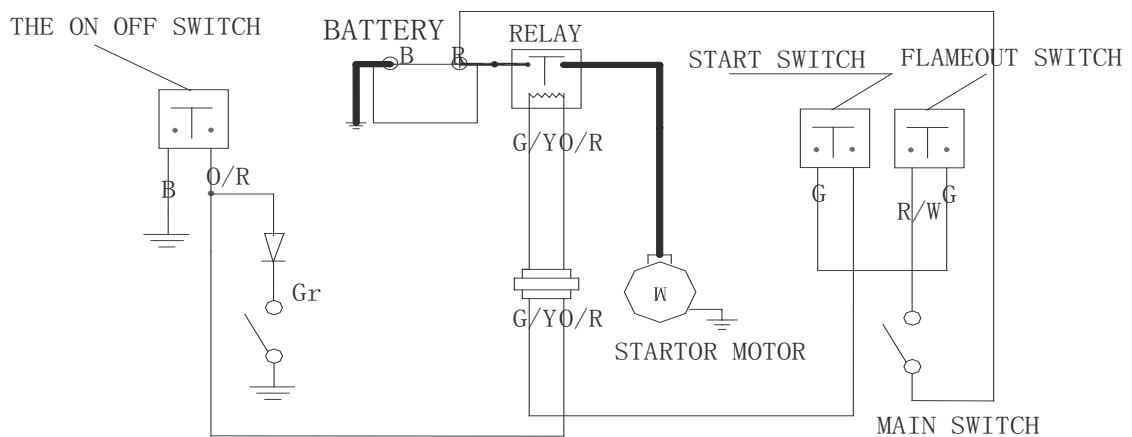
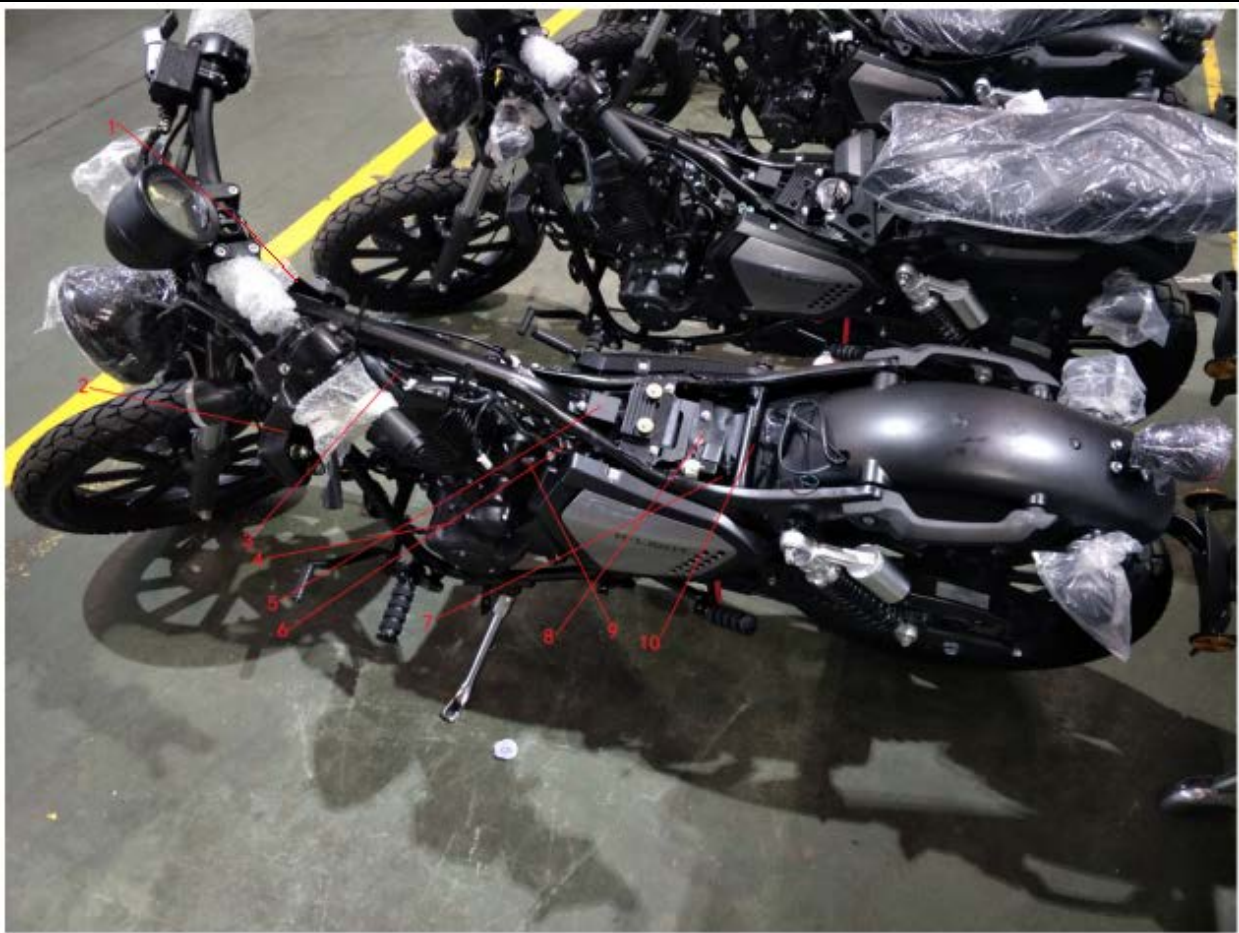


## 2.6 ECU

- System inspection
  - Remove ECU and check the parts at wiring terminal related to ignition system.
- (See section “ECU” of electronic injection system for details)



# Starter System



1 Ignition switch 2 Electric horn 3 Ignition coil 4 Motor 5 Variable-frequency flasher 6 Fuse 7 Relay 8 ECU 9 Battery 10 Voltage regulator

## III. Starter System

Preparatory Information .....	3.1
Fault Diagnosis.....	3.2
Starter Motor .....	3.3
Starter Relay.....	3.4

### 3.1 Preparatory Information

#### Precautions for operation

Starter motor can be removed on the engine.

Starter clutch should be disassembled in accordance with the working procedures.

#### Technical parameters

Item	Standard value	Operating limit
Length of starter motor brush	12.5mm	8.5mm
Stater idle shaft bushing		8.3mm
Outer diameter of starter idle shaft		7.94mm

#### Lock torque value

**Starter motor clutch cover bolt 12 N•m**

#### Tools

Mounting nut wrench

Universal fixing wrench

## 3.2 Fault Diagnosis

### Start failure

- The fuse is broken
- Insufficient battery power
- Detective ignition switch
- Defective starter clutch
- Defective brake switch
- Defective starter relay
- Defective connecting wire
- Defective starter motor

### Too weak rotation force of starter motor

- Insufficient battery power
- Defective connecting wire
- The gear of starter motor is struck by foreign body

### Starter motor can rotate but rotation engine cannot work

- Defective starter clutch
- Reverse rotation of starter motor
- Insufficient battery power

## 3.3 Starter Motor

### 3.3.1 Disassembly

#### \*Note

Before disassembling starter motor, first turn off the main switch, remove the bond strap of battery, then turn on the power and check whether starter motor is running to confirm safety.

remove starter motor cable [B] connector.

Remove the starter motor mounting bolt [A], and remove the starter motor.



### 3.3.2 Installation

Install the starter motor in the reverse order of disassembly.

Torque value

Starter motor mounting bolt 10-12 N•m



## 3.4 Starter Relay

### 3.4.1 Operation Inspection

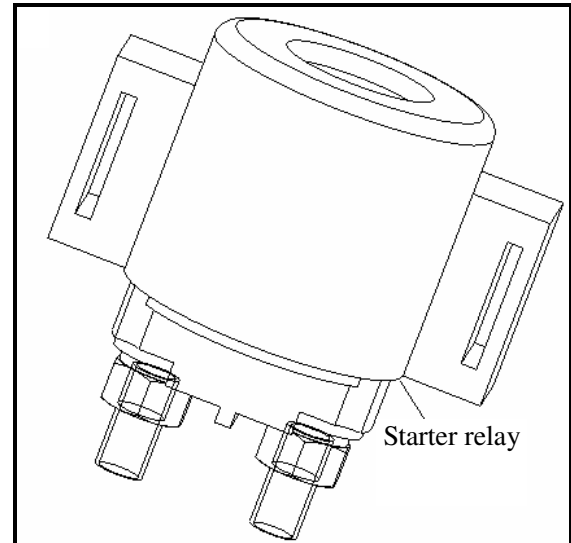
Remove the body protector.

When the main switch is related to “ON”, check whether a “click” sound is made after turning on starter motor.

It is normal when a sound is made.

When there is no sound: • Check starter relay voltage.

- Check bond strap circuit of starter relay.
- Check the operation of starter relay.

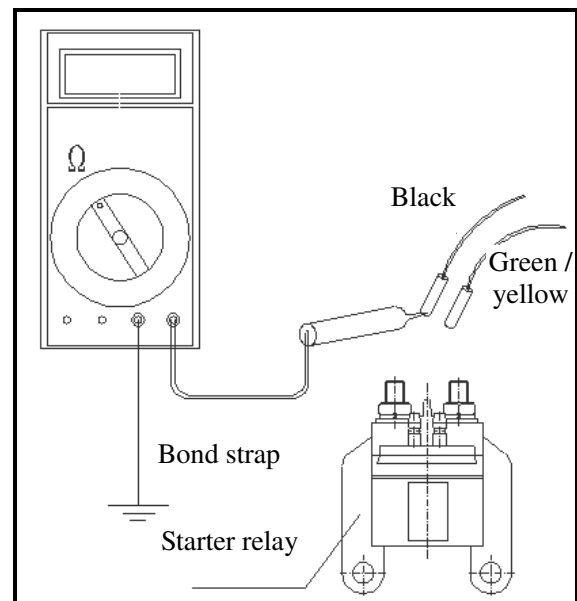


### 3.4.2 Inspection of Voltage of Starter Relay

Erect main foot, and measure the voltage between the negative electrode (green/yellow) of starter relay connector and bond strap of motorcycle body.

Place the main switch at the position of “ON”, pull the brake lever and ensure that the battery voltage meets the regulations.

When no voltage is applied to the starter relay wire, check the continuity and wire of brake switch.



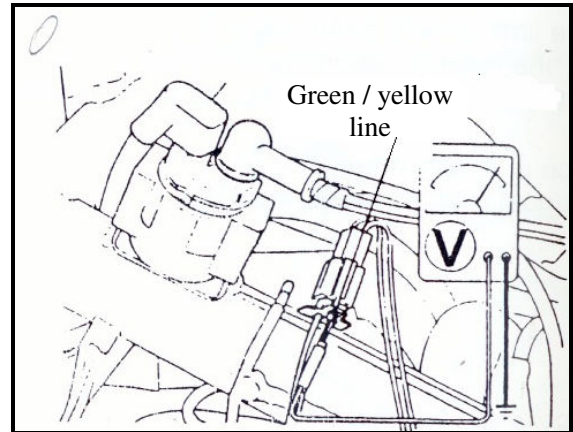
### 3.4.3 Inspection of Bond Strap Circuit of Starter Relay

Remove starter relay connector.

Check the continuity between black wire connector terminal and bond strap of body.

Ensure that the continuity between black wire connector terminal and bond strap of body is good after start button is pressed.

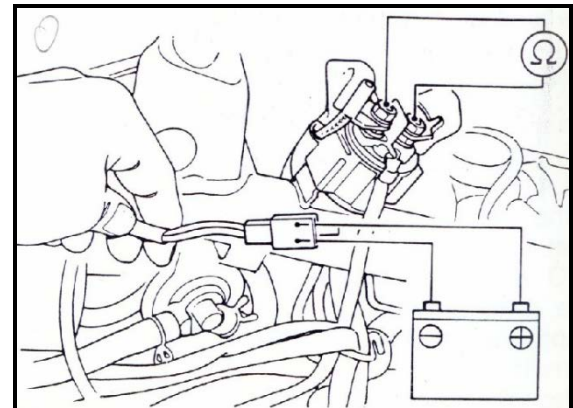
When it is nonconductive, check the continuity and wire of start button.



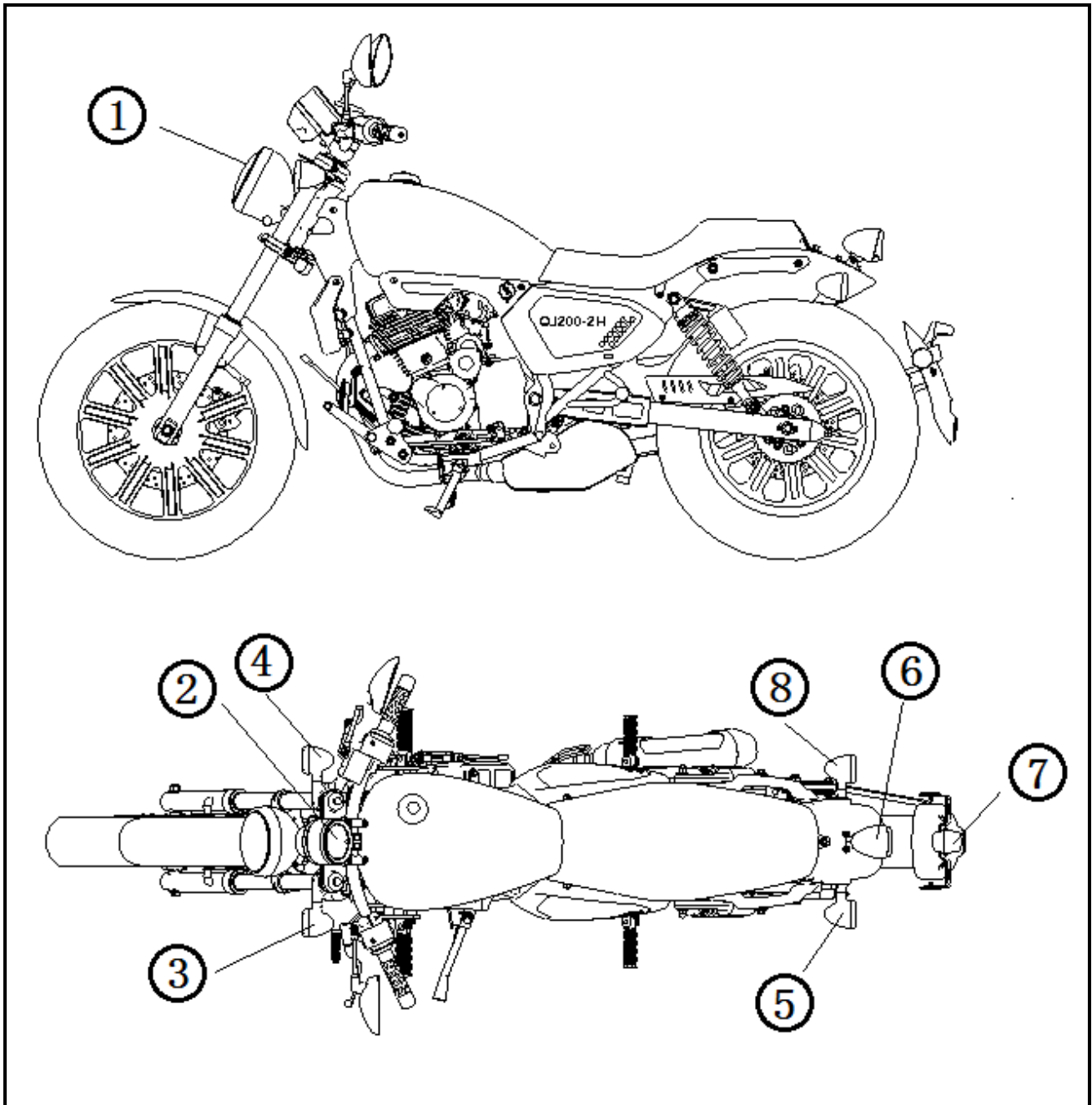
### 3.4.4 Operation Inspection

Connect the starter relay to the battery and connect the terminal of starter motor to multimeter.

Connect the fully charged battery between the black and green/yellow wires of the relay. At this point, “Da” sound is made in the relay and the resistance indication of multimeter is “zero”.



## Bulbs/Meters



1 Front headlight 2 Meter 3 Front left turn light 4 Front right turn light 5 Rear left turn light 6 Taillight 7 Reflector  
8 Rear right turn light

## **IV. Bulbs /Switches/Meters**

Preparatory Information .....	4.1
Fault Diagnosis.....	4.2
Replacement of Headlight Bulb.....	4.3
Replacement of Front Turn Signal Light Bulb.....	4.4
Replacement of Taillight Bulb .....	4.5
Replacement of License Plate Light Bulb .....	4.3
Meters .....	4.7
Ignition Switch.....	4.8
Electric Horn .....	4.9
Handlebar Switch.....	4.10

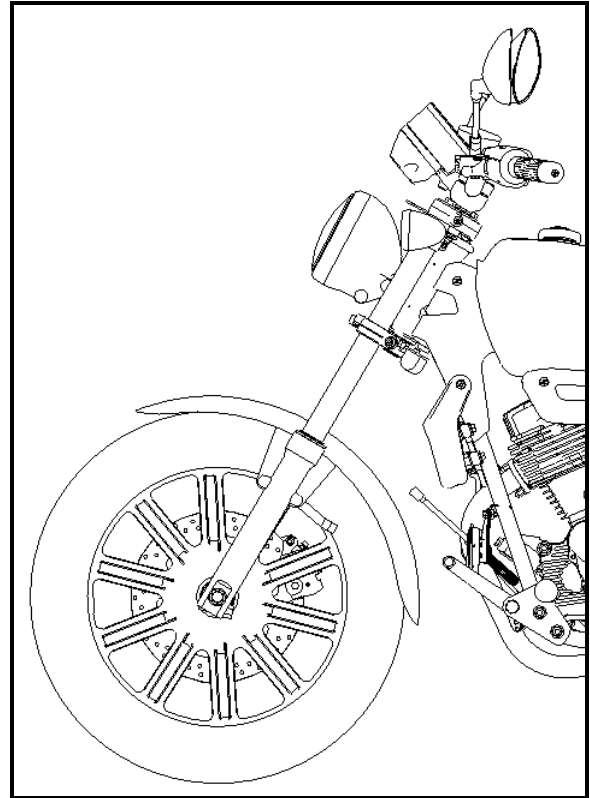
### **4.1 Preparatory Information**

Precautions for operation

Switch can be removed from motorcycle for measuring the continuity of switch.

All plastic connectors have claws. Remove the claws before disassembly. Be sure to align the claws with the card when reinstalling.

When looking for an electrical fault, check the continuity of the circuit passing through the electronics. Before performing any inspection, confirm the battery status, including checking whether the battery voltage is normal.



## 4.2 Fault Diagnosis

**The “ON” light of main switch is off.**

- Defective light bulb.
- Defective switch.
- The connector is in poor contact or disconnected.
- The power of battery is weak or there is no voltage.

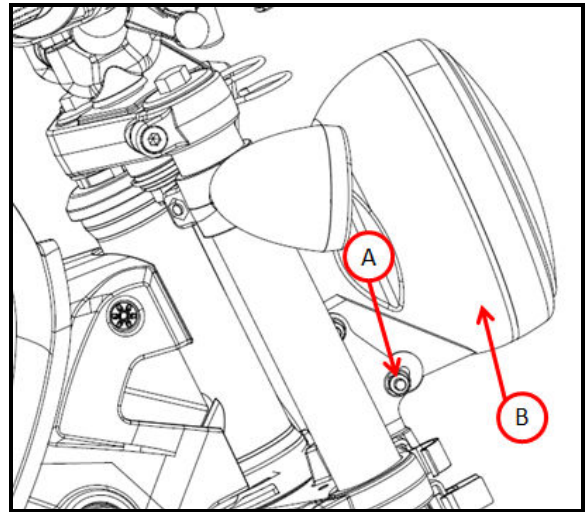
## 4.3 Replacement of Headlight Bulb

### 4.3.1 Disassembly

Remove

Locknut [A]

Headlight [B]



Remove the headlight

Take out

Headlight bulb [A]

Front position light bulb [B]

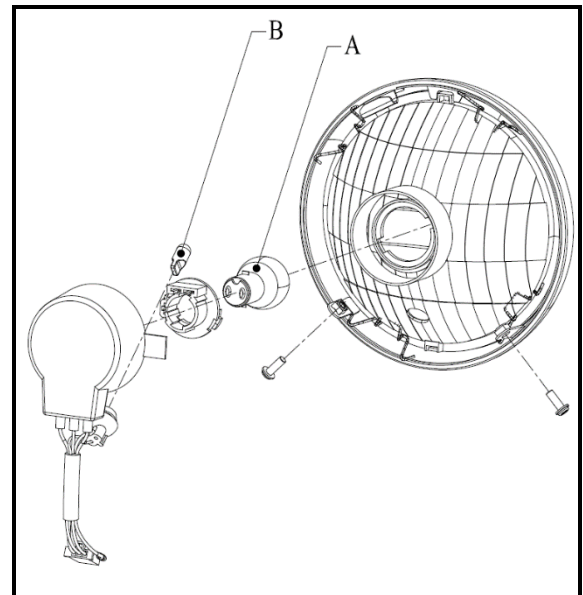
**Specifications:**

**Headlight bulb**                    **H4**

**Front position light bulb:**   **W3W**

**\*Note**

When the bulb is on, keep the flammable product and your hand at a distance from the bulb, because the bulb is hot and should be cooled before it can be touched.



### 4.3.2 Installation

Install the front headlight bulb and front position light bulb in the reverse order of disassembly.

**\*Note**

Avoid touching the glass part of the bulb directly and do not expose it to oil during installation. Otherwise, it may affect the transparency, life and luminous flux of bulb.

If it is stained with oil, wipe it thoroughly with a cloth dampened with alcohol or volatile rubber water.

## 4.4 Replacement of Front Turn Signal Light Bulb

### 4.4.1 Disassembly

Remove

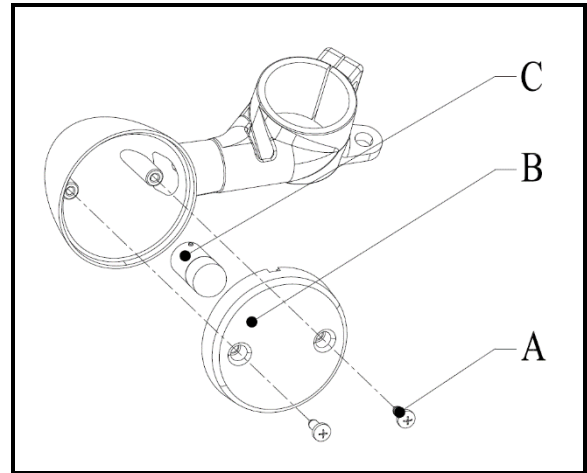
Self-tapping screw of turn signal light [A]

Turn signal light cover [B]

Turn signal light bulb [C]

**Specifications**

**Turn signal light bulb** R10W



### 4.4.2 Installation

The bulb should be installed in the reverse order of disassembly.

## 4.5 Replacement of Taillight Bulb

### 4.5.1 Disassembly

Remove

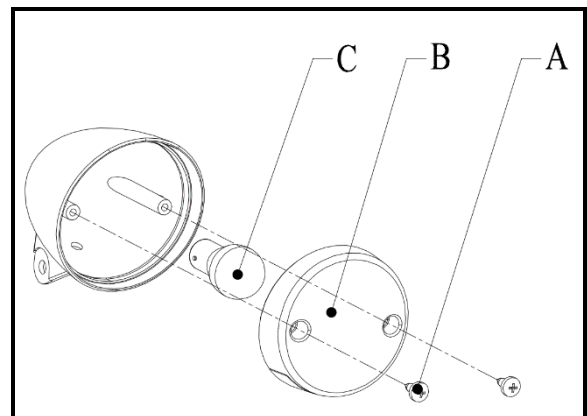
Self-tapping screw of taillight [A]

Taillight cover [B]

Taillight bulb [B]

**Specifications**

**Turn signal light bulb** P21/5W



### 4.5.2 Installation

The taillight bulb should be installed in the reverse order of disassembly.

**\*Note**

Ensure that the sealing washer of taillight cover is in the good state and correct position when installing the taillight.

## 4.6 Replacement of License Light Bulb

### 4.6.1 Disassembly

Remove

Self-tapping screw of license plate light [A]

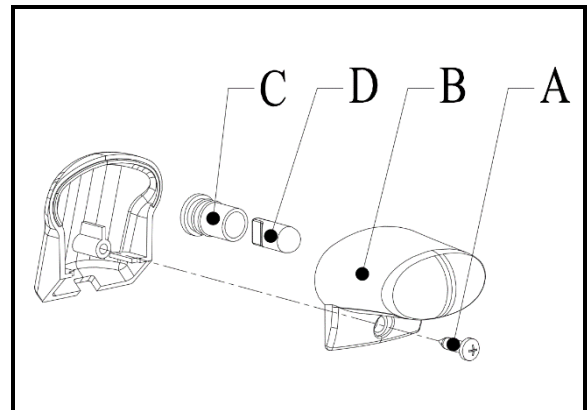
License plate light cover [B]

License plate light holder [C]

License light bulb [D]

#### Specifications

**License plate light bulb: W5W**



### 4.6.2 Installation

The license plate light bulb should be installed in the reverse order of disassembly.

## 4.7 Meters

### 4.7.1 Disassembly

Remove:

Inner hexagon screw M6×25[F]

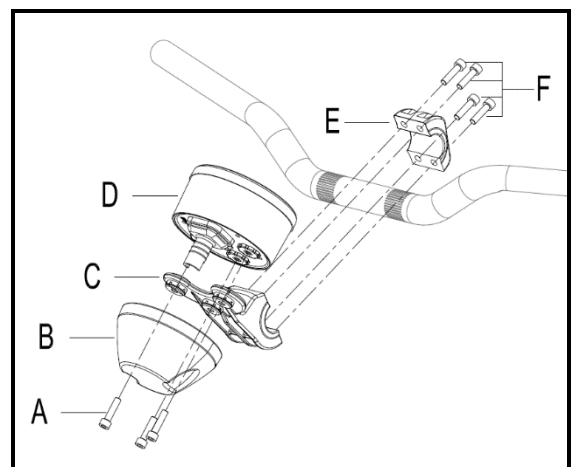
Upper meter mounting cover [E]

Meter mounting holder [C]

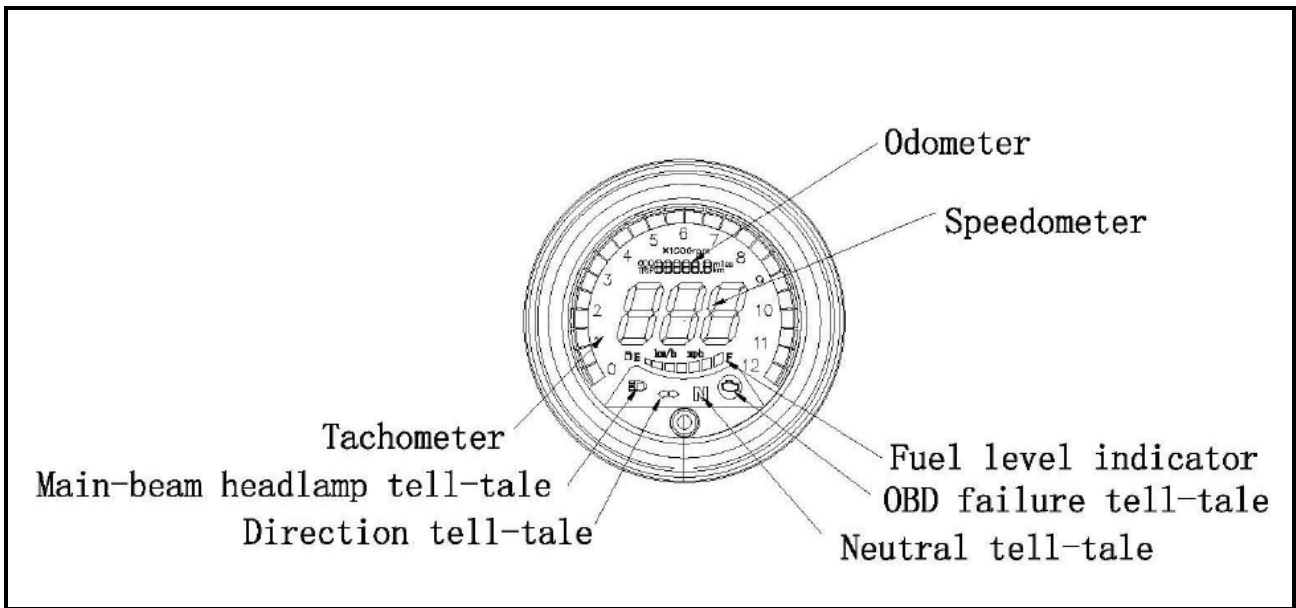
Bolt M6×20[A]

Rear meter cover [B]

Meter assembly [D]







## 4.7.2 Installation

The meter should be installed in the reverse order of disassembly.

**Torque value:**

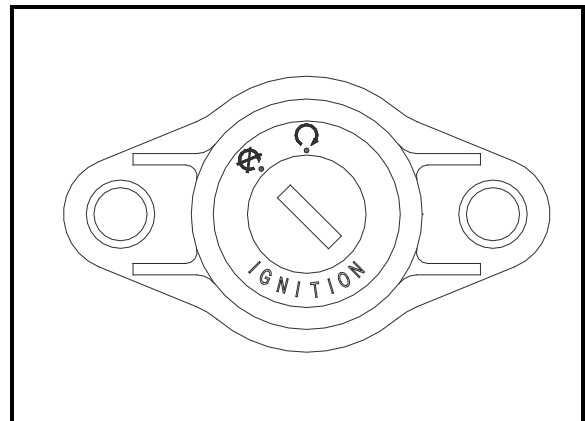
**Meter mounting holder mounting screw** 10~12N·m

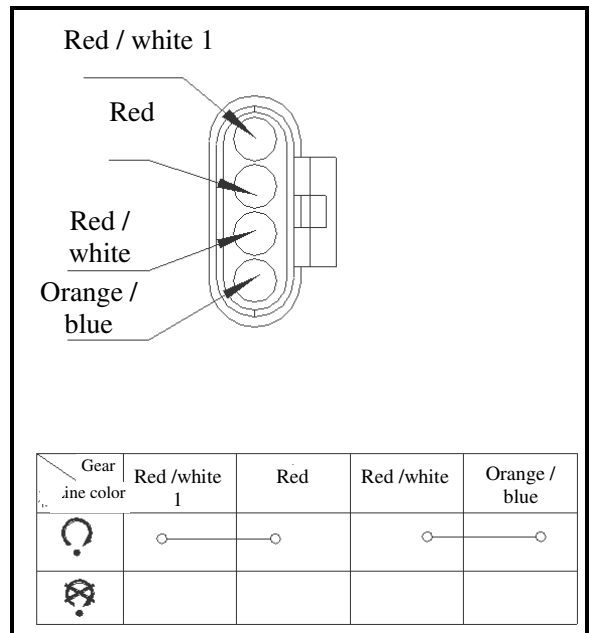
## 4.8 Ignition Switch

### 4.8.1 Disassembly

Remove the ignition switch wire connector.

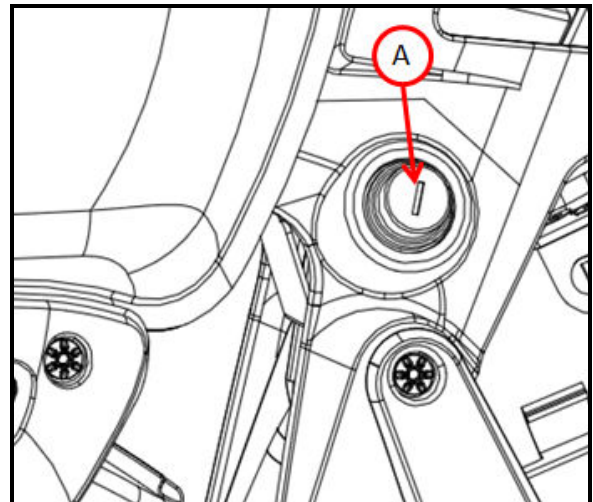
Check the conduction of connector terminal.





## 4.8.2 Replacement of Ignition Switch

Remove the mounting bolt and replace the ignition switch [A].



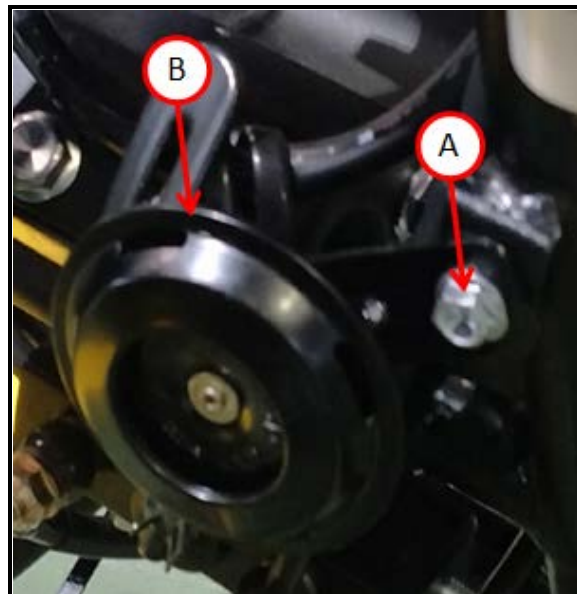
## 4.9 Electric horn

### 4.9.1 Disassembly

Remove

Mounting bolt [A]

Horn [B]



### 4.9.2 Installation

The horn should be installed in the reverse order of disassembly.

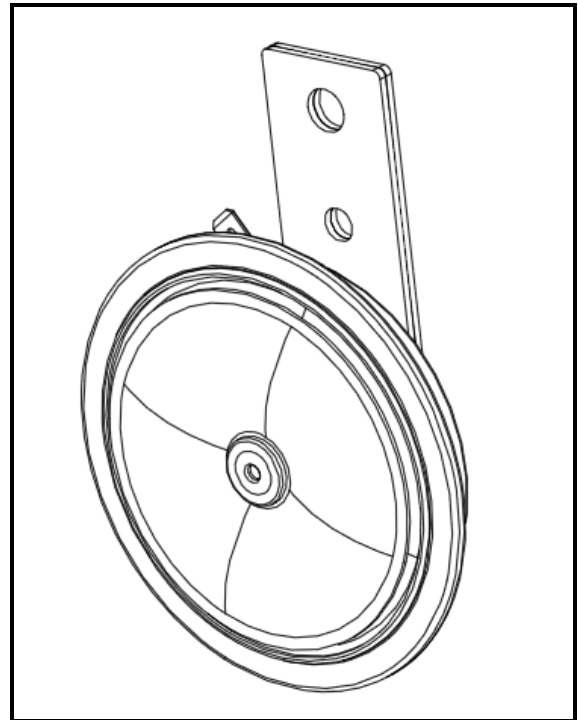
**Torque value:**

**Horn mounting bolt 10~12N.m**

### 4.9.3 Inspection

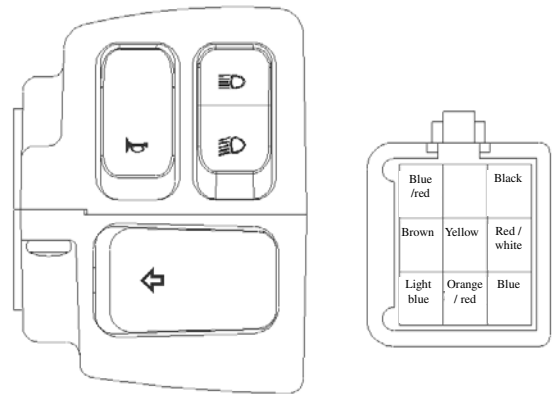
Remove the horn wire.

If the horn sounds after being connected to the battery, it is in good conditions.



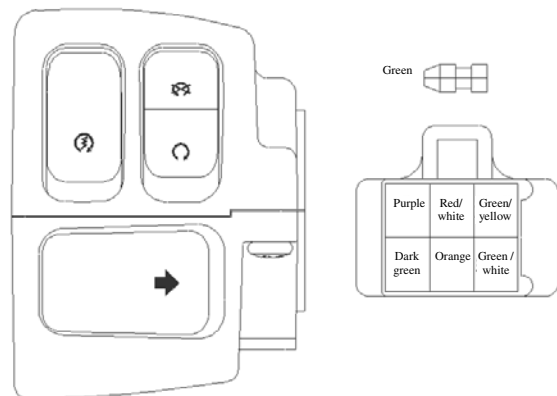
# 4.10 Handlebar Switch

## Left Handlebar Switch



Dimmer switch			Left steering switch			Horn button	
Light blue	Yellow	Blue	Black	Blue/red		Red/white	Brown
	○	○		○	○		○
	○	○					○

## Right Handlebar Switch



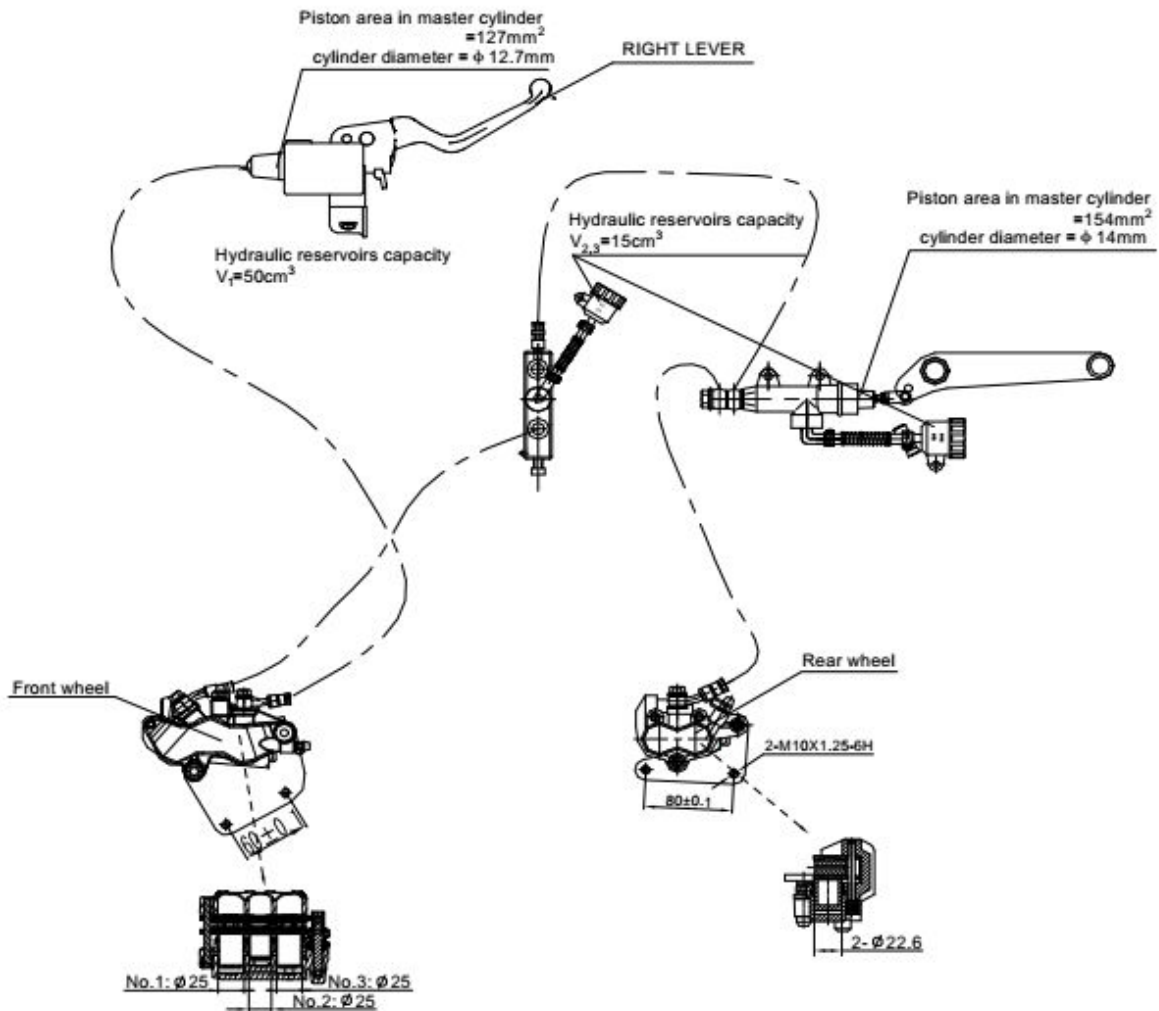
Right steering switch		Starting switch		Stop switch		Brake	
Orange	Green/white	Green/yellow	Red/white	Green	Dark green	Purple	Red/white
	○	○		○	○		○
							○

# Inspection and Maintenance of Chassis

## Torque Value Table of Chassis Fastener

Fastening location and fastener name	Tightening torque (N•m)
Mounting bolt of fuel pump assembly	5-9
Mounting bolt of front brake cylinder assembly	22-29
Rear brake rocker arm mounting bolt	5-9
Rear wheel mounting nut	85-98
Handlebar welding assembly mounting bolt	40-60
Front axle locknut	75-88
Mounting bolt of front shock absorber	40-60
Rear wheel mounting nut	85-98
Nut at the top of rear shock absorber	37-44
Nut at the bottom of rear shock absorber	22-29
Mounting bolt of rear grab rail	22-29
Fuel tank mounting bolt	5-9
Helmet barrel mounting bolt	5-9
Muffler mounting bolt	22-29
Muffler connector mounting bolt	5-9
Mounting nut of rear rocker arm axis	70-83

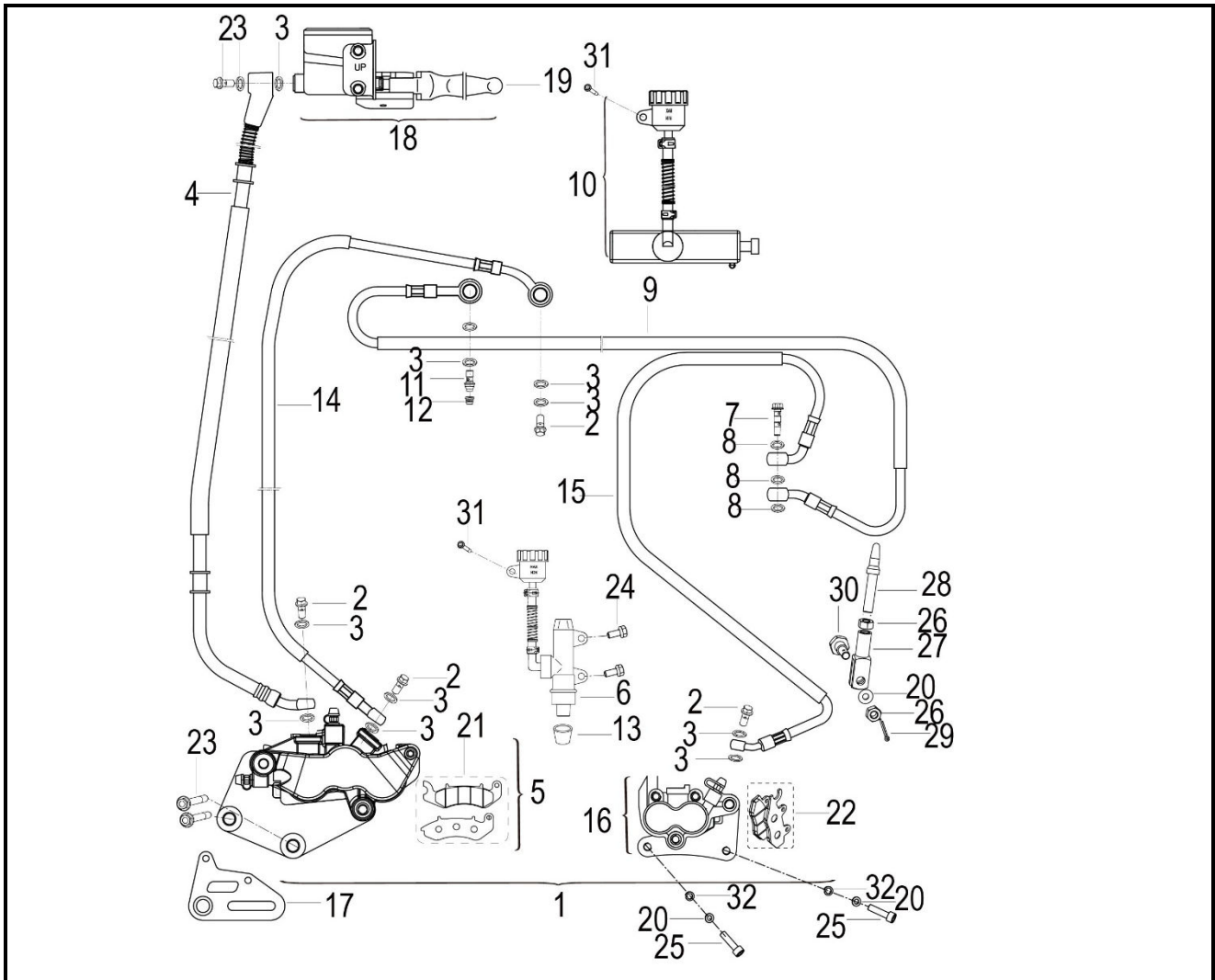
# Front / rear fluid brake



Front brake: Piston area in wheel cylinder  
 $F3=490.88\text{mm}^2 \times 2=981.76\text{mm}^2$  (No.1 and No.3)

CBS: Piston area in wheel cylinder (Front)  
 $F4=490.88\text{mm}^2$  (No.2)  
 Piston area in wheel cylinder (Rear)  
 $F5=2 \times 401.15\text{mm}^2=802.30\text{mm}^2$

# CBS brake



No.	Name	No.	Name	No.	Name
1	CBS linkage brake assembly	13	Dust cover of bleed screw	25	Inner hexagon screw M10×1.25×18
2	Hexagon flange bolt	14	Rear linkage brake hose assembly II	26	Nut M6
3	Sealing washer	15	Rear linkage brake hose assembly III	27	Lever
4	Front brake hose (CBS)	16	Rear brake cylinder assembly	28	Ejector rod of rear brake
5	Front left brake cylinder assembly	17	Rear brake bracket assembly	29	Split pin 2×18
6	Rear fuel pump assembly	18	Fuel pump assembly	30	Mounting bolt
7	Fuel hose mounting bolt (three-way)	19	Front brake lever	31	Bolt M6×12
8	Sealing washer	20	Washer 10	32	Spring Gasket 10
9	Rear linkage brake hose assembly I	21	Brake pad assembly (front)		
10	CBS fuel pump assembly	22	Brake pad assembly (rear)		
11	Fuel hose mounting bolt	23	Fluid brake bolt M10×1.25×43		
12	Bleed screw	24	Bolt M6×16		



## V. Brake

Preparatory Information .....	7.1
Fault Diagnosis.....	5.2
Front Brake Disc.....	5.3
Rear Brake Disc.....	5.4
CBS.....	5.5

### 5.1 Preparatory Information

#### Operation Precautions

\*Note

- Do not expose the brake assembly to oil when installing or removing.
- Use specified cleaning agent to avoid reducing brake performance.

\* Check brake before riding

#### Technical parameters

Item	Standard value (mm)	Allowable limit (mm)
Diameter of front brake disc	φ280	-
Thickness of front brake disc	4.0	3.0
Thickness of front friction pad	6.0	3.0
Diameter of rear brake disc	φ240	-
Thickness of rear brake disc	5.0	4.0
Thickness of rear friction pad	6.0	3.0

#### Torque value

<b>Front wheel axle mounting nut</b>	<b>75-88 N·m</b>
<b>Rear wheel axle mounting nut</b>	<b>100-113 N·m</b>
<b>Mounting bolt of front brake cylinder assembly</b>	<b>22-29 N·m</b>
<b>Mounting bolt of rear brake cylinder assembly</b>	<b>22-29 N·m</b>
<b>Mounting bolt of front fuel pump</b>	<b>5-9 N·m</b>
<b>Mounting bolt of rear fuel pump</b>	<b>5-9 N·m</b>
<b>Mounting bolt of front fluid brake disc</b>	<b>10-12 N·m</b>
<b>Mounting bolt of rear fluid brake disc</b>	<b>10-12 N·m</b>
<b>Brake tube mounting bolt</b>	<b>30 N·m</b>

## 5.2 Fault Diagnosis

### Poor brake performance

1. Proper adjustment of brake
2. Wear of brake shoe, friction pad assembly and fluid brake disc
3. Improper installation of brake shoe and friction pad assembly
4. Pollution of brake shoe, friction pad assembly and fluid brake disc

### Abnormal noise of brake

1. Wear of brake shoe, friction pad assembly and fluid brake disc
2. Pollution of brake shoe, friction pad assembly and fluid brake disc

### Slow Reaction of Brake or Tight Lever

1. Proper adjustment of brake
2. Wear of brake shoe, friction pad assembly and fluid brake disc
3. Improper installation of brake shoe and friction pad assembly

## 5.3 Front Brake Disc

### 5.3.1 Disassembly of front brake disc

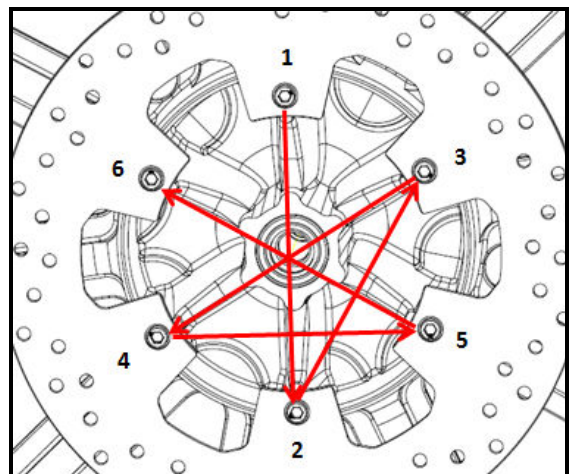
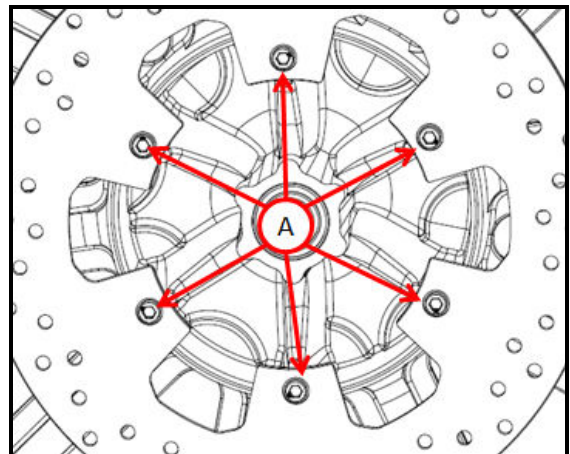
Remove the front axle

Remove the front wheel. (See Chapter 7 “Front wheel” of this book)

Remove the clamp screw [A] of front brake disc

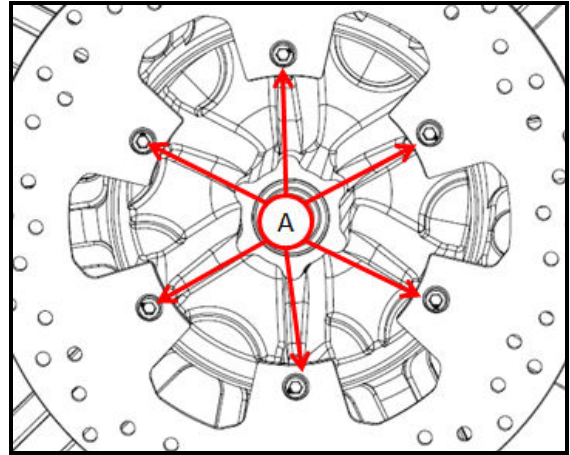
#### Note:

When disassembling the clamp screw of front brake disc, follow the instructions on the right figure



## 5.3.2 Installation of front brake disc

Insert the front brake disc into the edge of rim, and insert 4 clamp screws [A] after applying one drop of thread sealant at the end of thread



Tighten the bolt to the brake disc in the form of a cross step by step, and tighten 6 screws according to the following torque value:

### Torque value:

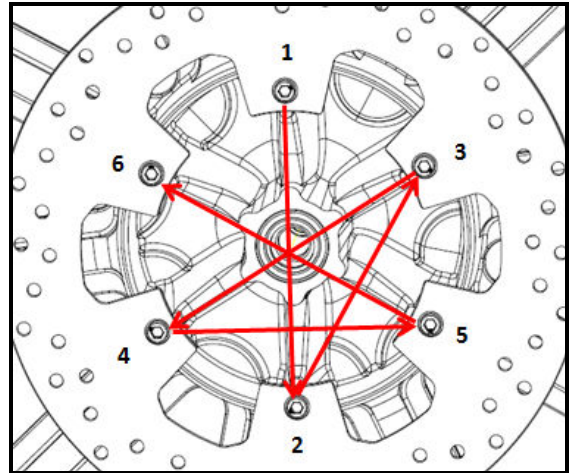
**Clamp screw of brake disc 10-12N·m**

### \*Note

- Do not expose the brake assembly to oil when installing or removing.
- Use specified cleaning agent to avoid reducing brake performance.

### \*Note

If there is grease on the brake shoe, braking performance will be reduced and the brake will fail.



## 5.3.3 Inspection of front brake disc

Check the brake disc for wear, and replace it if necessary.

Measure the brake disc and record the maximum value.

If the thickness of brake disc is smaller than the maintenance value, it should be replaced.

### Specifications

**Diameter of front fluid brake disc**     $\phi 280\text{mm}$

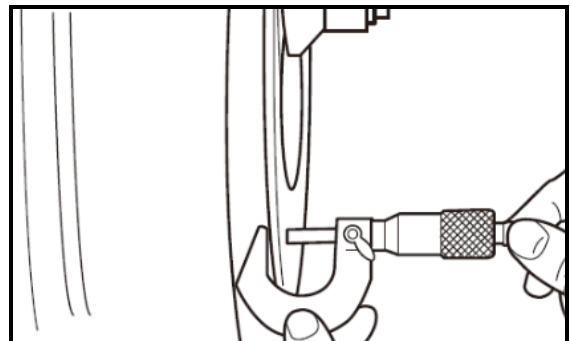
**Thickness of front brake disc**        **4.0mm**

### Allowable limit:

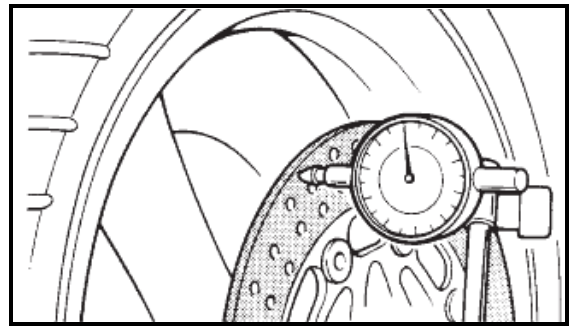
**Thickness of front fluid brake disc**    **3mm**

### \*Note

- Use a micrometer for measurement.



Measure the jump value at the edge of front brake disc  
Available limit 0.15mm

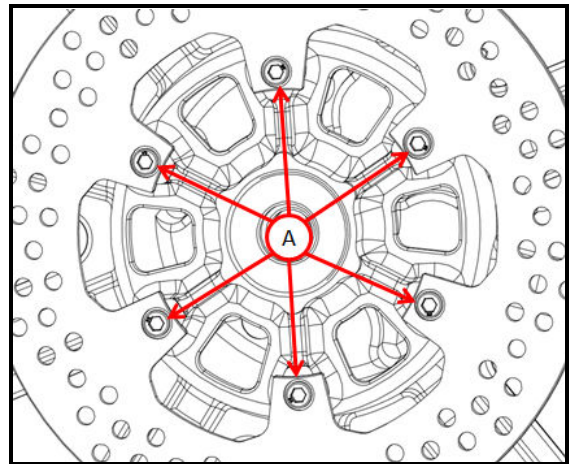


## 5.4 Rear Brake Disc

### 5.3.1 Disassembly of rear brake disc

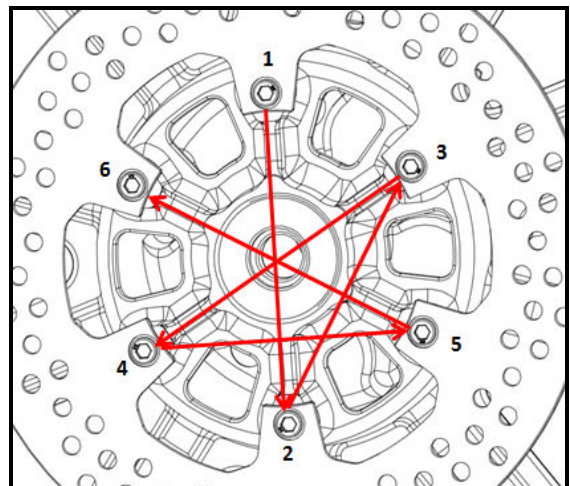
Remove rear wheel. (See Chapter VIII “Rear Wheel” of this book)

Remove the clamp screw of rear brake disc [A]



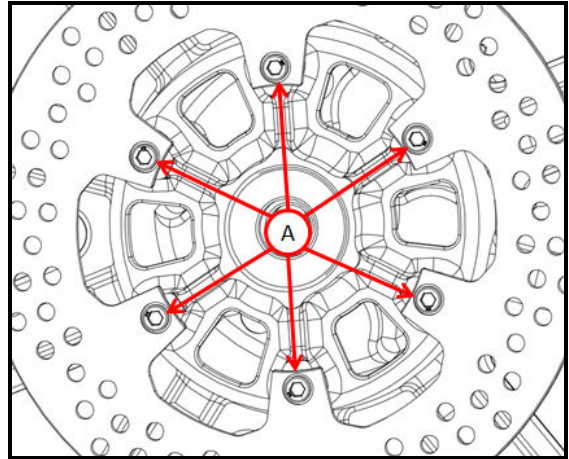
#### Note:

When disassembling the clamp screw of rear brake disc, follow the instructions on the right figure.



### 5.3.2 Installation of rear brake disc

Insert the rear brake disc into the edge of rim, and insert 6 clamp screws [A] after applying one drop of thread sealant at the end of thread.



Tighten the bolt to the brake disc in the form of a cross step by step, and tighten 6 screws according to the following torque value:

**Torque value:**

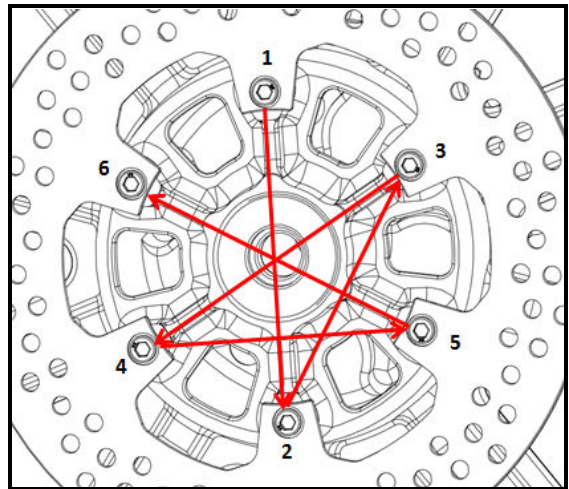
**Clamp screw of brake disc 10-12N·m**

**\*Note**

- Do not expose the brake assembly to oil when installing or removing.
- Use specified cleaning agent to avoid reducing brake performance.

**\*Note**

If there is grease on the brake shoe, braking performance will be reduced and the brake will fail.



### 5.3.3 Inspection of rear brake disc

Check the brake disc for wear, and replace it if necessary.

Measure the brake disc and record the maximum value. If the thickness of brake disc is smaller than the maintenance value, it should be replaced.

**Specifications**

**Diameter of rear fluid brake disc**     $\phi 240\text{mm}$

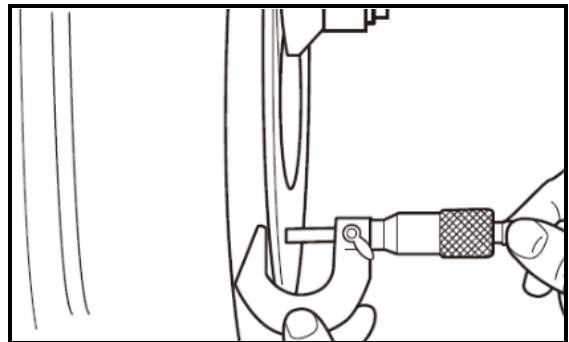
**Thickness of rear fluid brake disc**    **5.0mm**

**Allowable limit:**

**Thickness of rear fluid brake disc**    **4mm**

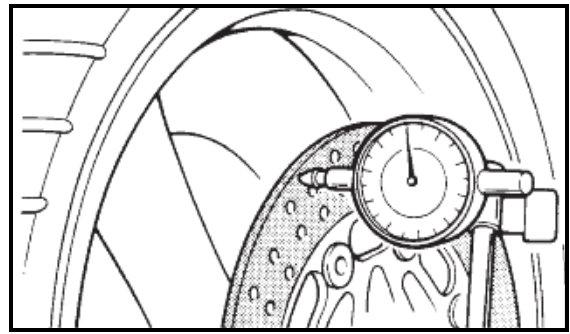
**\*Note**

- Use a micrometer for measurement.





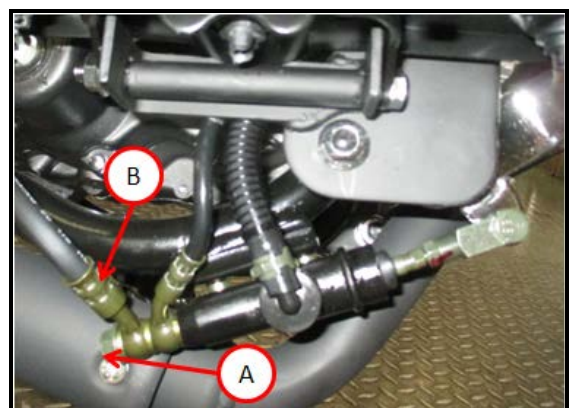
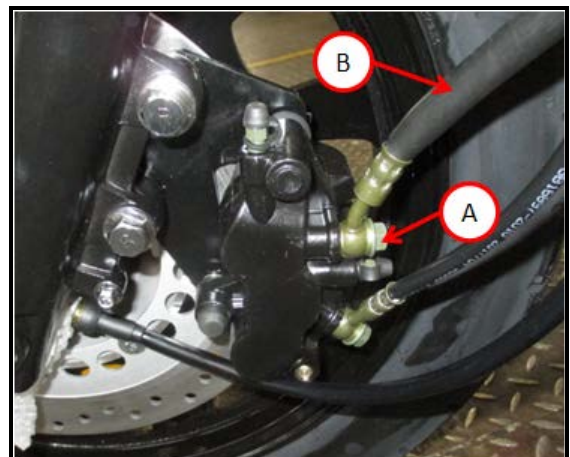
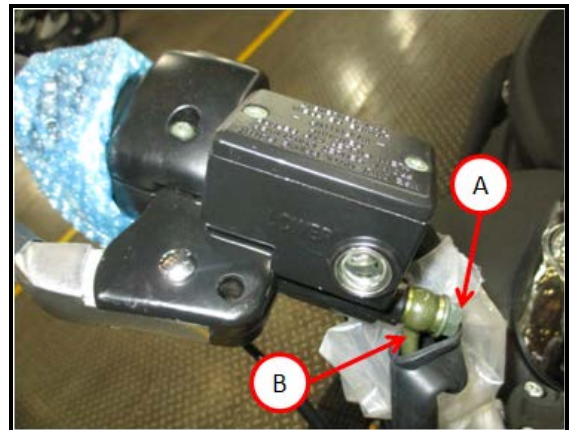
Measure the jump value at the edge of front brake disc  
Available limit 0.15mm

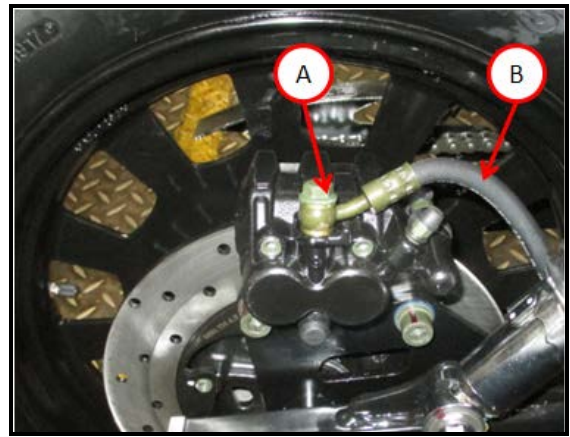


## 5.5 CBS

### 5.5.1 Replacement of brake hose and brake line

Notes
<p>Brake fluid may quickly corrode the surface of painted part, so if the brake fluid spills on any plastic part, it must be thoroughly rinsed immediately.</p> <ul style="list-style-type: none"><li>● Remove the hollow bolt of brake hose [A].</li><li>● When removing brake hose, be careful not to spill brake fluid on any painted part.</li><li>● When removing brake hose [B], temporarily fix the end of brake hose in a high place to minimize the loss of brake fluid.</li><li>● If brake fluid overflows, clean it immediately.</li></ul>





- All sides of brake line fittings are equipped with washers. They need to be replaced with new ones when installed.

- Tighten:

**Lock torque of hollow bolt of brake hose: 30 N•m;**

- Avoid sharply bending, kinking, squeezing or twisting in the process of installing the brake hose.

- Fill the brake line with brake fluid after installing brake hose. (See “replacement of brake fluid” for details).

## 5.5.2 Adjustment of brake stroke

### Front brake

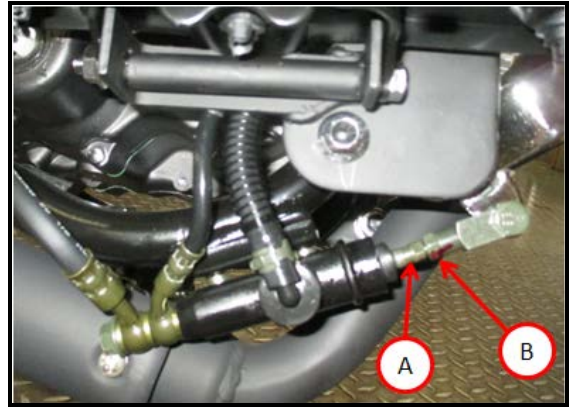
The stroke of front brake is nonadjustable



## Rear brake

Loosen the locknut [A] of ejector rod of rear brake.

After rotating the ejector rod of rear brake [B], the clearance between the ejector rod and the foot pump plunger is ensured to be around 0~0.2, and the ejector rod should not be adjusted to allow the foot pump plunger to generate pre-pressure (ensure that the foot pump plunger is in a free position).



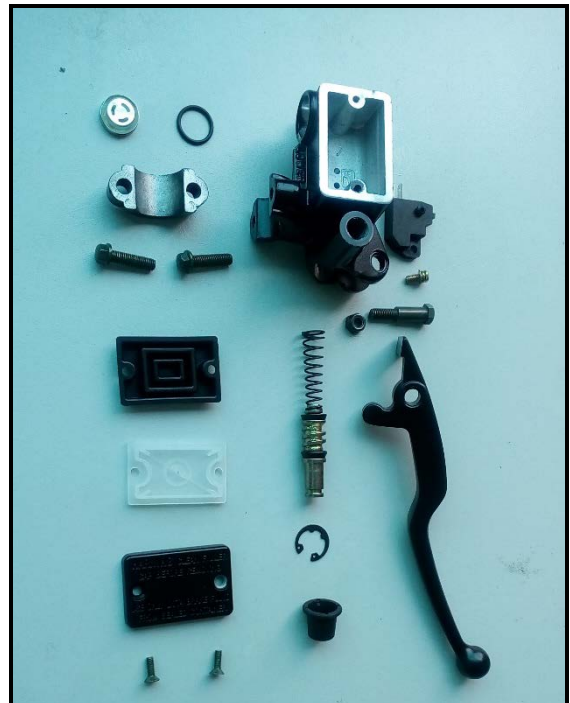
## 5.5.3 Front master cylinder

### 5.5.3.1 Disassembly of front master cylinder

- Remove mounting bolt A of front master cylinder tube.
- Remove mounting bolt B at mounting cap of front master cylinder and remove master cylinder.



- Remove reservoir cap bolt, remove reservoir cap, reservoir washer and diaphragm, and pour the brake fluid into the container.
- Remove lever locknut and remove lever bolt.
- Remove plunger dust cap.
- Remove plunger spring with a special tool—inside circlip pliers, and remove plunger assembly.





### 5.5.3.2 Assembly of master cylinder

Before assembly, clean all parts with brake fluid or alcohol, including master cylinder.

Notes
<p><b>Except brake pad and disc brake, other brake parts can only be cleaned with disc brake fluid, isopropyl alcohol or ethanol. Do not clean the above parts with other liquid. Gasoline, oil or other gasoline distillates may corrode rubber parts. If oil spills onto any part, it will be difficult to clean thoroughly and eventually corrode the rubber parts inside the disc brake.</b></p>

- Apply brake fluid to new parts and inner wall of brake cylinder.
- Be careful not to scratch the piston or the inner wall of brake cylinder.
- Install plunger assembly. If the front reservoir or rear reservoir on the plunger assembly is damaged, replace it with a new one.

Incorrect use or reverse installation of front and rear reservoirs should be avoided.

- Press the plunger assembly down and install it into the plunger spring using a special tool—inside circlip pliers, and press it into the dust cap.
- Apply silicon grease to the pivot bolt of brake lever.
- Install the lever, and tighten the lever bolt and locknut.

**Lock torque of lever bolt: 1.0 N•m**

**Lock torque of locknut: 5.9 N•m**

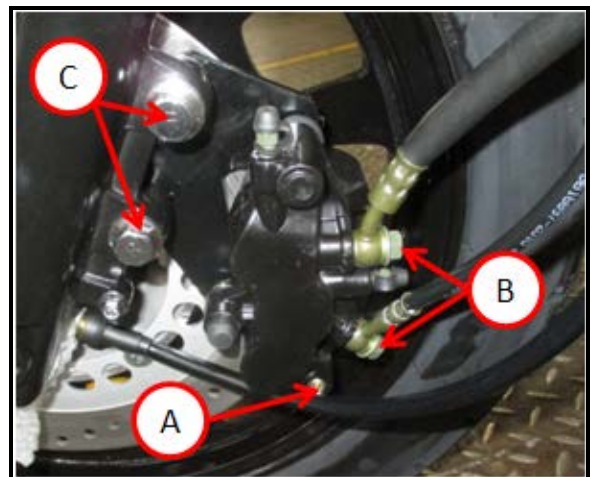
### 5.5.4 Front caliper

#### 5.5.4.1 Disassembly of front caliper

Loosen front caliper brake pin [A] and hollow bolt [B], and then gently tighten them (Tighten them a little bit, and do not tighten too much).

Mounting bolt of front caliper [C]. Remove front caliper

- Remove hollow bolt [B]



- Remove brake pad pin
- Remove brake pad
- Remove spring
- Remove the front brake mounting bracket
- Remove the piston with compressed air. The method for removing piston is as follows:
  - Install a rubber washer and a board with a thickness of 10mm (0.4 in.) or more in the middle of the caliper
  - Inject the compressed air into oil port slowly, and pull the piston out when the piston touches the rubber washer.

<b>⚠ WARNING</b>
<b>To avoid serious injuries, do not put your fingers or palms in front of the piston! Otherwise, the piston may crush your hands or your fingers when the compressed air is injected into the caliper.</b>



- Take out the dust ring and seal.

Notes
<b>Except brake pad and disc brake, other brake parts can only be cleaned with disc brake fluid, isopropyl alcohol or ethanol. Do not clean the above parts with other liquid. Gasoline, oil or other gasoline distillates may corrode rubber parts. If oil spills onto any part, it will be difficult to clean thoroughly and eventually corrode the rubber parts inside the disc brake.</b>

**Remarks**

- *If compressed air is not available, remove the piston from both calipers as follows (connect brake hose to caliper).*
- *Prepare a container to hold the brake fluid.*
- *Press the brake lever until the piston is pushed out of the brake cylinder, and then remove the caliper.*

### **5.5.4.2 Assembly of front caliper**

- Insert the oil seal and dust ring. Note that the oil seal groove and the dust groove should be flat, if oil seal or dust ring is damaged, replace it with a new one.
- Install piston
- Install spring
- Install front brake mounting bracket
- Install brake pad
- Install brake pad pin

## 5.5.5 Foot pump of rear brake

### 5.5.5.1 Disassembly of foot pump of rear brake

- Remove the hollow bolt of fuel hose
- Remove the mounting bolt of foot pump
- Remove the mounting bolt of rear brake reservoir assembly
- Remove the rear brake foot pump assembly

Notes
<b>Except brake pad and disc brake, other brake parts can only be cleaned with disc brake fluid, isopropyl alcohol or ethanol. Do not clean the above parts with other liquid. Gasoline, oil or other gasoline distillates may corrode rubber parts. If oil spills onto any part, it will be difficult to clean thoroughly and eventually corrode the rubber parts inside the disc brake.</b>

Remarks

- Prepare a container to hold the brake fluid.

- Remove the plunger dust cap
- Remove plunger spring with a special tool—inside circlip pliers, and remove plunger assembly.
- Remove the reservoir hose hoop with a hand pliers and remove the reservoir hose
- Remove the reservoir connector dust cap
- Use a special tool - inner circlip pliers to remove the reservoir connector circlip
- Remove the reservoir hose connector
- Remove the sealing ring



### 5.5.5.2 Assembly of rear foot pump

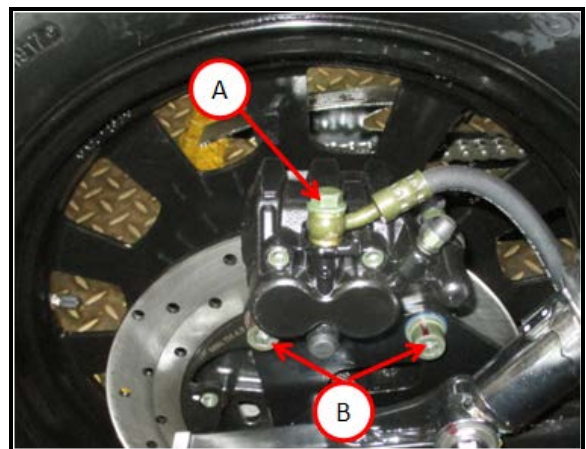
- Install the reservoir joint seal ring, if the seal ring is damaged, please replace it with a new one.
- Press it into the reservoir hose joint
- Use a special tool - inner circlip pliers to install the reservoir joint circlip and the reservoir joint dust cap

- Insert the reservoir hose, if it is damaged, please replace it with a new one. Install the reservoir hose hoop with the hand pliers
- Install plunger assembly. If front reservoir or rear reservoir on the plunger assembly is damaged, replace it with a new one. Incorrect use or reverse installation of front and rear reservoirs should be avoided.
- Install it into the plunger spring using a special tool—inside circlip pliers
- Press it into the dust cap

## 5.5.6 Rear Caliper

### 5.5.6.1 Disassembly of rear caliper

- Remove the hollow bolt of rear caliper [A] (rear brake switch)
- Release the joint bolt of caliper
- Remove the mounting bolt of rear caliper [B] and remove the rear caliper



- Remove rear brake pad pin
- Remove brake pad spring
- Remove brake pad
- Remove joint bolt
- Remove seal at joint surface
- Remove the piston with compressed air.
- Remove dust ring and seal



### 5.5.6.2 Assembly of rear caliper

- Install dust ring and seal. If seal and dust rings are damaged, replace it with a new one.
- Install piston



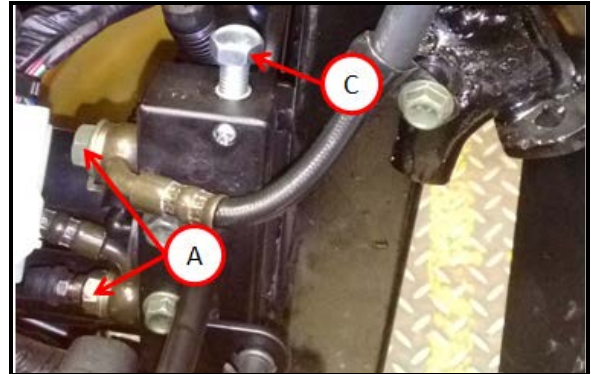
- Install seal of joint surface
  - Install joint bolt
- Lock torque value: 30 N•m
- Install brake pad
  - Install spring
  - Install brake pad pin

## 5.5.7 CBS pump

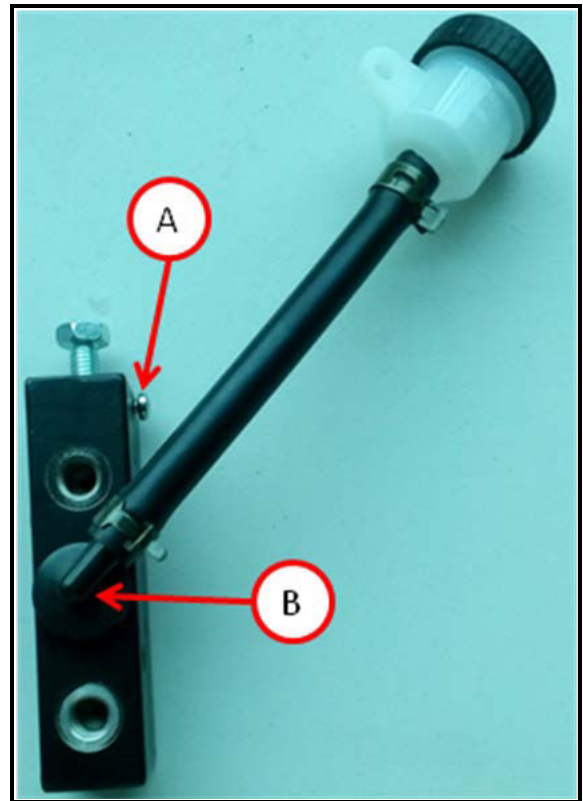
### 5.5.7.1 Assembly of CBS pump

- Remove the hollow bolt of brake hose [A]
- Remove the mounting bolt [B] at reservoir assembly of CBS pump
- Remove the mounting bolt [C] of CBS pump, and remove CBS pump

Notes
<b>If brake fluid spills out, rinse it immediately!</b>

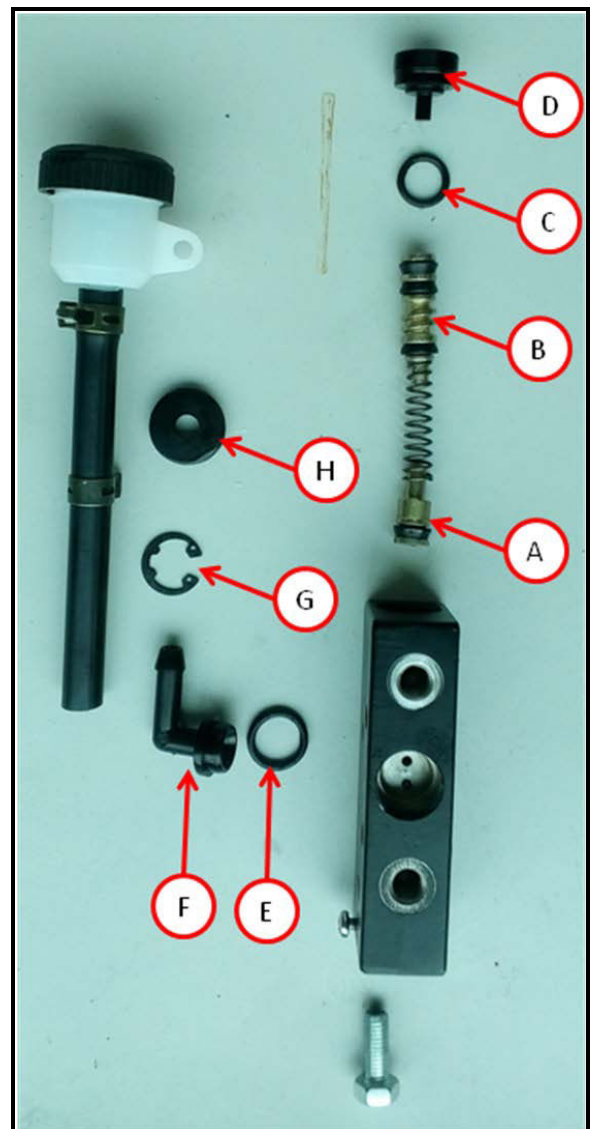


- Move the CBS pump reservoir hose clamp to the non-locking position at the middle of hose with a pliers, and pull out reservoir hose.
- Remove connector dust cap [B], and remove connector snap ring with a special snap ring pliers.
- Remove the joints and seals.
- Remove the plug of CBS pump, and remove seal and CBS plunger.
- Loosen the lock screw [A] of CBS pump adjusting bolt, and remove CBS pump adjusting bolt.
- Insert a round bar into CBS pump adjusting bolt to pull out adjusting valve element assembly.



### 5.5.7.2 Assembly of CBS pump

- Install adjusting valve element assembly [A]. If the reservoir of adjusting valve element assembly is damaged, replace it with a new one.
- Install plunger assembly [B]. If the reservoir of plunger assembly is damaged, replace it with a new one.
- Install seal [C]. If the seal is damaged, replace it with a new one.
- Install the plug of CBS pump [D].
- Install joint seal [E]. If the seal is damaged, replace it with a new one.
- Install fuel hose connector [F] and install the snap ring with a special snap ring pliers [G].
- Install the dust cap of fuel hose connector [H]
- Insert fuel hose. If fuel hose is damaged, replace it with a new one.
- Move the CBS pump reservoir hose clamp to the joint locking position.



## 5.5.8 Replacement and filling of brake fluid

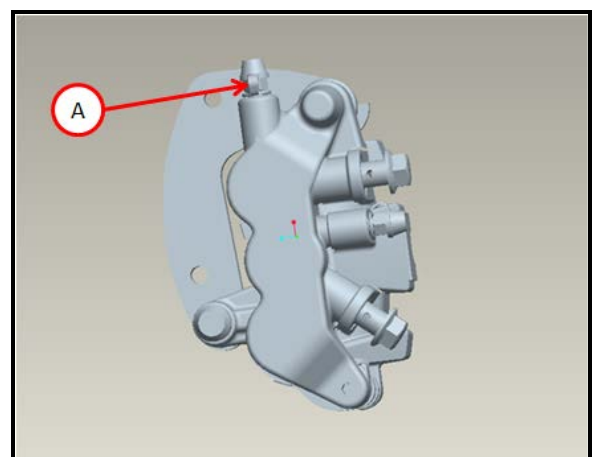
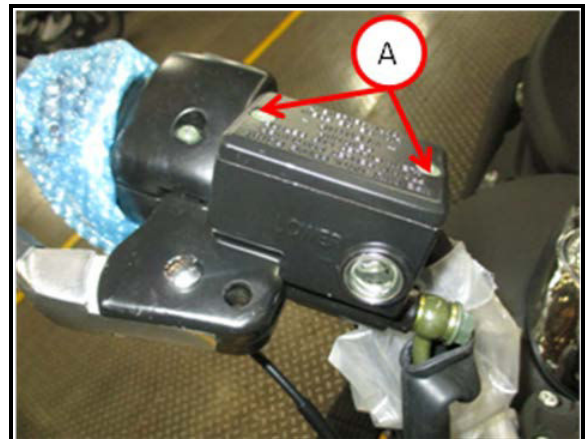
### ⚠ WARNING

Use only the prescribed brake fluid. Other types of brake fluid may damage the rubber seal, thus causing leakage and degrading the braking performance. Use the same brand of brake fluid in the process of adding brake fluid. Brake fluid must not be the mixture of different brands, because it may cause dangerous chemical reactions and also degrade braking performance.

When adding brake fluid, be careful not to allow any water to enter the container. Water will significantly reduce the boiling point of liquid, and it may cause the formation of vapor bubbles, degrading braking performance.

### 5.5.8.1 Replacement and filling of front brake fluid

- Remove the master cylinder reservoir cap bolt [A], and remove reservoir cap and reservoir washer.
  - Loosen the bleed screw of slave pump of front brake [B], and vacuumize from the bleed screw using a vacuum pump to pump the brake fluid completely.
  - Add new brake fluid to master cylinder reservoir, keep the brake fluid in the reservoir not less than 1/3 of its volume, and pull the brake lever for several times quickly, and lock the bleed screw of slave cylinder [B].
- Operate the brake lever and feel. If you feel that it is softer than before, please repeat the above actions to refill.





### 5.5.8.2 Replacement and filling of rear brake fluid

- Disassemble:

Reservoir [A]

- Disassemble:

Reservoir cover, reservoir washer

Loosen the bleed screw of slave pump of rear brake [B], and vacuumize from the bleed screw using a vacuum pump to pump the brake fluid completely.

- Add new brake fluid to master cylinder reservoir, keep the brake fluid in the reservoir not less than 1/3 of its volume, and pull the brake lever for several times quickly, and lock the bleed screw of slave cylinder [B].

○Operate the brake lever and feel. If you feel that it is softer than before, please repeat the above actions to refill. ◦



### 5.5.8.3 Replacement and filling of brake fluid of CBS pump

- Disassemble:

Reservoir [A]

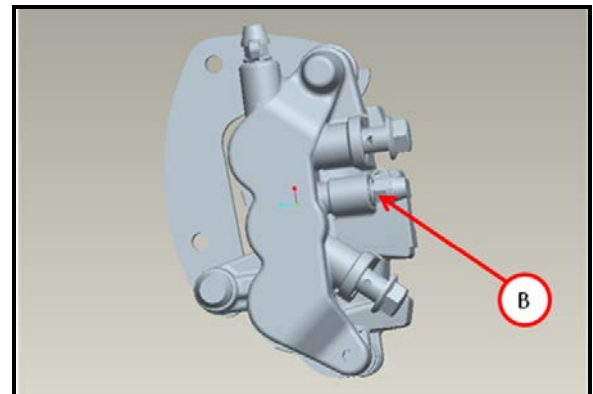
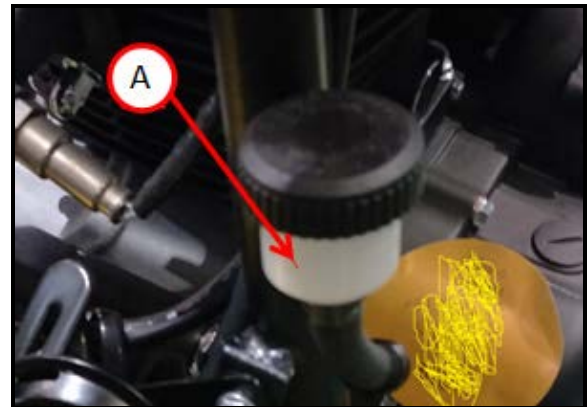
- Disassemble:

Reservoir cover, reservoir washer

Loosen the bleed screw of slave pump of front brake [B], and vacuumize from the bleed screw using a vacuum pump to pump the brake fluid completely.

- Add new brake fluid to master cylinder reservoir, keep the brake fluid in the reservoir not less than 1/3 of its volume, and pull the brake lever for several times quickly, and lock the bleed screw of slave cylinder [B].

- Operate the brake lever and feel. If you feel that it is softer than before, please repeat the above actions to refill. ○



#### **⚠WARNING**

The precautions for handling disc brakes are as follows:

1. It is forbidden to reuse brake fluid!
2. If the container containing the brake fluid is not sealed or has been opened for a long time, the brake fluid inside the container must not be used!
3. Do not mix brake fluids of different types or brands. This will reduce the boiling point of the brake fluid, resulting in brake failure or corrosion of rubber brake parts.
4. Do not open the reservoir cap for a long time to prevent the brake fluid from getting wet.
5. Do not replace brake fluid in rain or strong winds!
6. In addition to brake pads and brake discs, only disc brake fluid, isopropyl alcohol or alcohol can be used to clean the brake parts. Do not clean the above parts with any other liquid! Gasoline, oil or other

gasoline distillates may corrode rubber parts.

Gasoline, oil or other gasoline distillates may corrode rubber parts. If oil is splashed on any part, it will be difficult to completely clean and eventually corrode the rubber parts inside the disc brake.

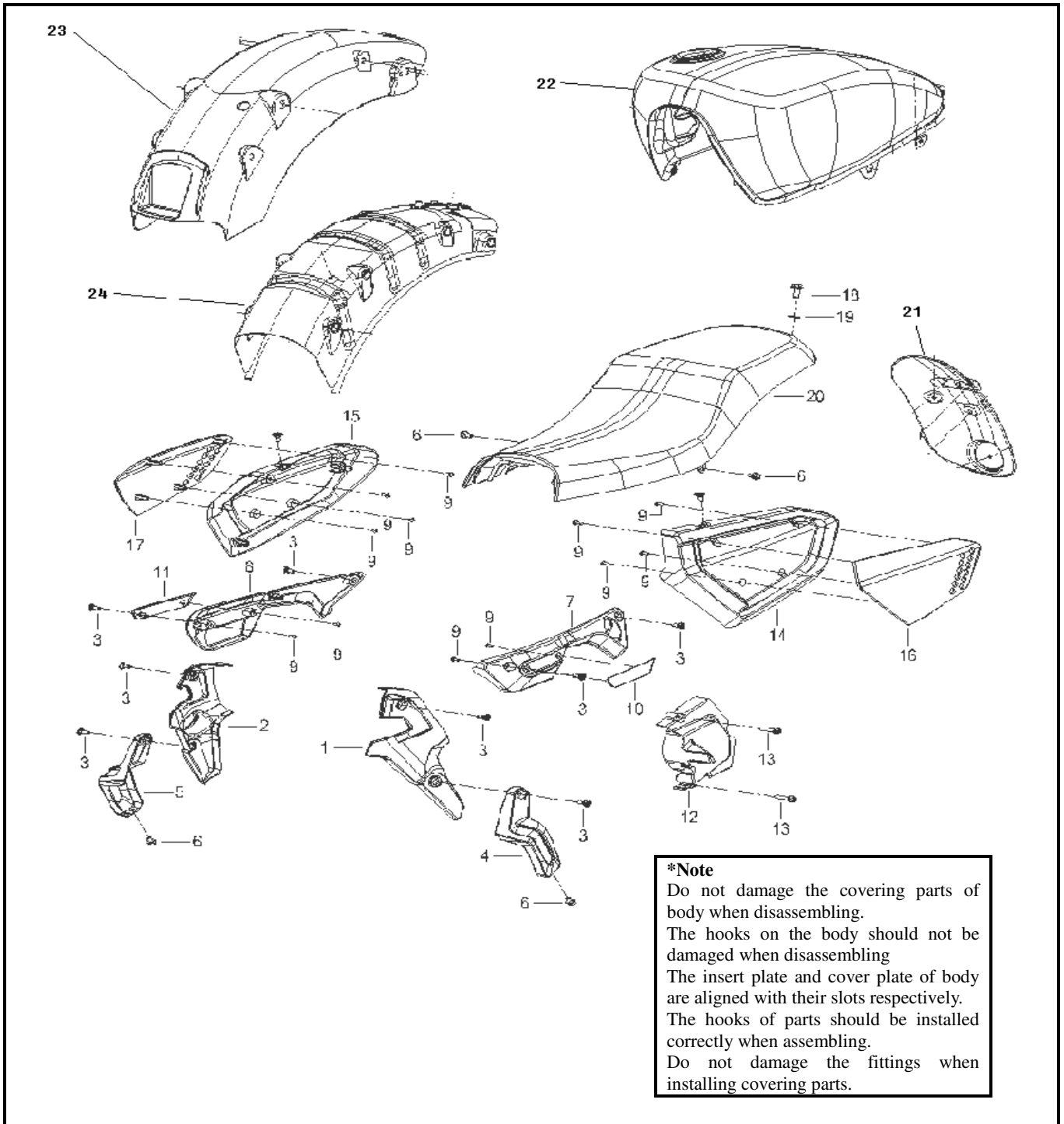
7. When handling brake pads or brake discs, prevent any brake fluid or other oil from splashing on them.

If you accidentally spill any brake fluid or other oil on the brake pads or discs, clean them using solvent with a high flash point! Do not use any solvents that may leave oily residues! If the brake fluid or oil cannot be completely removed from the brake pad, replace it with a new one!

8. The brake fluid may quickly corrode the surface of painted part, so if any brake fluid spills, it must be wiped!

9. The air in the brake line must be drained whenever the brake line connector or exhaust valve is opened!

# Covering Parts



1. Left cover of frame 2. Right cover of frame 3. Screw 4. Left cover of oil cooler 5. Right cover of oil cooler 6. Bolt M6 x 10 7. Left lower cover of fuel tank 8. Right lower cover of fuel tank 9. Self-tapping screw ST4.2 x 13 10. Left lower decorative strip of fuel tank 11. Right lower decorative strip of fuel tank 12. Left rear cover 13. Bolt M6 x 28 14. Left guard 15. Right guard 16. Left guard cover 17. Right guard cover 18. Bolt M8 x 20 19. Aluminum washer 8 20. Seat assembly 21. Rear left fender 22. Fuel tank 23. Rear fender 24. Rear fender stiffener assembly

## VI. Body Cover

Remove the body in the following order

Seat cushion assembly → Left guard assembly → Right guard assembly → left rear tail cover → right rear tail cover → left pedal →



Right pedal → front fender stiffener → front fender → rear fender assembly → rear tail cover connecting plate → taillight



→ Taillight holder → rear rack assembly → rear cargo box

### **\*Note**

Do not damage the covering parts of body when disassembling.

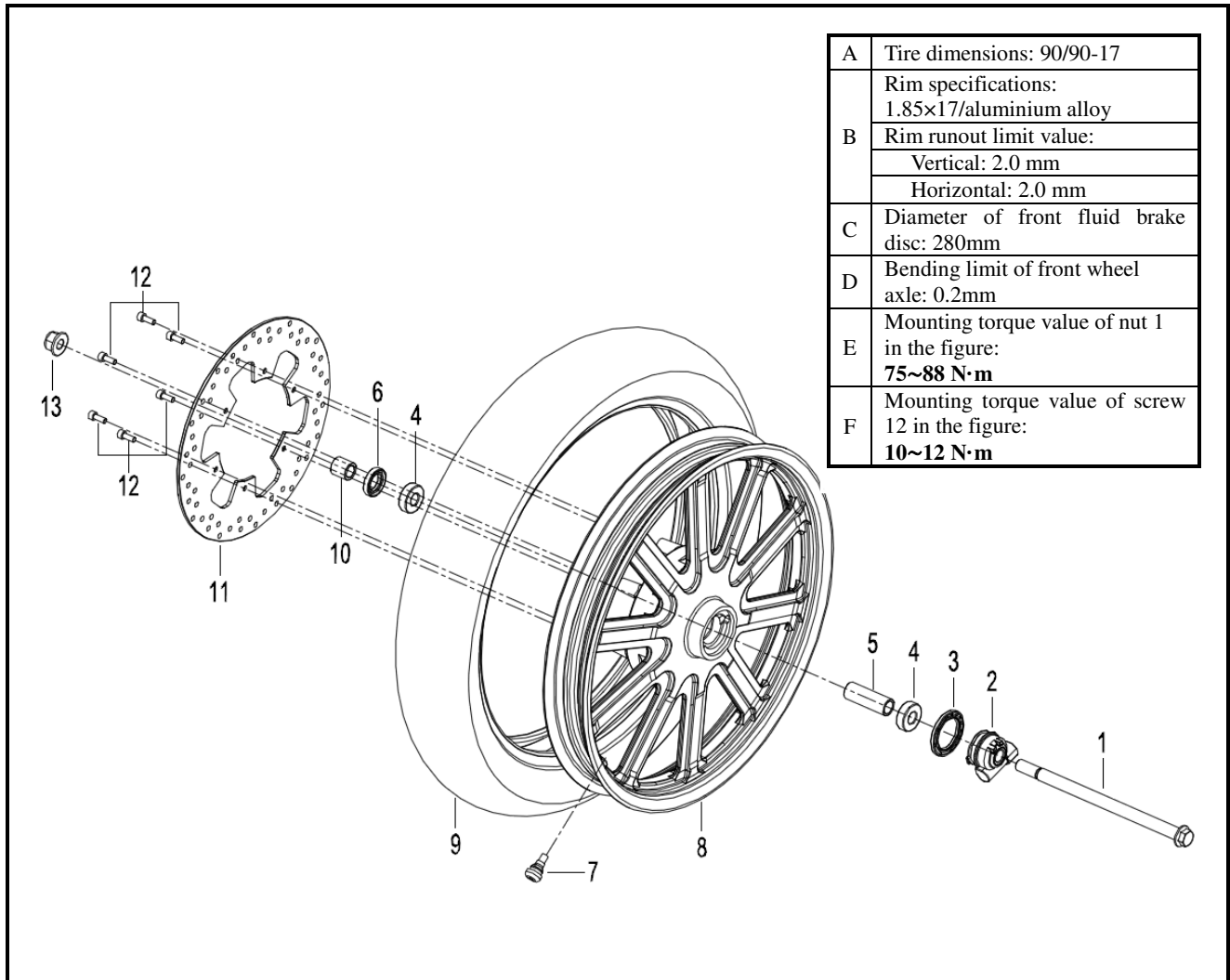
Remove the body in the following order

The insert plate and cover plate of body are aligned with their slots respectively.

The hooks of parts should be installed correctly when assembling.

Do not damage the fittings when installing covering parts.

# Front wheel

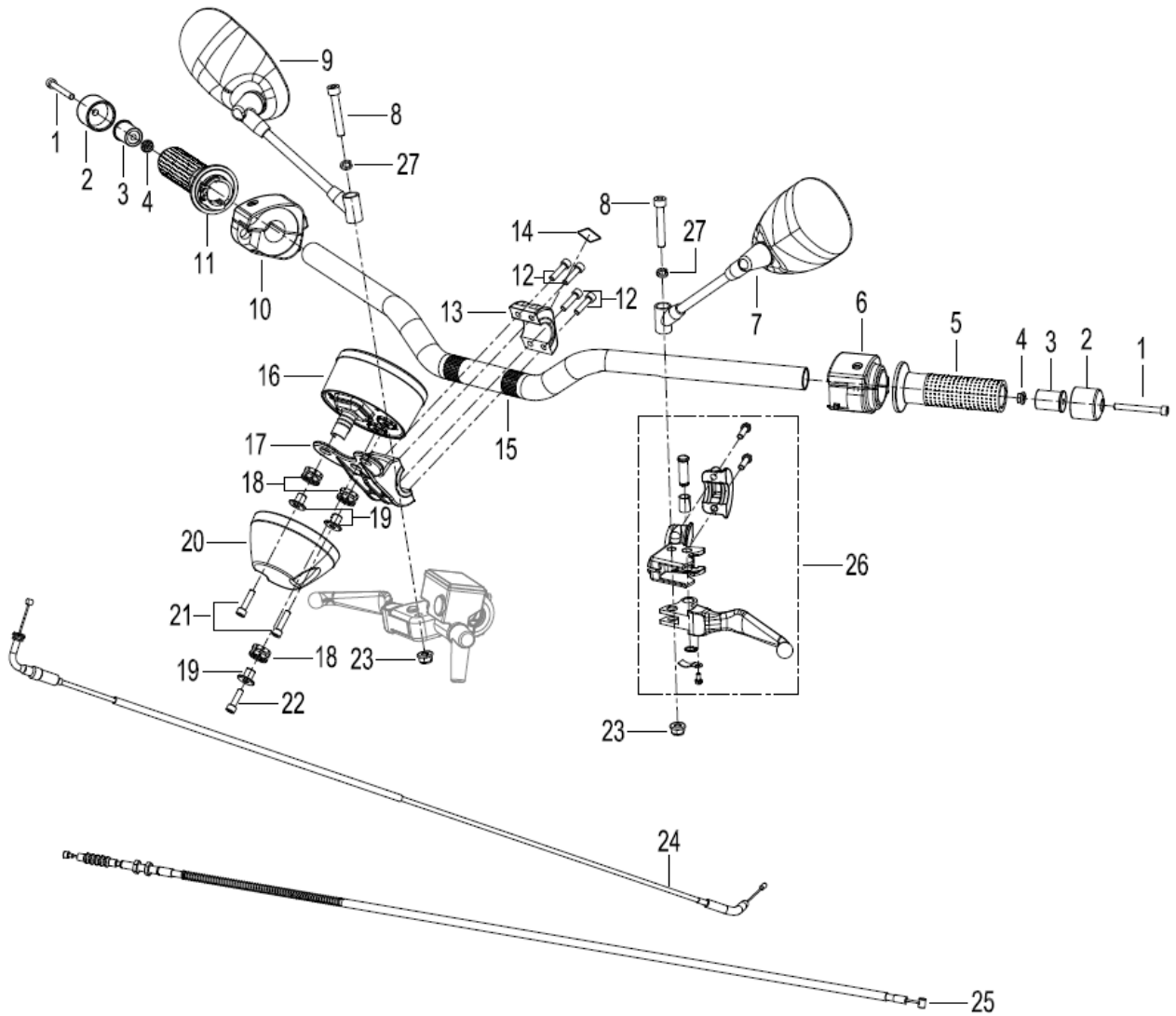


A	Tire dimensions: 90/90-17
B	Rim specifications: 1.85×17/aluminium alloy
	Rim runout limit value: Vertical: 2.0 mm Horizontal: 2.0 mm
C	Diameter of front fluid brake disc: 280mm
D	Bending limit of front wheel axle: 0.2mm
E	Mounting torque value of nut 1 in the figure: <b>75~88 N·m</b>
F	Mounting torque value of screw 12 in the figure: <b>10~12 N·m</b>

No.	Name
1	Rear wheel axle
2	Gear housing assembly
3	Gear housing oil seal assembly
4	Rolling bearing 6202-2RS
5	Front wheel middle shaft sleeve
6	Front wheel oil seal assembly
7	Air valve Z2-01-1
8	Front rim
9	Tubeless tire 90/90-17
10	Front wheel right collar
11	Front brake disc
12	Inner hexagon screw M6×20
13	Nut M14×1.5

# Console assembly

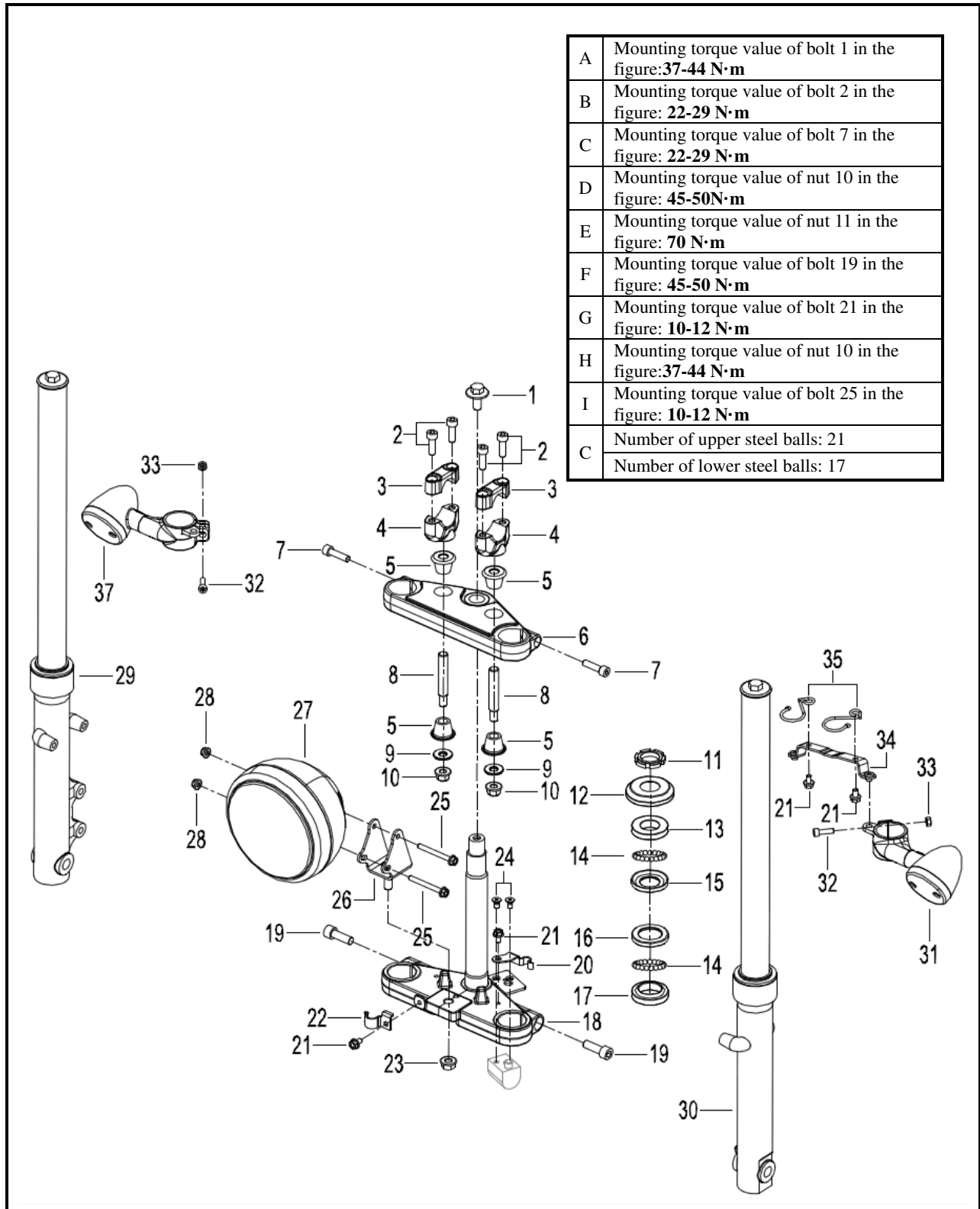
A	Mounting torque value of screw 8 in the figure: <b>22~29 N·m</b>
B	Mounting torque value of screw 12 in the figure: <b>10~12 N·m</b>



No.	Name
1	Screw M6×55
2	Grip end
3	Clamping set
4	Nut M6
5	Left handlebar cover assembly
6	Left combination switch
7	Left rear view mirror assembly
8	Inner hexagon screw M8×50
9	Right rear view mirror assembly
10	Right combination switch
11	Throttle handlebar assembly
12	Inner hexagon screw M6×25
13	Upper meter mounting cover
14	Nameplate of meter
15	Handlebar
16	Meter assembly
17	Meter mounting seat
18	Rubber washer of cover
19	Upper collar of radiator
20	Rear meter cover
21	Bolt M6×25
22	Bolt M6×20
23	Self-locking nut M8
24	Throttle cable assembly
25	Clutch cable assembly
26	Left lever assembly
27	Spring washer φ8



# Front Fork



No.	Name
1	Steering column clamp bolt M10×23
2	Inner hexagon screw M8×25
3	Upper grip positioner
4	Lower grip positioner
5	Damper
6	Upper bracket
7	Inner hexagon screw M8×35
8	Handlebar positioning double-end stud
9	Handlebar positioning washer
10	Self-locking nut M10×1.25
11	Slotted nut
12	Dust cover
13	Upper steel bowl of upper bearing
14	Steel ball 1/4 inch
15	Lower steel bowl of upper bearing
16	Upper steel bowl of lower bearing
17	Lower steel bowl of lower bearing
18	Lower bracket welding assembly
19	Inner hexagon screw M10×1.25×35
20	Clamp I
21	Bolt M6×10
22	Clamp II
23	Nut M10
24	Screw M4×10
25	Bolt M6×55
26	Headlight bracket welding assembly
27	Headlight
28	Self-locking nut M6
29	Front right shock absorber assembly
30	Front left shock absorber assembly
31	Front left turn signal light
32	Inner hexagon screw M6×20
33	Nut M6
34	Front steering light stop plate welding assembly
35	Clamp
36	Front right turn signal light

## VII. Front Wheel/Front Suspension

Preparatory Information .....	7.1
Fault Diagnosis.....	7.2
Front Wheel .....	7.3
Handlebar.....	7.4
Front Fork .....	7.5
Front Shock Absorber .....	7.6

### 7.1 Preparatory Information

#### Operation Precautions

Before the front wheel is disassembled, support the bottom of the motorcycle with jacks and do not reverse the front wheel when it floats above the ground.

There should be no grease attached to the friction pad, friction pad assembly or fluid brake disc during operation.

#### Technical parameters

Measuring position	Item		Standard value (mm)	Allowable limit (mm)
Front wheel axle	Bending degree			0.2
Front wheel	Rim shimmy	Vertical direction		2.0
		Horizontal direction	Within 1.0	2.0

#### Torque value Tools

<b>Front axle locknut</b>	<b>75~88 N·m</b>	<b>Bearing removal rod</b>
<b>Front caliper mounting bolt</b>	<b>22~29 N·m</b>	<b>Locknut wrench</b>
<b>Rear view mirror mounting bolt</b>	<b>22~29 N·m</b>	Torque wrench
Meter mounting seat mounting bolt	<b>10~12 N·m</b>	
<b>Clamp bolt of upper bracket</b>	<b>37~44 N·m</b>	
Upper grip positioner mounting bolt	<b>22~29 N·m</b>	
Handlebar positioning double-end stud locknut	<b>45~50 N·m</b>	
Steering column bearing locknut	<b>70 N·m</b>	
<b>Steering column bearing nut</b>	<b>2 N·m</b>	
Upper clamp bolt of shock absorber	<b>22~29 N·m</b>	
Lower clamp bolt of shock absorber	<b>45~50 N·m</b>	
Headlight bracket locknut	<b>37~44 N·m</b>	

Clamp mounting bolt	10~12 N·m
Headlight mounting bolt	10~12 N·m

## **7.2 Fault Diagnosis**

### **7.2.1 Turning Difficulty of Handlebar**

The handlebar bearing fails.

The handlebar bearing fails.

The tire pressure is too low.

Tire leaks.

### **7.2.2 Instability of Direction**

The handlebar bearing fails.

The tire pressure is not enough.

The front fork and front wheel axle are bent.

The front wheel tire is deformed and deviates.

### **7.2.3 Front Wheel Shimmy**

The rim is deformed.

The front wheel axle bearing is worn.

Defective tire.

### **7.2.4 Rotation Difficulty of Wheel**

The wheel axle bearing fails or the gear seat fails.

### **7.2.5 Abnormal Sound of Front Shock Absorber**

Friction sound of shock absorber guard.

The bolts of all parts of shock absorber are loose.

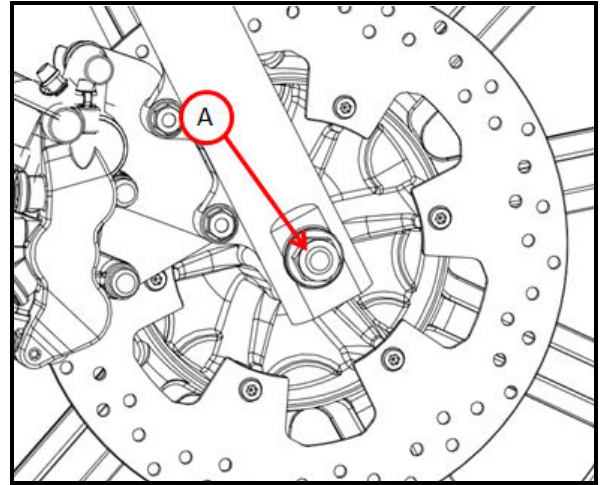
## **7.3 Front Wheel**

### **7.3.1 Disassembly**

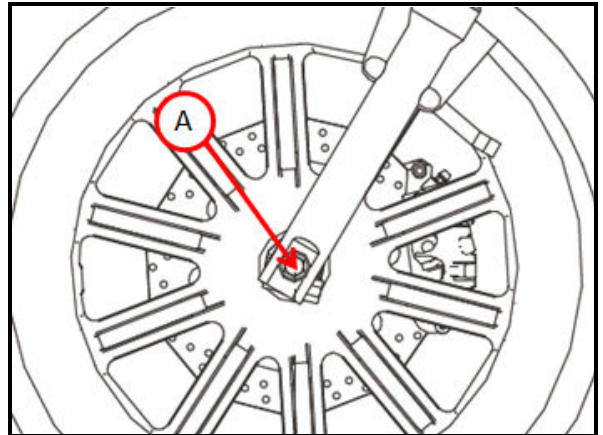
**Note:**

The motorcycle must be firmly supported.
--

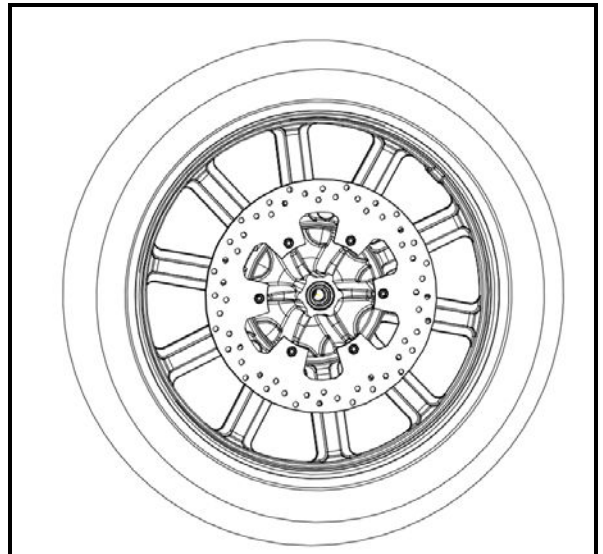
Remove  
Front wheel axle locknut [A].



Remove the front wheel axle [A]



Remove the front wheel

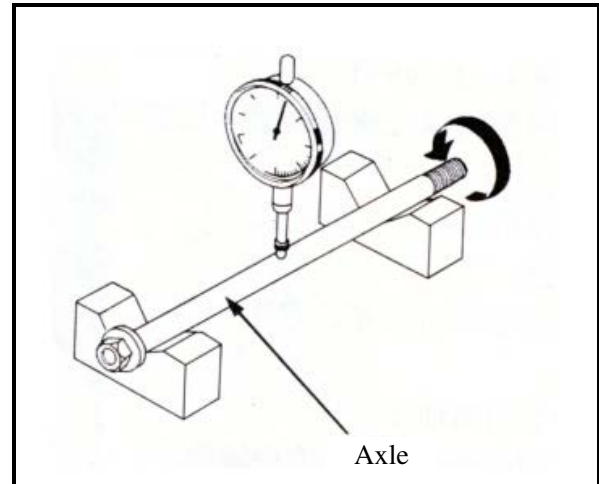


## 7.3.2 Inspection

### 7.3.2.1 Bending Inspection of Wheel Axle

Put the wheel axle on the V-shaped seat and measure the eccentricity with a dial gauge.

**Available limit:** Replace the wheel axle if the eccentricity is 0.2mm above



### 7.3.2.2 Rim Shimmy Inspection

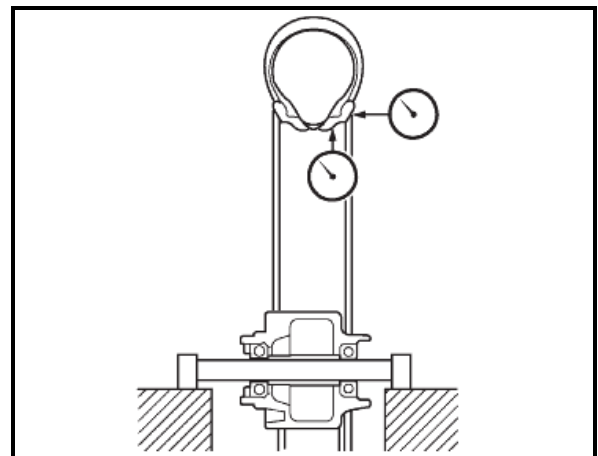
Put the rim on an accurate bracket and check the swinging amplitude of the rim.

Rotate the wheel with hands and read the swinging amplitude.

**Available limit:**

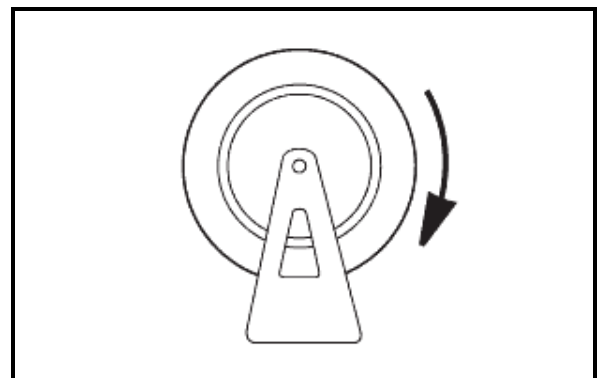
**Vertical direction:** Replace the rim if the swinging amplitude is 2.0mm or above.

**Horizontal direction:** Replace the rim if the swinging amplitude is 2.0mm or above.



### 7.3.2.3 Inspection of Front Wheel Bearing

- Bearing  
The front wheel rotates unsmoothly or it is too loose → Replace the bearing
- Oil Seal  
Damage/wear → Replacement



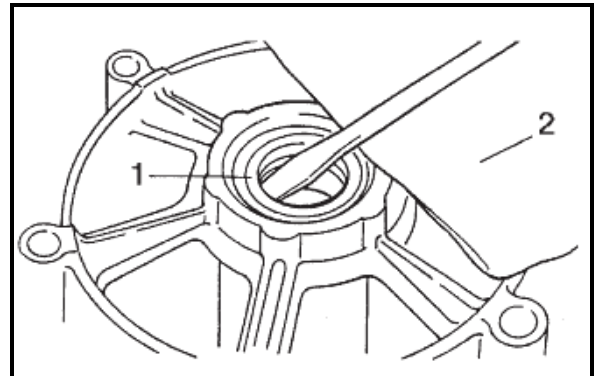
## 7.3.3 Replacement of Bearing

### 7.3.3.1 Disassembly of Bearing

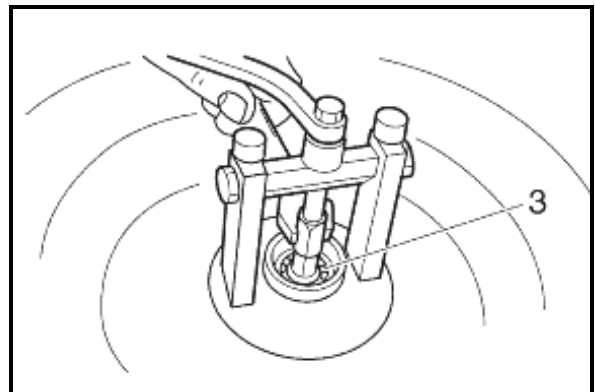
Remove the oil seal [1].

Note:

To avoid damaging the rim, please put a cloth [2] between the screwdriver and the surface of rim



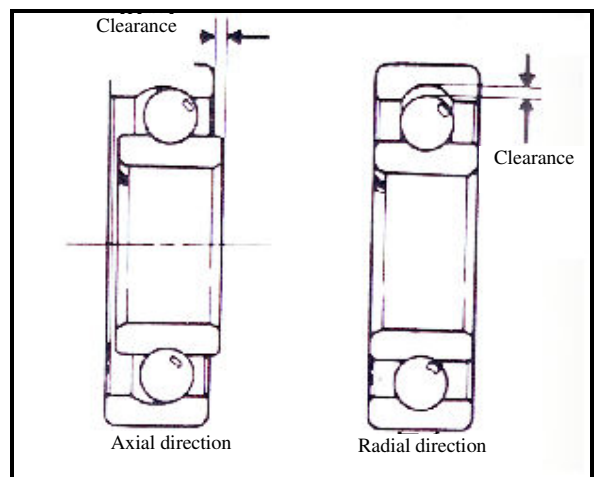
Remove the bearing [3] with a bearing puller.



### 7.3.3.2 Inspection of Bearing

Check the rolling conditions of bearing.

If the bearing does not roll, it may be worn or loose and thus it should be replaced with a new one.



### 7.3.3.3 Installation of Bearing

**Note:**

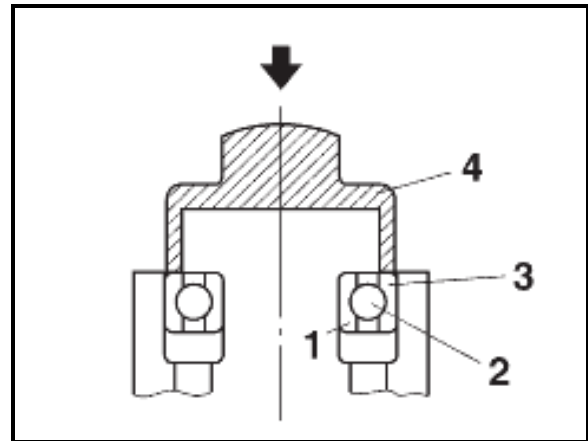
The bearing disassembled should be replaced with a new one.

Then push the bearing with bearing installation tools.

**\*Note**

Do not apply pressure on the inner race ring [1] or ball bearing [2] of wheel bearing and only apply pressure to the outer race ring [3] of bearing

Use the seat in line with the diameter of outer race ring [4] of bearing



### 7.3.4 Installation

Install it in the reverse order of disassembly.

**Notes**

- The oil seal on the front wheel should be lubricated.
- The engagement part or mobile part of gear seat assembly should be lubricated.

**Notes**

- When the odometer gear seat assembly fails to lock the front wheel axle, the odometer gear seat assembly will be deformed.
- After the wheel axle is installed, rotate the wheel to confirm whether the speedometer drive shaft rotates.

**Torque value:**

Front wheel axle locknut 75-88 N·m



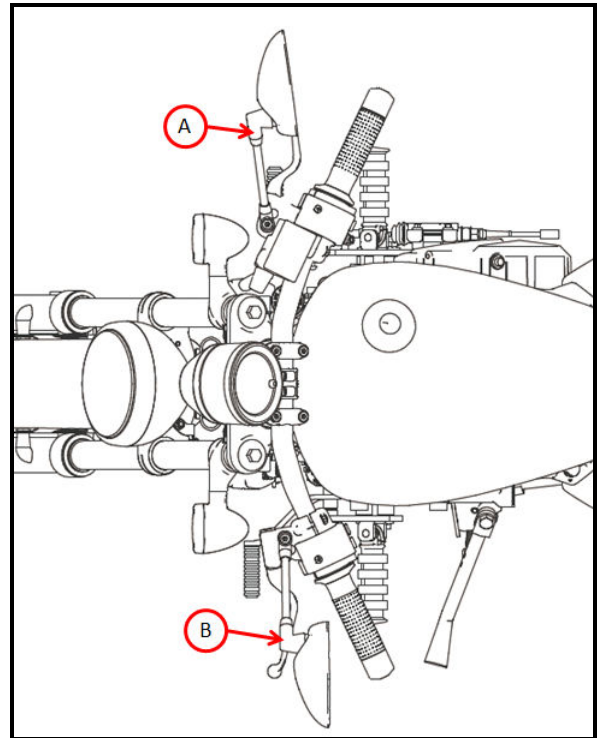
## 7.4 Handlebar

### 7.4.1 Disassembly

Disassemble

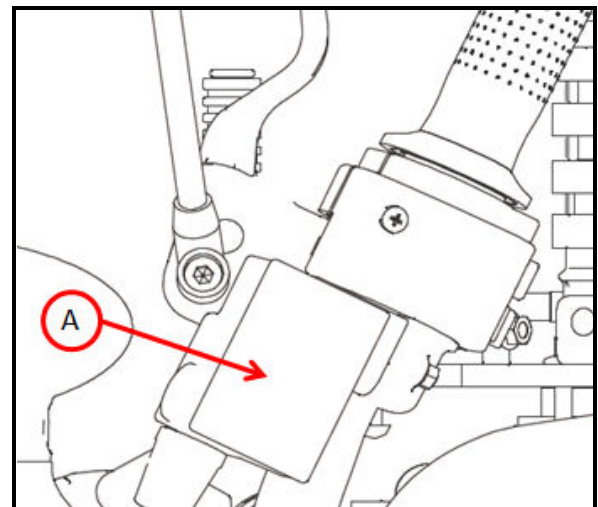
Right rear view mirror assembly [A]

Left rear view mirror assembly [B]

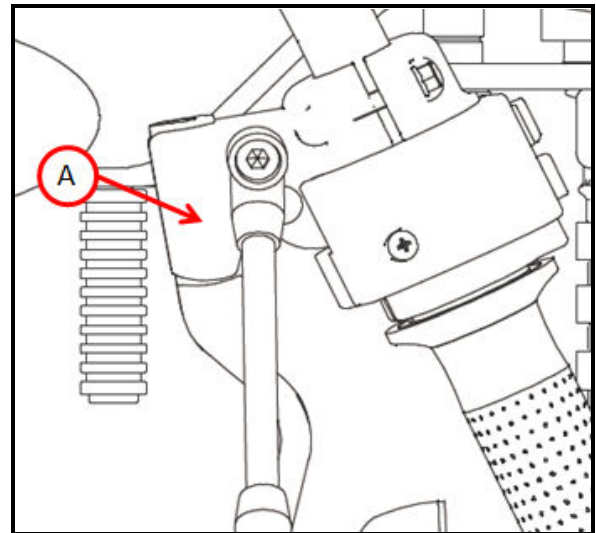


Remove

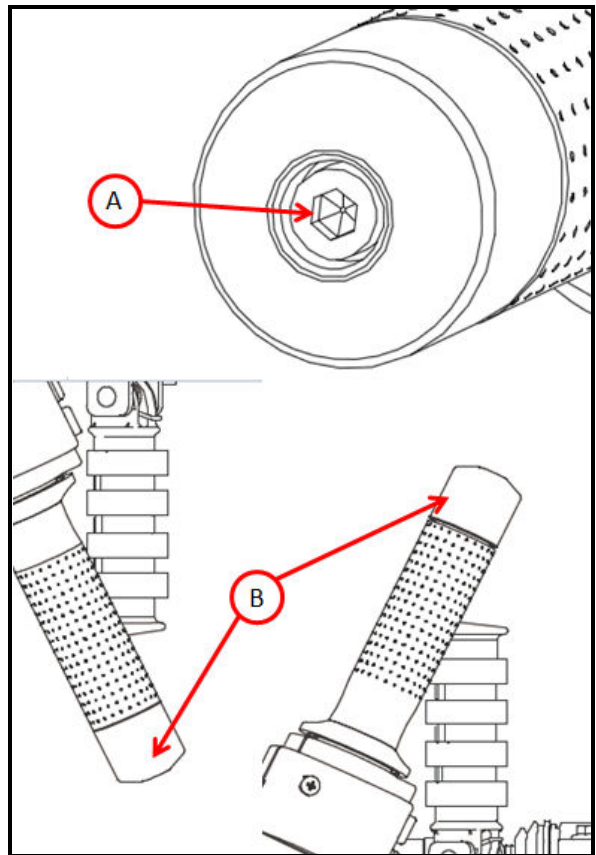
Primary cylinder of front brake [A]



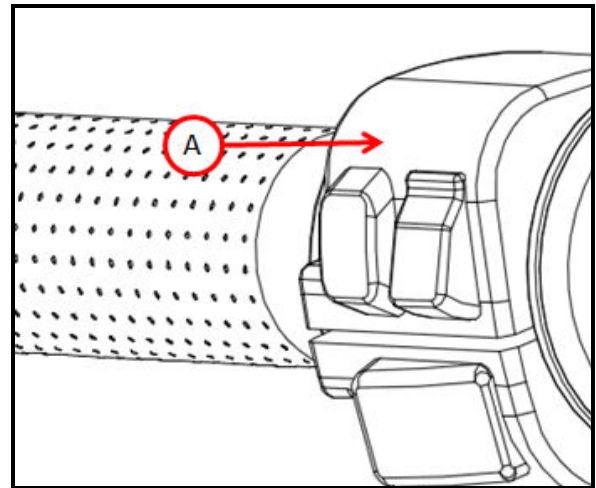
Remove  
Left lever assembly [B]



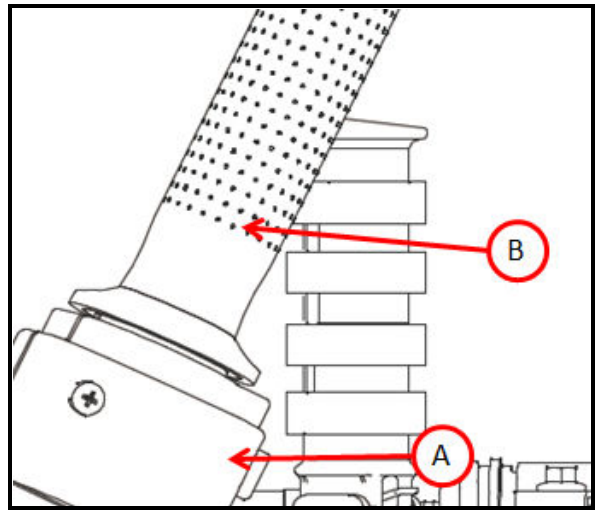
Remove  
Mounting bolt of grip end assembly [A]  
Grip end assembly [B]



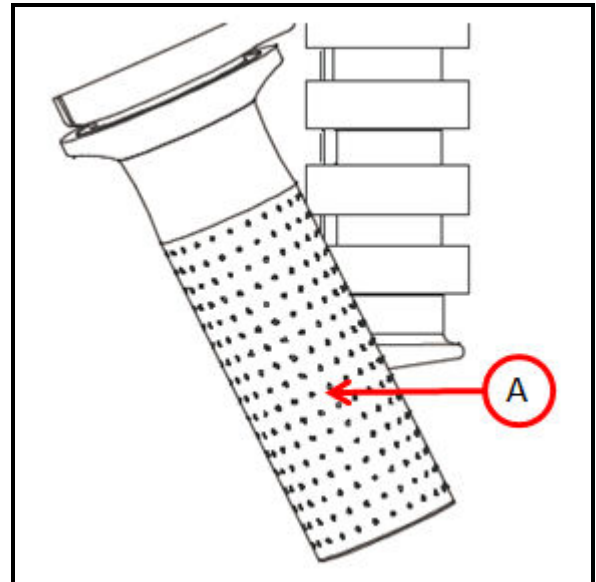
Remove  
Left combination switch [A]



Remove  
Right combination switch [A]  
Throttle grip [B]

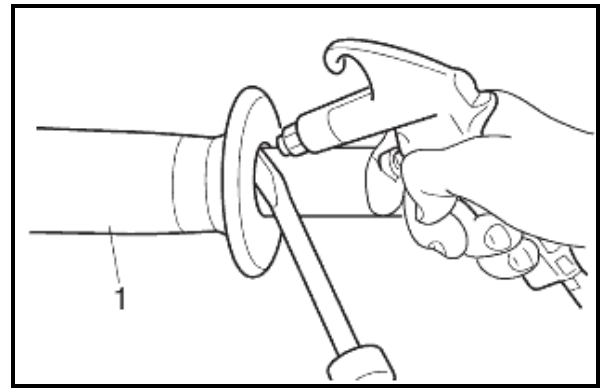


Remove  
Left handlebar cover [A]



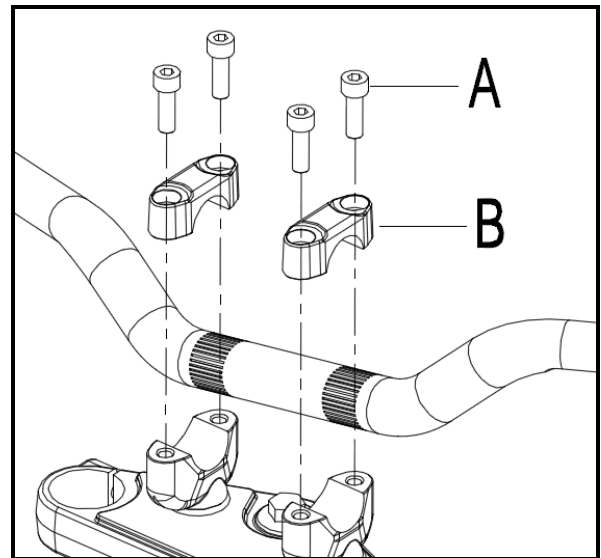
**\*Note:**

Compress the compressed air between the left handlebar and left handlebar grip [1] and slowly press the left handlebar grip.

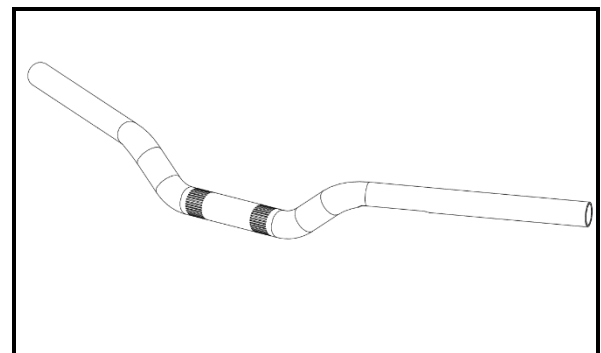


Remove the mounting screw at the upper seat of handlebar [A]

Remove upper seat of handlebar [B]



Remove the handlebar assembly

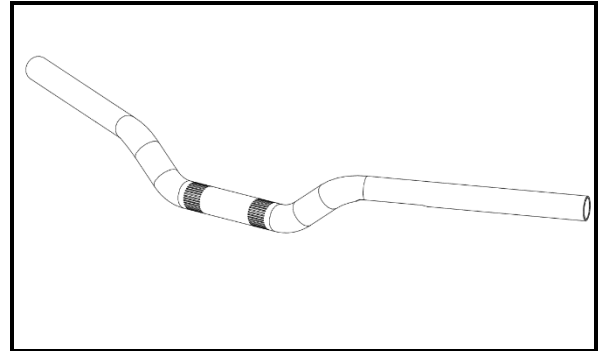


## 7.4.2 Inspection

Check

Handlebar

Deformation / bending → replacement



## 7.4.3 Installation

Install it in the reverse order of disassembly.

**Torque value:**

**Mounting screw at the upper seat of handlebar  
22-29 N•m**

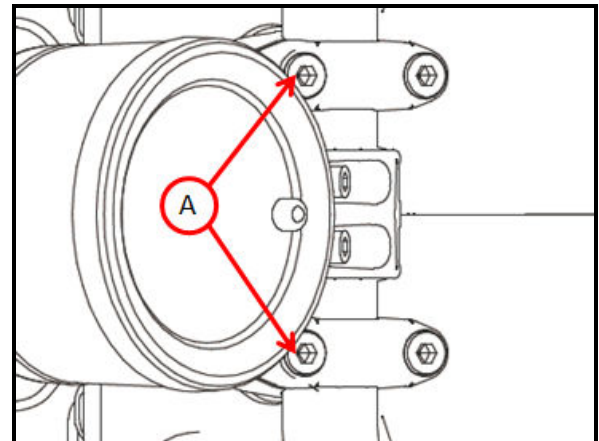
**Mounting screw of grip end 10-12 N•m**

**Mounting bolt of left lever assembly 10-12 N•m**

**Mounting bolt of primary cylinder of front brake  
10-12 N•m**

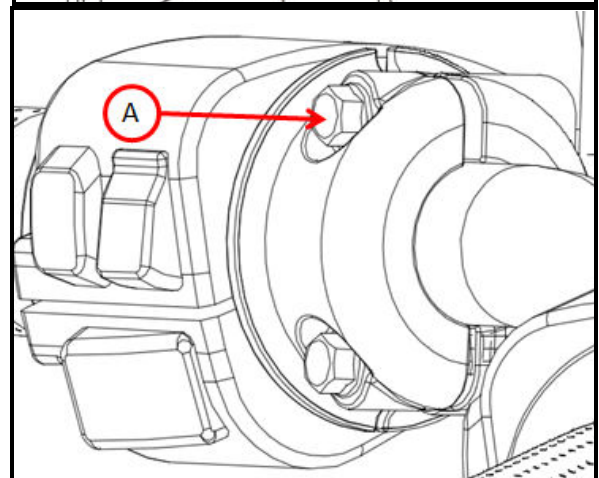
**\*Note:**

When installing the mounting screw at the upper seat of handlebar, finally fix the 2 screws [A] below



**\*Note:**

When installing the left lever assembly, first fix the screw [A] below



## 7.5 Front Fork

### 7.5.1 Disassembly

Support the center stand of motorcycle.

Remove the meter (see Chapter VI for details)

Remove headlight (see Chapter VI for details)

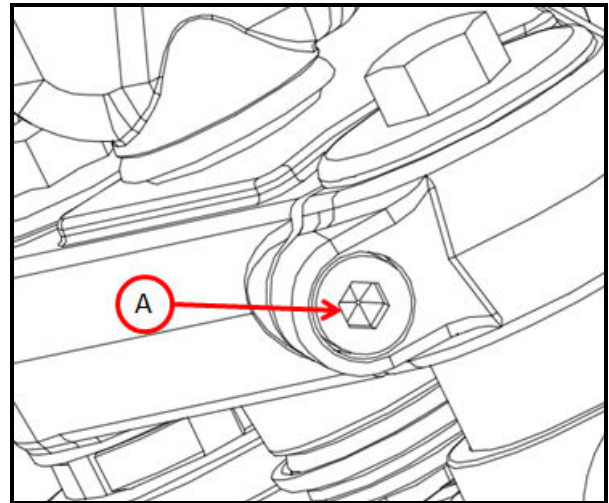
Remove the handlebar (see this section for details)

Remove the front wheel (see this section for details)

Remove the front fender (see Chapter VI for details)

Remove the caliper of front brake (see Chapter V  
“Brake” for details)

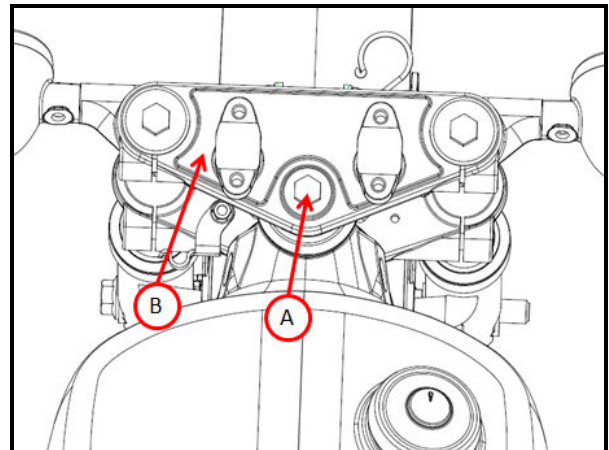
Loosen the clamp bolt of upper bracket [A]



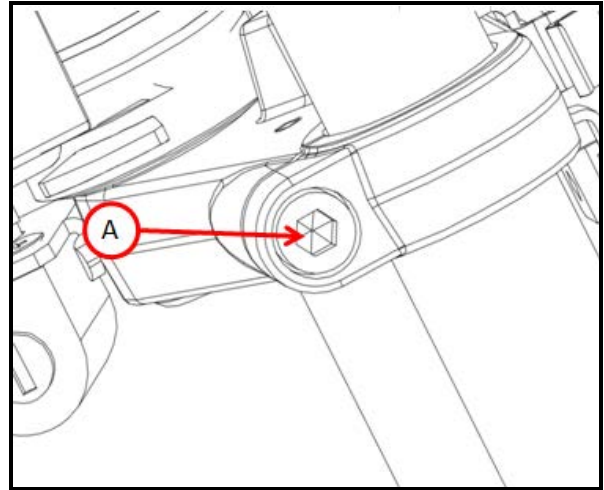
Disassemble

Supporting bolt [A]

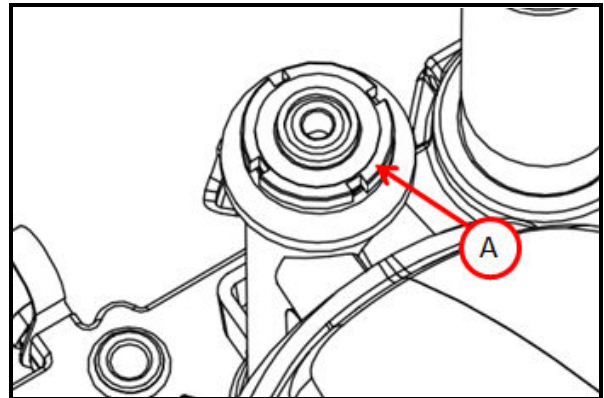
Upper bracket [B]



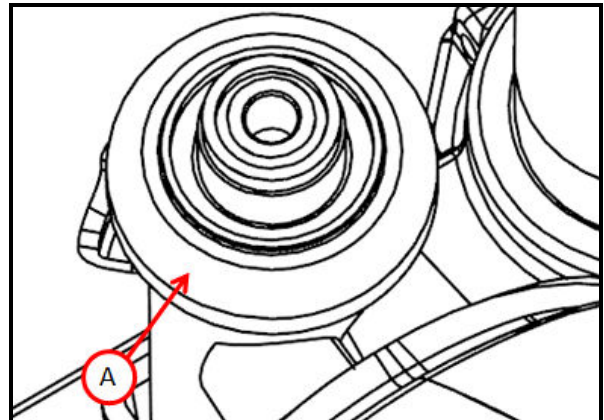
Loosen the clamp bolt of lower bracket[A]  
Remove the front shock absorber



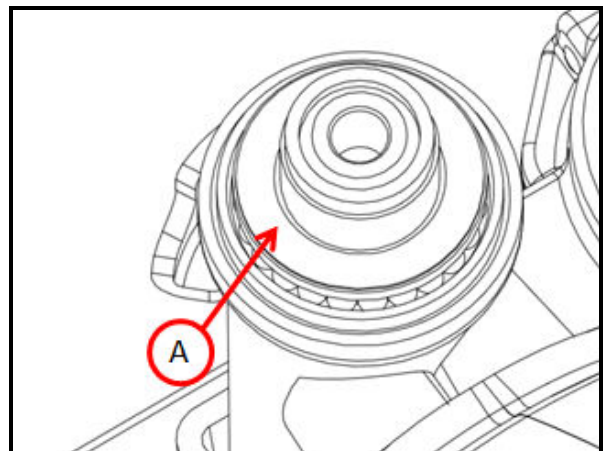
Disassemble  
Locknut [A]



Remove  
Dust cap [A]

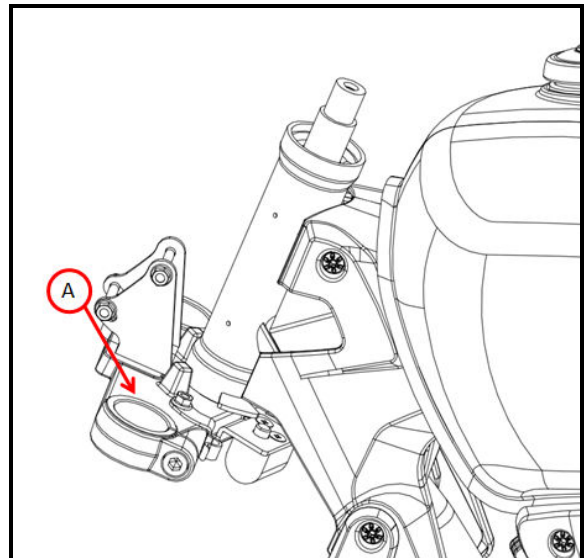


Disassemble  
Upper steel bowl of upper bearing [A]





Disassemble  
Support and lower bracket

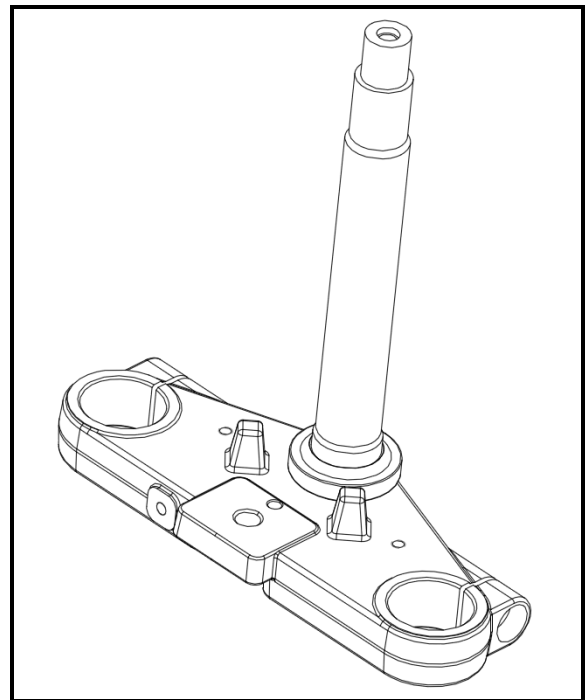


## 7.5.2 Inspection of Steering Column

### Check

Steering column

Deformation / bending → replacement





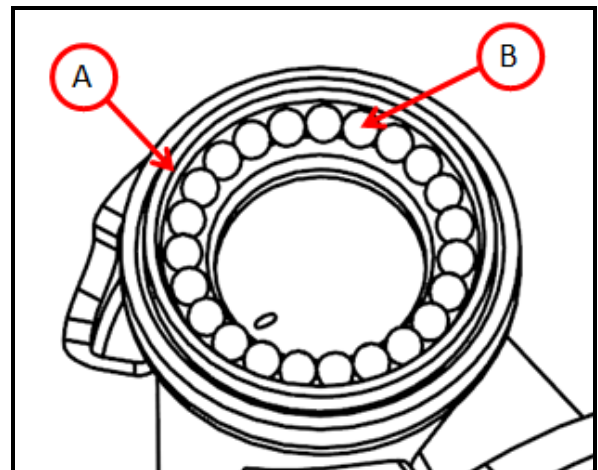
Clean the rolling ball and bearing race

**Check**

Bearing race[A]

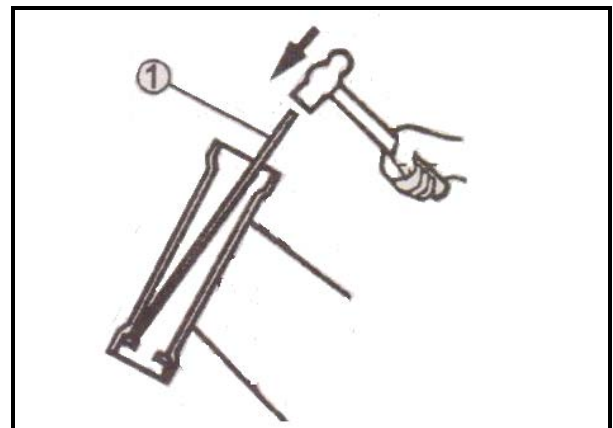
Ball[B]

Wear/damage→Replacement

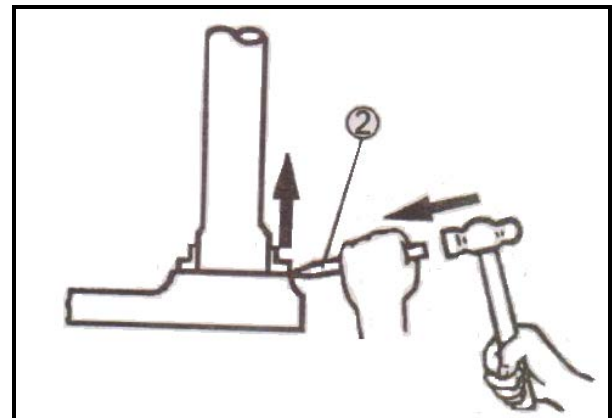


Replacement step:

Disassemble the bearing race with a long rod ① and a hammer and remove it from the groove of head pipe, as shown in the figure



Disassemble the bearing race of steering lever with a flat chisel ② and a hammer, as shown in the figure



**\*Note:**

**Balls, bearing races and dust seals are always replaced in sets.**  
**The ball and bearing race mounted obliquely will cause the wear of rack, therefore, they shall be mounted horizontally carefully.**  
**Do not strike the surfaces of ball and direction axle.**

### 7.5.3 Installation

Carry out assembly in the reverse process of disassembly

**\*Note**

Apply grease to the steel bowl of bottom bearing confirm that the number of balls (21), check whether the handlebar is not rotatable (to prevent the steel balls from falling) and then install the steering stem. Support the handlebar, apply grease to the steel bowl of top bearing and confirm the number of balls (19). (17) Apply grease to the race of top seat.

Apply grease to the race of top seat. Rotate the handlebar horizontally to make the steel balls contact tightly.

**\*Note**

When installing the front shock absorber, first tighten the clamping bolts. Ensure that the end of inner fork is flush with the head of handlebar.

**Torque value:**

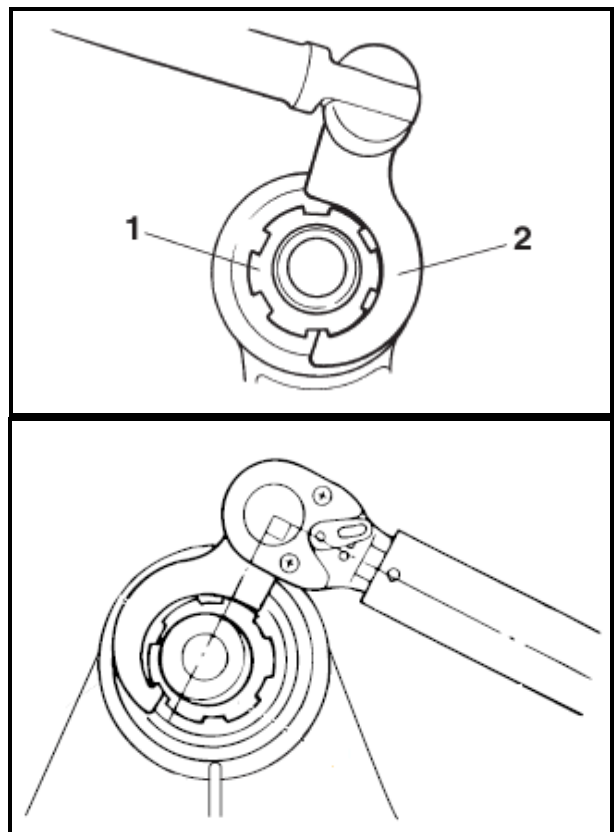
<b>Nut of steering axle</b>	<b>2.5 N·m</b>
<b>Locknut of steering axle</b>	<b>70 N·m</b>
<b>Upper clamp bolt of front shock absorber</b>	<b>22~29 N·m</b>
<b>Lower clamp bolt of front shock absorber</b>	<b>10~12 N·m</b>
<b>Mounting bolt at the bracket of headlight</b>	<b>10~12 N·m</b>
<b>Mounting bolt at the lower bracket of headlight</b>	<b>10~12 N·m</b>
<b>Mounting bolt of brake clamp</b>	<b>10~12 N·m</b>
<b>Mounting bolt of front fender bracket</b>	<b>10~12 N·m</b>

**Note:**

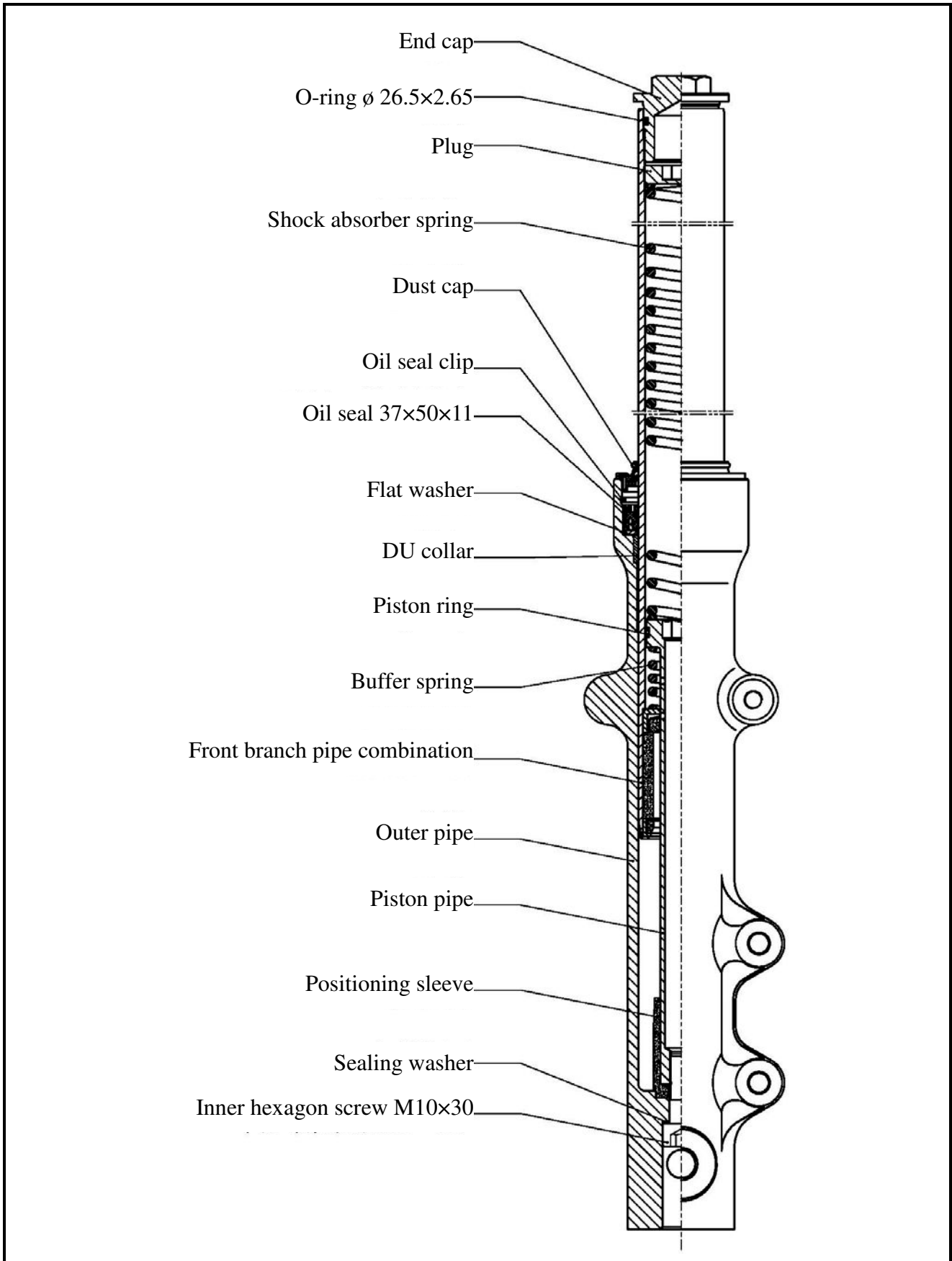
Assemble or disassemble the steering axle nut [1] with a steering nut wrench [2].

**Note:**

- Make the torque wrench perpendicular to the steering nut wrench.
- Rotate the direction axle left and right several times to check whether it rotates smoothly.



# Diagram of front shock absorber



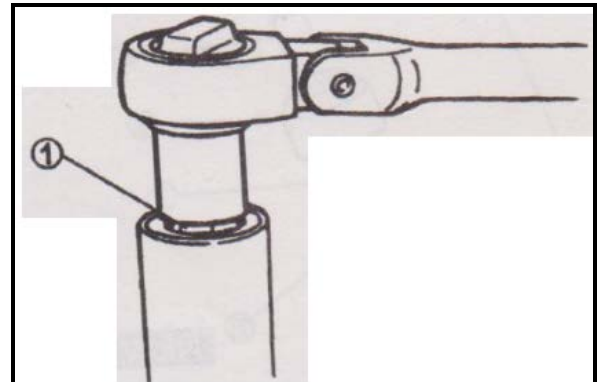
## 7.6 Front Shock Absorber

### 7.6.1 Disassembly

Disassemble

Cap bolt ① and O-ring seal

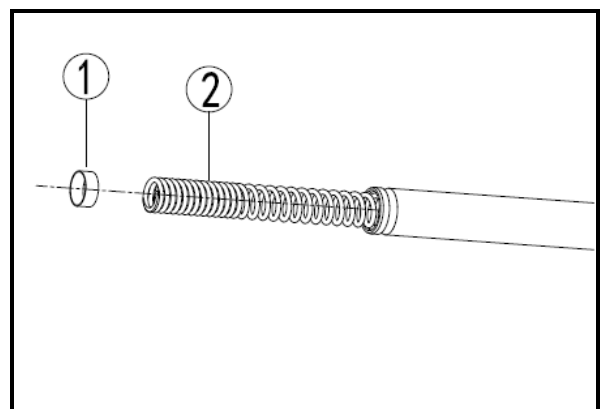
Oil drainage



Disassemble

Plug ①

Spring ②



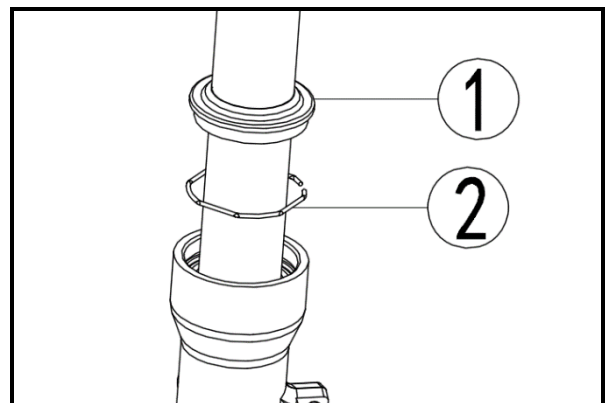
Disassemble

Dust ring ①

Wire clamp ②

Note:

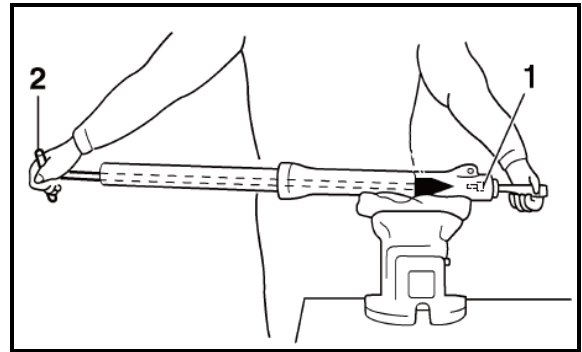
Do not damage the surface of inner tube



Disassemble

Bolt ①

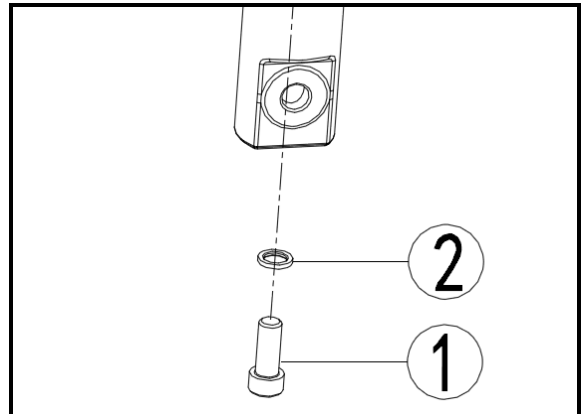
Hold the shock absorber lever and loosen the bolts with the T-shaped handle ② and the shock absorber clamp.



Disassemble

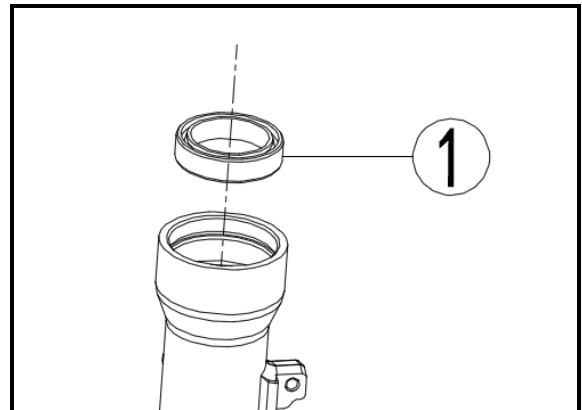
Bolt ①

Washer ②



Disassemble

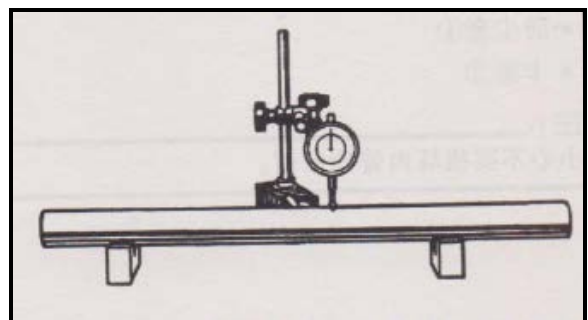
Oil seal ①



## 7.6.2 Inspection

Check

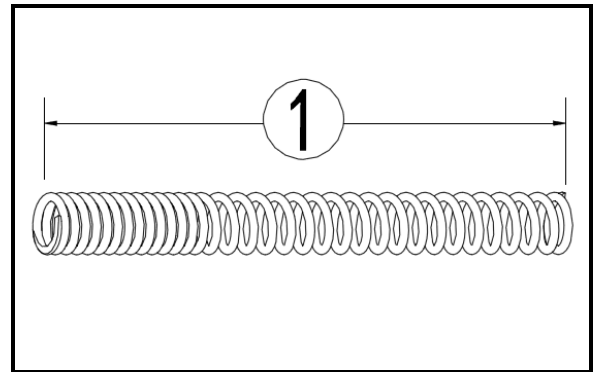
Bending degree of inner tube



Measure

**Free length of front shock absorber spring: 300mm**

**Minimum free length: 295mm**



Check

Damper rod ①

Shock absorber piston ring ②

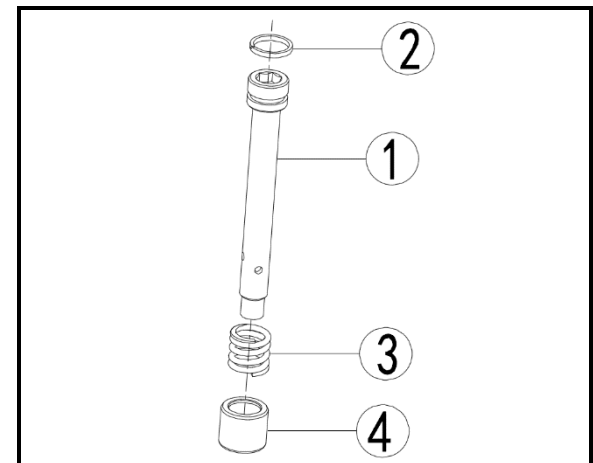
Scratch, damage, bending → Replacement

Spring ③

Oil plug rod ④

Wear, damage → Replacement

Waste → Clean all oil holes using the compressed air



**Note:**

**Do not attempt to straighten the bent damper bar, otherwise, it may seriously damage the damper rod.**

## 7.6.3 Installation

Carry out assembly in the reverse process of disassembly

**Notes**

**Be sure to use the following new parts when reassembling the shock absorber**

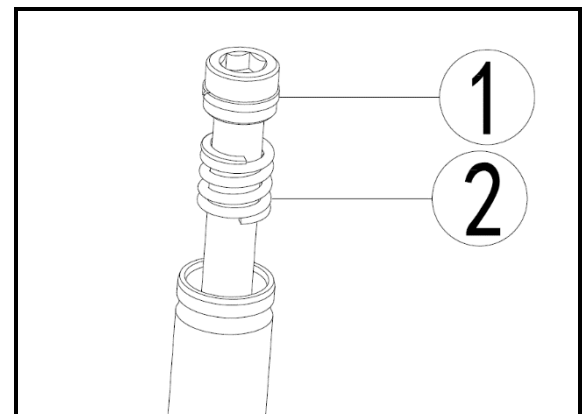
- Oil Seal
- Dust ring

**Ensure that all parts are clean before re-installation**

Installation

Shock absorber piston ring ①

Spring ②



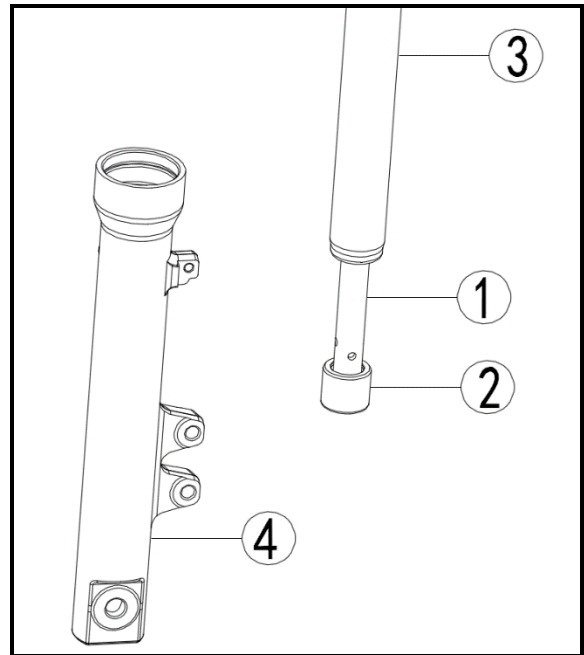
Installation

Damper rod ①

Oil plug rod ②

Inner tube ③

Outer tube ④

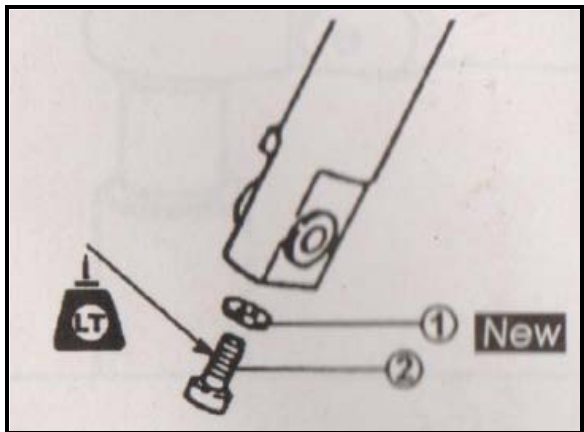


Installation

Washer ①

Bolt (damper rod) ②

Note: When assembling bolt ②, add thread-locking adhesive



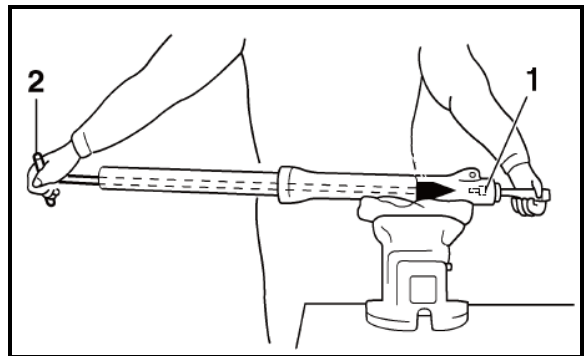
Tighten

Bolt (damper rod) ①

**Torque value: 15-20N•m**

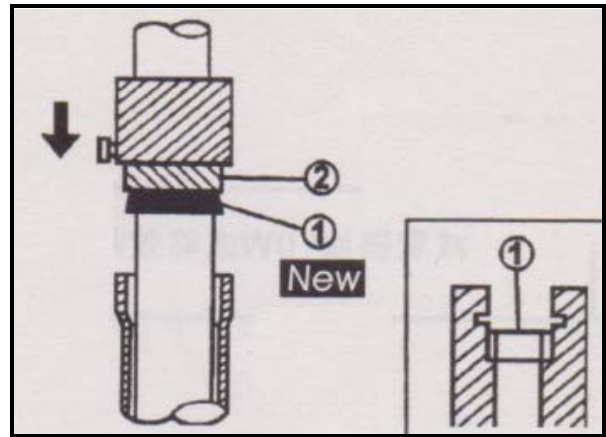
Notes

Tighten the bolt ① of damper rod with the T-shaped handle ② and the shock absorber clamp.



Installation

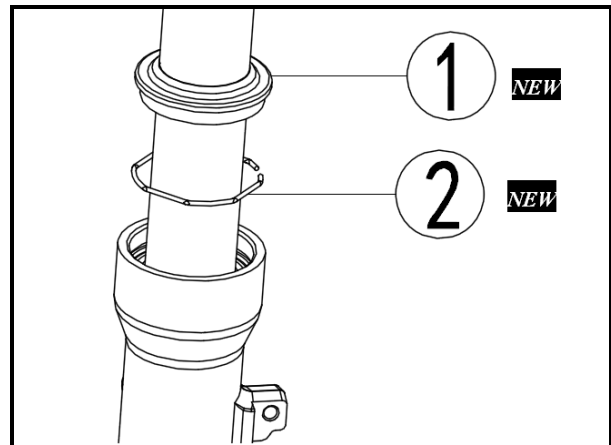
Oil seal ①



Installation

Dust ring ①

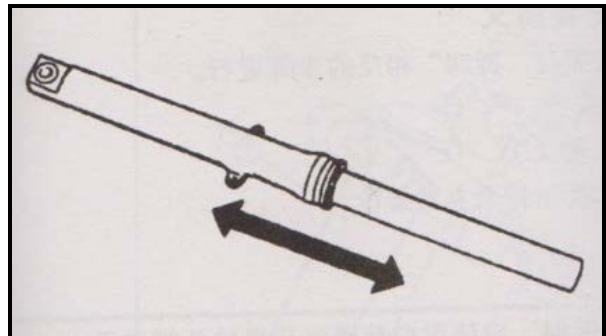
Wire clamp ②



Check

Extension of inner tube

Unable to extend smoothly - recheck after disassembly

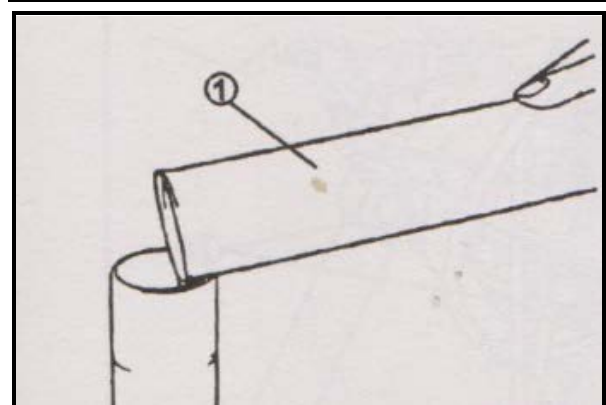


Refuel

Measuring cup ①

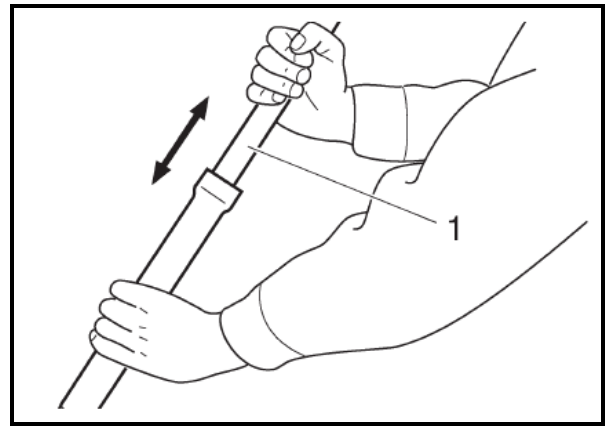
Shock absorber oil: 46# shock absorber oil

Oil capacity: 285±2ml





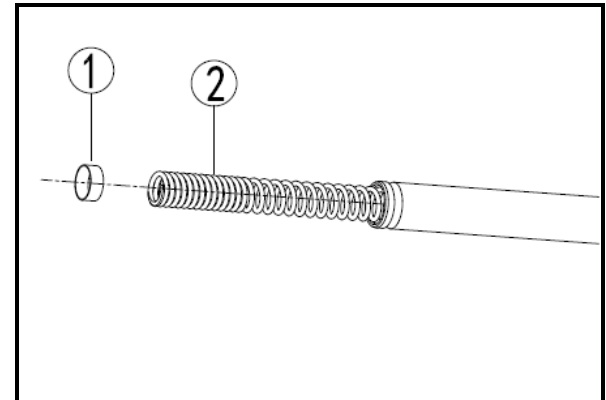
After refueling, slowly move the shock absorber [1] up and down, to fill the tube with oil



Installation

Plug ①

Spring ②



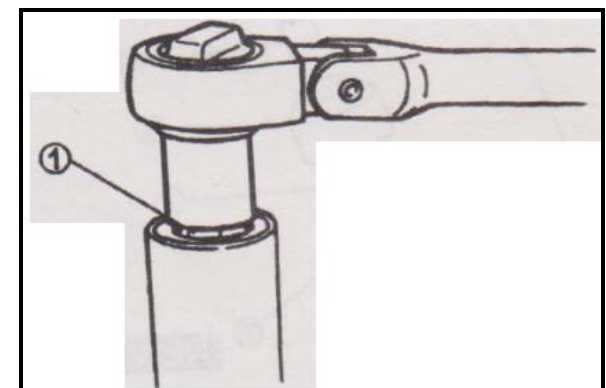
Installation

Cap bolt ① and O-ring seal

Notes

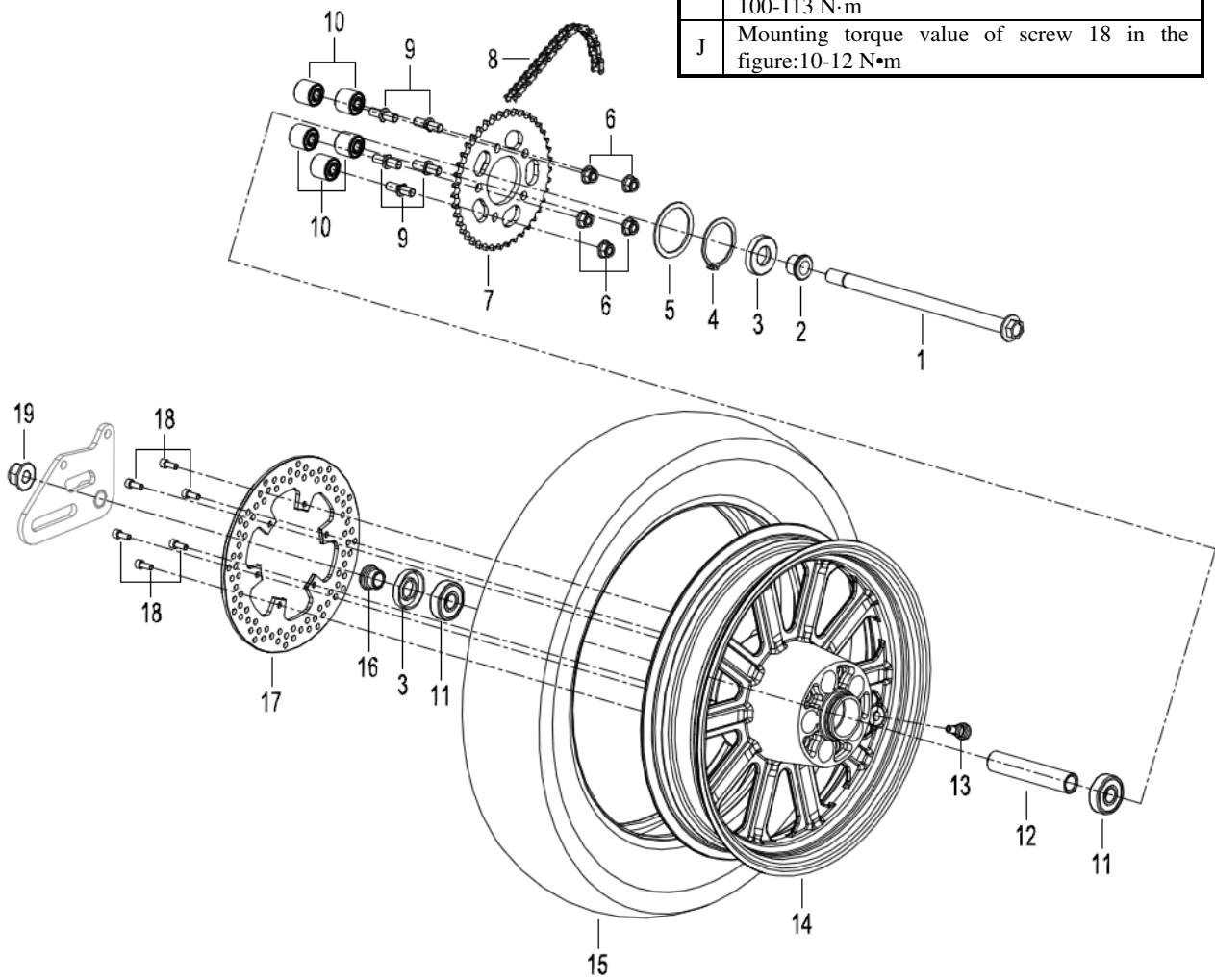
**Do not damage the surface of inner tube**

**Torque value of cap bolt: 12-18 N·m**



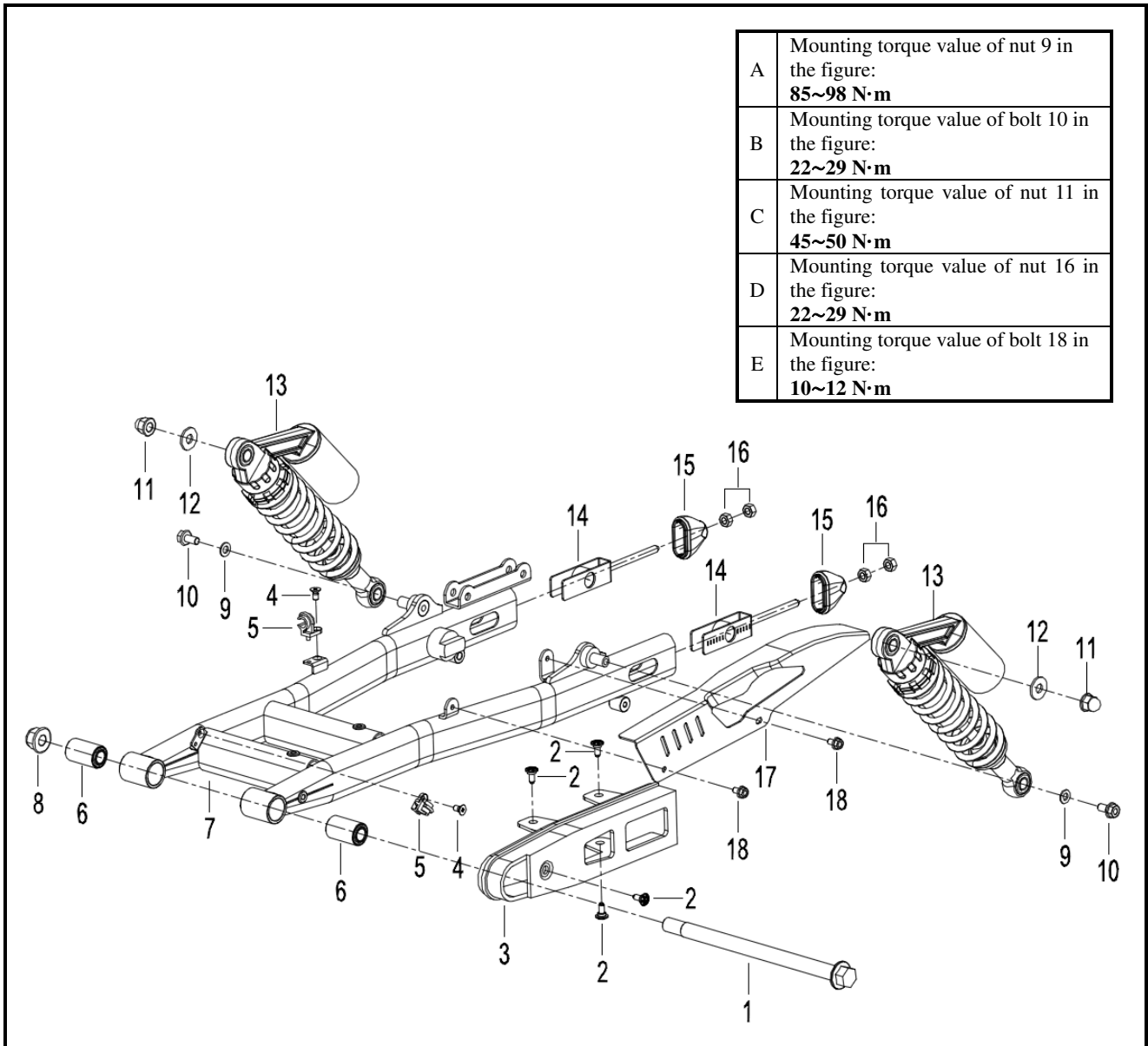
# Rear wheel and rear drive

A	Tire dimensions: 130/90-15
B	Rim specifications: 3.00×15/aluminum alloy
	Rim runout limit value:
	Vertical: 2.0 mm Horizontal: 2.0 mm
C	Diameter of rear fluid brake disc: 240mm
D	Bending limit of rear wheel axle: 0.2mm
E	Chain specification: 428HO-1×134
F	Sprocket specification: 41 teeth
H	Mounting torque value of nut 6 in the figure: 45-50N·m
I	Mounting torque value of nut 19 in the figure: 100-113 N·m
J	Mounting torque value of screw 18 in the figure: 10-12 N·m



No.	Name
1	Rear wheel axle
2	Left collar of rear wheel
3	Oil seal of rear hub
4	Retainer 55
5	Sprocket washer
6	Self-locking nut M10×1.25
7	Sprocket 41T
8	Chain 428HO-1×134
9	Sprocket mounting bolt M10×1.25×38.5
10	Rear wheel damper assembly
11	Rolling bearing 6303-2RS
12	Front wheel middle shaft sleeve
13	Air valve Z2-01-1
14	Rear wheel rim
15	Tubeless tire 130/90-15
16	Right collar of rear wheel
17	Rear brake disc
18	Inner hexagon screw M6×20
19	Nut M16×1.5

# Rear Suspension



A	Mounting torque value of nut 9 in the figure: <b>85~98 N·m</b>
B	Mounting torque value of bolt 10 in the figure: <b>22~29 N·m</b>
C	Mounting torque value of nut 11 in the figure: <b>45~50 N·m</b>
D	Mounting torque value of nut 16 in the figure: <b>22~29 N·m</b>
E	Mounting torque value of bolt 18 in the figure: <b>10~12 N·m</b>

No.	Name	No.	Name
1	Rear rocker arm mounting shaft M14×1.25×263	10	Bolt M8×16
2	Screw M6×15.2	11	Cap nut M10×1.25
3	Chain protective block	12	Washer
4	Screw M4×10	13	Rear shock absorber assembly
5	Clamp	14	Chain adjuster assembly
6	Rear rocker arm shaft sleeve assembly	15	Chain adjuster retainer
7	Rear rocker arm welding assembly	16	Nut M8
8	Self-locking nut M14×1.5	17	Drive chain cover
9	Washer	18	Bolt M6×10

## VIII. Rear wheel/rear suspension

Preparatory Information .....	8.1
Fault Diagnosis.....	8.2
Rear Wheel .....	8.3
Rear Shock Absorber.....	8.4
Rear rocker arm.....	8.5
Chain drive .....	8.6

### 8.1 Preparation of Information-

#### Notes for operation

There should be no oil stains attached on the surface of brake disc or friction pad.

#### Technical parameters

Item		Standard value (mm)	Available limit (mm)
Swinging amplitude of rear wheel	Vertical direction		2.0
	Horizontal direction		2.0

#### Torque value

<b>Mounting nut of rear wheel</b>	<b>100-113 N·m</b>
<b>Nut at the top of rear shock absorber</b>	<b>45-50 N·m</b>
<b>Bolt at the bottom of rear shock absorber</b>	<b>22-29 N·m</b>
<b>Mounting nut of rear rocker arm axis</b>	<b>85-98 N·m</b>
<b>Mounting nut of rear sprocket</b>	<b>45-50N·m</b>

### 8.2 Fault Diagnosis

#### 8.2.1 Rear Wheel Shimmy

Deformation of rim

Wear of rear wheel bearing

Tire fault

Wear or damage of rocker arm pivot shaft bearing

Improper adjustment of drive chain adjuster

Bent frame or rocker arm

## **8.2.2 Inflexible rotation of wheel**

Incorrect adjustment of brake

Wear of rear wheel bearing

Too tight drive chain

## **8.2.3 Poor brake performance**

Incorrect adjustment of brake

The friction pad of brake is worn

The fluid brake disc is worn

Improper installation of brake friction pad

## **8.2.4 Inflexible Brake Pedal or Slow Return**

Wear or break of return spring

Incorrect adjustment of brake

The fluid brake disc is worn or dirty

Improper installation of brake friction pad

## **8.2.5 Abnormal sound of brake**

The friction pad of brake is worn

The fluid brake disc is worn

The friction pad of brake is dirty

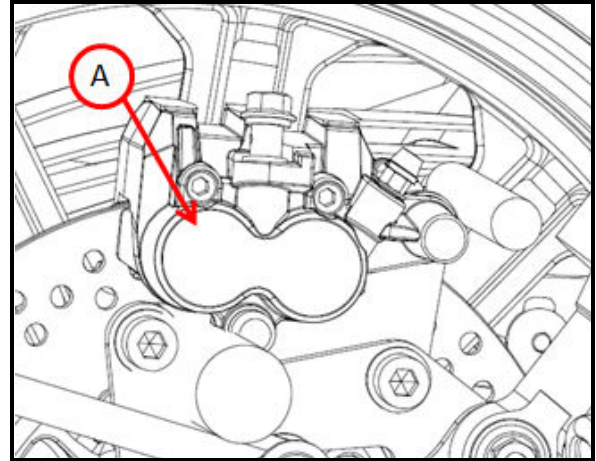
The fluid brake disc is dirty

## **8.3 Rear wheel**

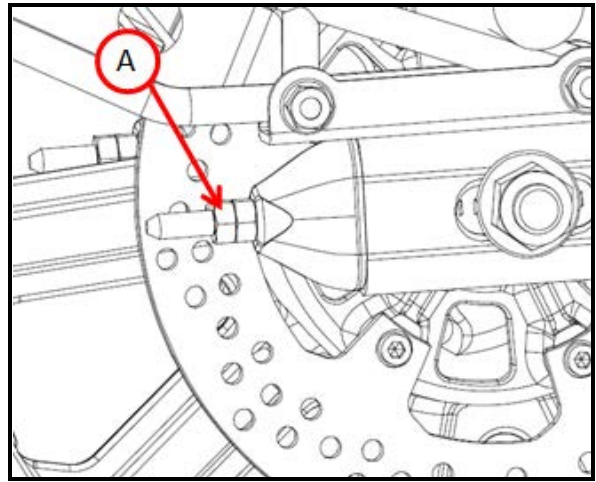
### **8.3.1 Disassembly**

Firmly support the motorcycle so that the rear wheel of motorcycle is lifted from the ground.

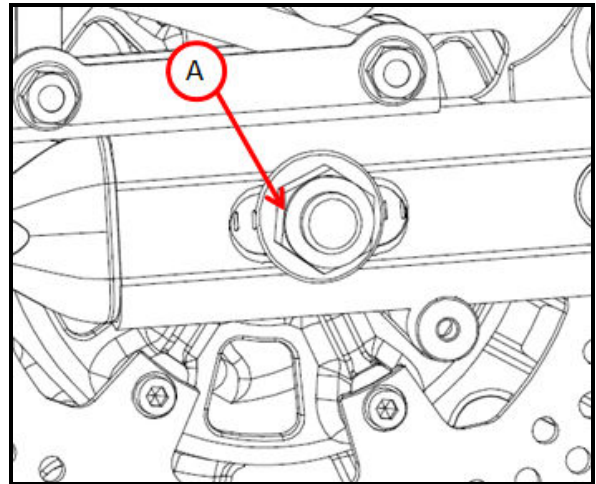
Remove  
Rear brake caliper



Loosen  
Chain adjuster bolt [A]



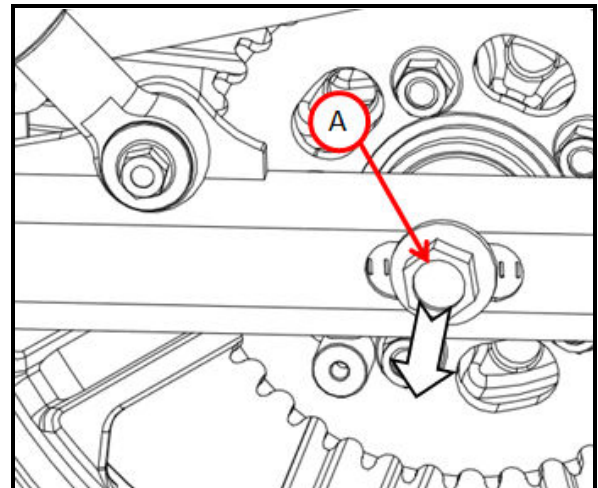
Disassemble  
Rear wheel axle mounting nut [A]



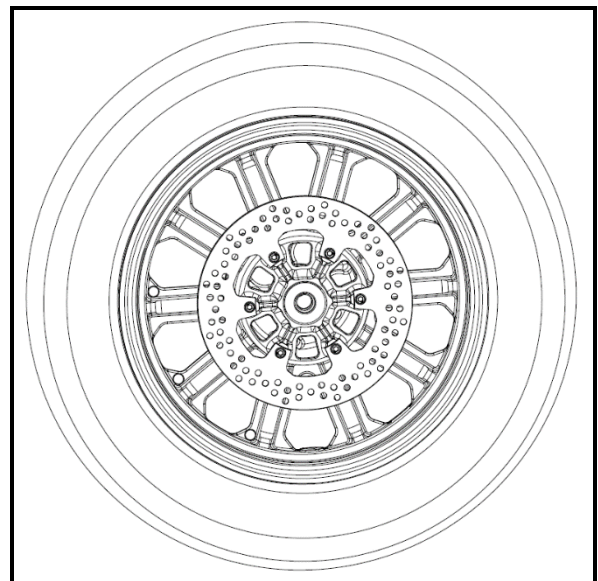
Disassemble

Rear wheel axle [A]

Pull out the rear wheel axle from right side to left side



Disassemble rear wheel

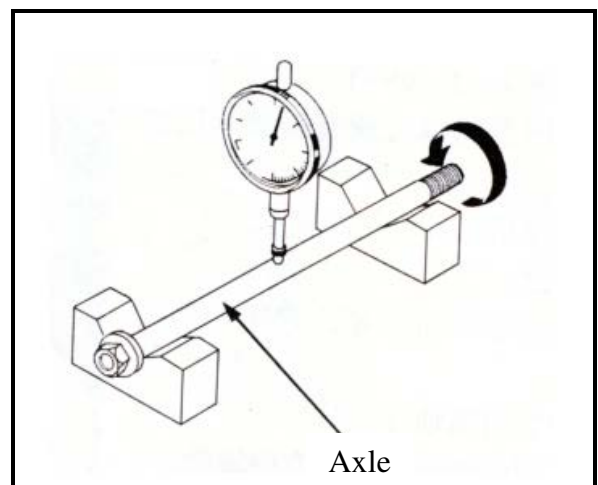


## 8.3.2 Inspection

### 8.3.2.1 Bending Inspection of Wheel Axle

Put the wheel axle on the V-shaped seat and measure the eccentricity with a dial gauge.

**Available limit: Replace the wheel axle if the eccentricity is 0.2mm above**





### 8.3.2.2 Rear Rim Shimmy Inspection

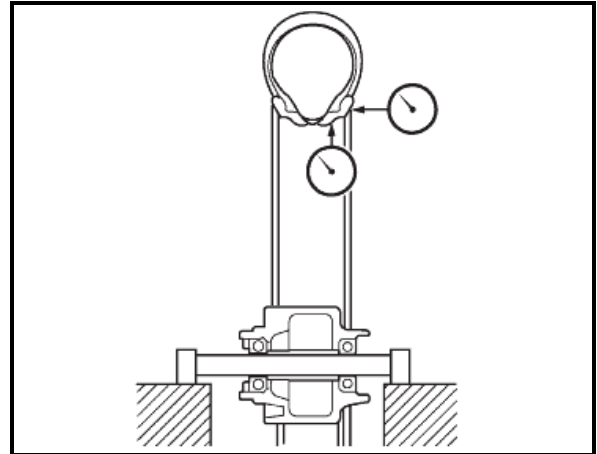
Put the rim on an accurate bracket and check the swinging amplitude of the rim.

Rotate the wheel with hands and read the swinging amplitude.

**Available limit:**

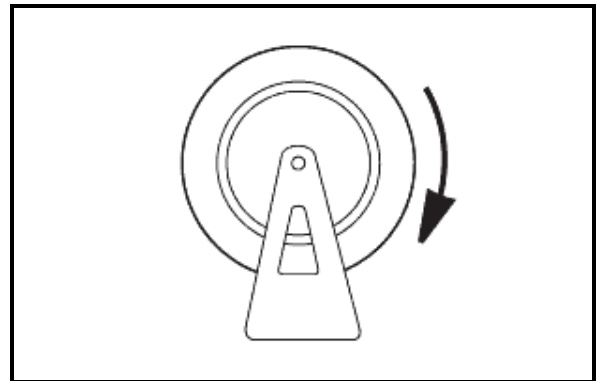
**Vertical direction:** Replace the rim if the swinging amplitude is 2.0mm or above.

**Horizontal direction:** Replace the rim if the swinging amplitude is 2.0mm or above.



### 8.3.2.3 Inspection of Rear Wheel Bearing

- Bearing  
The front wheel rotates unsmoothly or it is too loose→Replace the bearing
- Oil Seal  
Damage/wear→Replacement



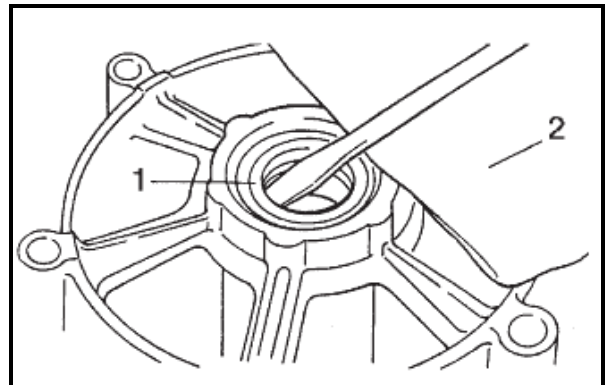
## 8.3.3 Replacement of Bearing

### 8.3.3.1 Disassembly of Bearing

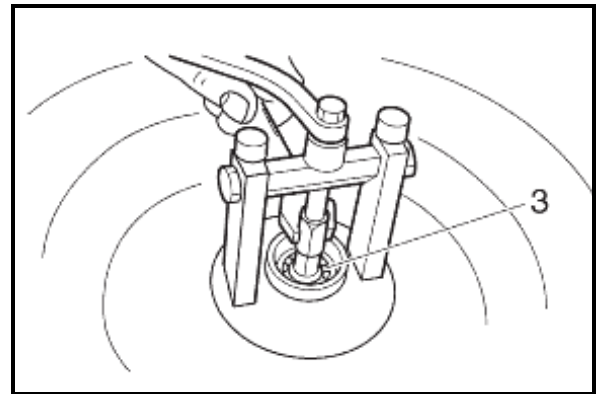
Remove the oil seal [1].

Note:

To avoid damaging the rim, please put a cloth [2] between the screwdriver and the surface of rim



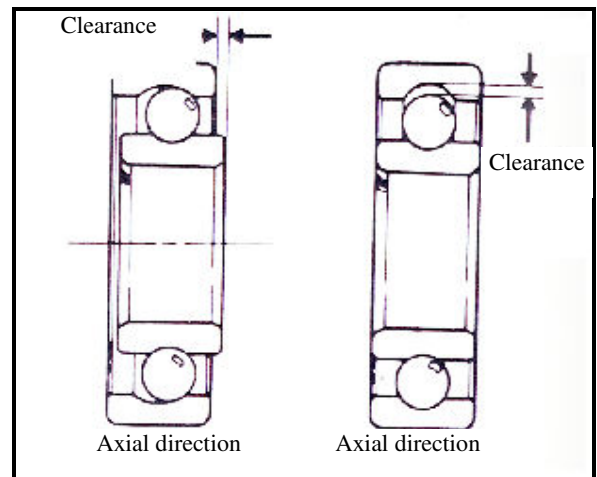
Remove the bearing [3] with a bearing puller.



### 8.3.3.2 Inspection of Bearing

Check the rolling conditions of bearing.

If the bearing does not roll, it may be worn or loose and thus it should be replaced with a new one.



### 8.3.3.3 Installation of Bearing

Note:

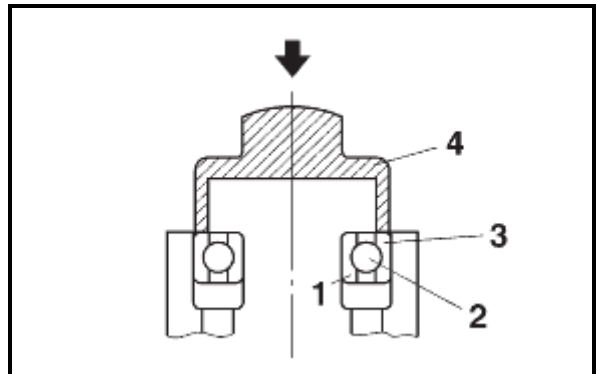
The bearing disassembled should be replaced with a new one.

Then push the bearing with bearing installation tools.

\*Note

Do not apply pressure on the inner race ring [1] or ball bearing [2] of wheel bearing and only apply pressure to the outer race ring [3] of bearing

Use the seat in line with the diameter of outer race ring [4] of bearing



### 8.4.4 Installation

Install it in the reverse order of disassembly.

Notes

The oil seal on the rear wheel should be lubricated.

Torque value:

Rear wheel axle locknut 85-98 N•m

## 8.4 Rear shock absorber

### 8.3.1 Disassembly

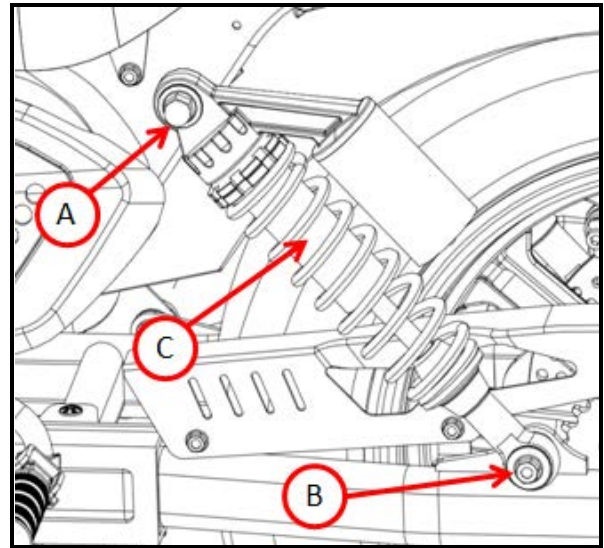
Firmly support the motorcycle

Disassemble

Lower mounting bolt of rear shock absorber [A]

Upper mounting bolt of rear shock absorber [B]

Rear shock absorber [C]



## 8.3.2 Inspection

Rear shock absorber

Check

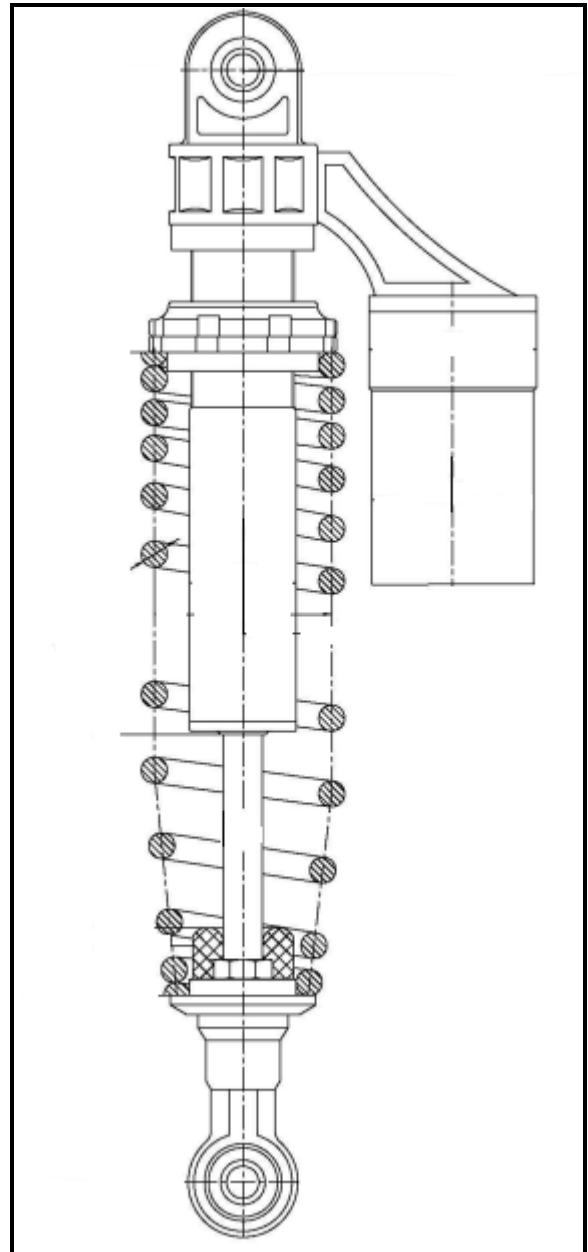
Rear shock absorber lever

Bending/damage → Replacement of rear shock absorber

Check

Rear shock absorber spring

Fatigue → Replacement of rear shock absorber



## 8.3.4 Installation

Install it in the reverse order of disassembly.

Install the upper mounting nut and lower mounting bolt of rear shock absorber.

Lock it to the specified torque value.

**Torque value:**

**Nut at the top of rear shock absorber 45-50 N·m**

**Bolt at the bottom of rear shock absorber 22-29 N·m**

## 8.5 Rear Rocker Arm

### 8.5.1 Disassembly

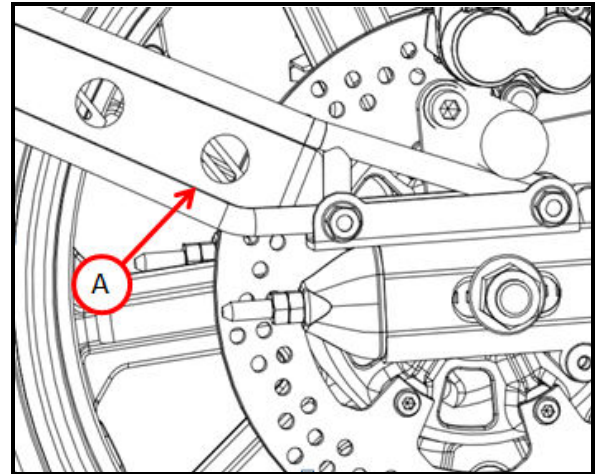
Firmly support the motorcycle

Disassemble the rear shock absorber (see this chapter for details)

Disassemble the rear wheel (see this chapter for details)

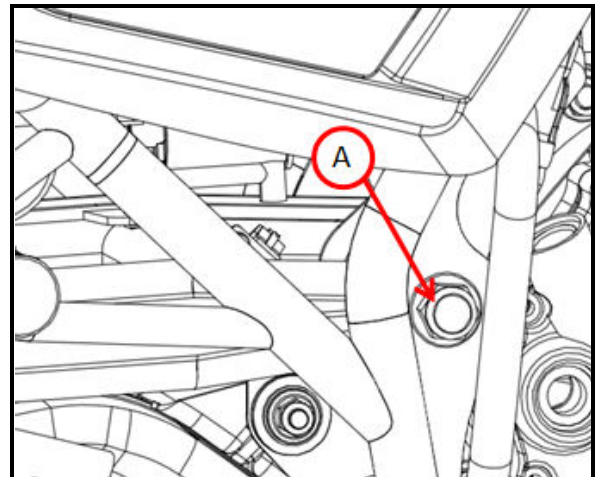
Disassemble

Rear lower fender bracket [A]



Disassemble

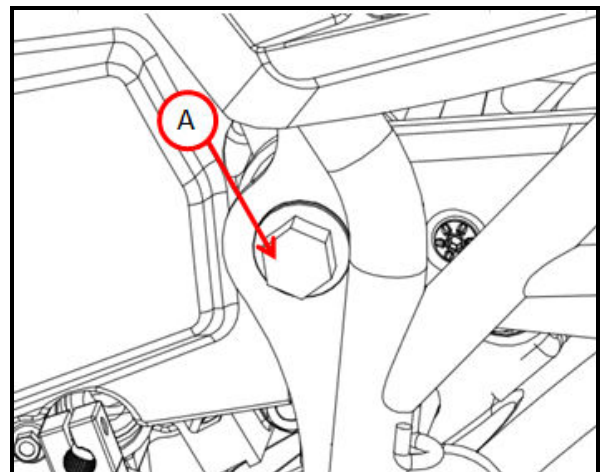
Mounting nut of rear rocker arm axle [A]



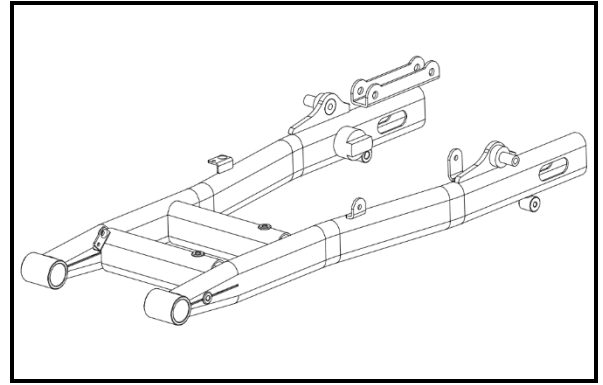
Disassemble

Rear rocker arm shaft

Pull out the rear rocker arm shaft from right side to left side



Remove  
Rear rocker arm

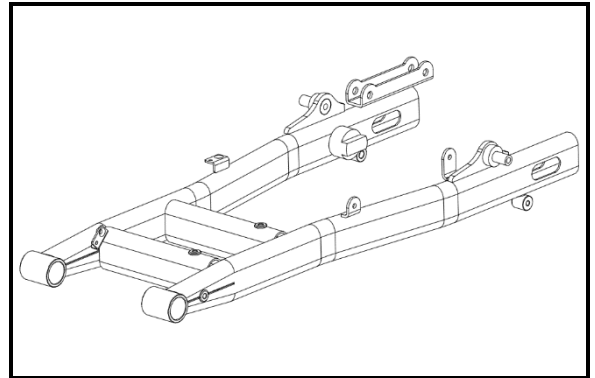


## 8.5.2 Inspection

Check

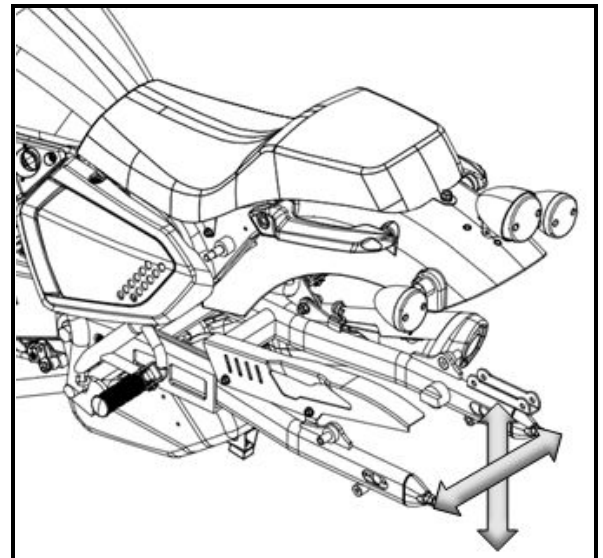
Rear rocker arm

Bending/damage → replacement



Check

- Tightness of rear rocker arm  
If it is loose → tighten the rear rocker arm nut or replace the collar
- Vertical movement of rear rocker arm  
If the movement is not smooth, or there is any bent or rough parts → replace the axle sleeve



Check

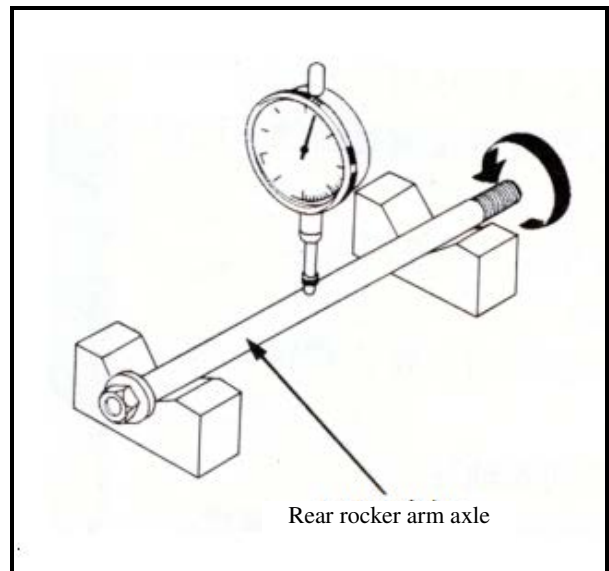
Rear rocker arm shaft

Put the rear rocker arm shaft on the V-shaped seat and measure the eccentricity with a dial gauge.

**Available limit: Replace the wheel axle if the eccentricity is 0.2mm above**

**\*Note**

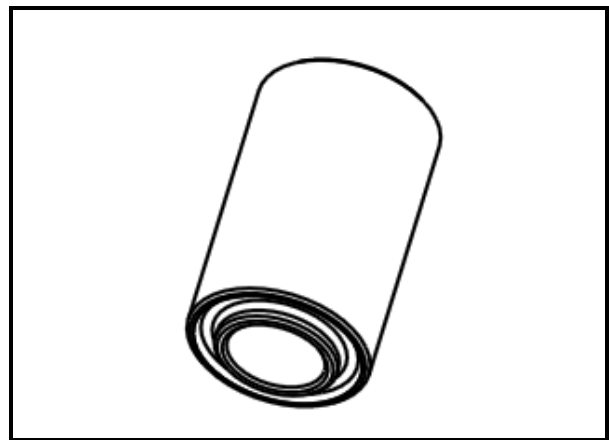
Never try to straighten a bent axle.



Check

Rear rocker arm shaft sleeve assembly

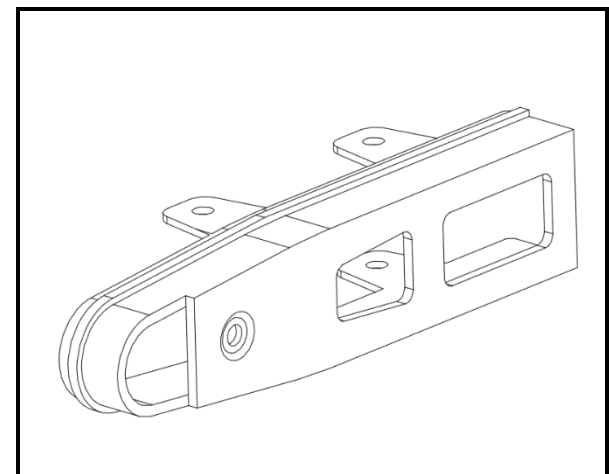
Damage / crack → Replacement



Check

Chain protective block

Wear/damage /crack → replacement



### 8.5.3 Installation

Install it in the reverse order of disassembly.

Clean the mounting axle parts of rear rocker arm in the solvent, and apply grease to the mounting shaft.

**Torque value:**

**Mounting nut of rear 85~98 N·m**

rocker arm axis

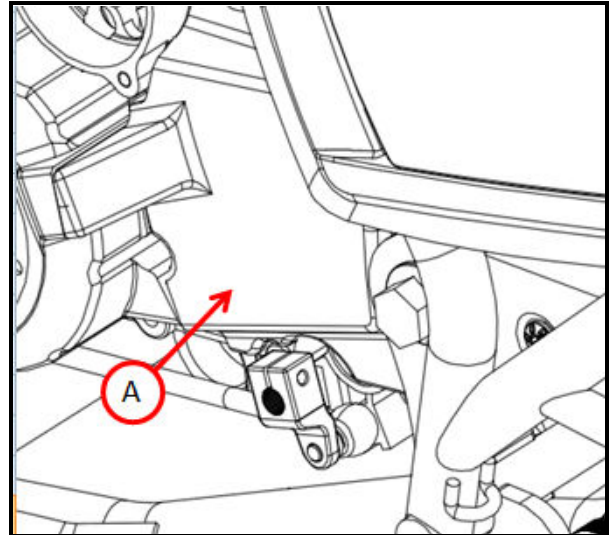
## 8.6 Chain drive

### 8.6.1 Disassembly

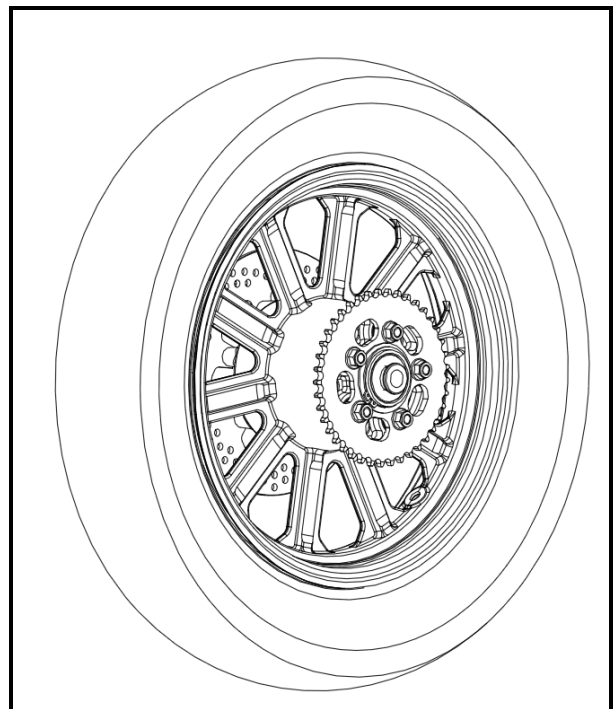
Put the motorcycle on a flat surface and secure it.

Disassemble

Drive sprocket cover [A]



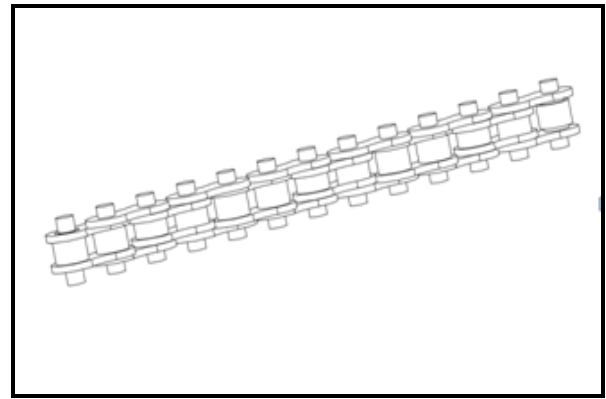
Disassemble the rear wheel (see this chapter for details)





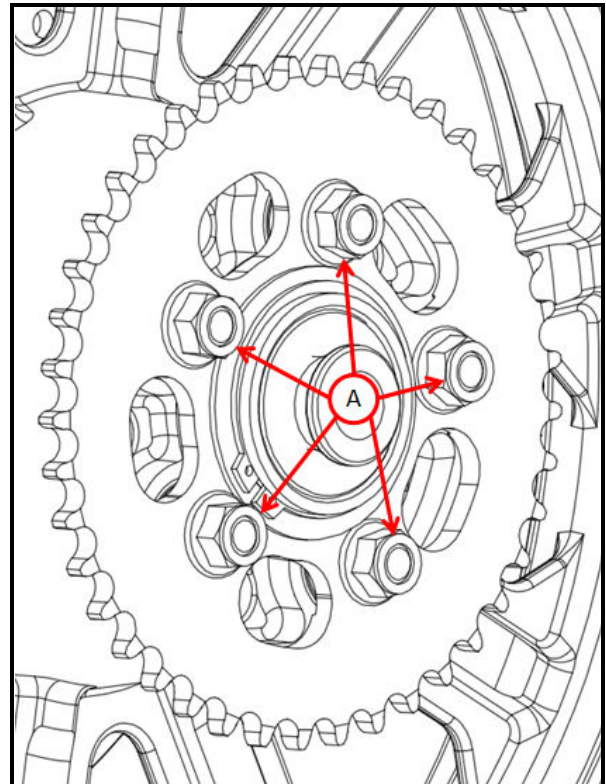
Disassemble the rear rocker arm (see this section for details)

Remove the drive chain



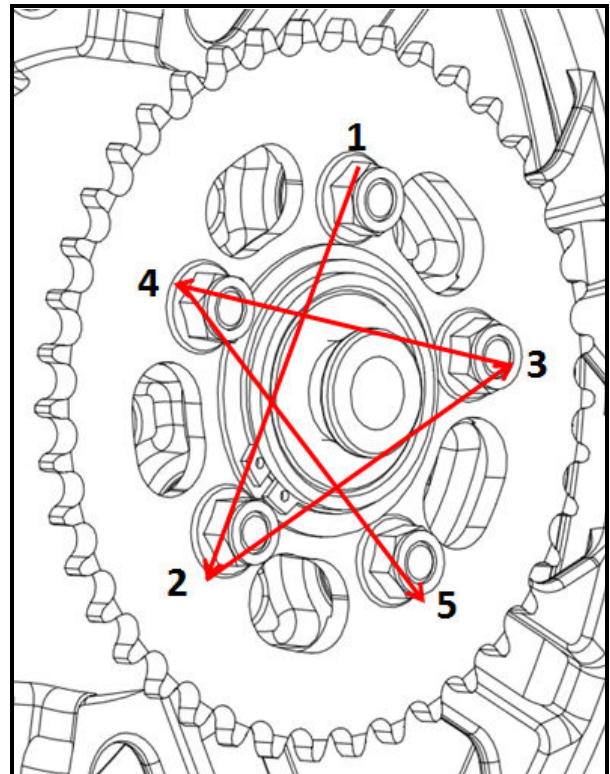
Disassemble

Mounting nut of sprocket mounting bolt [A]

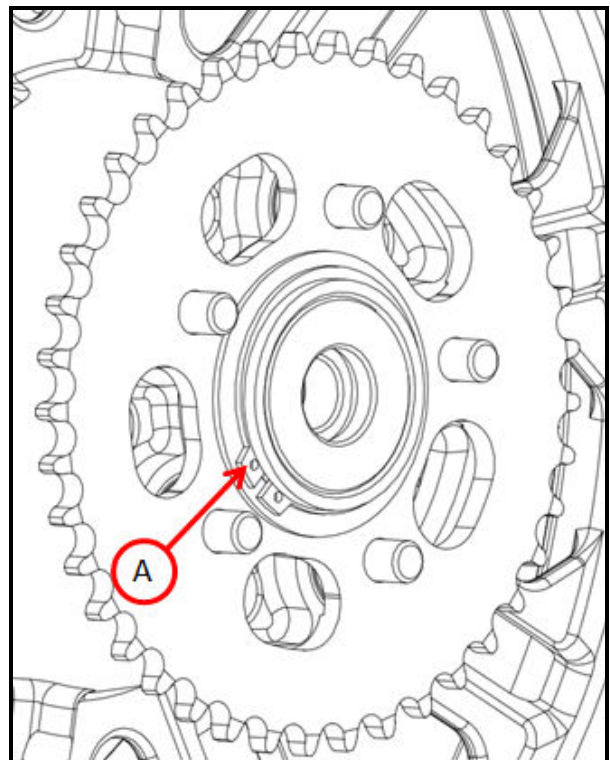


**Note:**

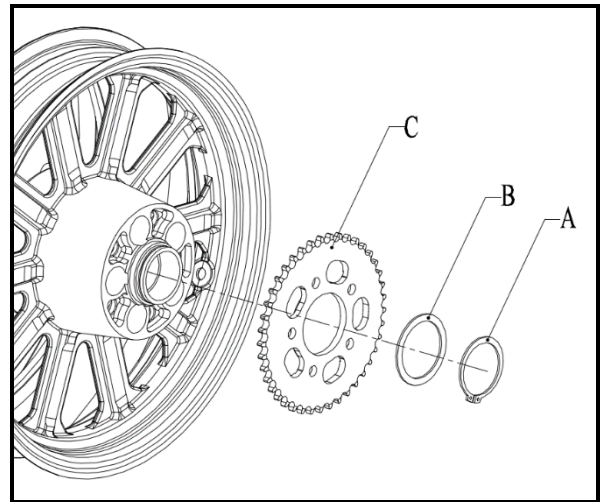
When disassembling the mounting nut of sprocket mounting bolt, follow the instructions on the right figure.



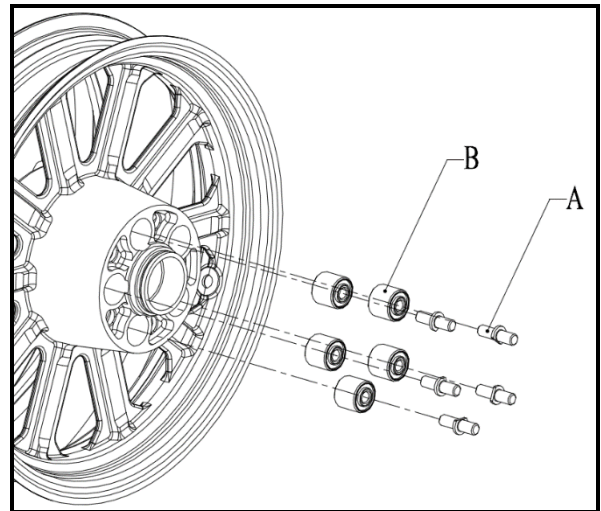
Remove the retainer [A] using the retainer caliper.



Disassemble  
 Retainer [A]  
 Sprocket washer [B]  
 Sprocket [C]



Disassemble  
 Sprocket mounting bolt [A]  
 Rear wheel damper [B]



## 8.6.2 Inspection

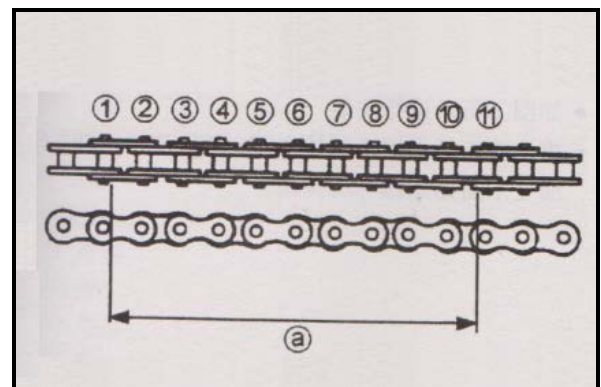
Check the chain

Measure the length of 10 links<sup>Ⓐ</sup>. The drive chain should be replaced if the length does not match the specified value.

The length limit of 10 links is 127 mm.

**\*Note:**

- Take measurements after stretching the chain by hands.
- Measure the length of 10 links within the range from the link roller ① to the inside of roller $\square$ .
- Measure the length of 10 links in different positions for 2-3 times.

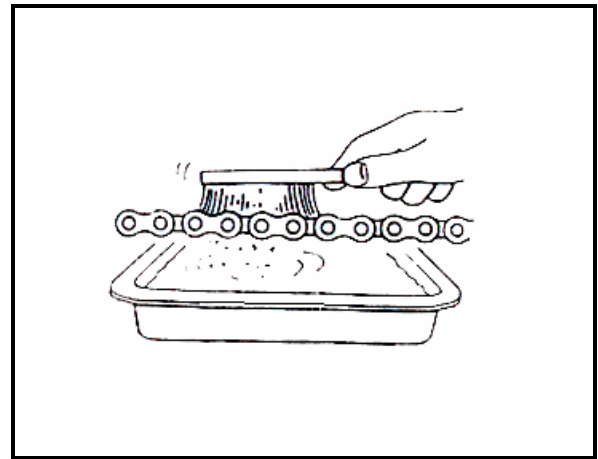


Clean the drive chain

- Wash with a neutral detergent and clean the dust as much as possible.
- Apply the chain lubricant thoroughly after washing.

**⚠ WARNING**

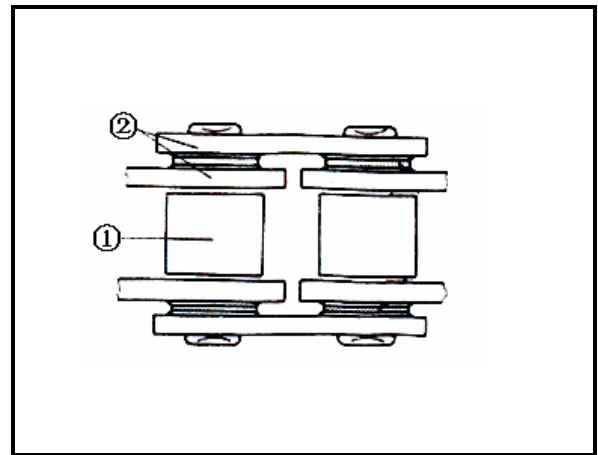
**Never use volatile substances such as steam, gasoline or solvents.**



Check rotor ① and side panel ②

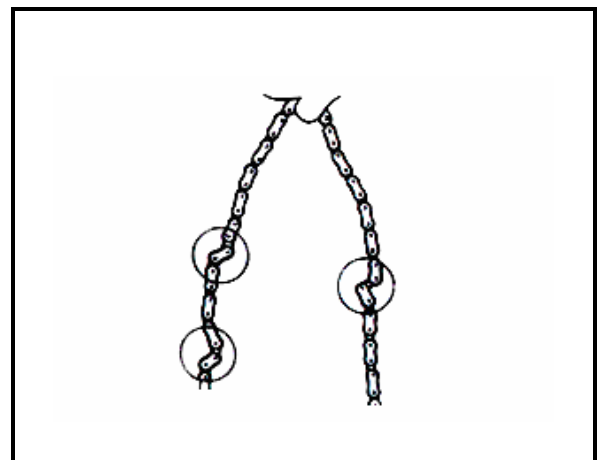
If it is damaged or worn, replace the drive chain.

Lubricate the drive chain and purchase drive chain lubricants from the store.




Check drive chain hardness

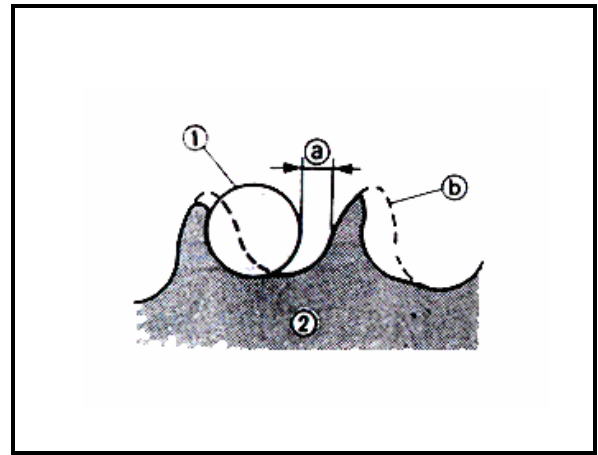
If it is hard, clean, lubricate or replace.



Check the driving sprocket and the driven sprocket.

If there is a quarter of gear wear , replace the sprocket.

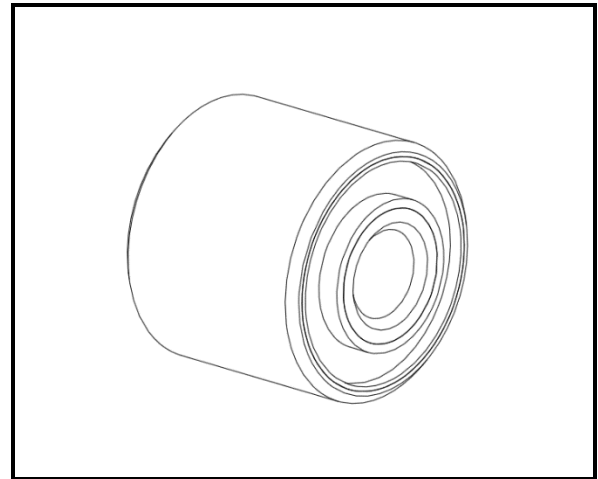
If the gear is bent, replace the sprocket.



Check

Rear wheel damper

Damage / crack → Replacement



### 8.6.3 Installation

Install it in the reverse order of disassembly.

Adjust the drive chain slackness.

If the chain slackness is too smallness, the engine and other important parts may be overloaded.

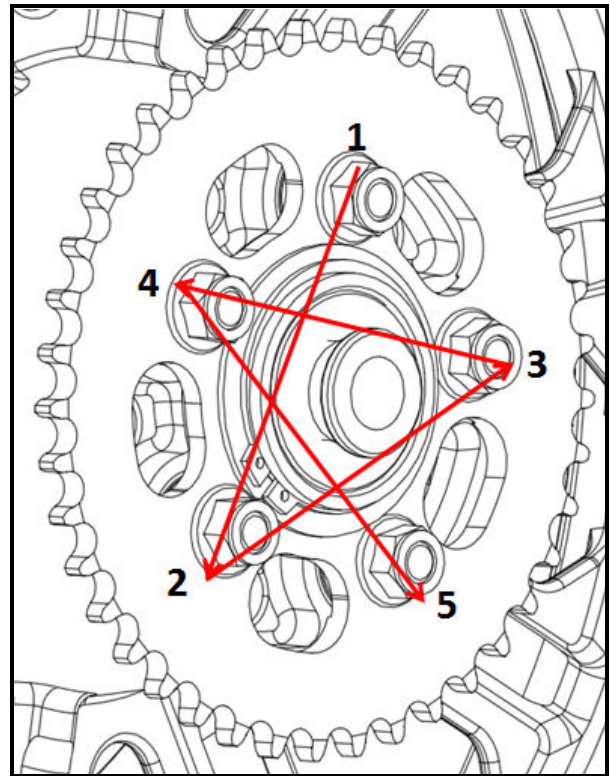
The chain slackness should be kept within the specified limits.

Torque value:

**Locknut of sprocket bolt    45~50 N·m**

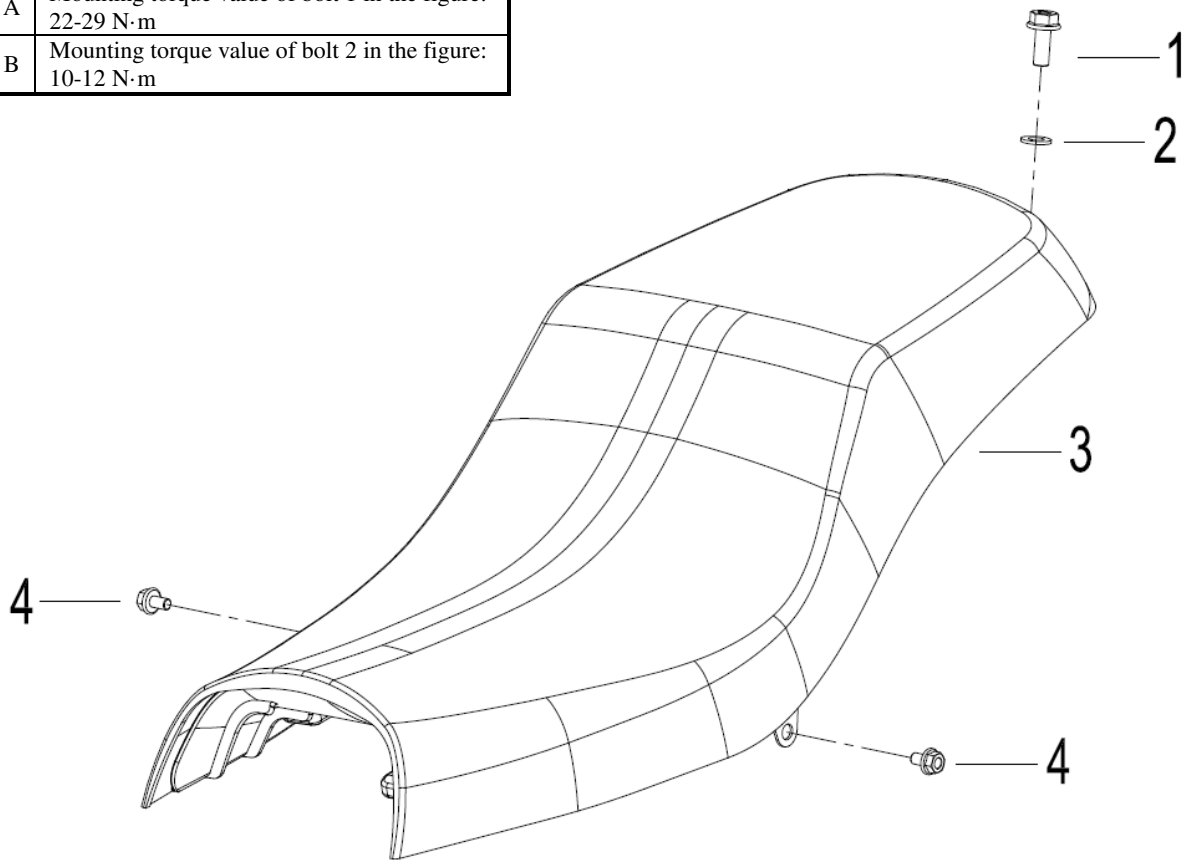
**\*Note**

**Tighten the nut by 2-3 times in the order shown in the right figure.**



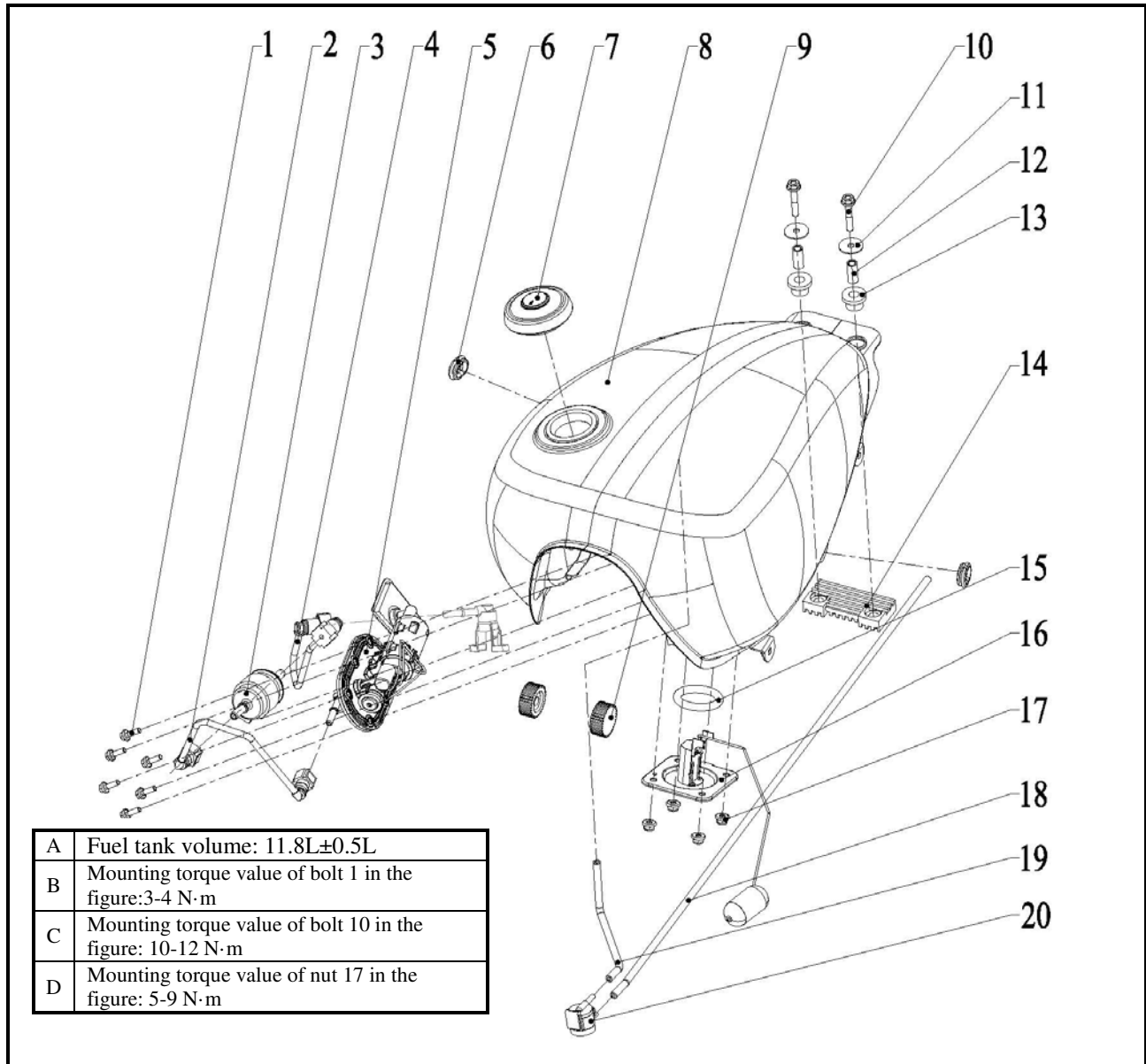
# Seat Cushion

A	Mounting torque value of bolt 1 in the figure: 22-29 N·m
B	Mounting torque value of bolt 2 in the figure: 10-12 N·m



No.	Name
1	Bolt M8×20
2	Aluminum washer 8
3	Seat assembly
4	Bolt M6×10

# Fuel tank



No.	Name	No.	Name
1	Bolt M5×16	11	Fule tank mounting washer
2	Fuse hose assembly 1	12	Fuel tank mounting shaft
3	Gasoline filter	13	Rubber cover
4	Fuse hose assembly II	14	Mounting washer of fuel tank
5	Fuel pump assembly	15	Sensor rubber washer
6	Rubber washer of cover	16	Oil level sensor assembly
7	Fuel tank lock	17	Self-locking nut M6
8	Fuel tank assembly	18	Connecting pipe between canister and dump valve
9	Buffer rubber	19	Connecting pipe between fuel tank and dump valve
10	Inner hexagon screw M6×35	20	Dump valve assembly



## IX. Fuel Tank/Seat

Preparatory Information .....	9.1
Fault Diagnosis.....	9.2
Seat .....	9.3
Fuel Tank .....	9.4

### 9.1 Preparatory information

#### Precautions for operation

The disassembly site should be away from the fire source.

When disassembling the gasoline tank, the fuel switch must be moved to "OFF" position.

Tighten bolts and nuts to the specified torque values during assembly.

Check whether all the parts are installed or operated correctly after assembly.

#### Technical parameters

Item	Normal	Allowable limit
Tank capacity	11.8L±0.5L	/

#### Locking torque

<b>Rear mounting bolt of seat</b>	<b>22-29 N·m</b>
<b>Lower mounting bolt of seat</b>	<b>10-12 N·m</b>
<b>Fuel tank mounting bolt</b>	<b>10-12 N·m</b>
<b>Fuel level sensor mounting bolt</b>	<b>5-9 N·m</b>
<b>Fuel pump mounting bolt</b>	<b>3-4 N·m</b>

### 9.2 Fault Diagnosis

#### Reduction of gasoline quantity

Natural consumption of gasoline

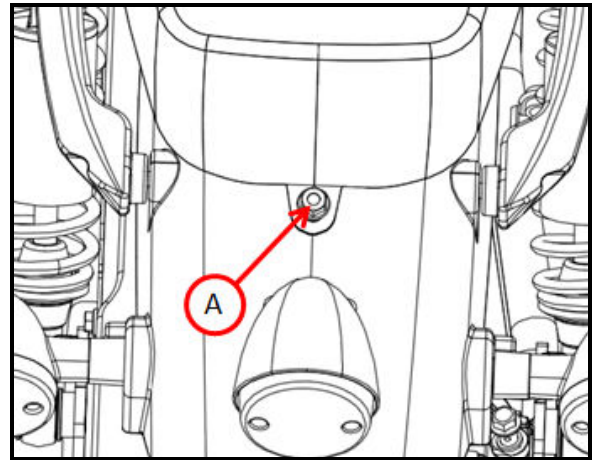
Gasoline leakage

## 9.3 Seat

### 9.3.1 Disassembly

Disassemble

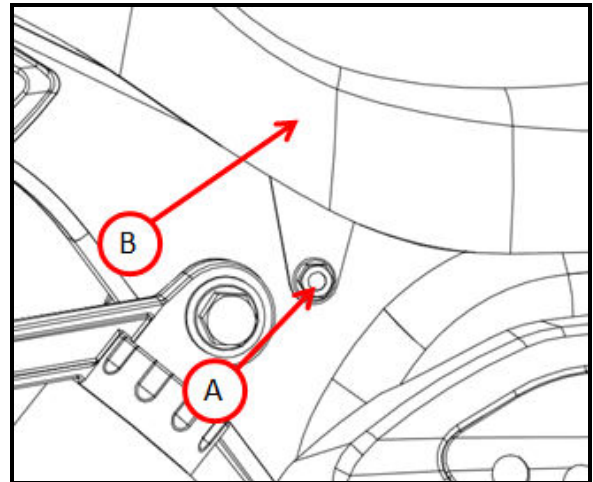
Rear mounting bolt of seat [A]



Disassemble

Lower mounting bolt of seat [A] (two sides)

Seat [B]

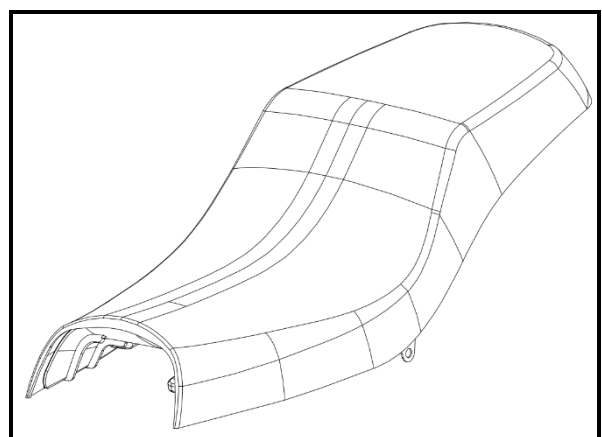


### 9.3.2 Inspection

Check

Seat Cushion

Breakage or damage → replacement



## 9.3.3 Installation

Install it in the reverse order of “disassembly”

### Torque value:

Rear mounting bolt of seat 22-29 N·m

Lower mounting bolt of seat 10-12 N·m

## 9.4 Fuel Tank

### 9.4.1 Disassembly

#### **▲ WARNING**

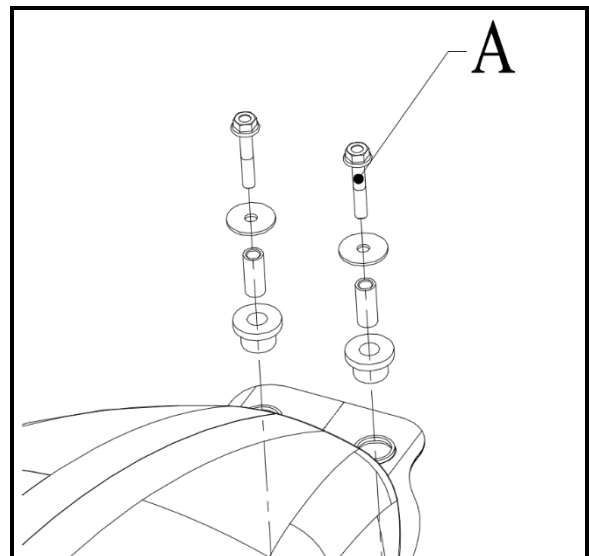
**Gasoline is extremely flammable and may even cause explosion in some cases. Therefore, it must be ensured that the above operations are performed in a well-ventilated area, and any fire source or spark is strictly prohibited, including any devices with indicators. No smoking! Close the electric door lock! Disconnect the negative electrode (-) of battery**

**In order to minimize the amount of spilled fuel, the fuel in the fuel tank should be extracted when the engine is cool. If some fuel spills, it must be thoroughly cleaned.**

Disassemble

Bolt [A]

Remove fuel level sensor wire connector.



Disconnect:

Connector between fuel hose and fuel pump [B]

**⚠ WARNING**

**The fuel hose connector must be covered with a cloth when being removed. The residual pressure in the fuel pipeline when the hose is removed may cause the ejection of fuel.**

Note:

- Remove the fuel hose with hands. Do not remove the hose with tools forcibly.
- Although the fuel in the fuel tank has been removed, there may still be fuel residuals, so be careful when disassembling the fuel hose.
- Do not remove the fuel hose from the fuel hose connector. Remove the connector from the fuel pump interface.

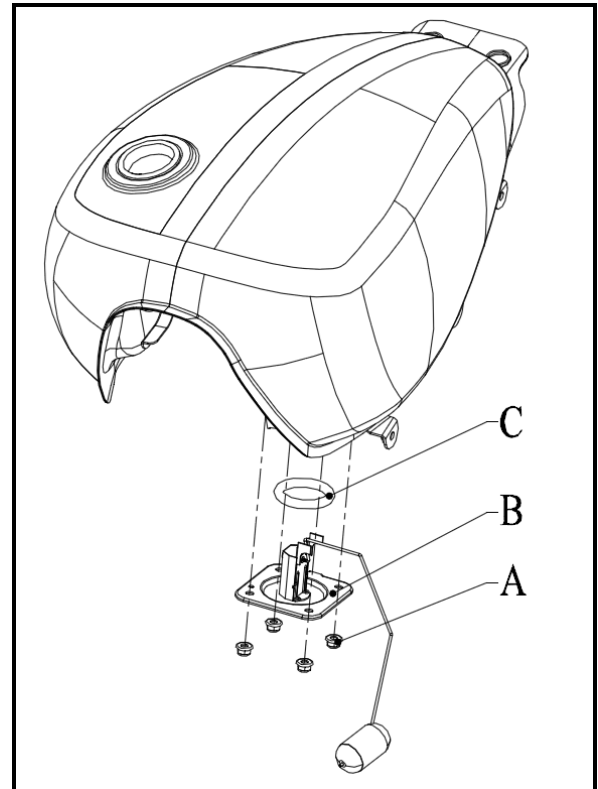
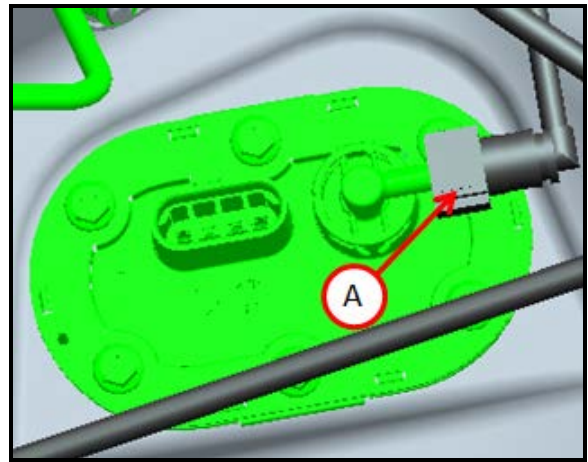
Remove the fuel tank from the frame

Disassemble

Nut [A]

Fuel level sensor assembly [A]

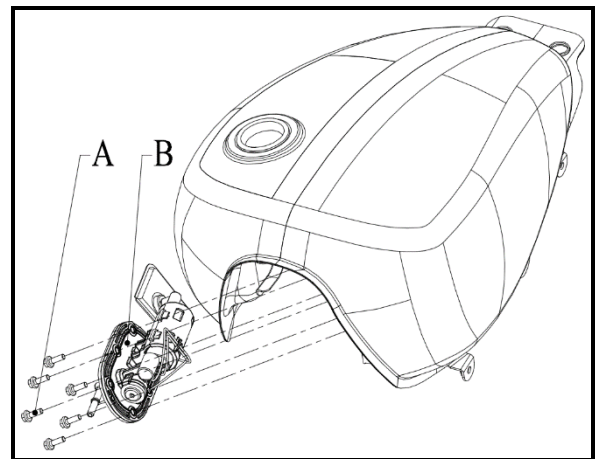
Sensor rubber washer [B]



Disassemble  
Bolt [A]  
Fuel pump assembly [B]

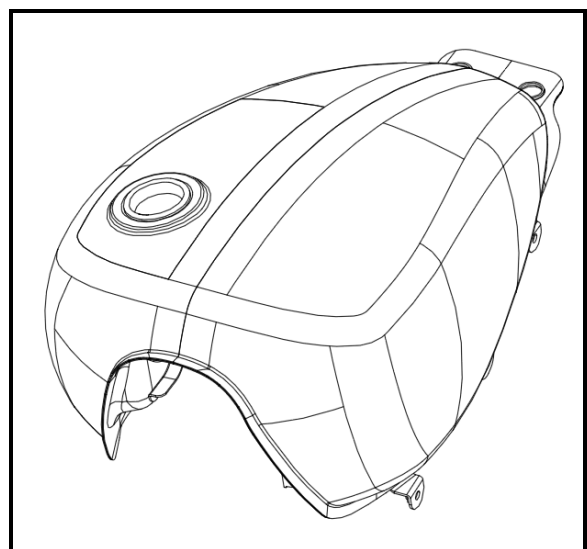
**Notes**

**Do not drop the fuel pump, especially avoid falling on hard surfaces, otherwise the fuel pump may be damaged.**

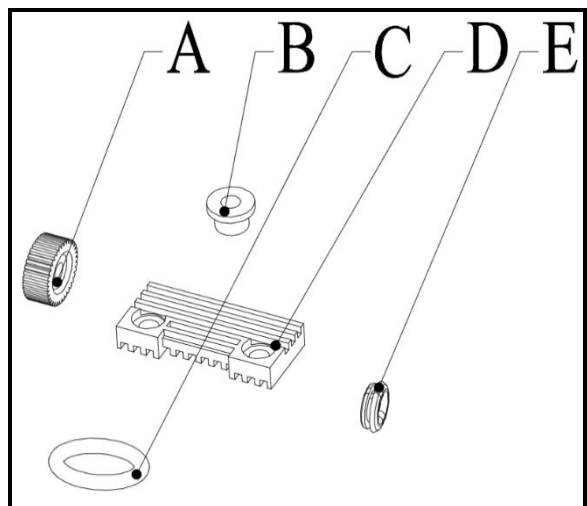


### 9.4.2 Inspection

• Inspection  
Fuel tank  
Rust / damage / oil leakage→replacement



• Inspection  
Rubber part  
Buffer rubber [A]  
Rubber cover [B]  
Sensor rubber washer [C]  
Mounting washer of fuel tank [D]  
Rubber washer of guard [E]  
Crack/damage→Replacement



- Inspection

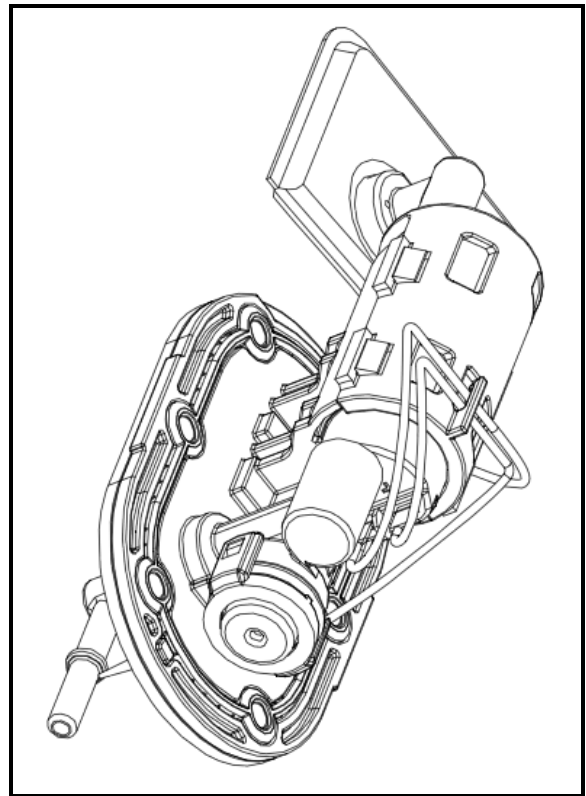
- Inspect fuel pump

- Fuel pump

- Block-clean it

- Crack/damage→Replace fuel pump assembly

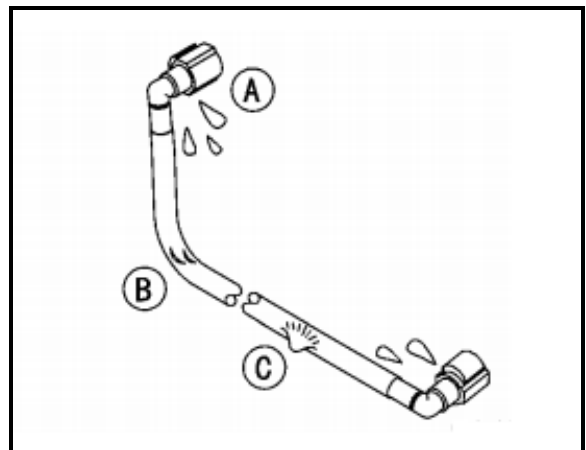
- Performance inspection of fuel pump (see Chapter XVII for details)



- Inspection

Fuel hose

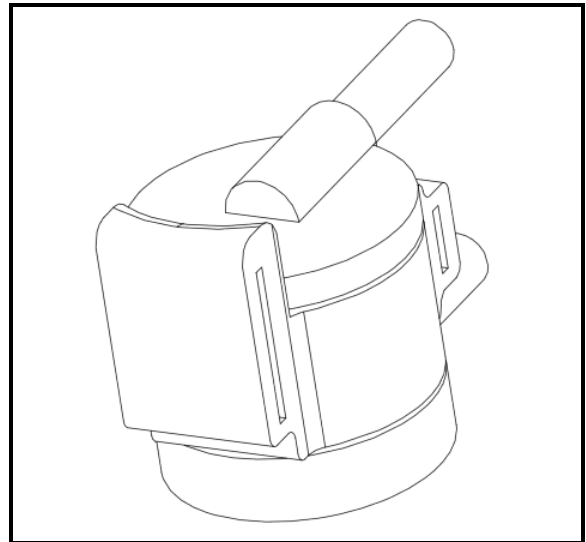
If any wear, crack [B] or expansion [C] is found → the fuel pipe must be replaced.



- Inspection

Dump valve

Damage/fault→Replacement



### 9.4.3 Installation

Install it in the reverse order of “disassembly”

**Torque value:**

**Fuel tank mounting bolt**                    **10-12 N·m**

**Fuel level sensor mounting bolt**        **5-9 N·m**

**Fuel pump mounting bolt**                 **3-4 N·m**

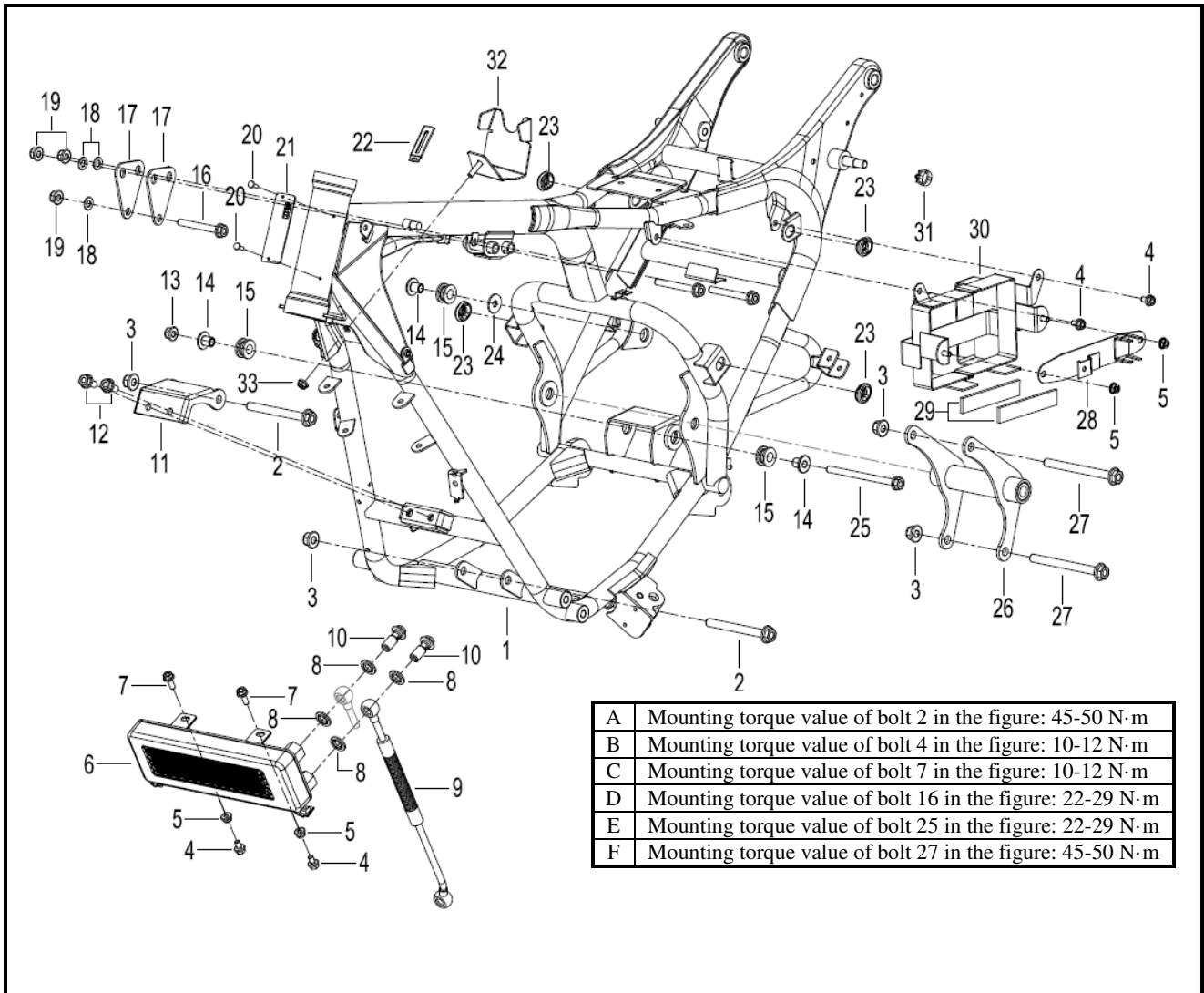
Note:

Do not damage the mounting surface of fuel tank  
when installing the fuel pump  
Use new fuel pump seal ring

Note:

See Chapter XVIII for the details of fuel pump

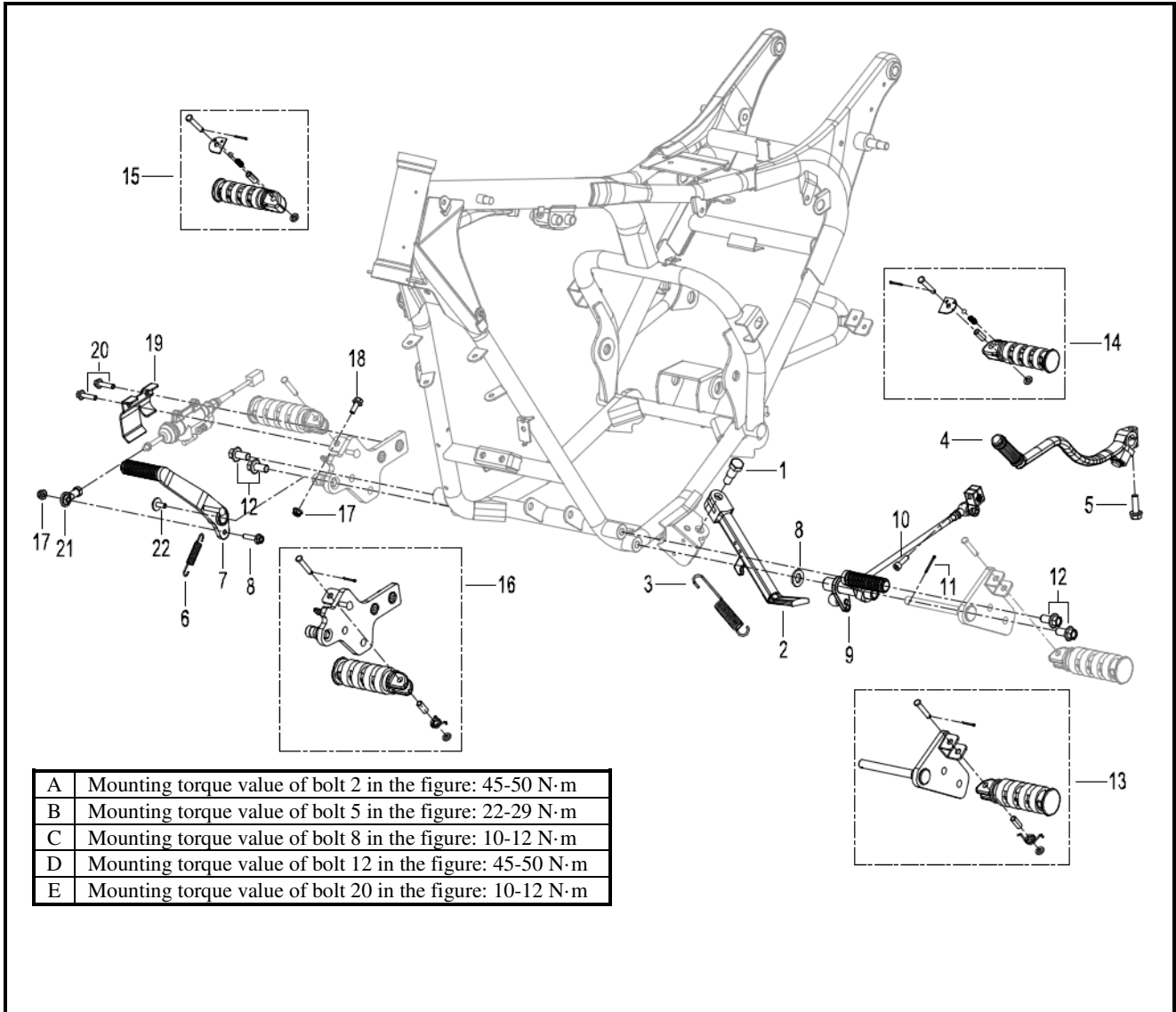
# Frame





No.	Name	No.	Name
1	Frame welding assembly	21	Nameplate of frame
2	Bolt M10×1.25×95	22	Clamp assembly
3	Self-locking nut M10×1.25	23	Rubber washer of cover
4	Bolt M6×10	24	Washer φ8
5	Self-locking nut M6	25	Bolt M8×110
6	Fuel cooler assembly	26	Rear hanging board assembly of engine
7	Bolt M6×16	27	Bolt M10×1.25×10
8	Washer	28	Battery bracket mounting plate
9	Fuel inlet pipe assembly	29	Battery bracket rubber
10	Oil drain bolt	30	Battery holder
11	Front hanging board of engine	31	Brake wire clamp
12	Bolt M8×16	32	Wire box mounting plate welding assembly
13	Self-locking nut M8	33	Nut M6
14	Guard bush		
15	Rubber cover II		
16	Bolt M8×65		
17	Upper hanging panel of engine		
18	Washer 8		
19	Nut M8		
20	Rivet for nameplate 3×6		

# Pedal



No.	Name	No.	Name
1	Sidestand welding assembly	12	Bolt M10×1.25×20
2	Sidestand bolt M10×1.25×36	13	Left pedal assembly
3	Sidestand tension spring	14	Left rear pedal assembly
4	Starter pedal assembly	15	Right rear pedal assembly
5	Bolt M8×25	16	Right pedal assembly
6	Brake return spring	17	Self-locking nut M6
7	Brake pedal welding assembly	18	Bolt M6×16
8	Bolt M6×25	19	Windshield
9	Shift rod assembly	20	Bolt M6×25
10	Inner hexagon screw M6×20	21	Joint M6
11	Split pin 2×25	22	Combination screw M6×16

# X. Disassembly/Installation of Engine

Preparatory information.....	10.1
Fault Diagnosis.....	10.2
Disassembly of engine .....	10.3
Installation of engine .....	10.4

## 10.1 Preparatory information

### General

Keep the disassembly site clean.

Lift the engine using a jack or other supporting devices.

Tighten bolts and nuts to the specified torque values during assembly.

Check whether all the parts are installed or operated correctly after assembly.

Disassemble the engine when repairing the following parts:

- Cylinder head box valve
- Cylinder and piston
- Crankshaft, pedal starter and transmission.

### Specifications

Oil capacity of engine:	1.1±0.1L <b>when changing oil</b>
	1.2±0.1L <b>when disassembling</b>

### Locking torque

<b>Front mounting bolt of engine</b>	<b>45-50N·m</b>
<b>Upper mounting bolt of engine</b>	<b>22-29N·m</b>
<b>Rear mounting bolt of engine</b>	<b>45-50N·m</b>

## 10.2 Fault Diagnosis

Compression pressure is low Wear, burn or breakage of piston Wear or damage of cylinder and piston	The gear cannot be engaged Breakage or deformation of gear shift fork	It is difficult to shift the gear The clutch is not completely disengaged Breakage of fork guide pin Defective operation of return spring of transmission
<b>Abnormal sound of crankcase</b> Scattered or broken parts in the crankcase	<b>Automatic shutdown of engine</b> Stuck clutch	

## 10.3 Disassembly of Engine

Disassemble fuel tank assembly.

Disassemble air filter assembly and muffler assembly.

Before repairing the crankcase, drain the engine oil.

Remove the bolt and rear cover of left crankcase.

Loosen rear wheel axle nut and drive chain adjusting nut.

Remove the driving sprocket bolt and sprocket mounting plate.

Remove the driving sprocket from the middle shaft.

Remove the shifting arm from the shifting mandrel.

Remove the alternator wire connector.

Remove rear wheel locknut and clutch adjusting nut.

Remove the clutch cable from the pushing arm of clutch.

Remove nut and starter motor cable.

Remove bolt, grounding cable and crankcase air pipe

Remove the spark plug cap.

Remove the throttle body and isolator mounting bolt.

Lift the engine using a jack or other supporting devices.

Remove the engine mounting nut and bolt from frame, and disassemble engine mounting plate and engine.

## 10.4 Installation of Engine

Install it in the reverse order of “disassembly”

Note:

**Ensure that the usage position of engine mounting bolt is correct.**

Replace them with new O-ring of throttle body and isolator.

Install the engine on the frame and tighten the mounting nut.

**Installation torque value:**

**Front mounting nut of engine** 45-50N·m

**Upper mounting nut of engine** 22-29N·m

**Rear mounting nut of engine** 45-50N·m

Note:

**Properly lay wire and cable.**

If oil has been drained, fill the crankcase with recommended engine oil

Conduct the following inspection and adjustment after installing the engine;

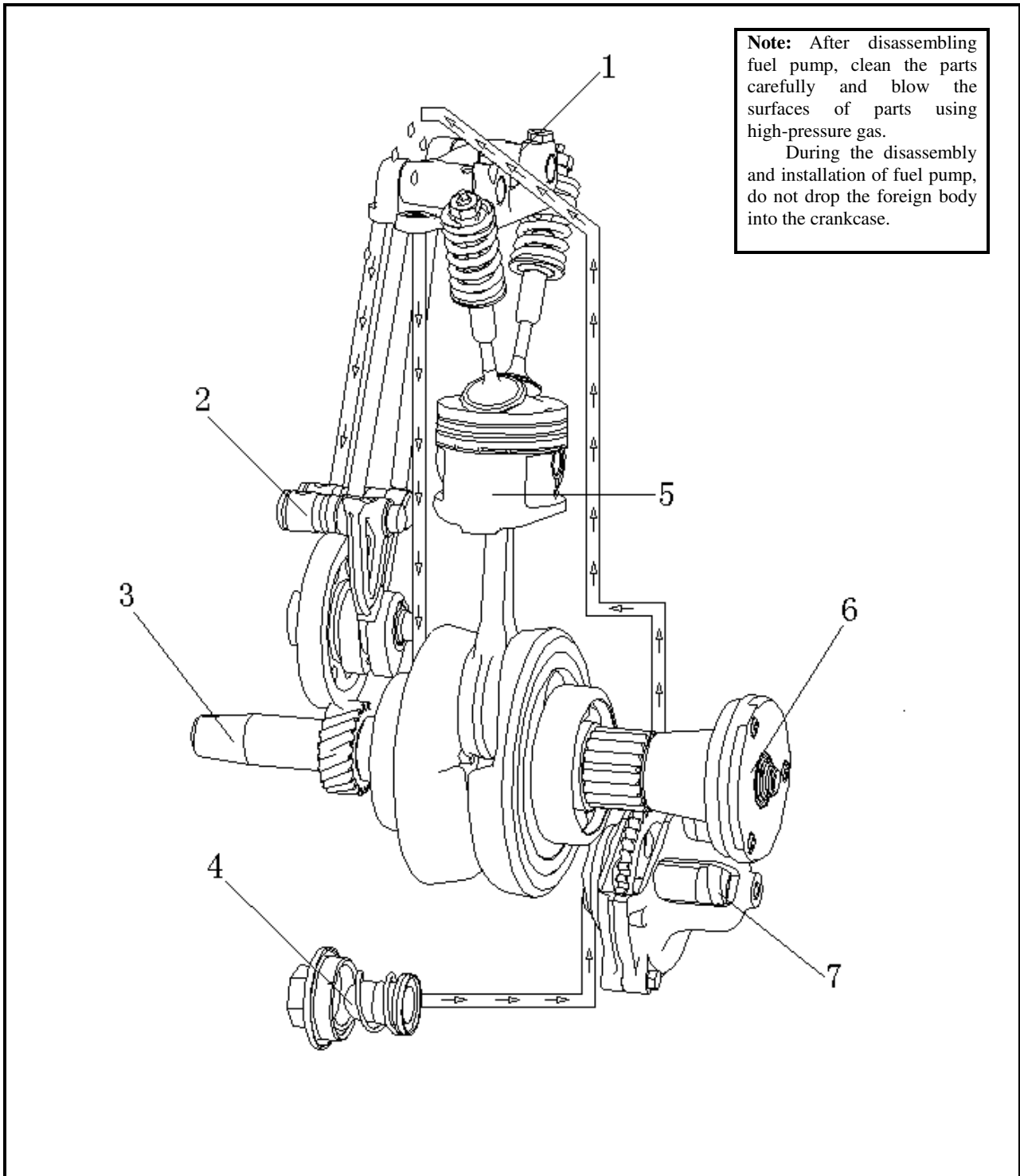
- Engine oil level.
- Tightness of driving chain.
- Clearance of rear brake pedal.
- Clearance of clutch push lever.
- Clearance of throttle cable.

# Inspection and maintenance of engine

## Table of torque value of engine fastener

Fastening location and fastener name	Tightening torque (N•m)
Cylinder head nut	25~28
Rocker arm seat bolt	15~20
Double-end bolt of cylinder	10~17
Cam follower shaft mounting bolt	18~23
Flywheel locknut	55~60
Filter spring screw cap	15~30
Valve clearance adjusting nut	10~15
Shift positioner bolt	10~16
Assembling bolt	9.8~11
Bolt at left / right crankcase cover	9.8~11
Coil screw	9.8~11
Screw at oil filter cover	4~7
Clutch push disc bolt	10~16
Bolt at cylinder head cover	9.8~11
Cylinder block clamp bolt	9.8~11
Oil filter rotor nut	40~50
Driving sprocket bolt	10~16
Fuel pump screw	9.8~11
Shift positioner bolt	10~16
Spark plug	15~26

# Lubrication System



1 Rocker arm 2 Cam mechanism 3 Crankshaft 4 Oil filter mesh 5 Piston 6 Oil filter 7 Fuel pump

# XI. Lubrication System

Preparatory Information ..... 11.1  
Fault Diagnosis..... 11.2  
Fuel Pump ..... 11.3

## 11.1 Preparatory Information

### Operation Precautions:

After disassembling fuel pump, clean the parts carefully and blow the surfaces of parts using high-pressure gas.  
During the disassembly of fuel pump, do not drop the foreign body into the crankcase.

**Function of lubricating system:** The function of the lubricating system of engine is to provide lubricant to the friction surface of workpiece to make the dry surface friction become into the liquid friction between lubricant particles so as to reduce the wear of parts; cool the parts with high heat loads; absorb the impacts of bearing and other parts and reduce noise; increase the sealability between the piston ring and cylinder wall; clean and remove the impurities on the surfaces of parts.

### Technical parameters

Item		Normal	Allowable limit
Oil capacity	When replacing the oil	1.1±0.1L	—
	When disassembling	1.2±0.1L	—
Fuel pump rotor	Radial clearance between inner and outer rotors	0.10-0.15	0.25
	Clearance between outer rotor and pump	0.10-0.15	0.25
	Rotor end gap	0.07-0.12	0.15

## 11.2 Fault Diagnosis

### Reduced oil level

Natural consumption of oil  
Oil leakage

### Burning of engine

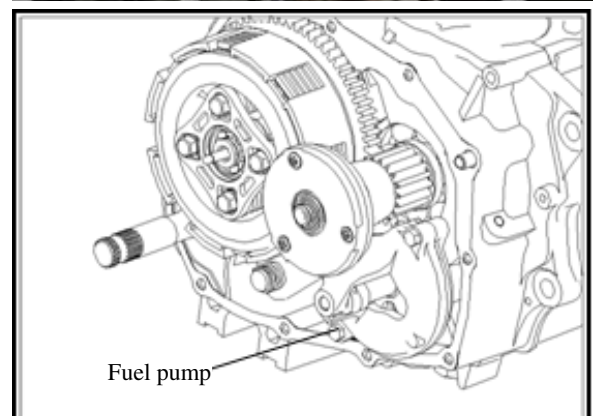
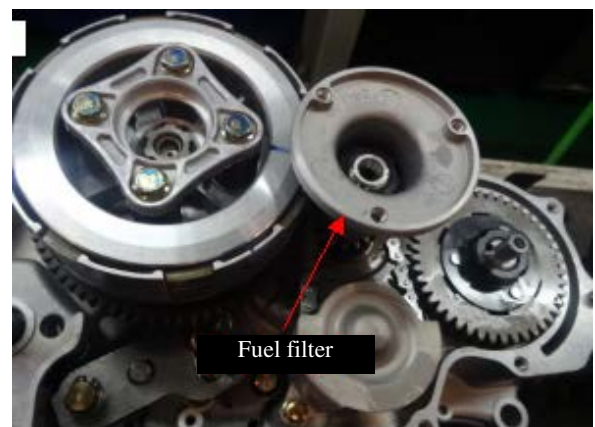
There is no oil pressure or oil pressure is too low  
Oil path is blocked



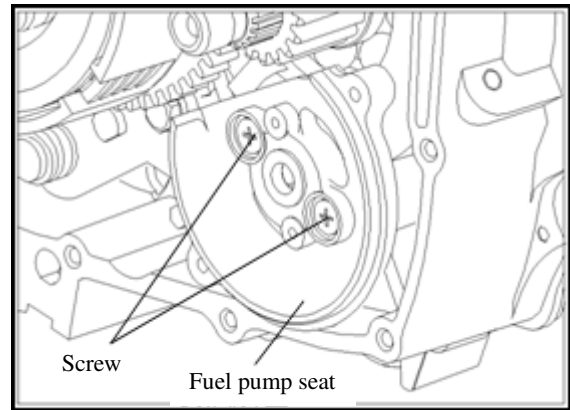
## 11.3 Fuel Pump

### 11.3.1 Disassembly

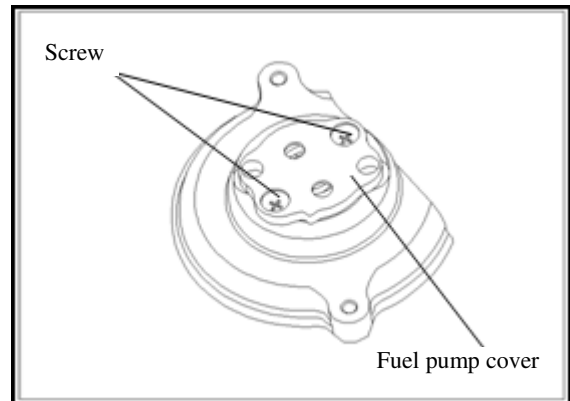
Remove the right cover,  
remove the oil filter  
loosen fuel pump mounting screw,  
remove fuel pump body, driving gear and fuel pump  
shaft.



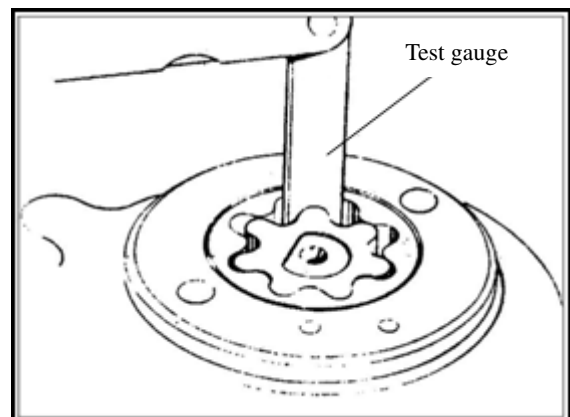
Remove the screw.  
Remove fuel pump seat.



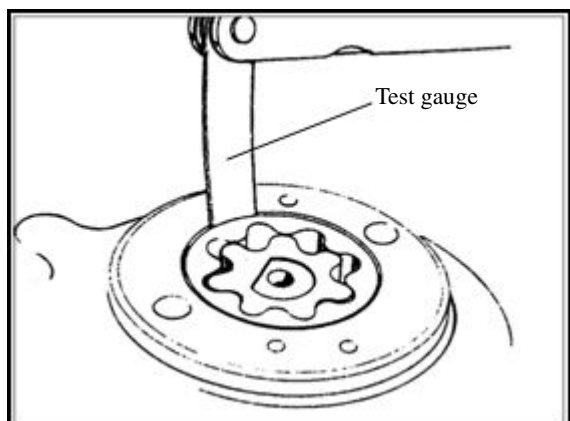
Remove the screw, remove the fuel pump cover and disassemble fuel pump.



Check the radial clearance of internal and external rotors.  
Allowable limit: 0.25mm.

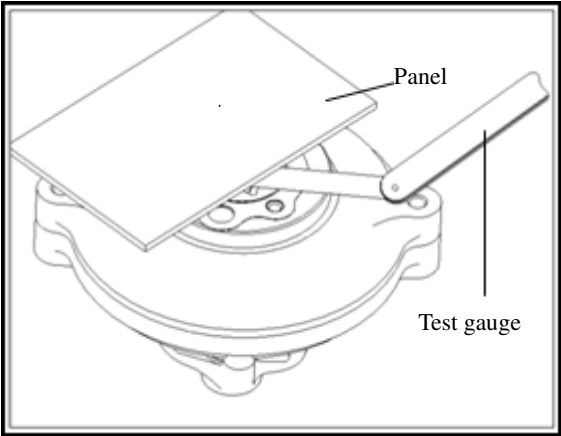


Check the clearance between external rotor and fuel pump base.  
**Allowable limit: 0.25mm.**



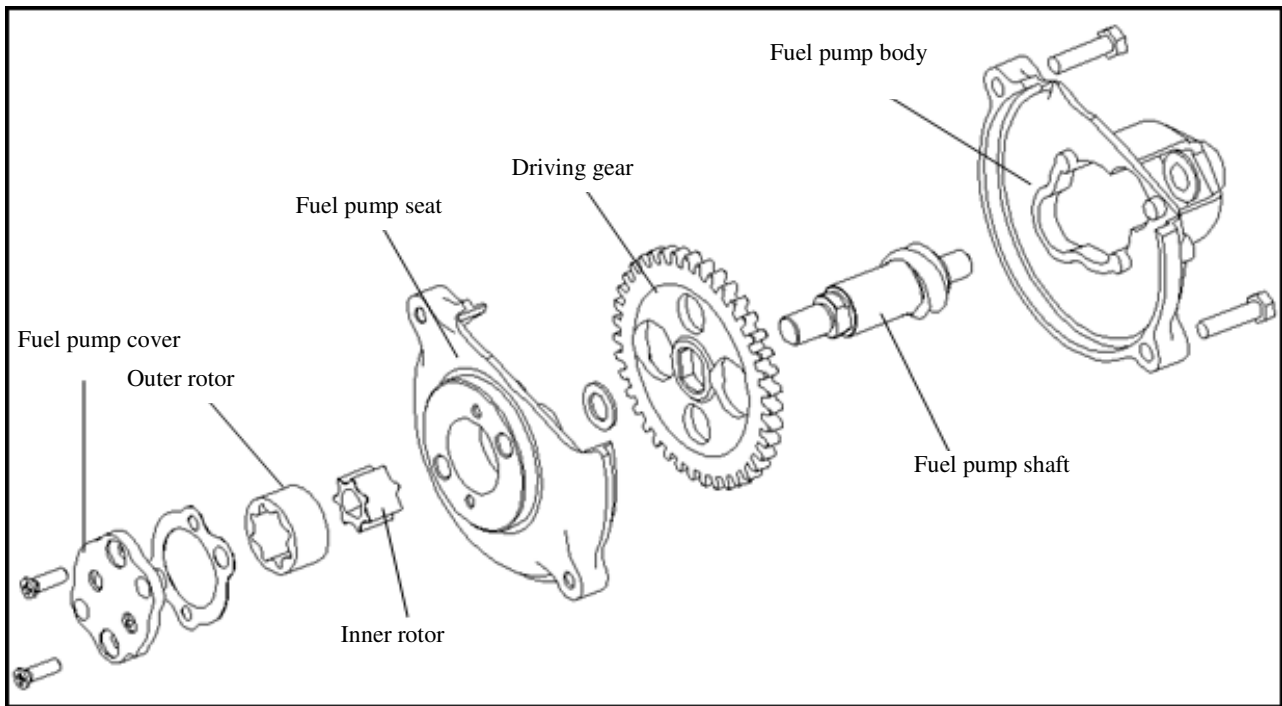
Check the end clearance of rotor.

**Allowable limit: 0.15mm.**



### 10.3.2 Assembly of Fuel Pump

As shown in the figure



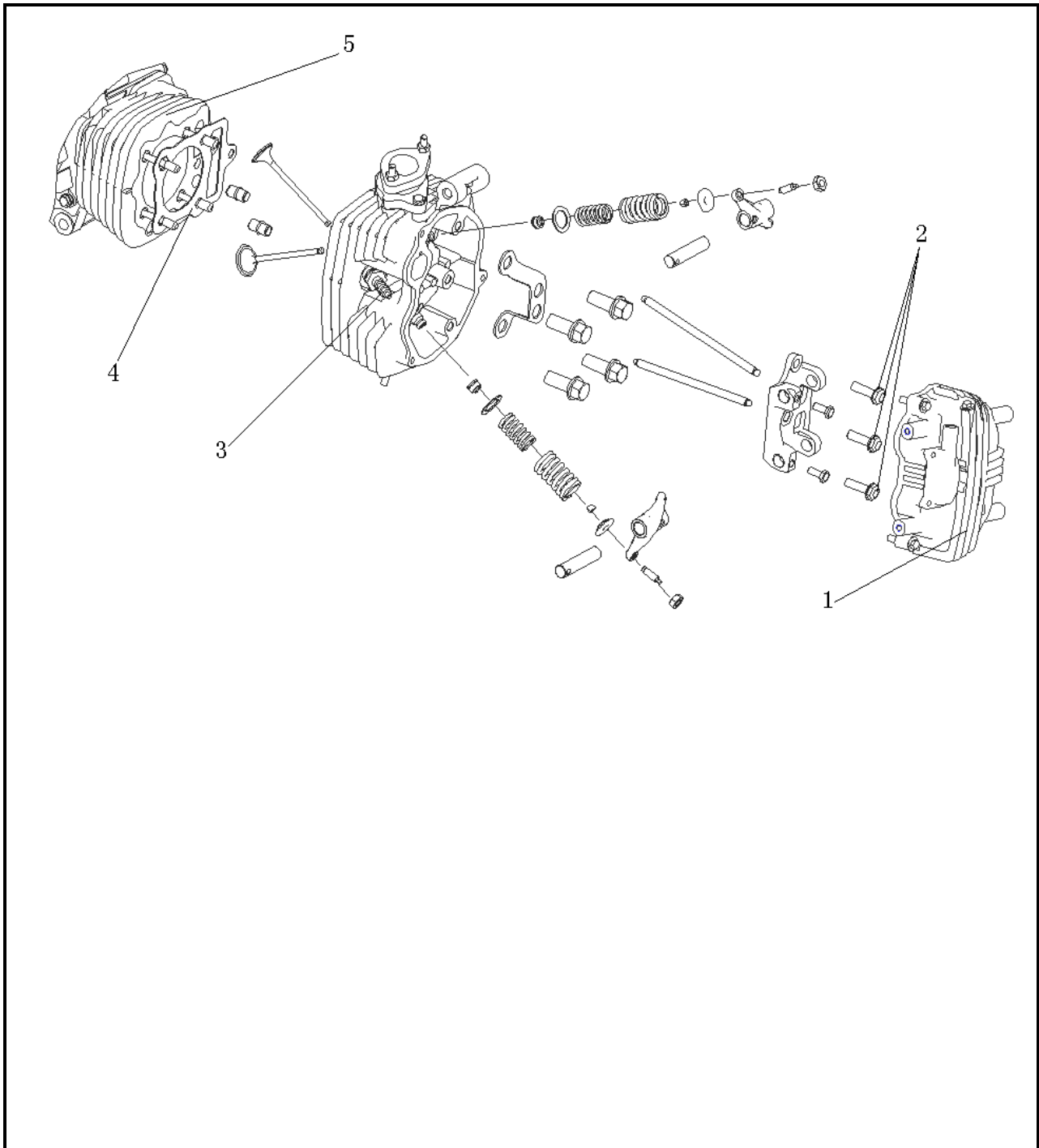
\*Note:

After assembly, the inner and outer rotors should be able to rotate flexibly without clamping stagnation.

### 10.3.2 Installation

Install it in the reverse order of disassembly.

## Cylinder head / valve



1 Cylinder head cover 2 Bolt 3 Spark plug 4 Cylinder washer 5 Cylinder

## XII. Cylinder head / valve

Preparatory Information .....	12.1	Replacement of valve guide .....	12.5
Fault Diagnosis.....	12.2	Adjustment of valve retainer .....	12.6
Cylinder head .....	12.3	Installation of cylinder head .....	12.7
Valve inspection.....	12.4		

### 12.1 Preparatory information

#### Precautions for operation

In order to ensure the sealing of cylinder head and cylinder block, the cylinder head withstands great bolt pretightening force. Pretightening force value: 50 N·m

Before the inspection and measurement, all parts shall be cleaned and blown with high-pressure air.

**Function of cylinder head:** Cylinder head is used to seal the cylinder and it forms a combustion chamber with the piston to withstand the high temperature and high pressure gas. And it can also complete the intake and exhaust through the distribution mechanism.

#### Technical parameters

Unit: mm

Item			Normal	Allowable limit
Planeness of cylinder head			0.03	0.05
Valve Valve guide	Valve clearance	Inlet	0.05-0.07	—
		Outlet	0.05-0.07	—
	Outer diameter of valve stem	Intake	5.44-5.45	5.40
		Exhaust	5.435-5.445	5.40
	Inner diameter of valve guide:	Intake	5.475-5.485	5.50
		Exhaust	5.475-5.485	5.50
	Clearance between valve stem and valve guide	Intake	0.025-0.045	0.08
		Exhaust	0.03-0.05	0.10
Width of valve seat	Intake / exhaust	0.8-1.0	1.6	
Valve spring	Free length	Inner	33.5	30
		Outer	40.9	39.5
Rocker arm	Outer diameter of rocker arm shaft	Intake / exhaust	11.98-11.988	11.95
	Inner diameter of rocker arm hole	Intake / exhaust	12-12.018	12.05
	Clearance between rocker arm shaft and rocker arm hole	Intake / exhaust	0.012-0.038	0.08

## 12.2 Fault Diagnosis

### Compression pressure is low

Valve clearance is not adjusted properly

Valve burns out or is bent

### The airtightness of valve seat is not good

The washer of cylinder head is leaking

The spark plug is not installed properly

### Abnormal sound of cylinder head

Valve clearance is not adjusted properly

Valve spring is damaged

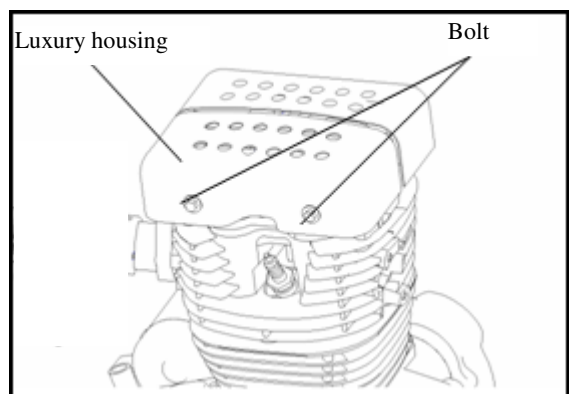
### Compression pressure is too high

There is excessive carbon deposition in the combustion chamber

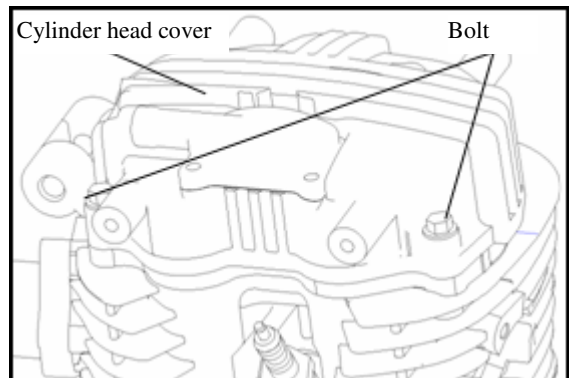
## 12.3 Cylinder Head

### 12.3.1 Disassembly

Loosen bolt and remove the luxury housing.

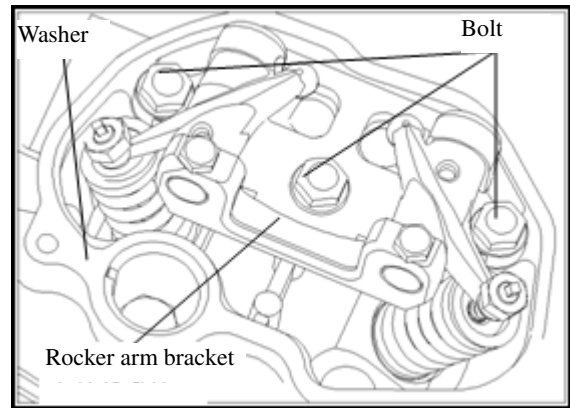


Loosen three mounting bolts and remove the cylinder head cover.



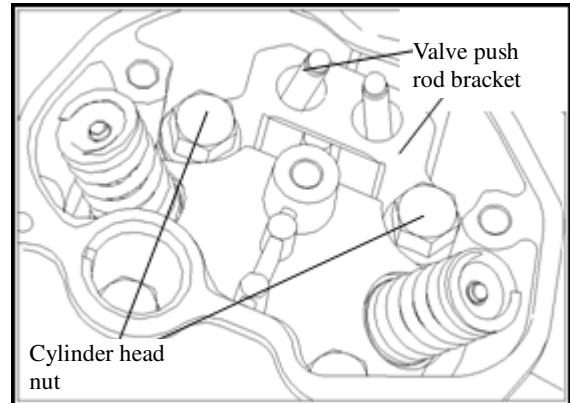
Remove the washer.

Loosen three clamp bolts, and remove the rocker arm bracket (rocker arm).



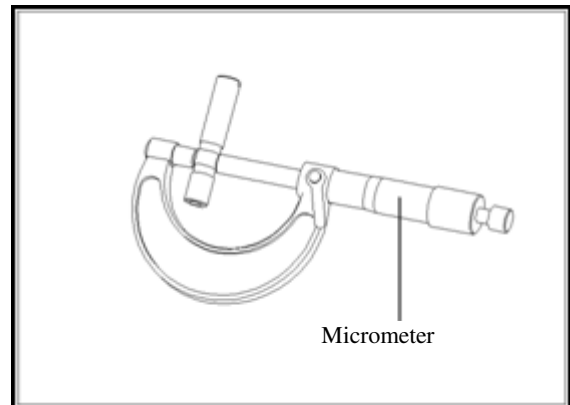
Remove the valve pusher.

Loosen cylinder head nut, and remove the pusher bracket.



Measure the external diameter of rocker arm.

**Allowable limit: 11.95 mm.**

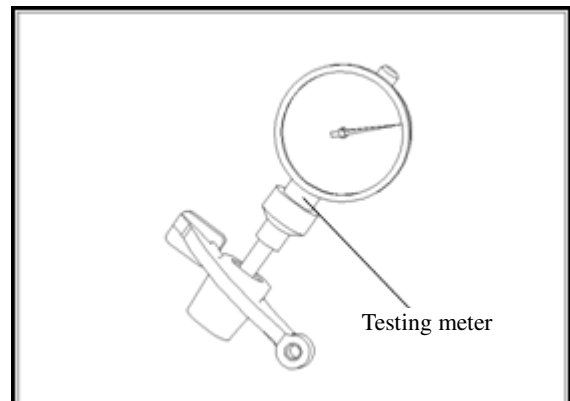


Measure the inner diameter of rocker arm hole.

**Allowable limit: 12.05 mm.**

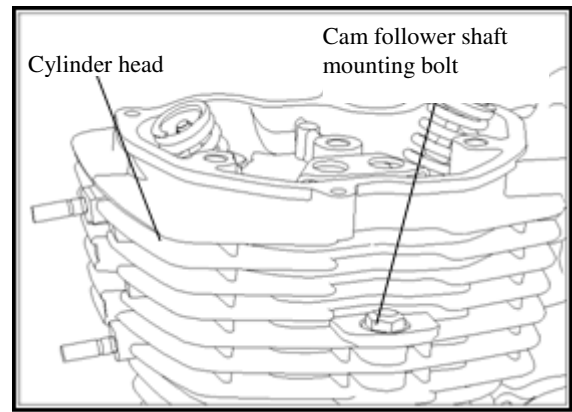
Clearance between rocker arm hole and rocker arm shaft.

**Allowable limit: 0.08 mm.**



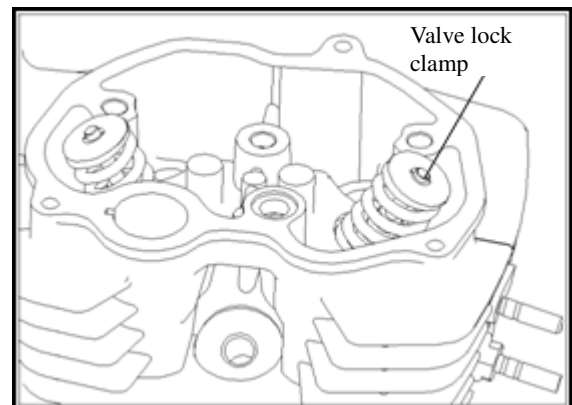
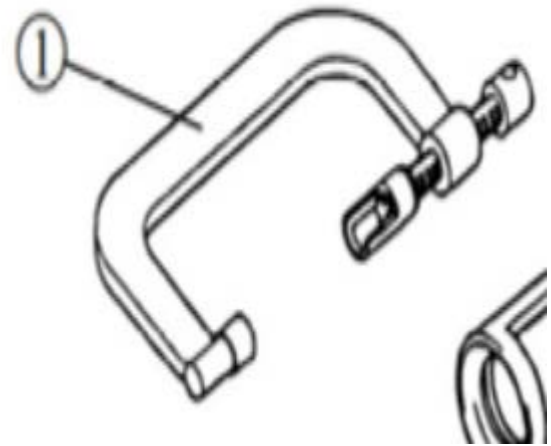


Remove the cam follower shaft mounting bolt and take down the cylinder head.

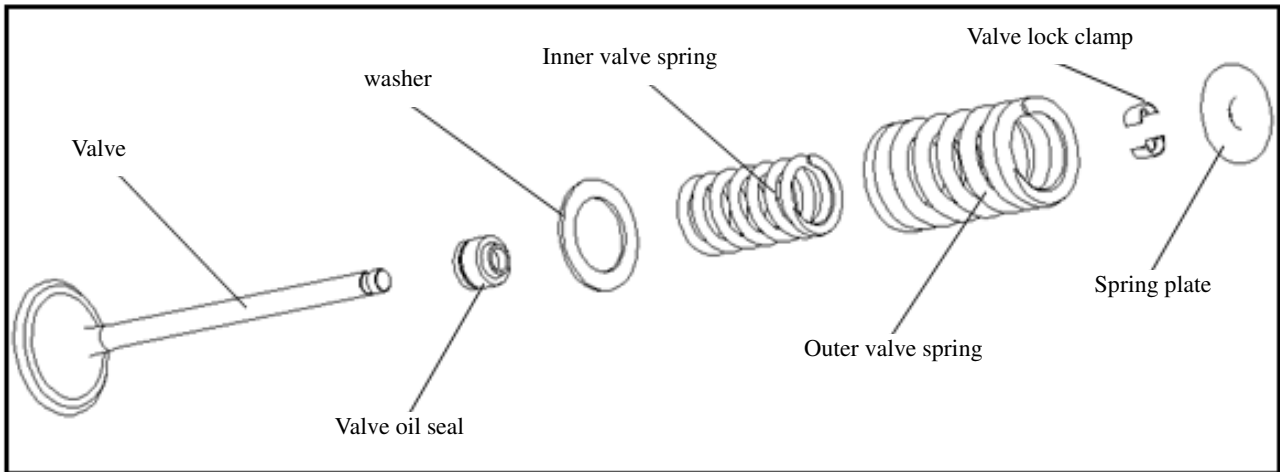


Compress the valve spring with ① valve spring compression tool (QJ153-10-0104/G10) and remove valve cotter.

Remove the spring disc, the springs of outer and inner valves, the spring washer of outer valve and the valve.



### 12.3.2 Valve decomposition



## 12.4 Valve inspection

Clear the carbon deposits on the cylinder head.

Measure the flatness of the cylinder head joint surface.

**Allowable limit: 0.05mm.**

When the flatness of the cylinder head joint surface exceeds the use limit, place a fine sandpaper on the flat plate, make the cylinder head joint surface fit the sandpaper and sand the surface in 8 shape.

Measure the free length of inner and outer valve springs.

**Allowable limit: inner spring: 30mm.**

**Outer spring: 39.5mm.**

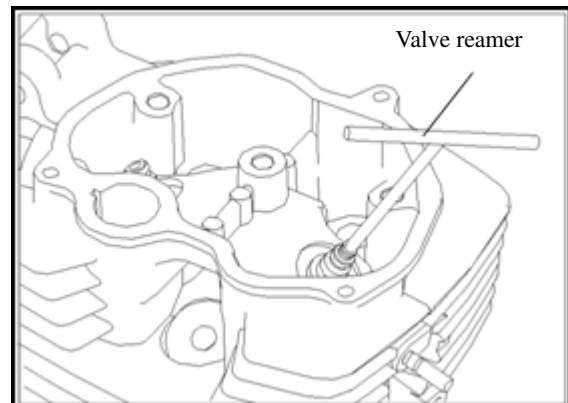
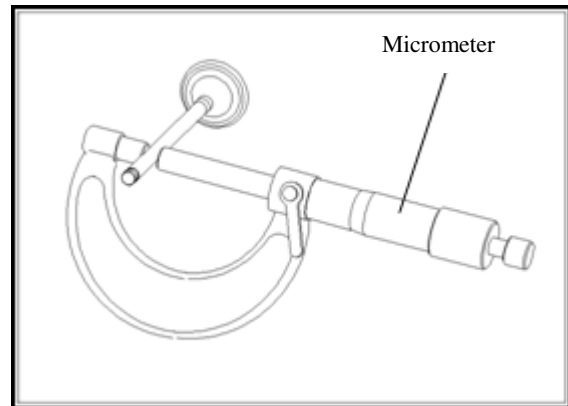
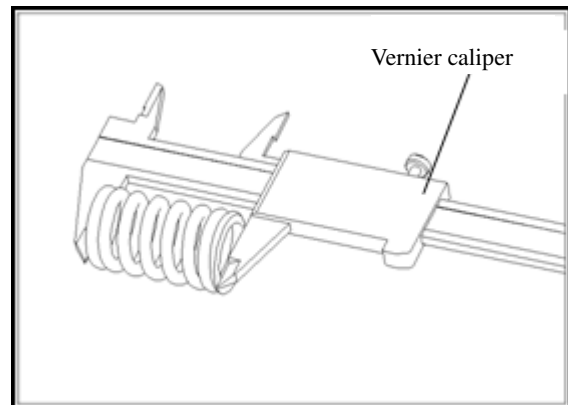
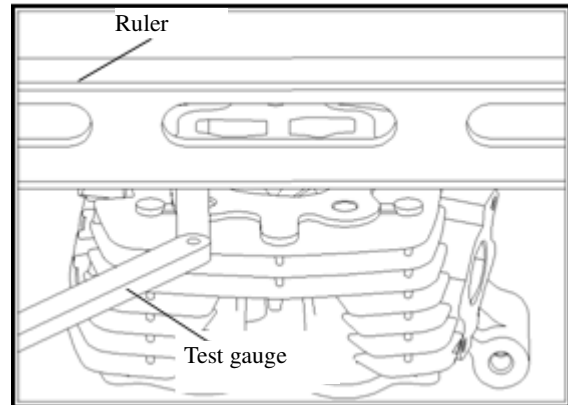
Measure the external diameter of valve stem.

**Allowable limit: 5.40 mm.**

Check the valve guide and remove the carbon deposits in the valve guide with a reamer before check.

**Note:**

**Rotate the reamer clockwise and do not rotate the reamer counterclockwise.**



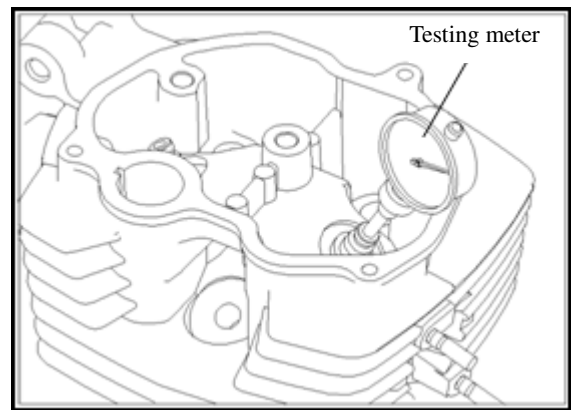
Measure the inner diameter of valve guide.

**Allowable limit: intake /exhaust: 5.5mm**

Clearance between valve and valve guide

**Allowable limit: Intake valve: 0.08mm.**

**Exhaust valve: 1.0mm.**



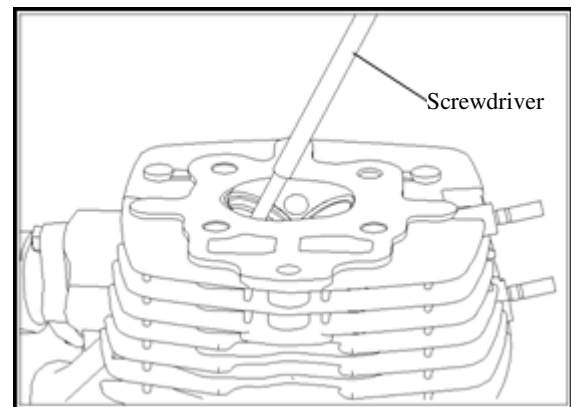
## 12.5 Replacement of Valve Guide

### \*Note:

If the clearance between valve and valve guide exceeds the limit, replace the valve guide. After the valve guide is replaced, the valve seat ring surface must be finished. Put the valve guide in the freezing cavity of refrigerator to cool it for an hour.

Use the electric furnace or oven to heat the cylinder head to 100-150 °C.

Fix the cylinder head and remove the valve guide from the upper side of cylinder head with the valve guide disassembly tool.

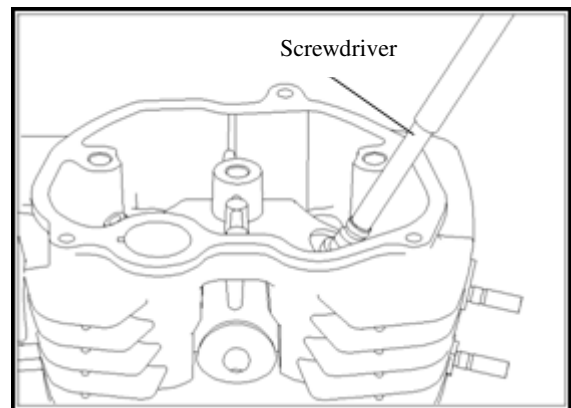


Put a new O-ring on the new valve guide.

Install the valve guide from the top of cylinder head.

### \*Note:

Do not damage the cylinder head when installing the valve guide.

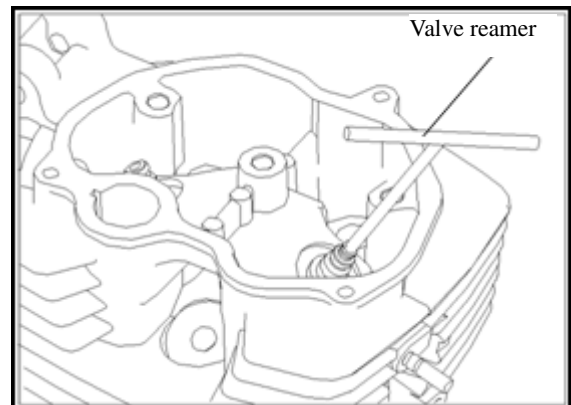


After the valve guide is embedded, carry out the finishing by using the valve guide reamer.

### \*Note:

Add an appropriate amount of cutting oil during cutting with a reamer.

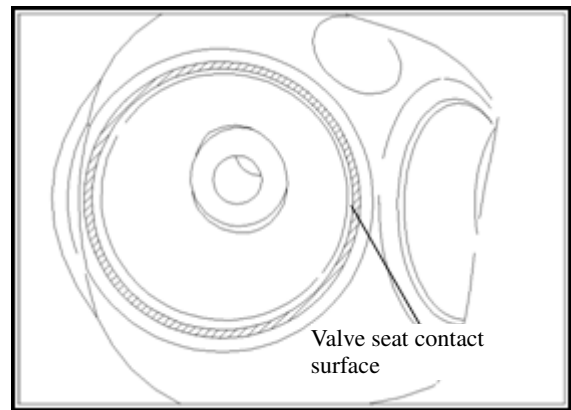
The reamer shall be rotated clockwise.



Clean the carbon deposits in the combustion chamber and valve, and thoroughly rinse the intake and exhaust valves.

Check the width of valve seat contact surface (width of valve seat ring).

**Allowable limit: intake /exhaust: 1.6mm**



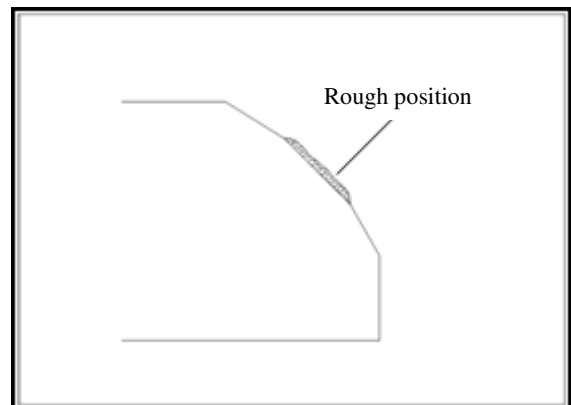
## 12.6 Finishing Valve Seat Ring

Use a 45° cutter to remove the rough or uneven parts on the surface of valve seat ring.

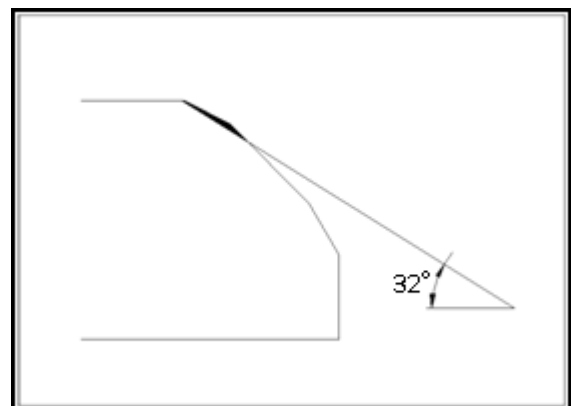
**\*Note:**

Apply a layer of transparent or Prussia blue coating to the valve seat ring.

so that it can be seen more clearly.

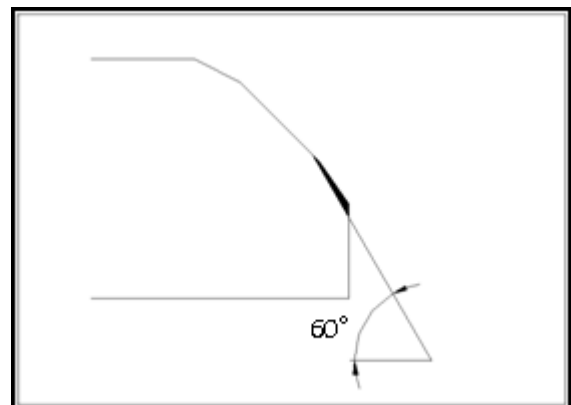


Remove 1/4 of outer end of valve seat ring with a 32° cutter.



Remove 1/4 of bottom end of valve seat ring with a 60° cutter.

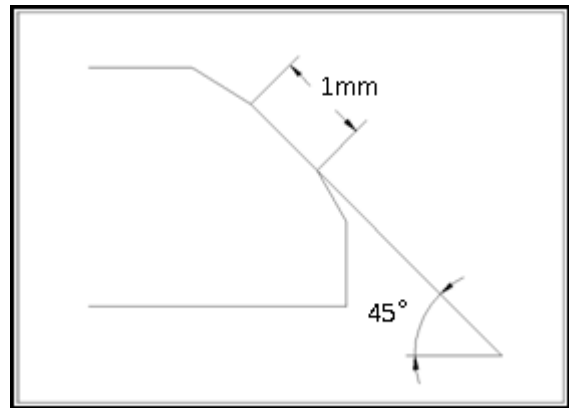
Remove the cutter, and check the places that have been handled.



Grind the valve seat ring with a 45° finishing cutter to reach an appropriate width.

Make sure to remove all dents and uneven parts.

Standard valve seat ring width: intake: **1.0mm**  
exhaust: 1.0mm

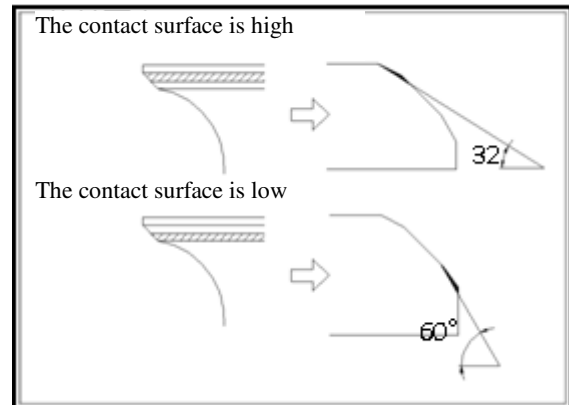


If the contacted position is in the too high part of valve, please lower the valve seat ring with a 32° flat cutter.

If the contacted position is in the too low part of valve, raise the valve seat ring with a 60° internal cutter.

Use the 45° finishing cutter to finish the valve seat ring again to make it meet the required specification.

After the valve seat ring is grinded, apply polish to the valve surface and gently polish the valve.



## 12.7 Installation of Cylinder Head

Installation shall be carried out in the order contrary to the disassembly order.

### \*Note:

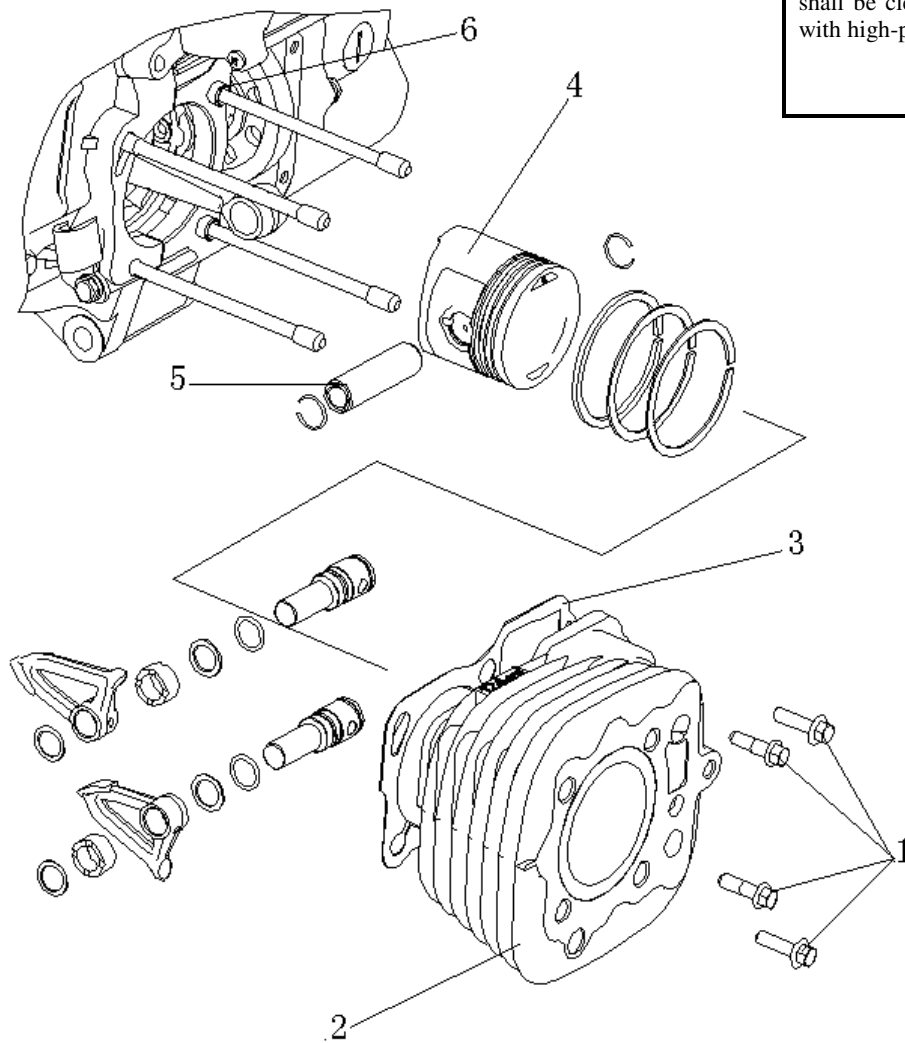
When installing the valve spring, install the end of spring with smaller pitch toward the combustion chamber.

When installing the valve collet, compress the valve spring with valve spring compression tool (QJ153-10-0104/G10) for installation.

When the valve is installed, apply appropriate amount of engine oil to the surface of the valve stem and then install the valve stem into the valve guide.

## Cylinder Block and Piston

Note: Before the inspection and measurement, all parts shall be cleaned and blown with high-pressure air.



1 Bolt    2 Cylinder block    3 Washer    4 Piston    5 Piston pin    6 Dowel pin

## **XIII. Cylinder Block and Piston**

Preparatory Information .....	13.1
Fault Diagnosis.....	13.2
Cylinder Block.....	13.3
Piston.....	13.4
Installation of Cylinder Block.....	13.5

### **13.1 Preparatory Information**

#### **Precautions for operation**

Before the inspection and measurement, all parts shall be cleaned and blown with high-pressure air.

#### **Function of cylinder block:**

The cylinder block provides a space for gas compression, combustion and expansion and guides the movement of piston.

It can also transfer some heat in the cylinder to the surrounding cooling mediums.

#### **Function of piston:**

It can withstand the pressure generated by the combustion of combustible gas mixture in the cylinder and transmit the pressure to the connecting rod to drive the crankshaft to rotate. Form a combustion chamber together with the cylinder head and other parts.

Acting as a slide valve for opening and closing air, the fresh mixed gas in crankcase is pressed into the cylinder regularly and the exhaust gas after burning in the cylinder is discharged timely.



## Technical parameters Unit: mm

Item		Standard value	Allowable limit	
Cylinder	Inner diameter	56-56.505	56.505	
	Cylindricity		0.05	
	Roundness		0.05	
	Planeness	0.03	0.05	
	Outer diameter of piston (measurement point)	56.470-56.485 (11mm at the bottom of piston skirt)	56.470	
	Inner diameter of piston pin hole	13.002-13.008	13.04	
	Outer diameter of piston pin	12.994-13.000	12.96	
	Clearance between piston and piston pin	(+0.005, +0.011)	0.07	
	Clearance between piston ring and ring groove	First ring	(+0.015, +0.05)	0.09
		Second ring	(+0.015, +0.05)	0.09
	Piston ring joint clearance	First ring	0.15-0.30	0.5
		Second ring	0.15-0.30	0.5
		Oil ring		—
Inner diameter of connecting rod small end	13.010-13.018	13.06		
Clearance between connecting rod and piston pin	(+0.014, +0.020)	0.10		
Cam follower Cam follower shaft	Inner diameter of cam follower hole	12.01-12.018	12.05	
	Outer diameter of cam follower hole	11.986-11.994	11.93	
	Clearance between cam follower hole and shaft	0.016-0.032	0.08	
Timing gear of camshaft Camshaft mechanism shaft	Cam height	32.6-32.8478	32.5	
	Inner diameter of camshaft liner	14.06-14.078	14.10	
	Clearance between camshaft mechanism shaft and liner	0.025-0.053	0.08	

## 13.2 Fault Diagnosis

Compression pressure is low  
smoke

Wear, burning loss or damage of piston

Wear or damage of cylinder and piston

Damage of washer and leakage between crankcase and gas

Compression pressure is too high

Too much carbon is accumulated in the combustion chamber

Exhaust pipe is emitting white

Wear or damage of piston ring

Wear or damage of piston or cylinder

Abnormal sound of piston

Damage of cylinder, piston and piston ring

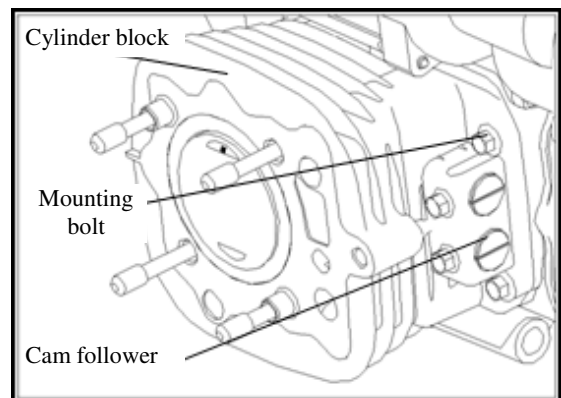
Wear of piston pin hole and piston pin

## 3.3 Cylinder Block

### 13.3.1 Disassembly of Cylinder Block

Remove the cylinder block mounting bolt.

Remove the cylinder block (with cam follower).

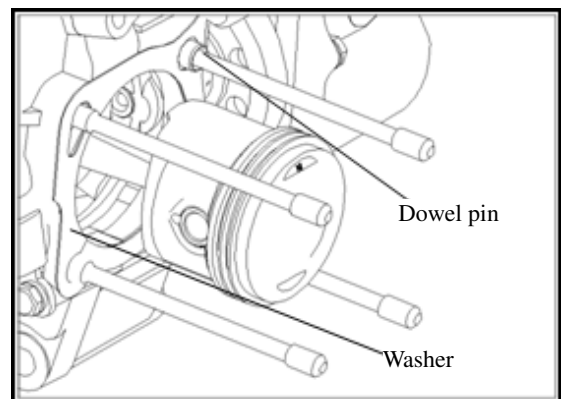


### 13.3.2 Inspection of Cylinder Block

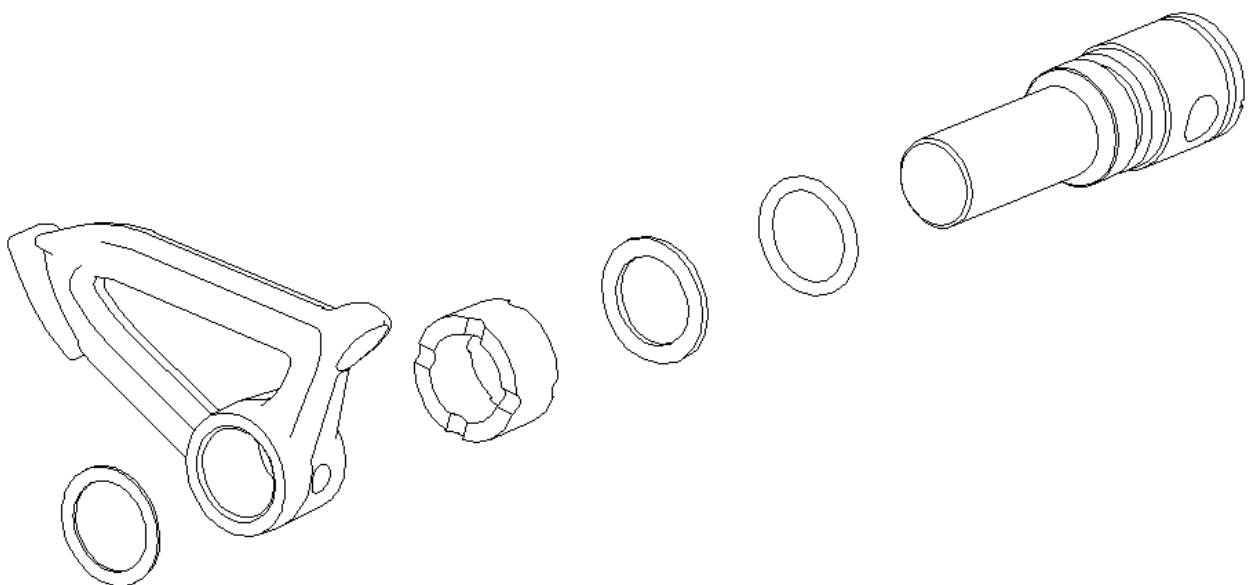
Check the wear situation of inner wall of cylinder.

If the wear is serious, please replace it.

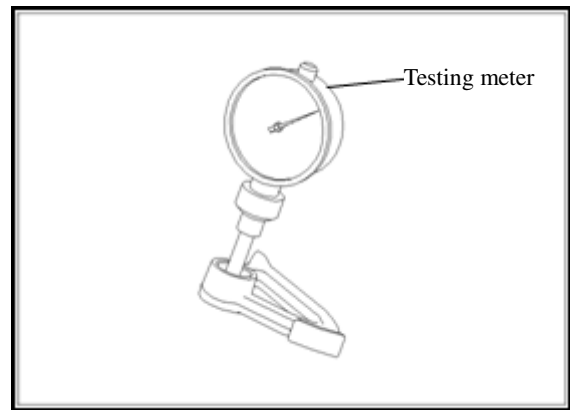
Remove washer and dowel pin.



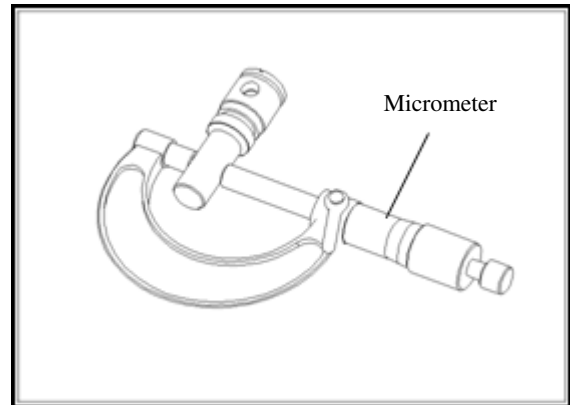
### 13.3.3 Disassembly of Cam Follower



Measure the inner diameter of cam follower.  
Allowable limit:12.05 mm.



Measure the outer diameter of cam follower.  
Allowable limit:11.93 mm.  
Clearance between cam follower hole and shaft.  
Allowable limit: 0.08 mm.



## 13.4 Piston

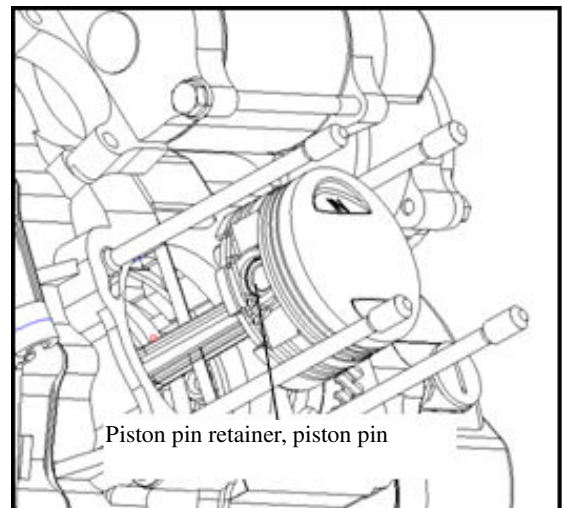
### 13.4.1 Disassembly

Remove the piston pin retainer.

**\*Note:**

During disassembly, do not drop the retainer into the crankcase.

Take out the piston pin and remove piston.



Remove the piston ring.  
Check the piston, piston pin and piston ring.

**\*Note:**

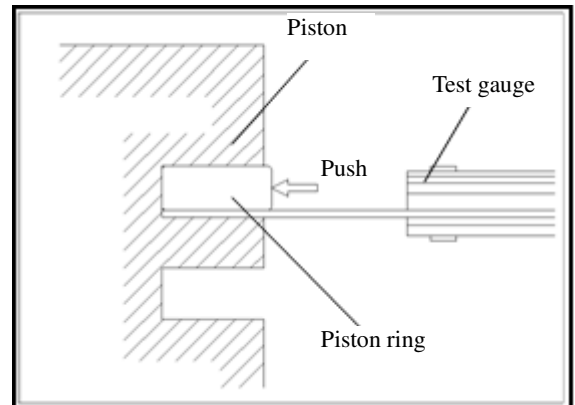
Do not break or damage the piston ring.

Clear the carbon deposits inside the piston ring groove.



Install the piston ring.  
Measure the clearance between piston ring and piston ring groove.

**Allowable limit: top ring: 0.09mm.  
Second ring: 0.09mm.**



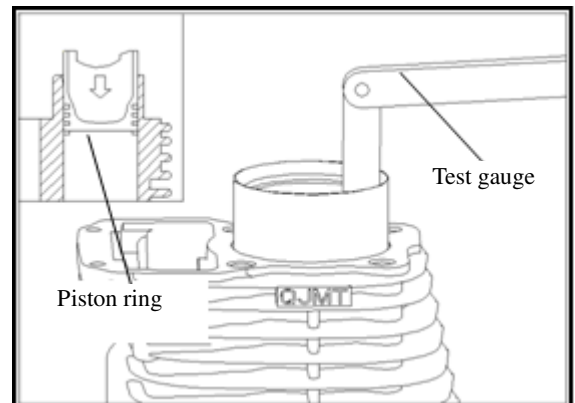
Remove the piston ring and install the piston rings at the bottom of cylinder.

**\*Note:**

Press the piston ring in the cylinder by using the piston head.

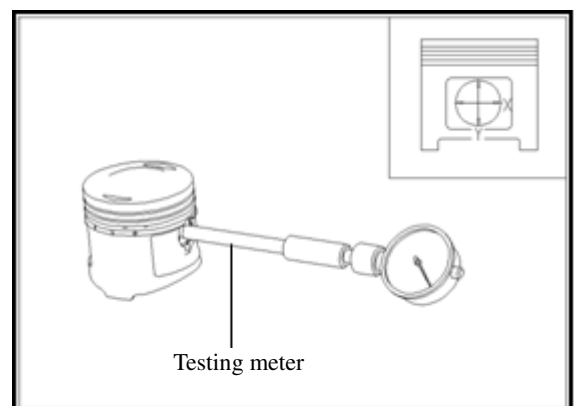
Measure the piston ring joint clearance.

**Allowable limit: 0.5mm.**



Measure the inner diameter of piston pin hole.

**Allowable limit: 13.04 mm.**

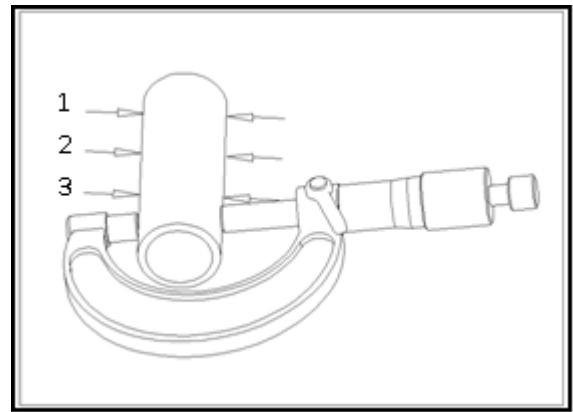


Measure the outer diameter of piston pin.

**Allowable limit: 13.04 mm.**

Clearance between piston pin hole and piston pin.

**Allowable limit: 0.02 mm.**

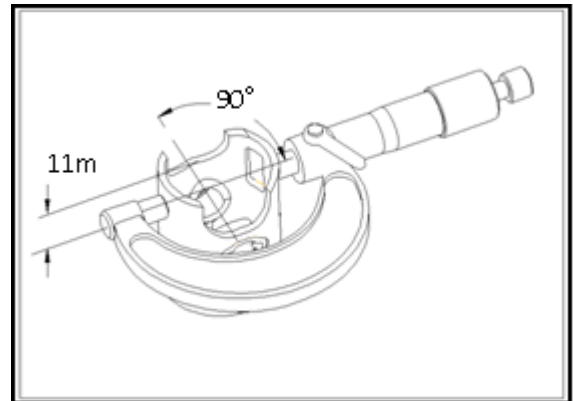


Measure the outer diameter of piston.

**\*Note:**

The measurement position forms an angle of 90 degrees with the piston pin and it is 11mm below the piston skirt part.

**Allowable limit: 56.43 mm.**

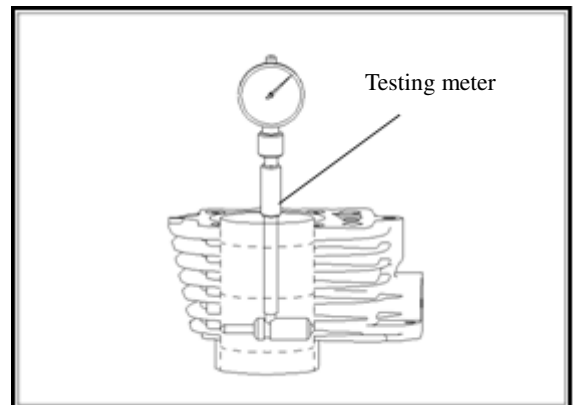


Check the damage and wear on the inner wall of cylinder.

**\*Note:**

Measure the inner diameter of cylinder in the upper, middle and lower positions in the direction which forms a right angle (90 degrees) with the piston pin.

**Allowable limit: 56.6 mm.**



Measure the clearance between cylinder and piston , whichever is the greater

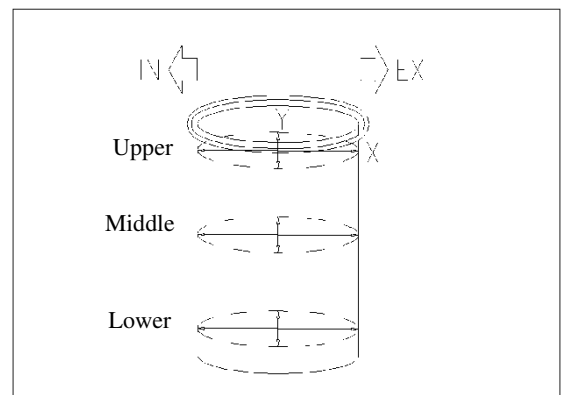
**Allowable limit: 0.17mm.**

Measure the roundness of inner wall of cylinder (inner diameter difference between X and Y directions).

**Allowable limit: 0.05mm.**

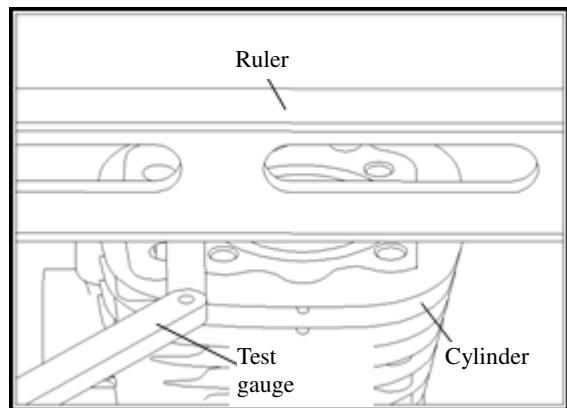
Measure the cylindricity of inner wall of cylinder (inner diameter difference between X and Y directions in upper, middle and lower positions).

**Allowable limit: 0.05mm.**



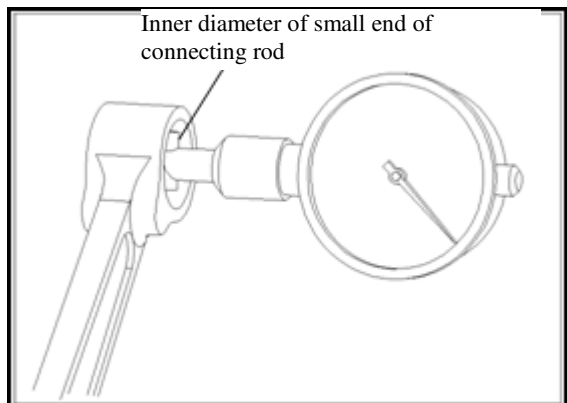
Check the planeness of cylinder surface.

**Allowable limit: 0.05mm.**



Measure the inner diameter of small end of connecting rod.

**Allowable limit:13.06 mm.**



### 13.4.2 Installation of Piston

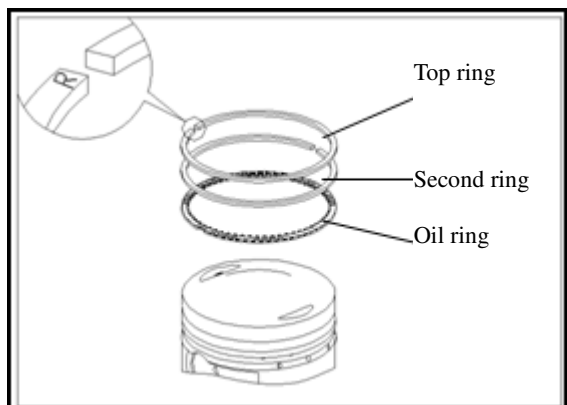
Install the dowel pin;

Apply oil to the piston ring and piston evenly, make the oblique plane of piston ring up and install it properly.

**\*Note:**

Do not scratch the piston and do not break the piston ring.

After the piston ring is installed, it can rotate freely in the piston ring groove.



Clean the washers attached to the crankcase.

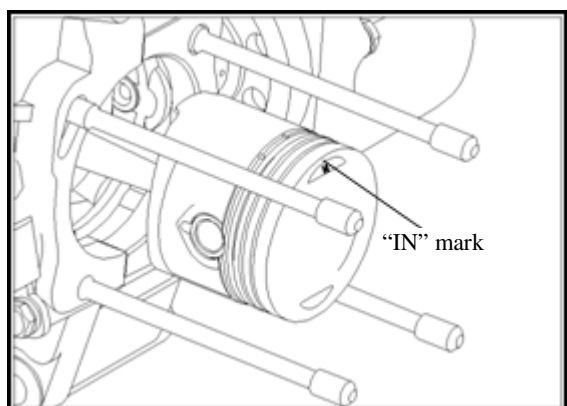
**\*Note:**

Foreign matters shall not fall into the crankcase.

Install the piston, piston pin and piston pin retainer.

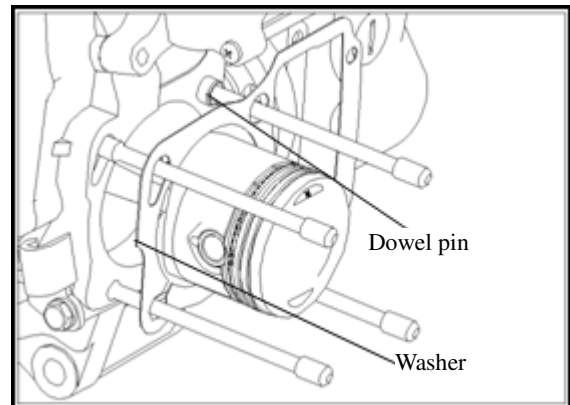
**\*Note:**

Install the piston into the intake valve according to the "IN" mark at the top.



## 13.5 Installation of Cylinder Block

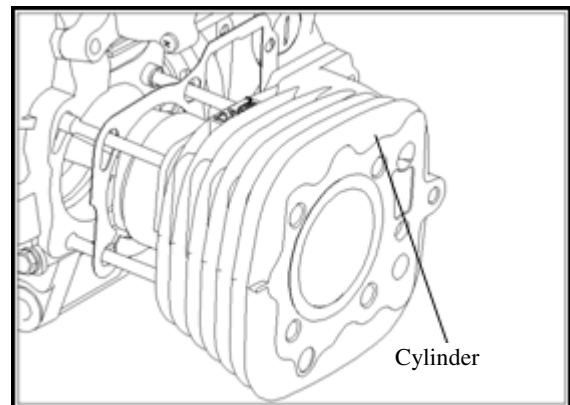
Install the gasket and dowel pin on the crankcase.



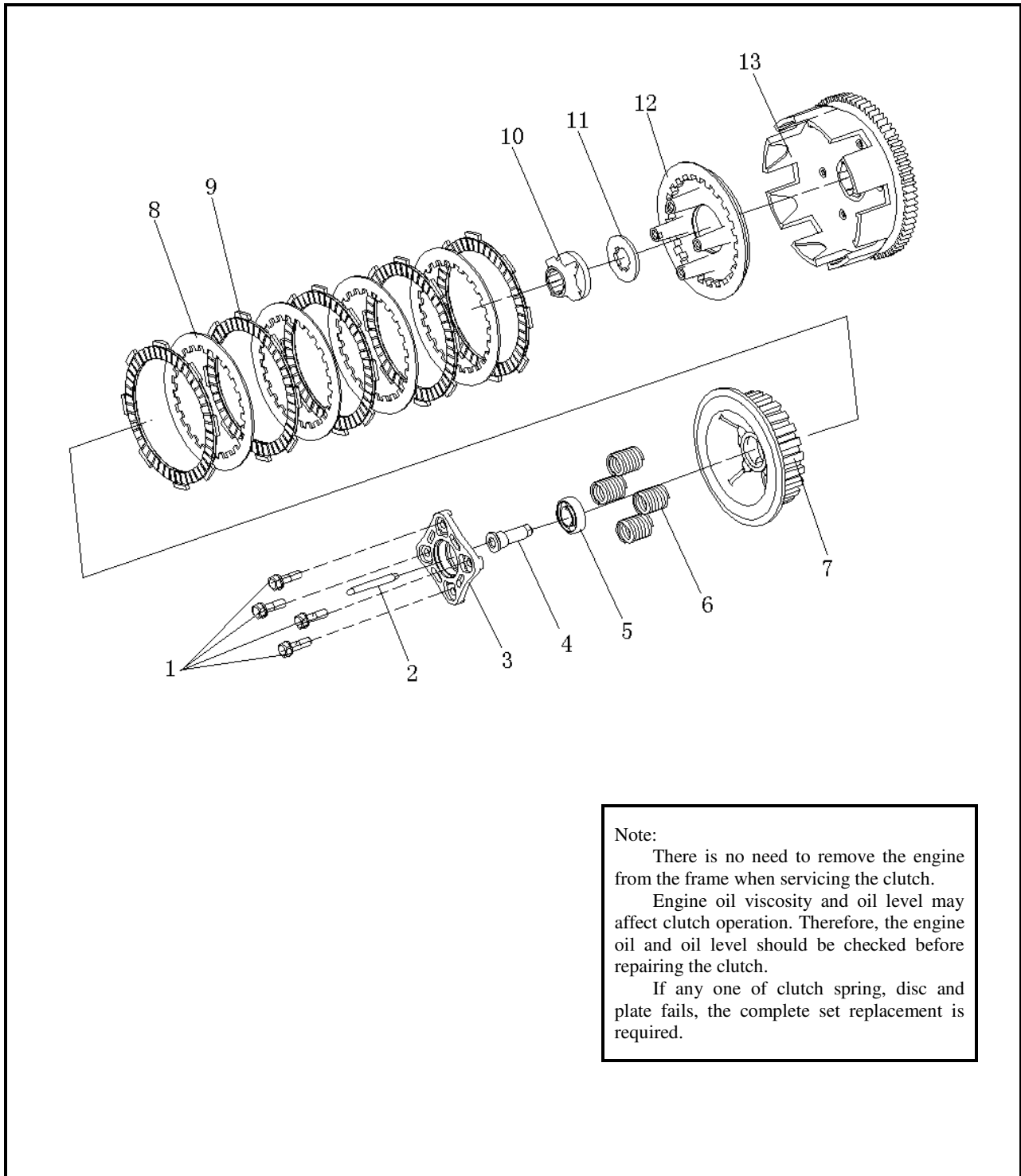
Apply oil to the inner wall of cylinder, piston and piston ring.

Install the piston ring into the cylinder carefully.

**\*Note:** Do not damage the piston ring.



# Clutch

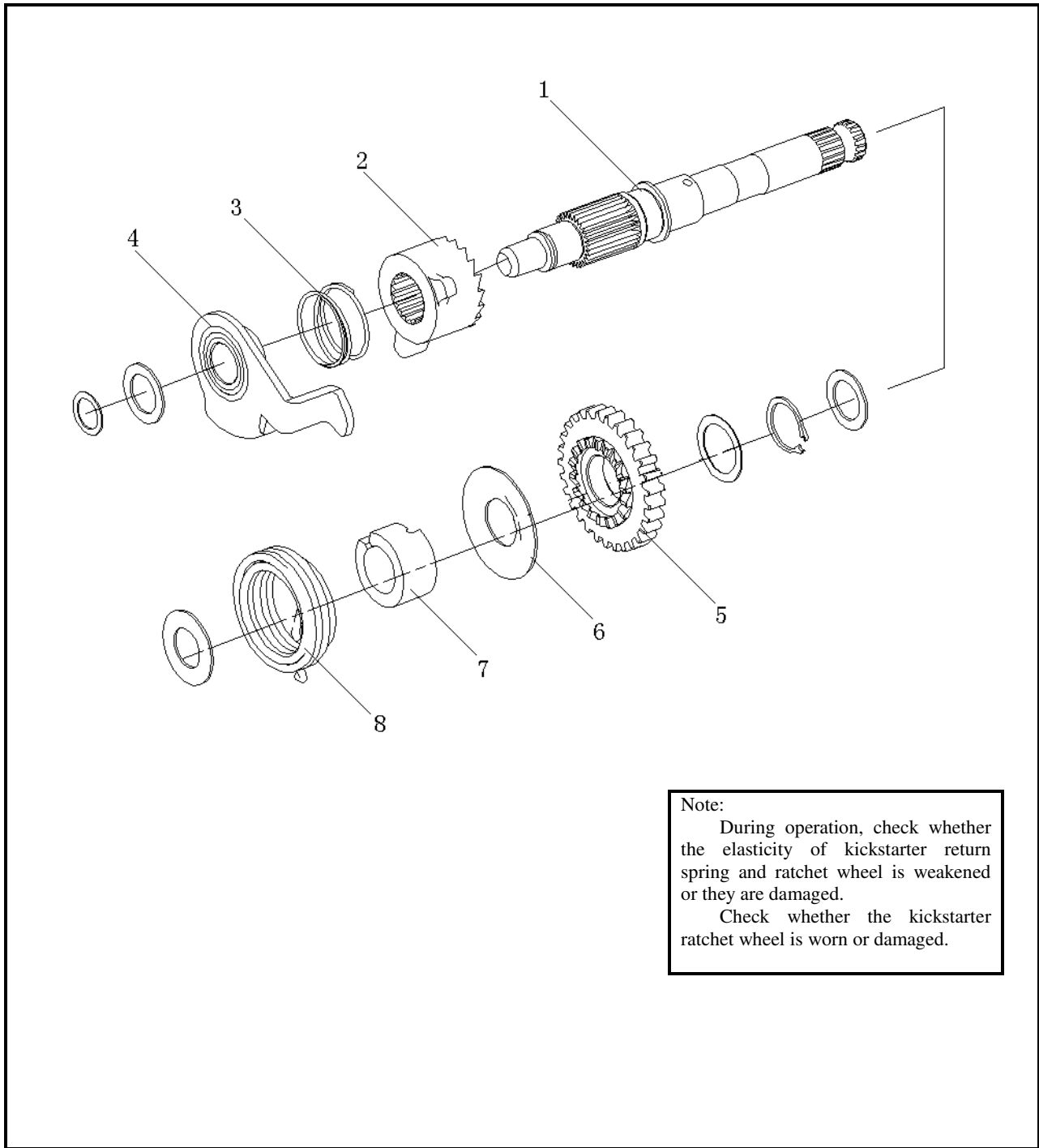


Note:  
There is no need to remove the engine from the frame when servicing the clutch.  
Engine oil viscosity and oil level may affect clutch operation. Therefore, the engine oil and oil level should be checked before repairing the clutch.  
If any one of clutch spring, disc and plate fails, the complete set replacement is required.

1 Adjusting bolt 2 Push lever 3 Push disc 4 Axle sleeve 5 Bearing 6 Pressure spring 7 Center bearing bracket 8 Active friction pad 9 Driven friction pad 10 Locknut 11 Sliding key washer 12 Pressure disc 13 Housing assembly



# Kickstarter mechanism



Note:  
During operation, check whether the elasticity of kickstarter return spring and ratchet wheel is weakened or they are damaged.  
Check whether the kickstarter ratchet wheel is worn or damaged.

1 Recoil starting shaft 2 Recoil starting ratchet wheel 3 Ratchet wheel spring 4 Ratchet wheel guide plate assembly 5 Recoil starting gear 6 Spring retainer 7 Shaft liner 8 Return spring

## XIV. Clutch / kickstarter mechanism

Preparatory Information .....	14.1
Fault Diagnosis.....	14.2
Clutch .....	14.3
Kickstarter mechanism.....	14.4
Disassembly of Primary and Auxiliary Shafts .....	14.5

### 14.1 Preparatory Information

#### Precautions for operation

There is no need to remove the engine from the frame when servicing the clutch.

Engine oil viscosity and oil level may affect clutch operation. Therefore, the engine oil and oil level should be checked before repairing the clutch.

Function: Clutch/driven wheel together form the stepless transmission.

#### Technical parameters

Unit: mm

Clutch	Thickness of friction pad	2.9-3	2.6
	Length of pressure spring	35.45-36.5	34.2

### 14.2 Fault Diagnosis

The clutch push lever is too tight	Clutch is sliding when accelerating	Transmission is tripping from the gear
Clutch cable is damaged, twisted or dirty	There is no clearance in the clutch push lever	The elasticity of stop block arm return spring is weaken or it is broken
The clutch lifter is damaged	The clutch disc is worn	The stop block arm is damaged
Clutch lifter plate bearing fails	The elasticity of clutch spring is weaken	Variable-speed cam is worn or damaged
	The clutch lifter is bonded	
It is difficult to change the speed	Motorcycle slows down when clutch is not released or released	
Clutch adjustment is improper	The clearance of clutch push lever is too large	
Variable-speed mandrel is bent	Clutch disc is warping	
Variable-speed cam is damaged	Clutch pusher fails	
Variable-speed plate is bent or damaged		Engine oil and oil level are abnormal

## 14.3 Clutch

### 14.3.1 Disassembly

Loosen the four bolts of push disc in the way of diagonal cross.

Remove push lever, collar, bearing, push disc and clutch spring.

Remove the parts shown in the exploded view.

Loosen the clutch locknut and remove the locknut and washer using special tools.

Remove the center bearing bracket of clutch.

Remove the active and driven friction pads of clutch.

Remove the pressure disc of clutch.

Remove the parts shown in the exploded view.

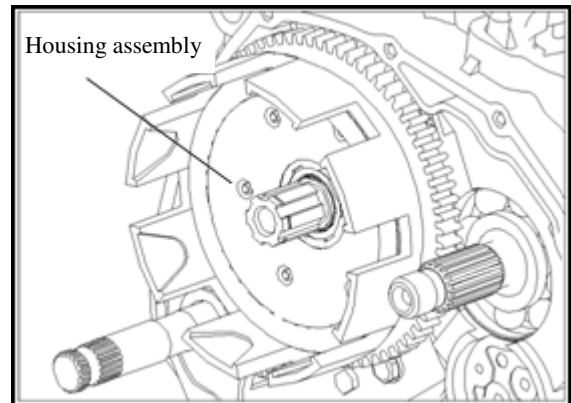
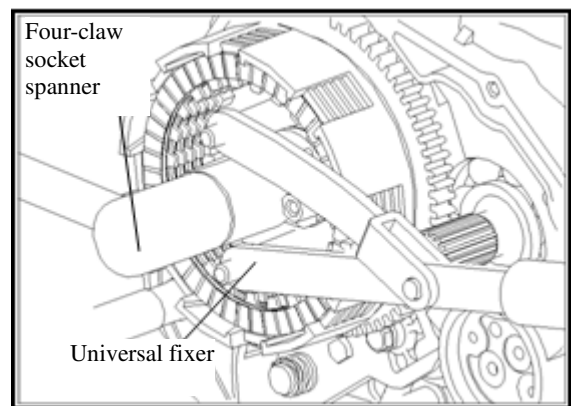
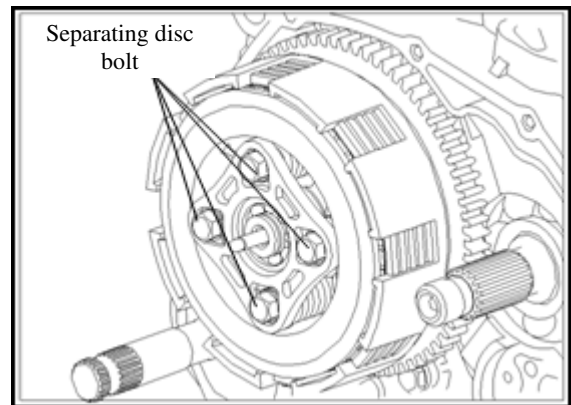
Lock torque of locknut: 50-60N.m

Four-claw socket wrench: QJ157-0110/G20

Universal fixer: QJ157-0111/G20

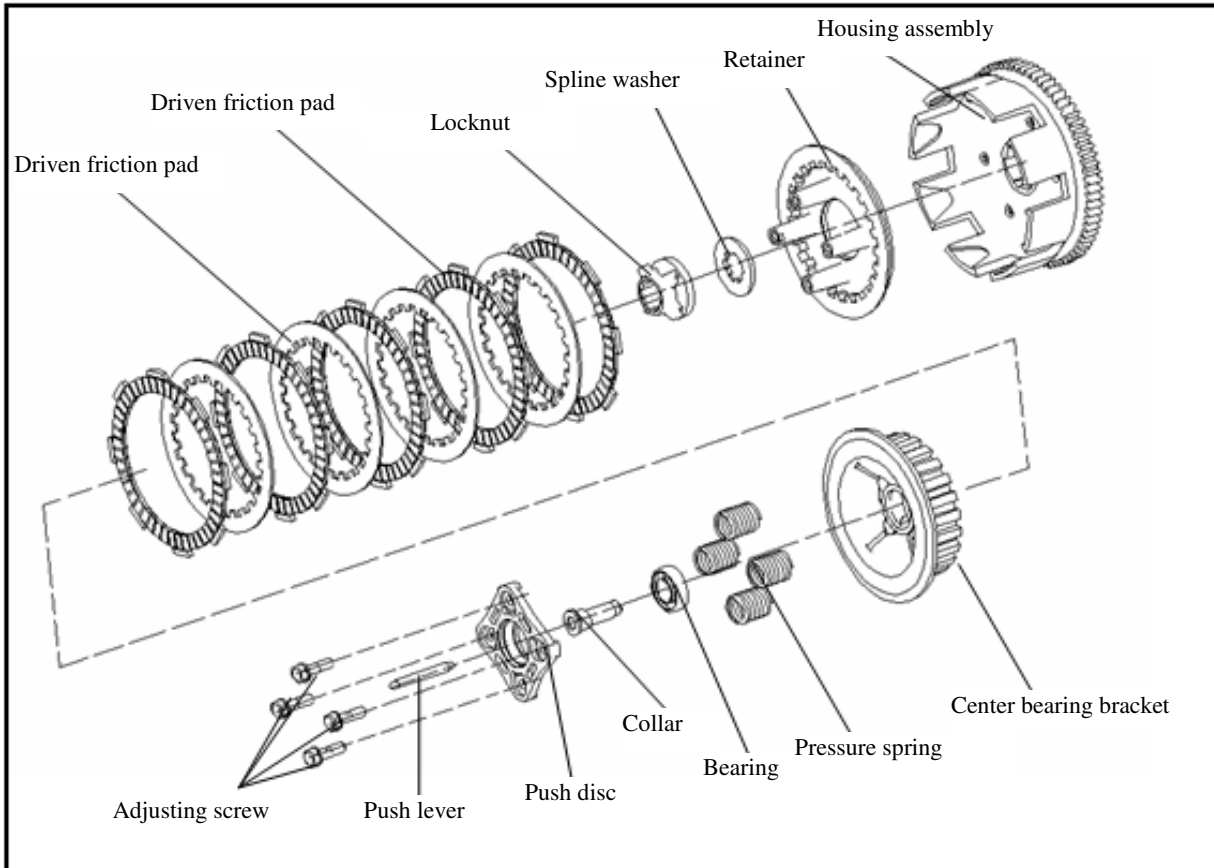
Remove the spline washer.

Remove housing assembly.



Install the clutch in the reverse order of disassembly.

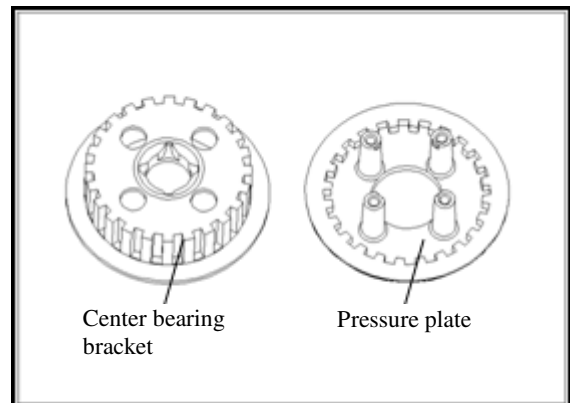
### 14.3.2 Disassembly of Clutch



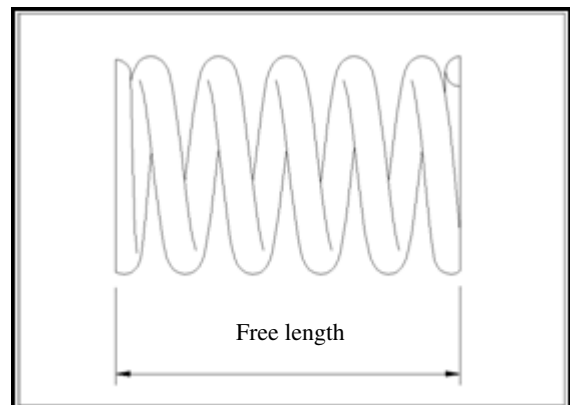
### 14.3.3 Inspection

Check the housing groove of clutch for the trace of any burr or damage. If any, polish it using a file, and replace it when the polishing amount is too large.

Check the tooth shape of pressure plate and center bracket for damage, if any, it should be replaced.

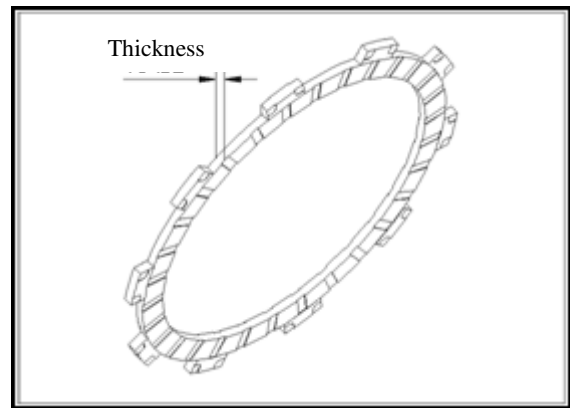


Measure the free length of pressure spring.  
Allowable limit: Replace it if its length is less than 34.2mm.



Measure the thickness of friction plate with a vernier calipers.

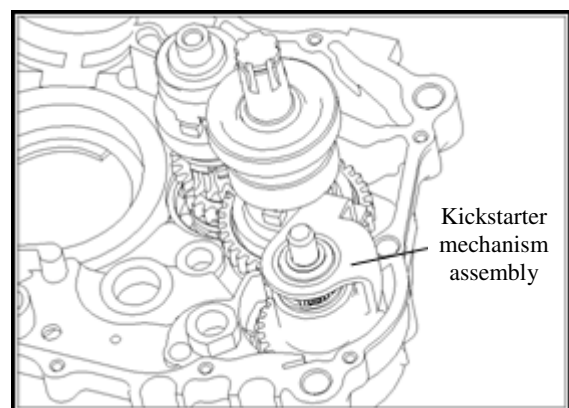
**Allowable limit:** Replace it if its thickness is less than 2.6mm.



## 14.4 Kickstarter Mechanism

### 14.4.1 Disassembly

Remove the kickstarter mechanism assembly from right crankcase.



### 14.4.2 Inspection

Check the elasticity of return spring and ratchet spring; in case of any damage, it should be replaced.

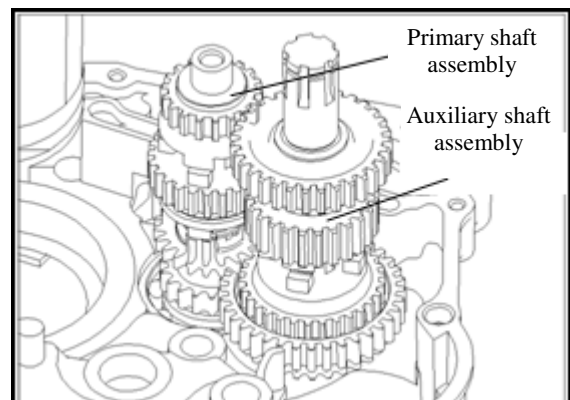
Check the meshing condition of starting shaft spline and spline in ratchet wheel. When the meshing is loose, it should be replaced.

### 14.4.3 Assembly

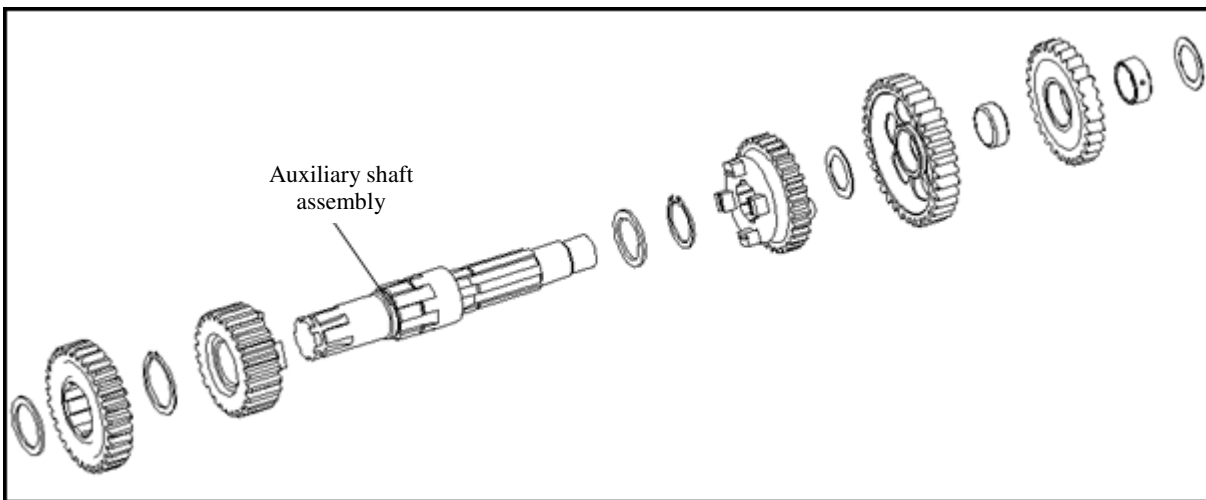
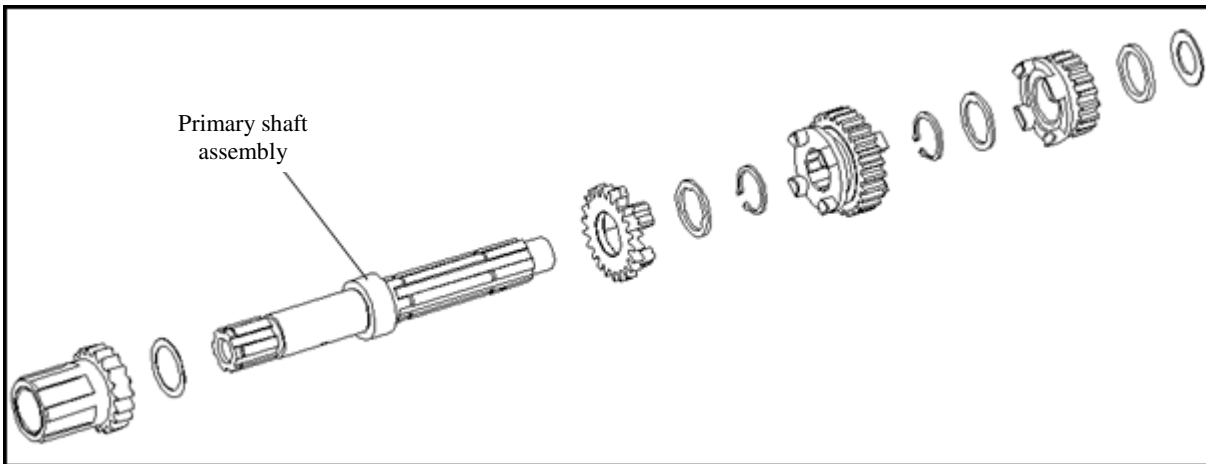
Install it in the reverse order of decomposition and disassembly.

Remove primary shaft assembly.

Remove auxiliary shaft assembly.



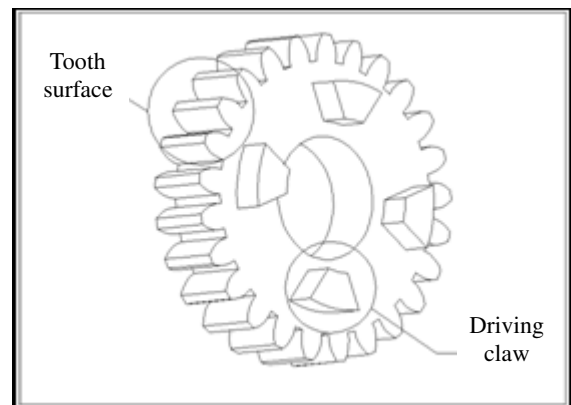
## 14.5 Disassembly of primary and auxiliary shafts



### 14.5.1 Inspection

Check the wear of gear teeth surface and drive claw respectively.

If the wear is serious or it is damaged, please replace it.



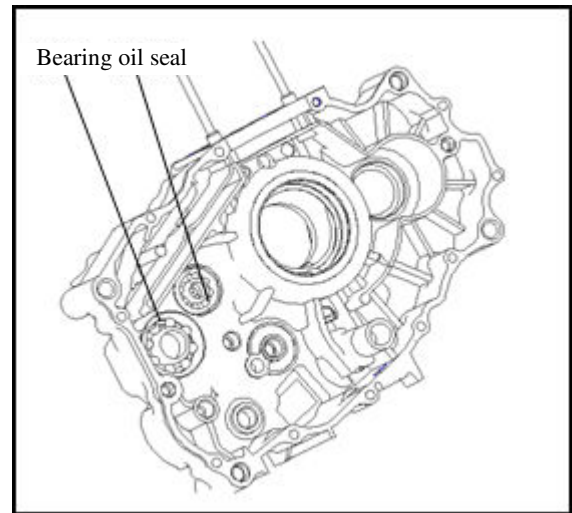
Remove bearing and oil seal from the left crankcase.  
Check the bearing and oil seal for damage; if any, replace it.

**\*Note:**

The bearing disassembled cannot be reused and should be replaced with a new one;  
Bearings and oil seals should be disassembled by using special tools.

Bearing: QJ153-7-0101/G15

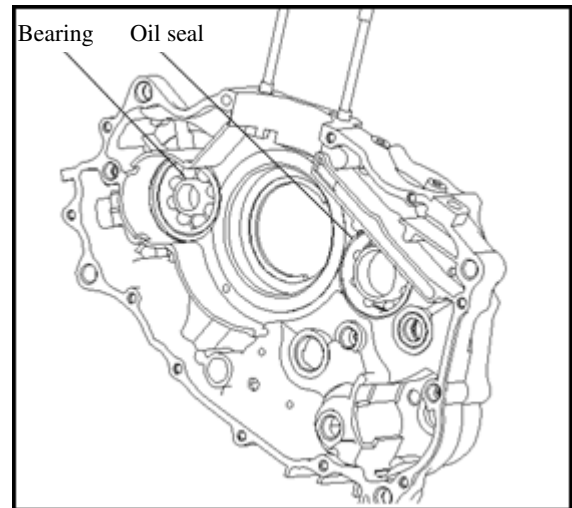
Oil seal pliers: QJ157-0112/G15



Remove the bearing from the right crankcase.  
Check the bearing for damage; if any, replace it.

**\*Note:**

The bearing disassembled cannot be reused and should be replaced with a new one;  
Bearings and oil seals should be disassembled by using special tools.



### 14.5.2 Combination of primary and auxiliary shafts

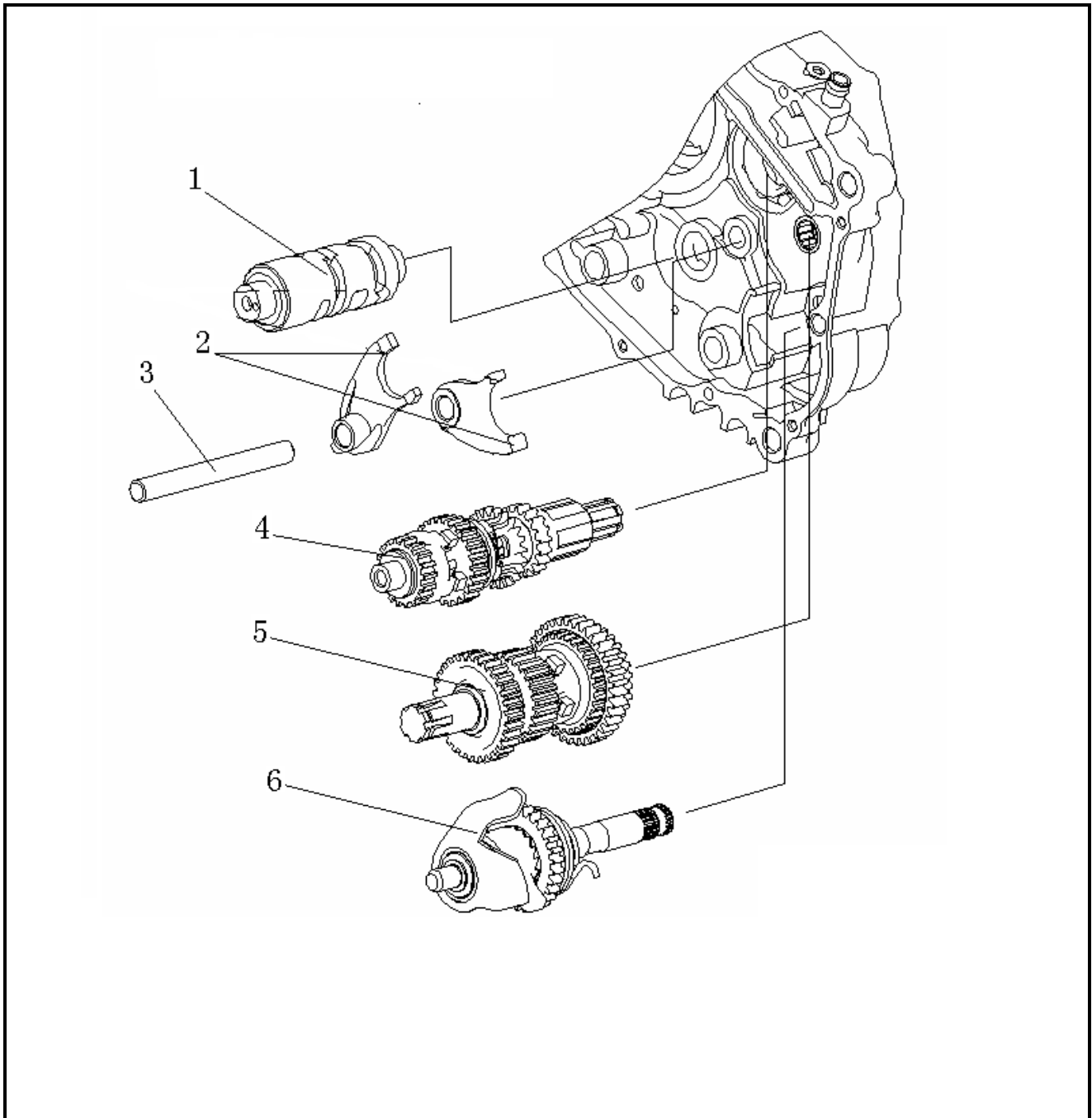
**\*Note:** When combined, apply lubricating oil to all gears and shafts.  
Ensure that the gears are not jammed after combination.

Notes:

Install the crankcase in the reverse order of disassembly.



## Reduction gear



1 Shifting drum 2 Shift fork 3 Shift fork shaft 4 Primary shaft assembly 5 Auxiliary shaft assembly 6 Recoil kickstarter assembly

## XV. Variable speed gear

Preparatory Information .....	15.1
Fault Diagnosis.....	15.2
Gearshift Mechanism.....	15.3
Installation.....	15.4

### 15.1 Preparatory Information

Function: Transmit torque, and decide the torque and speed of final output.

Technical parameters Unit: mm

Gearshift Mechanism	Outer diameter of shift fork shaft	11.97-12	11.95
	Diameter of inner hole of shift fork	12-12.018	12.05
	Thickness of shift fork	4.93-5.0	4.7
	Outer diameter of shift drum	35.8-36	35.75
	Width of lock groove of shift drum	7.05-7.15	7.3

### 15.2 Fault Diagnosis

#### The gear cannot be engaged

Variable-speed shift fork is broken or deformed

The guide pin of shift fork is broken

The gear claws are worn

#### The gear is out of controlled spontaneously

Joint claws are worn and the edges become round corners

The elasticity of return spring of transmission is weaken

The spline teeth of spline shaft and spline grooves of sliding gear are worn,

resulting in a great axial force when the gear is working

Shift drum or shift fork is worn

#### It's hard to shift gears

Clutch is not completely disengaged

The return spring of transmission is not working properly

The lock groove of shift drum is worn

## 15.3 Shift mechanism

### 15.3.1 Disassembly

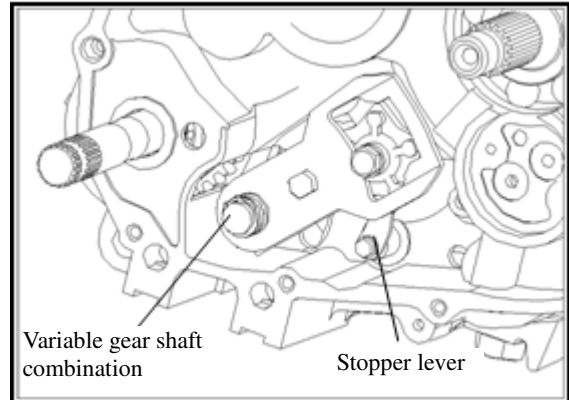
Remove the shift shaft combination.

Remove the bolt and shift locking plate.

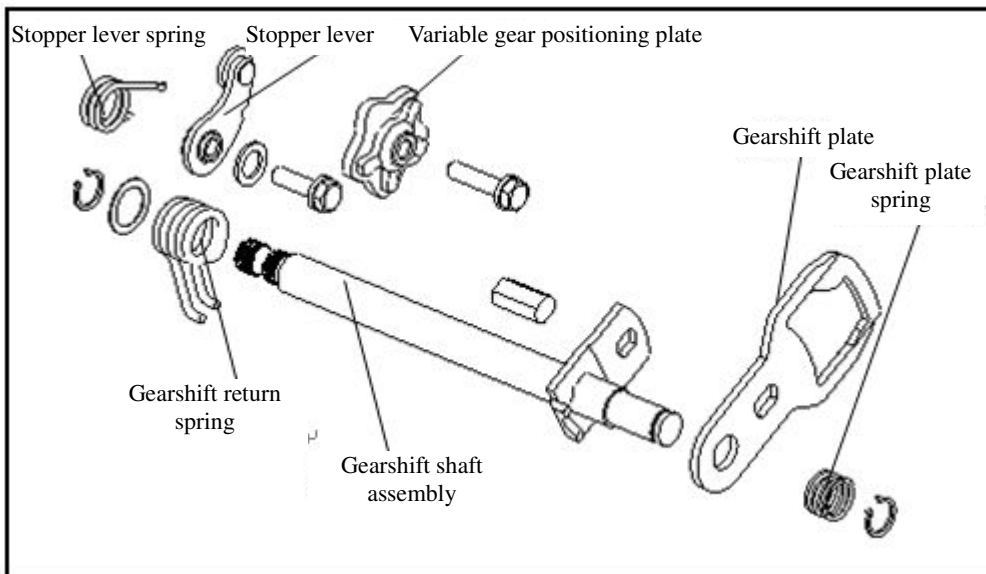
Remove bolt, clamp arm and spring.

Remove the dowel pin.

Remove the parts shown in the exploded view.



### 15.3.2 Disassembly



### 15.3.3 Inspection

Before disassembly, the shift plate should be able to return flexibly without clamping.

Check the wear of shift plate and shift shaft combination.

In case of serious wear, replace the assembly.

Check the wear of shift locking plate.

In case of serious wear, replace the assembly.

Check the shift shaft for bending; in case of overbending, replace it.

Check whether the elasticity of return spring is weakened, and replace it if necessary.

Loosen the assembling bolt.

Separate the crankcase.

**\*Note:**

Do not damage washer and assembling surface.

Remove the left case.

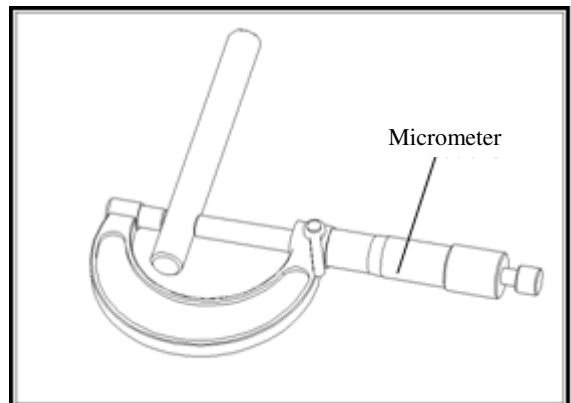
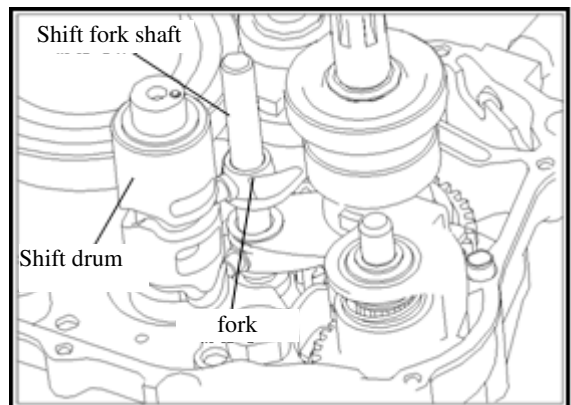
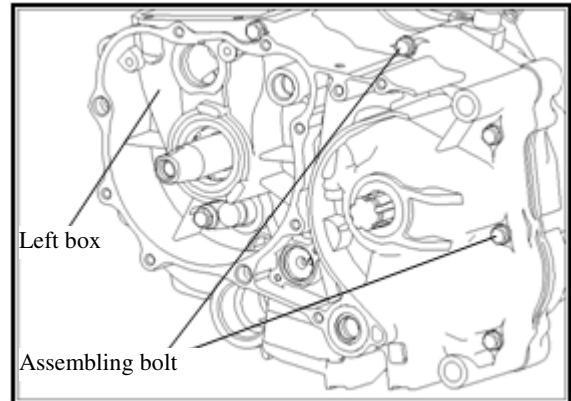
Pull out the shift fork shaft.

Remove shift drum.

Remove the shift fork.

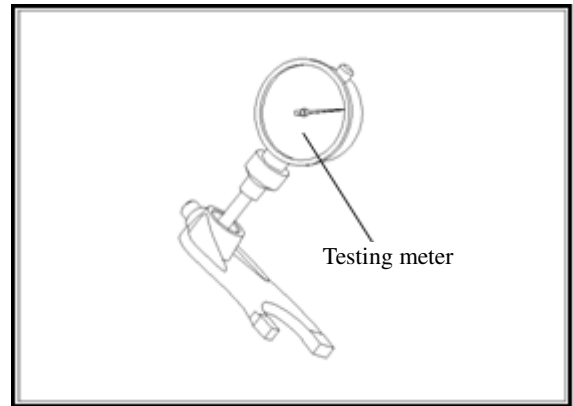
Measure the outer diameter of shift fork shaft.

**Allowable limit: 11.95 mm.**



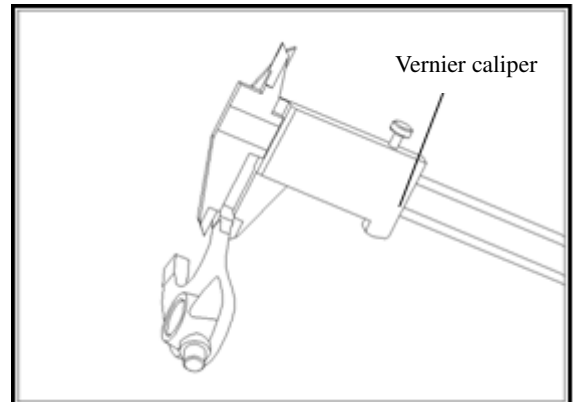
Measure the inner diameter of shift fork hole.

**Allowable limit: 12.05 mm.**



Measure the thickness of shift fork.

**Allowable limit: 4.7 mm.**

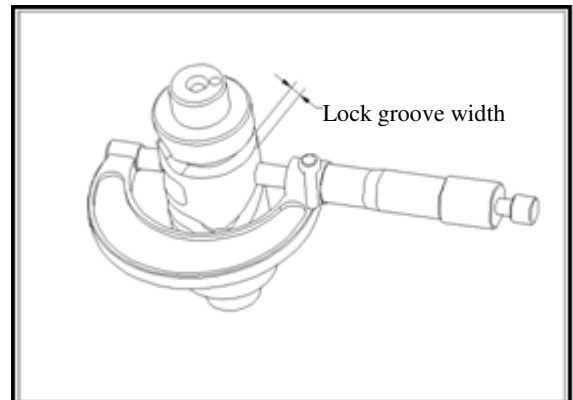


Measure the outer diameter of shift drum.

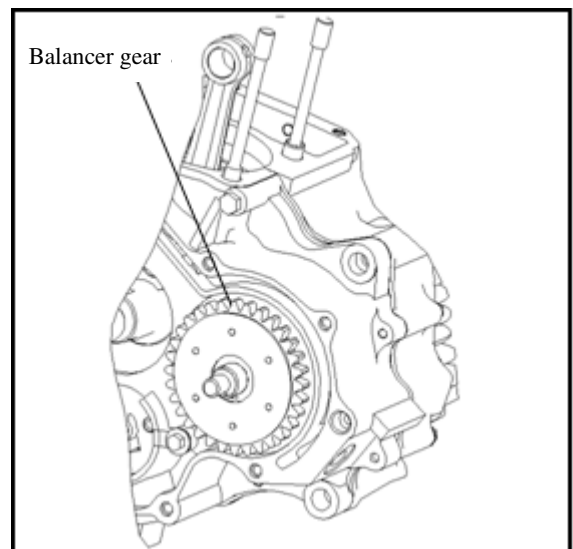
**Allowable limit: 35.75 mm.**

Measure the width of lock groove of shift drum.

**Allowable limit: 7.3 mm.**



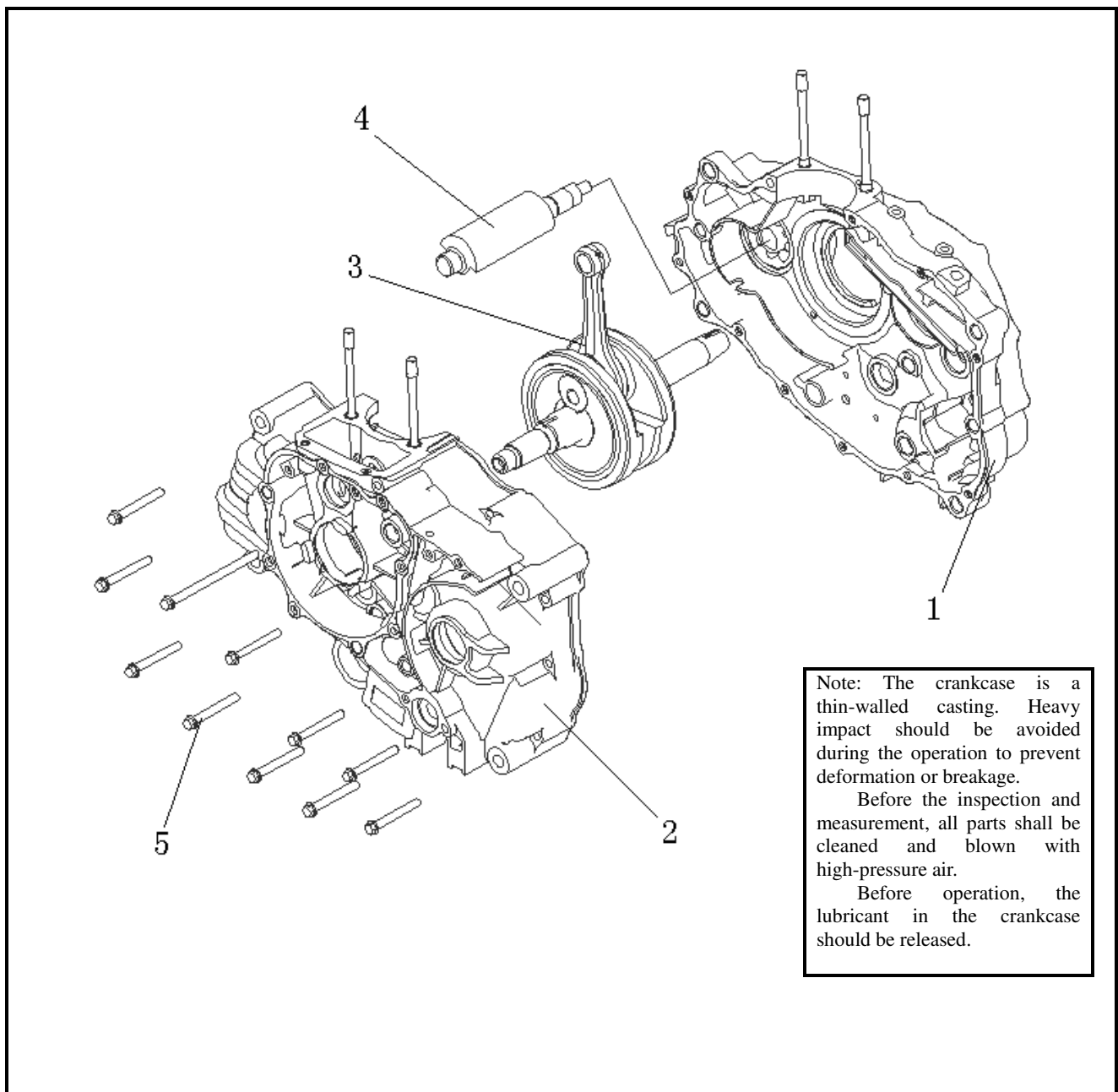
Remove the balancer gear



## **15.4 Installation**

Install it in the reverse order of disassembly.

# Crankcase



Note: The crankcase is a thin-walled casting. Heavy impact should be avoided during the operation to prevent deformation or breakage.  
Before the inspection and measurement, all parts shall be cleaned and blown with high-pressure air.  
Before operation, the lubricant in the crankcase should be released.

1 Right crankcase 2 Left crankcase 3 Crankshaft combination 4 Balancer 5 Bolt

## XVI. Crankcase

Preparatory Information .....	16.1
Fault Diagnosis.....	16.2
Crankcase.....	16.3

### 16.1 Preparatory Information

#### Precautions for operation

The crankcase is a thin-walled casting. Heavy impact should be avoided during the operation to prevent deformation or breakage.

Before the inspection and measurement, all parts shall be cleaned and blown with high-pressure air.

Before operation, the lubricant in the crankcase should be released.

#### Function of crankcase:

The crankcase is the force-bearing part of engine. Its main function is to support the crankshaft, clutch, gearbox, cylinder block and cylinder head, withstand the combustion explosion impact and inertia force of movement of crankshaft mechanism and form a part of closed (oil and air seal) space.

The crankcase is also equipped with suspension holes, and the engine is connected with the frame and other parts through the connection with the suspension holes on the motorcycle.

#### Technical parameters Unit: mm

	Item	Standard value	Allowable limit
Crankshaft	Lateral clearance of big end of connecting rod	0.1-0.35	0.55
	Radial clearance of big end of connecting rod	0.008-0.018	0.05
	Shimmy	-	0.1

#### Tools

Universal fixer	Clutch spring compressor
Screwdriver rod	Socket wrench
Guide rod	Bearing screwdriver

### 16.2 Fault Diagnosis

Abnormal sound of crankcase	Automatic shutdown of engine
Scattered or broken parts in the crankcase	Stuck clutch

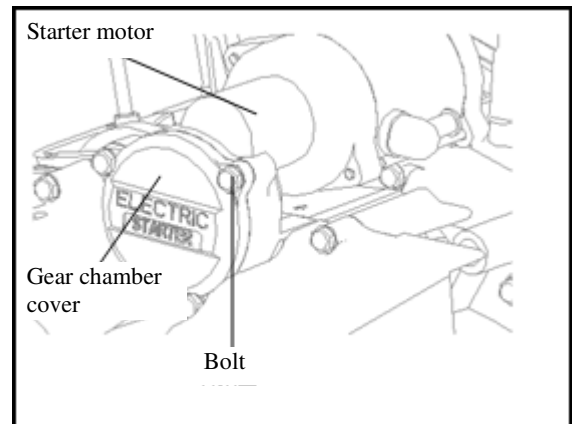


## 16.3 Crankcase

### 16.3.1 Disassembly of crankcase

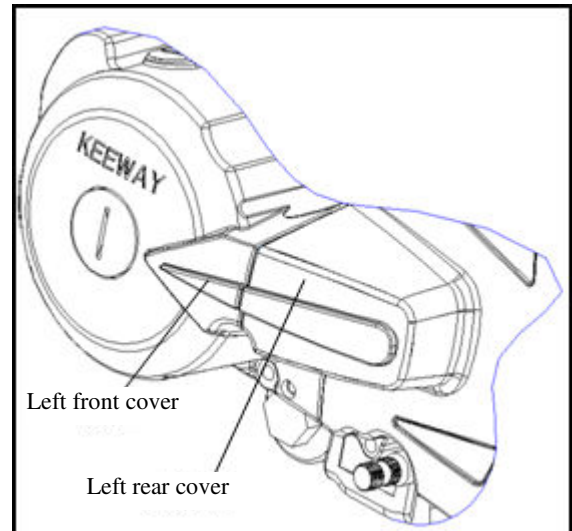
Loosen motor mounting bolt and remove the starter motor.

Loosen starter motor gear chamber cover mounting bolt, and remove the gear chamber cover. Remove electric starter gear, needle bearing and washer.



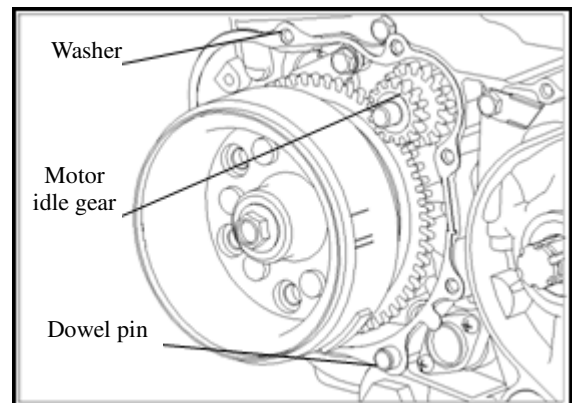
Loosen the bolts on the left front cover and left rear cover of crankcase.

Remove the left front cover and left rear cover.



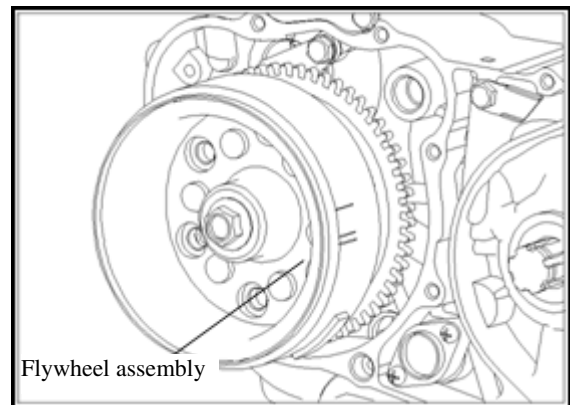
Remove the idle gear of starter motor.

Remove washer and dowel pin.



Loosen flywheel locknut using electric or pneumatic tools.

Pull out flywheel assembly (including star wheel).

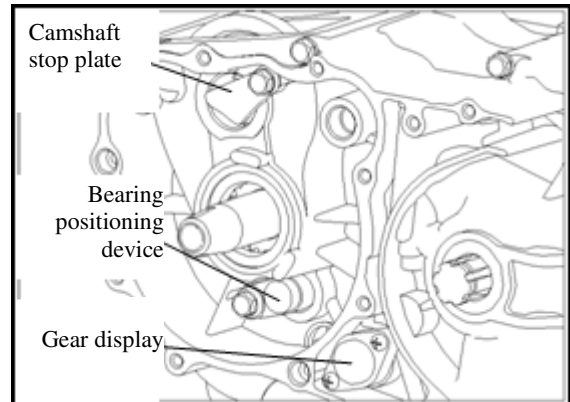


Remove the gear display.

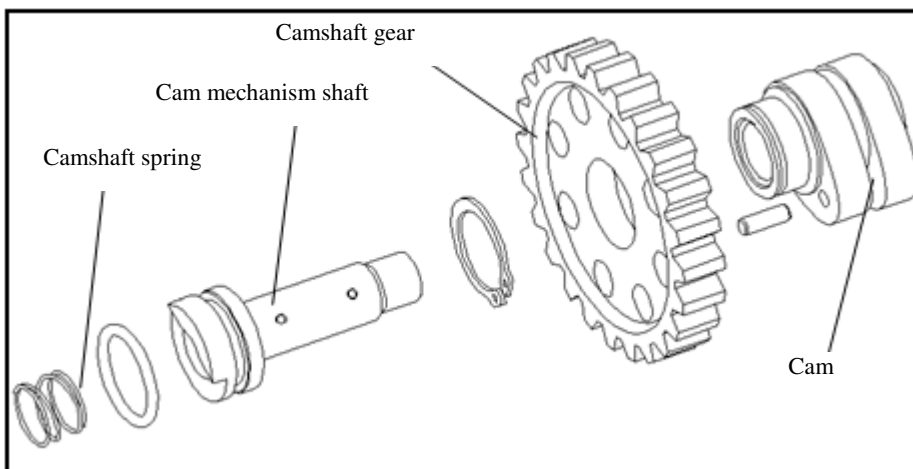
Remove camshaft retainer,

remove the cam assembly.

Remove bearing positioning device.



### 16.3.2 Disassembly of cam component

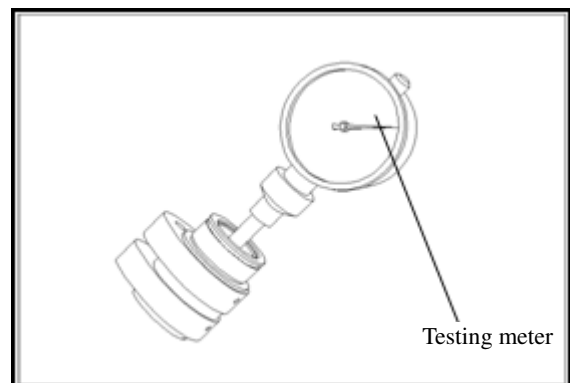


Measure the inner diameter of cam bushing.

**Allowable limit: 14.10 mm.**

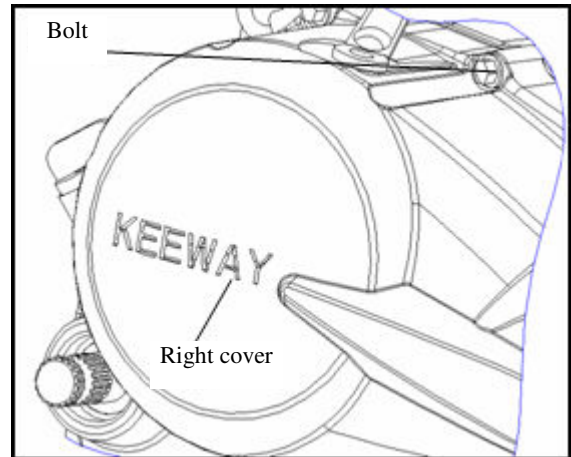
Measure cam height

**Allowable limit: 32.5mm.**

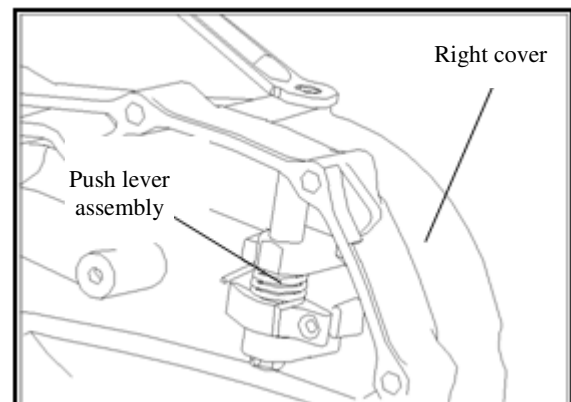


### 16.3.1 Disassembly of right cover of crankcase

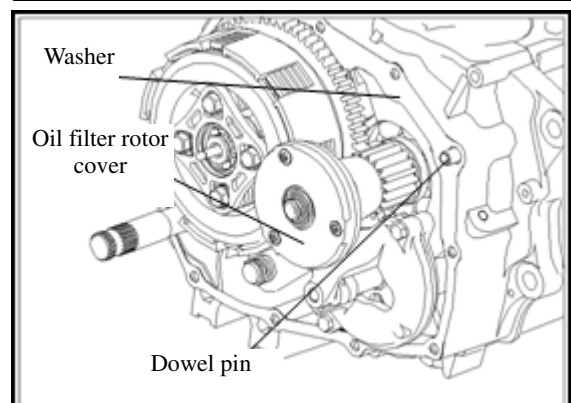
Loosen the clamp bolt,  
remove the right cover of crankcase (referred to as right  
cover in the figure).



Remove the clutch push lever assembly from the right  
cover.



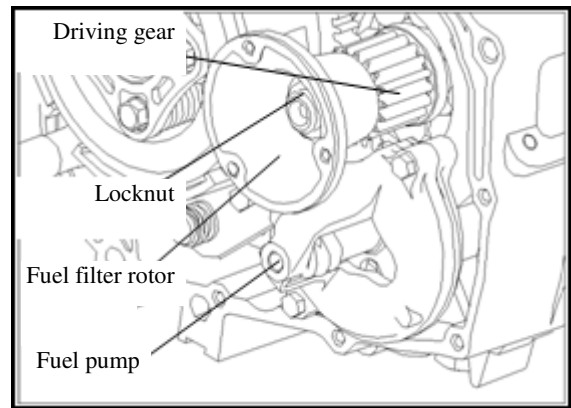
Remove the screw, oil filter rotor cover and oil filter  
rotor cover washer.  
Remove washer and dowel pin.



Clamp the nut using four-jaw sleeve, loosen the locknut  
with the pneumatic tool, remove the oil filter rotor and  
remove the driving gear.

loosen fuel pump mounting screw, and remove fuel  
pump assembly.





## 16.4 Crankshaft combination

### Disassemble

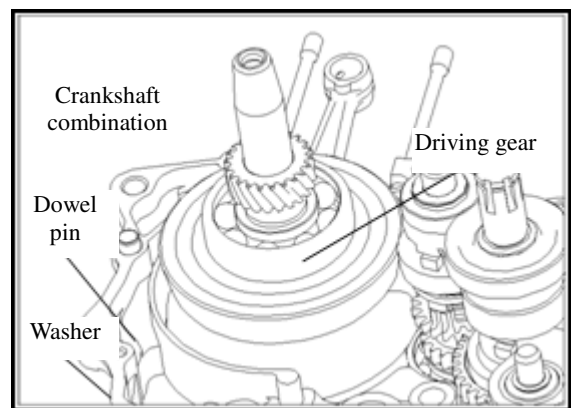
Remove the left crankcase.

Remove washer and dowel pin.

Remove the driving gear.

Remove the crankshaft combination from right crankcase.

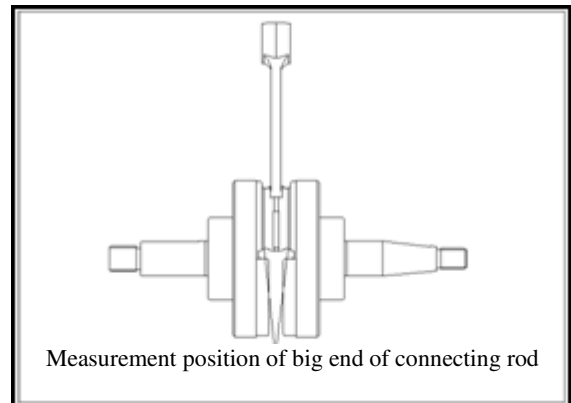
**Note:** Do not damage washer and assembling surface.



### Check

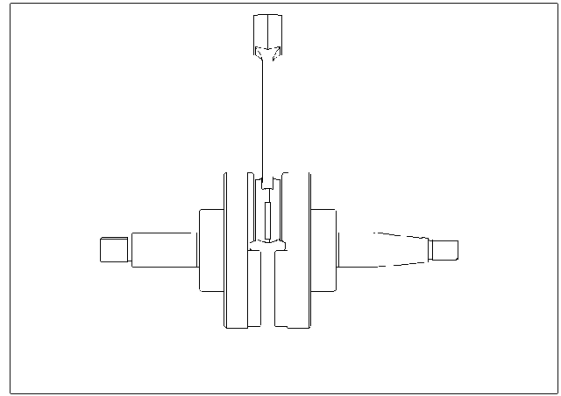
Measure the lateral clearance of big end of connecting rod.

**Allowable limit: 0.55 mm.**



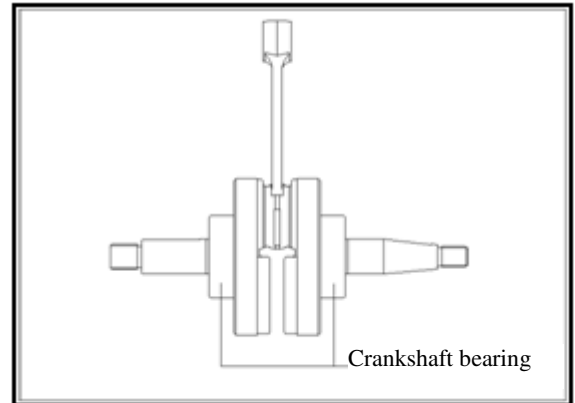
Measure the clearance of big end of connecting rod in X-Y direction.

**Allowable limit: 0.05mm.**



Measure the shimmy of crankshaft.

**Allowable limit: 0.01 mm.**



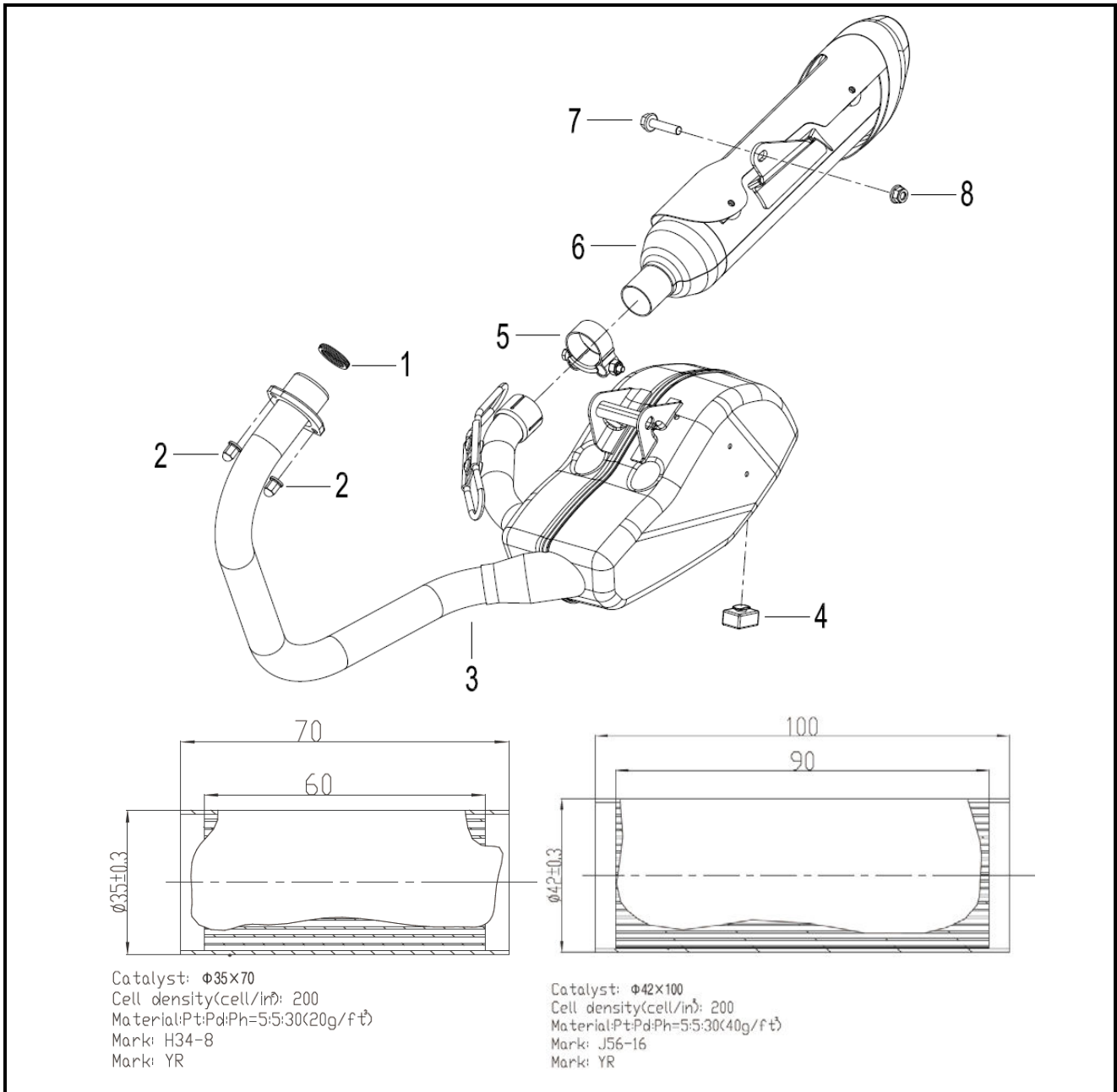
Check whether the crankshaft bearing rotates with abnormal noise or whether it is loose.

If there is abnormal noise or it is loose, replace the crankshaft assembly.

**\*Note:**

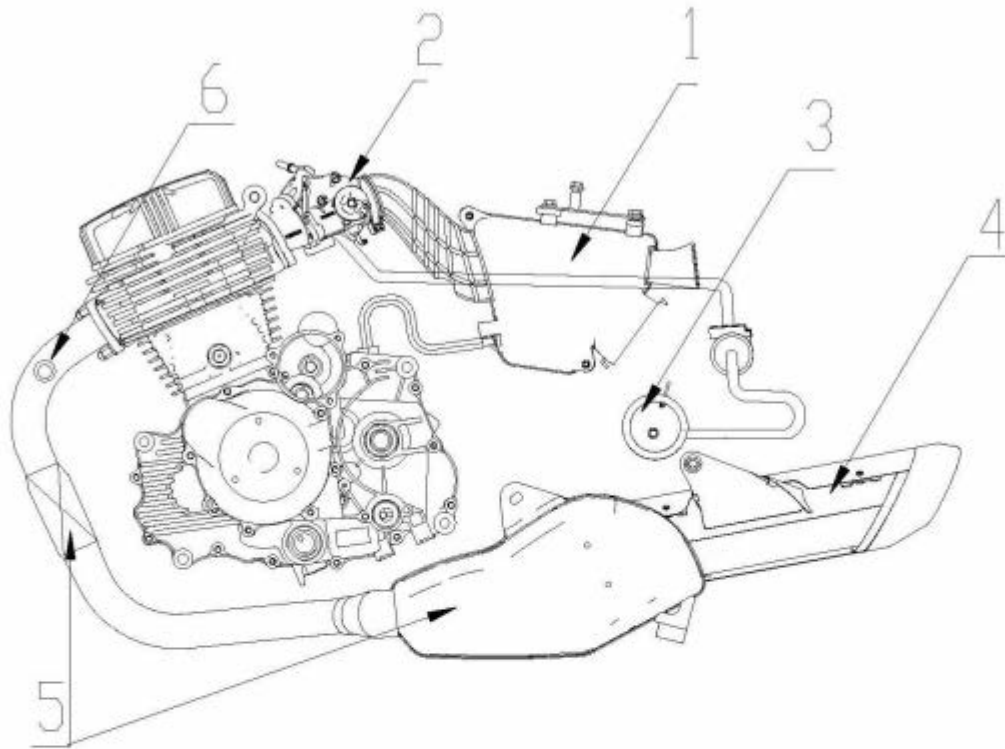
Crankshaft combination and transmission  
Installed on the crankcase.

# Muffler

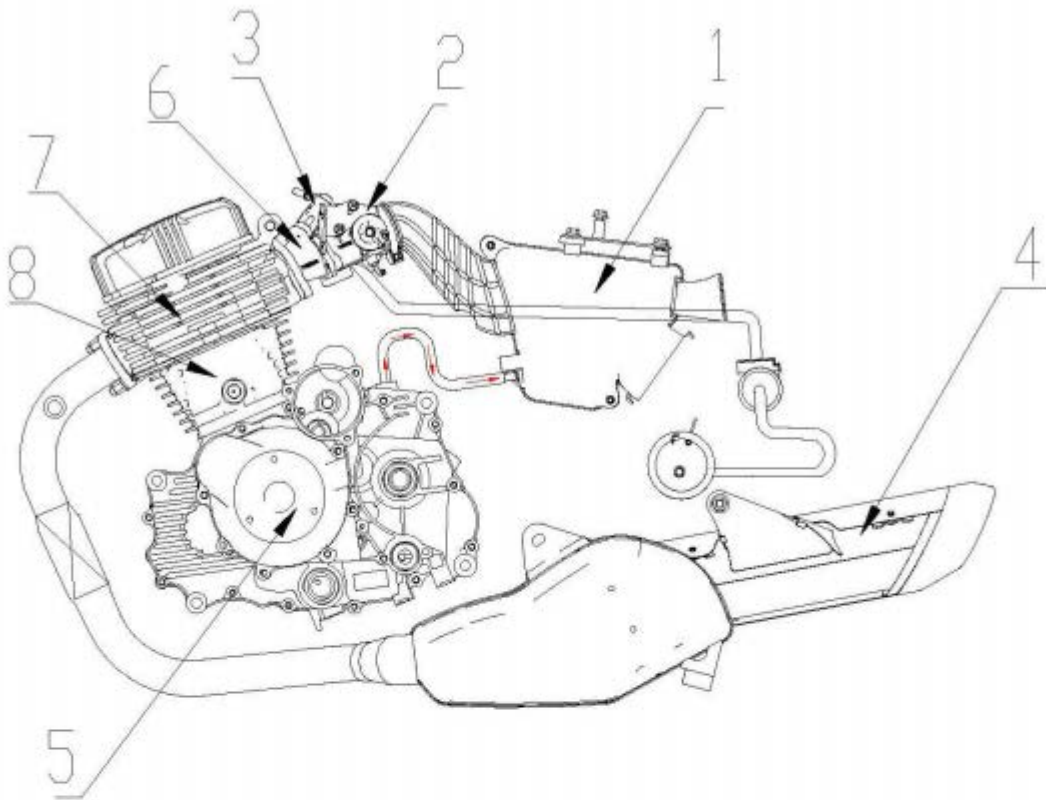


No.	Name
1	Air exhaust gasket
2	Cap nut M6
3	Main cylinder assembly
4	Buffer rubber
5	Clamp assembly
6	Auxiliary cylinder assembly
7	Bolt M8x30
8	Self-locking nut M8

## Emission Control

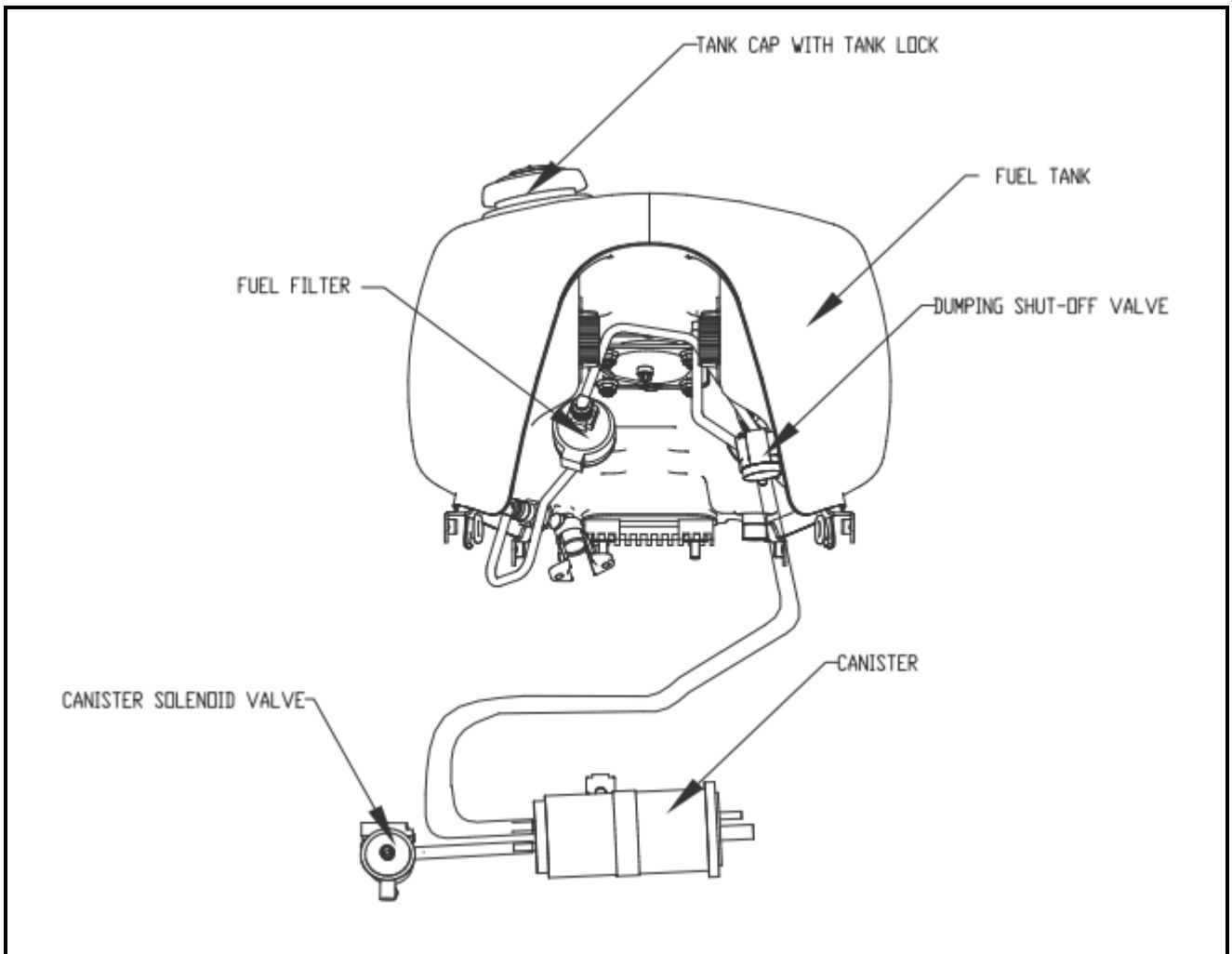


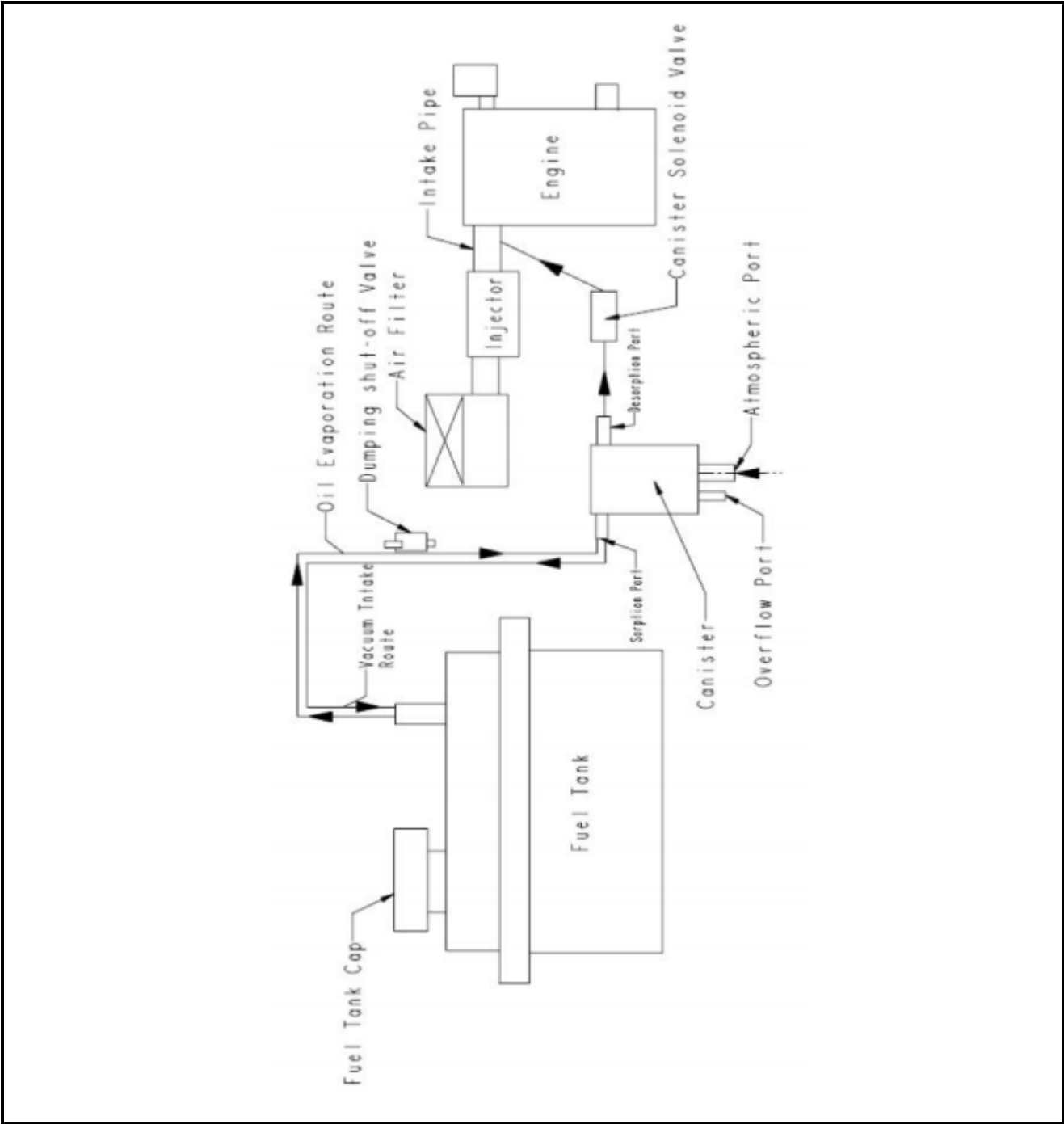
1. AIR FILTER
2. THROTTLE BODY
3. EVAPORATIVE EMISSIONS CANISTER
4. EXHAUST ASSEMBLY
5. CATALYTIC CONVERTER
6. OXYGEN SENSOR



1. AIR FILTER
2. THROTTLE BODY
3. FUEL INJECTOR
4. EXHANST SYSTEM
5. ENGINE ASSEMBLY
6. INTAKE MANIFOID
7. CYLINDER HEAD
8. CYLINDER







# XVII. Exhaust Emission Control System

Guarantee of Exhaust Emission Control System .....	17.1
Regular Maintenance Notice/Guarantee Emission Standard .....	17.2
Mechanical Function of Exhaust Control System .....	17.3
Catalytic Conversion System.....	17.4

## 17.1 Guarantee of Exhaust Emission Control System

1. The exhaust emission control system of the motorcycle complies with the provisions of Regulation (EU) No 134/2014. This Company will provide the guarantee in the case of completely normal use and maintenance as required within the effective service life of the exhaust emission control system.
2. Scope of guarantee
  - 1) Function guarantee of exhaust emission control system  
It is guaranteed that the system meets the regular or irregular exhaust inspection performed by government agencies within the scope of use (15,000 km).
3. If the following situations exist, this guarantee clause will not be applicable, but the provincial or city dealers or service departments of this Company are still willing to serve customers at a reasonable price if there are maintenance needs.
  - 1) The regular maintenance is not performed according to the time or mileage specified by this Company.
  - 2) The regular inspection, adjustment or maintenance is not carried out at the dealers or service centers of this Company or the maintenance record certificates cannot be provided.
  - 3) Overload or improper use.
  - 4) The motorcycle is transformed, original parts are disassembled or other devices are installed at will.
  - 5) The motorcycle is used for races or frequently ridden on the roads which are applicable to non-motor vehicles.
  - 6) Damage is caused due to typhoon, flood and other weather disasters or damage and faults are caused due to negligence, accident or impact of foreign objects.
  - 7) The motorcycle is disused in a long term without regular maintenance.
  - 8) The odometer is damaged and not maintained immediately or it is transformed, disused or changed artificially.
  - 9) The motorcycle is sent to the inspection station for exhaust inspection every three months.

The new motorcycles of this Company have passed the UNECE regulation No 41 including all amendments up to Series 04, Supplement 3 standard implemented by EU through the noise inspection results.

## 17.2 Regular Maintenance Notice

- In order to ensure that the degree of environmental pollution will not become increasingly serious, the state requires that all the motor vehicles produced by all manufacturers must meet the air pollution emission standards. The production of this Company meets the provisions of air pollution emission standards, meanwhile, the Company also strives to purify the air and take efforts to reduce air pollution.
- This motorcycle has passed rigorous inspection before leaving the factory and meets the provisions of air pollution emission standards. However, due to the different service conditions of this product, we have formulated the following regular checklist on exhaust emission. To ensure normal emission, the users should carry out inspection, adjustment or maintenance in accordance with the specified time.
- For other individual problems on use, please ask the dealers .
- The relevant emission provisions are shown below:

Emission regulation	CO	HC	NO <sub>x</sub>
Emission standard	≤1.14g/km	≤0.38g/km	0.07g/km

※ If the emission standard changes, the newest national provision shall prevail.

- If the regular inspection is not carried out at the dealers or service centers of this Company, this Company will not be responsible for the prohibition. Please make necessary inspection at any time to maintain the best motorcycle conditions.

Note: ①The cleaning frequency of air filter should be increased if the motorcycle is ridden on sandy roads or in the seriously polluted environment to prolong the service life of engine.

②If the motorcycle is always ridden at a high speed or in a frequent manner with large mileage, the maintenance degree should be increased.

### Precautions for guarantee of emission standards

- 1) The unleaded gasoline should be restricted.
- 2) The engine oil with the specification specified should be used.
- 3) Please carry out maintenance in accordance with the provisions of the regular maintenance table.
- 4) For the exhaust control system, arbitrary adjustment or replacement (including use of spark plug, idle adjustment and ignition timing) is strictly prohibited.
- 5) Precautions:  
The catalyst device will be greatly affected due to the block of ignition system, charging system or fuel system; therefore, please go to the dealers or service centers specified by this Company for inspection, adjustment or maintenance if you feel that the engine is unsmooth.
- 6) The exhaust control system of the motorcycle complies with the national regulations. Therefore, if any parts of the system need to be replaced, make sure to use the original parts of this Company and carry out replacement by the specified dealer or service center

## 17.3 Mechanical Function of Exhaust Control System

### Summary

The exhaust countermeasure is to use four-stroke single-cylinder engine and air induction device, maintain a good level of exhaust and adopt activated carbon canisters for exhaust from fuel evaporation.

#### ※ Engine improvement

Strive to increase the combustion efficiency depending on improved spark plug, combustion chamber, compression ratio, ignition time, exhaust system and other engine elements and high intake and exhaust efficiency.

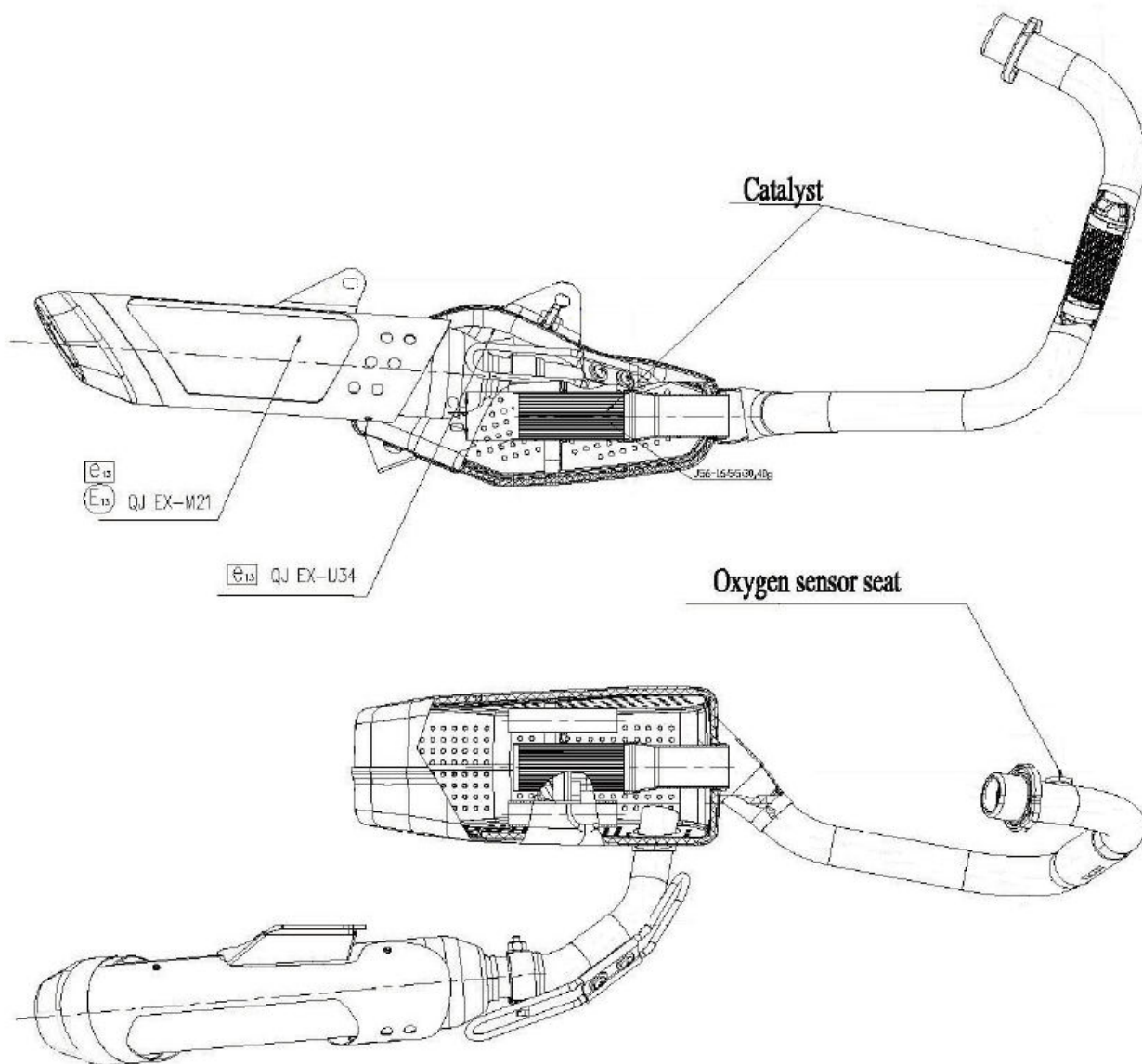
#### ※ Air induction device

After air is induced into the exhaust pipe, the chemical reaction of incompletely burnt CO and HC will occur to generate harmless gases.

Distinction	Device	Constituent part	Function
Exhaust system	Catalyst device	Catalyst convertor	The canned oxydic catalyst installed in the middle of exhaust pipe will oxidize CO, HC and NOX.

## 17.4 Catalyst Conversion System

### 17.4.1 Construction:



## 17.4.2 Instructions:

1. The function of catalyst conversion is to convert the completely burnt gases (including HC, CO and NOX) into H<sub>2</sub>O, CO<sub>2</sub>, N<sub>2</sub> and other harmless gases and then discharge them.
2. When the catalyst containing platinum, rhodium and other rare metals is converted, unleaded gasoline should be used.

Leaded gasoline will lead to the failure of catalyst.

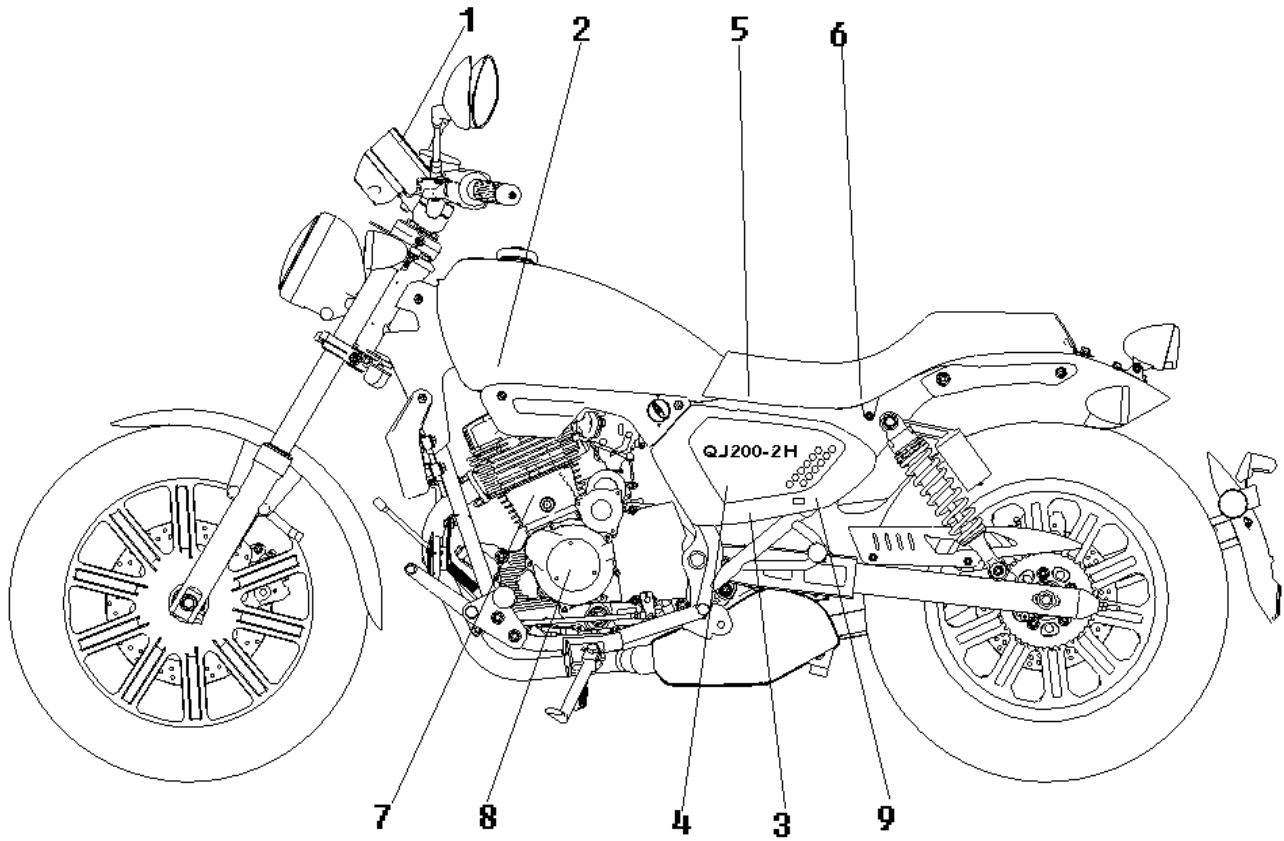
### • General precautions during maintenance of motorcycles (exhaust pipes) with catalytic converters:

- 1) The motorcycle with a catalytic converter should not be touched after the engine is turned on or off, because the temperature is high in a short time.
- 2) The motorcycle with a catalytic converter should not be close to combustibles.
- 3) The carbon monoxide in the exhaust pipe is harmful to human body, so do not operate the engine in a closed space.
- 4) The motorcycle with a catalytic converter should not use leaded gasoline. (to prevent catalyst poisoning)
- 5) Do not start the engine by pushing the motorcycle. If necessary, start the engine by pushing the motorcycle after the temperature of the engine and catalytic converter is reduced.
- 6) Do not ride the motorcycle by putting into gear or turning off the motorcycle during downhill running.

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- 7) Do not ride the motorcycle with poor ignition.
- 8) When maintaining the ignition system of engine, it is not allowed to start the engine to check whether the spark plug can generate sparks by removing the spark plug. If it is necessary, the time should not be too long.

## Electronic Injection Pars



No.	COMPONENT
1	SPEEDOMETER
2	IGNITION COIL+PLUG CAP
3	DIRECTION INDICATOR FLASHER
4	BATTERY (OPTION 1)
	BATTERY (OPTION 2)
	BATTERY (OPTION 3)
5	MODULATOR (OPTION 1)
	MODULATOR (OPTION 2)
6	ECU
7	SPARK PLUG
8	MAGNETO
9	RELAY STARTER

# XVIII. Electronic Injection System

Electronic Injection System .....	18.1
Electronic Injection System Parts.....	18.2
Fault Diagnosis.....	18.3
Common Fault Elimination Method.....	18.4

## 18.1 Introduction of Electronic Injection System

This motorcycle adopts the small engine electronic injection system from Shanghai YESON Electric Company. For this system, the closed-loop control is realized by an oxygen sensor. The oil injection and ignition are controlled by ECU. A three-way catalyst is used to carry out aftertreatment for the gas burnt by the engine to convert it into harmless gas and discharge it to the air. This system adopts the closed-loop control self-learning system which can effectively eliminate the manufacturing differences between the system and related mechanical parts, improve the overall consistency of the motorcycle and remove the errors caused due to wear and other factors after actual use.

- The on-board diagnostic system (referred to as OBD system) refers to a diagnostic system integrated in the engine control system that can monitor the faulty components that affect exhaust emissions and the main functional state of engine. It has the ability to identify, store and display fault information through a self-diagnostic fault indicator (MIL).
- When repairing the motorcycle with an OBD system, maintenance personnel can quickly and accurately locate the faulty components through the diagnostic apparatus, thus greatly improving the efficiency and quality of repair.
- OBD technology involves many new concepts. The following is a brief introduction to some basic knowledge about OBD technology in order to help readers better understand the subsequent contents.
- The electronic control unit constantly monitors sensors, actuators, associated circuits, fault indicators and battery voltages, and even the electronic control unit, and conducts reliability detection to the output signal of sensor, drive signal of actuator and internal signal (e.g., closed loop control, cooling liquid temperature, idle speed control, battery voltage control, etc.). Once a link is found to be faulty, or a signal value is not trusted, the electronic control unit should be used to immediately make fault information records in the fault memory of RAM. The fault information record is stored in the form of a fault code and displayed in the order in which the faults occur.
- Faults can be divided into "steady-state faults" and "incidental faults" according to the frequency (including the faults caused due to a short wire harness open-circuit or poor connector contact)
- Motorcycle EFI systems, like other electronically controlled gasoline injection systems, can significantly reduce emissions on the one hand and cause difficulties in engine maintenance on the other. At present, it is in the market incubation period of motorcycle EFI system, and maintenance personnel can see and feel the throttle engine. However, some of the mechanical components of electronically controlled gasoline injection system that are previously familiar to people are eliminated and replaced with various electronic components. Originally, maintenance personnel and even drivers may adjust the throttle by themselves; however, the data is now stored in the computer chip and must be adjusted by electronic instruments, which is beyond the reach of general maintenance personnel. If the electronic components of the system fail, it may not be seen from the outside. It is often necessary to use various instruments for testing, so as to identify them. Therefore, maintenance personnel often feel unable to find the way to start working when repairing electronically controlled gasoline injection engines. Based on these actual situations, we have prepared this maintenance manual, and we hope to play its role in two aspects: on the one hand, help the engineers in engine plants or OEMs to understand the electronic control systems of engine more deeply; on the other hand, help the maintenance personnel in various



areas repair electronically controlled gasoline injection engine. This manual first introduces the composition and working principles of electronically controlled gasoline injection system. Next, the structure and performance of various components of the system are described in detail.

- In general, fault diagnosis instrument is an essential tool in the maintenance of electronically controlled gasoline injection system. The fault diagnosis instrument can be used to call the fault information record stored in the ECU out. To help the reader understand the true meaning of each fault code, this manual lists the conditions under which the ECU sets various fault information records. However, many faults are not directly determined based on the fault information record, but a series of analyses are required to find the true fault. Therefore, this manual uses quite a bit of space to describe how to find the true fault based on the fault information record.

Due to the presence of electronic control components, new contents are given to the cause of engine failure. In other words, the same engine fault may be caused either by mechanical components or by electronic components. Moreover, the actual fault of engine can be diagnosed not just with the fault diagnosis instrument. Therefore, this manual also starts from the symptoms of the engine, and finds the fault in combination with electronic control system.

## **18.2 EFI Parts**

### **18.2.1 Engine Controller (YESON ECU)**

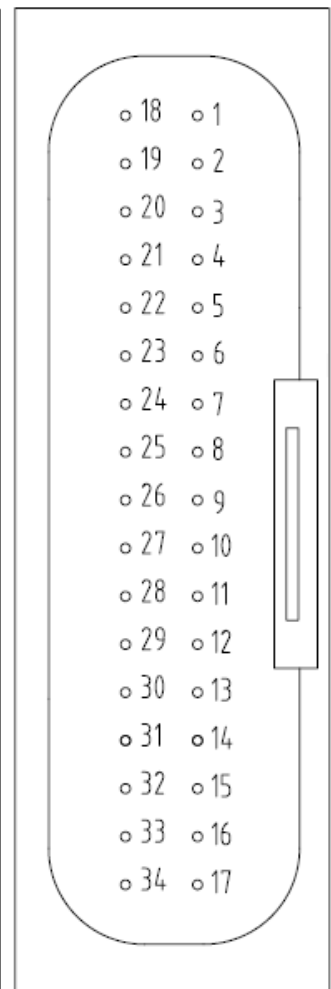
The engine controller is used to detect the running state of engine in real time through various sensors, and ensure the original motorcycle emission and fuel economy while optimizing the driving performance of motorcycle under various working conditions through reasonable calculation and self-learning control output devices. The engine controller can also wake up the self-diagnosis when the system is faulty.

#### **18.2.1.1 ECU Appearance**



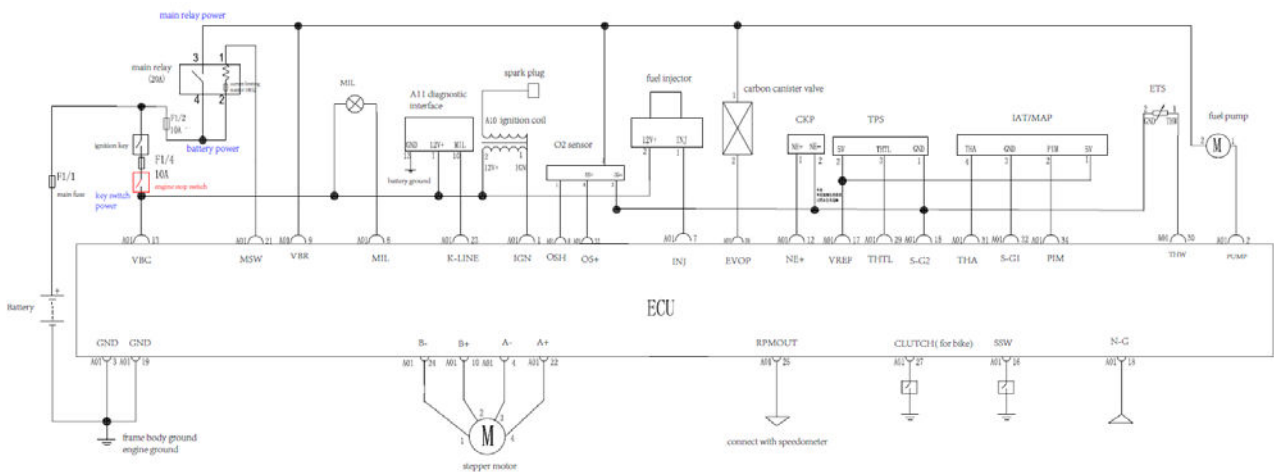
### 18.2.1.2 ECU Pin Definition

1	IGN	Ignition coil	18	N-G	Neutral gear signal
2	PUMP	Fuel pump control terminal	19	GND	Negative electrode of battery
3	GND	Negative electrode of battery	20	—	—
4	A-	Negative electrode of idle motor coil A	21	MSW	Control terminal of main relay
5	—	—	22	A+	Positive electrode of idle motor coil A
6	MIL	Fault light signal	23	K-LINE	K line fault diagnosis port
7	INJ	Fuel injector control terminal	24	B-	Negative electrode of idle motor coil B
8	OSH	Oxygen sensor heating control terminal	25	RPMOUT	Rotating speed signal output of engine (optional)
9	VBR	Supply terminal controlled by main relay	26	EVOP	Control terminal of canister solenoid valve (optional)
10	B+	Positive electrode of idle motor coil B	27	CLUTCH	Clutch switch signal (for riding)
11	—	—	28	—	—
12	NE+	Trigger coil “+”	29	THTL	Throttle sensor signal terminal
13	VBC	12V+controlled by ignition key	30	THW	Engine temperature sensor signal
14	—	—	31	THA	Intake temperature signal +
15	S-G2	“-” terminal of sensor	32	S-G1	“-” terminal of intake temperature and pressure sensor
16	SSW	Diagonal stop switch signal (highly effectively; optional)	33	OS+	Oxygen sensor signal “+”
17	VREF	5V+ at supply terminal of sensor	34	PIM	Intake pressure signal +



ECU harness connector

### 18.2.1.3 Circuit Diagram of Electronic Injection System



#### Precautions:

- Do not place the ECU at high-temperature parts, such as muffler or engine;
- Do not place the ECU near water drops, engine oil or any liquid;
- Do not allow mud or other pollutants to cover the ECU and thus affect the heat dissipation of the ECU;
- The mounting surface must be flat to prevent generating external force to ECU and thus making the circuit board bent.
- The normal working DC power supply voltage range of the ECU is 9 to 16V. Permanent damage will not be caused to the ECU both when it works for one minute under DC voltage of 26V or less and when it works for one minute or less under the DC voltage with the reverse voltage of 13V or less

### 18.2.1.4 Working Temperature

- Normal working temperature range: -30 °C ~ 0 °C
- Maximum working temperature: 80 °C (the contin
- Storage temperature range: -40 °C ~ 85 °C

### 18.2.1.5 Maintenance

After-sale maintenance cannot be carried out for the controller. In the event of a problem, first confirm whether the problem is caused by calibration or software. If it is caused by calibration or software, please refresh the software calibration. Once a problem arises, it should be confirmed whether it is caused by calibration or software. If it is caused by calibration or software, please refresh the software calibration again. If there is a fault or damage in the controller hardware within the warranty period, the controller must be returned to the motorcycle manufacturer with detailed controller part number, serial number, motorcycle type, production date, cumulative mileage of motorcycle, using site and motorcycle repair date.

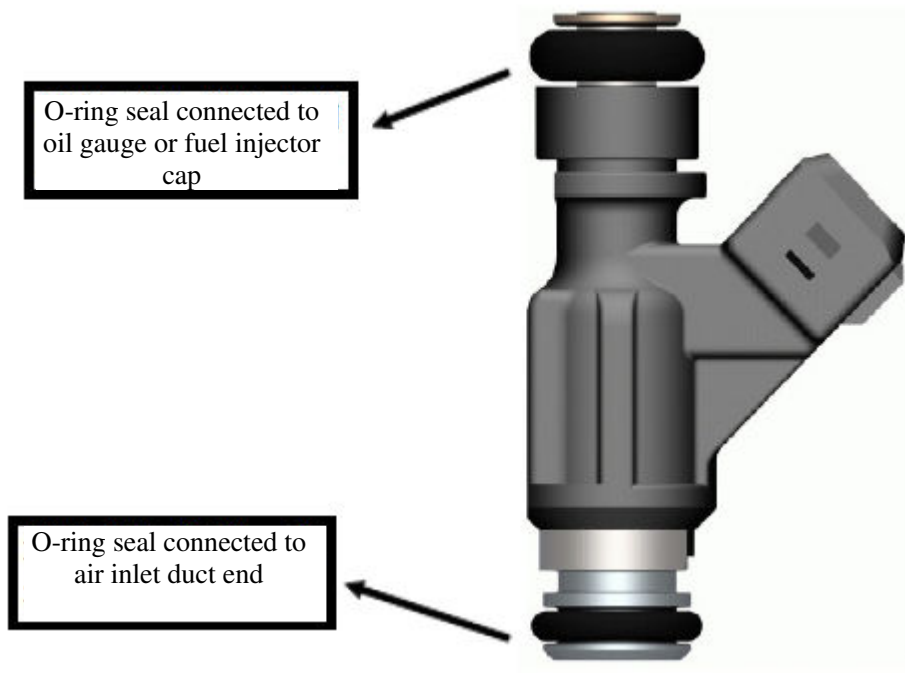
## 18.2.2 Fuel Injector

### 18.2.2.1 Working Principle of Fuel Injector:

An electromagnetic coil is designed around the iron core inside the fuel injector. The two electrodes led by the electromagnetic coil are the input control interfaces of fuel injector. When the electromagnetic coil is energized, the generated electromagnetic force overcomes the spring force of ball valve and fuel pressure to make the ball valve rise so that the high-pressure fuel (300Kpa) in the fuel pipe can flow through the nozzle plate

through the valve seat hole of fuel injector and form taper vapor to spray to the intake valve. When the fuel injector is powered off, the electromagnetic force of electromagnetic coil will disappear and the ball valve of fuel injector will close automatically under the action of return spring, so that the fuel injection action of fuel injector stops.

### 18.2.2.2 Appearance of Fuel Injector:



#### Precautions:

- A filter is designed inside the fuel injector, but it is not a maintainable part, because its design function is to filter the accumulated impurities from the fuel filter in the oil line to the fuel injector only. Impurities can cause the cohesion, flow deviation, leakage and other faults of fuel injector, so the fuel filter is very significant.
- The fuel injector should be replaced with that with the same part number only,

### 18.2.2.3 Replacement of O-ring Seal

- Lubricate the O ring seal with the recommended lubricant. Prevent the lubricant from contacting with the nozzle plate during use; otherwise, the spray may be affected.
- Delphi recommends that the seal can only be used once. If the seal cannot be replaced, check whether it is damaged carefully before repeated use, because very small damage can also cause fuel leakage accidents. In order to avoid potential safety hazards, please install the fuel injector in strict accordance with the specified installation method.
- Be careful not to damage the seal when it is installed into the fuel injector.

### 18.2.2.4 Temperature Range

The standard injector operating temperature range is as follows. Within the qualified operating temperature range, the fuel injector flow is within the tolerance range and fault will not be caused. At the same time, in a reasonable working environment, leakage, degradation or reduction of service life will not be caused to fuel injector.

- Operating temperature range: -30 -125°C
- Extreme operating range (may cause some functional degradation): - 40-150°C
- Storage temperature: -60 -60°C

### 18.2.2.5 Requirements for Installation

During the installation and removal process, please strictly observe the following methods to avoid damage to the fuel injector body and electronic components.

- Lubrication: Apply a small amount of lubricant to the underside of the sealing ring. ISO 10 light mineral oil or equivalent product is recommended. ISO 10 light mineral oil or equivalent product is not recommended.
- When conditions allow, apply lubricant to the fuel injector seat, which is better than the effect of being applied the seal ring. So that the fuel injector contamination probability will be reduced to minimum.
- Do not allow the spray plate to come into contact with the lubricant, which may affect the injection quantity. Do not dip the top of the fuel injector to into the lubricant.
- All fuel injector sealing rings are factory assembled. In principle, the sealing seals should not be reused. In the case of being resued in special conditions, please carefully check the sealing rings for damage. Very small damage may cause leakage. Carefully insert the sealing ring into the installing seat during installation.
- When installing the fuel injector connector, take care not to damage the connector, and you can hear a click, indicating that it is in place.
- Avoid unnecessary disassembly and assembly of connector.
- Harness should not be clamped too tightly, which may cause a short circuit.
- When installing the fuel injector connector, do not rotate the fuel injector. This may cause fuel injection target to shift.

### 18.2.2.5 Replacement Method

The following is the disassembly and replacement method of fuel injector.

**Note: The injector and the surrounding objects are very hot.**

- Turn off the motorcycle.

- Cut off the negative electrode of storage battery, to avoid accidentally starting the engine.
- Remove the fuel injector connector.
- Release the fuel pressure.
- Remove the fuel pipe from the fuel injector.
- Remove the fuel injector from the air inlet duct.
- Remove the fuel injector retainer and carefully remove the fuel injector from the seat ring.
- Carefully clean the impurities at the injector contact surface, and be careful not to damage the contact surface.
- Apply lubricant to the sealing rings on both ends of the new fuel injector.
- Carefully put the head of fuel injector into the intake pipe, and confirm that the installation direction is consistent with the original one.
- Press it in the fuel injector seat ring and secure the clamp.
- Tighten the mounting bolt according to the torque specified in the installation manual.
- Install fuel hose.
- Insert the fuel injector connector.
- Power on the key, do not start the engine and check fuel injector for leakage.
- Start engine for running check.

### **18.2.2.5 Replaceability**

Only allow to replace the fuel injector with one with the same part number. Because the part number may change sometimes, please select the correct fuel injector after inquiring the motorcycle maintenance manual and list of part number.

### **18.2.2.6 General Failure Mode and Prevention and Solving Measures in Using Process**

- Important note: All the following decisions are based on normal functions of motorcycle, wiring harness and other system parts.
- Block of fuel injector: Please clean the fuel injector by using special devices (such as ultrasonic wave) and special cleaning agent.
- Fuel leakage of fuel injector: Replace the fuel injector with that with the same part number or that specified by the motorcycle factory.
- Damage of electromagnetic coil: Please measure the resistance of electromagnetic coil of fuel injector with a multimeter. If the reading is about 10 Ohms, the electromagnetic coil of fuel injector is normal; if the coil resistance is infinite, it means that an open circuit fault has occurred to the coil.

## **18.2.3 Throttle Body**

### **18.2.3.1 Working Principle of Throttle Body:**

Throttle body assembly mainly consists of the following components: main casting valve, return spring, throttle wire, throttle body position sensor, inlet pressure temperature sensor, stepper motor and idle speed adjusting screw.

The throttle body position sensor provides the ECU with a throttle opening;

Note: The engine idle speed is automatically controlled by the EFI system within the normal range. Do not adjust the idle screw with a great force.

### 18.2.3.2 Appearance of Throttle Body:



### 18.2.3.3 Cleaning Method of Throttle

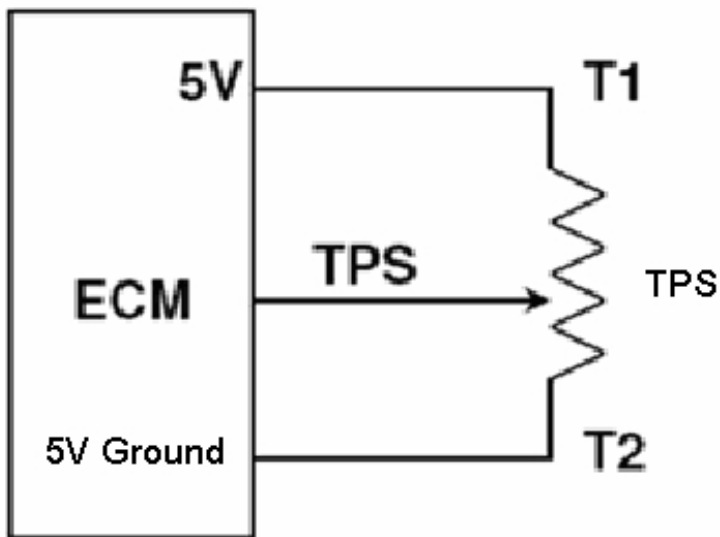
Clean the throttle body with a carburetor cleaner, spray cleaner at the inner wall of throttle body, and gently remove dust and carbon deposit and other items using a brush.

**Precautions:**

Be careful to prevent the bypass airway from being blocked by dirt.

### 18.2.3.4 Technical Parameters

- Measurement range: Opening of 7% to 93% (the actual opening from idle to full open)
- Reference voltage of throttle position sensor:  $5\pm 0.1V$
- When the throttle is fully closed, the normal output is  $14\%\pm 5\%$  of the reference voltage.
- When the throttle is fully opened, the normal output is between 70% and 80% of the reference voltage.
- The impedance between the T1 and T2 terminals is  $0k\Omega$  to  $5k\Omega$ .
- Adaptive temperature of working conditions:  $-40^{\circ}C \sim 125^{\circ}C$ .



### 18.2.3.5 Precautions

Do not spray any cleanser into the TPS throttle position sensor

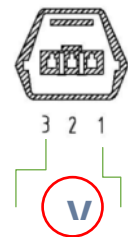
- Open the throttle valve plate with a throttle cable
- Do not insert any tool or club into the throttle hole to keep the valve plate open. Otherwise, the valve plate may be deformed and the inner wall of throttle may be damaged.
- Maintain the air flow needed for idle speed setting by the factory by keeping the amount of carbon deposits around the throttle valve plate
- Do not adjust the position of idle screw
- Replace the O ring during disassembly and assembly

### 18.2.3.6 Sensor fault judgement

1. Sensor inspection: connect it to the cable and turn on the power; measure the voltage between pin 1 and pin 3 with multimeter;(as shown in the figure)

Standard: throttle idle position: 0.5 - 0.9V

Full-open position of throttle: about 3.5-4V



2. Sensor circuit inspection

Sensor 1—ECU29	Standard: On	NG: Sensor 1—ECU29
Sensor 1—to ground	Standard: Off	NG: Sensor 1—to ground



## 18.2.4 Temperature Sensor of Engine Cylinder Head

### 18.2.4.1 Working Principle of Temperature Sensor of Engine Cylinder Head

The engine cylinder head temperature sensor is used in the air cooled engine to measure the temperature of engine cylinder head. Within the sensor temperature range, the resistance will change with the temperature of engine and the temperature characteristic is the negative temperature coefficient resistance characteristic. It is an irreparable part.

### 18.2.4.2 Appearance of Temperature Sensor of Engine Cylinder Head



### 18.2.4.3 Working Environment

- The sensor is mainly used for air-cooled engine
- Normal operating temperature range: -40 -160°C (continuous work)
- Relative humidity at working environment: 0 ~ 100%
- Typical operating pressure: at minimum installation torque, the sensor is capable of sealing the engine coolant at an actual pressure of 206.8 kPa (30 psi) and a temperature of 135°C.
- Extreme working conditions: only 1 hour at maximum temperature of 160°C.

### 18.2.4.4 Electric environment

- Typical working voltage: The reference voltage is  $5\pm 0.1$ VDC
- Maximum excitation current: During the characteristic test and calibration of the sensor under any temperature, the performance of the sensor should not be affected by the current of less than 1mA.

### 18.2.4.5 Fault Determination and Characteristic of Output Resistor

Fault performance:

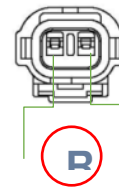
This will have a large impact on start-up, because the ECU cannot monitor the temperature of engine or achieve accurate fuel injection.

General faults are caused by the looseness of connection plug-in or the falling of the pin on the plug-in. The sensor can only be replaced with that of the same model.

**Internal resistance measurement: disconnect it from the cable; measure the resistance between pin 1 and pin 2 with multimeter (as shown in the figure)**

**Standard: 25 °C: 1KΩ  
100 °C: 0.179~0.187KΩ**

Otherwise, the sensor fails.



## 18.2.5 Intake temperature sensor signal

### 18.2.5.1 Working Principle of Intake Temperature Sensor

It is used to measure the intake air temperature, its resistance will change with the intake air temperature and its characteristic is also the negative temperature coefficient resistance characteristic. It is also an irreparable part.

### 18.2.5.2 Appearance of Intake Temperature Sensor



**Intake pressure sensor / intake temperature sensor (integrated)**

### 18.2.5.3 Fault Determination and Characteristic of Sensor

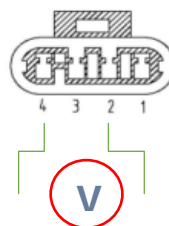
Inspection of input voltage: the measurement diagram is shown in the figure

Inspection point: connect it to the cable and turn on the power; measure the voltage between pin 2 and pin 4 with multimeter;

**Standard: 4.75-5.25V**

**Inspection of resistance: 5.5954 kilohm at 0°  
2.0000 kilohm at 25°**

Otherwise, the sensor fails.



## 18.2.6 Inlet Pressure Sensor

### 18.2.6.1 Working Principles of Inlet Pressure Sensor

This sensor is used to measure the absolute pressure of air intake elbow, reflect the size of intake pressure according to the difference of resistance, and then calculate the intake volume in engine combustion chamber through indirect conversion, and it is also a non-serviceable part.

### 18.2.6.1 Appearance of Inlet Pressure Sensor



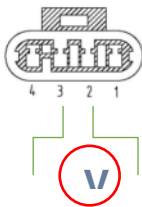
### 18.2.6.3 Electrical environment

- Typical voltage: The working DC reference voltage of sensor circuit is  $5 \pm 0.1$  V.

### 18.2.6.4 Fault Determination

1. Check whether the plug-in is loose
2. Check the fault or current data with a diagnostic instrument
3. View the breakover between the sensor and ECU and check whether the abnormal operation of sensor is caused by cables
4. Inspection of sensor: Connect with cable and power on; measure the voltage between pin 2 and pin 3 with a multimeter; in the standard case, the voltage is 4.25-4.75V under the air pressure of 100kPa when the sensor is not started. Otherwise, the sensor fails.

The measurement diagram is as follows:



## 18.2.7 Oxygen Sensor

### 18.2.7.1 Working Principle of Oxygen Sensor

Oxygen sensor can be used to detect the oxygen content in the waste gas of engine exhaust pipe for internal fuel closed loop control of ECU, thus maintaining engine combustion at the most reasonable state of air and fuel ratio (14.7).

### 18.2.7.2 Appearance of Oxygen Sensor

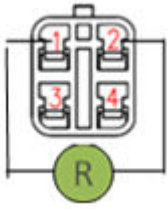


### 18.2.7.3 Technical Parameters

- Partially thick limit of air-fuel ratio:  $> 750\text{mVDC}$
- Partially thin limit of air-fuel ratio:  $< 120\text{ mVDC}$
- The resistance of heater is:  $9.6 \pm 1.5\Omega$  (measured at  $21^\circ\text{C}$ )
- Operating temperature range:  $260\text{-}850^\circ\text{C}$

### 18.2.7.4 Fault Determination

1. Conduct fault diagnosis with a diagnostic instrument and judge the fault type
  2. Check whether pins fall off
  3. Check the voltage between sensor line and signal ground with a multimeter: Standard When the engine temperature is 80 degrees and the idle speed or constant speed is 3000 revolutions, 4000 revolutions or 5000 revolutions, the duration is more than 2 minutes. Measure whether the voltage at both ends changes between 0-1V constantly. Otherwise, the sensor fails.
  4. Determination of oxygen sensor heating: measure the resistance between two pins (two white lines) of sensor heating rod with multimeter; Standard:  $9.6 \pm 1.5\Omega$  (measured at  $21^\circ\text{C}$ )
- The measurement diagram is as follows:



## 18.2.8 Ignition Coil

### 18.2.8.1 Working Principle of Ignition Coil

The ignition coil can provide energy to the spark plug and the ignition coil and spark plug are connected by a high-voltage cable.

### 18.2.8.2 Technical Parameters

- Input voltage: 9-14 VDC
- Output voltage: 25~35kV
- Normal working temperature: -30 ~110°C
- Storage temperature: -40~155°C
- Installation torque: 8.8~11.8Nm

### 18.2.8.3 Inspection of Ignition Coil Line

Ignition coil 1—ECU1	Standard: On	NG: Power+Open circuit
Ignition coil 2—ECU13	Standard: On	NG: Control-Open circuit
Ignition coil 1/2—To ground	Standard: Only one 12V	NG: Short circuit

## 18.2.9 Idle Speed Stepper Motor

### 18.2.9.1 Working Principle of Idle Speed Stepper Motor

The function of idle speed control valve is to control the flow area of bypass air passage of throttle body, so as to adjust the air volume of engine and control the idle speed of engine.

### 18.2.9.2 Appearance of Idle Speed Stepper Motor



### 18.2.9.3 Fault Determination:

Before inspection, check whether the stepper motor 4 PIN (black) connector and ECU34 PIN (black) connector are loosened or improperly connected, and then check the flashing of malfunction indicator light.

Inspection of stepper motor: Measure the resistance between Pin A and Pin B and that between Pin C and Pin D respectively with a multimeter

Standard: air temperature: 20-30 °C

**50±10%Ω**

Circuit inspection of idle speed stepper motor:

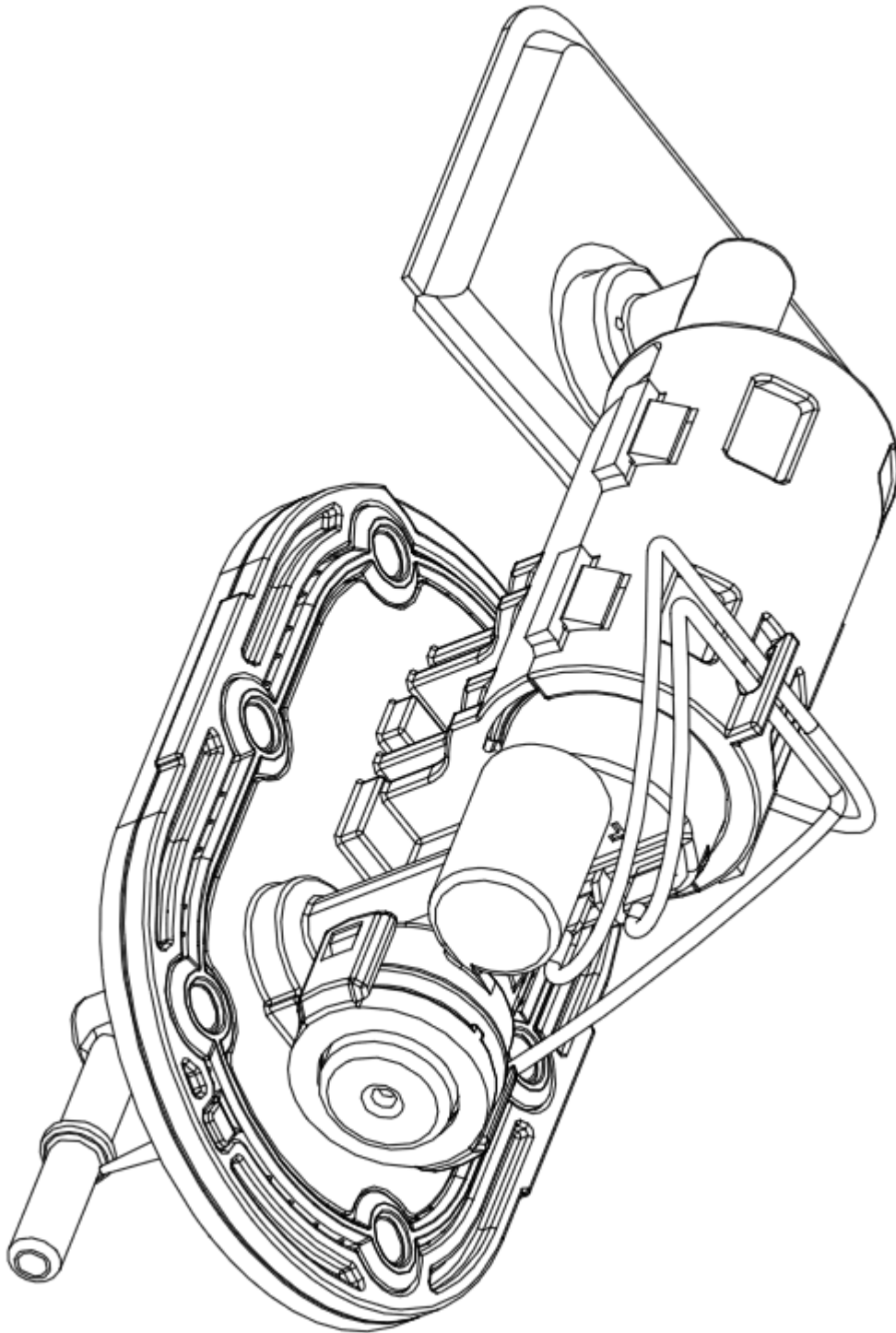
Stepper motor A-ECU22	On	NG: A+Open circuit
Stepper motor B—ECU4	On	NG:A-Open circuit
Stepper motor C—ECU10	On	NG:B+Open circuit
Stepper motor D—ECU24	On	NG:B-Open circuit

### 18.2.10 Fuel pump assembly

#### 18.2.10.1 Working Principle of Fuel Pump Assembly

The electric fuel pump and pressure regulator work together to provide 300Kpa gasoline pressure to the engine and the fuel pump is installed at the bottom of fuel tank.

### 18.2.10.2 Appearance of Fuel Pump Assembly



### 18.2.10.3 Installation of Fuel Pump Assembly:

- Replace the sealing washer of fuel pump assembly (Used washer may lead to fuel leakage)
- Lightly support the fuel pump strainer and carefully put the fuel pump assembly into the tank. Avoid damaging the filter screen of fuel pump.

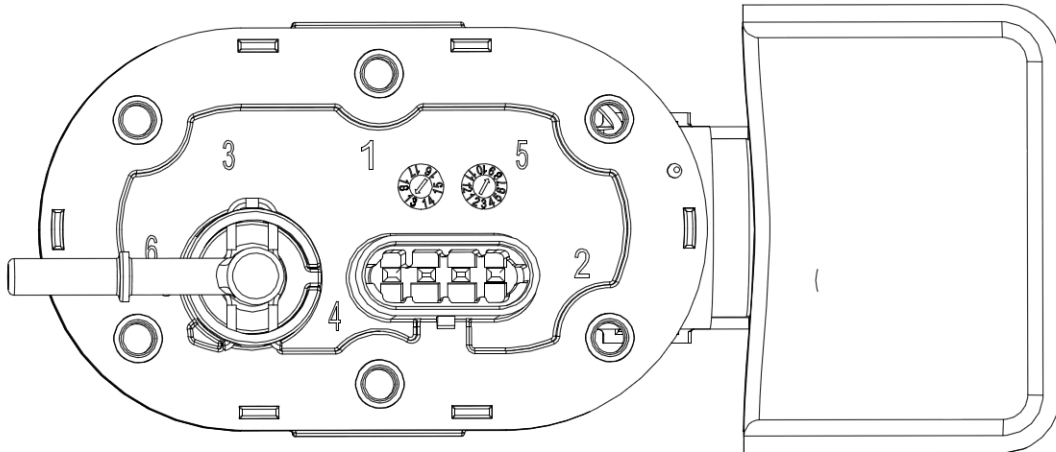
Installation direction of fuel pump assembly: Arrange the installing screw holes of fuel pump assembly asymmetrically, and installed it in the specified direction. The pressure regulator should

face the rear of fuel tank

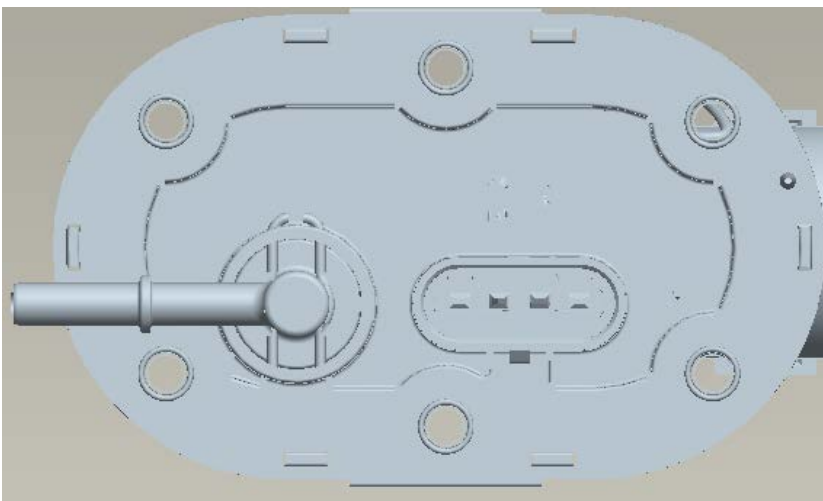
to ensure that the installing surface of fuel tank is clean and flat.

- Install mounting bolts on the fuel pump assembly cover plate and tighten them evenly in the order indicated in the following figure. Installing torque of screw: 3- 4 Nm

The fuel pump assembly should be secured with special bolts. It should be tightened according to specified tightening order and torque during the installation. Over torque an incorrect tightening order may cause washer deformation and thus result in leakage.



- Install the fuel tank on the motorcycle.
- Connect fuel pipe and fix it with a suitable clamp.
- Connect the fuel pump harness connector.
- Check for leaks according to “Fuel Leakage Check Process” before the operation of engine.



### 18.2.10.3 Fault Diagnosis of Fuel Pump Assembly

- a) After it is unlocked with a key, the fuel pump will run for about 3 seconds. If you can hear the rotation sound of fuel pump, perform the operations according to the requirements in Article d.



- b) Disconnect the fuel pump connector and check whether the fuel pump supply voltage is around 12V.
- c) If there is no problem in step b, the external battery is connected to supply 12V DC power to the fuel pump to check whether the fuel pump is running.
- d) If the fuel pump is running normally, use a gasoline pressure gauge to check whether the fuel tube pressure at the front end of the injector is about 300Kpa when the engine is in idling state.
- e) If the pipeline pressure is lower than 270Kpa, check whether there is leakage in the oil line, whether the fuel pump is rotating in the reverse direction, and whether the filter is blocked.

### 18.2.10.4 Common Problems

- a) The fuel pump assembly plug-in is reversed, which enables the fuel pump to reverse and fail to provide the engine with sufficient fuel pressure, resulting in engine failure.
- b) The fuel pump is damaged and fails to rotate.

Precautions:

- 1) Because there is no gasoline in the fuel tank of new motorcycle at the beginning, a lot of air is generated at fuel pipe, so it needs to start it for several times to empty the air in the fuel line, and then the engine can work properly, which is normal. Motorcycle will be started easily in the future.
- 2) Because gasoline can cool fuel pump, do not let fuel pump work little oil or no gasoline, which may burn fuel pump.

### 18.2.10.5 Fault Determination:

1. Inspection of fuel pump: Measure the voltage between pin 1 and pin 2 of fuel pump with a multimeter;  
Standard: Within 3S after the ignition key is inserted or during the start-up process: 12±2V.
2. Inspection of fuel pump circuit:

Fuel pump 1—ECU2	Standard: On	NG: Control-Open circuit
Fuel pump 2—ECU9	Standard: On	NG: Voltage+Open circuit
Fuel pump 2—To ground	Standard: Off	NG: Power+ Short circuit

## 18.3 Fault Maintenance and Diagnosis Method

The fault light is located on the meter panel with a FI mark below. Under normal circumstances, after the key is turned, if the engine in the neutral position, and the fault light is on, it indicates that the electronic injection system is powered and it can work; if the fault light is off, it indicates that the electronic injection system circuit is disconnected, it will not work and the connection of positive and negative electrodes of fuse and battery should be checked. If the fault light is off after the engine is started, it indicates that there is no fault; on the contrary, if the fault light is still on after the engine is started, it indicates that the electronic injection system works abnormally and the fault should be removed if any.

### Table of fault code

Component	Fault Code	Monitor Strategy	Fault detection criteria	MI activation Criteria	Chinese description
Throttle Position Sensor	P0123	Signal range check high for throttle Position Sensor	Voltage of throttle position sensor is higher than 4.9V.	1st cycle	<b>Throttle position sensor is short-circuited to power</b>

	P0122	Signal range check low for throttle Position Sensor	Voltage of throttle position sensor is lower than 0.1V.	1st cycle	<b>Throttle position sensor is short-circuited to ground</b>
Manifold absolute pressure sensor	P0108	Signal range check high for Manifold absolute pressure sensor	Voltage of Manifold absolute pressure sensor is higher than 4.9V.	1st cycle	<b>Intake pressure sensor is short-circuited to power</b>
	P0107	Signal range check low for Manifold absolute pressure sensor	Voltage of Manifold absolute pressure sensor is lower than 0.1V.	1st cycle	<b>Intake pressure sensor is short-circuited to ground</b>
Air temperature sensor	P0113	Signal range check high for Air temperature sensor	Voltage of Air temperature sensor is higher than 4.9V.	1st cycle	<b>Intake temperature sensor is short-circuited to power</b>
	P0112	Signal range check low for Air temperature sensor	Voltage of Air temperature sensor is lower than 0.1V.	1st cycle	<b>Intake temperature sensor is short-circuited to ground</b>
Engine coolant temperature sensor	P0118	Signal range check high for Engine coolant temperature sensor	Voltage of Engine coolant temperature sensor is higher than 4.9V.	1st cycle	<b>Engine temperature sensor is short-circuited to power</b>
	P0117	Signal range check low for Engine coolant temperature sensor	Voltage of Engine coolant temperature sensor is lower than 0.1V.	1st cycle	<b>Engine temperature sensor is short-circuited to ground</b>
Oxygen sensor	P0132	Signal range check high for Oxygen sensor	Voltage of Oxygen sensor is higher than 0.7V and duration is more than 15 seconds.	1st cycle	<b>Oxygen sensor is thick for too long time</b>
	P0131	Signal range check low for Oxygen sensor	Voltage of Oxygen sensor is lower than 0.3V and duration is more than 15 seconds.	1st cycle	<b>Oxygen sensor is thin for too long time</b>
	P0134	Signal range check no activity detected for Oxygen sensor	Voltage of Oxygen sensor is between 0.35V to 0.55V.	1st cycle	<b>Oxygen sensor is not ready</b>
Crankshaft Position sensor	P0335	Crankshaft Position Sensor Circuit	Signal voltage of the crankshaft position sensor is high when engine is not running.	1st cycle	<b>The crankshaft position sensor signal is abnormal</b>
Injector	P0262	Short circuit to battery for Injector.	Output short circuit current is higher than 5A.	1st cycle	<b>Fuel injector is short-circuited to power</b>

	P0261	Short circuit to ground for Injector.	The voltage of output is lower than 0.7V when the injector is switched off.	1st cycle	<b>Fuel injector is short-circuited to ground</b>
	P0201	Injector open circuit.	The voltage of output is lower than 1.3V when the injector is switched off.	1st cycle	<b>Fuel injector is open-circuited</b>
Idle Air Control System	P0509	Short circuit to battery for Stepper motor.	Output short circuit current is higher than 2A.	1st cycle	<b>Stepper motor is short-circuited to power</b>
	P0508	Short circuit to ground for Stepper motor.	Output short circuit current is higher than 2A.	1st cycle	<b>Stepper motor is short-circuited to ground</b>
	P0505	Stepper motor open circuit.	Output open load current is lower than 100mA.	1st cycle	<b>Stepper motor is open-circuited</b>
HO2S Heater Control	P0032	Short circuit to battery for Oxygen sensor heater circuit.	Output short circuit current is higher than 5A.	1st cycle	<b>Oxygen sensor is short-circuited to power</b>
	P0031	Short circuit to ground for Oxygen sensor heater circuit.	The voltage of output is lower than 0.7V when the HO2S Heater is switched off.	1st cycle	<b>Oxygen sensor is short-circuited to ground</b>
	P0030	Open circuit for Oxygen sensor heater circuit.	The voltage of output is lower than 1.3V when the HO2S Heater is switched off.	1st cycle	<b>Oxygen sensor heater is open-circuited</b>
Ignition Coil "A" Primary Control	P2301	Short circuit to battery for Ignition coil.	Output short circuit current is higher than 8.6A.	1st cycle	<b>Ignition coil is short-circuited to power</b>
	P2300	Short circuit to ground for Ignition coil.	No output clamping voltage is detected when ignition coil is switched off.	1st cycle	<b>Ignition coil is short-circuited to ground</b>
Fuel Pump Control	P0629	Short circuit to battery for Fuel pump.	Output short circuit current is higher than 8.4A.	1st cycle	<b>Fuel pump is short-circuited to power</b>
	P0627	Open circuit for Fuel pump.	Output short circuit current is lower than 0.4A.	1st cycle	<b>Fuel pump is open-circuited</b>
Evaporative Emission System Purge Control Valve	P0459	Short circuit to battery for EPC Valve.	Output short circuit current is higher than 2A.	1st cycle	<b>Canister control valve is short-circuited to power</b>
	P0458	Short circuit to ground for EPC Valve.	The voltage of output is lower than 0.7V when the ECP Valve is switched off.	1st cycle	<b>Canister control valve is short-circuited to ground</b>
	P0444	Open circuit for EPC Valve.	The voltage of output is lower than 1.3V when the ECP Valve is switched off.	1st cycle	<b>Canister control valve is open-circuited</b>
Internal Control Module Memory Check Sum Error	P0601	Check sum error	The calculated check sum is not equal to the check sum in the flash memory.	1st cycle	ECU internal fault - checksum error

### 18.3.1 Diagnosing Fault Using Diagnostic Apparatus



#### Operation method:

- Find the 16-port diagnose interface at motorcycle; connect it using the adapter.
- Connect connecting wire and diagnostic apparatus interface;
- Open the key for diagnosis;

## 18.4 Common Troubleshooting Methods

### 18.4.1 Maintenance Tool

- Disassembly and assembly of electronic control system components - common automotive mechanical parts removal tool
- Electronic control system circuit and system electrical signal - digital multimeter (with buzzer)
- Electric control system fault diagnosis and engine working condition detection
  - Electronic control system fault diagnostic apparatus (recommended)
- electronic control system fault code table (emergency use)
- fuel pressure gauge, range: 0-600kP



Tool name:

Cylinder pressure gauge

Function:

Check the cylinder pressure.

Tool name:

Fuel pressure gauge

Function:

Check the fuel system pressure, and judge the working conditions of fuel pump and fuel pressure regulator in the fuel system.

## 18.4.2 Engine Working Data Flow Displayed by Diagnostic Apparatus

Analyze and determine engine fault using the engine working data flow displayed by the diagnostic apparatus.

### 18.4.2.1 Step I

- Engine harness and the vacuum pipeline—may affect the system to control air flow and fuel supply
- Whether oxygen sensor is assembled in place—may affect the system to determine the air to fuel ratio
- Engine fault indicator—may affect the system to give an alarm for fault

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- d) Storage battery voltage—determine whether the power of storage battery is sufficient
- e) Determine whether coolant temperature sensor, intake temperature sensor, intake manifold absolute pressure sensor and oxygen sensor display value are normal
- f) Working range of throttle position sensor—it cannot be fully opened or closed, which may affect engine power performance and some system functions

### 18.4.2.2 Step II

Check whether ECU power is turned off—the communications between diagnostic apparatus and system is interrupted after turning off key switch

### 18.4.2.3 Step III

- a) Coolant temperature and coolant temperature cycle—predicts whether the thermostat is working properly
- b) Storage battery voltage —Indicate whether the generator is working properly.

Too high: there may be fault in voltage regulator;

Too low: there may be improper connection of generator or generator fault

- c) Intake manifold pressure—it can predict whether there is leakage in intake and valve clearance problems.

Valve clearance is too small: this value is too high, so engine power performance may be affected; in addition, due to too early opening of exhaust valve and increase in exhaust temperature, oxygen sensor and three-way catalytic converter service life may be significantly shortened;

Valve clearance is too large: it may cause low intake manifold pressure, and thus affect the system to determine the working state of engine, thus resulting in abnormal idle speed during warm-up of motorcycle.

In addition, if the exhaust system is blocked, for example: a foreign body exists in the exhaust channel; the oil consumption is too high, thus blocking three-way catalytic converter; three-way catalytic converter is blocked due to internal damage, which will cause slightly high value.

- d) Number of cycles of oxygen sensor value—the number of cycles is too small, indicating fault of oxygen sensor

## 18.4.3 Simple Troubleshooting

Please follow the following steps to repair EFI system. To repair fault in one step, the subsequent steps may be stopped. And then use diagnostic apparatus to conduct inspection and acceptance and clear fault code according to Section 14.4.2 “Engine Working Data Flow Displayed by Diagnostic Apparatus”.

When using diagnostic apparatus, the voltage of storage battery should not be lower than 8.5 V.

### 18.4.3.1 Daily Use and Maintenance

- 92# or 95# gasoline should be high quality without lead.
- ECU has a moisture-proof function, but high-pressure water gun should not be used to rinse its shell.
- The petrol filter should be changed every 7000-10000 km.
- Under normal conditions of use, clean the throttle body every 10,000 km or 1 year.

### 18.4.3.2 Fault phenomenon-Start Fault

- a) Rotate ignition switch to “On” position, and check whether engine fault lamp is on.

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If it is off:	<ul style="list-style-type: none"> <li>◆ Check fuse and grounding wire</li> <li>◆ Check whether ECU plug is connected firmly</li> <li>◆ It is able to check whether this lamp and line is normal using the check function of diagnostic apparatus actuator</li> <li>◆ Check and repair bulb and its line</li> <li>◆ Judge using another ECU</li> </ul>
It is be able to be on:	<ul style="list-style-type: none"> <li>◆ Connect diagnostic apparatus to system diagnosis interface</li> </ul>

b) Check whether diagnostic apparatus can be connected to system for communications

If not:	<ul style="list-style-type: none"> <li>◆ Check fuse and grounding wire</li> <li>◆ Check whether ECU plug is connected firmly</li> <li>◆ Test whether diagnostic apparatus is working normally at another normal motorcycle</li> <li>◆ Judge using another ECU</li> </ul>
If yes:	<ul style="list-style-type: none"> <li>◆ Remove the fault indicated by diagnostic apparatus</li> </ul>

c) Check ignition system fault—whether normal ignition can be made for spark plug

If not:	<ul style="list-style-type: none"> <li>◆ Check whether high-voltage line and spark plug are plugged firmly or damaged</li> <li>◆ Use another ignition coil for assembly judgment</li> <li>◆ Judge using another ECU</li> </ul>
If yes:	<ul style="list-style-type: none"> <li>◆ Check whether high-voltage line is connected to ignition coil and spark plug properly</li> </ul>

d) Check oil supply system fault

Check whether fuel pump is working—it is able to hear the sound that the fuel pump is working near the fuel tank when starting engine

Not work:	<ul style="list-style-type: none"> <li>◆ Check whether fuel pump relay is working normally</li> <li>◆ Check whether the connection and working of crankshaft position sensor is normal</li> <li>◆ Judge using another ECU</li> <li>◆ Check fuel pump line</li> </ul>
Be able to work:	1) Check whether fuel supply pressure is greater than 270Kpa
	2) Insufficient pressure: <ul style="list-style-type: none"> <li>◆ Check whether there is sufficient fuel in the fuel tank</li> <li>◆ Check whether fuel filter needs to be replaced (note: replace the fuel filter special for electronic injection should be replaced once every 7000-18000km)</li> <li>◆ Check whether fuel supply pipe and fuel return pipe are damaged</li> </ul>
	3) Normal pressure: <ul style="list-style-type: none"> <li>◆ Check whether there is any abnormality in nozzle control line</li> <li>◆ Check whether nozzle needs to be cleaned</li> </ul>

e) Confirm whether cylinder is submerged

If yes:	<ul style="list-style-type: none"> <li>◆ After completely opening the throttle and turning on starting motor, there should be working sign in engine after several seconds</li> </ul>
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f) Check whether crankshaft position sensor clearance is too large

### 18.4.3.3 Fault phenomenon—Start failure with tempering

- a) Check whether ignition coil is loosened;
- b) Check whether timing gear ring is loosened.

### 18.4.3.4 Fault phenomenon—Too high or too low idle speed (idle speed is obviously inconsistent with target idle speed)

Too high idle speed:	<ul style="list-style-type: none"><li>◆ When the water temperature is lower than 68 degrees, the system will increase idle speed to accelerate warming-up process, which is normal phenomenon. Check the items according to the following items except that</li><li>◆ Check whether the stepper motor is leaking</li><li>◆ Check whether there is any leakage the connection between the throttle body and the engine</li><li>◆ Check whether valve clearance, especially exhaust valve clearance is too large</li></ul>
Too low idle speed:	<ul style="list-style-type: none"><li>◆ Check fuel quantity in fuel tank, fuel filter, fuel line pressure and nozzle</li><li>◆ Checking valve clearance and confirm whether it is too small</li></ul>

### 18.4.3.6 Fault phenomenon—Instable idle speed with deceleration and flameout

- a) Checking valve clearance;
- b) Check whether idle speed bypass hole and throttle body are too dirt.

### 18.4.3.7 Fault phenomenon—Insufficient power of deceleration

- a) Check whether the parameters are normal at idle speed and high idle speed;
- b) Check fuel quantity in the fuel tank and fuel filter;
- c) Check whether exhaust system is blocked, for example: whether three-way catalytic converter is blocked by burning oil or damage;
- d) Check fuel line pressure and nozzle;

### 18.4.3.8 Fault phenomenon—Slight burning phenomenon

Check whether the spark plug clearance meets specification of  $0.7\pm 0.1$  mm

### 18.4.3.9 Fault phenomenon—Fault lamp is on, but fault code is inconsistent with fault

It may be caused due to instable connection of system grounding wire, reconnect the grounding wire, disconnect the power wire of battery for 3 minutes and then start the engine.

### 18.4.3.10 Fault phenomenon—Extremely high fuel consumption

- a) Check whether the oxygen sensors of two cylinders are assembled in place; if it is in the loose state, the oxygen sensor may incorrectly judge that the combustion in the cylinder is thin, and then increase fuel, which may result in unusually high fuel consumption.
- b) After confirming that the engine mechanical parts and oxygen sensor are in normal conditions, run the engine to observe the oxygen sensor reading. If the reading is always greater than 500 mV at normal water temperature, check whether there is leakage in fuel injector.



## Precautions

- The vast majority of EFI parts cannot be repaired; after the confirmation of damaged parts, generally replacement is taken.
- When starting the engine, do not operate any mechanism (including the throttle, do not pull the throttle for start) on the engine.
- If engine fault lamp becomes on during the engine operation, cause must be checked and eliminated as soon as possible.
- Do not use leaded gasoline, because lead may damage the oxygen sensor and three-way catalytic converter.
- If oil consumption is abnormal, the problem should be resolved as soon as possible, because some of the substances in the oil may damage the oxygen sensor and three-way catalytic converter.
- Valve clearance should not be too small, if the exhaust valve is not shut off tightly, exhaust temperature may become too high and thus shorten the life of three-way catalytic converter.
- At the temperature of below 10°C, if the vehicle and engine run at low speed for a long time, the exhaust pipe may have carbon deposition and become black, which is a normal phenomenon. It will be eliminated after a period of high-speed operation, or appropriate means should be taken to keep the engine coolant temperature within the specified temperature range.

# Circuit Diagram

