

Two-wheel Motorcycle QJ125GY-16A

Instruction and Maintenance Manual



ZHEJIANG QIANJIANG MOTORCYCLE CO., LTD.

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Preface

The Instruction and Maintenance Manual contains an introductory description of maintenance on QJ125GY-16A motorcycle.

Preparatory data include attentions that shall be paid on all the maintenance operations in the Instruction and Maintenance Manual. Please read the manual carefully before operation.

Check and adjustment contains main aspects for inspection and adjustment, safety of the vehicle, performance and maintenance of each component. This shall be started from the time of periodical inspection.

The parts following Chapter One demonstrate the main point of disassembly, installation and check of electrics parts, finished vehicle, engine and other components.

System diagrams, breakdown drawings, fault diagnosis, maintenance and other explanatory contents are presented before each part.

Note:

The parts which are not explained separately in the manual apply to both of the motorcycles.

For any pattern and structure change of the motorcycle, or any difference between the product and pictures, drawings and instructions in the manual, the product shall prevail. The product is subject to changes without prior personal notice.

ZHEJIANG QIANJIANG MOTORCYCLE CO., LTD.

Finished Automobile Institute

Preparatory Data

General Safety

Maintenance Rules

Specification Table

Fault Diagnosis

General Safety

Carbon monoxide (CO)

When it is necessary to start the engine, please make sure the operation area is well ventilated. Never run the engine in an enclosed place.

Attention

Gas exhausted from the motorcycle contains harmful carbon monoxide, which may lead to loss of consciousness and death.
--

It is necessary to run the engine in an open area. To run the engine in an enclosed site, ventilation system shall be used.

Gasoline

Operate in well-ventilated site. No fire or smoking is allowed in operation site and gasoline storage place.

Storage Battery

Electrolyte in the storage battery has sulfuric acid, so leave eyes, skin and clothes away from it. Once got electrolyte on our skin or clothes, you will have to wash them by fresh water thoroughly; once into our eyes, to see a doctor immediately is necessary.

Special Tool

When disassembly and installation is in process, general tools and special tools should be selected correctly. When it is time to use the special, the general can not be substitution. Besides, appropriate power is welcomed to avoid the damage of components.

High Temperature Burn

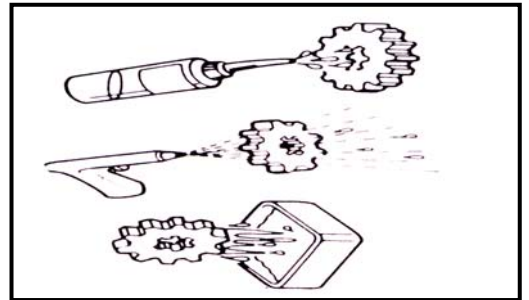
Tips: Do not be burned by engine, exhaust pipe, silencer and other components with high temperature. When operating together with others, you'd better look after each other and keep a way for safety.

Maintenance Rules

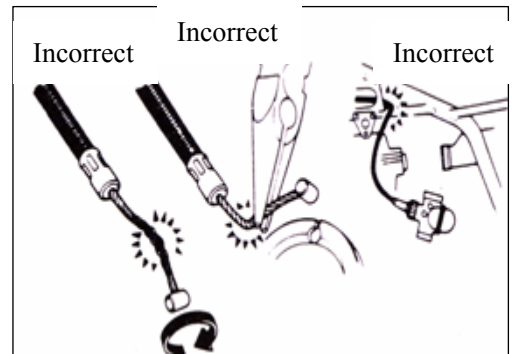
While repairing and servicing, use tools of metric system as possible. Incorrect tools may damage the motorcycle.

Before taking down or opening protecting plate for repair work, please clean the dirt on the external surfaces of components or combination parts and prevent the dirt from falling into engine, chassis or braking system

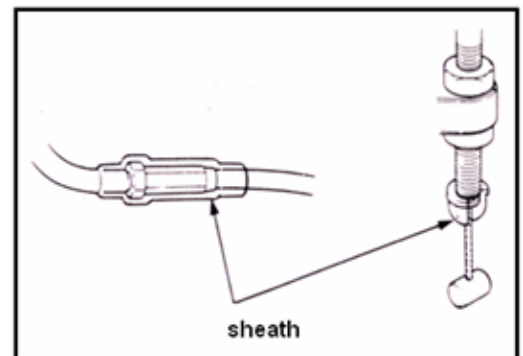
After disassembly and before measuring friction, please clean the components and blow them with compressed air.



—Bending or Warping are forbidden in operation, otherwise tough operation or advanced damage will be caused.

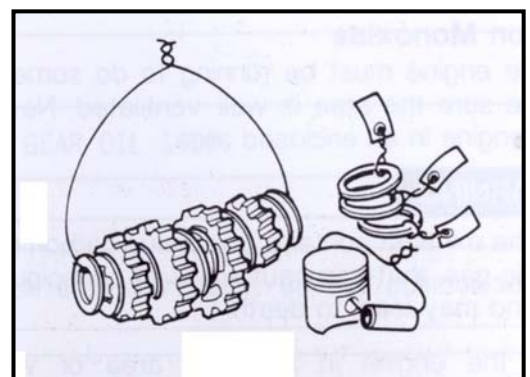


Plastic parts may age and deteriorate, which are apt to be damaged by solvent or oil. Check before re-installation and replace if necessary.

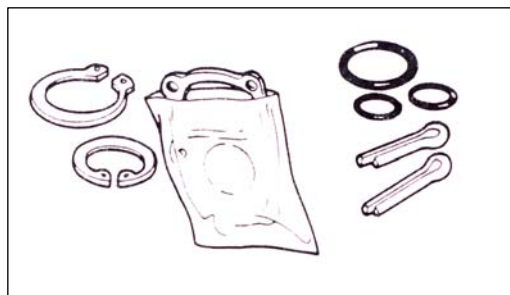


To loose component with many assembling units, it shall start from external to internal and loosen smaller assemblies first.

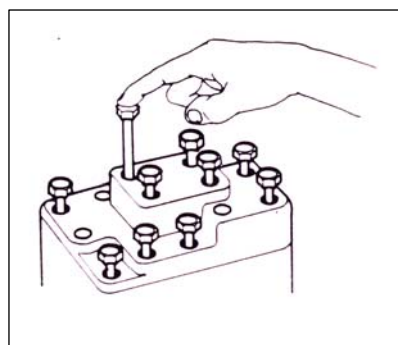
The complicated assemblies such as transmission case shall be put in proper assembling order for easy assembly in the future.



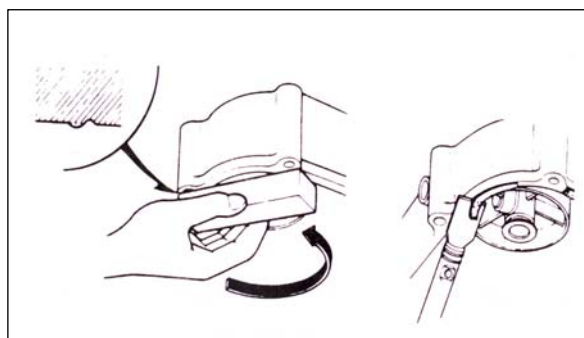
Pay special attention to the key fitting position before disassembly. The components that are not used any more shall be replaced on time before disassembly.



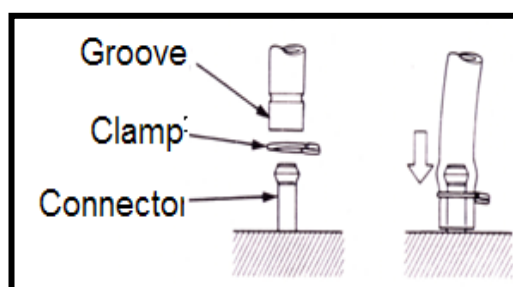
Length of bolts and screws are different for assembly components and protecting plates. They shall be installed at correct positions. If confused, just put the bolt in the hole and see if it matches.



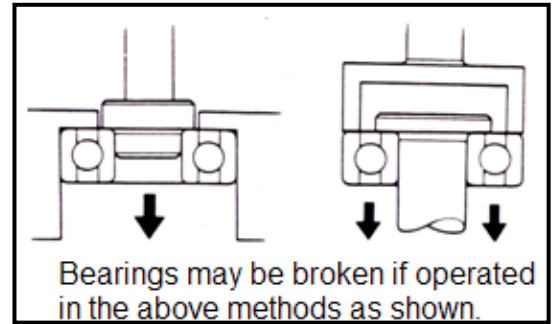
Fill lubricating grease into the groove during oil seal installation. Check if the oil seal is smooth and if there is any damage to it.



Installation of rubber hose (fuel, vacuum, or coolant): insert its end into bottom of connector so that there is enough room for the hose clamp to grip the connector. Install the rubber or plastic dust cover back to its originally designed position



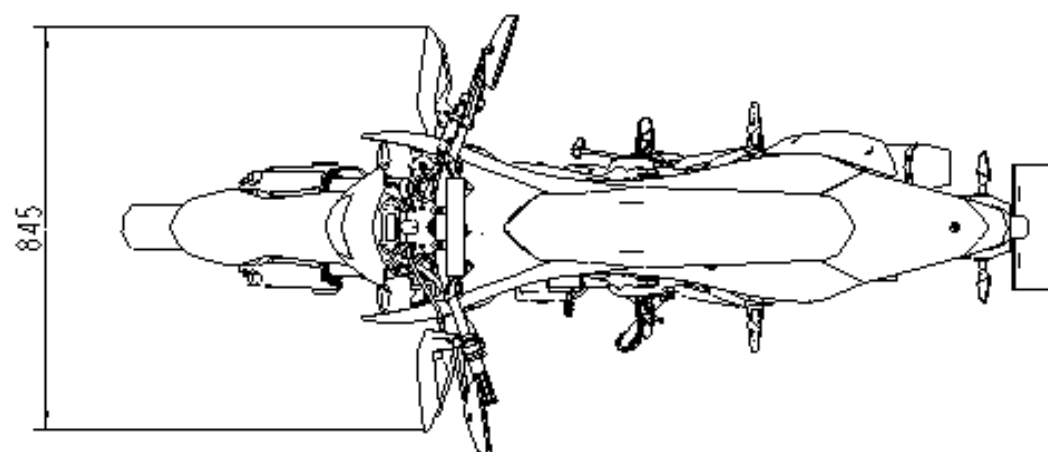
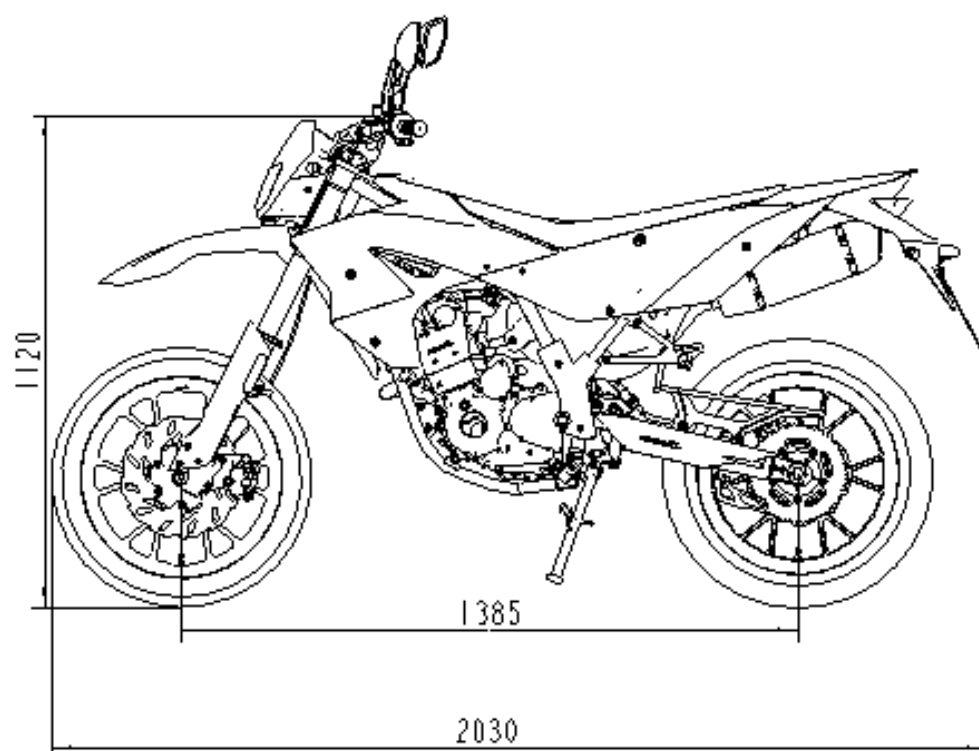
Disassembly of ball bearing: use a tool to push against one or two (internal and external) bearing races. If the force works only on one bearing race (whatever internal or external), it may be damaged when the bearing is disassembled, in which case, it must be replaced



Specifications (QJ125GY-16A)

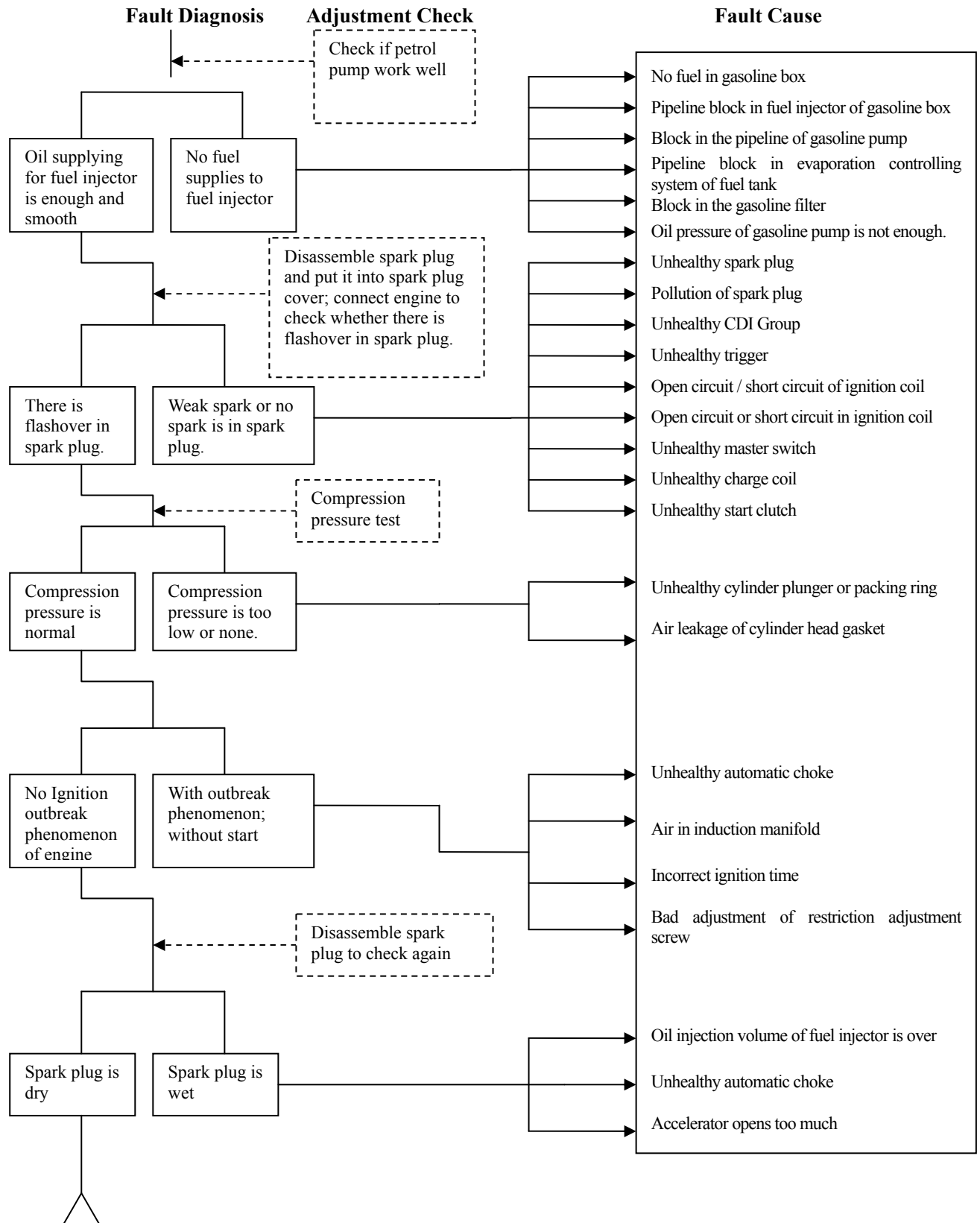
Model		QJ125GY-16A		Engine	Engine type	QJ160MI-A
Overall Length (mm)		2030			Fuel type	92# or 95# unleaded gasoline
Overall Width (mm)		845			Number of cylinders	1
Overall height (mm)		1120			Bore*stroke	Φ60 mm *44 mm
Wheelbase (mm)		1385			Displacement	124.4
Vehicle Weight (kg)		Front axle	63kg		Starting mode	Electric
		Rear axle	76kg		Cooling mode	Water cooled
		Total	139kg		Lubricating mode	Force-feed and splash lubrication
Wheel Specification		Front (External)			Fuel tank capacity	1.2L(Oil change1L)
		100/80-17			Air cleaner	Filter sponge
		Rear (External)				
		130/80-17			Fuel tank capacity	7.5L ± 0.2L
Drive Train	Clutch type	Wet multi-plate friction type		Performance	Top speed	110 km/h
	Gear shift pattern	Manual 6 gear			Slope climbing force	Maximum climbing angle is not less than 20 degrees
	Drive Train	Clutch type			Idle speed	1700± 100rpm/min
Electrical	Battery capacity/type	12V-6AH/YUASA TT27SL			Max. torque	12.18N·m/7500r/min
	Generator type	Alternating current permanent magnetic motor			Max. power	11 Kw/ 9000 r/min
	Spark plug	NGK CR8E			Compression ratio	12.0 : 1
	Spark plug clearance	0.7~0.8mm			Pressure of cylinder	8.5Mpa
	Ignition type	CDI		Braking system	Diameter of front brake disc	φ280mm
			Diameter of rear brake disc		φ240 mm	

QJ125GY-16A

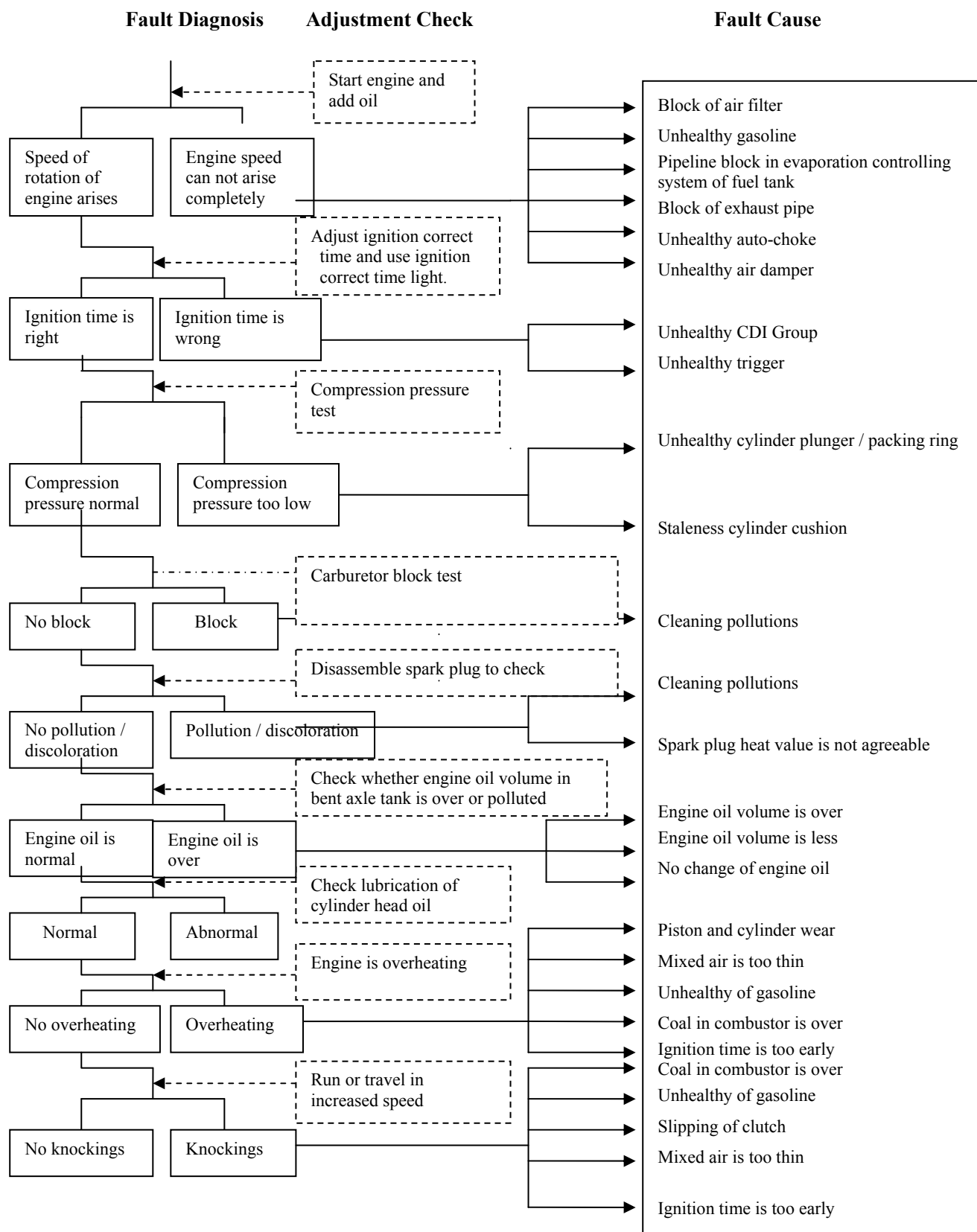


Fault Diagnosis

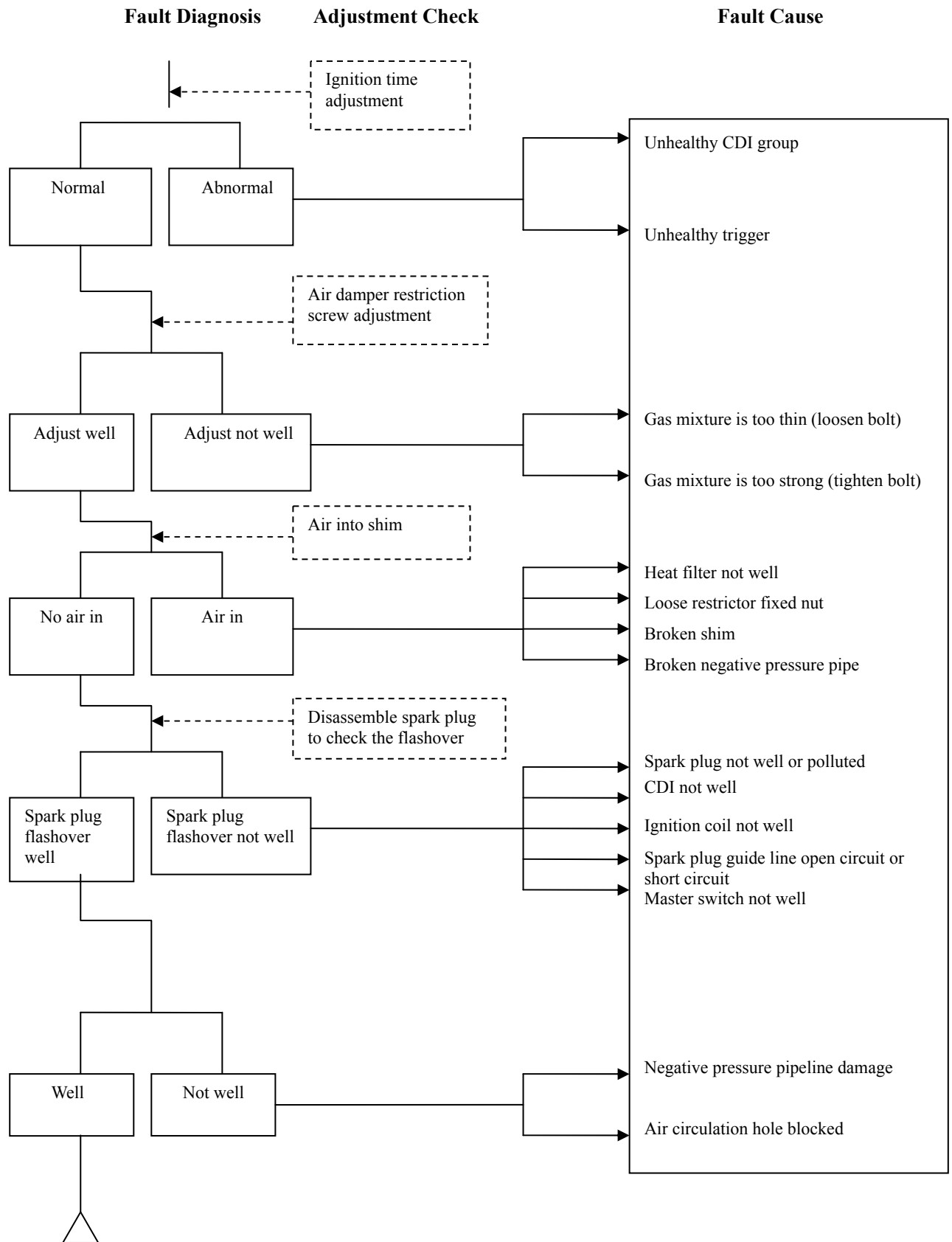
Start difficultly or start failed



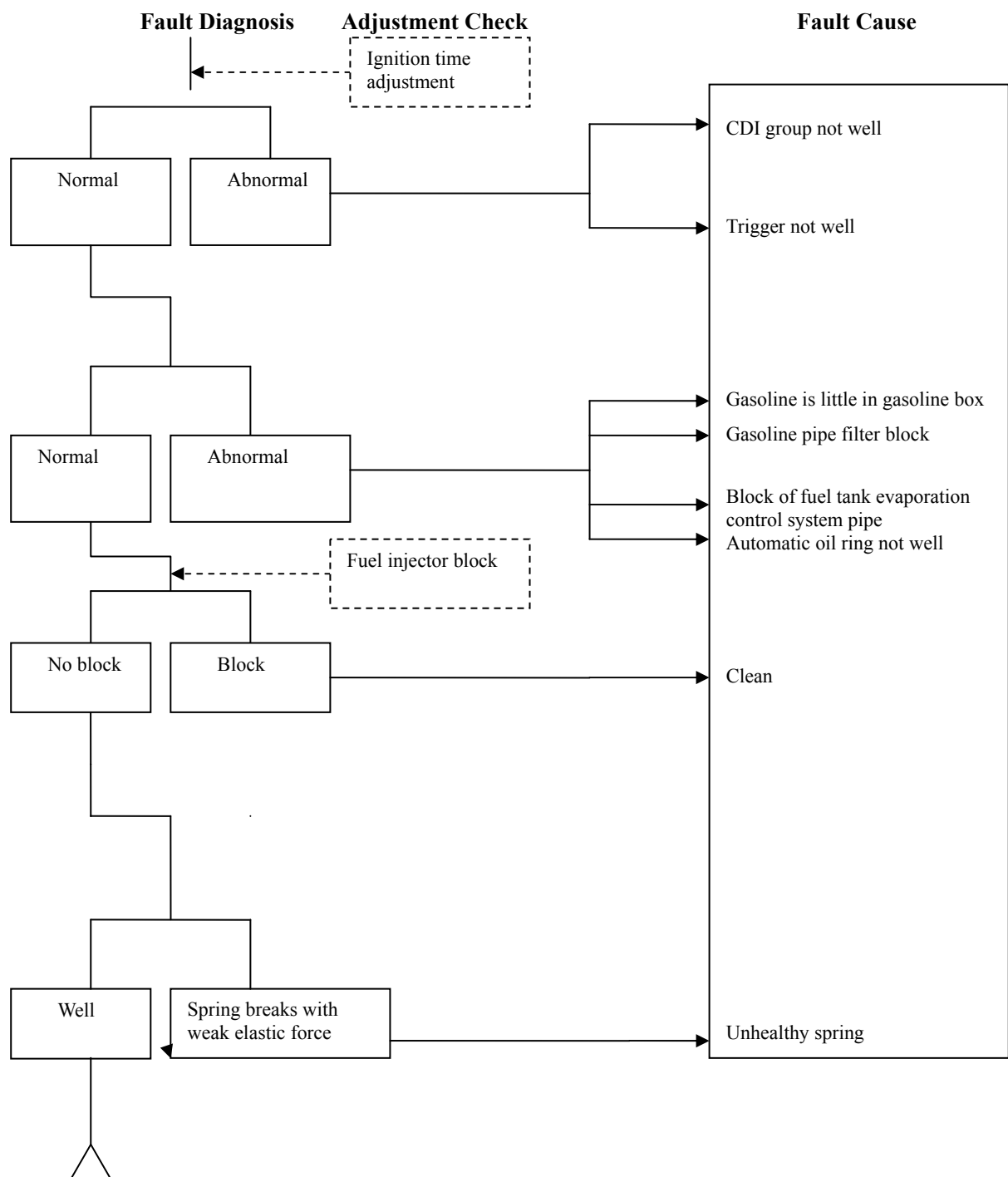
Rotation unsmooth (No speed or low speed)



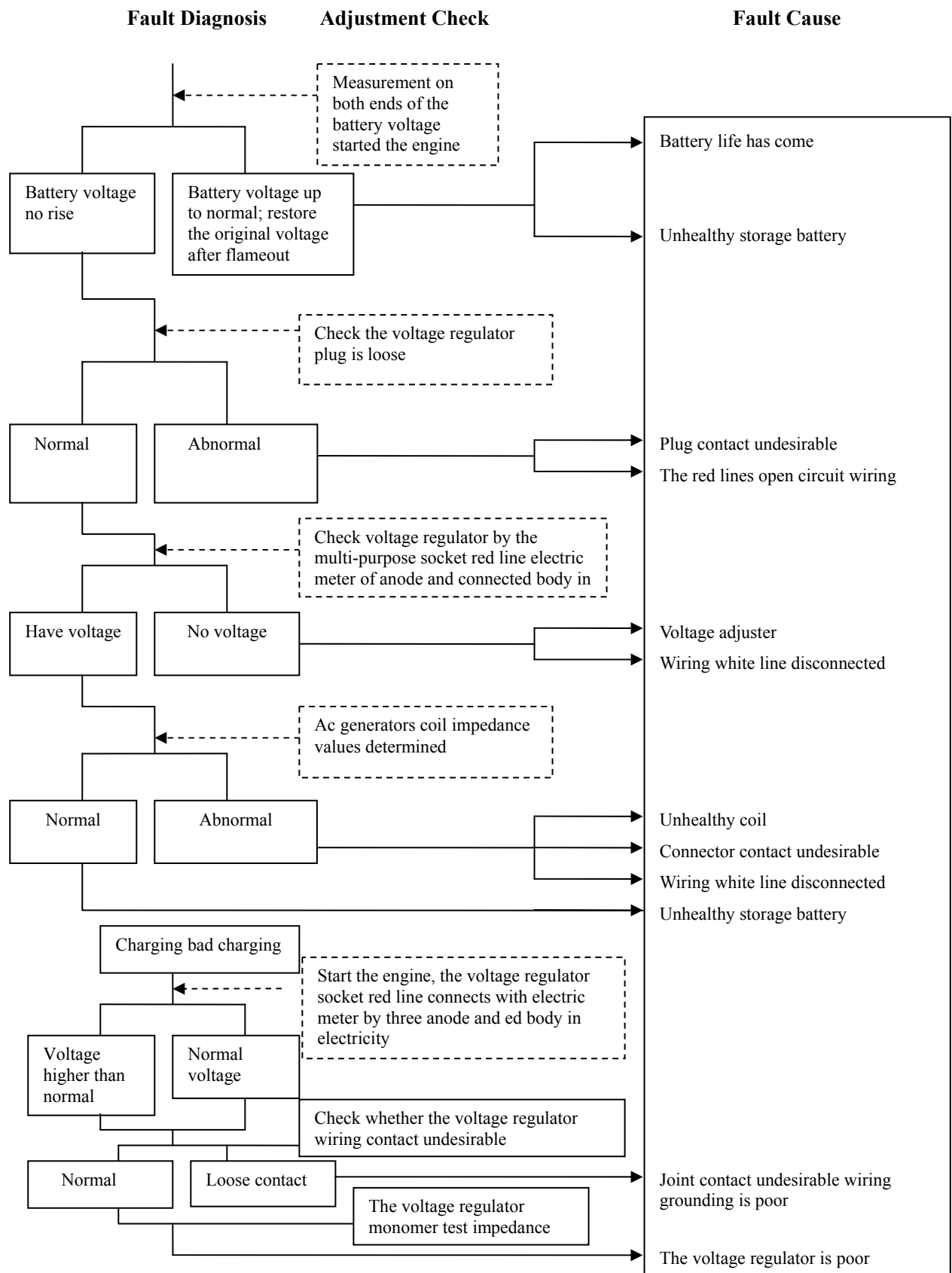
Rotation unsmooth (especially in low speed)



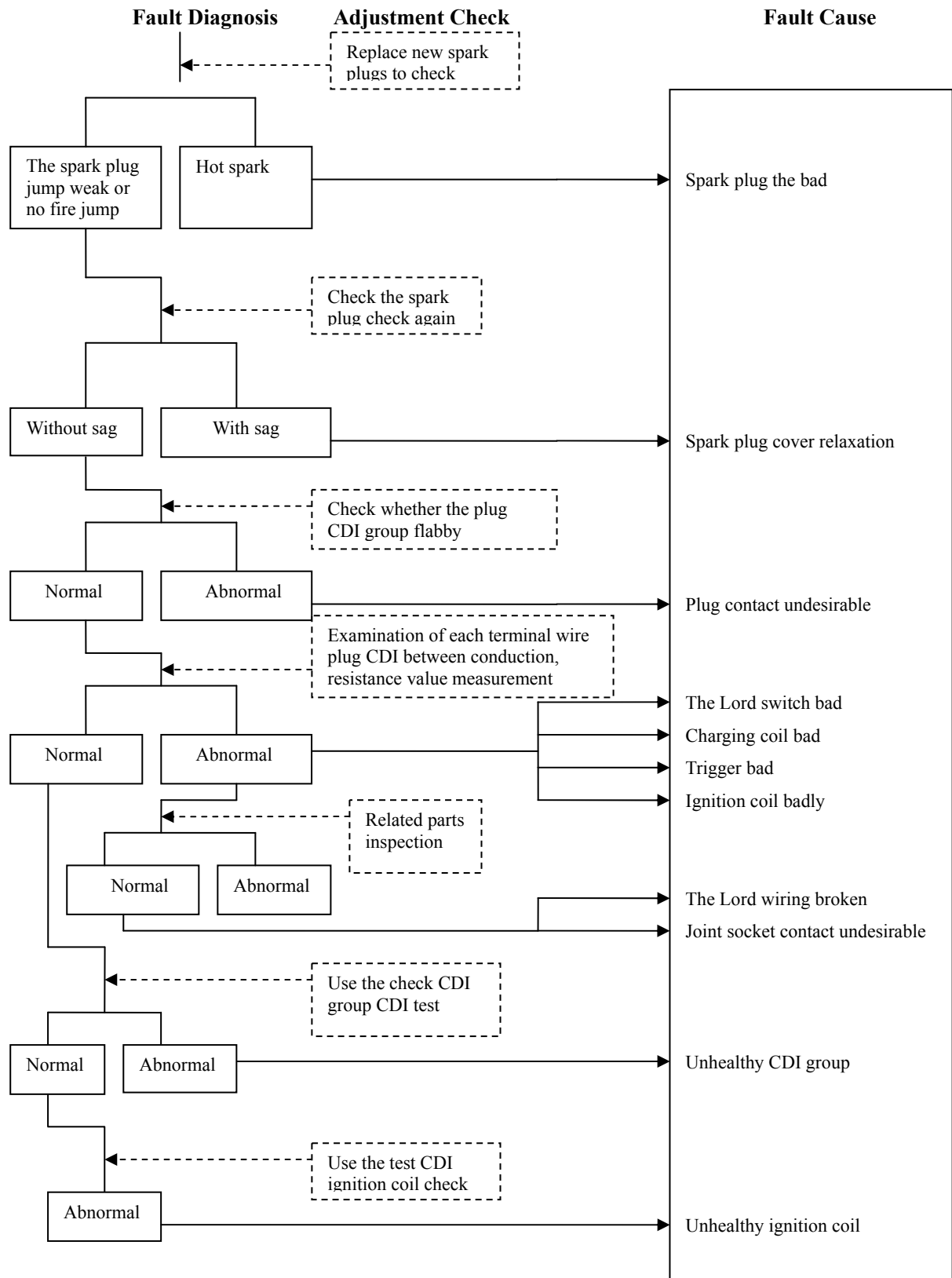
Rotation unsmooth (especially in high speed)



Unhealthy charging (storage battery over discharge or over charge)



Spark plug without flashover



Inspection/Adjustment

Preparatory data	Front/Rear brake free stroke
Periodic maintenance schedule	Front/Rear brake shoe's abrasion
Engine oil / Oil-filter screen	Headlamp
Gasoline filter	Clutch
Check/Adjustment of accelerator stay wire	Front/Rear suspension system
Air cleaner	Bolt/Nut/Fastening part
Spark plug	Wheel rim/Tyre
Battery	Tyre specification
Restrictor	Steering stem bearing and handle fixation
Cylinder pressure	
Driving chain	

Preparatory Standard

General

Warning!

- Before running the engine, please make sure the area you are working in is well ventilated. You shall never run the engine in an enclosed site. Gas exhausted from the motorcycle contains carbon monoxide, which may lead to loss of consciousness and result in death.
- Under certain conditions, gasoline is highly volatile. Work in well-ventilated site. Fire and smoking are forbidden in working site or gasoline storage place.

Specifications

Engine

Idle speed	1,700±100rpm/min		
Spark plug clearance	0.7~0.8mm	engine oil volume	1.2L(oil change1L)
Spark plug type	NGK CR8E		
Cylinder compression pressure	1.1~1.3Mpa		
Ignition time	BTDC12 degrees (+/-)1degree 1,700±100rpm		

Frame

Clearance of front brake handle		10-20mm		
Clearance of rear brake pedal		10-20mm		
Pneumatic pressure unit of tyre: Kpa		Specification		Tyre pressure
		QJ125GY-16A	Front wheel	100/80-17
			Rear wheel	130/80-17
Torque	Front shaft locknut	75-88 N·m		
	Rear shaft locknut	100-113 N·m		

Periodic Maintenance Schedule

	Mileage and interval Items	Every 300 KM	Every 1000 KM	Every 3000 KM	Every 6000 KM	Every 12000 KM	Every 14500 KM	Tools
		New Vehicle	One month	three months	Six months	Twelve months	Fifteen months	
*	Air cleaner	I		C	C	R	C	Common tool
*	Gasoline filter	I			I	R		Common tool
*	Engine oil filter	C			C	C		Common tool
	Engine oil replacement	R	Once every 1000KM					Common tool
	Tyre pressure	I	I	I	I	I	I	Tyre pressure gauge, air inflator
	Battery inspection	I	I	I	I	I	I	Densimeter, multimeter
	Actuating clearance inspection	I	I	I	I	I	I	Common tool
	Inspection of steering handle bar looseness	I			I	I		Common tool
	Shock absorber actuating inspection	I			I	I		Common tool
	Inspection of looseness of bolts at all positions	I	I	I	I	I	I	Torque wrench
	Check if gearbox leaks oil	I	I	I	I	I	I	Common tool
*	Spark plug inspection and replacement	I		I	R	R	I	Common tool
*	Gearbox oil replacement	I	Once every 5000KM					Common tool
	Lubrication of all the places on the vehicle				L	L		Lubricant injector
	Exhaust pipe	I	I	I	I	I	I	Common tool
*	Ignition timing	I	I	I	I	I	I	Timing light
*	Restrictor	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	Common tool
	Fuel hose inspection	I		I	I	I	I	Common tool
	Light instrument and electric apparatus	I	I	I	I	I	I	Visual multimeter
	Main stand and side stand	I			I	I		Common tool
	Shock absorber			I	I	I	I	Common tool
*	Torque of engine bolt	I		I	I	I	I	Torque wrench

Expected Inspection

1	Ignition system -- perform maintenance inspection on obvious and continuous ignition malfunctions, engine on fire, overheated back burning and others.
2	Carbon deposit removal -- obvious underpowered, get rid of carbon deposit at cylinder head, piston head and air exhaust system.
3	Piston and cylinder -- when cylinder is over worn or stuck, please replace it.

Please go to your local Qianjiang Motorcycle dealer periodically for inspection and adjustment to keep your vehicle in best conditions.

In above table, monthly 1000km travel is employed as reference.

I—Inspect A—Adjust R—Replace C—Clean L—Lubricate

Note: 1. “*” for items involved in exhaust gas, which meets regulations of **national environmental protection**. Normal maintenance shall be performed according to specifications on the user’s manual; unauthorized repair and adjustment are forbidden. We will not be responsible for the results.

2. You shall clean more frequently the air cleaner to extend its service life when your motorcycle is used on sand-gravel roads or in severely polluted environment.

3. More frequent servicing may be required when the motorcycle is often driven at high speed or travels a long distance.

Engine Oil/Filter

Engine oil level

*Attention

- Motorcycle shall stand on the flat ground while checking engine oil level.
- Inspect engine oil level when the engine has run for 2~3 minutes or stopped for 2~3 minutes.

Check engine oil level

When the engine oil level sensor alarms, refill engine oil to its upper limit.

Engine oil replacement

* Attention

When the engine is warmed up, replace engine oil. The oil can flow out easily.

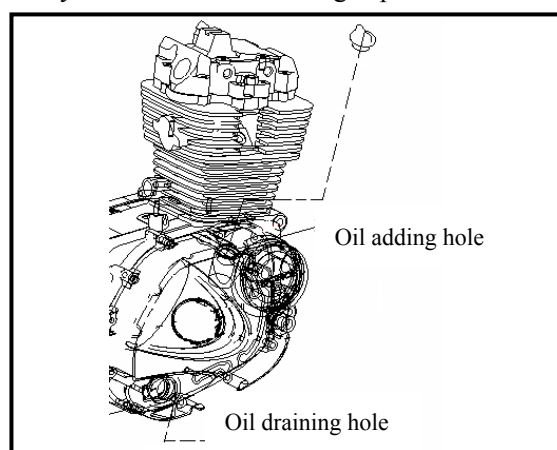
Shut down engine.

Screw off the drain plug at the bottom of crankcase to drain engine oil.

When the engine oil is completely drained, put back cleaned drain plug and sealing ring.

Refill engine oil to specified level.

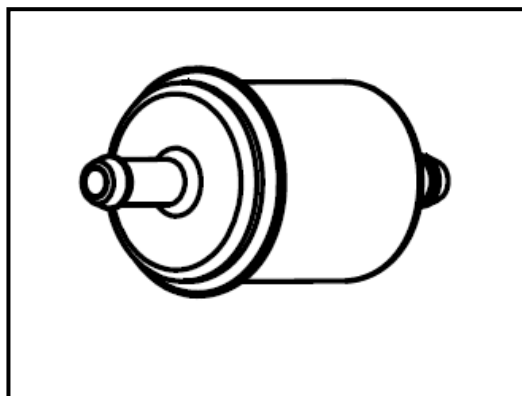
Engine oil volume: 1.0-1.2L



Check if there is engine oil leakage. Start the engine and run the engine on idle for a few minutes.
Check engine oil level again.

Gasoline filter

Check of degradation and damage of fuel pipe.
If there is any degradation, damage or fuel leakage, new products should replace the old ones.



Warning!

No open flames.

Check/Adjustment of accelerator stay w

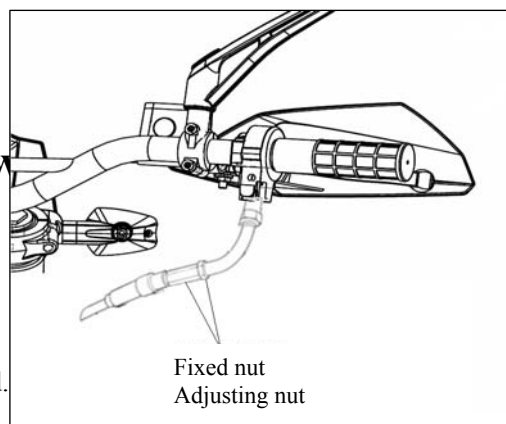
Check the smoothness of accelerator stay wire.

Check the play of accelerator stay wire.

Free stroke: 2-6mm

Side of the restrictor is the main parts which should be adjusted.

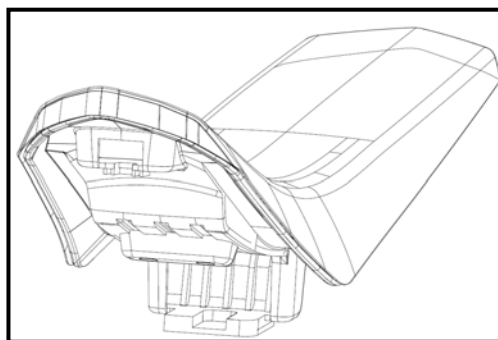
Loosen the hold-down nut and rotate to adjust nuts.



Air filter

Change of air filter

Disassemble seat cushion



Disassemble backplate of the right fuel tank

Disassemble right knee board.



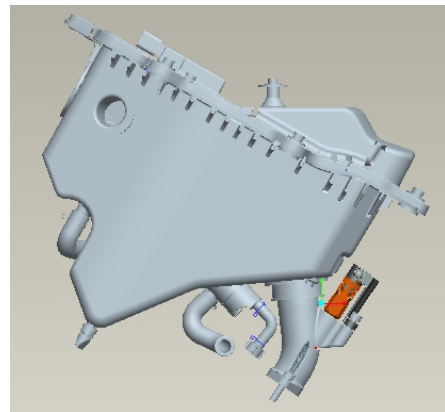
Disassemble backplate of the left fuel tank
Disassemble left knee board.



Disassemble gusset plate of right and left fuel tank
backplate



Disassemble air filter cover; fix bolts; take down the cover.
Disassemble bolts; take down air filter.
Disassemble filter sponge from air filter.

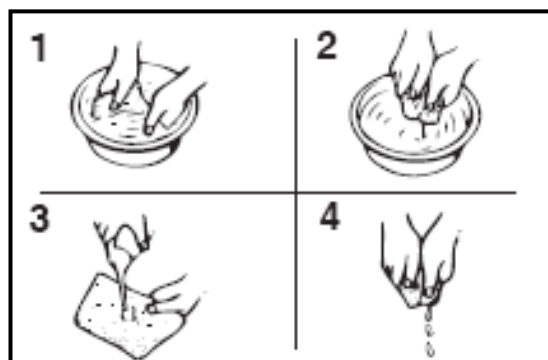


Check whether the filter sponge is polluted or damaged.
If there is pollution or damage, please replace a new one.
If there is pollution, please replace and wash.



How to wash the filter sponge:

- a) Wash it in the clean washing oil.
- b) Make it fully dry.
- c) Soak it in the clean gear oil until soaking well.
- d) Squeeze out the extra oil in sponge.

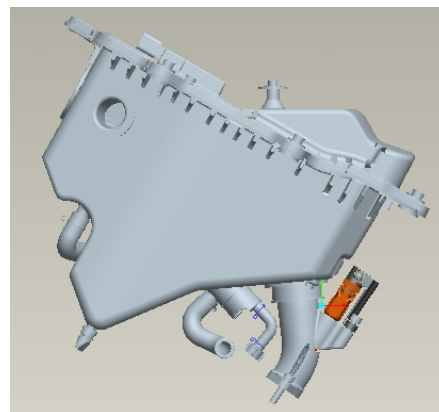


Replacing Time

If driving under dusty condition or in rainy days frequently, replace the air cleaner earlier.

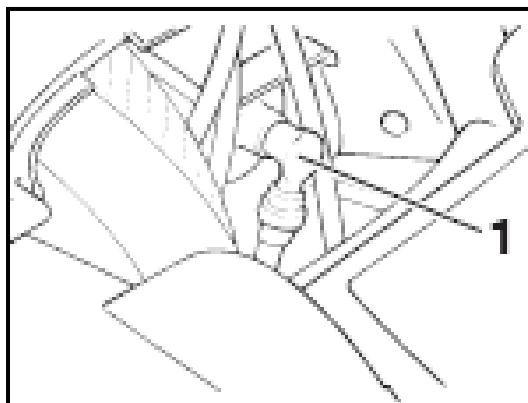
*Attention

- When installing air filter cover, please make sure that it is finished well.

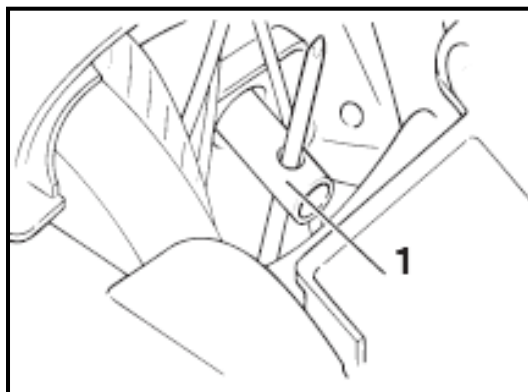


Spark plug

Pull out head of spark plug.



Disassemble spark plug with spark plug sleeve.



Check the burning, pollution and carbon deposit of spark plug.

If the conditions above happen, please clear with spark plug scavenger or steel brush.

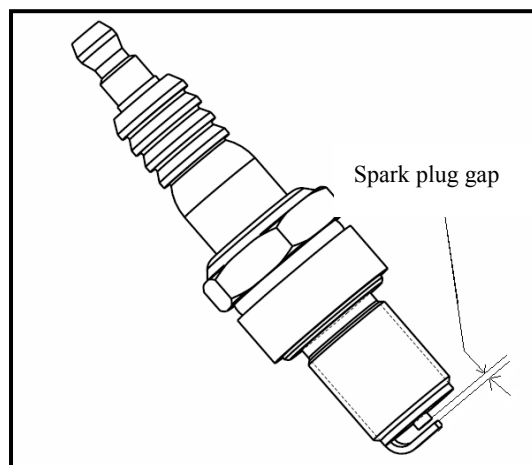
Clearance inspection of spark plug

Gap: 0.7-0.8mm

Spark plug type: **CR8E (NGK)**

***Attention**

When installing spark plug, you'd better install with hands and then use spark plug sleeve to tighten.



Storage battery

Disassembly of storage battery

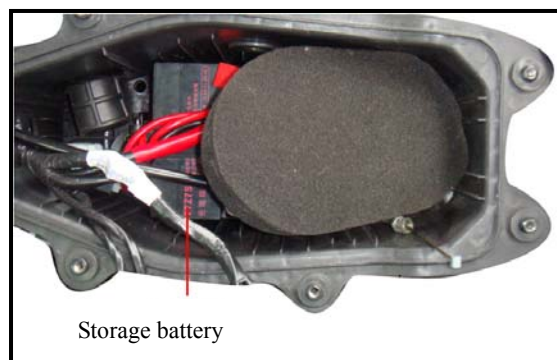
Open seat cushion

Disassemble gusset plate of right and left fuel tank backplate.

Disassemble air filter cover

Disassemble negative wire first and then the positive one.

Take out storage battery.



Warning!

During positive lead wire disconnection, be sure to prevent the tools being used from touching the frame; or it will result in short circuit sparks, which may ignite gasoline and damage battery. It is dangerous!

Install the battery in reverse order of removal.

Warning!

To avoid short circuit, please connect positive (+) lead wire first, then the negative (-) lead wire.

Check of the charging state (closed circuit voltage)

Open seat cushion

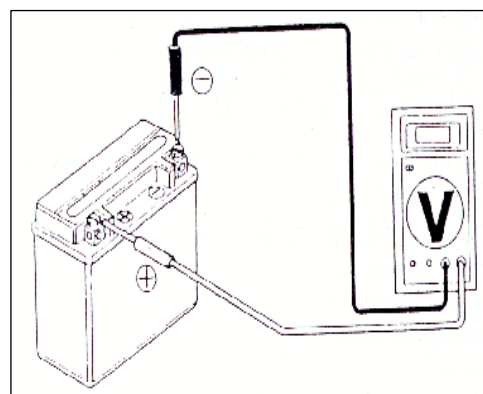
Open roof cover of air filter; disassemble joint wire of storage battery.

Measure the battery voltage using a voltmeter.

Fully charged: 13.1V

Undercharge: 12.3V

*** Attention**



Voltmeter shall be used for charging inspection.

Charging

Connection method: Positive pole of battery charger is connected to battery positive lead wire;
Negative pole of battery charger is connected to battery negative lead wire.

Warning!

- Battery shall be away from fire.
- Shut off charger switch first before or after charging in case sparks may be generated at connection parts, which may result in explosion.
- During charging, please take the current time labeled on the battery as basic time.

* Attention

- Battery quick recharging is not recommended except in case of emergency.
- After recharging, wait at least 30minutes and then measure the battery voltage.

Recharging current: Standard: 0.4A
Quick recharging: 4.0A
Recharging time: Standard: 10-15hours
Quick recharging: 30minutes
After recharging: Closed circuit voltage: over 12.8V

Restrictor

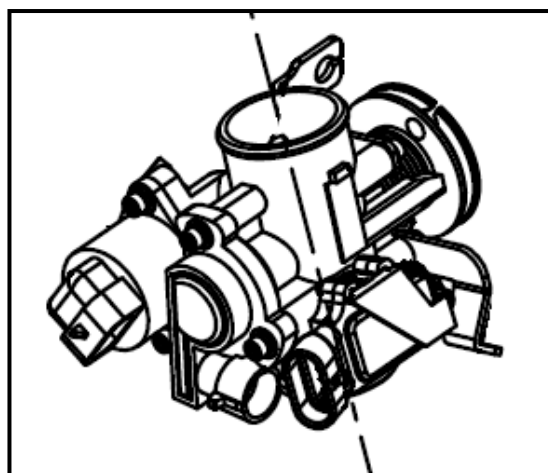
Idle speed adjustment

*Attention

Perform idle speed adjustment when the engine is warm.

Warm up the engine and then adjust idle speed.
Run the engine and connect engine tachometer.
Adjust the throttle cable lock-screw to specified RPM.

Idle speed RPM: 1,700±100rpm/min



If idle speed RPM is unsteady, or idle speed is not smooth when gently raise engine speed, adjust idle speed adjusting screw again.

Cylinder pressure

Operation when engine is warming.

Disassemble spark plug.

Install roof cylinder pressure gage.

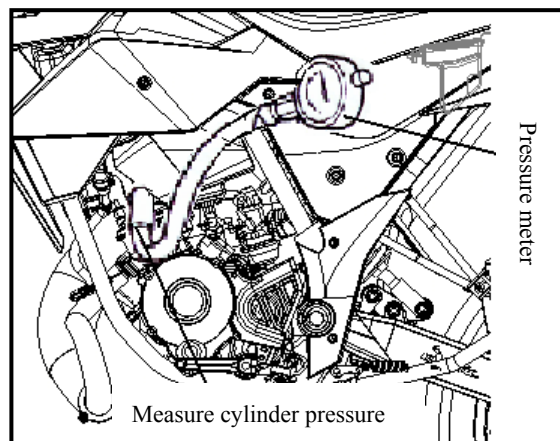
Fully open accelerator; start engine to measure cylinder pressure.

Compression pressure: 1.1-1.3Mpa/1,400rpm

When compression pressure is too low, check the following items:

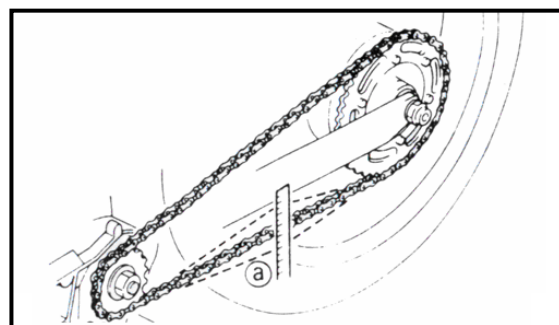
- Damage of cylinder head gasket
- Damage of piston ring
- Piston ring scuffing
- Piston and cylinder scuffing.

Check when compression pressure is too high or carbon deposit is too much in combustor or the head of piston.



Drive Chain Slackness

Service life of drive chain relies on proper lubrication and adjustment. If not maintained in a proper way, advanced abrasion will come out in drive chain or chain wheel. In the harsh using conditions, maintain frequently is necessary.



Stand vertically the motorcycle on the flat ground and check drive chain slackness ○,a.

Drive chain slackness: 10-20mm

Adjustment of drive chain:

Adjust drive chain to keep the deflection of chain is 10-20mm per 1000km.

According to users' driving conditions, drive chain likely need to be adjusted often.

Warning:

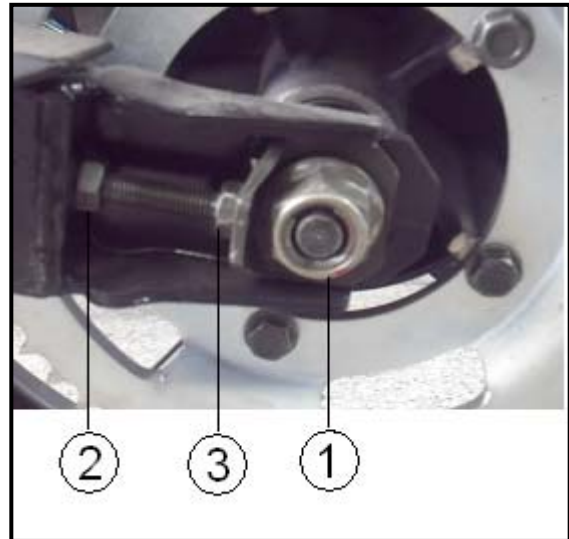
This advice is the maximum adjustment time gap. In fact chain should be checked and adjusted every time before driving. If chain is too loose, accident caused by chain dropping may happen or serious damage of engine may be caused.

Please adjust chain as the following methods:

- (1) Put up motorcycle with carriage
- (2) Loosen the back axle nut1.
- (3) Loosen the locking nut2
- (4) Turn the adjustment bolt3 to right or left to adjust the looseness of chain. When adjusting chain, make sure front and back chain wheel should aim at centre as a line. In order to help you adjust, there is reference mark on swing arm and every chain adjuster. They can aim at each other and become as the reference from out to out. After aiming at and adjusting the looseness of chain to 10-20mm, fix back axle nuts again and then check as the last time.

Attention:

When changing the new chain, the wear of the two chain wheels should be checked. Replace them when necessary.



Check the following situations of chain in periodic inspection.

- (1) Loose pin
- (2) Damaged idler wheel
- (3) Dry out and rusting chain
- (4) Twisting or seizing chain
- (5) Excessive damage
- (6) Adjust the loose chain

If chain is in the above conditions, chain wheel is likely to be damaged. Check the chain wheel as following:

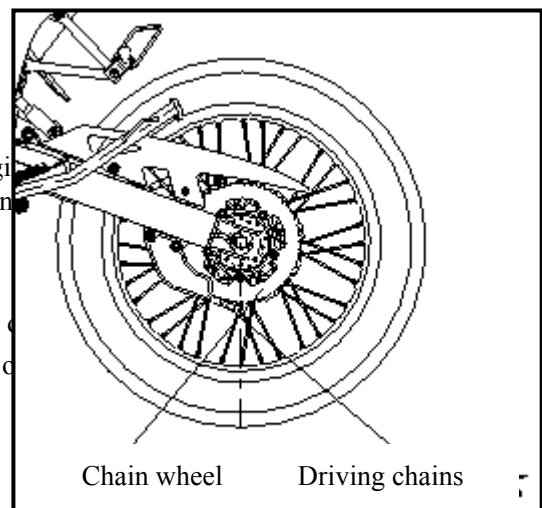
- (1) Over wearing gear teeth
- (2) Breaking off or damaged gear teeth
- (3) Fix nuts with loose gear teeth

Lubrication of drive chain

Use drive chain grease first; buy drive chain grease or engine oil. Apply grease to the joint to make grease through link plate, melt, lining and rolling.

***Attention**

Don't install new chain on the damaged chain wheel or install a new chain wheel if the old chain wheel should be in good condition, or the changed chain will be damaged.

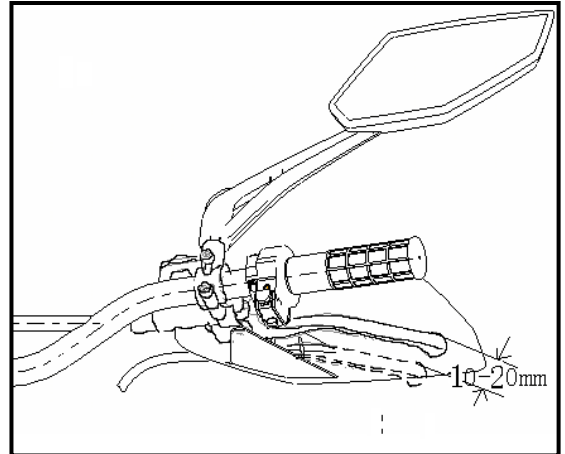


Clearance of Front/Rear Brake

Front brake clearance

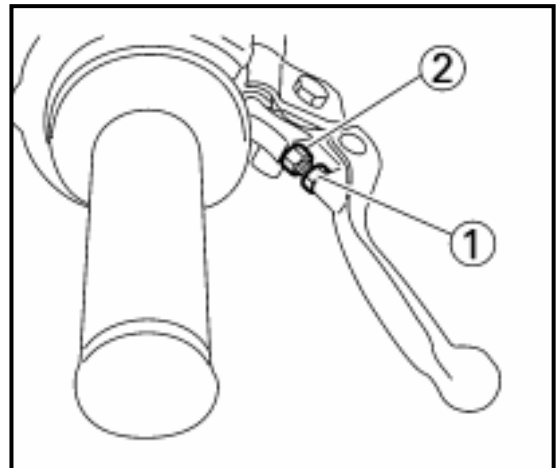
Measure the clearance of front brake at the tip of front brake handle.

Clearance: 10-20mm



Please adjust free travel of front brake handle in the following way:

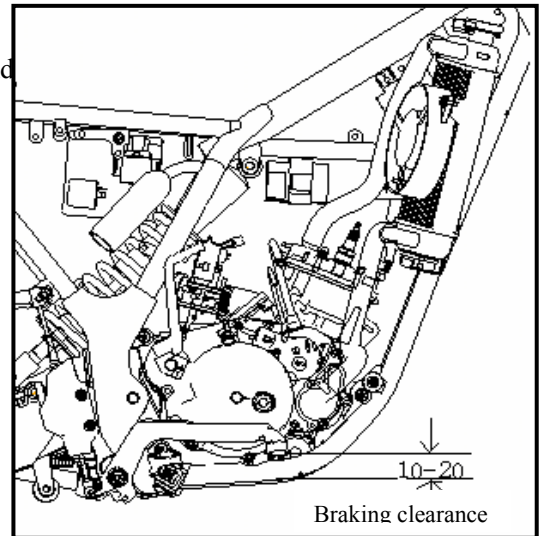
- (1) Loose mandrill to lock nut1.
- (2) Twist in or out the mandril2 to adjust free travel of front brake handle, after adjusting free travel to 10-20mm.
- (3) Install mandril1 tight and lock nut1



Rear brake clearance

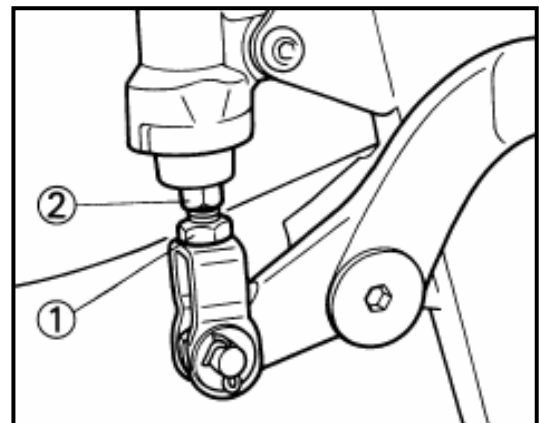
Measure the clearance of rear brake at the tip of front brake hand

Clearance: 10-20mm



Please adjust free travel of back brake footstep in the following way:

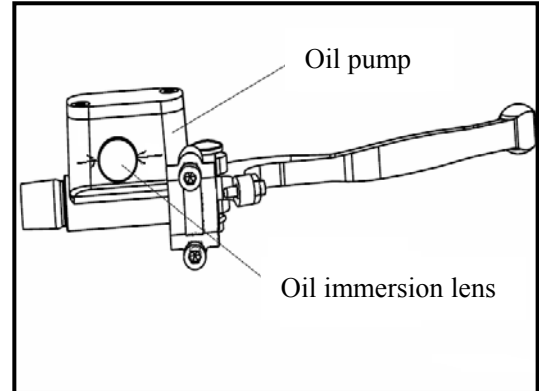
- (1) Loose mandrill to lock nut1.
- (2) Twist in or out the mandril2 to adjust free travel of front brake handle, after adjusting free travel to 10-20mm.
- (3) Install mandrill1 tight and lock nut1



Front/back brake shoe's abrasive wear

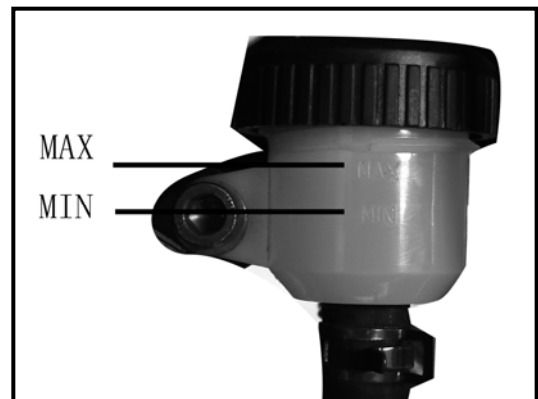
Front brake shoe's abrasive wear

When braking exactly, check oil level from oil immersion lens. If liquid level of brake fluid is below the arrow position in the right picture, brake shoe should be replaced immediately by a new one.



Back brake shoe's abrasive wear

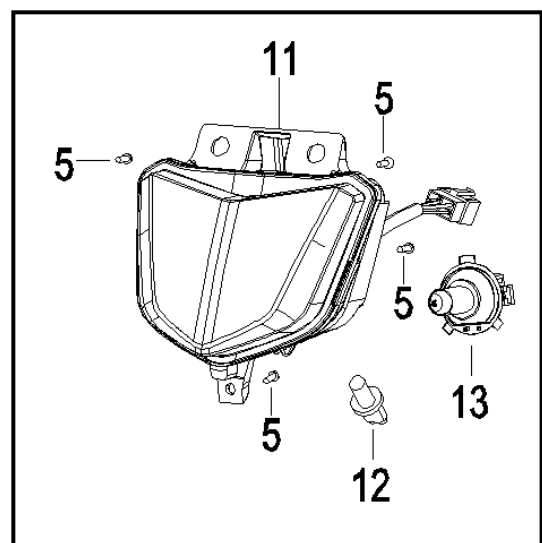
When braking exactly, look oil cup to check oil level of brake fluid. If the level is below MIN, brake shoe should be replaced as soon as possible.



Headlight

Adjustment

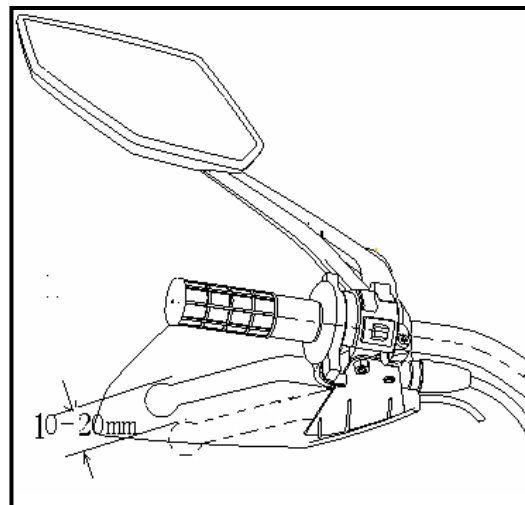
Optical axis adjustment of headlight is loosening headlight spinning adjusting bolt and then rotating.



Clutch

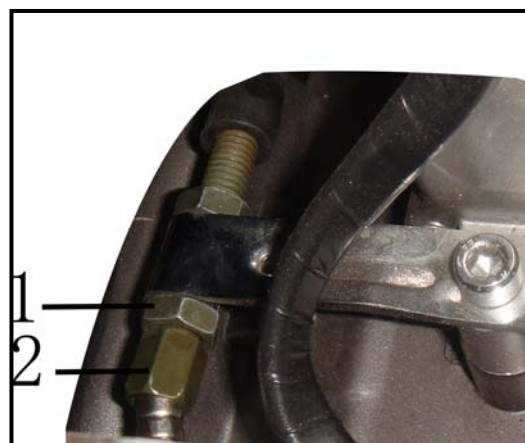
Start engine and increase rotation speed gradually to check running condition of clutch. If motorcycle can not walk or engine shuts down, check clutch block. Replace a new one when necessary.

Free travel of clutch: 10-20mm



Please adjust free travel of clutch in the following way:

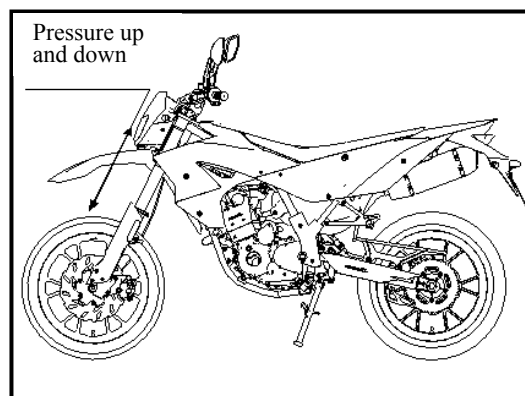
- (1) Loosen mandrill to lock nut1
- (2) Twist in or out the mandril2 to adjust free travel of front brake handle, after adjusting free travel to 10-20mm.
- (3) Install mandrill tight and lock nut1.



Front/Rear Suspension System

Front suspension

Grasp the front brake handle and compress upward and downward the front shock absorber to check its actuator. Check if the front shock absorber leaks oil and if the components are loosened.

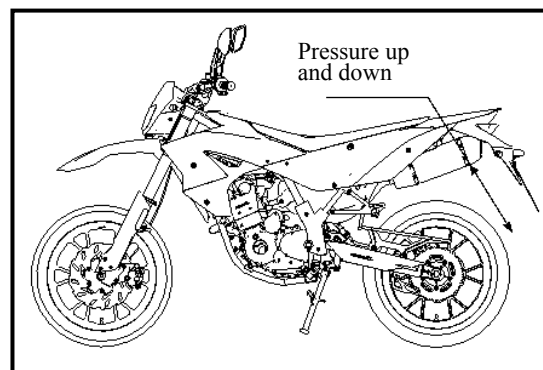


Rear suspension

Compress upward and downward the rear shock absorber to check its actuator.

Check if components on the rear shock absorber are loosened or injured.

Lift and support the rear wheel and swing the wheel to check if engine suspension bushing is loosened.



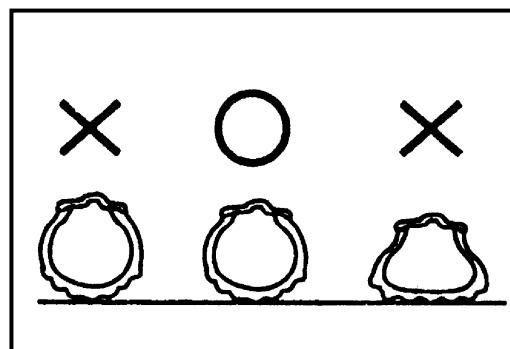
Bolt/Nut/Fastening Part

Inspect bolts, nuts and fastening parts at every part of the motorcycle for looseness.

If it is loose, tighten it to specified torque.

Wheel Rim/Tyre

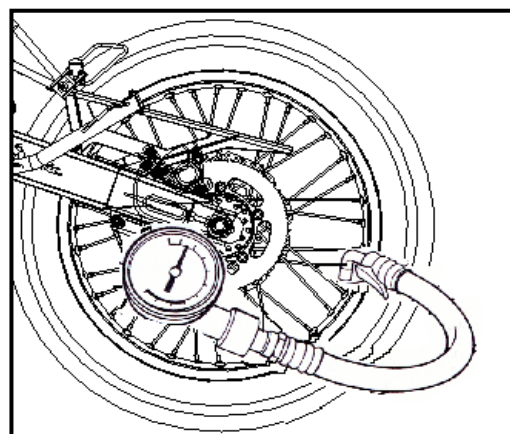
Check if there is crack, nails and similar sharp objects, and other injuries on the tyres.



Inspect pneumatic pressure of tyres.

* Attention

Measure cold inflation tyre pressure



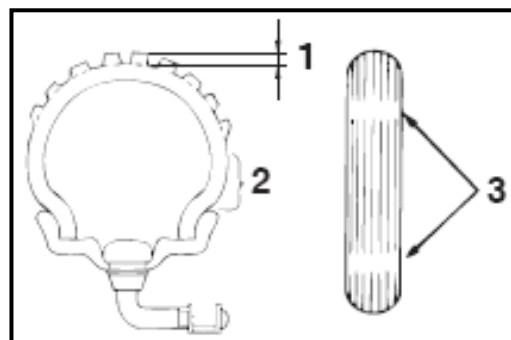
Specified air pressure

Unit: Kpa

Tyre specifications			Tyre pressure
QJ125GY-16A	Front tyre	100/80-17	225±10kpa
	Rear tyre	130/80-17	225±10kpa

Change a new tyre when decorative pattern depth on tyre middle reaches the degree of the right picture.

Minimum decorative pattern depth	
Front tyre	1.6mm
Back tyre	2.0mm



Warning:

Do not try to mend damaged tyre because wheel balance and tyre reliability may be worsen.

To inflate tyre in a wrong way will cause unusual tread abrasive wear and threaten safety. To inflate tyre less may cause slipping or casting and cause tyre deflate.

When tyre is abraded over, it is dangerous to drive and goes against ground adhesion and driving.

Check if lock nut of front shaft is loosened.

Check if lock nut of rear shaft is loosened.

If loosened, tighten it to specified torque.

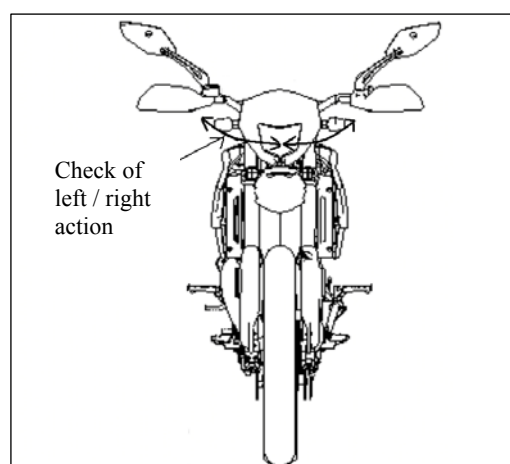
Torsion force: **Front shaft** **100-113N·m**
 Back shaft nut **100-113N·m**

Steering Stem Bearing and Handle Fixation

Move the left and right handle and check if lead wires disturb it.

Rotate front wheel and confirm handle can move smoothly.

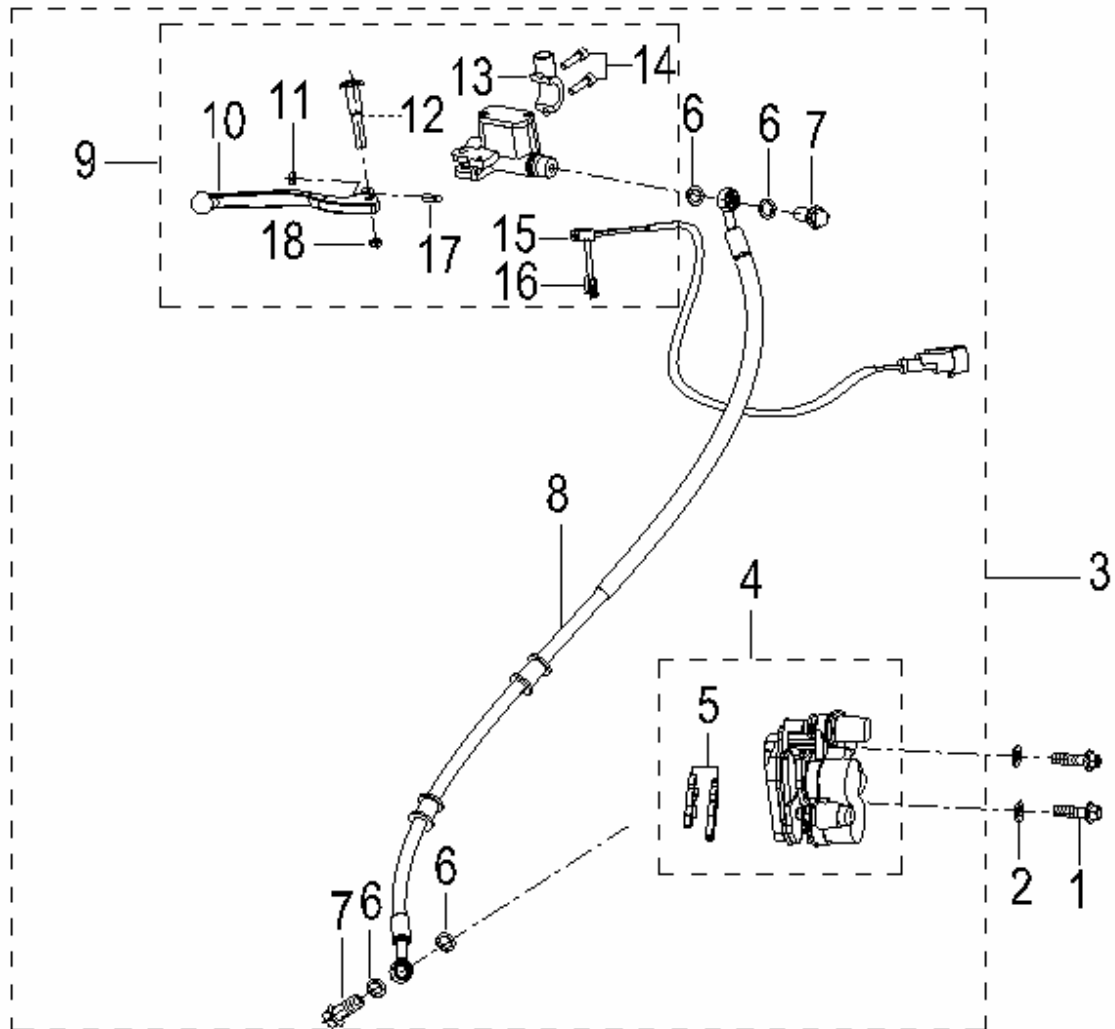
If the handle does not move smoothly and is loosened, check steering stem bearing.



Check and Maintenance of Body

Front liquid brake block

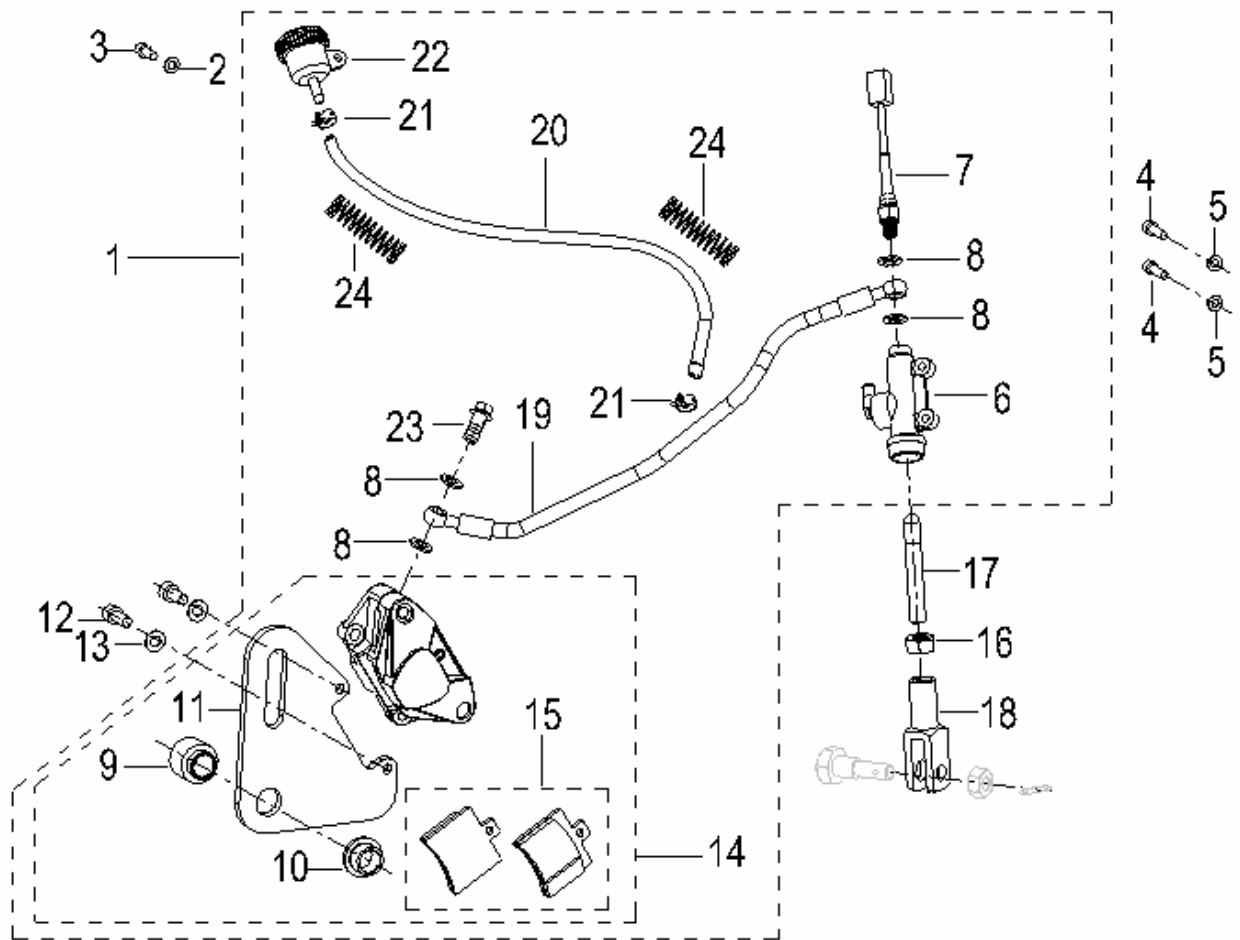
A	Thickness of brake shoe: 7.8mm Use limits: 3.8mm
B	Torsion force to Install Bolt 1: 22-34N·m
C	Torsion force to Install Bolt 7: 30-35N·m
D	Torsion force to Install Bolt 14: 5-10N·m
E	Torsion force to Install Bolt 16: 2-5N·m
F	Torsion force to Install Bolt 18: 5-10N·m



- (1) Inner hexagon screw M8*35 (2) Gasket 8 (3) Front liquid brake block units (4) Brake cylinder units
 (5) Brake shoe units (6) Sealing gasket (7) Erection bolt in oil tube (8) Brake house units (9) Oil pump units
 (10) Handle (11) Thin nut M6 (12) Handle screw (13) Fixed cover (14) Bolt M6*25 (15) Brake switch units
 □ Countersunk flat Phillips heads for exposed screws M4*12 □ Mandrill □ Self-locking nut M6

Back liquid brake block

A	Thickness of brake shoe: 7.0mm Use limits: 3.7mm
B	Torsion force to Install Bolt 3: 5-10N·m
C	Torsion force to Install Bolt 4: 5-10 N·m
D	Torsion force to Install Bolt 7: 30-35 N·m
E	Torsion force to Install Bolt 12: 22-34N·m
F	Torsion force to Install Bolt 23: 30-35 N·m



☐ Rear liquid brake block units ☐ Gasket 6 ☐ Inner hexagon screw M6*16 ☐ Inner hexagon screw M6*16
☐ Gasket 6 ☐ Oil pump assembly ☐ Brake switch assembly ☐ Seal ring ☐ Lining I ☐ Lining II ☐
☐ Connecting plate ☐ Inner hexagon screw M8*20 ☐ Gasket 8 ☐ Brake cylinder B ☐ Friction plate units
☐ Nut M6 ☐ Draw bar ☐ Draw handle ☐ Brake hose unit ☐ Oil tube (21) Hoop (22) Oil cup units
☐ (23) Hexagon flange head tapping screw (24) Protecting spring

I Braking System

Maintenance instruction-----1.1

Fault diagnosis-----1.2

Front hydraulic disc brake----- 1.3

Rear drum brake-----1.4

1.1 Maintenance Instruction

Precautions on operation

* Attention

- Please do not contaminate braking assembly with oil while assembly or disassembly.
- Please use specified detergent to clean the braking assembly, or it may reduce braking performance.

* Please check braking system before driving your motorcycle.*

1.1.1 Specifications

project		Standard value	Available limits	project		Standard value	Available limits
front	Dedicated brake fluid	DOT4	-	back	Dedicated brake fluid	DOT4	-
	thickness of liquid brake block	4.0	3.0		thickness of liquid brake block	5.0	4.0
	thickness of brake shoe	9mm	4.5mm		thickness of brake shoe	9mm	4.5mm
	diameter of liquid brake block	φ280mm	-		diameter of liquid brake block	φ240mm	-
	Jump of liquid brake block	0.1mm	-		Jump of liquid brake block	0.1mm	-
	Inner diameter of mercury oil cylinder	Φ12.7 ^{+0.027} ₀ mm	-		Inner diameter of mercury oil cylinder	Φ14 ^{+0.027} ₀ mm	-
	Outer diameter of mercury oil piston	Φ12.7 ^{-0.050} _{-0.077} mm	-		Outer diameter of mercury oil piston	Φ14 ^{-0.050} _{-0.077} mm	-
	Inner diameter caliper cylinder	Φ25 ^{+0.05} ₀ mm	-		Inner diameter caliper cylinder	Φ30 ^{+0.05} ₀ mm	-
	Outer diameter of caliper piston	Φ25 ^{-0.07} _{-0.10} mm	-		Outer diameter of caliper piston	Φ25 ^{-0.07} _{-0.10} mm	-

1.1.2 Torsion force

Former brake disc retaining bolt

5-10N·m

Under the brake fluid before pump installation bolt	22-34N·m
Liquid brake oil pump before installation bolt	5-10N·m
Front wheel spindle	100-113N·m
Front wheel head bolt	5-10N·m
The brake disc retaining bolt	5-10N·m
Liquid brake pump installation after the bolt	22-34N·m
Back oil pump installing bolts liquid brake	5-10N·m
Back wheel spindle	100-113N·m

1.2 Fault diagnosis

1.2.1 Brake in ill performing services

- Brake without adjustment well
- Abrasive wear of brake shoe units and liquid brake plate
- Improper installment of brake shoe units
- Pollution of liquid brake plate of brake shoe units

1.2.2 Brake reaction slowly or handle is tight

- Brake without adjustment well
- Abrasive wear of brake shoe units and liquid brake plate
- Improper installment of brake shoe units

1.2.2 Brake with abnormal sound

- Abrasive wear of brake shoe units and liquid brake plate
- Pollution of liquid brake plate of brake shoe units

1.2.4 Braking handle/footstep is soft or light

- Air in hydraulic system
- Leakage of hydraulic system
- Braking footstep/plate is dirty
- Sealing abrasive wear of caliper piston
- Abrasive wear of braking footstep/plate
- Caliper is dirty
- Caliper can not slide well
- Lack of brake fluid
- Block of brake fluid pipe
- Bending/incompletion of caliper piston
- Bending/incompletion of master cylinder piston
- Master cylinder piston is dirty
- Braking handle/footstep is curving

1.2.5 Brake gets stuck or is pulled to one side

- Braking footstep/plate is dirty

*** Attention**

- Please do not contaminate braking shoe assembly with oil while assembly or disassembly
- Please use specified detergent to clean the braking assembly, or it may reduce braking performance.

Disassemble front axle

Take down front axle

Disassemble front liquid brake block from front wheel

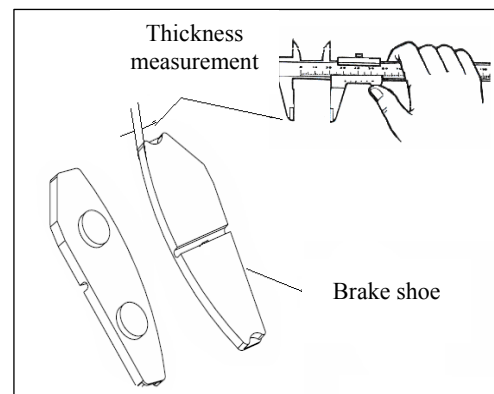
1.3.2 Check

Check the abrasive wear condition of brake shoe. Replace it when necessary.

Measure brake shoe、 brake plate and then write down the maximum number.

Measure the thickness of brake shoe.

Use limits: brake shoe 4.5mm

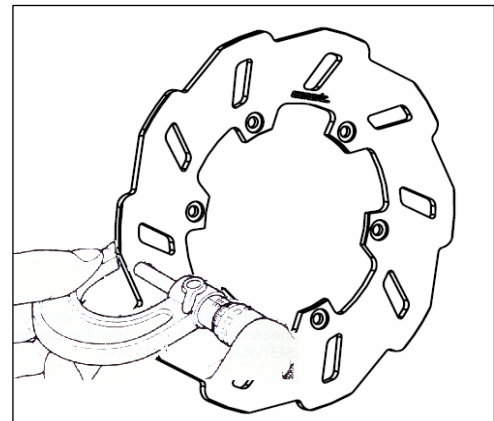


Specification

Diameter of front liquid brake plate: $\phi 280\text{mm}$

*** Attention**

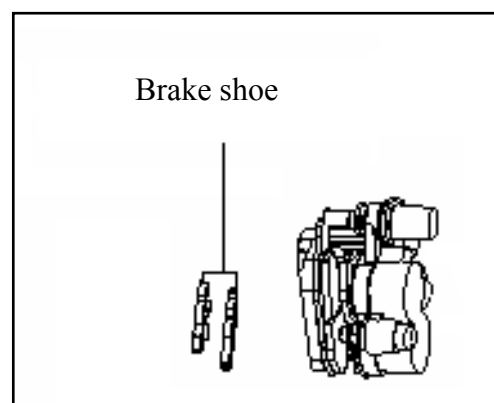
- Wipe brake plate with #120 abrasive paper if it rusts
- Micrometer is the only choice for measurement.



If the thickness of brake plate and brake shoe are less than maintenance value or polluted by grease, please replace them.

*** Attention**

- Micrometer and vernier caliper are the only choices for measurement.



1.3.3 Installment

Install front wheel
 Install front liquid brake oil pipe and brake cylinder units
 Do not get grease on brake shoe

*** Attention**

If there is grease on brake shoe, brake ability will reduce and cause brake failure

Fasten bolts to the setting torsion force

Torsion force:

Former brake disc retaining bolt	5-10N·m
Under the brake fluid before pump installation bolt	22-34N·m
Liquid brake oil pump before installation bolt	5-10N·m
Front wheel spindle	100-113N·m
Front wheel head bolt	5-10N·m

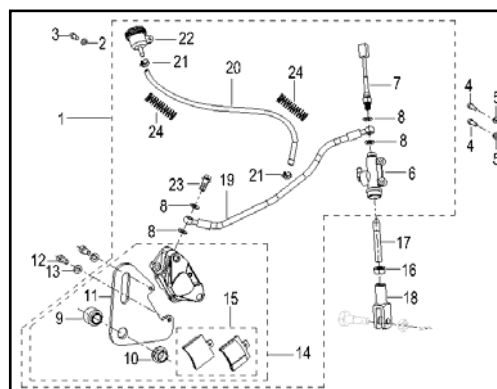
1.4 Back liquid brake

1.4.1 Disassembly

Disassemble back brake oil pump units
 Disassemble back brake cylinder units
 Disassemble back wheel
 Disassemble brake disc from back wheel hub

Note:

**Generally speaking, brake disc can not be disassembled.
 If needs, heat it.**



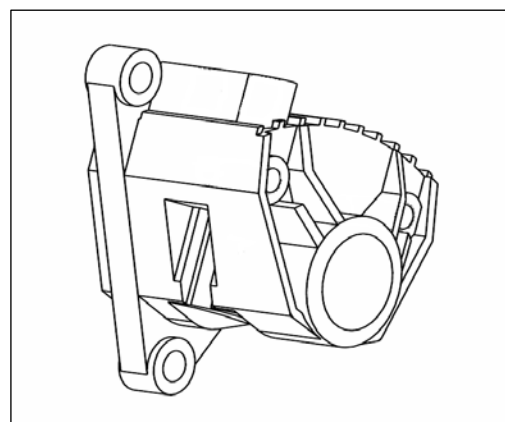
*** Attention**

- Change of brake shoe
- If using brake shoe again, mark it on its side before disassembly to make it available back to the original position

Disassemble the following units from back wheel

Back brake:

1. Back liquid brake units
2. Brake shoe units
3. Lining
4. Connection plate



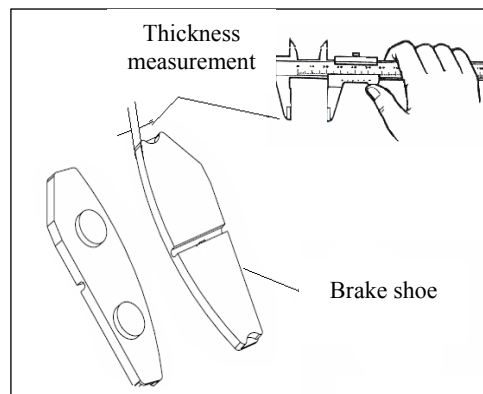
1.4.2 Check

Check the abrasive wear condition of brake shoe. Replace it when necessary.

Measure brake shoe, brake plate and then write down the maximum number.

Measure the thickness of brake shoe.

Use limits: brake shoe 4.5mm



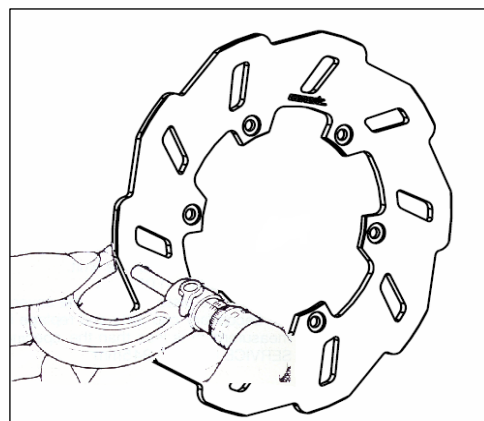
Specification

Diameter of front liquid brake plate: $\phi 280\text{mm}$

*Attention

- Wipe brake plate with #120abrasive paper if it rusts
- Micrometer is the only choice for measurement.

If the thickness of brake plate and brake shoe are less than maintenance value or polluted by grease, please replace them.



* Attention

- Micrometer and vernier caliper are the only choices for measurement.

1.4.3 Installment

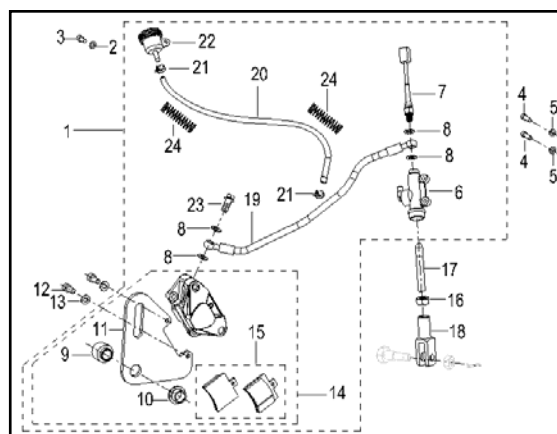
Install front wheel

Install front liquid brake oil pipe and brake cylinder units

Do not get grease on brake shoe

* Attention

If there is grease on brake shoe, brake ability will reduce and cause brake failure



Fasten bolts to the setting torsion force

Torsion force:

Former brake disc retaining bolt

5-10N·m

Under the brake fluid before pump installation bolt

22-34N·m

Liquid brake oil pump before installation bolt

5-10N·m

Front wheel spindle

100-113N·m

Front wheel head bolt

5-10N·m

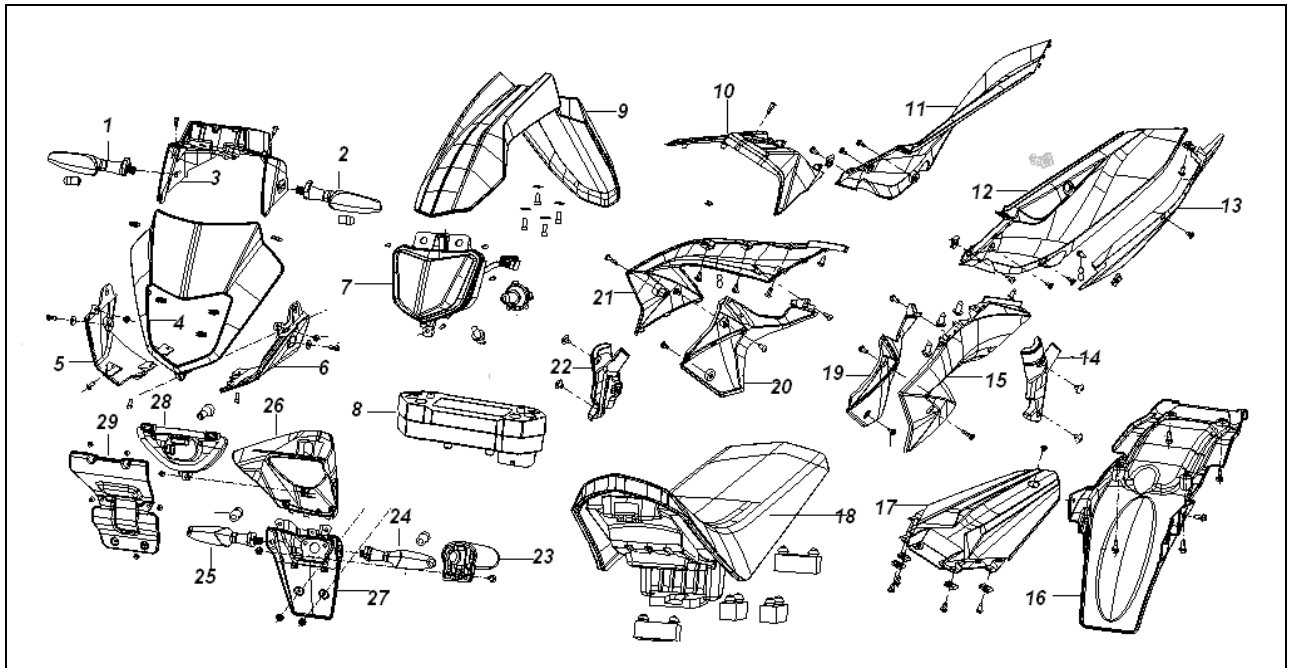
No oil stain shall be on brake shoe and brake disk.

If any, use brake cleaner fluid.

***Attention**

Oil stain on brake shoe will eliminate braking performance.
--

Body outer panels



- 1 Front and right turn light 2 Front and left turn light 3 Front night-light fixed position 4 Pod
 5 Right mounting plate of pod 6 Left mounting plate of pod 7 Headlight 8 Instrument assembly
 9 Front splash guard 10 Right and left oil tank guard plate gusset piece 11 Right back plate 12 Left back plate
 13 Right and left back plate 14 Left dale 15 Back plate of left oil tank 16 Front of back splash guard
 17 Right and left guard plate gusset piece 18 Seat cushion 19 Left kneelet 20 Right kneelet
 21 Back plate of right oil tank 22 Right decorative plate 23 Back license plate lamp 24 Back and left turn light
 25 Back and right turn light 26 Back splash guard 27 Back splash guard 28 Back taillight
 29 Back of back splash guard

II Vehicle Housing

Disassemble body as the following order:

rearview mirror → front pod → instrument support → instrument → back pod
→ front splash guard → seat cushion → decorating plate of left and right front back
plate → left and right front back plate → front and back junction plate of right and
left back plate → bottom cover → left and right back plate of oil tank → right and
left back guard board → right and left step tread → taillight → back splash plate →
back license tag support

* Attention

Do not damage exterior parts during assembly and disassembly.

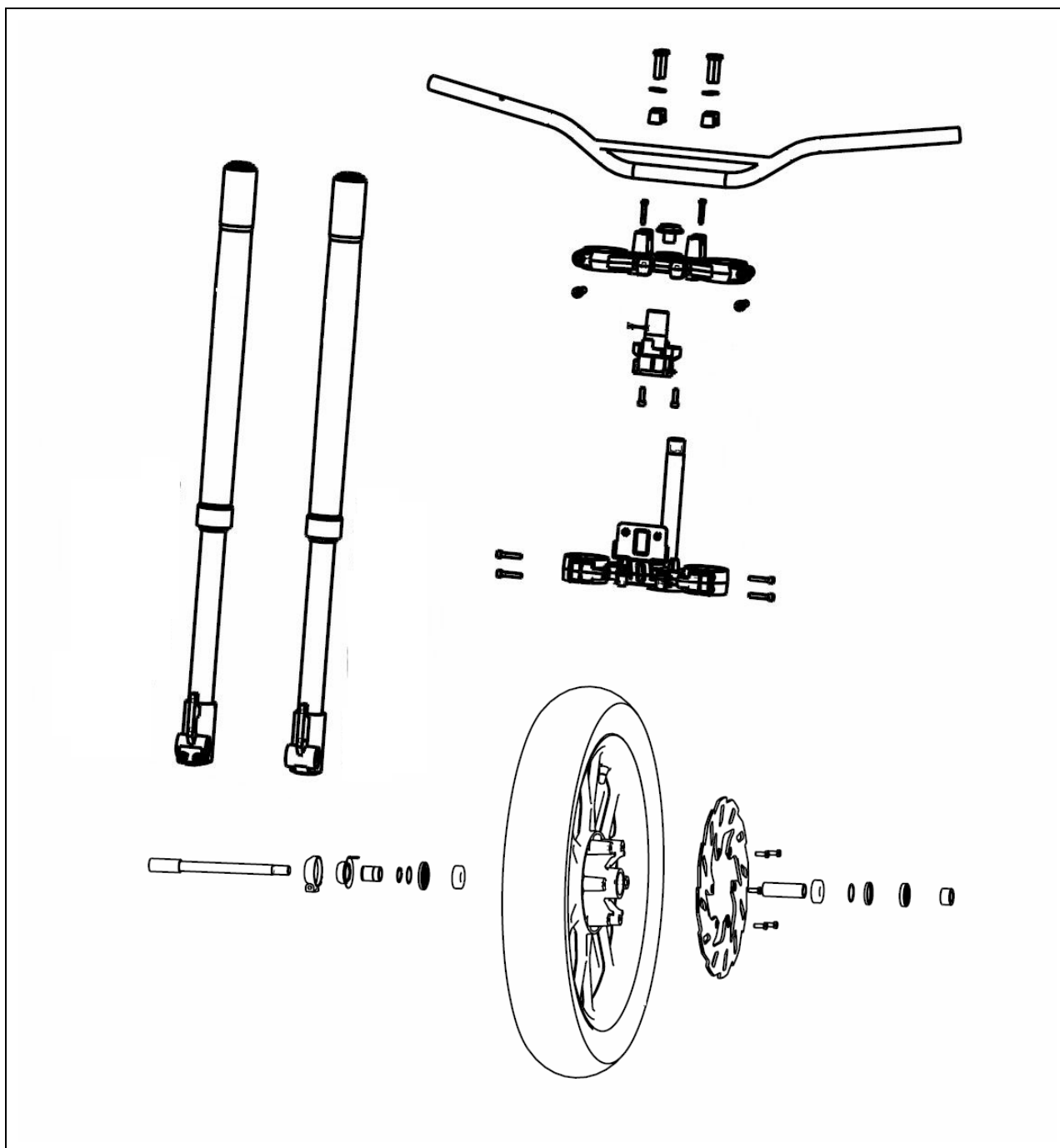
Do not damage the jaws on the exterior parts of the vehicle during assembly or disassembly.

Align built-in panel and cover plate to their grooves respectively.

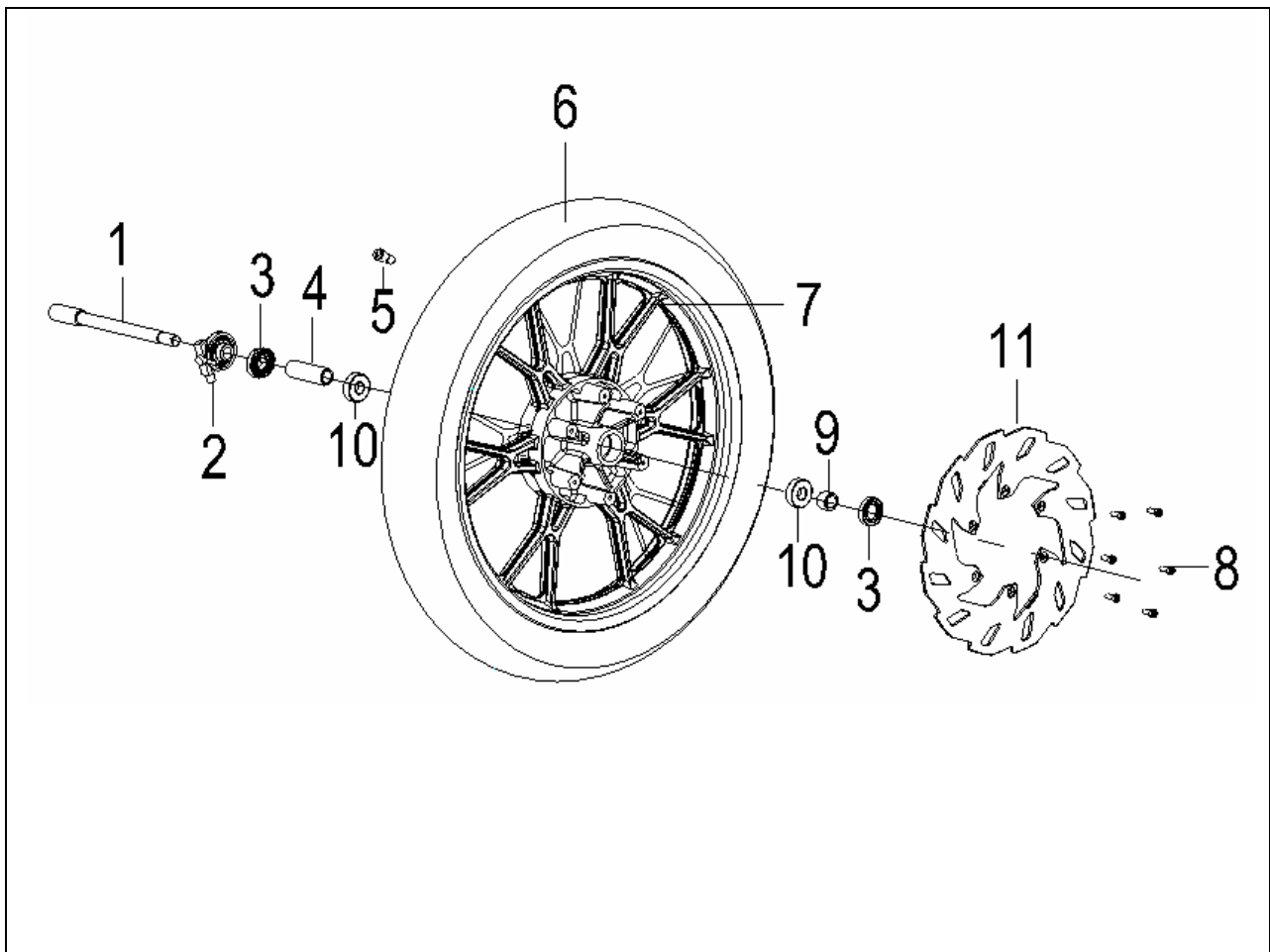
Correctly install paw of each part during combination.

Do not damage the fittings during exterior part installation.

Front wheel/front suspension



Front wheel



- 1 Front wheel axle M14*1.5*219 2 Odometer wheel gear units 3 Front wheel sealed units 4 Front wheel middle shaft sleeve 5 Cycle valve 6 vacuum tyre 100/80-17 7 Front wheel ring 8 Liquid brake plate erection bolt
- 9 Front wheel left shaft sleeve 10 Antifriction bearing 6202-2RS 11 Front brake plate

III Front Wheel/Front Suspension

Preparatory data-----3.1

Fault diagnosis-----3.2

Front wheel-----3.3

Control assembly-----3.4

Front fork assembly-----3.5

3.1 Preparatory Data

Precautions on operation

Before removing the front wheel, lift and support the bottom of motorcycle with a jack or other available device. The front wheel is off the ground. Take care not to rotate the wheel reversely.

Attention: Please do not let oil contaminate braking shoe.

Basic data of the motorcycle as a whole

Measuring position	Item		Standard value(mm)	Service Limit(mm)
Front wheel shaft	Curvature			0.2
Front wheel	Wheel shimmy	Longitudinal		2.0
		Transversal	Within 1.0	2.0

Tightening torque

Direction handle fixed screw 22-29 N·m

Front axle 37-44 N·m

Tools

Bearing disassembly pole

3.2 Fault diagnosis

3.2.1 Direction handle moves hard

- Direction handle is out of order or damaged
- Bearing failure of direction handle
- Faucet bearing rating nut is too tight
- Tire pressure is not enough

3.2.2 Wobbly Direction Handle

- Damaged handle bearing
- Not enough tyre pressure.
- Front fork bent, front wheel shaft bent.
- Distorted and crooked front wheel tyre.

3.2.3 Wobbly Front Wheel

- Distorted wheel rim
- Worn front wheel bearing
- Defective front tyre
- Unbalance of tyre or wheel

3.2.4 Difficult Rotation of Wheel

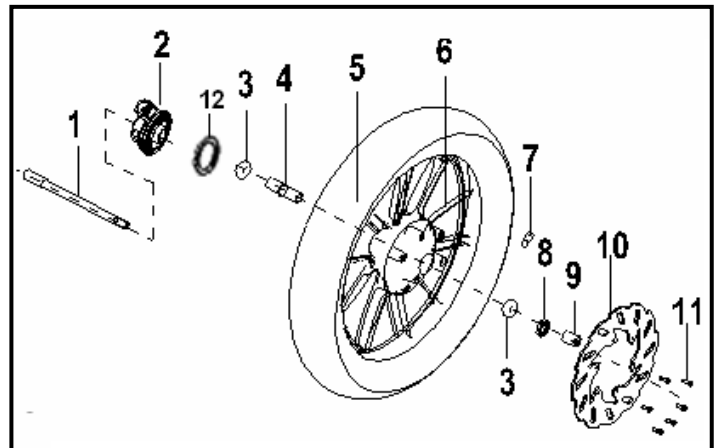
- Breakdown of front wheel bearing
- Braking breakdown of brake
- Breakdown of wheel and axle
- Bending of front wheel

3.2.5 Noisy Front Shock Absorber

- Lack of liquid in shock absorber
- Friction sound of shock absorber protecting plate.
- Loosened bolts on the shock absorber.

3.2.6 Operated to one side only or walking not in straight line

- unbalance of both crosses' adjustment
- bending of shock absorber
- bending of wheels
- inaccuracy of wheels' installment
- bending of car frame
- illness of axle
- illness of swing arm central shaft units



3.2.7 Front shock absorber is soft

- lack of liquid in shock absorber
- insecure of spring in shock absorber
- tyre pressure is too low

3.2.8 Front shock absorber is hard

- inadequacy of liquid weight
- block of shock absorber liquid pipe

3.3 Front wheel

3.3.1 Disassembly

Support the bottom of body to float front wheel

Disassemble bolt and take down front splash guard and odometer guide line.

Disassemble front brake hose

Disassemble front axle jam nut

Disassemble front axle

Disassemble front wheel

Disassemble oil seal with oil seal stripping attachment and bearing with bearing stripping attachment.

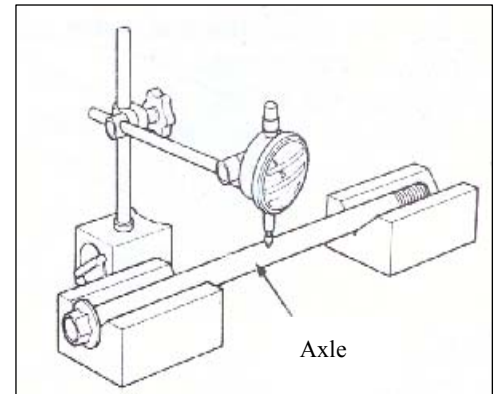
***Note: dismantling picture is on page 41 of this manual**

3.3.2 Inspection

3.3.2.1 Shaft Bow Inspection

Place the shaft onto a V block and measure its eccentricity with a dial gauge.

Service limit: When the measured value exceeds 0.2mm, replace it.

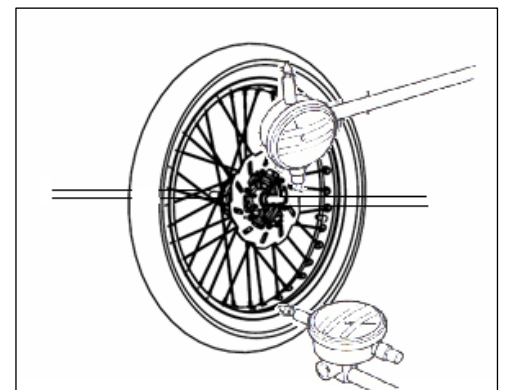


3.3.2.2 Wheel Shimmy Inspection

Service limit:

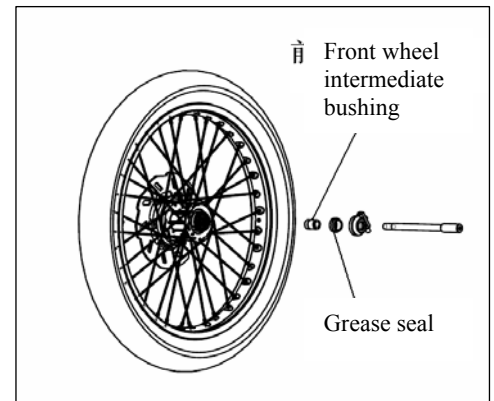
Longitudinal: replace it when it is over 2.0mm

Transversal: replace it when it is over 2.0mm.



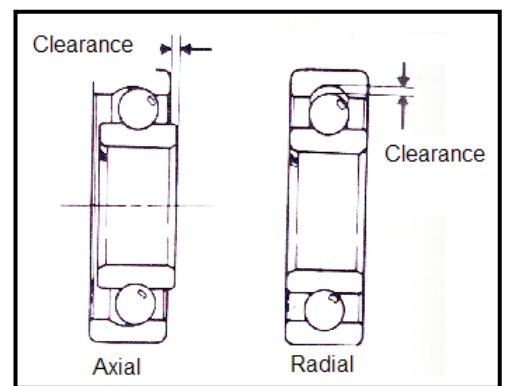
3.3.2.3 Front Bearing Inspection

Disassemble front wheel central lining and take down oil seal.



Check the rolling condition of bearing.

If not rolling, or the bearing is worn or loose, replace with a new one.



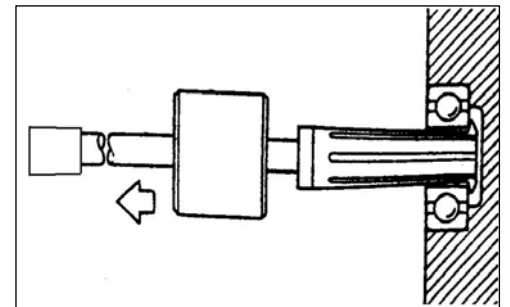
3.3.3 Bearing Replacement

Disassemble front wheel, front axle and axle sleeve and then disassemble oil seal with oil seal stripping attachment and bearing with bearing stripping attachment.

Note: Removed bearing shall be replaced with a new bearing.

Apply some lubricating grease on the bearing at installation.

And then press the bearing in with bearing installer.



* Attention

- The bearing must be pushed in parallel.
- Bearing oil seal sleeve must be pressed in from the out.

3.3.4 Installation

Oil seal on front wheel should be spread with lubricating grease.

Autometer gearing mesh and moving parts should be spread with lubricating grease.

Fold odometer wheel gear units and then install brake disc

Attention

Without folding and locking odometer wheel gear units to front axle, odometer wheel gear units will be out of shape

After installment of axle, rotate it to make sure the rotation condition of odometer drive shaft.

Install front axle and then lock tight.

*** Note: the dismantling picture is on page 41 of this manual**

Torsion force

Front axle: 37-44 N·m

3.4 Direction handle

3.4.1 Disassembly

Disassemble direction handle sheath and rearview mirror units

Disassemble front brake handle and left handle units

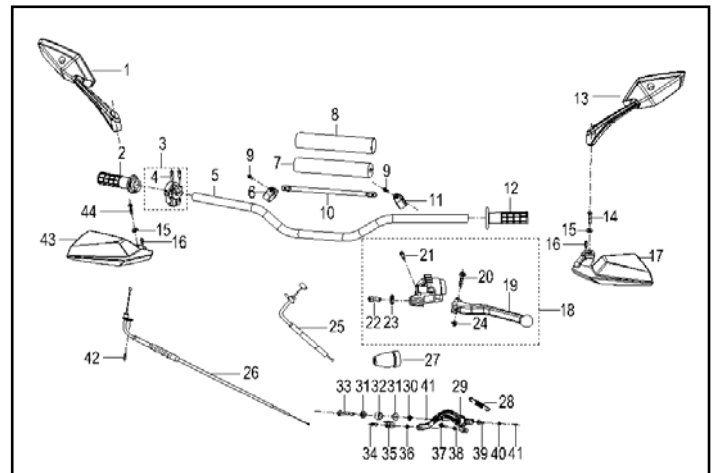
Take down accelerator seats units and right grip units

Take down accelerator cable units

Take down left direction handle cover

Take down clutch line units and ventilation door line units

Take down handle fixed bolt and handle.



3.4.2 Installment

Install in the order which is against disassembly

Fixed bolt

Torsion force: 22-29N·m

3.5 Front fork

3.5.1 Disassembly

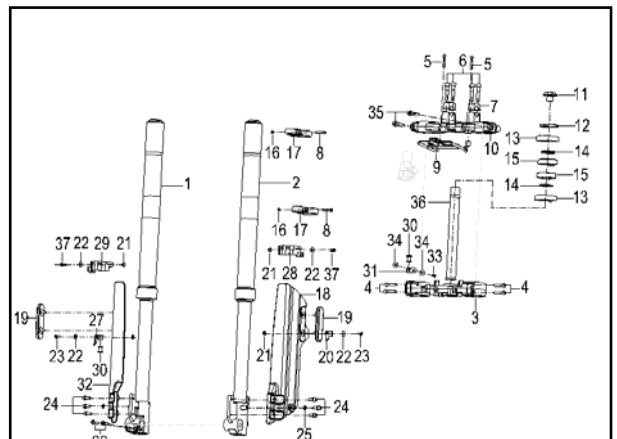
Disassemble front splash guard

Disassemble front wheel

Disassemble brake hose and autometer wire

Disassemble front shock absorber

Disassemble diversion fixed nut



Disassemble direction handle

Tools:

Direction handle fixed bolt wrench

Fixed nut wrench

*** Attention:**

- Clean the opening part of protecting plate of motorcycle block with a cloth.

3.5.3 Installation

Tools:

Locknut wrench

Rotate the front fork left and right to be sure of its smoothness and there shall be no looseness.

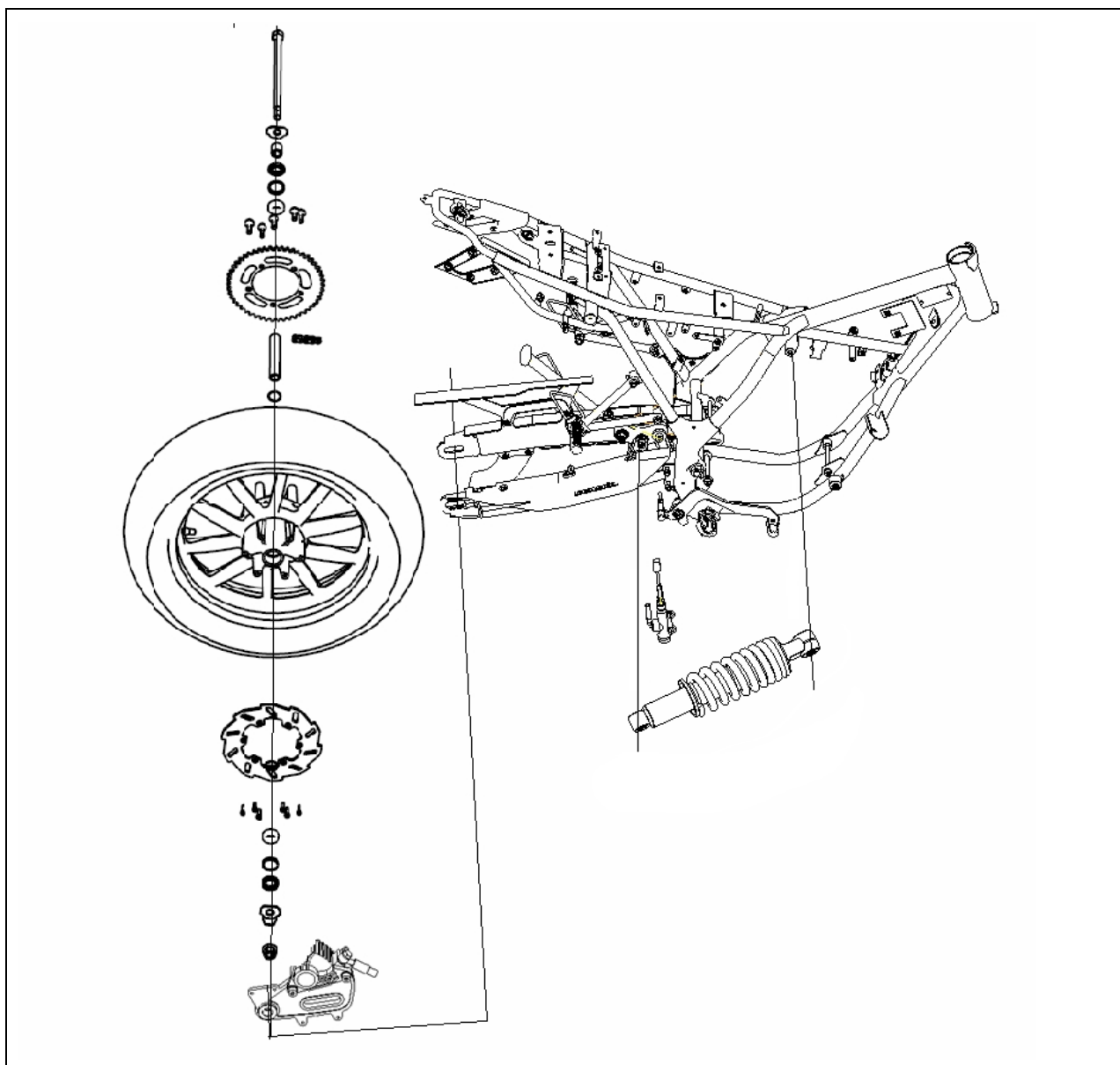
Steps:

Install direction handle.

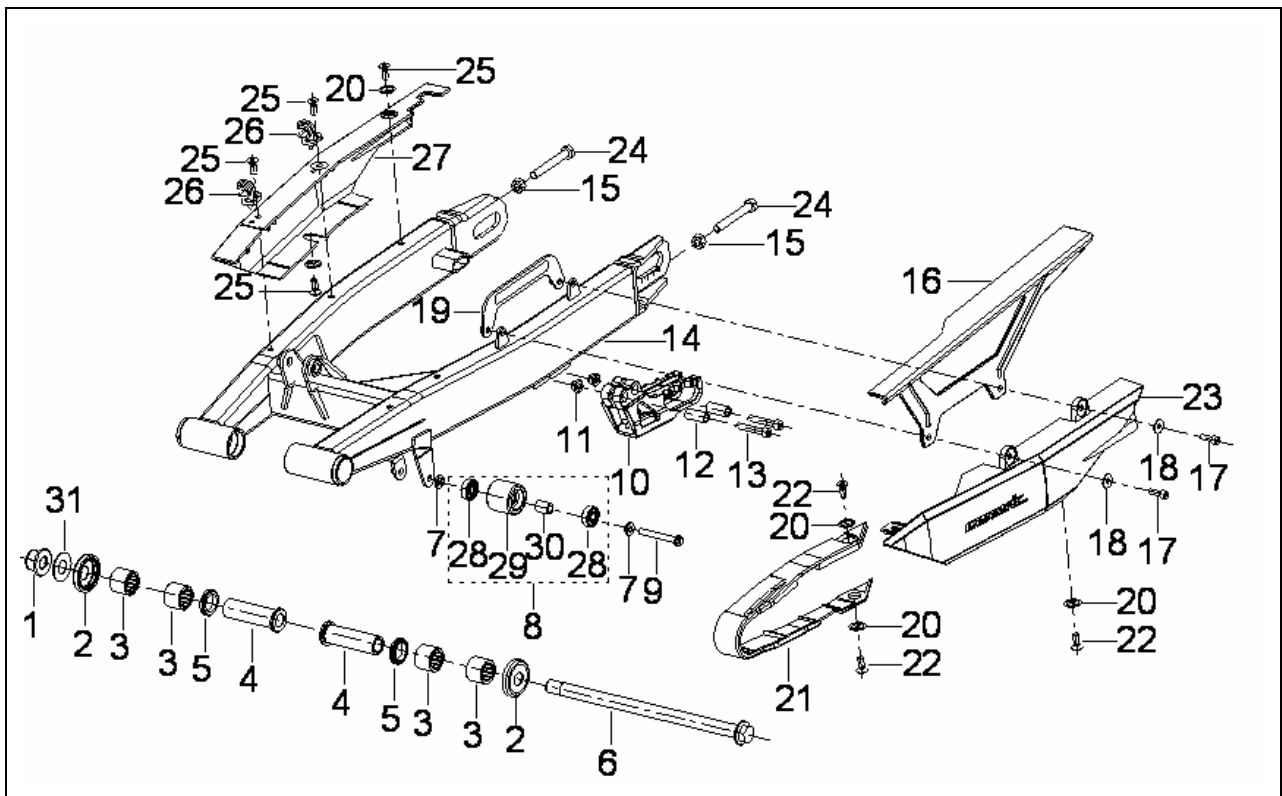
Install front shock absorber.

Install front wheel.

Rear Wheel / Rear Suspension

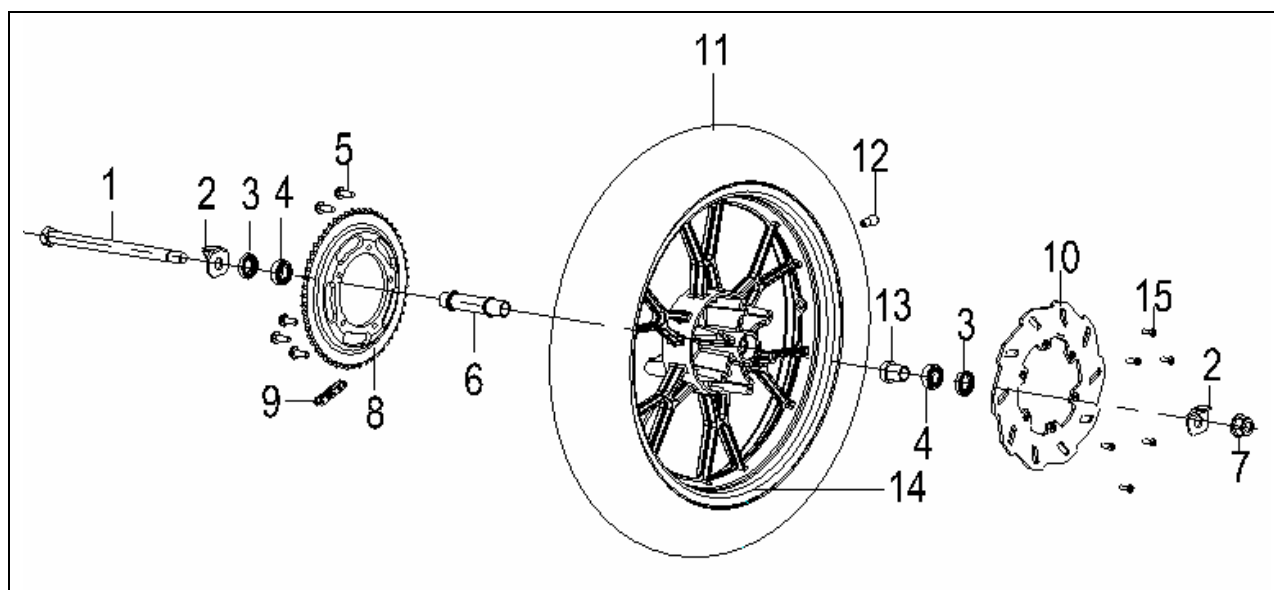


Real Shock Absorber / Real Rocker Arm



1. Self-locking nut M14*1.5 2. Dust ring units 3. Multi-roll bearing HK2020 4. Real rocking arm axle sleeve 5. Oil seal 6. Real rocking arm installment axle 7. Chain tension axle sleeve 8. Chain tension wheel units 9. Bolt M6*50 10. Chain guide plate 11. Self-locking nut M6 12. Guide plate lining 13. Bolt M6*45 14. Rear rocking arm weld assembly 15. Nut M8 16. Chain upper shield 17. Inner hexagon screw M5*15 18. Gasket 5 19. Bracing sheet weld assembly 20. Spacer bush 2 21. Chain fence 22. Group bolt M6*12 23. Rear rocking arm left decorative plate 24. Bolt M8*60 25. Bolt M6*1*14 26. Liquid brake cable clamp 27. Rear rocking arm right decorative plate 28. Chain tensioner axle 29. Chain tension wheel 30. Chain tension wheel lining 31. Gasket $\phi 16 \times \phi 32 \times 2$

Rear wheel



1. Rear axle 2. Rear wheel plate pinch 3. front wheel oil seal assembly 4. Rolling bearing 6003-2RS 5. Chain erection bolt M8*22 6. Rear wheel central axle sleeve units 7. Self-locking nut M16*1.5 8. Chain wheel 9. Chain 428HG-1*132 10. Rear brake disc 11. Vacuum tyre 130/80-17 12. Cycle valve 13. Rear wheel left axle sleeve 14. Rear wheel ring 15. Liquid brake plate erection bolt

IV Rear Wheel/Rear Suspension

Preparatory data-----	4.1
Fault diagnosis-----	4.2
Rear wheel-----	4.3
Rear shock absorber/rear swing arm-----	4.4
Chain drive assembly-----	4.5

4.1 Preparatory Data

Precautions on operation

Do not contaminate braking shoe and brake disc with oil.

Basic preparatory data

Item		Standard Value (mm)	Service Limit (mm)
Rear wheel Shimmy	Longitudinal		2.0
	Transversal		2.0

Tightening torque

Rear shaft locknut	100 - 113 N·m
Rear shock absorber top nut	37 - 44 N·m
Rear shock absorber bottom nut	37 - 44 N·m

4.2 Fault Diagnosis

4.2.1 Shimmy Rear Wheel

- Distorted wheel rim
- Worn rear bearing
- Troubled tyre
- Worn or injured swing arm pivot bush
- Improper adjustment of drive chain adjuster
- Unbalance of tyre and wheel
- Tyre pressure is too low
- Bent frame or swing arm

4.2.2 Inflexible Wheel Rotation

- Flexible rear liquid brake plate
- Worn rear bearing
- Too tight drive chain

4.2.3 Soft suspension

- Insecure damping spring with shock
- Incorrect front suspending regulator
- Oil leakage of shock absorber
- Tyre pressure is too low

4.2.4 Hard suspension

- Damage of assembly axle on shock absorber
- Bending shock absorber pipe
- Damage of rear rocking arm pivot bearing
- Bending rear rocking arm pivot bearing
- Incorrect suspending regulator
- Tyre pressure is too high

4.2.5 Operation with one side only or not taking straight line

- Bending rear axle
- Arrangement of axle of both sides/incompetent chain regulator

4.3 Rear wheel

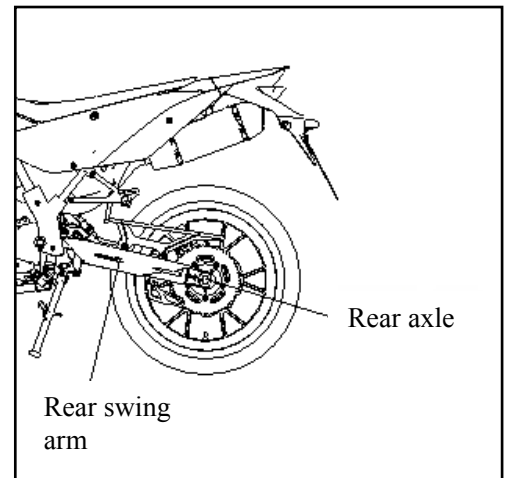
4.3.1 Disassembly

Loosen rear axle nut

Disassemble rear axle nut and take down chain from chain wheel seat

Disassemble rear axle

Disassemble rear wheel

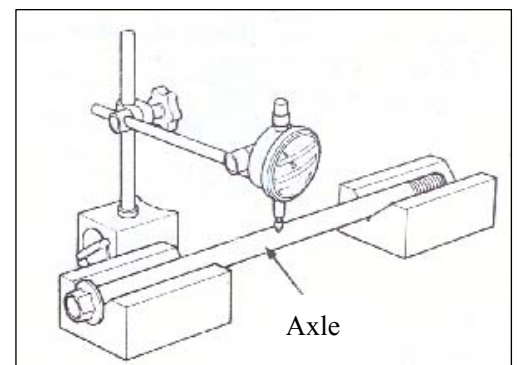


4.3.2 Inspection

4.3.2.1 Check the bending of axle

Put axle on V-style seat and measure its eccentricity ratio with dial indicator

Use limits: change over 0.2mm



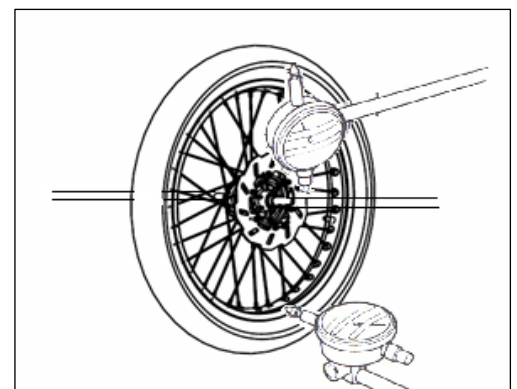
4.3.2.2 Wheel Shimmy Inspection

Rotate the wheel by hands and measure its eccentricity with a dial gauge.

Service limit:

Longitudinal: Replace it when the measured value exceeds 2.0mm.

Transversal: Replace it when the measured value exceeds 2.0mm.



When rear wheel shimmy exceeds service limit, rear wheel bearing is loosened, which results in wobbly rear wheel. Check and replace rear wheel bearing.

4.3.3 Installation

Install the rear wheel in the reverse order of removal and tighten the nut.

Rear wheel shaft locknut

Tightening torque: 100-113N·m

4.4 Rear Shock Absorber

4.4.1 Disassemble rear shock absorber

Disassemble body guard board

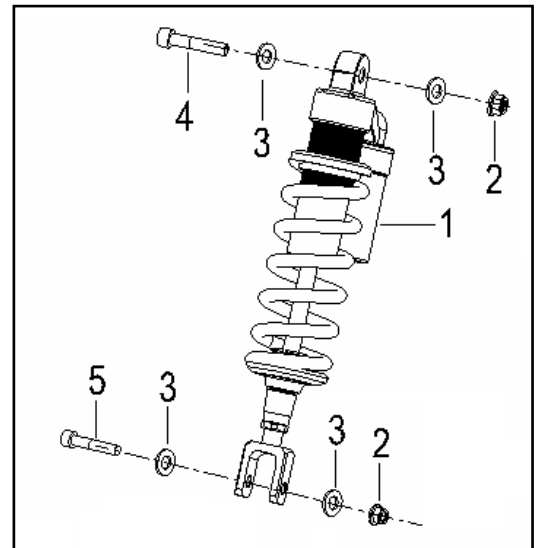
Disassemble rear splash guard

Disassemble tool box

Disassemble air filter

Disassemble rear wheel shock absorber fixed bolt

Take down rear shock absorber



4.4.2 Rear Shock Absorber Inspection

Visual inspection of shock absorber to check whether there is damage

Check the following items:

- bending or damage of shock absorber pipe
- out of shape or oil leakage of shock absorber
- abrasive wear or damage of block rubber
- damage of spring

Check damage or abrasive wear of other parts

Replace shock absorber if necessary

4.4.3 Install Rear Shock Absorber

Install the rear shock absorber in the reverse order of removal.

Install upper locknut and lower mounting bolt on the rear shock absorber

Tighten them to specified torque.

Torsion force:

Upper hold-down nut: 37-44N·m

Bottom hold-down nut: 37-44N·m

4.5 Rear Swing Arm

4.5.1 Remove Rear Swing Arm

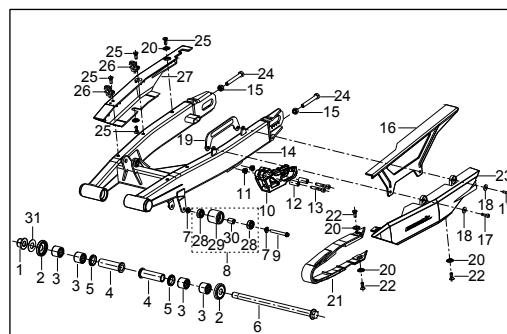
Disassemble chain guard board

Disassemble chain tension wheel and rear axle

Disassemble rear wheel and rear shock absorber

Disassemble rear swing arm installment axle

Take down rear swing arm weld assembly



4.5.2 Rear Swing Arm Inspection

Check rear swing arm installation shaft. Rotate the shaft on a flat surface or measure it with a dial gauge. If it is bent, replace it.

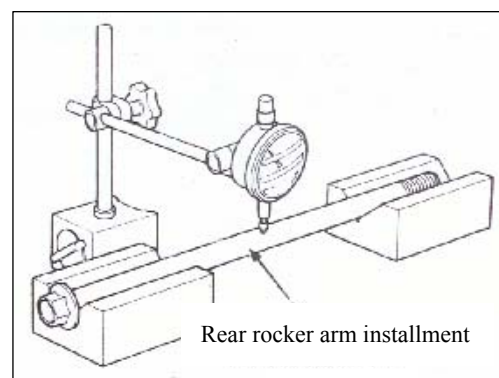
*** Attention**

Don't attempt to straighten bent shaft.

Wash in solvent the components for rear swing arm installation shaft.

Check sleeve assembly and intermediate sleeve of rear swing arm.

If they are damaged, replace them.



4.6 Drive Chain

4.6.1. Disassembly

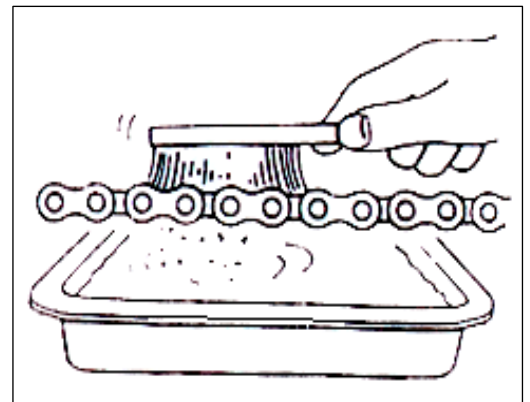
Lay motorcycle on the flat ground and fasten

Disassemble shift lever swing arm, left rear cover and drive chain

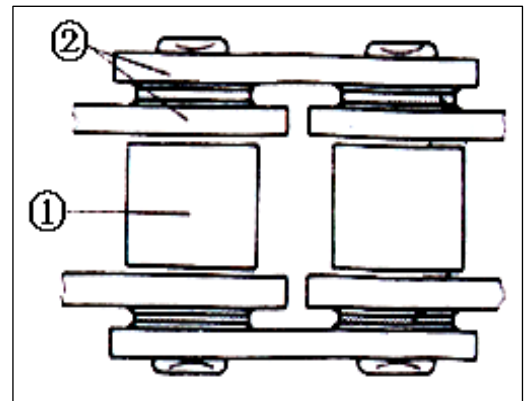
Disassemble rear wheel, chain shield and drive chain

4.5.2. Inspection

Wash drive chain and put it into kerosene. Brush dust and then take it out from kerosene and dry it out.

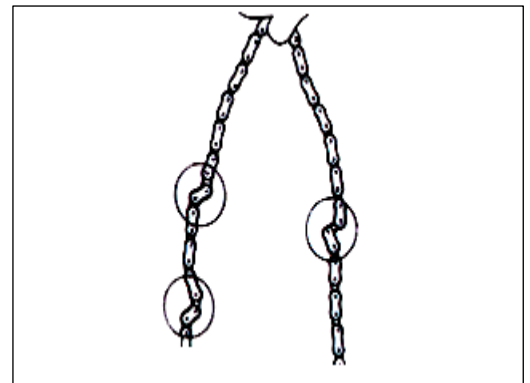


Check rattle1 and side panel2. replace drive chain when damaged or abraded.

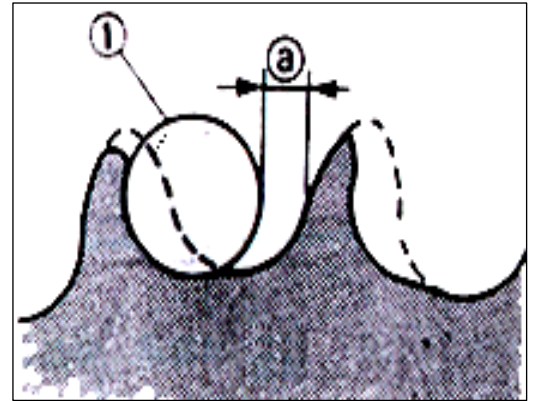


Lubricate drive chain. Buy it from store

Check drive chain. Wash, lubricate and replace it if it is hard.



Check drive chain and driven chain wheel. Replace chain wheel when 1/4 gear teeth are worn. Replace it when gear teeth is bending.



Check wheel axle. Replace when there is bearing gap in hub or unbalance of rotation. Check oil seal and replace when there is abrasive wear or damage.

4.5.3 Drive Chain Slackness Adjustment

Stand vertically the motorcycle on the flat ground and check drive chain slackness. Drive chain slackness: 10-20mm

Adjustment with Not fulfill quality requirements

Screw off rear axle nut1

Adjust the slackness of drive chain. The adjustment steps are as follows:

Screw off erection nut2; screw in or back adjusting device3 until fulfilling quality requirements

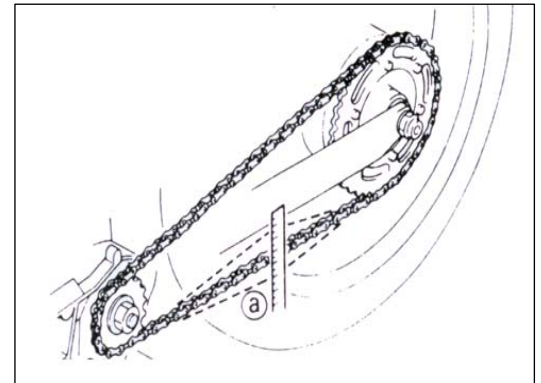
Screw in; slackness increases

Screw back; slackness reduces

Attention

Make sure the rotation cylinder number of adjusting device is the same to install axle correctly

At last, screw down locking nut

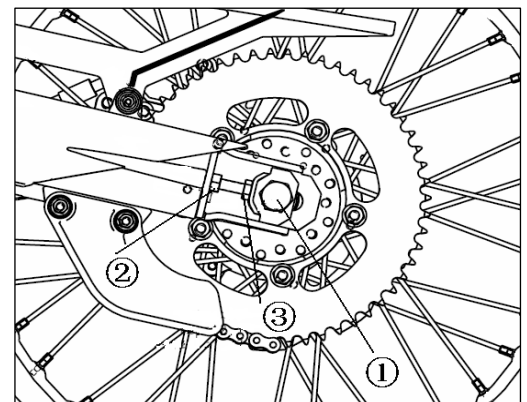


4.5.4 Installment

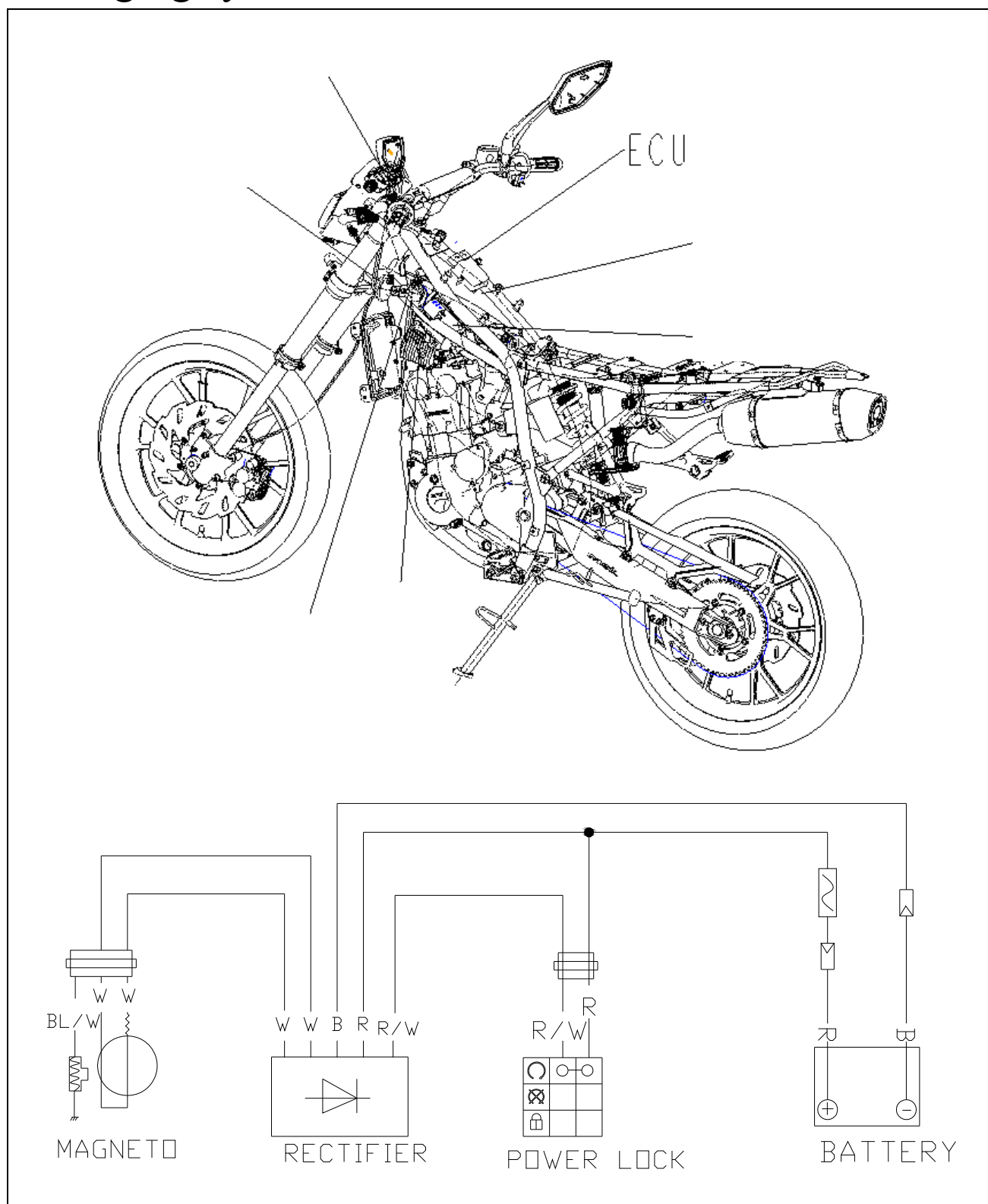
Do the verse steps as disassembly

Install drive, hull, rear shock absorber(left), rear wheel and drive chain sleeve

Adjust slackness of drive chain and free travel of brake footstep. If the slackness is too small, engine and other important parts will overload. Make sure the slackness in the scope of limit value.



Charging system



V Storage Battery/Charging System

Preparatory data-----5.1	Fault diagnoses-----5.2
Battery-----5.3	Charging system-----5.4
Voltage/current adjuster-----5.5	Alternator charge coil-----5.6
Alternator light coil-----5.7	Disassembly of alternator-----5.8

5.1 Preparatory Data

Precautions on operation

* Attentions

1. The battery can be charged and discharged, and used repeatedly. If a battery is laid aside after discharging, its service life will be shortened and its performance is degraded. Performance of a battery is usually reduced after about 2-3 years' run. Voltage of the performance-reduced (capacity drops) battery can be resumed, but the voltage will run down quickly while loading.
2. Overcharging of battery: Usually overcharging is demonstrated by the battery itself. If short circuit occurs inside the battery, there will be no voltage or very low voltage on the terminals of the battery. Adjuster fails: it indicates too high voltage on the battery, the life-span of the battery will be shortened.
3. When the battery is not be used for a long period, it will self-discharge and its capacitance will drop. The battery should be recharged every three months.
4. Charging system inspection: please perform inspection in the sequence listed in the fault diagnosis table.
5. If there is current going through the electric part, please do not remove the connector, or the voltage will be very high and electronic components inside the voltage adjuster will be damaged. Set ignition switch at "Off" position and then begin your operation.
6. It is not necessary to inspect maintenance-free (dry-charged type) battery. You don't need to add electrolyte and distilled water for it.
7. Inspect the entire electric load.
8. Quick charging is forbidden except in emergency.
9. During quick recharging, the battery must be removed from the motorcycle and recharged.
10. While battery is exchanged, please do not use liquid-feeding battery.
11. A voltmeter shall be employed to check recharged battery.

Preparatory Standard

Item			Specification
Battery	Capacity/type		12V-6AH/ Dry-charged type
	Voltage (20℃)	Fully recharged	13.1V
		Must be recharged	12.3V (not work for one hour)
	Recharging current		Standard: 0.9A, Quick: 9A
	Recharging time		Standard: 10-15hours; Quick: 30minutes
Magneto	Max. capacity		100W/8000rpm
	Coiling impedance value (20℃)		White-white 0.5-10Ω
Voltage regulator	Type		Full-wave rectification
	Battery recharging voltage		14.5V±0.4V/5.000rpm

Tightening torque

Rectifier bolt	5.0 N·m
High-voltage coil pinch bolt	9.0 N·m

Tools

Universal non-adjustable spanner
Flywheel remover
Testing device
Multimeter

5.2 Fault Diagnosis

No power

Battery over discharged
 Lead wire of battery is not connected.
 Fuse is broken.
 Power switch is poorly contacted.

unstable power

Lead wire of battery is poorly contacted.
 Discharging system is of poor contact.
 Lighting system is of poor contact or short circuit.

Low voltage

Battery is poorly recharged.
 Poor contact.
 Poor charging system
 Bad voltage and current adjuster

Poor charging system

Wire connector is of poor contact, short circuit or short line.
 Defective voltage and current adjuster
 Magneto does not work well.

5.3 Storage Battery

5.3.1 Battery Removal

Open seat cushion

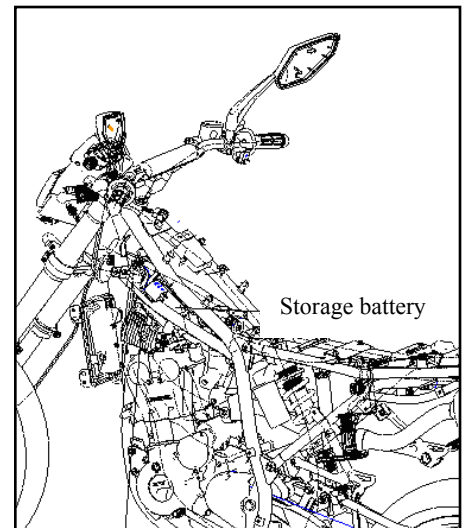
Disassemble left guard board

Disassemble negative guide line first and then the positive guide line

Take out storage battery

Warning!

During positive lead wire disconnection, be sure to prevent the tools being used from touching the frame; or it will result in short circuit sparks, which may ignite gasoline and damage battery. It is dangerous!



Install the battery in the reverse order of removal.

***Attention**

To avoid short circuit, please connect positive (+) lead wire first, then the negative (-) lead wire.

Check of charging situation (open-circuit voltage)

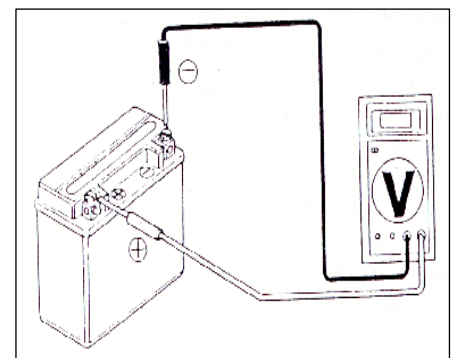
Open seat cushion

Open air filter's cover and disassemble storage battery joint guide line

Measure voltage between terminals of the battery

Fully charged: 13.1V

Undercharged: 12.3V (battery does not work for 1hour)



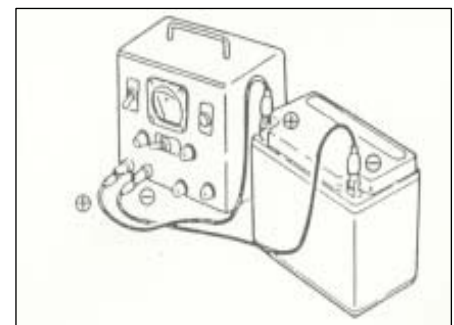
*** Attention**

A voltmeter shall be employed to check recharged battery.

5.3.2 Charging

Connection method:

Positive pole of battery charger is connected to battery positive lead wire; Negative pole of battery charger is connected to battery negative lead wire.



Warning!

- Battery shall be away from fire.
- Shut off charger switch first before or after charging in case sparks may be generated at connection parts, which may result in explosion.
- During charging, please take the current time labeled on the battery as basic time.

*** Attention**

- Battery quick recharging is not recommended except in case of emergency.
- After recharging, wait at least 30minutes and then measure the battery voltage.

Recharging current: Standard: 0.4A

Quick charging: 4.0A

Recharging time: Standard: 10-15hours

Quick recharging: 30minutes

Recharging completed: Open circuit voltage: over 12.8V

5.4 Charging System

5.4.1 Short circuit test

Disconnect the grounding wire from the battery and use a voltmeter to connect battery negative lead wire with grounding wire. Set the switch at OFF position and check if it is shorted.

*** Attention**

Positive lead wire of multimeter is connected to negative lead wire of battery.

If abnormality found, check if there is short circuit on ignition switch and main wiring.

5.4.2 Charging state inspection

While inspection, battery shall be fully charged and a multimeter be used for the test.

Warm up the engine and then install fully charged battery onto the motorcycle.

Connect voltmeter between terminals of the battery.

Remove the main fuse and connect ammeter between the two terminals.

Start engine and slowly raise RPM. Measure limited voltage and current.

Limited voltage/rpm: 14-15V (5.000rpm)

If limited voltage is beyond the specified range, check voltage regulator.

Inspect limited voltage in lighting system.

*** Attention**

Set multimeter to position of AC voltage

Limited voltage: 13.1 (+/-) 0.5V/5.000rpm

If limited voltage is beyond the specified range, check voltage-current regulator.

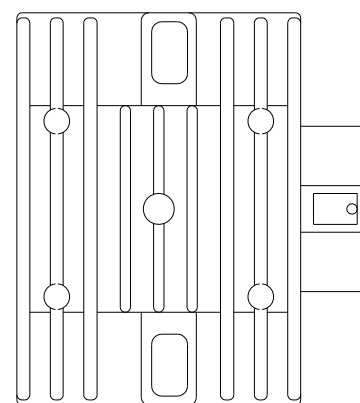
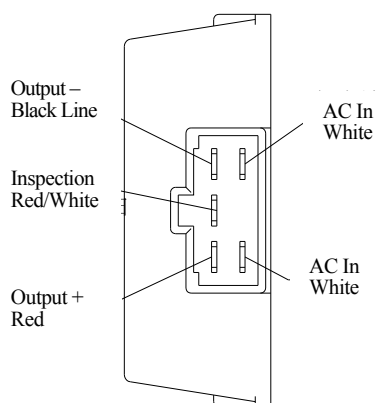
5.5 Voltage-current Regulator

1.5.1 Loop inspection on main wiring terminals

Disconnect the 6P plug on the voltage-current regulator.

Check continuity between main wiring terminals in the following way:

Item (wire color)	Judgment
Battery (red) and ground of vehicle block	It is battery voltage.
Ground wire (black) and ground of vehicle block	There is a lead wire.
Charging coil (white) and ground of vehicle block	No power flowing between magneto coil and ground
Between charging coils (while 1 and white 2)	There is resistance between coils



5.5.2 Voltage-current regulator inspection

When main wiring terminal is normal, check if plug of voltage-current regulator is of poor contact and measure impedance value between terminals of voltage-current regulator itself.

* Attention

- Do not touch the metal part of multimeter probe with your finger.
- Check with a multimeter. If impedance values measured by different multimeters are not the same, it perhaps the inspection is not correct.

When impedance value between terminals is abnormal, replace voltage regulator.

Multimeter + -	White1	Red/white	Red	Black	White2
	Unit: MΩ				
White1		No	No	0.1~3	10~90
red/white	No		No	0.1~3	No
Red	0.1~3	No		1.2~5	0.1~3
Black	No	No	No		No
White2	60~80	No	No	0.1~3	

5.6 Alternator Charging Coil

* Attention

Inspection of alternator charging coil can be performed on the engine.

Inspection

Disassemble alternator 4P joint

Measure Alternator white coil and impedance between bodies with multimeter

Standard value: 0.6-1Ω (20℃)

If measured value exceeds the standard, the alternator coiling shall be replaced.

5.7 alternator light coil

* Attention

Inspection of alternator charging coil can be performed on the engine.

Inspection

Measure Alternator white coil and impedance between body bondings with multimeter

Standard value: 0.6-1Ω (20℃)

If measured value exceeds the standard, the alternator coiling shall be replaced.

5.8 disassembly of alternator

5.8.1 Disassembly

Disassemble fixed bolt and bolt

Take down left cover

Fix flywheel with universal fixed wrench

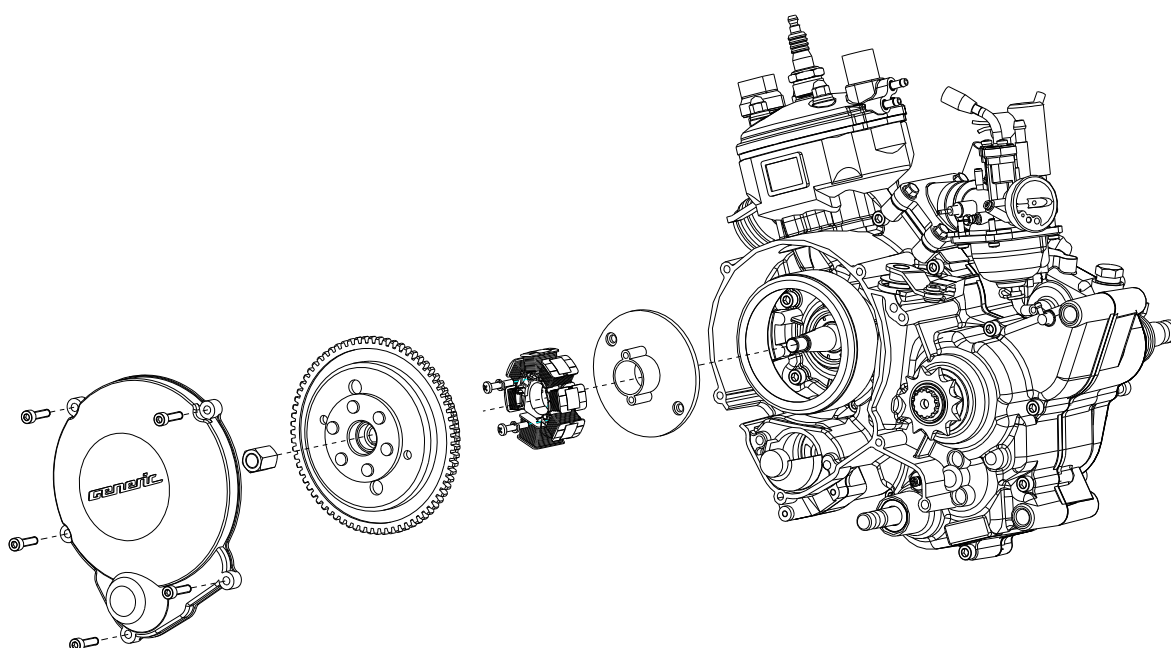
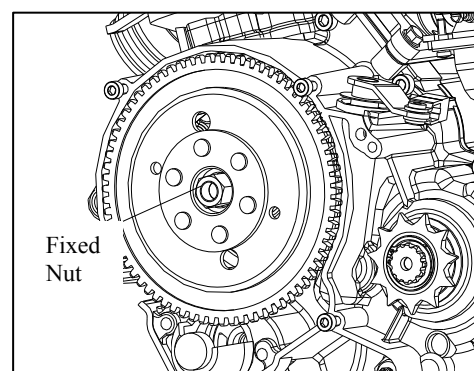
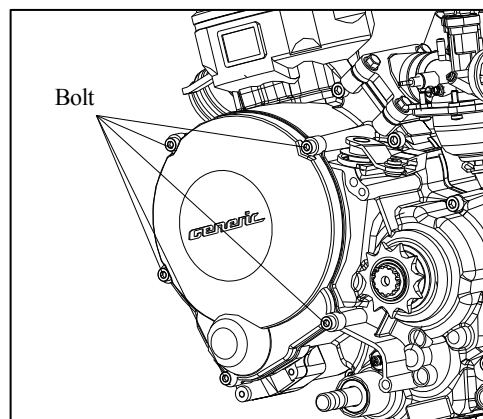
Disassemble flywheel fixed nut

Take down flywheel with flywheel puller

Disassemble solid key

Disassemble alternator guide line joint

Disassemble alternator stator



5.8.2 Installation

Install the alternator stator onto the engine box.

Connect lead-wire connector alternator.

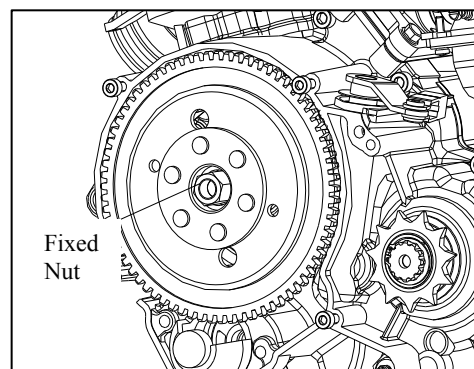
Clean crankshaft and conical part of flywheel.

Make sure the fixation key is installed into the key slot on the crankshaft.

Align the groove on the flywheel to the fixation key on the crankshaft.

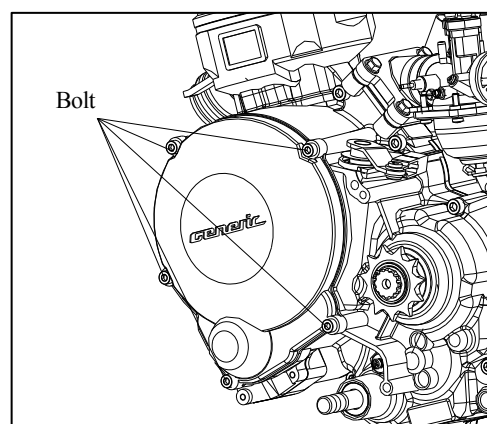
* Attention

There is magnetism on the inner surface of flywheel, ensure there is no bolt on it.

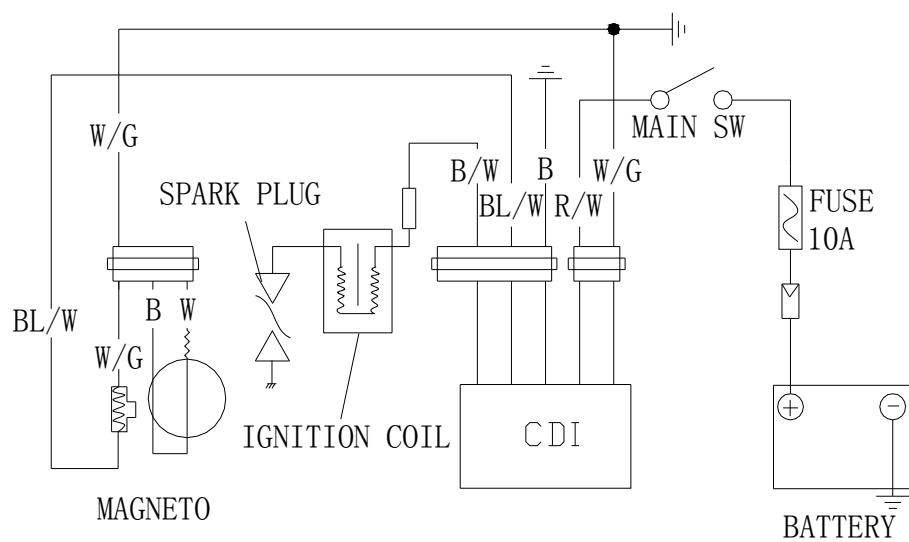
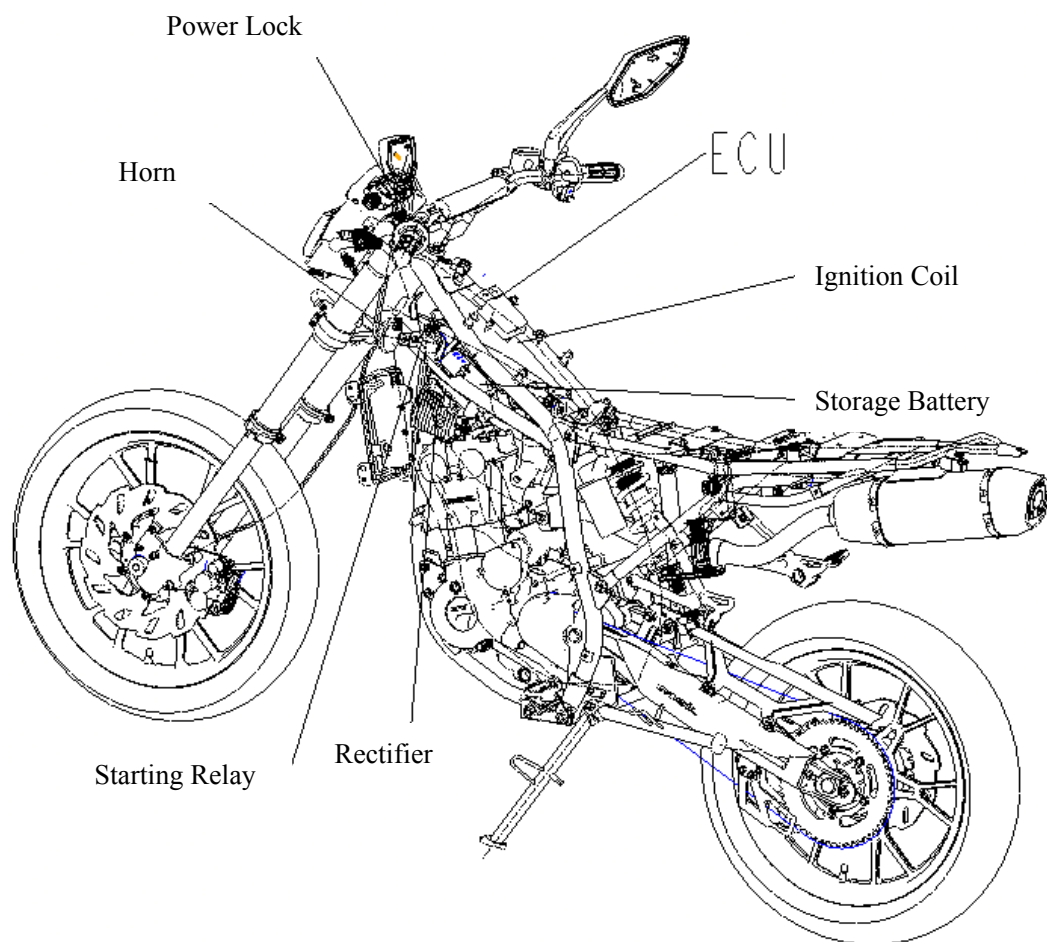


Fix the flywheel using a universal non-adjustable spanner and then tighten the locknut.

Torque value: 9.0 N·m



Install protecting plate on the left side.



VI Ignition System

Preparatory data -----6.1	Ignition coil
-----6.5	
Fault diagnosis -----6.2	Trigger
-----6.6	
Ignition system inspection ---- 6.3	Charging
coil----- 6.7	
CDI assembly -----6.4	

6.1 Preparatory Data

Precautions on operation

1. Ignition system inspection: please perform inspection in the sequence listed in the fault diagnosis table.
2. Ignition system uses electronic-type automatic timing device, which is solidified in the CDI assembly, so it is unnecessary to adjust the ignition time.
3. Ignition system inspection: please perform inspection in accordance with the sequence listed in the fault diagnosis table.
4. Ignition system CDI shall not be dropped and hung, or heavily knocked (this is also the main reason for its failure). Pay special attention to this while removing it.
5. Most of the ignition system problem due to poor contact of sockets. Please check first if parts of the connector are well contacted.
6. Check if heat value of spark plug is proper. Improper spark plug may result in unsmooth engine running or burn of spark plug.
7. The maximum voltage is taken to introduce inspection items in this Part. Inspection methods for impedance value of ignition coil are also recorded and judged.
8. Check ignition switch according to the continuity test table.
9. Remove alternator and stator on operation instructions.

Preparatory data

Item			Standard Value
Recommending spark plug	Standard		C5HSA(NGK)
	Hot type		C6HSA(NGK)
	Cold type		C7HSA(NGK)
Spark plug gap			0.5-0.7mm
Ignition coil impedance value (20□)	Primary coil		0.4Ω（+/-）10%
	Secondary coil	With spark plug cap	8-11KΩ
		Without spark plug cap	4.5-5.5KΩ
Impedance value of trigger (20□)			100-200Ω
Ignition coil primary peak voltage			95-400V
Trigger voltage			ABOVE 1.7V

Tools

**Accessory for voltmeter with maximum range
Multimeter**

6.2 Fault Diagnosis

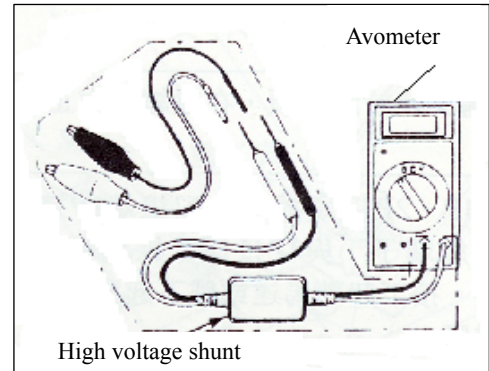
Spark plug not sparking

	Symptom	Possible causes (Determine the cause from 1 in sequence)
Ignition coil	When the high voltage power is too low.	<input type="checkbox"/> Inner impedance is too small. Use appointed tester to test. <input type="checkbox"/> Crankshaft rpm is too low. <input type="checkbox"/> Tester is disturbed (it is normal when more than one time's measured voltage is above the basic). <input type="checkbox"/> Wiring of ignition system is poorly contacted. <input type="checkbox"/> Ignition coil is no good. <input type="checkbox"/> Charging coil is bad. (Peak voltage measurement)
Secondary side voltage	While no high-voltage power supply, high voltage power is sporadic.	<input type="checkbox"/> Tester is wrongly connected. <input type="checkbox"/> Poor ignition switch. <input type="checkbox"/> Connector of CDI assembly is poorly contacted. <input type="checkbox"/> Ground wire for CDI assembly is shorted or poorly contacted. <input type="checkbox"/> Poor charging coil (Peak voltage measurement). <input type="checkbox"/> Defective trigger (Peak voltage measurement). <input type="checkbox"/> Connector of high voltage wire is not good. <input type="checkbox"/> Inferior CDI assembly (after items <input type="checkbox"/> - <input type="checkbox"/> are tested and proved abnormal or spark plug no sparking)
	High-voltage power is normal, spark plug no sparking.	<input type="checkbox"/> Inferior spark plug or secondary leakage of the ignition coil. <input type="checkbox"/> Bad ignition coil.
Charging coil	No high-voltage power supply	<input type="checkbox"/> Inner impedance is too small. Use appointed tester to test. <input type="checkbox"/> Crankshaft rpm is too low. <input type="checkbox"/> Tester is disturbed (it is normal when more than one time's measured voltage is above the basic). <input type="checkbox"/> Charging coil is bad. (when items <input type="checkbox"/> - <input type="checkbox"/> are proved normal)
	No high-voltage power supply or high voltage power is sporadic.	<input type="checkbox"/> Defective ignition coil. <input type="checkbox"/> Defective charging coil.
Trigger	When high-voltage power supply is too low.	<input type="checkbox"/> Inner impedance is too small. Use appointed tester to test. <input type="checkbox"/> Crankshaft rpm is too low. <input type="checkbox"/> Tester is disturbed (it is normal when more than one time's measured voltage is above the basic). <input type="checkbox"/> Trigger is bad. (when items <input type="checkbox"/> - <input type="checkbox"/> are proved normal)
	No high-voltage power supply or high voltage power is sporadic.	<input type="checkbox"/> Bad ignition coil. <input type="checkbox"/> Bad trigger.

6.3 Ignition System Inspection

* Attention

- When the spark plug is not sparking, check if components of wiring are loosened or badly contacted and make sure if all the voltage values are normal.
- There are many brands of multimeters with different interior impedance. The values they measured are not the same.



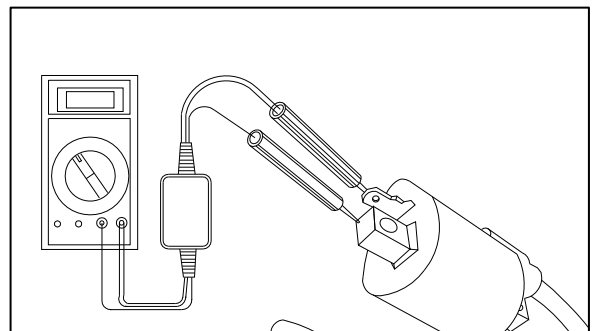
Connect a high-voltage shunt or an ammeter with input impedance higher than $10\text{M}\Omega$ 10CV to the multimeter.

6.3.1 Primary voltage of ignition coil

If an old spark plug is removed and replaced with a good one, ground it with engine.

* Attention

Test when wirings of all the circuits are correct.
Normal cylinder compression pressure means to test with spark plug installed on the cylinder head.



Disassemble central cover

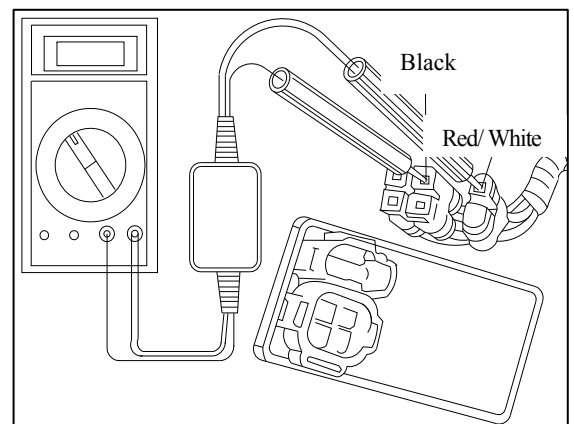
Connect lead wire of ignition coil; a shunt is connected between the terminal (black/white) of primary coil and the grounding vehicle block.

Press starting motor button or kick starting pedal to measure primary peak voltage of ignition coil.

Min. voltage: over 95V.

*Attention

Please do not touch the metal parts of testing probe with your fingers while measuring the voltage, or you will be shocked. Please take care.



6.3.2 Charging coil

*** Attention**

Install spark plug on the head of cylinder.
Check in the condition of normal
compression pressure

Disassemble 4P、2P joints of CDI group.

Connect high pressure shunt between 2P (red/white side) and 4P (black side).

Button start motor or step on actuating lever to measure the maximum voltage of charging coil.

Connection method: connect red/white with negative pole and black with black pole

Minimum voltage: more than 95V

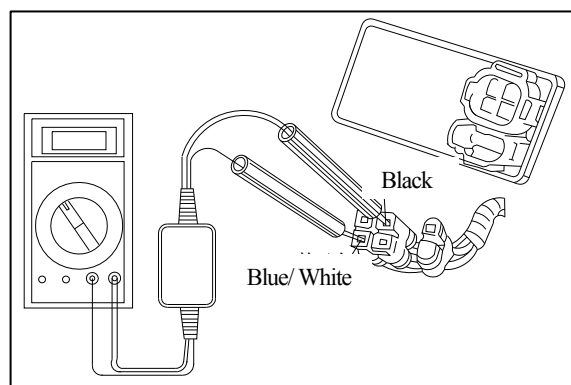
***Attention**

Fingers can not touch metal part of test
stick when measuring voltage. Special
attention should be taken when electric
shock may happen

When the maximum voltage of CDI group terminal is
abnormal, disassemble alternator joints.

Connect shunt with charging coil (red/white)

- When voltage is abnormal in CDI group while normal in alternator, joint is in bad contact or wiring is broken.
- That both are abnormal indicates badness of charging coil. Please refer to the check of charging coil meter.



6.3.3 Trigger

*** Attention**

Inspect when spark plug is installed on the
cylinder head and compression pressure is
normal.

Disconnect connector 4P from CDI assembly. A peak-voltage shunt is indirectly connected to the 4P connector
(black terminal) and 4P wiring-terminal connector of trigger (blue/white terminal). Press starting motor button
or kick pedal level to measure primary peak voltage of trigger.

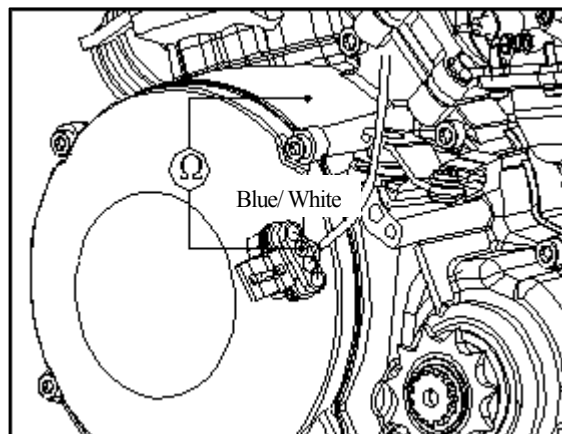
Connecting method: positive (+) to blue/white, negative (-) to black.

Min. voltage: higher than 1.7V.

*** Attention**

Please do not touch the metal parts of
testing probe with your fingers while
measuring the voltage, or you will be
shocked. Please take care.

When the peak voltage measured at connector of CDI assembly
is abnormal, take down the protecting plate on the right side of



vehicle and remove connector of alternator. Trigger (blue/white) is connected with a shunt.

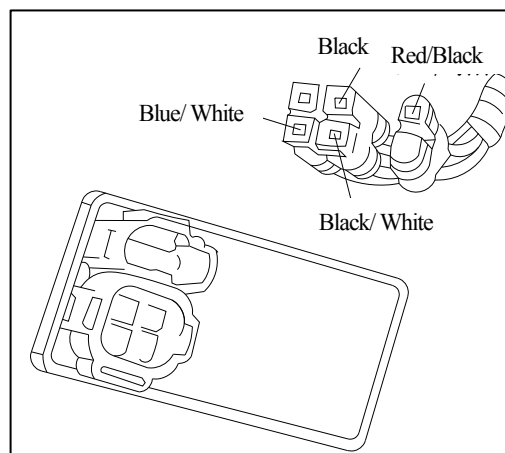
- When the measured voltage at CDI assembly terminal is abnormal, but measured voltage at alternator terminal is normal, it indicates that the connector is of poor contact or wiring is broken.
- When measured results at both sides are abnormal, the trigger is damaged. Please refer to items listed in Diagnosis Table and check.

6.4 CDI Assembly

6.4.1 System Inspection

System inspection

Remove CDI assembly and check components related to the ignition system at wiring terminal.



6.4.2 Inspection

Remove CDI assembly and check if connectors are loose or corrosive.

Item	Measuring terminal	Standard Value (20℃)
Main switch	Red—Red/White	On continuity when main switch is “OFF”.
Trigger	Red - Machine short cut	100-200Ω
Primary coil of ignition coil	Black/White—Black	0.4Ω (+/-) 10%
Secondary coil of ignition coil	Black—spark plug cap (not including spark plug)	4.5-5.5KΩ (+/-) 10%

6.5 Ignition Coil

6.5.1 Removal

Remove vehicle block cover.

Remove spark plug cap.

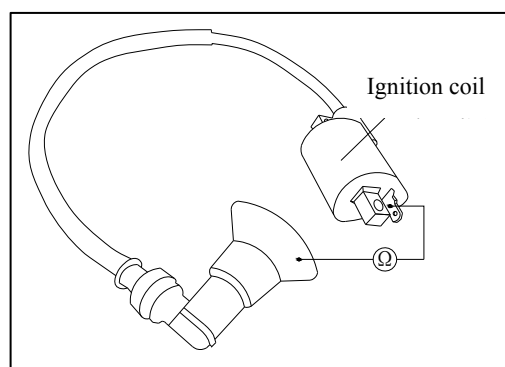
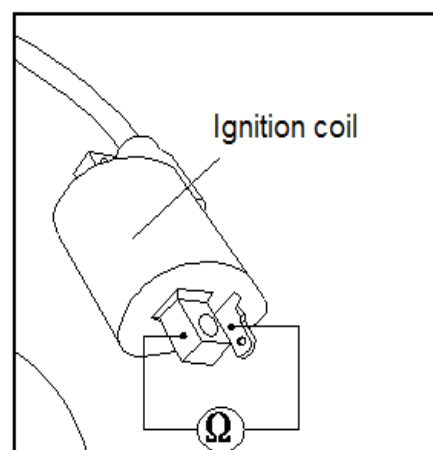
Remove primary lead wire of ignition coil.

Remove locknut of ignition coil and take out the ignition coil.

Install it in the reverse order of removal.

*Attention

The primary coil is installed with black/white wire connector.



6.5.2 Primary coil inspection

Measure the impedance between terminals of primary coil.

Standard value: $0.4\Omega \pm 10\%$ (20□)

Impedance value within the range is good.

Impedance value “ ∞ ” indicates broken wire inside the coil. The coil shall be replaced.

6.5.3 Secondary coil

Attached with the spark plug, and measure the impedance between lead-wire side of spark plug cap and terminal.

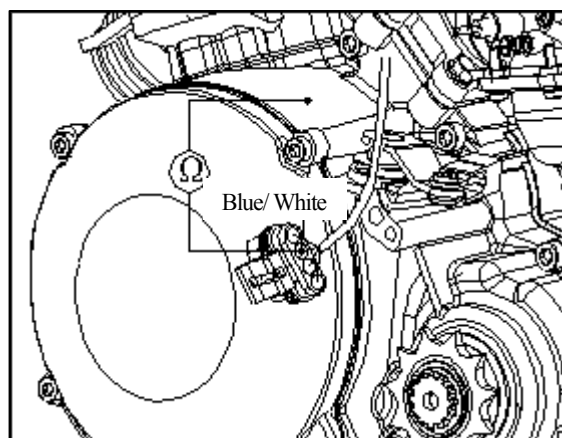
Standard value: $8-11K\Omega$ (20□)

Impedance value within the range is good.

Impedance value “ ∞ ” indicates broken wire inside the coil.

Remove the spark plug cap and measure impedance value between primary side lead-wire of ignition coil cap and negative terminal.

Standard value: $4.5-5.5K\Omega \pm 10\%$ (20□)



6.6 Trigger

* Attention

Trigger inspection can be performed on the engine.

Inspection

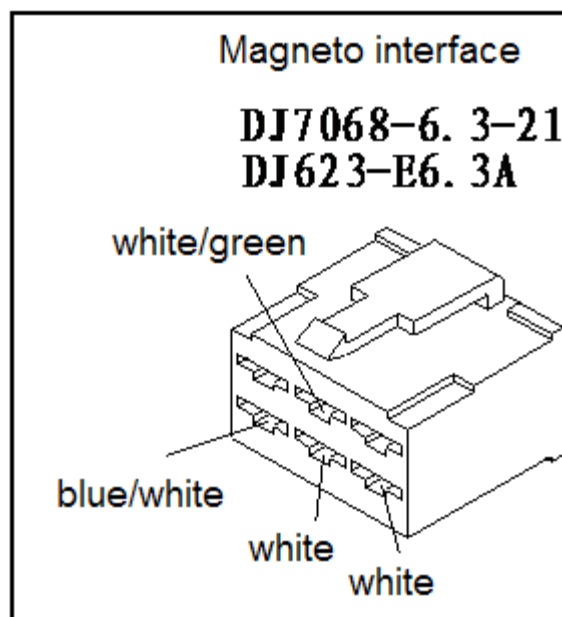
Remove protecting plate of vehicle block.

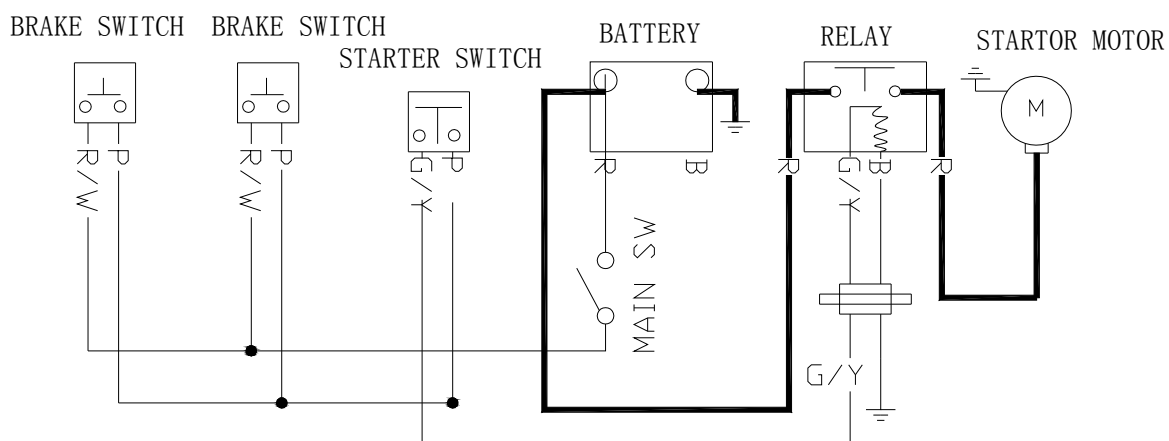
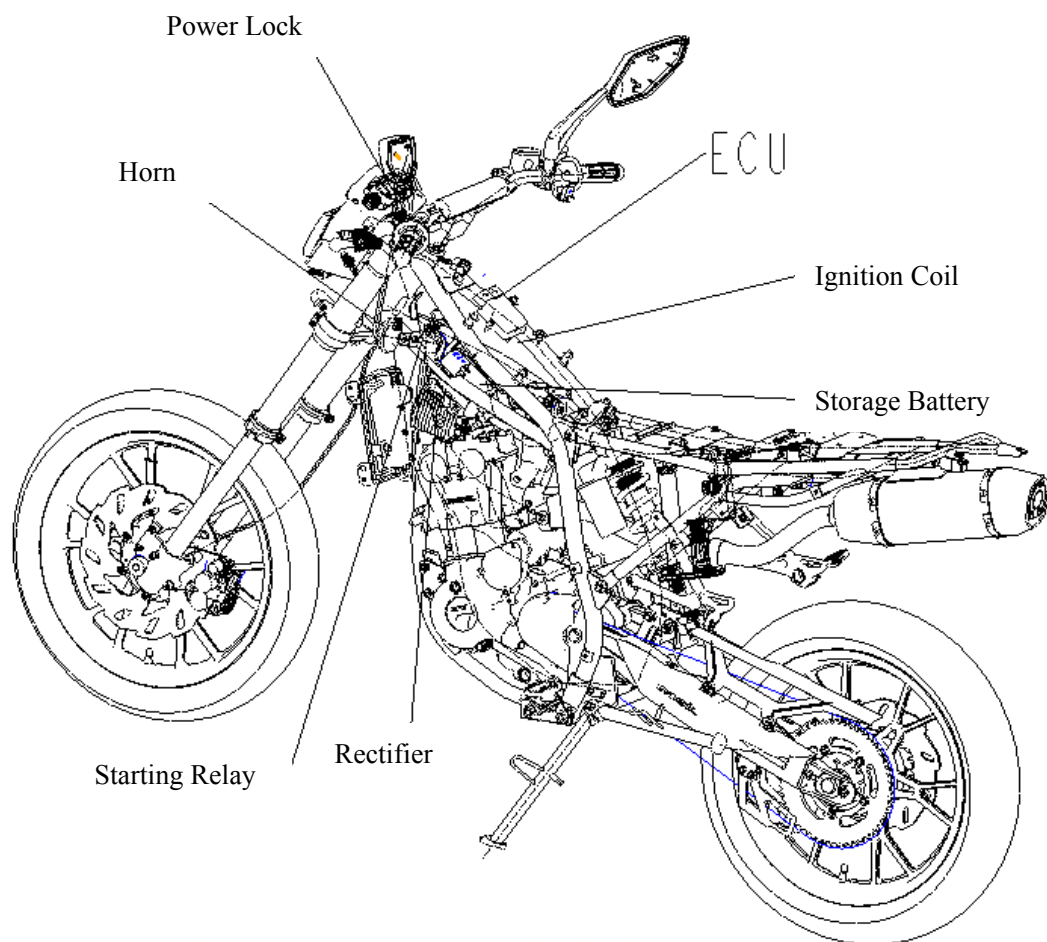
Remove lead-wire connector of trigger.

Measure the impedance between blue/white terminal of lead wire at engine side and grounding vehicle block.

Standard value: $100-200\Omega$ (20□)

If measured impedance value is beyond the range, please replace the alternator.





VII Starting System

Preparatory data----- 7.1

Fault diagnosis-----7.2

Starting motor-----7.3

Starting relay-----7.4

7.1 Preparatory Data

Precautions on operation

Starting motor removal can be performed on the engine.

Starting clutch removal refers to removal instruction.

Basic data

Item	Standard	Service Limit
Length of starting carbon brush	12.5mm	8.5mm
Starting idler shaft bushing		8.3mm
Starting idler shaft OD		7.94mm

Tightening torque

Starting motor clutch cap bolt **12 N·m**

Starting motor clutch locknut **95 N·m**

Tools

Locknut wrench

Universal un-adjustable wrench

7.2 Fault Diagnosis

Starting motor will not run not

- Broken Fuse
- Low battery
- Defective ignition switch
- Defective starting clutch
- Defective braking switch
- Defective starting relay
- Poor connecting wire contact
- Defective starting motor

Starting motor runs weakly

- Low battery
- Poor connecting wire contact
- Starting motor gear stuck by foreign substances

Starting motor runs but the engine does

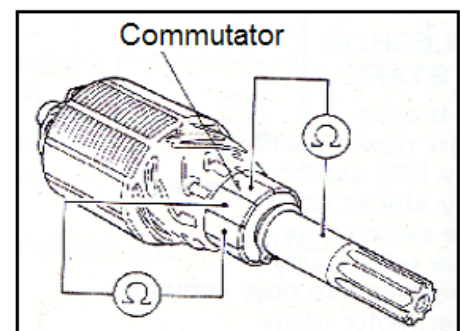
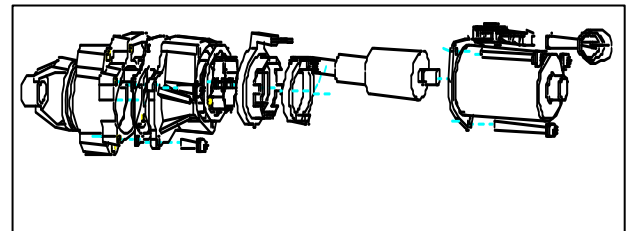
- Defective starting clutch
- Starting motor counter-rotate
- Low battery

7.3 Starting Motor

7.3.1 Removal

* Attention

Before removing starting motor, the ignition switch must be set at “OFF” position. Disconnect battery grounding wire and then turn on the power supply to check if starting motor runs to confirm your operation is safe.



First remove the lead-wire clip of starting engine.

Remove starting motor pinch bolt and take down the starting motor.

Roll up the rubber waterproof jacket and remove starting motor connector.

7.3.2 Disassembly

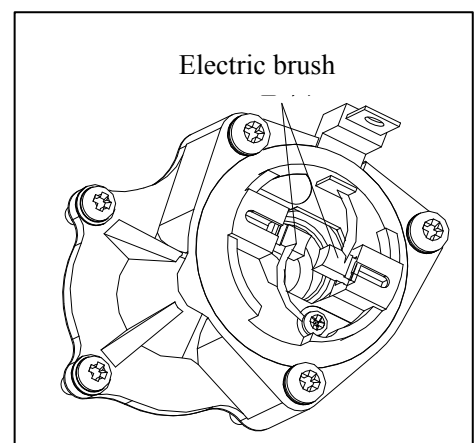
Disassemble housing screw, front cover, motor housing and other parts.

7.3.3 Inspection

Inspect other component assemblies.

Replace with a new one when there is surface partial friction, injuries or burn.

The commutator shall be cleaned when there is metal particles



adhered to its surface.

Inspect for continuity between contact surfaces of other assemblies.

Confirm the discontinuity of armature shaft among surfaces of commutator.

Inspect for continuity of starting motor housing.

Confirm the continuity between conducting terminal and starting motor housing.

Inspect continuity between conducting terminal and brush.

Replace it with a new one if abnormality exists.

Inspect carbon brush holder for continuity. If there is continuity, replace it.

Measure carbon brush length

Service limit: replace it when it is shorter than 8.5mm

Check rotation smoothness of the needle bearing in the front cover and whether it is loosened when it is pressed in.

If there is abnormality, replace it with a new one.

Check the oil seal for wear and injury.

7.3.4 Assembly

Apply lubricating grease on the oil seal in the front cover.

Install brush onto the carbon brush holder.

Apply lubricating grease on movable parts at both ends of brush shaft.

Press brush into its holder and install front cover of electrodes.

*** Attention**

- There should be no hurt on the contact surface of brush and armature. Take care.
- Installation shaft of armature cannot hurt lip of oil seal. Take care.

Install the new seat cushion ring on the front cover

Align and install the boss of motor housing to the recess of front cover.

Tighten housing screws.

*** Attention**

When assembling housing and front cover, armature can work as a magnet to easily pull the front cover up; and then gently press it down to complete the assembly.

7.3.5 Installation

Install lead wire of starting motor and be sure to install the dust seal.

Then install starting dynamo

Install rear brake wire clip.

7.4 Starting Relay

7.4.1 Actuation Inspection

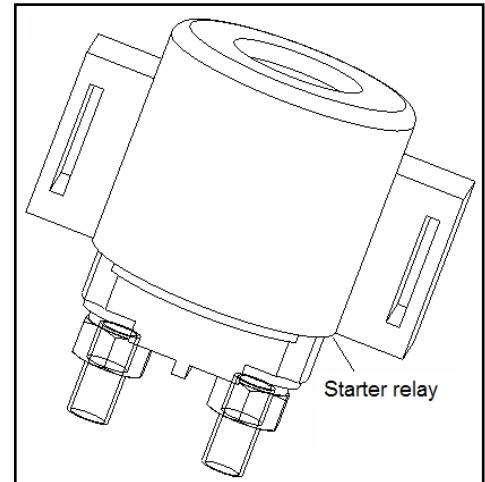
Take down the protecting plate of vehicle block.

When the ignition switch is set at “ON” position, press starting motor and a “Click” sound can be heard.

“Click” sound indicates normal.

No sound:

- Check starting relay voltage.
- Check starting relay ground wire loop.
- Inspect starting relay actuation.

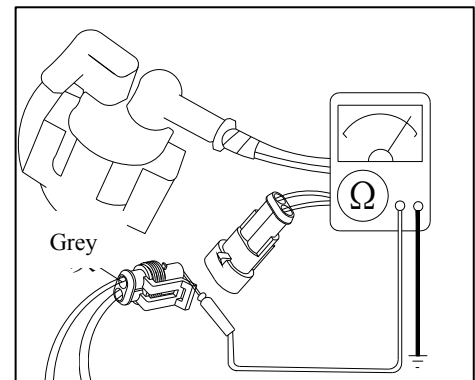


7.4.2 Starting relay voltage inspection

Lift and support the main stand. Measure the voltage between negative pole (green/yellow) of starting relay connector and vehicle ground wire.

Set ignition switch at “ON” position and catch the brake lever. Battery voltage shall meet the specified.

When there is no voltage at wire terminal of starting relay, inspect braking switch continuity and lead wire.



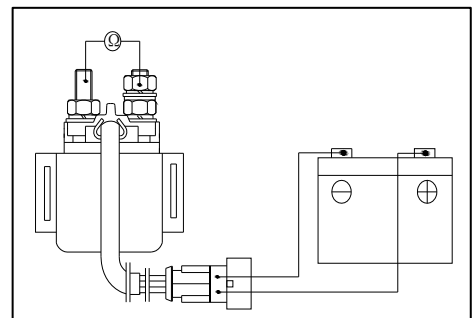
7.4.3 Starting relay ground loop inspection

Remove starting relay connector.

Inspect continuity between grey wire of connector terminal and vehicle ground wire.

When the starting button is pressed, continuity between grey wire of connector and vehicle ground wire shall be fine.

If there is no continuity, inspect starting button continuity and lead wire.



7.4.4 Actuation Inspection

Connect starting relay with battery and connect terminal of starting motor with multimeter.

Connect fully charged battery between black wire and green/yellow wire of relay. A “tap” sound of operation can be heard on the relay and resistance displayed by multimeter is zero.

VIII Bulbs/Switches/Instruments

Preparatory data-----	8.1
Fault Diagnosis -----	8.2
Headlamp Bulb Replacement -----	8.3
Front Turn Signal Lamp Bulb Replacement -----	8.4
Taillight/license plate lamp/rear turn-lamp bulb replacement--	8.5
Instrument -----	8.6
Master switch-----	8.7
Horn-----	8.8
Handle switch-----	8.9

8.1 Preparatory Data

Precautions on operation

Remove switches from the motorcycle and perform continuity test.

8.2 Fault Diagnosis

“ON” lamp of Ignition switch is not on.

- Bulb burnt.
- Defective switch.
- Poor contact of connector or broken wire.

8.3 Headlamp Bulb Replacement

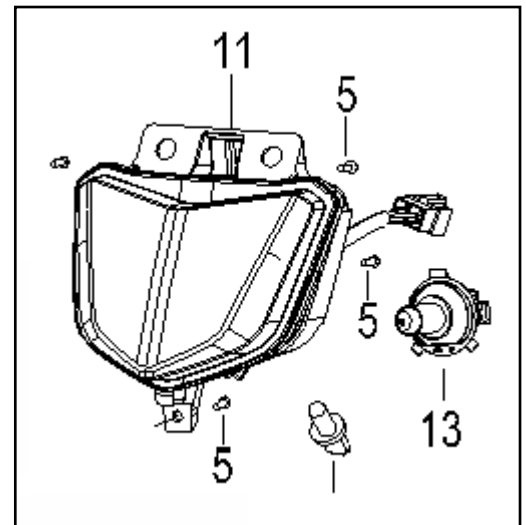
8.3.1 Removal

Disassemble pod

Disassemble blot to disassemble headlamp

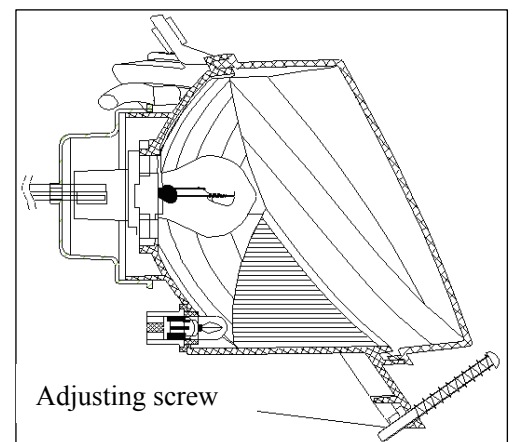
Disassemble sheet glass of headlamp

Fix headlamp and rotate socket in clockwise to disassemble bulb.



8.3.2 Installment

Install bulb back in the verse order of disassemble.



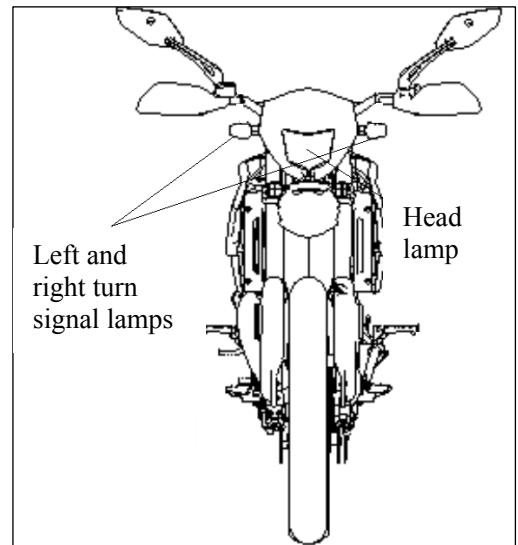
8.4 Front Turn Signal Lamp Bulb Replacement

8.4.1 Removal

Loosen turn signal lamp fixed bolt
Take down bulb from bulb socket

8.4.2 Installation

Install bulb back in the verse order of disassemble.



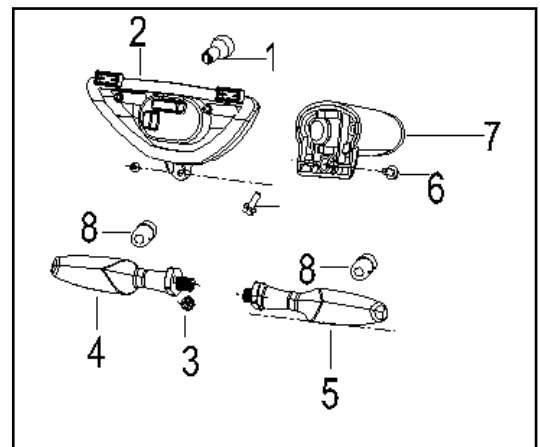
8.5 Taillight/license plate lamp/rear turn-lamp bulb replacement

8.5.1 Disassembly

Disassemble bolt and taillight shade.
Disassemble bulb from socket

8.5.2 Installment

Install bulb back in the verse order of disassemble.



8.5.3 Rear turn signal lamp replacement

8.5.3.1 Disassembly

Disassemble bolt and taillight shade.
Disassemble bulb from socket

8.5.3.2 Installment

Install bulb back in the verse order of disassemble.

8.6 Instrument

Remove rear mirror.

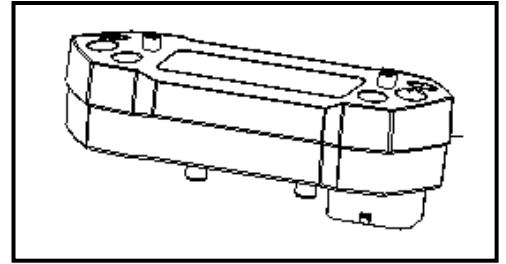
Take down the handle hood and pull out waterproof connector.

Remove the bolts.

Remove meter housing

Remove the instrument.

Install the instrument orderly in the reverse order of removal.



8.7 Main Switch

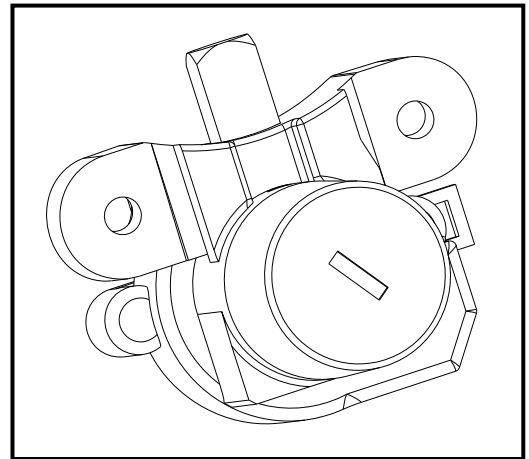
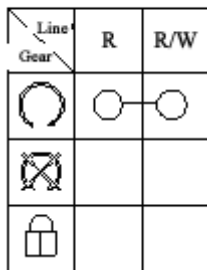
8.7.1 Inspection

Disassemble front guard board

Disassemble master switch guide line joint

Break over test of joint side

Wiring Diagram



8.7.2 Master switch replacement

Disassemble body front guard board

Disassemble fixed bolt and take down master switch fixed seat

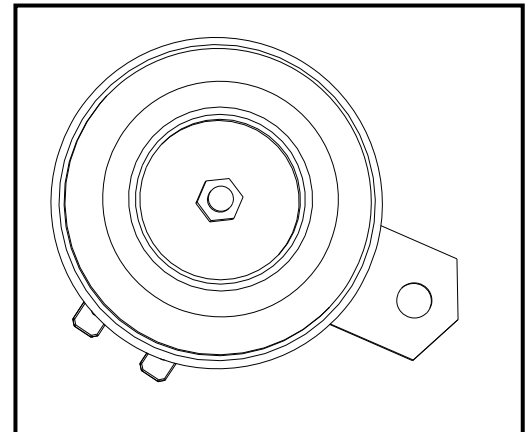
Disassemble fixed bolt and replace master switch.

8.8 Horn

Inspection

Disconnect wire to the electric horn.

Connect lead wire of horn with the battery. When the electric horn sounds, it indicates the horn is in good condition.



8.9 Handle switch

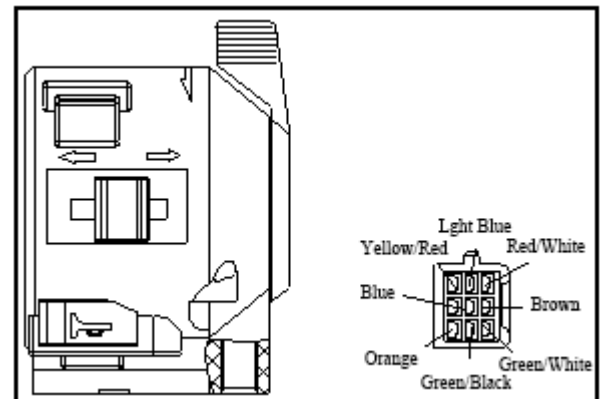
Remove protecting plate of steering handle.

Screw off mounting bolt on the brake lever and take down the bracket.

Remove bracket for the rear brake lever.

Remove throttle handle and bolts.

Take down throttle handle from the handle and remove the throttle cable.



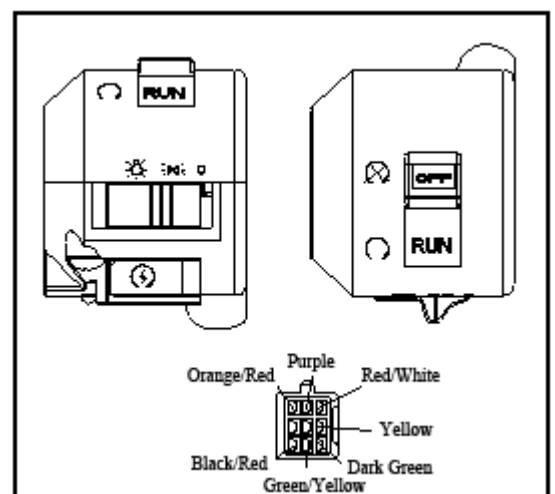
Remove locknut on the handle and take down the handle.

Wiring Diagram

Dimmer Switch				Turning Switch			Horn Button		Overtaking Button	
	Blue	Yellow/Red	Light Blue		Green/Black	Orange	Green/White		Brown	Red/White
	○	○			○	○			○	○
									PASS	○
		○	○			○				○

Wiring Diagram

Headlight Switch				Starter Switch			Cut-off Switch	
	Yellow	Red/White	Yellow/Red		Dark Green	Green/Yellow		Black/Red
	○	○	○		○	○		○
	○	○						○
								○

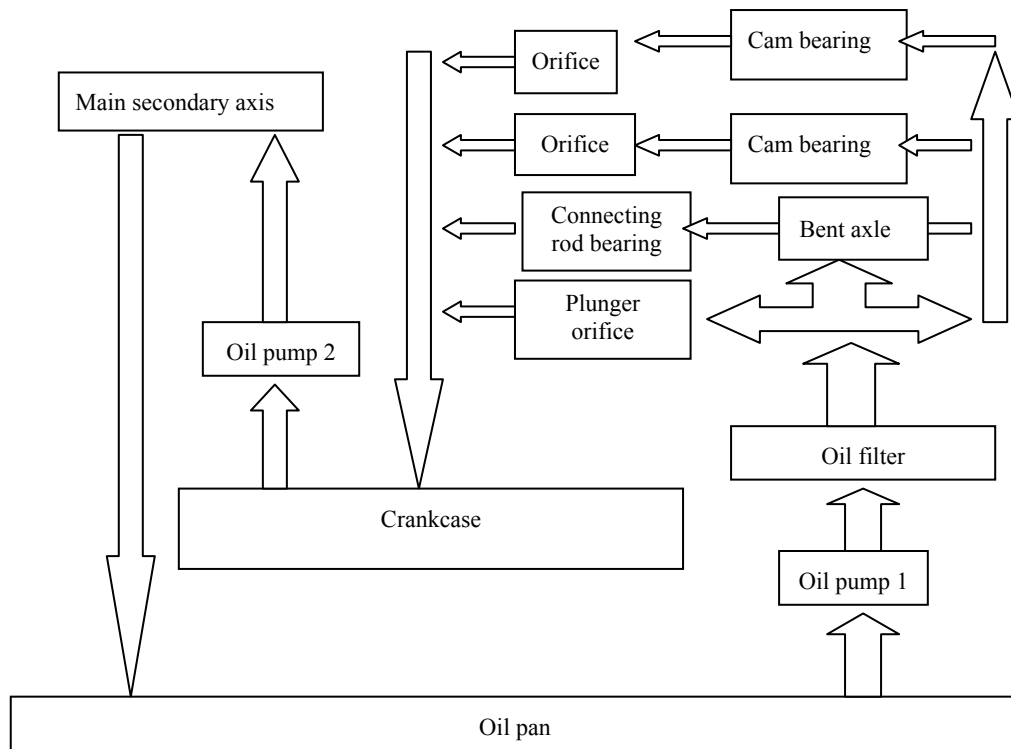


Engine Inspection and Maintenance

Table of tightening torque for fastening parts used in engine

Table of tightening torque for fastening parts	
Names of fastening parts and fasteners	Fastening torque (N·m)
Cylinder head cover screw M6	10-14
Cam cover fastening screw M5	7
Cylinder head cover screw M6	12
Cylinder head cover acorn nut M8	25-28
Cylinder stud bolt M8	25-28
Tensioner fastening screw M6	10
Chains leading fastening screw M8	8
Oil pipe set bolt M8	10
Thermostat fastening screw M6	7
Induction manifold fastening bolt M6	7
Flywheel locking hexnut M12	55
Starting engine set bolt M6	8
Clutch transmission gear jam nut M16	70
Clutch jam nut M16	70
Gearshift star-wheel fastening screw M6	8
Gearshift positioning wheel rocker arm fastening screw M6	8
Mould assembling screw M6	10
Left and right crankcase cap bolt M6	10
Cylinder head cover fastening screw M6	8
Water pump cover fastening screw M6	8
Machine oil strainer cover M6	8
Engine cover fastening screw M6	7
Machine oil strainer plug screw M20	25
Oil pump cover fastening screw M6	8
Coil fastening screw M6	8
Output sprocket nut M18	72
Spark plug M10	10-15
Water temperature sensor M12	16
Magnetic bolts M12	15

Lubricating System Chart



IX Lubricating System

Preparatory data-----9.1

Fault diagnosis-----9.2

Oil engine pump-----9.3

9.1 Preparatory Data

Function of lubricating system:

Function of engine lubricating system is to supply lubricating oil to friction surfaces of engine parts so that dry surface friction will turn to liquid friction between plasmids of lubricating oil. It is used to reduce wear of component, cool components of higher heat, absorb impact from bearing and other parts, weaken noise, increase tightness between piston ring and cylinder wall, clean and take away impurities from surface of component, etc.

Precautions on Operation

When engine oil pump is removed, clean carefully all the components and purge them with high-pressure gas. During engine oil pump removal and installation, pay attention not to drop anything into the crankcase.

Table of standard values of baseline projects and allowable limit

Item			Standard	Service Limit
Engine oil capacity	Oil replacement		1L	-
	Engine overhaul		1.2L	-
Oil pump rotor	Radial clearance between inner and external rotors	Oil pressure pump	0.025-0.175	0.23
		Oil suction pump	0.025-0.175	0.23
	Clearance between external rotor and pump block	Oil pressure pump	0.11-0.163	0.22
		Oil suction pump	0.11-0.163	0.22
	Clearance of rotor end face	Oil pressure pump	0.05-0.11	0.15
		Oil suction pump	0.05-0.11	0.15

9.2 Fault Diagnosis

Reducing engine oil

Natural consumption

Oil leakage

Engine burnt

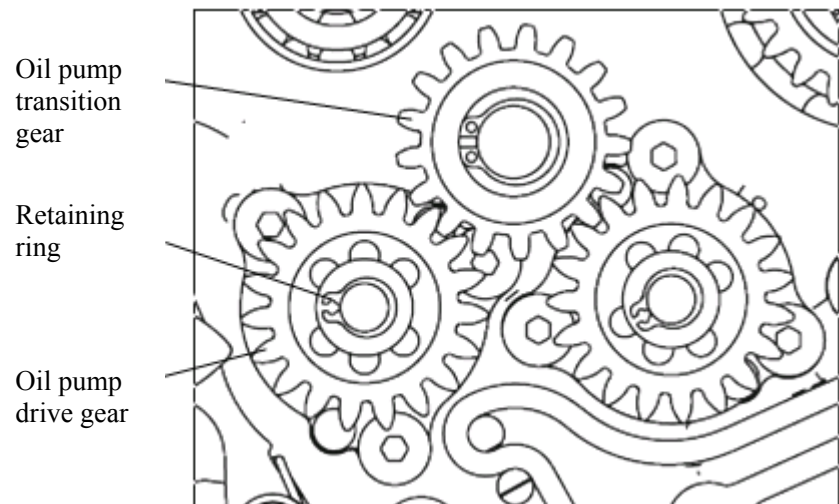
No oil pressure or too low oil pressure

Oil way clogged

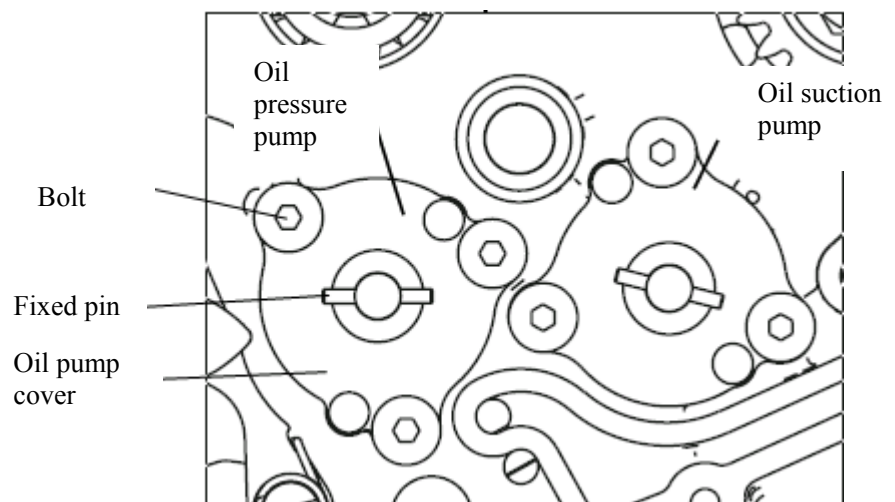
9.3 Oil Pump

Disassembly

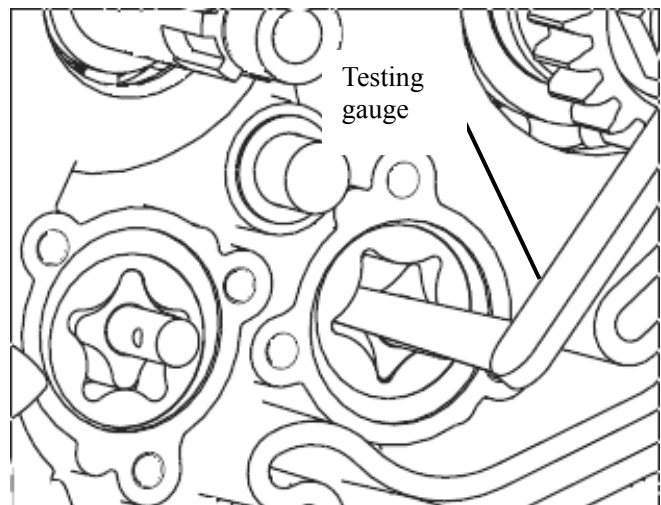
Remove the right cover, the clutch, and the retaining ring, and then remove the oil pump gears and oil pump transition gear;



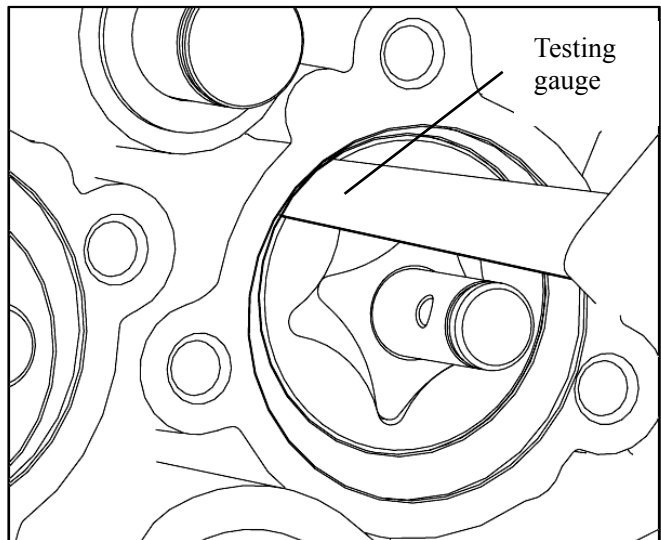
Remove the fixed pin, the screw and the pup cover, and disassemble the oil pump;



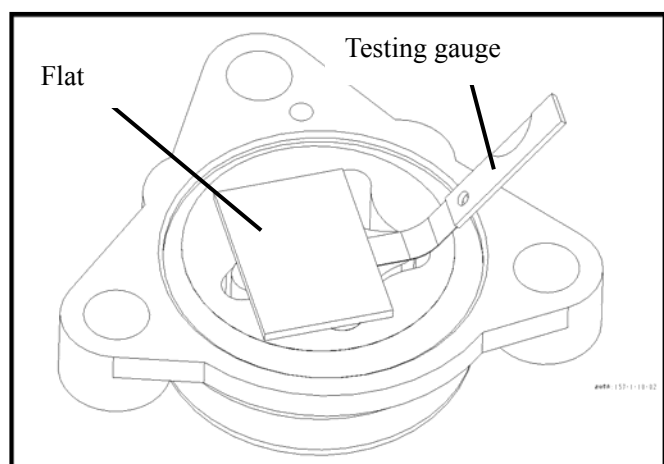
Check the radial clearance between the inner
and outer rotor
Allowable limit: 0.15 mm



Check the clearance between the outer rotor
and pump body
Allowable limit: 0.15 mm

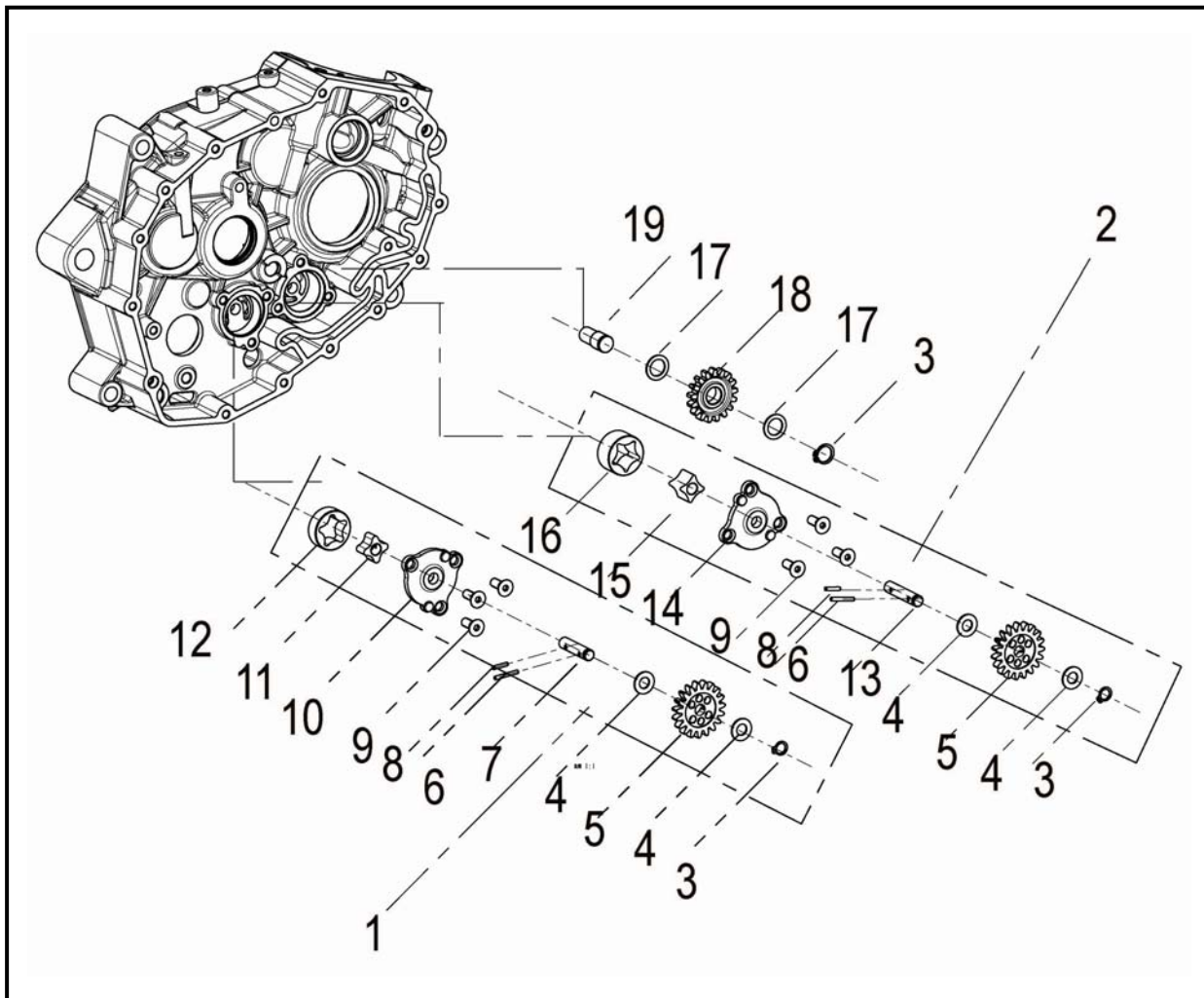


Check the clearance between the rotor ends
Allowable limit: 0.15 mm



Assemble Engine Oil Pump

As shown in the following figure:



1 Oil suction pump assembly 2 Oil pressure pump assembly 3 Retaining ring 4 Gasket 5 Oil pump gear
6 Fixed pin 7 Oil suction pump shaft 8 Pin 9 Bolt M6x16 10 Oil pump cover 11 Inner rotor 12 Outer
rotor 13 Oil pressure pump shaft 14 Oil pump cover 15 Inner rotor 16 Outer rotor 17 Gasket 18 Oil
pump transition gear 19 Transition gear shaft

* Attention:

After assembly, inner and external rotors shall rotate smoothly and be out of nimbleness.

Installation

Install the oil pump in the reverse order of removal.

X Cooling system

Preparatory data-----	10.1
Fault diagnosis-----	10.2
Water pump-----	10.3

10.1 Preparatory data

Functions of cooling system:

It can build some channels which can allow liquid circulation inside the cylinder and the inner wall of the cylinder cover; a special radiator is set outside the engine body so that the forced circulation of cooling water can be made through water pump and pipeline, and then the heat of the engine can be released to cool it through air blowing the surface of the cooling fin of the radiator at high speed.

10.2 Fault diagnosis

Water leakage

Seal ring damaged

Pump body broken

Water pipe breakage

Over-high temperature of cylinder body

Water pump impeller damaged

Radiator fan broken

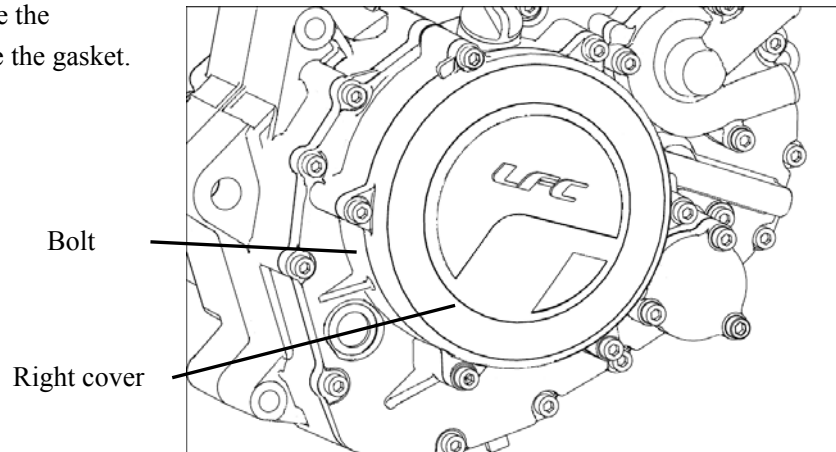
Lack of cooling liquid

Temperature sensor damaged

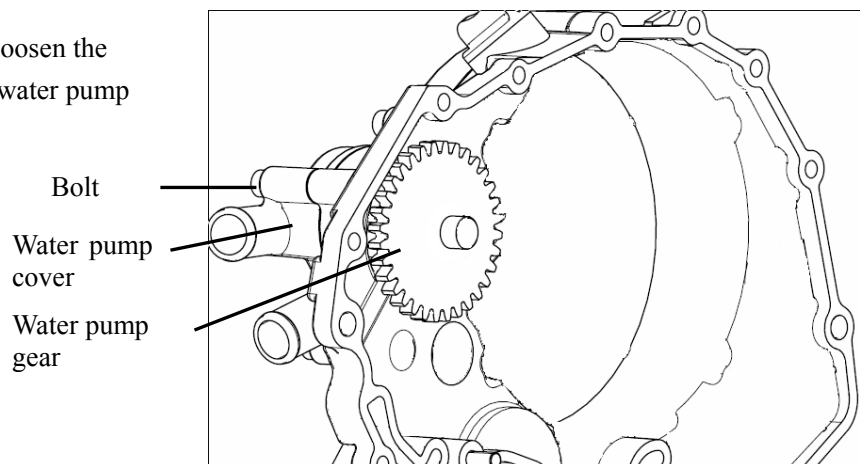
10.3 Water pump

Disassemble

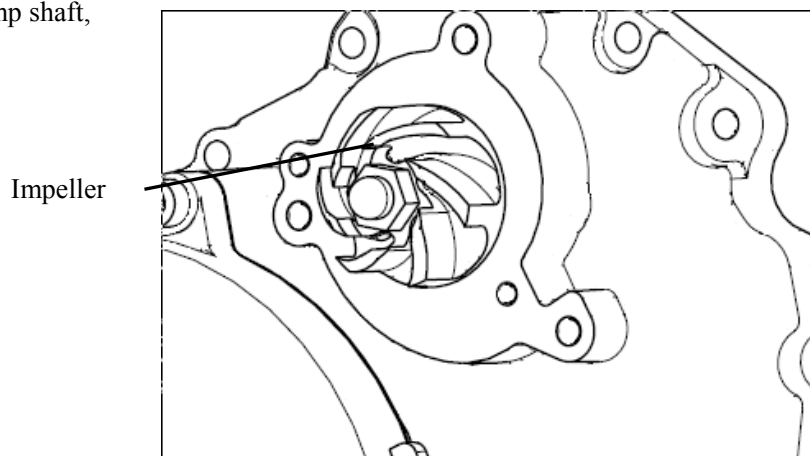
Loosen the fastening bolt, remove the crankcase right cover and remove the gasket.



Remove the water pump gear, loosen the Fastening bolt and remove the water pump cover and the gasket.



Remove the impeller, the water pump shaft, the water seal assembly, etc.



Inspection

Check whether the parts wear.

If badly worn, replace it.

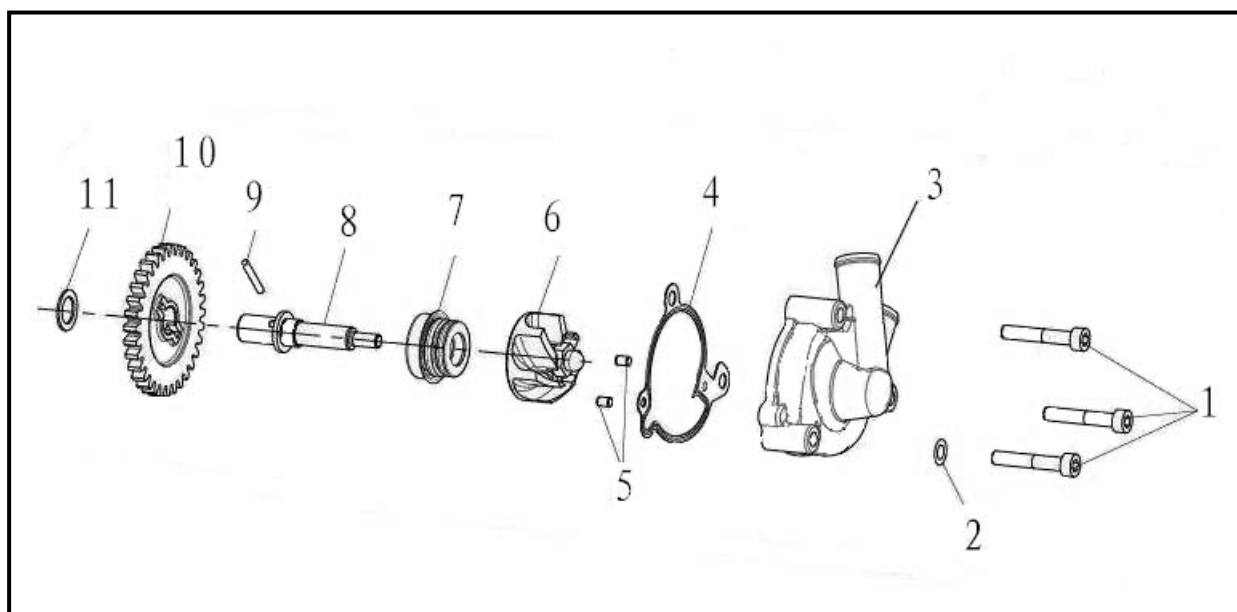
Note:

No damage should be made to the gasket and the box joints in operation.

Installation

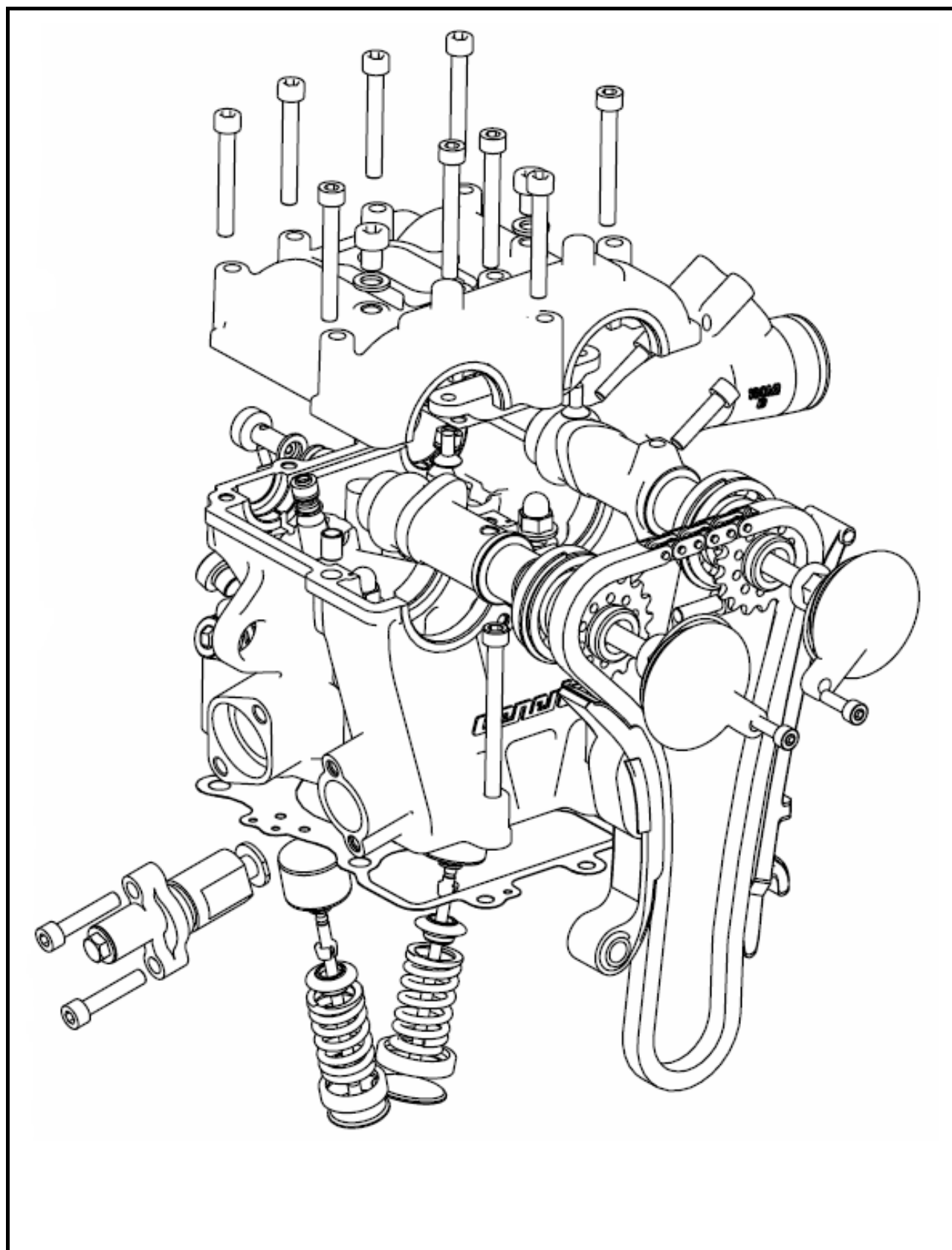
Installation should be made in accordance with the reverse order of the removal.

Water pump disassembling



1 Hexagon socket cylinder bolt 2 Gasket 3 Water pump cover 4 Water cover seal gasket 5 Pin
6 Impeller 7 Water seal assembly 8 Water pump shaft 9 Pin3*22 10 Water pump gear 11 Gasket

Cylinder head



XI Cylinder Head

Preparatory data	11.1
Fault diagnosis	11.2
Cylinder Head/Valve	11.3

11.1 Preparatory Data

Function of cylinder head:

Cylinder head is used to seal cylinder and form a combustion chamber with piston to hold high-temperature and high-pressure fuel gas. It accomplishes air intake and exhausting operation with valve mechanism.

Precautions on Operation

To ensure sealing between cylinder head and cylinder body, there is a great bolt pretension on the cylinder head. Pre-tightening force value 12 N·m; Locking force value: 30 N·m.

All the components shall be cleaned before inspection and test, and purged with high-pressure air.

Table of standard values of baseline projects and allowable limit Unit: mm

Item			Standard	Service Limit
Cylinder cover flatness			0.03	0.05
Valve Valve guide	Valve clearance	Intake	0.15-0.2	-
		Exhaust	0.2-0.25	-
	Valve stem OD	Intake	4.47-4.48	4.455
		Exhaust	4.455-4.47	4.448
	Valve guide ID	Intake	4.5-4.512	4.53
		Exhaust	4.5-4.512	4.53
	Clearance between valve stem and valve guide	Intake	0.02-0.042	0.075
		Exhaust	0.03-0.057	0.082
	Valve race width	Intake	0.9-1	1.6
		Exhaust	1-1.1	1.6
Valve spring	Free length	Intake	39.5	37
		Exhaust	39.5	37
Cam shaft	Fit clearance between the cam shaft and the cylinder head		0.02-0.054	0.08

11.2 Fault Diagnosis

Low compression pressure

Improperly adjusted valve clearance
Valve burnt or bent

Poorly sealed valve race

Air leakage at cylinder head
Improperly installed spark plug

Noisy cylinder head

Improperly-adjusted valve clearance
Valve spring hurt

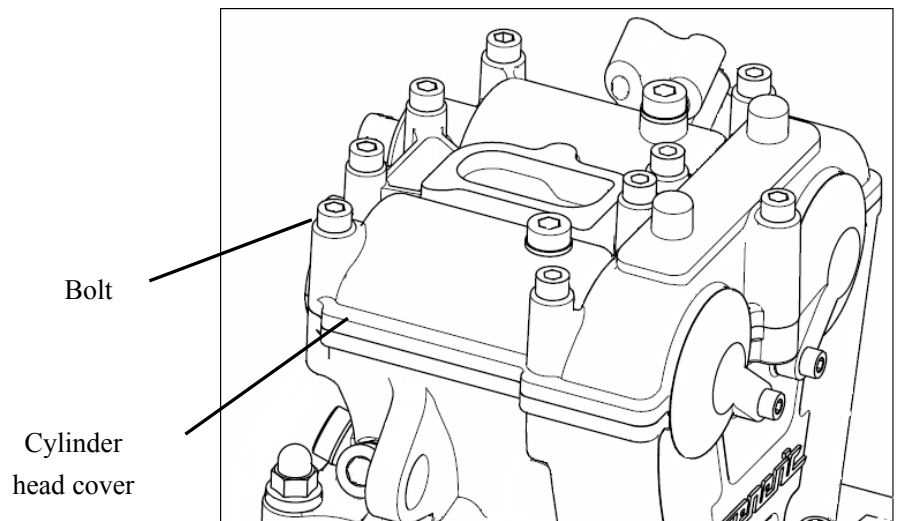
Over-high compression pressure

Too much carbon deposited in the combustion chamber

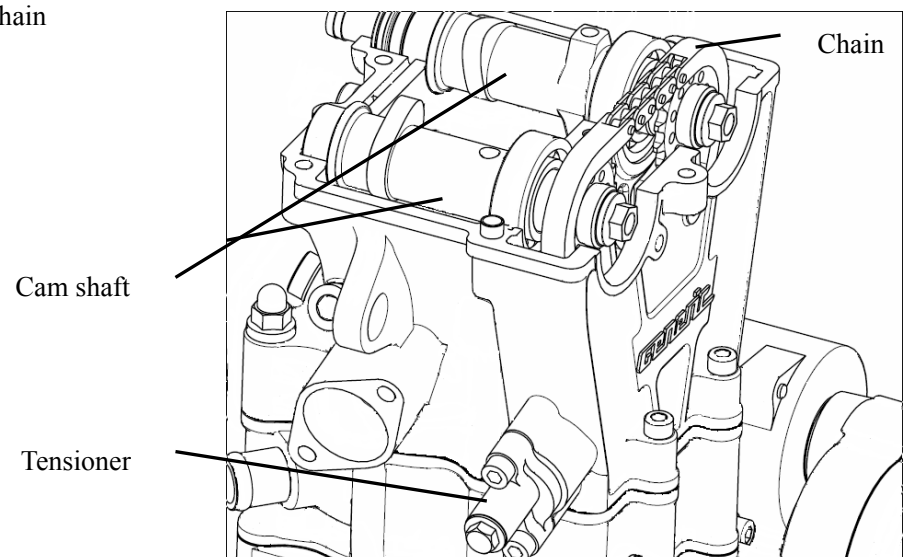
11.3 Cylinder Head

Removal

Loosen the fastening bolt, and
remove the cylinder head cover
(rocker arm, rocker arm shaft)



Remove the tensioner, loosen the chain
and remove the cam shaft.



Cam shaft measurement

Measure the size of the cam matching journal

Admission can shaft:

Allowable limit: $\Phi 24.957$ mm

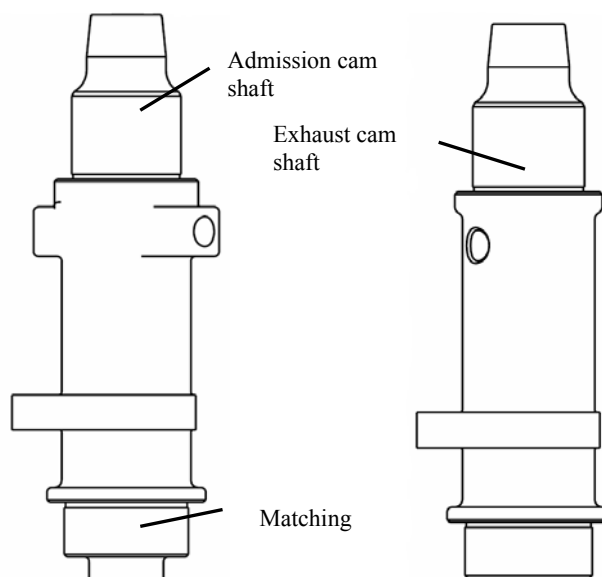
Exhaust cam shaft:

Allowable limit: $\Phi 24.957$ mm

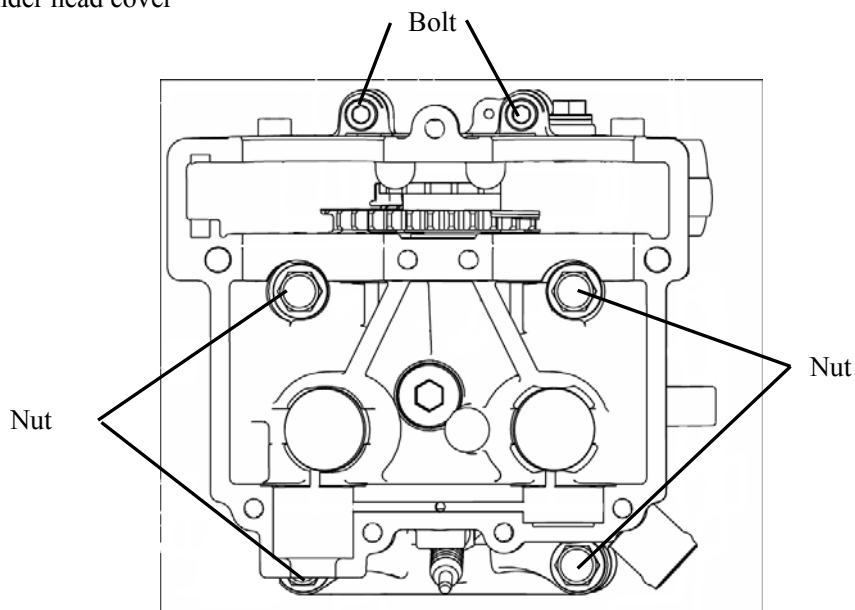
Measure the height of the cam shaft

Allowable limit: Intake 36.9 mm

Exhaust 35.9 mm



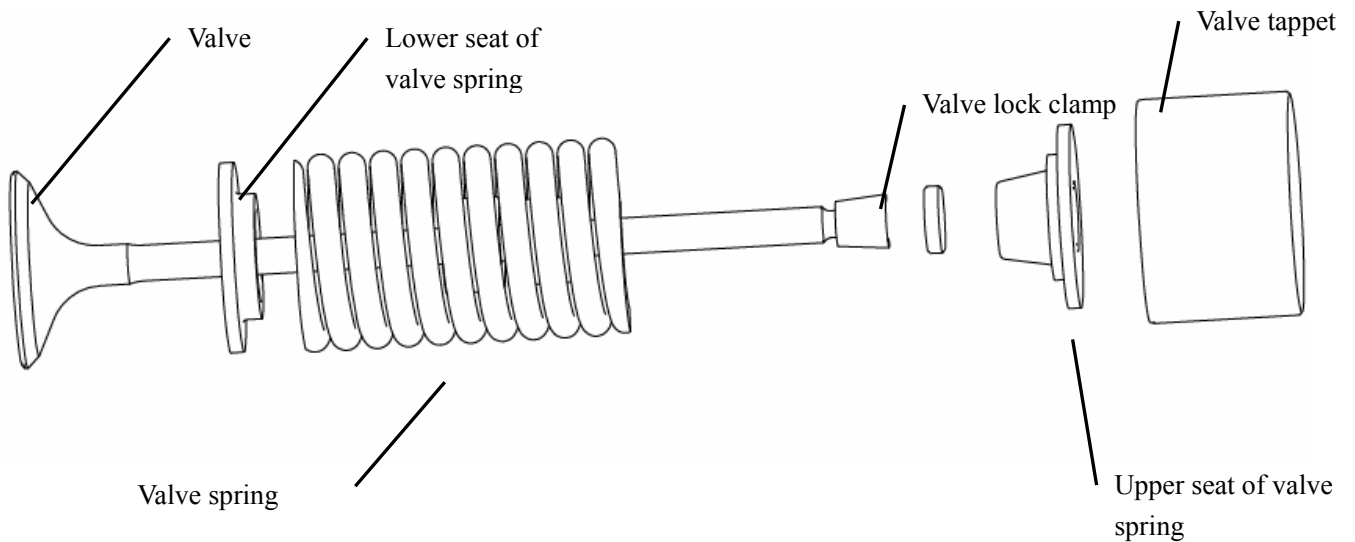
Remove the bolt, nut and the cylinder head cover



Remove the tappet; compress the valve spring with valve spring compressor; remove the valve lock clamp.

Remove the gas distribution adjustment gasket, valve spring, the upper and lower seat of valve spring, valve.

Valve disassembling



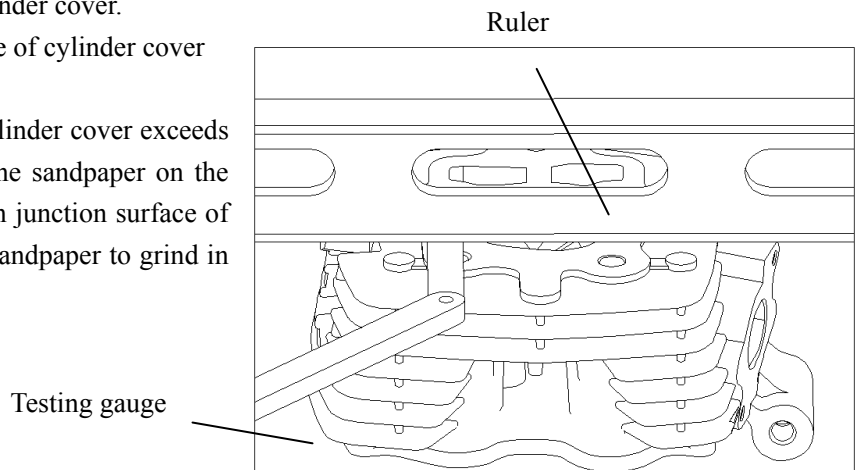
Inspection

Clean carbon deposition on the cylinder cover.

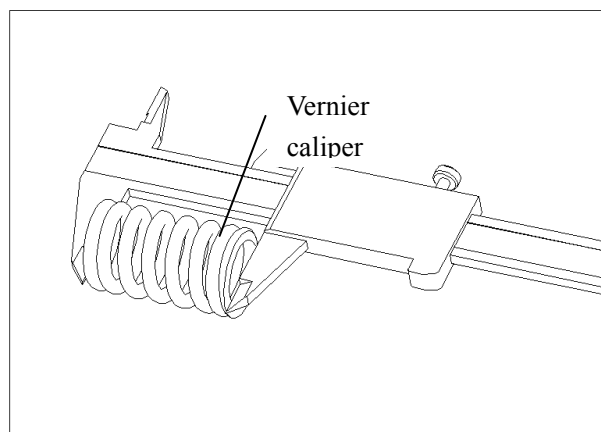
Measure flatness of junction surface of cylinder cover

Allowable limit: 0.05mm.

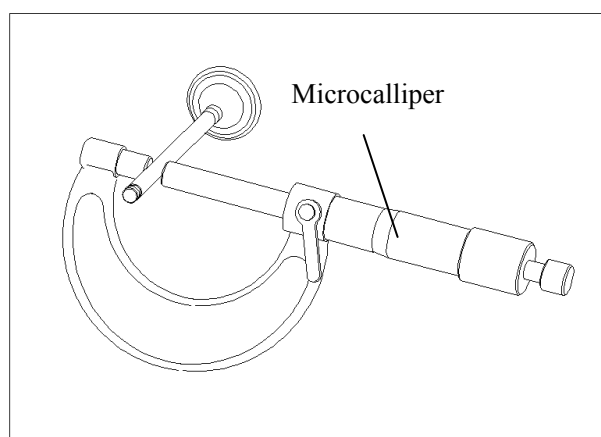
If flatness of junction surface of cylinder cover exceeds the service limit, put a piece of fine sandpaper on the flat plate and fit the sandpaper with junction surface of cylinder cover; and then push the sandpaper to grind in figure of “8” way.



Measure the free length of the valve spring.
Allowable limit: Spring: 37 mm

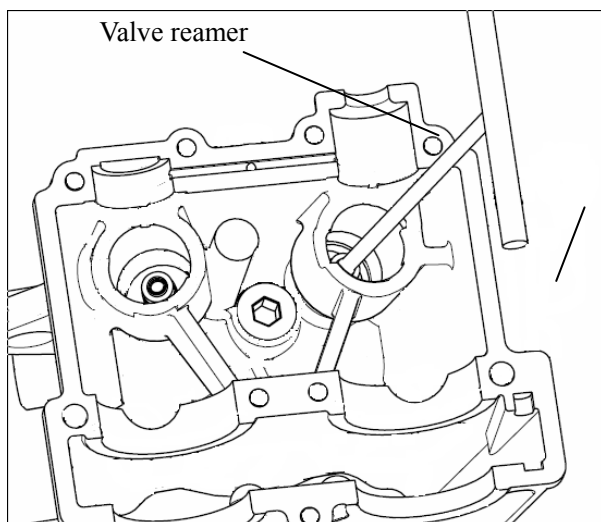


Measure the outer diameter of the valve stem.
Allowable limit: Intake $\Phi 4.455$ mm
Exhaust $\Phi 4.448$ mm



Check valve guide. Please eliminate the carbon deposition in the valve guide with a reamer before inspection.

Attention: Rotate the reamer in clockwise. Please do not rotate the reamer in counterclockwise.



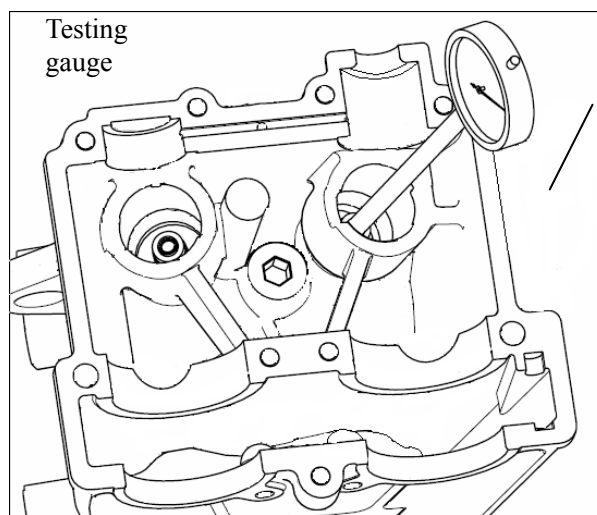
Measure valve guide ID.

Allowable limit: Intake/Exhaust: $\Phi 4.53\text{mm}$.

Clearance between valve and valve guide

Allowable limit: Intake Valve: 0.08mm.

Exhaust valve: 0.1mm.



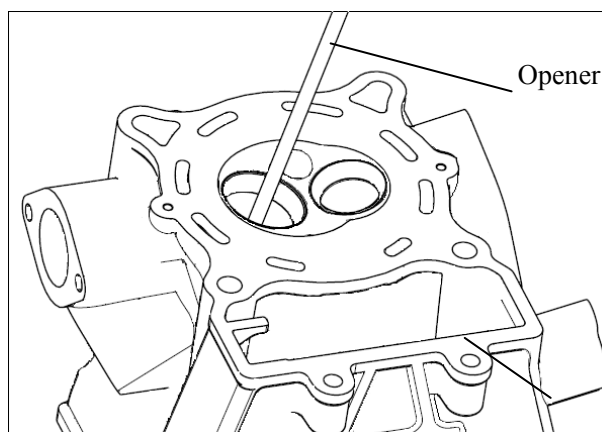
Valve Guide Replacement

Attention: When the clearance between valve and valve guide exceeds service limit value, please replace the valve guide. When a valve guide is replaced, surface of valve seat retainer shall be fixed and adjusted.

Put the valve guide into the freezing chamber of refrigerator for one hour to freeze it.

Heat with electric furnace or oven the cylinder head to 100-150°C.

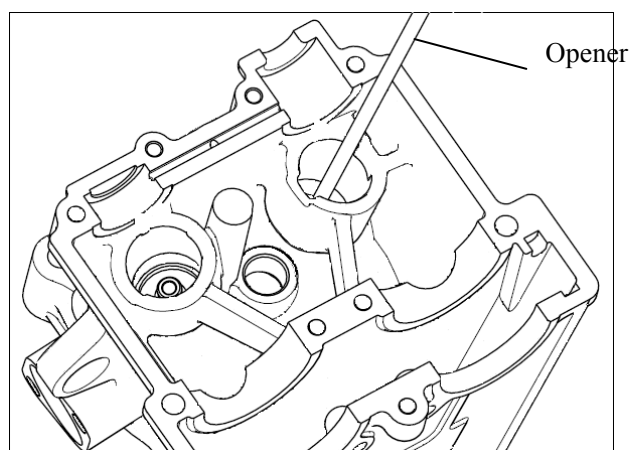
Fix the cylinder head and remove the valve guide from upper side of cylinder head with a special valve guide remover.



Install a new O ring onto the new valve guide.

Install the valve guide from the top of cylinder head.

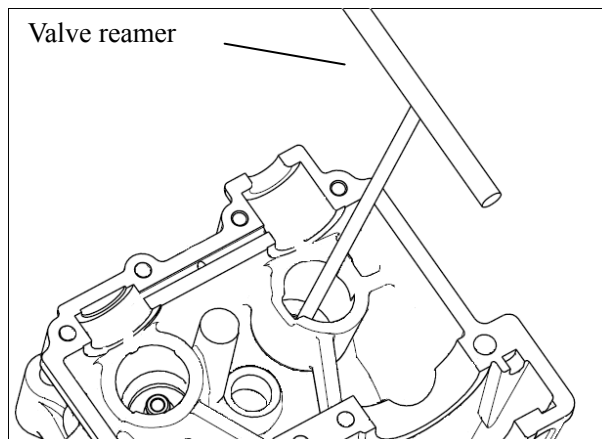
Attention: Please do not hurt cylinder head while installing valve guide.



When the valve guide is inserted, fix and adjust it with a valve guide reamer.

Attention: When a reamer is used to cut, please apply some amount of cutting lubricant onto it.

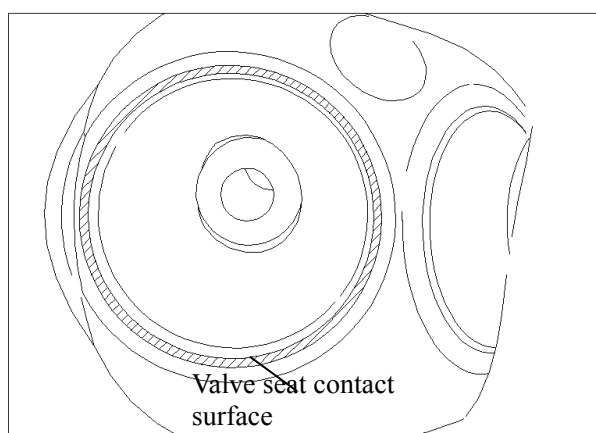
Rotate the reamer in clockwise direction.



Remove carbon deposited in combustion chamber and valve and clean thoroughly intake and exhaust valves.

Inspect width of contact surface of valve seat (width of valve race)

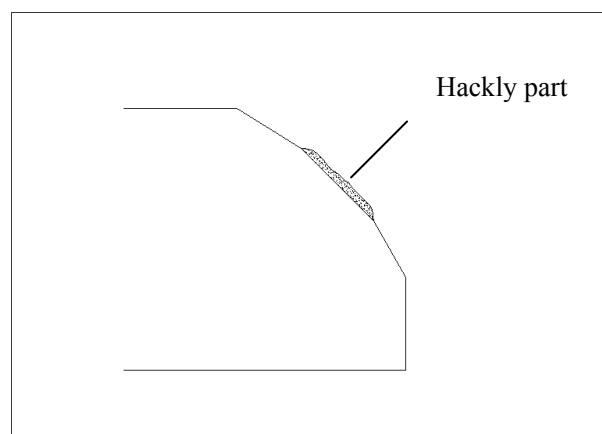
Allowable limit: intake/exhaust: 1.6mm.



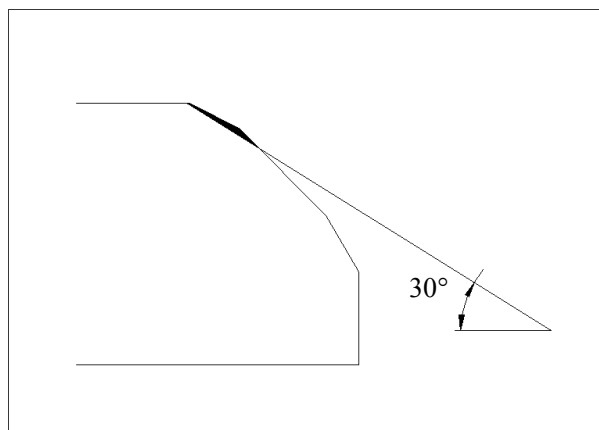
Valve Race Fixing and Adjustment

Remove hackly and ragged parts on the valve race with a 45° angled milling cutter.

Note: Apply a layer of transparent or Prussian blue film onto the valve race so that it can be observed clearly.

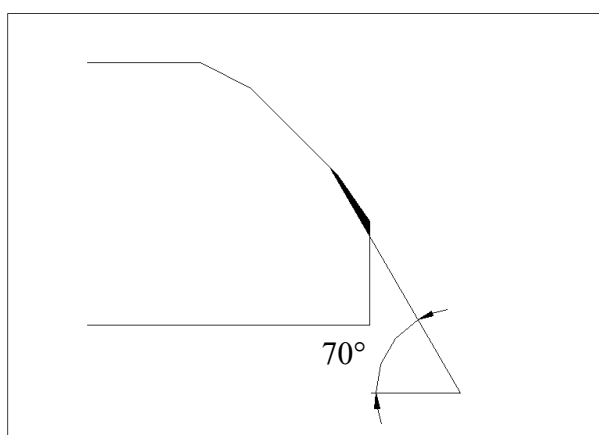


Remove 1/4 of external edge of valve race with a 30° angle milling cutter.



Remove 1/4 of bottom of valve race with a 70° angle milling cutter.

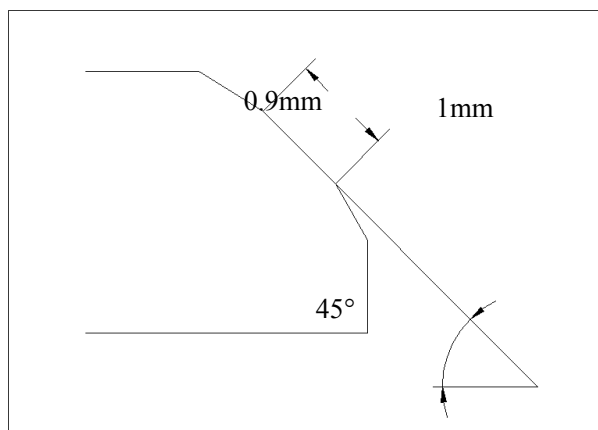
Remove the milling cutter and check the places processed.



Grind and cut valve race with a 45° angle precise milling cutter till it gains a proper width.

All the dents and ragged parts must be removed.

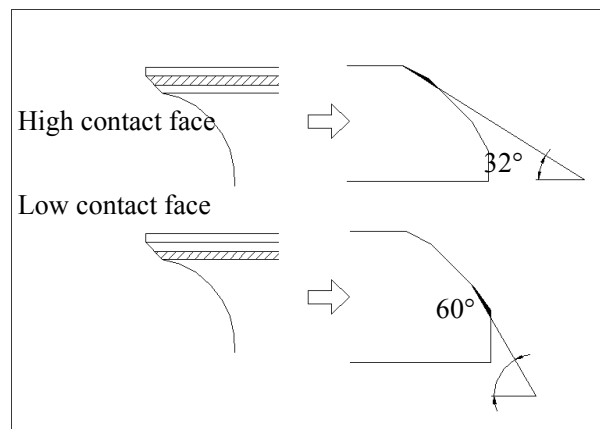
Standard valve race width: Intake: 0.9mm
Exhaust: 1.0mm



If contacted place is the higher part of valve, please use a 32° angle plain milling cutter to lower the valve race. If contacted place is the lower part of valve, please use a 60° angle internal milling cutter to raise the valve race.

Grind and cut valve race with a 45° angle precise milling cutter till it meets the required specification.

After completion of valve race grinding and cutting, please apply some polishing agent on the surface of valve. Polish the valve gently.



Installation

Install the cylinder head in the reverse order of removal.

Attention:

While installing valve spring, the end with short spring links heads combustion chamber.

While installing valve collet, please compress valve spring with a valve spring compressor and install the valve collet.

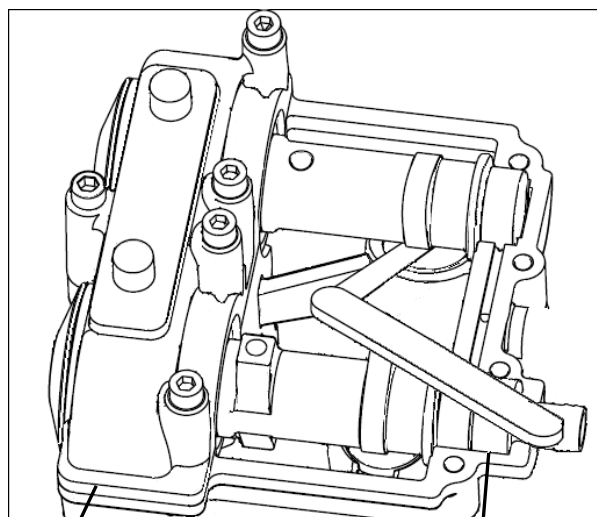
While installing valve, please apply appropriate amount of engine oil on the surface of valve stem, and then install it into valve guide.

Valve clearance adjustment

With a special cylinder head cover for valve clearance adjustment installed, measure the clearance between the cam base circle and tappet with the testing gauge.

Inlet valve: 0.15-0.2mm

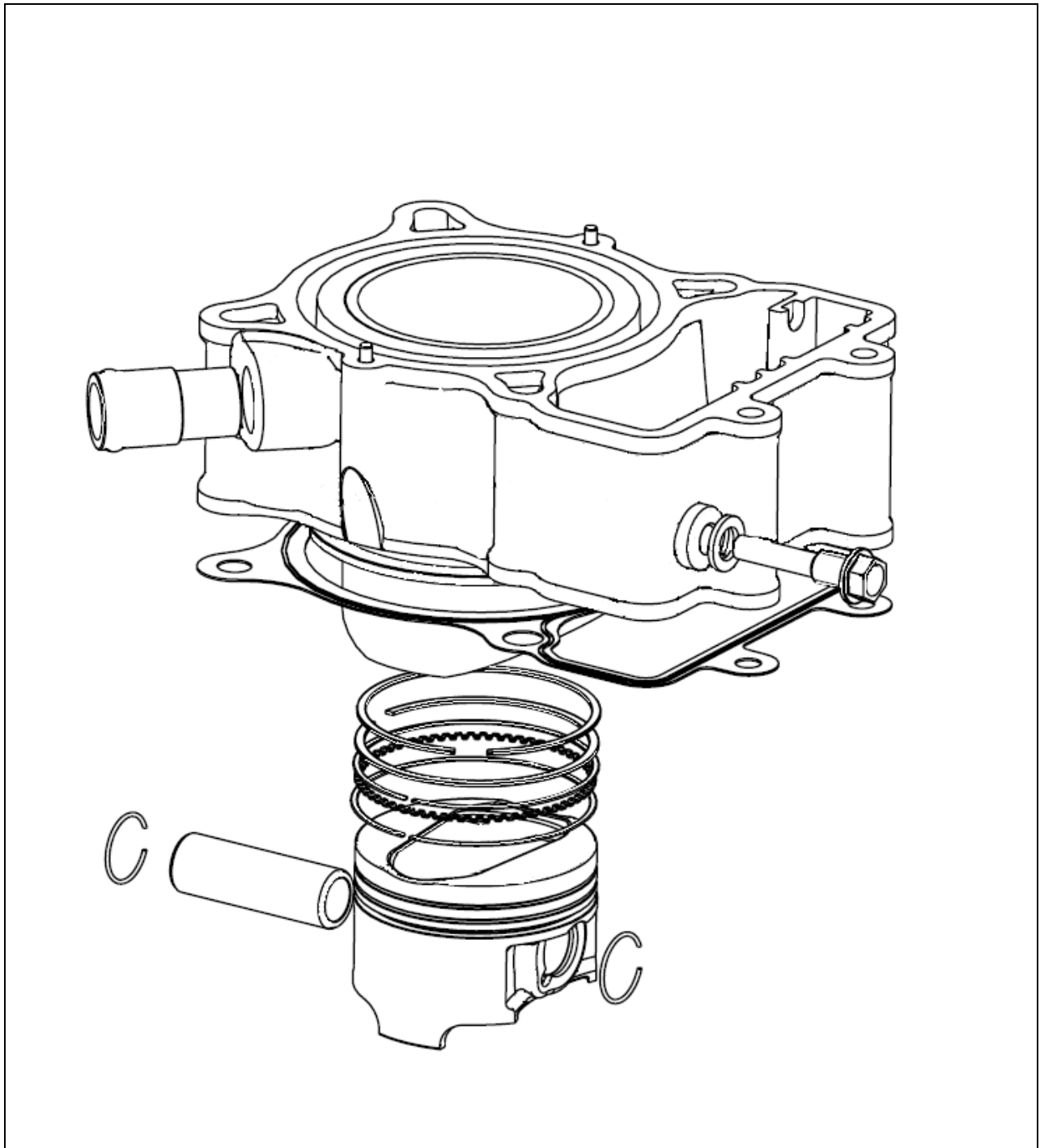
Exhaust valve: 0.2-0.25mm



Special cylinder
head cover

Testing gauge

Cylinder Block and Piston



XII Cylinder Block and Piston

Preparatory data	12.1
Fault diagnosis	12.2
Cylinder block	12.3
Piston	12.4

12.1 Preparatory Data

Function of cylinder block:

Cylinder block provides the space for gas compression, combustion and expansion and guides piston movement. It also transfers part of heat in the cylinder to surrounding coolant.

Function of piston:

1. Piston can bear the pressure generated by combustion of mixed combustible gas in the cylinder and transmit the pressure to connecting rod to drive crankshaft to rotate.
2. It forms a combustion chamber with cylinder head.

Precautions on Operation

All the components shall be cleaned before inspection and test, and purged with high-pressure air.

Table of standard values of baseline projects and allowable limit

Item		Standard Value	Service Limit
<i>Cylinder</i>	ID	60-60.013	60.063
	Cylindricity	0.005	0.025
	Roundness	0.004	0.025
	Flatness	0.03	0.05
	Piston OD(measuring point)	59.94-59.95	-
	Piston pin hole ID	15.002-15.008	15.04
	Piston pin OD	14.994-14.999	14.976
	Clearance between piston and piston pin	0.003-0.014	0.064
	Clearance between piston ring and ring groove	Top ring	0.03-0.07
		Second ring	0.03-0.07
	Joint clearance of piston rings	Top ring	0.15-0.3
		Second ring	0.25-0.4
		Oil ring	0.15-0.6
	Connecting rod small end ID	15.01-15.018	15.068
	Clearance between linkage rod and piston pin	0.011-0.024	0.092

12.2 Fault Diagnosis

Low compression pressure

Worn, burnt or broken piston
Worn or damaged cylinder and piston
Broken washer, air leakage between crankcase and gas

Higher compression pressure

Too much carbon deposited in the combustion chamber

White smoke from exhaust pipe

Worn or damaged piston ring
Worn or damaged cylinder and piston

Noisy piston

Damaged cylinder, piston and piston ring
Worn piston pin hole and piston pin

12.3 Cylinder Head

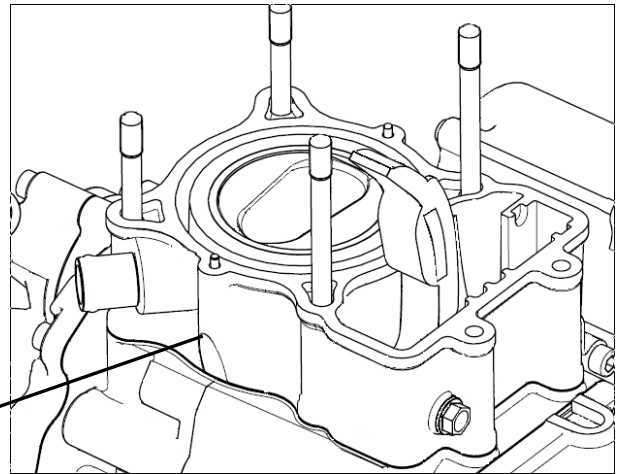
Removal

Remove cylinder block

Inspection

Inspect wear of cylinder inner wall.
If it is seriously worn, replace it.

Cylinder
block

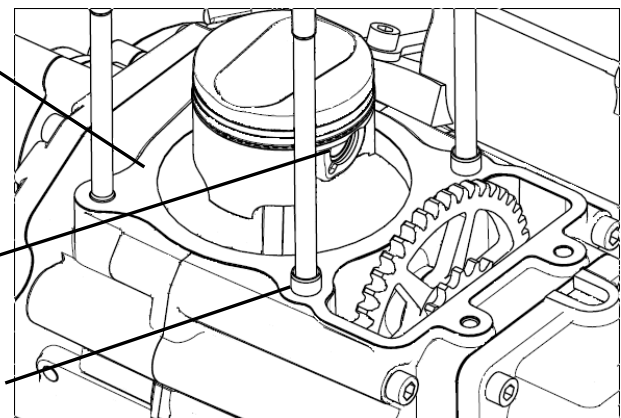


Remove washer and location pin.

Gasket

Piston pin
retainer

Locating
pin



Piston

Removal

Remove piston pin retainer.

Attention: Please do not drop the retainer into crankcase during removal.

Take out piston pin and remove piston.

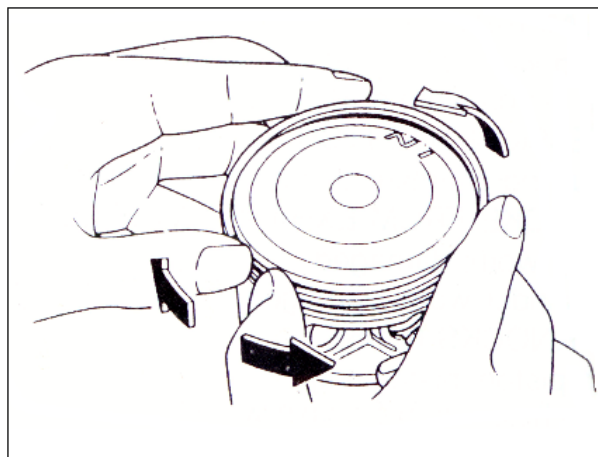
Remove piston ring.

Inspect piston, piston pin and piston ring.

Attention:

Please do not break or hurt piston ring.

Remove deposited carbon inside the piston ring.

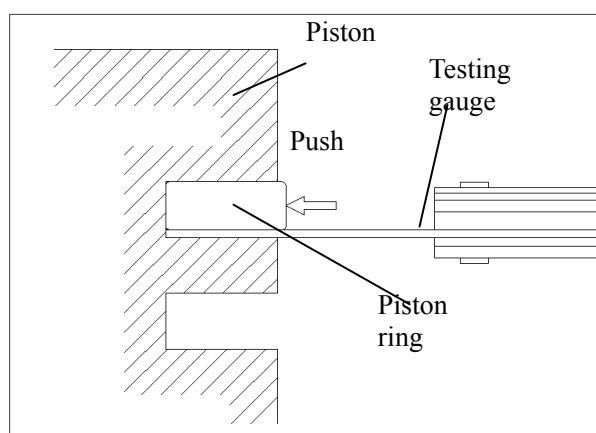


Install the piston ring.

Measure the clearance between piston ring and piston ring groove.

Allowable limit: First ring: 0.12 mm
Second ring: 0.12 mm

Remove piston ring and install all the piston rings onto bottom of cylinder.

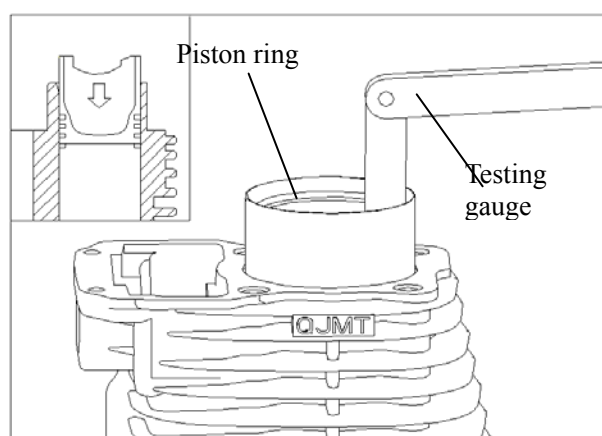


Attention:

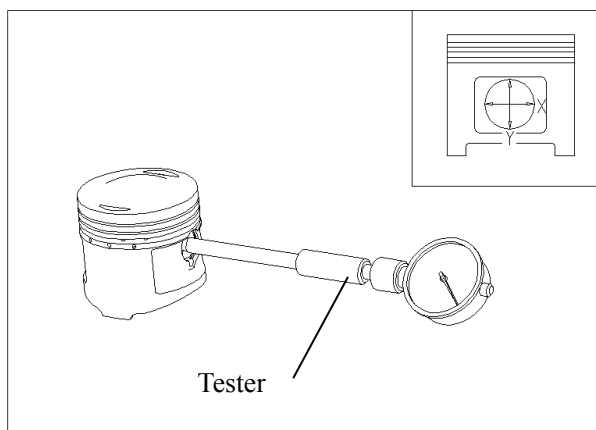
Compress piston rings into the cylinder with piston head.

Measure the joint clearance between piston rings.

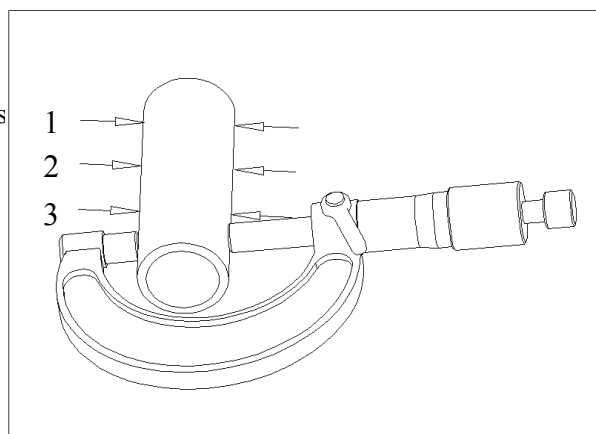
Allowable limit: First ring: 0.4 mm
Second ring: 0.5 mm



Measure piston pin hole ID.
Allowable limit: $\Phi 15.04$ mm



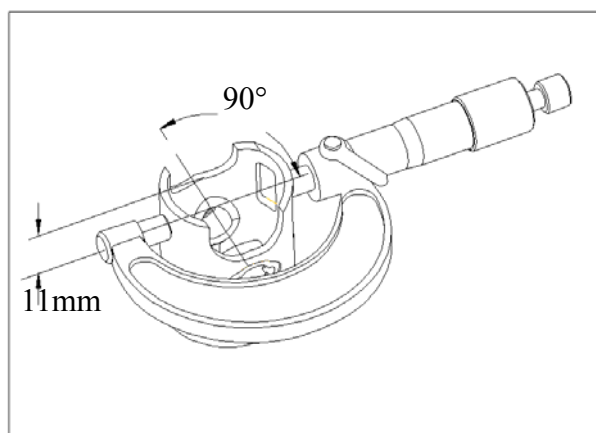
Measure piston pin OD.
Allowable limit: $\Phi 14.976$ mm
 Measure the clearance between piston pin hole and pis
Allowable limit: 0.064mm



Measure piston OD

Attention:
 Measuring position forms a 90° angle with piston pin, about 11mm below piston skirt.

Allowable limit: $\Phi 59.93$ mm



Inspect wear and scratch on inner wall of cylinder.

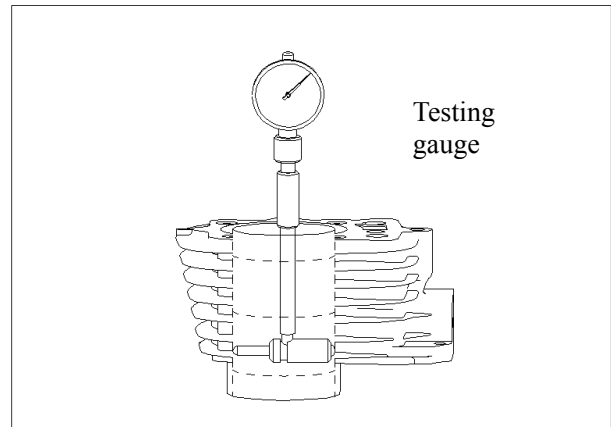
Attention:

Measure cylinder ID at three positions, i.e. upper, intermediate and lower positions. The position forms a 90° angle with piston pin.

Allowable limit: $\Phi 60.063\text{mm}$

Measure the clearance between cylinder and piston. Take the maximum clearance as standard.

Allowable limit: 0.07mm

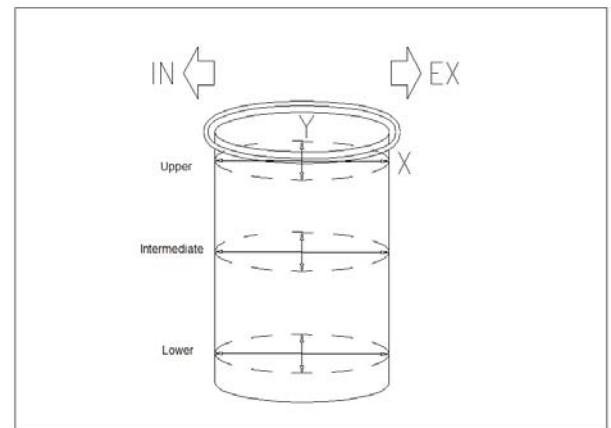


Measure the roundness of cylinder inner wall (internal diameter difference between X direction and Y direction).

Allowable limit: 0.01mm

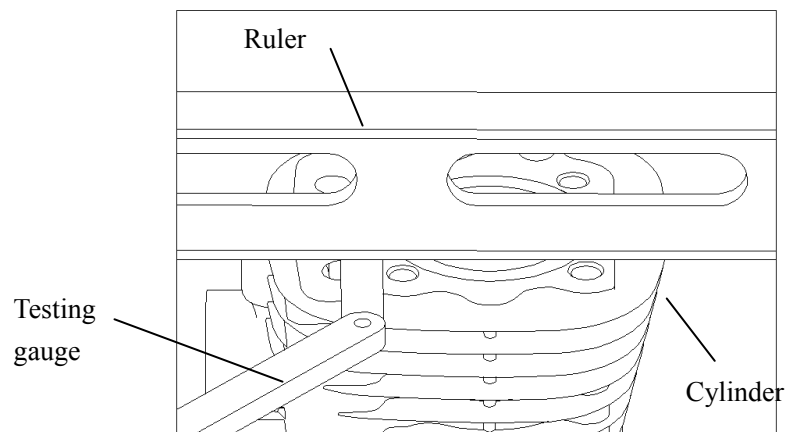
Measure the cylindricity of inner wall of cylinder (internal diameter difference of three positions (upper, intermediate and lower) along X direction or Y direction).

Allowable limit: 0.01mm



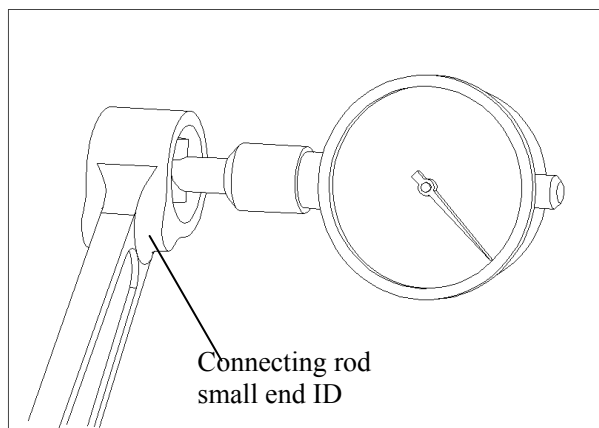
Check flatness of cylinder surface.

Allowable limit: 0.05mm



Measure Connecting rod small end ID.

Allowable limit: $\Phi 15.068\text{mm}$



Installation of piston

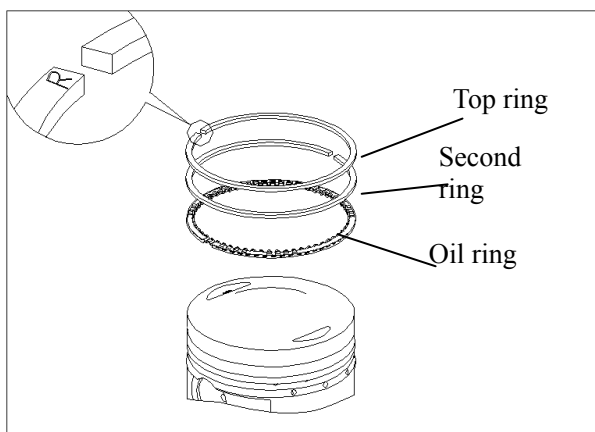
Install location pin.

Apply engine oil evenly on each piston ring and piston. Install piston to its place with bevel upward.

Attention:

Piston shall not be scratched and piston ring shall not be broken.

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



Scrape the washer attached to the crankcase.

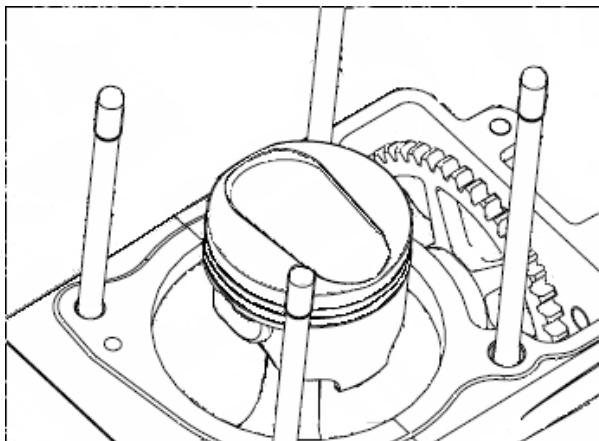
Attention:

No foreign matters can be dropped into the crankcase.

Install piston, piston pin and piston pin retainer.

Attention:

The larger side of the groove at the piston head should be installed towards the intake valve.



Install Cylinder

Install washer and location pin onto the crankcase.

Apply evenly engine oil on inner wall of cylinder, piston and piston ring.

Install carefully the piston ring into the cylinder.

Attention:

Do not hurt piston ring.

XIII Crankcase

Preparatory data	13.1
Fault diagnosis	13.2
Crankcase	13.3
Clutch	13.4
Gearshift mechanism	13.5
Bent axle connecting rod assembly	13.6
Variable speed chamber	13.7

13.1 Preparatory Data

Function of crankcase:

Crankcase is the force bearing part of engine. It is mainly used to support crankshaft, clutch, transmission, cylinder block and cylinder head. It bears impact from combustion and inertia force from movement of crankshaft connecting rod; and forms a partial enclosed space (for air and oil).

Suspension hole is set on the crankcase, which can be connected with the suspension hole in the vehicle block so that the engine can be linked together with frame and other parts.

Precautions on Operation:

Crankcase is a thin-wall casting part. Avoid impact on it during operation in case it may be distorted or broken.

Clean carefully all the components before inspection and test and purge them with high-pressure gas.

Drain the lubricating oil from crankcase before working on it.

Table of standard values of baseline projects and allowable limit

Unit: mm

Item		Standard	Allowable limit
Bent axle connecting rod assembly, clutch	Clearance between the left and the right of the big end of the connecting rod	0.1-0.35	0.5
	Connecting rod big end radial clearance	0.008-0.018	-
	Jump	-	0.03
	Thickness of friction plate	2.8-2.9	2.5
	Flatness of running friction plate	0.04	0.2
	Length of pressure spring	30.4-31.6	29.7
	Thickness of surface needle roller	1.88-2	1.8
Gearshift mechanism	Outer diameter of shifting fork axis	9.98-9.995	9.96
	Diameter of bore of shifting fork	10-10.018	10.05
	Thickness of shifting fork	4.8-4.9	4.6
	Outer diameter of gearshift hub	41.8-42	41.75
	Width of gearshift hub locked groove	5.45-5.55	5.7

13.2 Fault Diagnosis

Low compression pressure

Crankcase air leakage

Engine overheat

Clutch clipping

Poor lubrication

Failure in gear

Gear shift fork broken or deformation

Shifting fork guide pin broken

Wheel gear convex claw worn

Auto-off gear

The joint claw is worn with the edge into a fillet.

Force of return spring of the speed shifting mechanism is weakened.

The spline tooth of spline shaft and the spline groove of sliding gear are worn, resulting a greater axial force in the gear while working.

Gearshift hub and shifting fork are worn.

Abnormal sound in the crankcase

There are parts scattered or broken inside the crankcase

Engine stalling

Clutch is stuck

Shifting difficulty

Separation between the clutches is not complete

Poor returning spring of the clutch

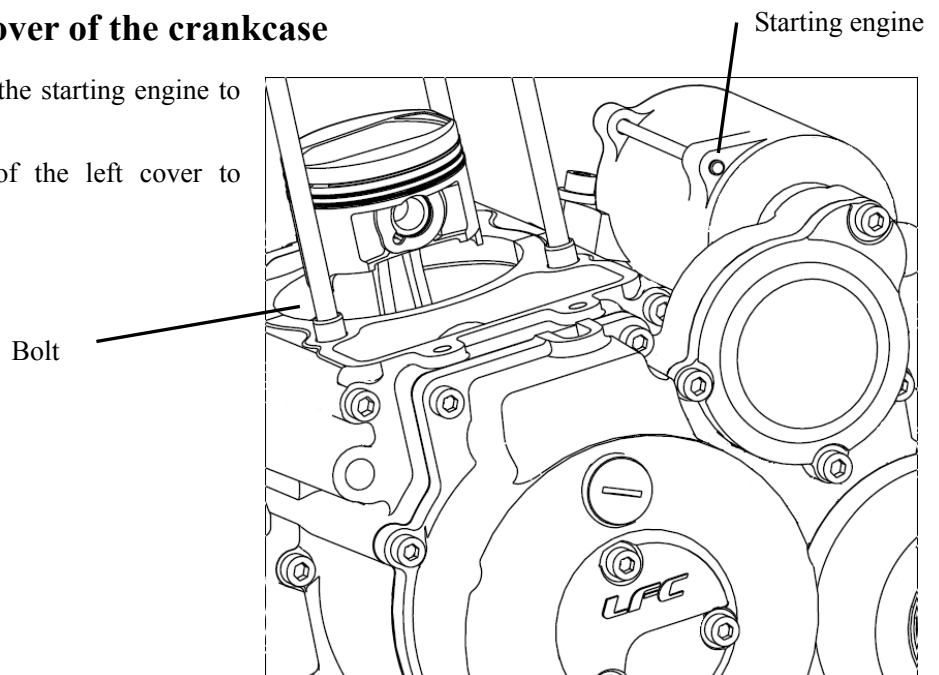
Locked groove of the gearshift hub worn

13.3 Crankcase

Disassemble the left cover of the crankcase

Release the fastening bolts of the starting engine to remove the starting engine.

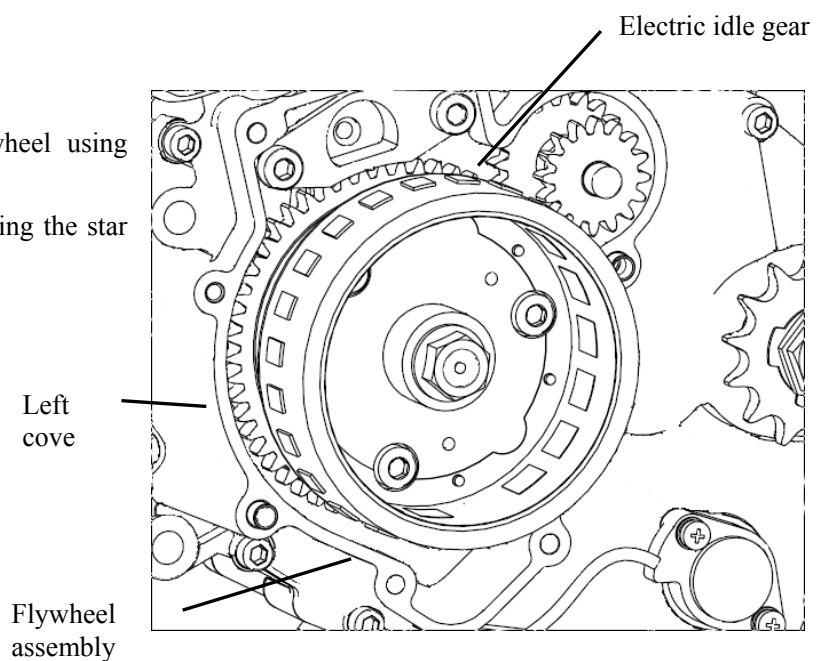
Release the fastening bolts of the left cover to remove the left cover.



Release the locking nuts of the flywheel using electric or pneumatic tools.

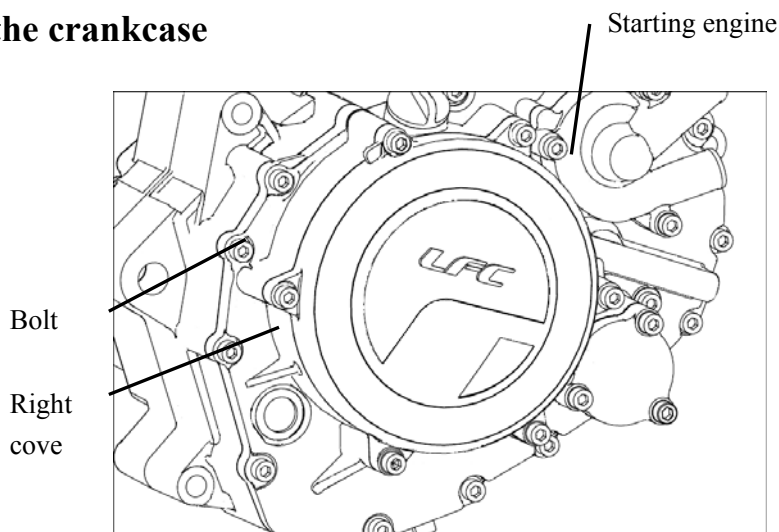
Allocate the flywheel assembly (including the star wheel) to remove the electric idle gear.

Remove the gasket.



Disassemble the right cover of the crankcase

Loosen the fastening bolts to remove the right cover of the crankcase, gasket and locating pin.

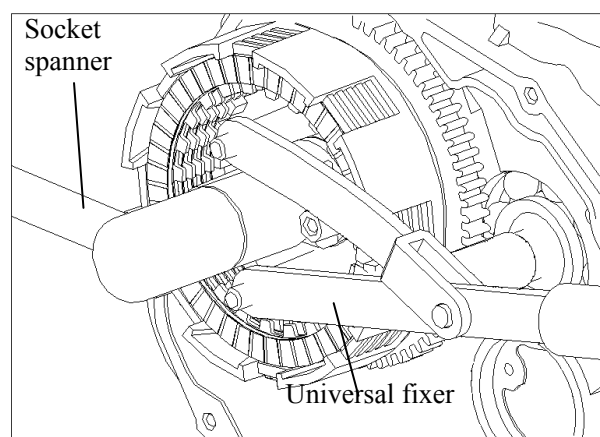


13.4 Clutch

Removal

Loosen the five bolts of the pressure plate according to the diagonal cross mode.

Remove the clutch springs, spring washers, pressure plate, bearing washer, surface needle roller bearing and bearing pedestal, clutch separation shaft sleeve and so on.



Use a special tool to screw off clutch locknut. Remove locknut and washer.

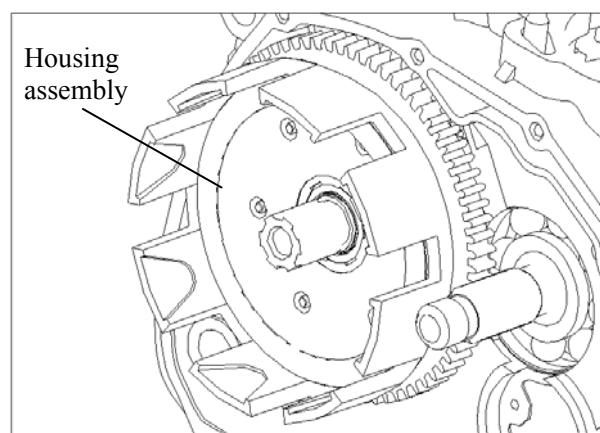
Remove clutch center bracket.

Remove clutch drive and driven friction plates.

Removed components refer to exploded view.

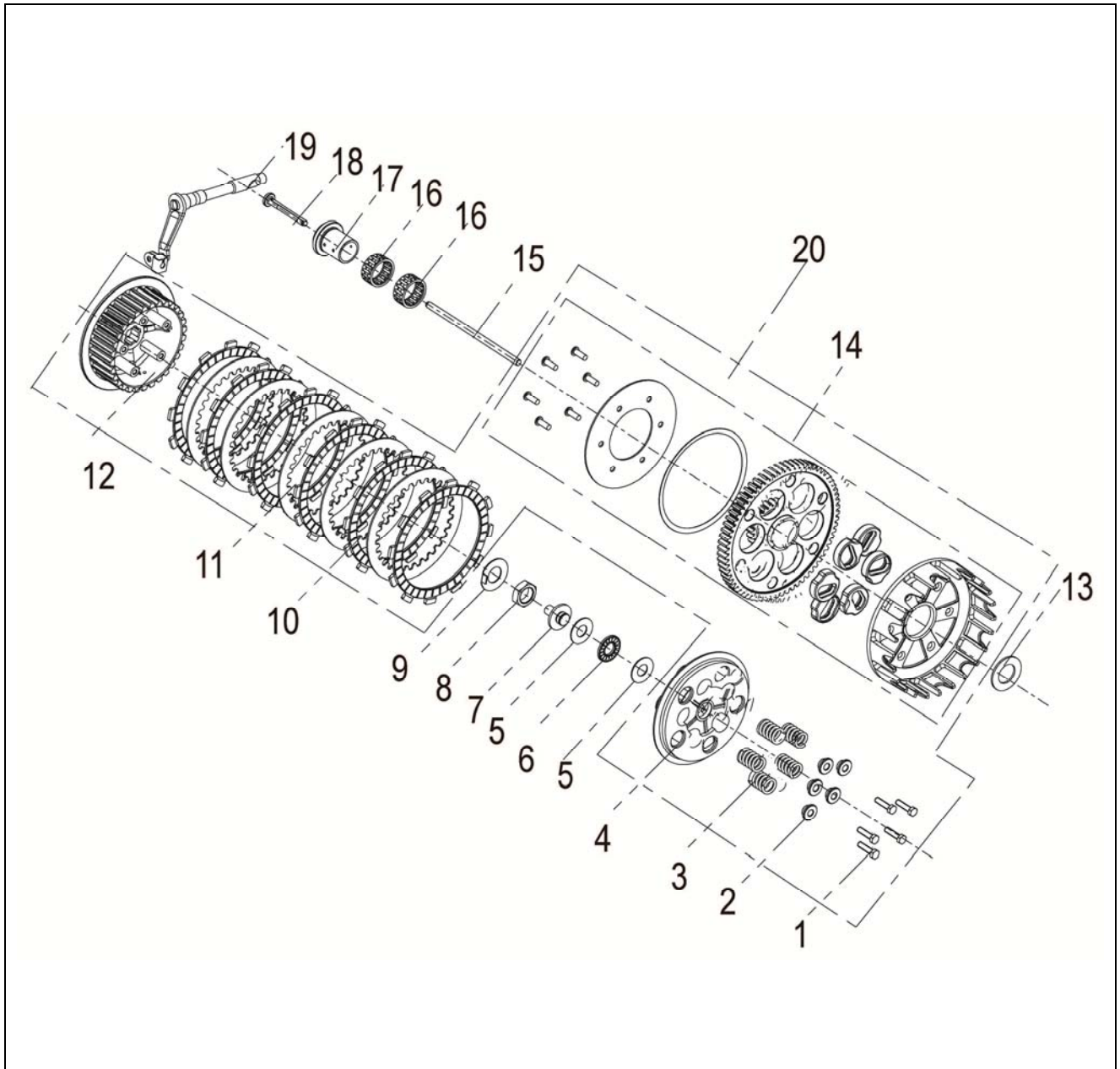
Remove the thrust washer.

Remove housing assembly.



Install clutch in the reverse order of removal.

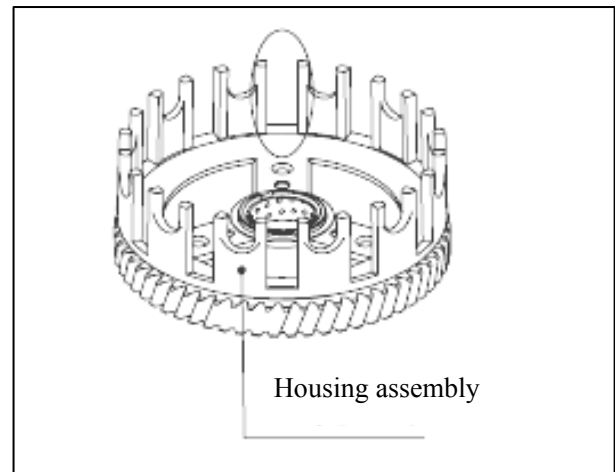
Disassemble Clutch



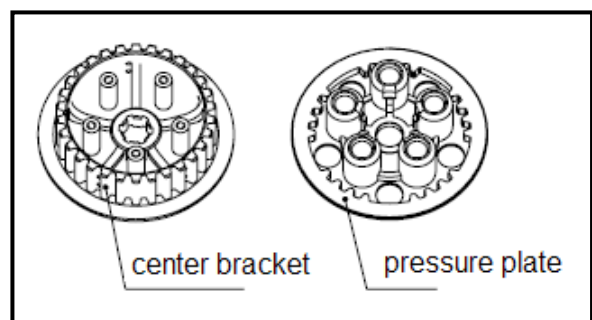
1 Bolt 2 Spring washer 3 Clutch spring 4 Pressure plate 5 Bearing washer 6 Surface needle bearing
 7 Clutch separation shaft sleeve 8 Jam nut 9 Locking washer 10 Friction plate assembly 11 Driven
 plate 12 Clutch driven hub 13 Thrust washer 14 Clutch driving drum assembly 15 Internal separation
 mandrill 16 Needle roller bearing 17 Bushing 18 Internal separation mandril | 19 Separation drag bar
 weld assembly 20 Clutch assembly

Inspection

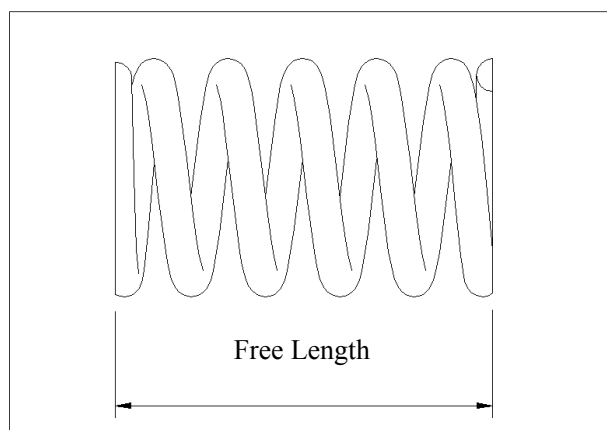
Check if there are burrs or broken parts on the housing groove of clutch. If there are, fix and adjust with a file. If there is a lot for fix and adjustment, replace it.



Check if teeth of pressure plate and center bracket are injured. If they are, replace them.

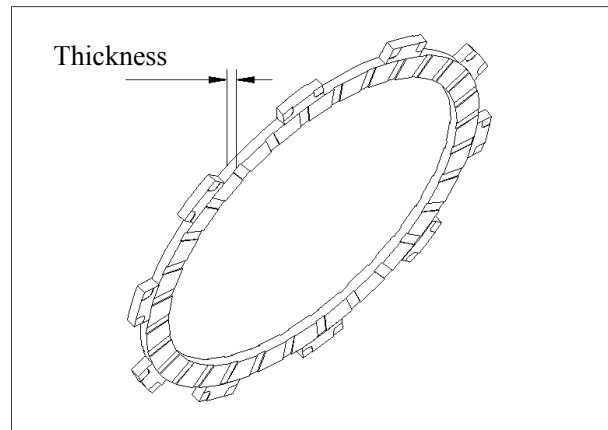


Measure the free length of pressure spring.
Allowable limit: replace it if below 29.7mm.



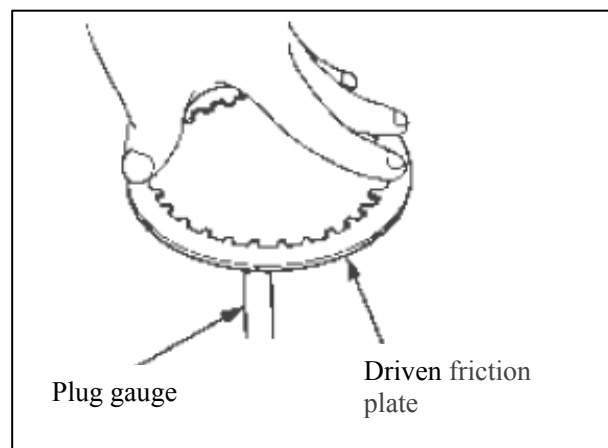
Measure the thickness of friction plate with a vernier caliper.

Allowable limit: Replace it when below 2.5mm.



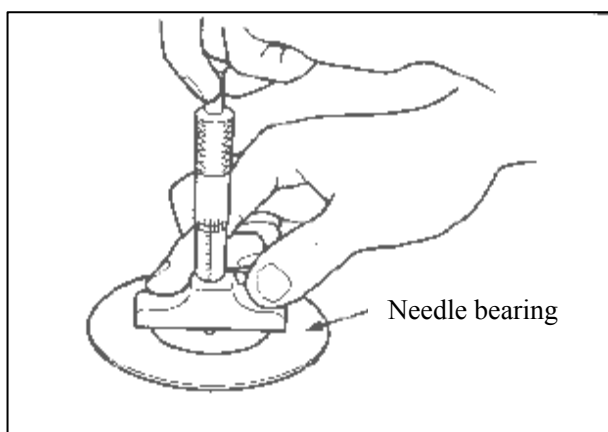
Check the flatness of the driven friction plate with the plug gauge.

Allowable limit: Replace it if above 0.2mm.

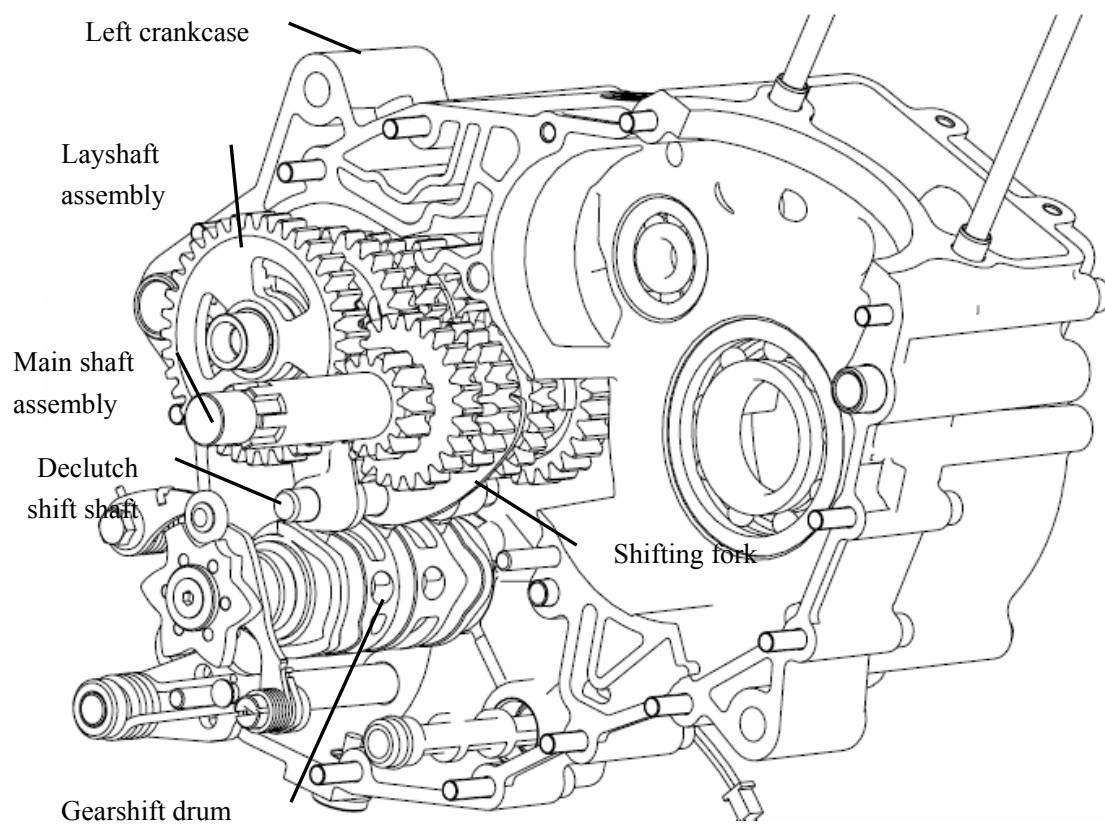
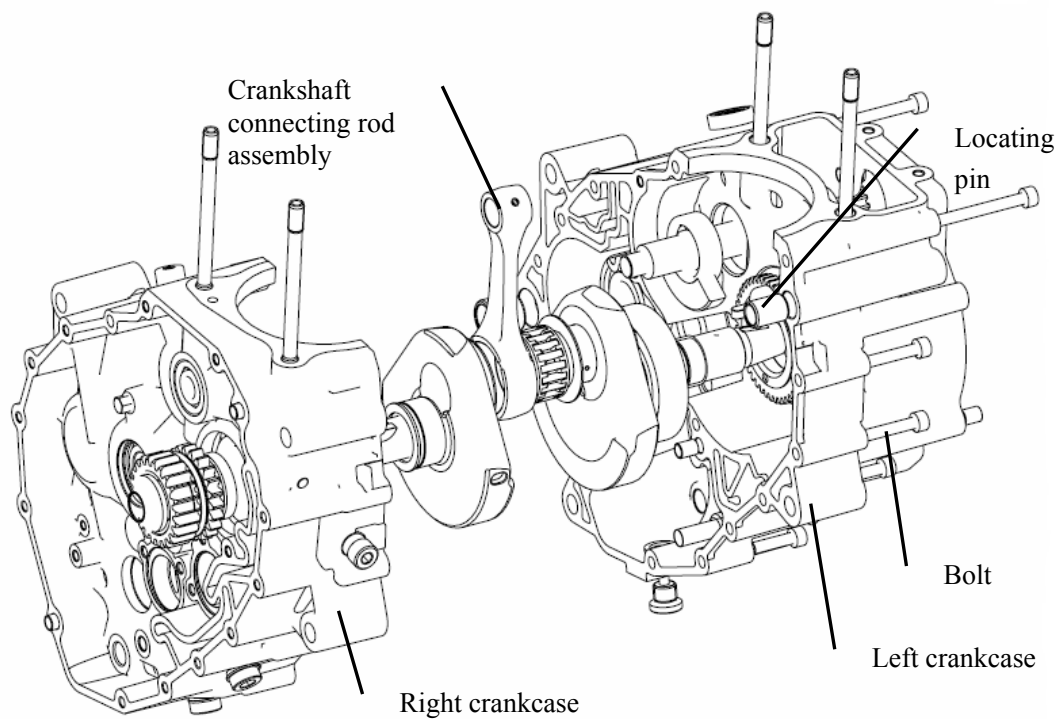


measure the thickness of the surface needle roller bearing.

Allowable limit: Replace it when it is below 1.8 mm.



Crankshaft connecting rod combination and variable speed chamber



13.5 Gearshift mechanism

Disassemble

Remove the stop arm.

Remove the gearshift locating plate.

Remove the gearshift shaft combination

Remove the parts.

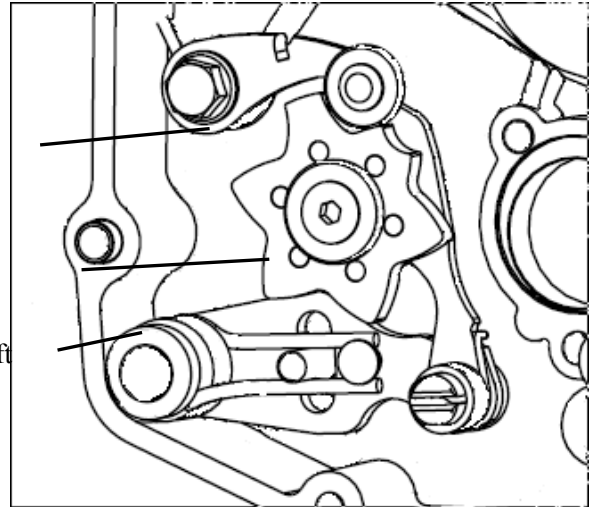
(Please refer to the exploded view of the variable-speed shift assembly)

Stop arm

Gearshift

locating plate

Gearshift shaft
combination



Inspection

The gearshift plate should be pulled back flexibly without clamping stagnation before being disassembled.

Check whether the gearshift plate and the gearshift shaft combination are worn. If badly worn, replace it.

Check whether the gearshift locating plate is worn. If badly worn, replace it.

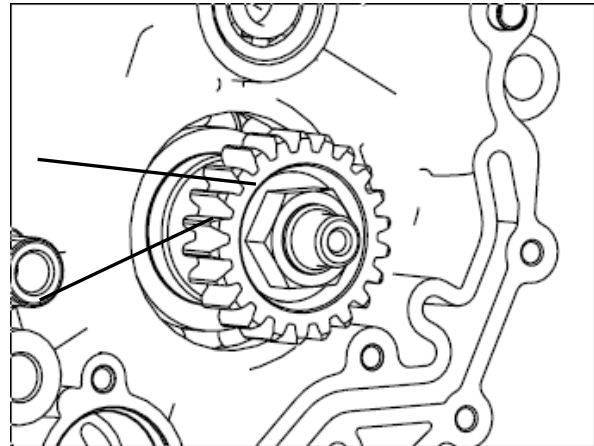
Check whether the gearshift shaft is bent. If excessively bent, replace it.

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

Loosen the nuts and washer of the right crankshaft to remove the clutch drive gear using electric or pneumatic tools.

Nut

Clutch
drive gear



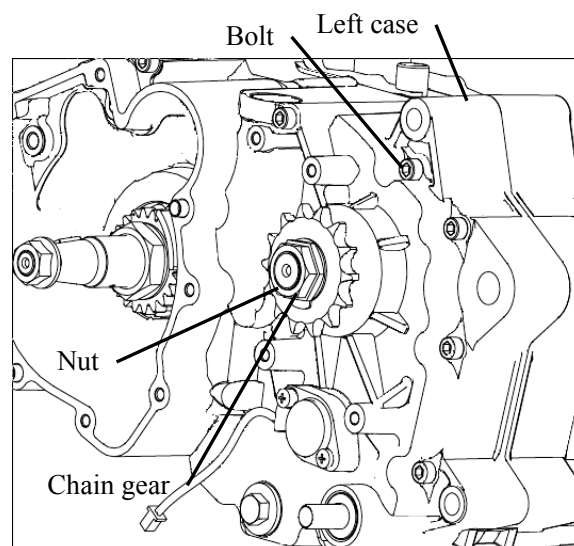
Remove the nuts of the countershaft to remove the sprockets and bushings.

Loosen the mould assembling bolt.

Separate the crankcase.

Attention: There should be no damage on joint case surface.

Remove the left case.



13.6 Crankcase connecting rod combination

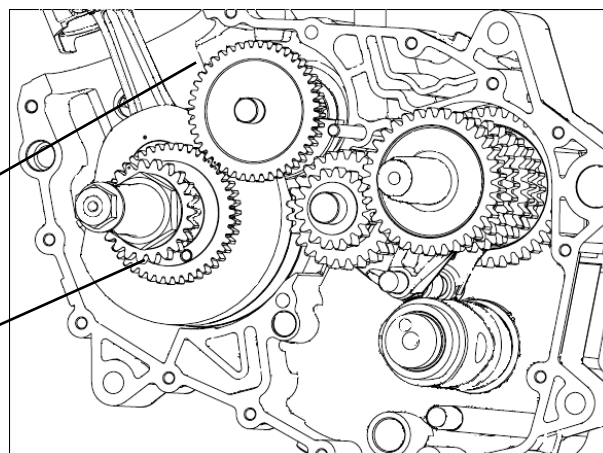
Disassemble

Remove the trunnion shaft combination and crankcase connecting rod combination from the right crankcase.

Attention: There should be no damage on joint case surface.

Trunnion shaft combination

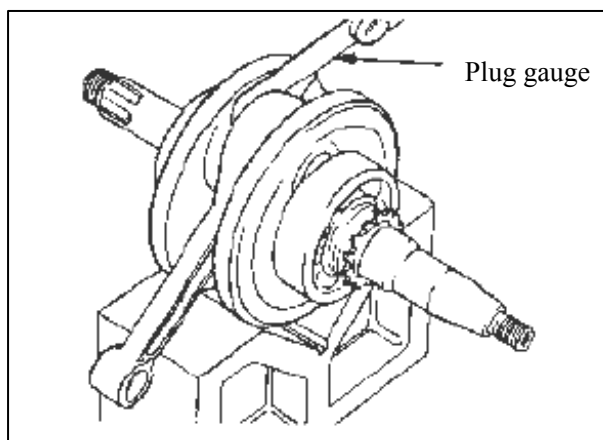
Crankcase connecting rod combination



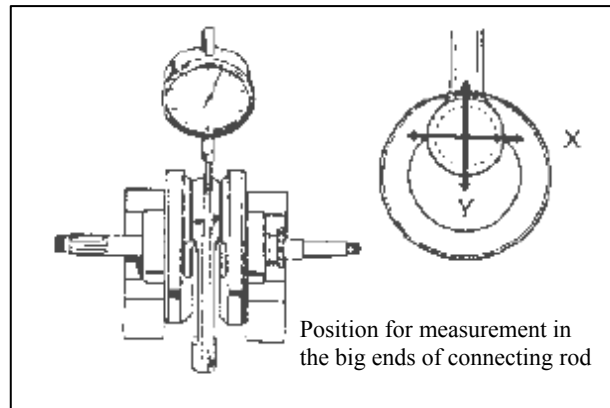
Inspection

Measure the clearance between the big ends of connecting rod.

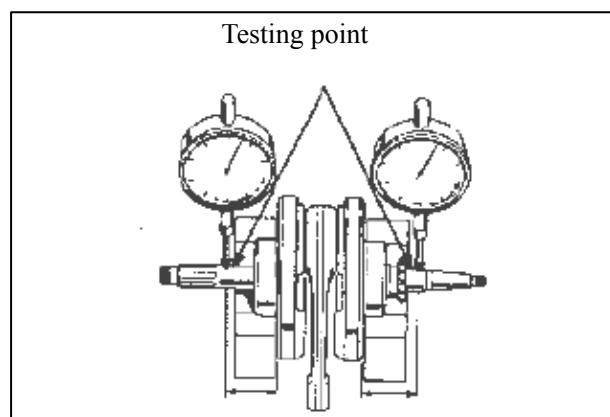
Allowable limit: 0.5 mm.



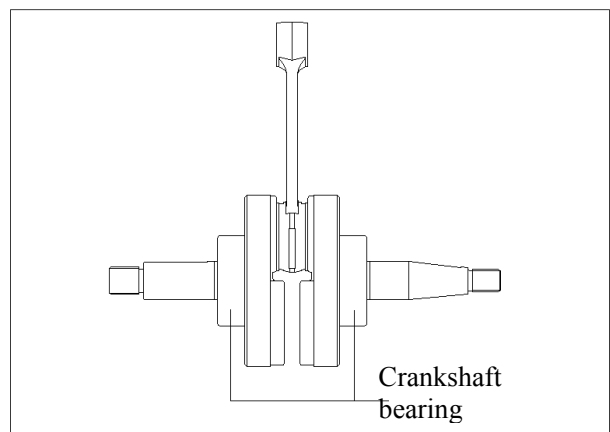
Measure the clearance in the X-Y direction of the big ends of connecting rod.
Allowable limit: 0.008-0.018mm.



Measure the jumping of the crankshaft.
Allowable limit: 0.03 mm.



Check whether there is abnormal sound or loose for the revolution of the crankshaft bearing. If any, replace the crankshaft assembly.



Set aside the shifting fork shaft.

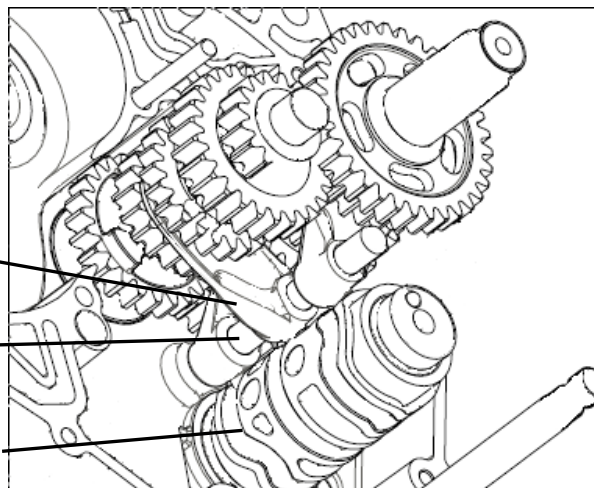
Remove the gearshift drum.

Remove the gearshift fork.

Shifting fork

Shifting fork
shaft

Gearshift drum

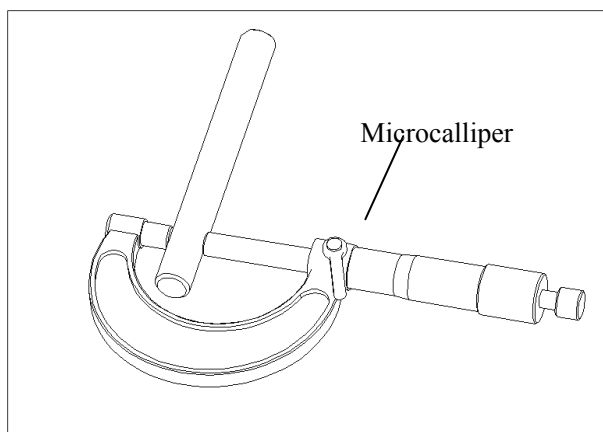


Inspection

Measure the outer diameter of the shifting fork shaft.

Allowable limit: 9.96mm.

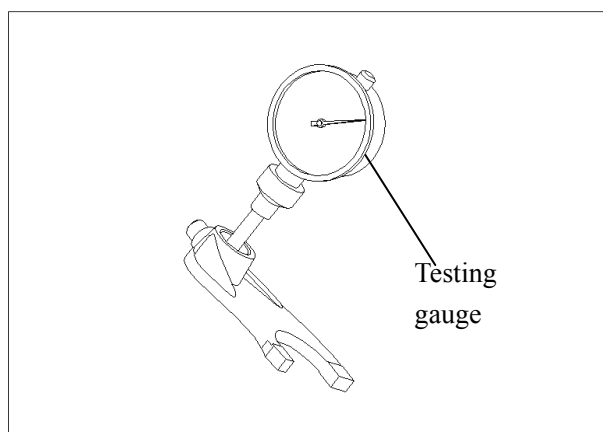
Microcalliper



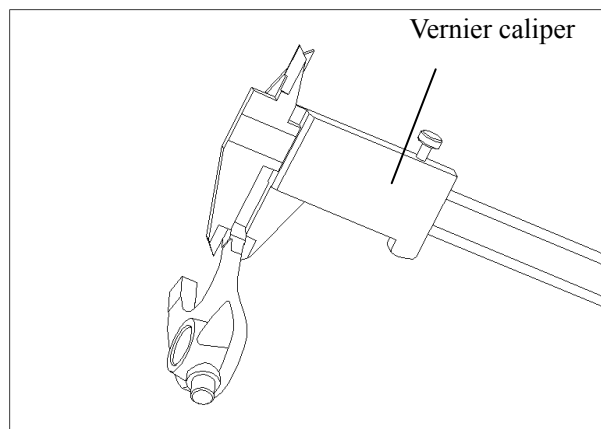
Measure the inner diameter of the shifting fork hole.

Allowable limit: 10.05mm.

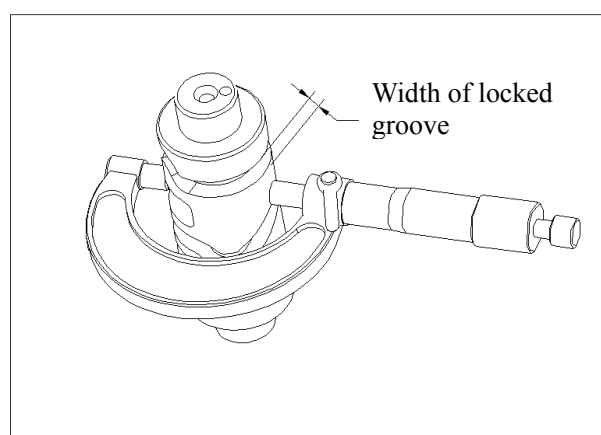
Testing
gauge



Measure the thickness of the shifting fork.
Allowable limit: 4.6mm

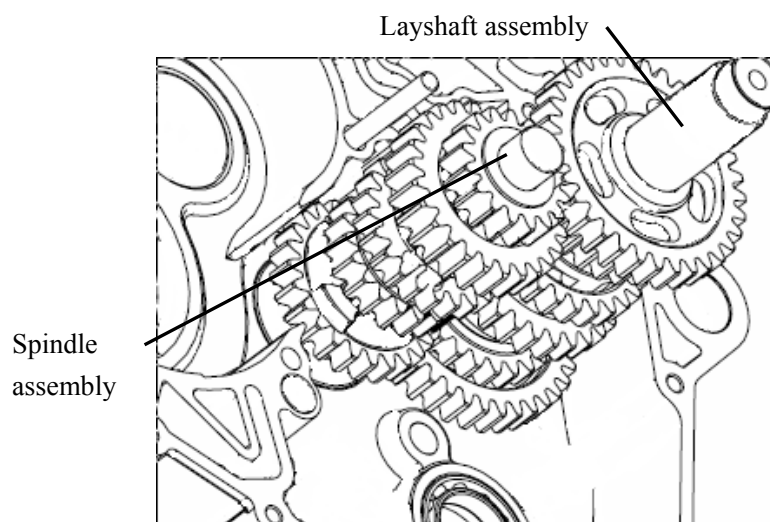


Measure the outer diameter of gearshift drum.
Allowable limit: 41.75mm.
Measure the width of the locked groove of the gearshift drum.
Allowable limit: 5.7mm.

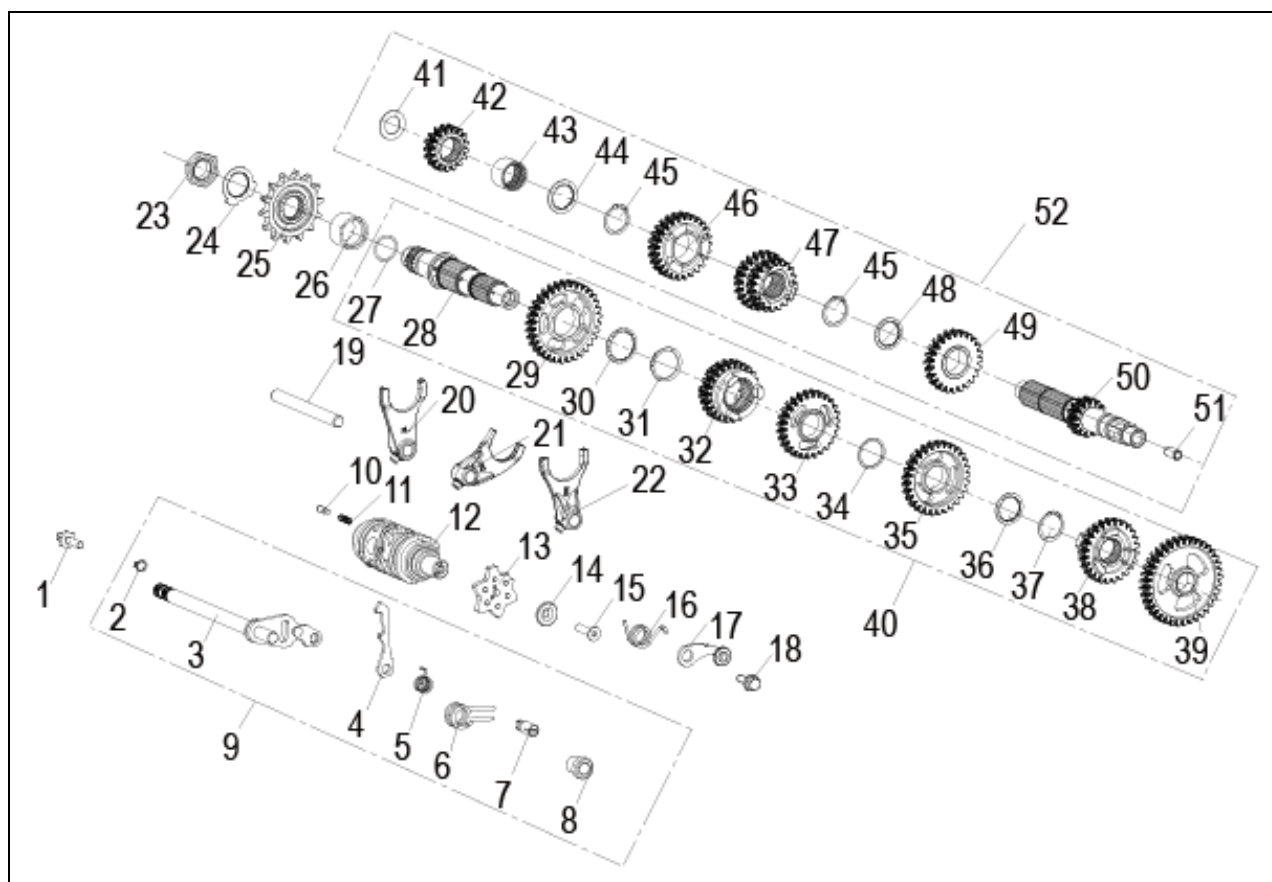


13.7 Variable speed chamber

Remove the spindle assembly.
Remove the layshaft assembly.



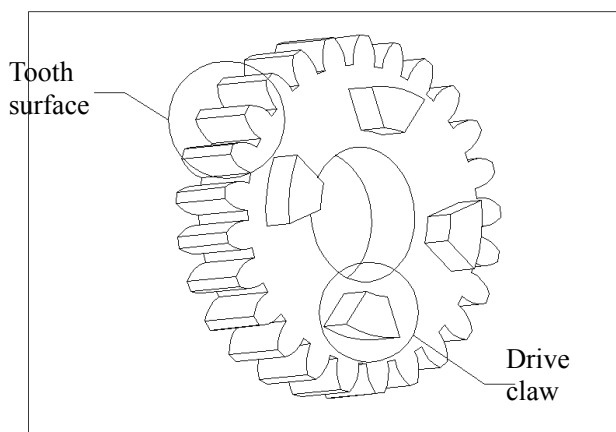
Exploded view of variable-speed gear shift assembly



1 Gearshift stop pin 2 Stop collar 3 Gearshift shaft combination 4 Gearshift running board 5 Gearshift running spring 6 Gearshift shaft return spring 7 Gearshift plate pin 8 Plastic sleeve 9 Gearshift shaft assembly 10 Gearshift changeover contact 11 Contact spring 12 Gearshift drum 13 Gearshift positioned assembly 14 Washer 15 Bolt M6X25 16 Positioning wheel return spring 17 Star wheel positioning plate assembly 18 Gearshift positioning roller arm axis 19 Shifting fork shaft 20 Shifting fork III 21 Shifting fork II 22 Shifting fork 23 Nut 24 Spline pad 25 Output chain wheel 26 Output chain wheel space bush 27 O-shape ring $\phi 19 \times \phi 1.8$ 28 Layshaft 29 Layshaft second gear 30 Spline pad 31 Shaft collar 32 Layshaft sixth gear 33 Layshaft fourth gear 34 Washer 35 Layshaft third gear 36 Spline pad 37 Shaft collar 38 Layshaft fifth gear 39 Layshaft first gear assembly 40 Layshaft assembly 41 Thrust washer (inner) 42 Spindle second gear 43 Spline sleeve 44 Spline pad 45 Shaft collar 46 Spindle sixth gear 47 Spindle third and fourth gear 48 Spline pad 49 Spindle fifth gear 50 Spindle 51 spindle sleeve 52 Spindle assembly

Inspection

Check respectively whether the tooth surface of the wheel gear and the drive claw are worn.
If badly worn or damaged, replace it.



Remove the bearings and oil seals of the left and right crankcase.
Check whether they are damaged; if there is any, replace it.

Attention:

The bearing that is knocked out can not be used again; replace it.
Disassemble the bearing and oil seals using special tools.

Combine spindle and layshaft

Attention:

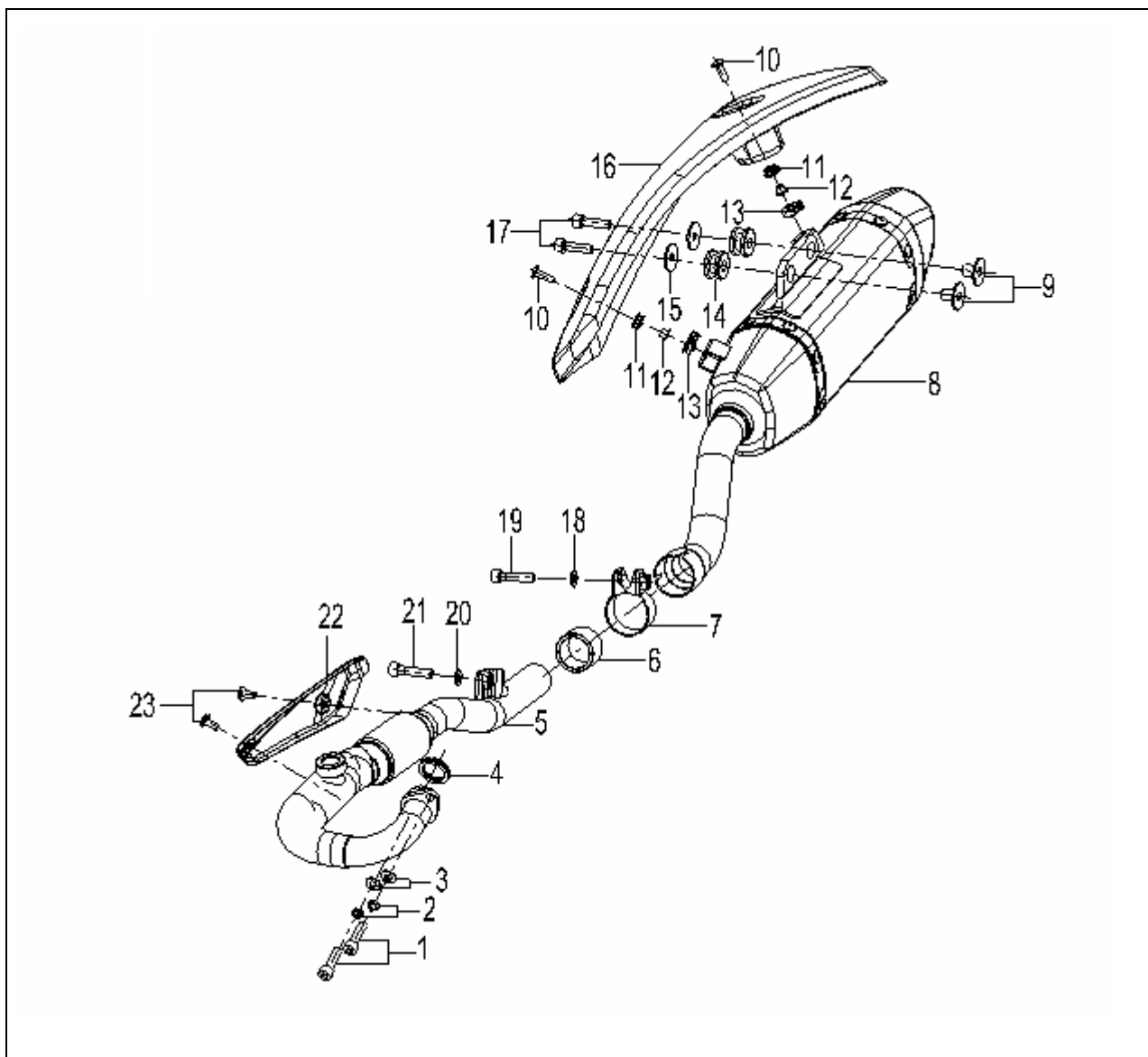
Apply lubrication oil evenly onto each gear and shaft while combining. Make sure that there is no jamming for each gear after combination.

Attention:

Assemble the crankcase in accordance with the reverse order of the removal.

Exhaust System Inspection and Maintenance

Muffler



1. Socket head cap screw M8*30 2. Spring washer 8 3. Washer 8 4. Exhaust gasket 5. Exhaust pipe assembly 6. Graphite gasket 7. Clip assembly 8. Muffler cylinder assembly 9. Cylinder liner installation 10. Bolt M6*19 11. Rubber space bush 12. Fasten space bush 13. Card nut M6 14. Heat insulation rubber gasket 15. Washer $\phi 8 * \phi 27 * 2$ 16. Muffler decorative board 17. Socket head cap screw M8*30 18 Washer 8 19. Socket head cap screw M8*40 20 Washer $\Phi 20 * \Phi 8 * 1.5$ 21 Socket head cap screw M8*20 22 Exhaust protective shield 23 Combination screw M6*12

XV Emission Control System

Emission control system guarantee -----	15.1
Periodical maintenance instructions/ensure emission standard -----	15.2
Emission control system mechanical function -----	15.3
Catalyst conversion system-----	15.4
Solutions to Idle exhaust exceeding specified value -----	15.5

15.1 Emission Control System Guarantee

1. The emission control system of the enginecycle is up to the EC/97/24/5/1 and 2003/77/EC Stage B. The company will guarantee it in its effective service life, under normal use and specified maintenance.

2. Scope of Guarantee

1> Emission control system function guarantee

The company guarantees that the system meets regular or irregular exhaust emission inspection carried out by relevant government authorities within 15,000km drive.

3. The guarantee article is not applicable to the following situations, but local dealers or service departments of the company are still willing to provide maintenance service for the customers at a reasonable price.

1> Not performing regular maintenance according to the time and traveled distance specified by the company

2> Users not performing regular inspection, adjustment or maintenance at local dealer or service center of the company, or unable to provide evidence of maintenance record

3> Overloading or improper use

4> Remounting the enginecycle, removing original spare parts or install extra devices on to the vehicle at will

5> Using the enginecycle as a racing vehicle or driving on the roads not suitable for it

6> Damages because of typhoon, flood or other natural disasters; or injuries or trouble caused by gross negligence, traffic accident or subject to impact by external objects

7> Stopping use for a long time without regular maintenance

8> Odometer is damaged and no prompt repair; or the odometer is artificially altered, stopped or replaced

9> Please come to the inspection station every three months for regular exhaust gas inspection

· The new enginecycle delivered by the company has passed noise inspection and is up to EC 97/24/9 and 2003/77/EC.

15.2 Regular maintenance guidelines

·To reduce environment pollution, it is required by the country that all the engine vehicles manufactured by each company shall meet the regulations of emission standard of air pollutants. Besides the production process is up to the regulations of emission standard of air pollutants, the company is also devoted to purifying air and reducing air pollution.

·Strict inspection is performed on the enginecycle delivered from the company; all the specifications can meet the regulations of emission standard of air pollutants. Due to different situations the users are in, we make the following regular inspection table relating to exhaust emission. To ensure normal gas exhaust, please inspect, adjust or repair your enginecycle in the specified time intervals.

·If you have any other individual problem, please contact or call your local dealer or service center of Qianjiang Enginecycle Co., Ltd.

· Relevant emission specifications:

Emission Specifications	CO	HC+NO _x
Emission standard	≤1.0g/km	≤1.2g/km

※ The latest version shall prevail when emission standard is updated.

· The enginecycle that does not perform regular inspection in local dealer or service center of the company may be prohibited to use. The company will not be responsible for that. Please have your enginecycle inspected whenever necessary to keep it in best condition.

Note: ① You shall clean more frequently the air cleaner to extend service life of the engine when your enginecycle is often used on sand-gravel roads or in severely polluted environment.

② More frequent services may be required when the enginecycle is often driven at high speed or travels a long distance.

Pay attention to the followings to ensure standard emission

1> Please use only 92 or 95 unleaded gasoline.

2> Please use only specified type of engine oil.

3> Please service your enginecycle according to your periodical maintenance table.

4> Emission control system is forbidden to be adjusted or replaced (including spark plug use, idle speed adjustment, ignition timing, carburetor adjustment, etc.).

5> Attentions:

· Improper ignition system, charging system or fuel system will have great effect on muffler, so please go to your local dealers or service center of the company for inspection, adjustment or maintenance when you encounter it.

· Please use only 92 or 95 unleaded gasoline, or the muffler device (two-stroke system) may be injured.

6> Emission control system of the enginecycle meets national standard. If you have to replace any component of the system, please use the spare parts made by Qianjiang Enginecycle Co., Ltd. and ask your local dealer or service center to replace it for you.

15.3 Emission Control System Mechanical Functions

General introduction

The emission control system is based on two-stroke single cylinder engine and throttle valve. It uses air intake device and keep excellent exhaust gas level; Activated carbon canister is used for vaporized waste gas process.

※ Engine improved

Improvement in the central spark plug with compression ratio, combustor, duration of ignition and ventilation system, is for a commonly-accepted intake and exhaust efficient, which is also for improvement in combustion efficiency.

※ Air intake device

Guide air into exhaust pipe and CO and HC of incomplete combustion will be reacted into harmless gas.

Classification	Equipment	Constituted Part	Desired Function
Combustion system	Combustion chamber	Hemispherical combustion chamber	Have spark plug hemispherical combustion chamber placed in middle to seek the safety of burning.
Exhaust system	Catalyst device	Catalyst converter	Have canned oxidation catalyst put in central exhaust pipe to oxide CO, HC and NOX.

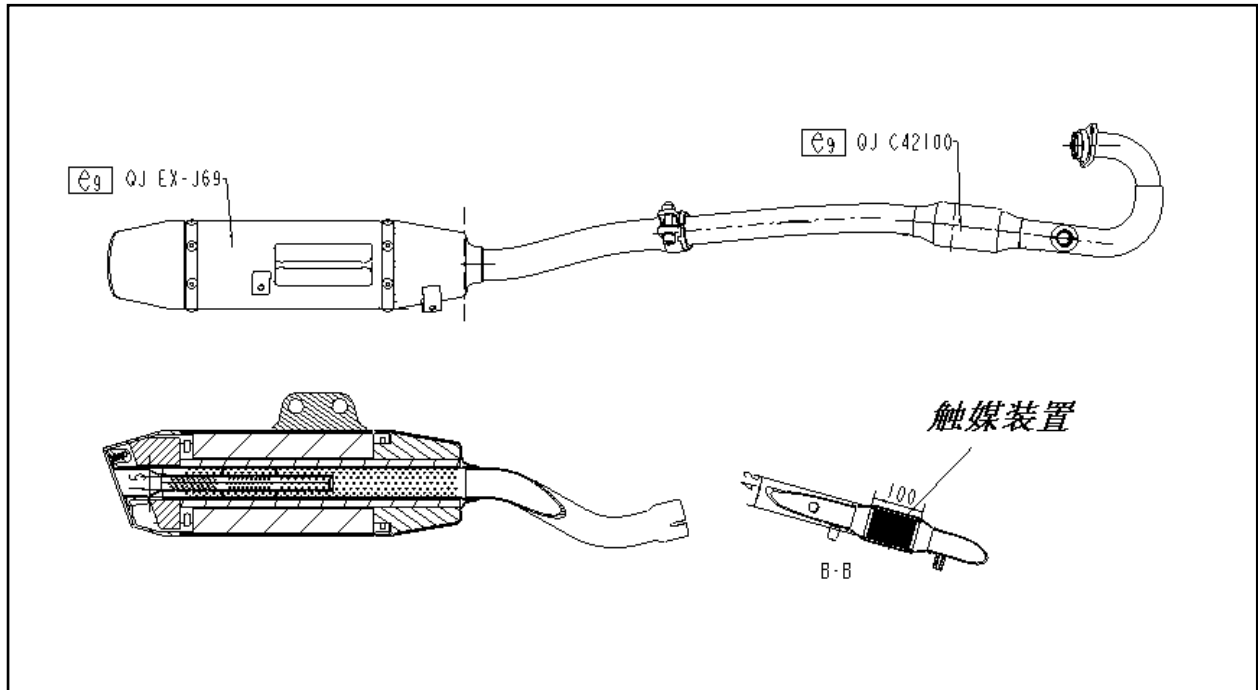
— Parameters and the recommended settings can be adjusted.

· Idling adjustment — Engine speed 1400±100rpm/min

Concentration of CO 0.5-1.2%

15.4 Catalyst conversion system

15.4.1 Construction:



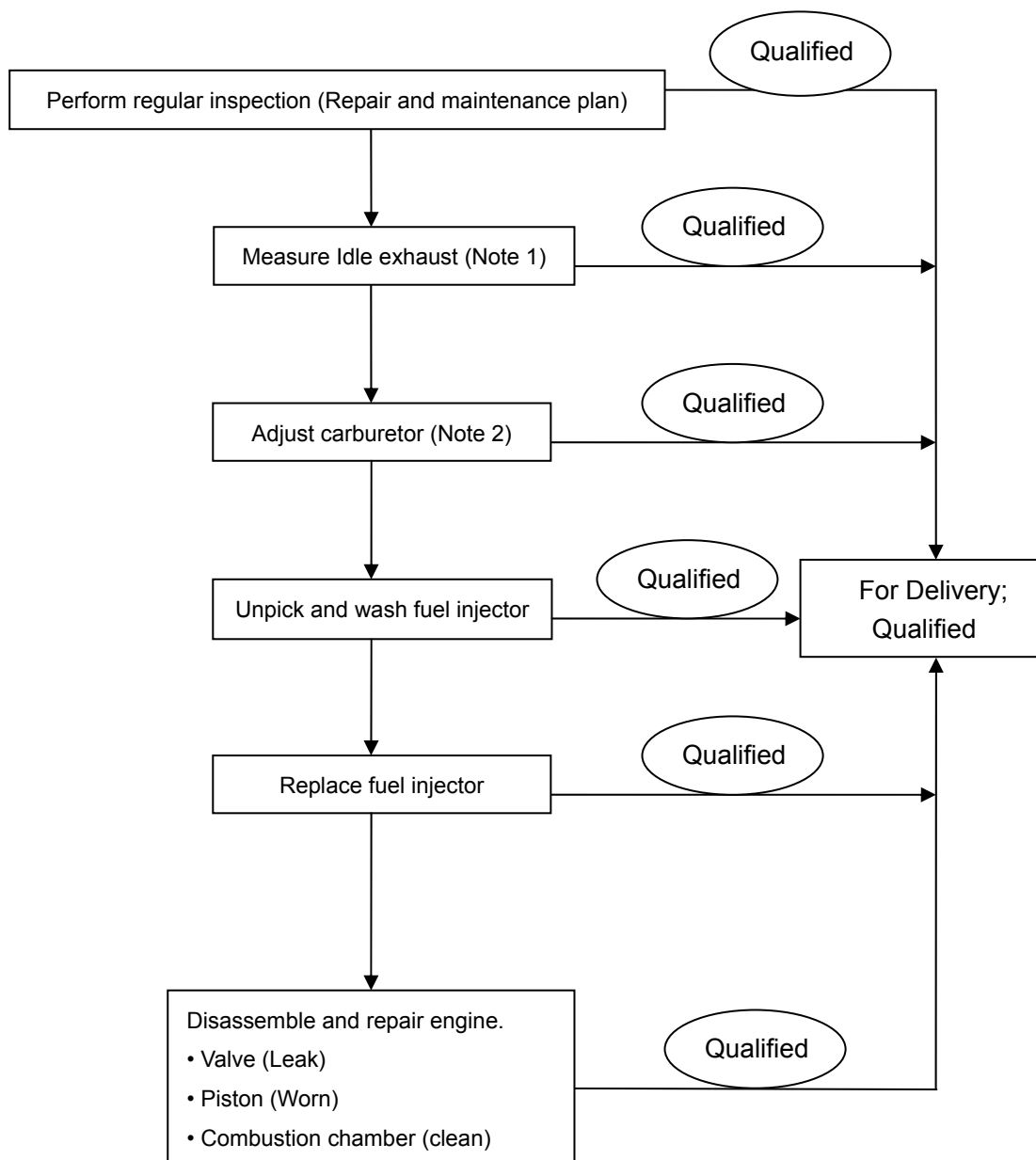
15.4.2 Instructions:

1. The function of conversion catalyst is to convert the waste gas HC, CO, NO_x into H₂O, CO₂, N₂ and other harmless gas before release.
2. Conversion catalyst contains platinum, rhodium and other rare metals, restricted unleaded petrol.
※ Note that leaded petrol will make catalyst failure.

• **General notes for inspection and maintenance of vehicles (exhaust pipes) filled with catalytic converters:**

- 1> Vehicles filled with the conversion catalyst cannot be touched when the engine is running or turned off for only a short time because of the too high temperature.
- 2> Vehicles filled with the conversion catalyst cannot be close to combustibles.
- 3> Exhaust pipe contains carbon monoxide which is harmful to health, so do not run the engine in a confined space.
- 4> Vehicles filled with the conversion catalyst cannot use leaded petrol. (To prevent catalyst poisoning)
- 5> Engine cannot be launched by use of cranks. If it must rely on cranks to starting the engine, cranks can also not be used until the temperature of the engine and the catalytic converter is lowered.
- 6> Do not use gear-up and way of shut-down in going downhill.
- 7> Do not drive the vehicle of bad ignition.
- 8> when in maintenance of engine ignition, do not disassemble the spark plug. Start the engine and use the method to check if there is any sparks. If necessary, however, a long time of spark plug removal is not allowed.

15.5 Solutions to Idle Exhaust Exceeding Specified Value

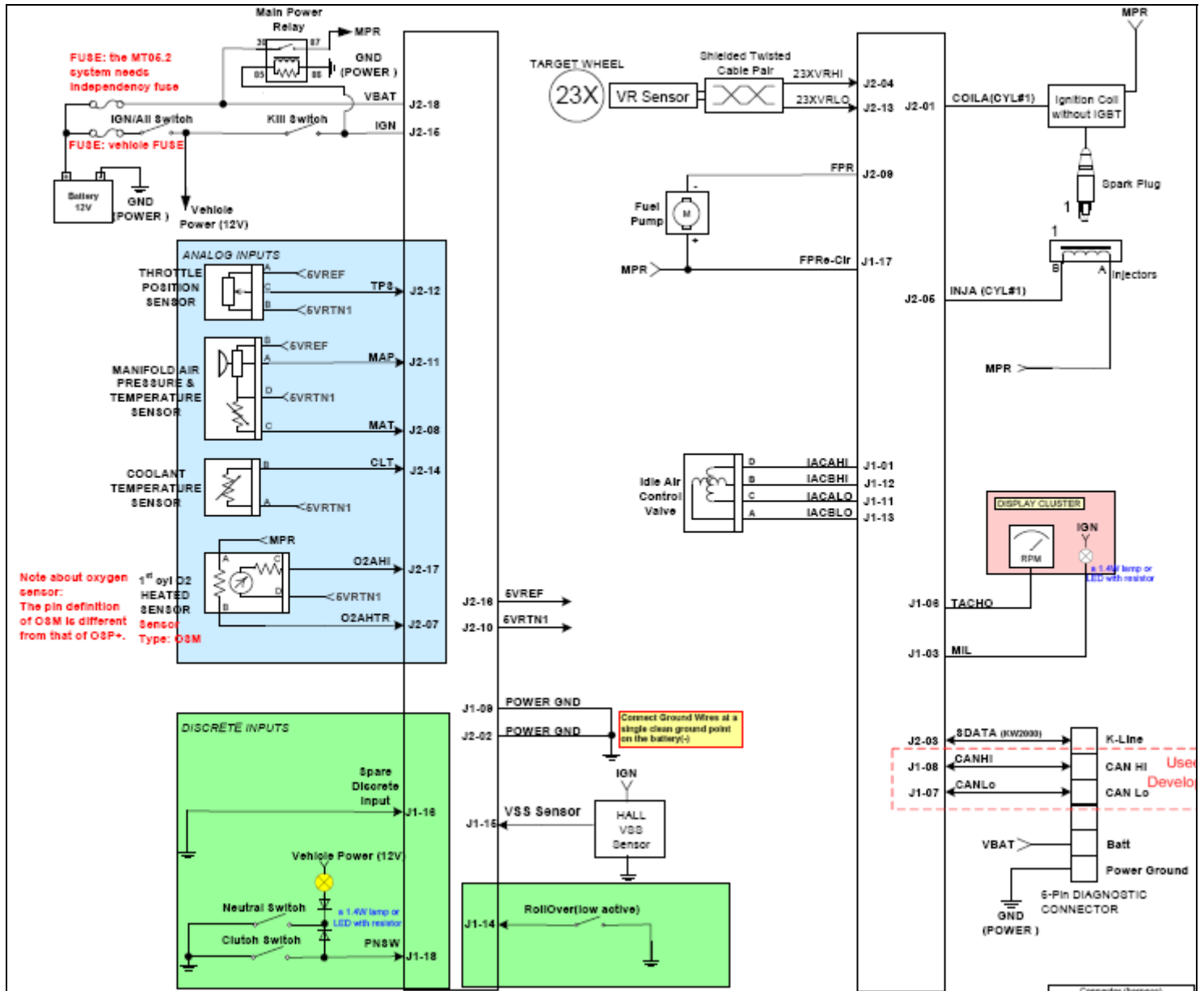


Attention:

1. Make the measurement with idling testing procedure.
2. Adjust the engine idle speed within the provisions, and measure the idle speed CO/HC.

Inspection and Maintenance of EFI System

QJ125GY-16A EFI circuit diagram



XVI EFI System Description

EFI system -----	16.1
EFI system parts -----	16.2
Fault diagnosis -----	16.3
Common troubleshooting -----	16.4

16.1 Introduction to EFI System of finished enginecycle

QJ125GY-16A uses the small engine EFI system from Delphi Corporation, which makes closed-loop control through the oxygen sensor with independent fuel injection and ignition control. It uses three way catalytic converters for post-processing of the gas after the engine's combustion to make it into harmless gas before emitted into the atmosphere. The system uses a closed-loop control self-learning system, which can effectively eliminate the manufacturing difference of the system and related mechanical components, improve the consistency of the finished enginecycle, and can also eliminate the error caused by the vehicles in actual use due to wear.

16.2 EFI system parts

16.2.1 Engine controller (MT05.2 ECU)

16.2.1.1 Working principle of ECU:

The engine controller makes real-time detection on the running state of the engine through various sensors to control the output device through rational calculation and self-learning, which can optimize the drive of vehicles under various conditions, and also ensures the vehicle emissions and fuel economy. When the system is out of order, the engine controller can be awakened to self-diagnosis. This system needs two ECU working together.

16.2.1.2 Appearance of ECU:



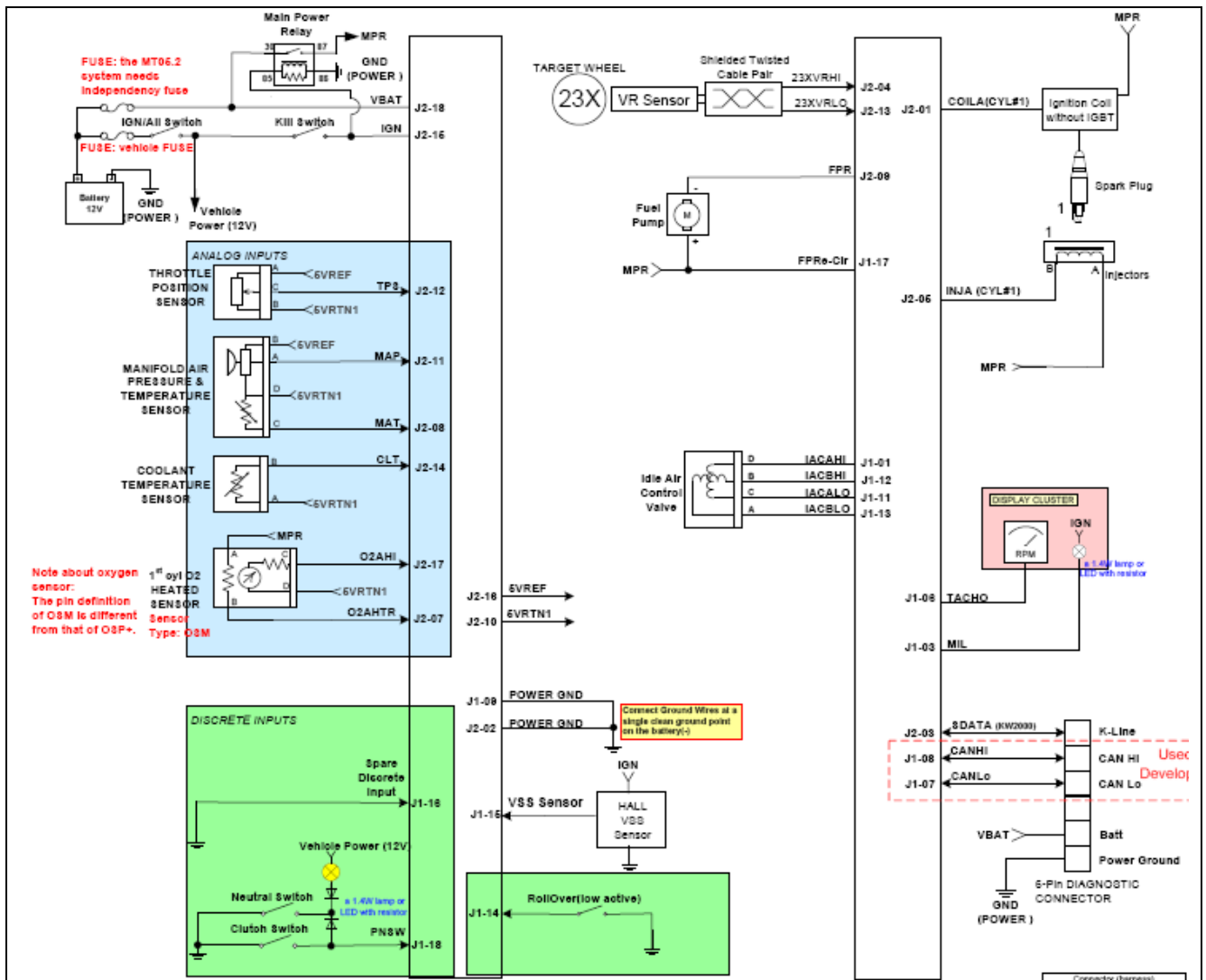
16.2.1.3 The ECU pin definitions:

J1-1	Stepper engine A high pin	J2-1	Ignition coil driver pin
J1-2		J2-2	System ground pin
J1-3		J2-3	K-wire communication pin
J1-4		J2-4	High potential pin of the crankshaft signal
J1-5		J2-5	Injector drive pin
J1-6	Rotating speed signal pin	J2-6	
J1-7	CAN line signal low pin	J2-7	Oxygen sensor heating pin
J1-8	CAN line signal high pin	J2-8	Intake air temperature sensor signal pin
J1-9	System ground pin	J2-9	
J1-10		J2-10	System 5V reference voltage ground pin
J1-11	Stepper Engine A low pin	J2-11	Intake air pressure sensor signal pin
J1-12	Stepper engine B high pin	J2-12	Throttle body position sensor signal pin
J1-13	Stepper engine B low pin	J2-13	Low potential pin of the crankshaft signal
J1-14	Dump switch (low effectiveness)	J2-14	Water temperature sensor signal pin
J1-15	Speed signal pin	J2-15	Ignition power (12V positive voltage after the key)
J1-16	Spara discrete input	J2-16	5V reference voltage
J1-17	Oil pump control signal pin	J2-17	Oxygen sensor signal pin
J1-18	Neutral switch pin	J2-18	Battery power (battery 12V positive power supply)

Note:

J1 means the gray plug in the ECU while J2 means the black plug in the ECU; J1-1 means the 1st pin in ECU gray plug.

16.2.1.4 EFI circuit diagram:



16.2.1.5 Note for use of ECU:

1. Do not place ECU in the high temperature parts, such as a muffler or engine;
2. The ECU cannot be placed near the water droplets, oil or any liquid;
3. Do not let the mud or other contaminants cover the ECU, affecting the ECU cooling;
4. Use the M8 bolt for connection and ensure that the tightening torque is about 3.9Nm; installation surface must be flat to prevent bending the circuit board caused by external forces to ECU.
5. The ECU normal DC power supply and voltage range is 9 to 16V, and the ECU does not produce permanent damage if working under no more than 26V DC voltage for one minute, and so is it, if working under the condition that the reverse voltage does not exceed 13V DC voltage within one minute, will not cause permanent ECU damage.

16.2.2 Oil Injector

16.2.2.1 Working principle of oil injector

Inside the injector surrounding the iron core there is an electromagnetic coil which leads to the two electrodes, namely, the injector input control interface. When the electromagnetic coil is energized, the generated electromagnetic force makes the ball valve rise by overcoming the spring force of the ball valve and fuel pressure, so the high-pressure fuel (250Kpa) inside the fuel pipe can pass through the injector valve seat hole, flowing through the spray orifice board and forming a conical mist sprayed into the intake valve. When the injector is in outage, electromagnetic coil's electromagnetic force disappears, and the ball valve of the injector closes automatically under the action of return spring to make fuel injection action of the injector stop.

16.2.2.2 Appearance of oil injector:



16.2.2.2 Note for use of injector:

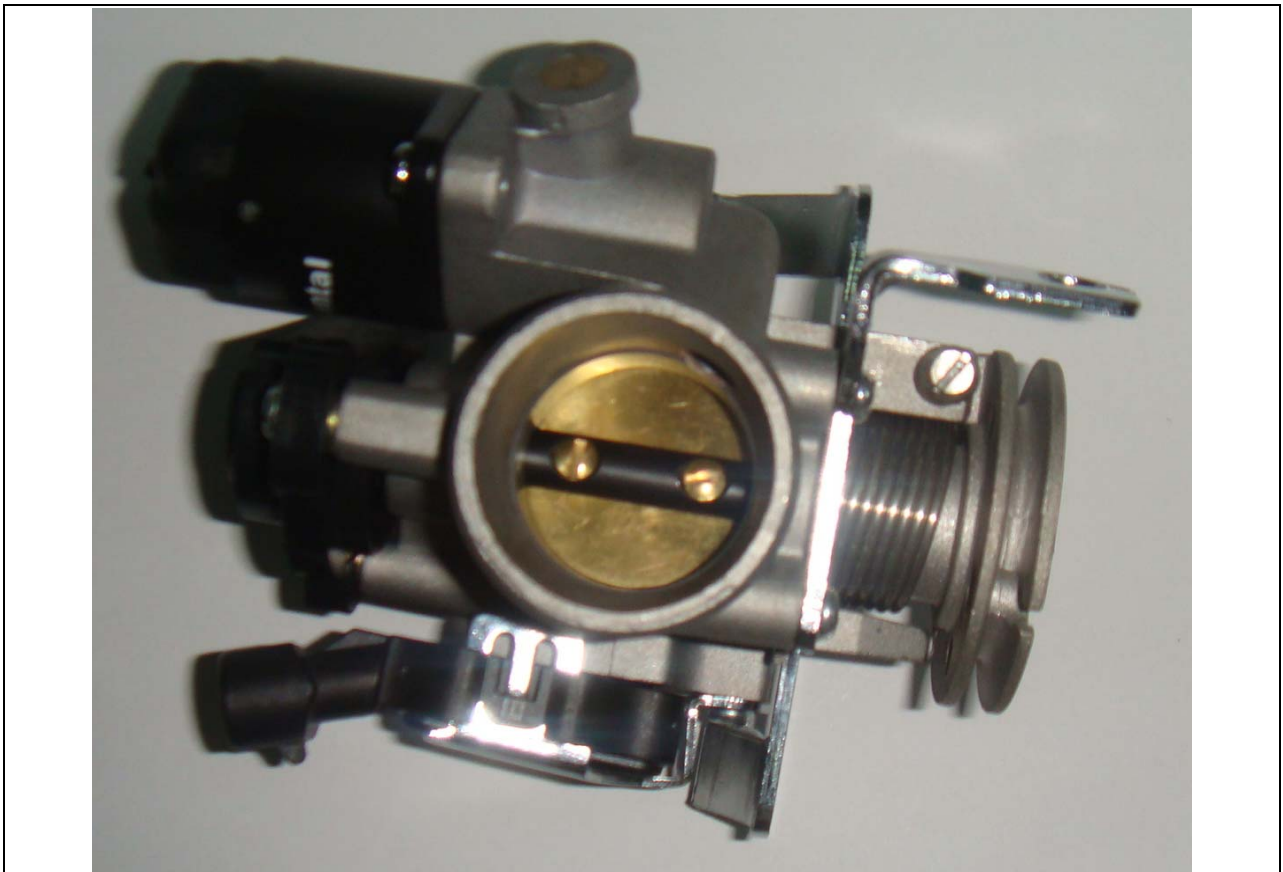
1. Inside the injector there is a filter, but it is not a serviceable part, because it is only designed to filter out the accumulated impurities between the fuel filter and injector of the oil line. The impurities can cause injection bonding, flow offset and leakage and other faults, so the fuel filter is very important.
2. Only the injector of the same parts number can be replaced,

16.2.3 Throttle body

16.2.3.1 Working principle of throttle body:

Throttle body is mainly made up of principle cast body, return spring, throttle cable, throttle body position sensor and idle speed adjustment screw, and throttle body position sensor is to provide throttle opening to the ECU; idle adjustment screw to control the idle speed and stability. Clockwise reduces the bypass gas, and reduces the idle speed while counterclockwise increases the bypass gas, and increases the idle speed; in general it requires about two laps.

16.2.3.2 Appearance of throttle body:



16.2.3.3 Clearing of throttle body

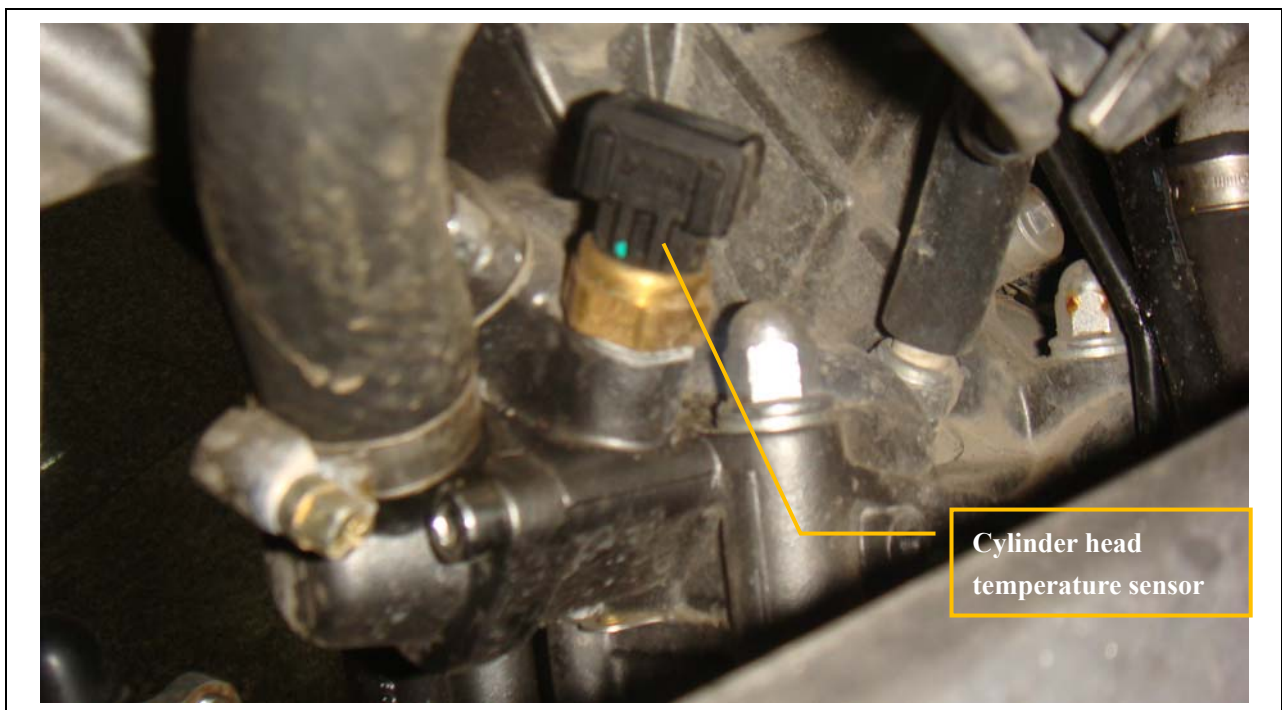
Use throttle cleaner to clean the throttle body; spray the cleaner on the internal wall of the throttle body and brush gently off the dust, coke, etc.; make sure no dirt clogging the side-channel.

16.2.4 cylinder head temperature sensor

16.2.4.1 Working principle of cylinder head temperature sensor:

The engine cylinder head temperature sensor is used for air-cooled engine to measure the engine cylinder head temperature; within the temperature range of the sensor, its resistance varies with engine temperature, and its temperature characteristic is the negative temperature coefficient resistance characteristics. It is a part which is not maintainable.

16.2.4.1 Appearance of cylinder temperature sensor:



16.2.5 Intake air temperature sensor

16.2.5.1 Working principle of intake air temperature sensor:

It is used to measure the temperature of incoming air, and its resistance will vary with the temperature of the intake air; its characteristic is also negative temperature coefficient resistance characteristics. It is also a part which cannot be repaired.

16.2.5.2 Appearance of intake air temperature sensor:

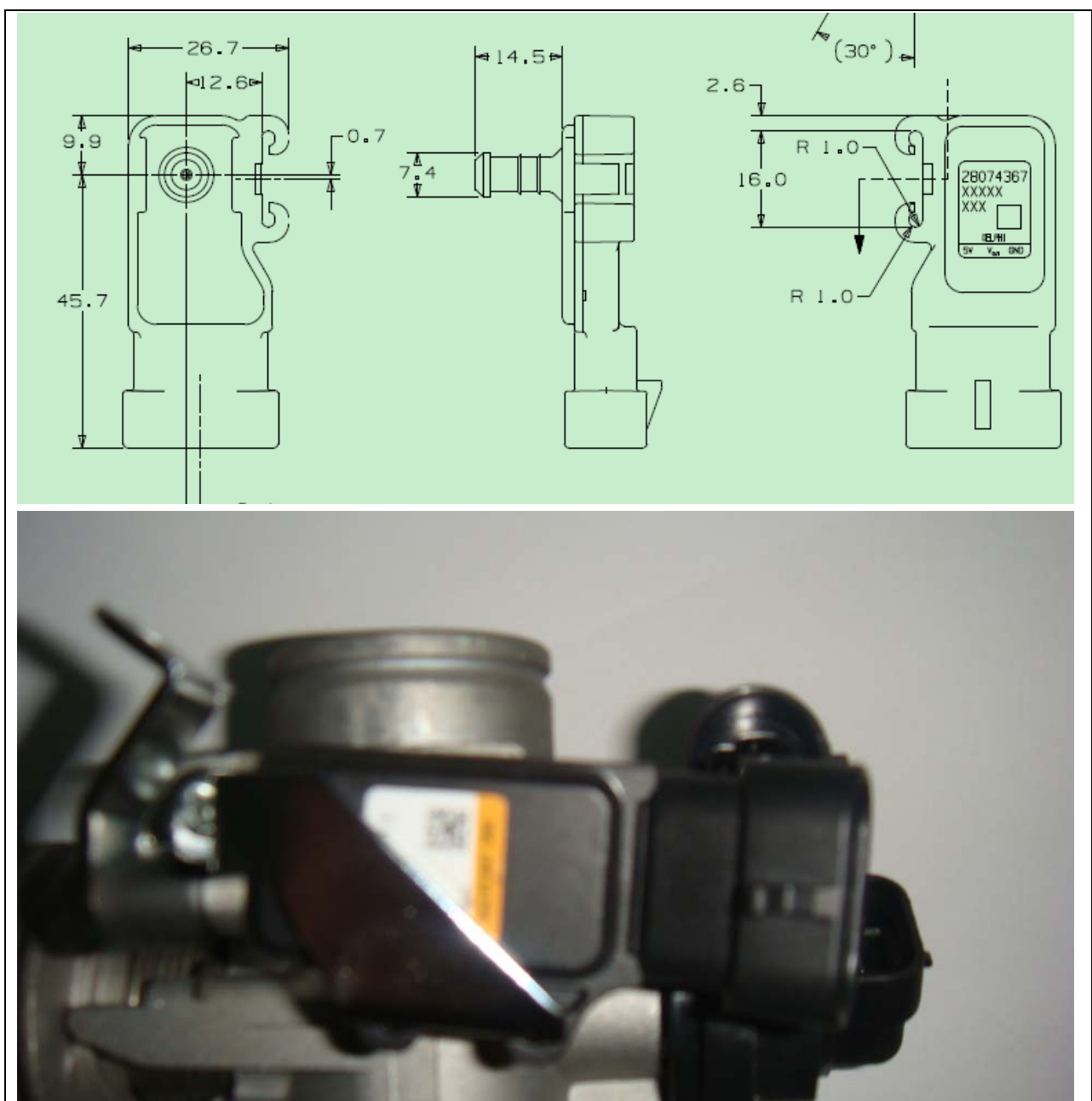


16.2.6 Intake air pressure sensor

16.2.6.1 Working principle of intake air pressure sensor:

The sensor is used to measure the absolute pressure of intake air elbow to reflect different inlet pressure according to the resistance value, and the inlet pressure can be thus indirectly converted into calculation of the size of the intake air into the engine combustion chamber. It is not the repairable parts

16.2.6.1 Appearance of intake air pressure sensor:



16.2.7 Oxygen sensor

16.2.7.1 Working principle of oxygen sensor:

The sensor can be used to detect the amount of oxygen in the exhaust gas in the engine exhaust pipe for the ECU internal fuel closed-loop control, so that the combustion of engine has always been maintained at the most reasonable proportion of air and petrol.

16.2.7.2 Appearance of oxygen sensor:



16.2.8 Ignition coil

16.2.8.1 Working principle of ignition coil:

Ignition coil can provide energy to the spark plug, and it is the high-voltage that connects the ignition coil and spark plug.

16.2.8.2 Appearance of ignition coil:



16.2.9 Idling stepper engine

16.2.9.1 Working principle of idling stepper engine:

Function of idling control valve is to control the circulation area of the airway next to the throttle body to regulate the amount of air entering the engine to achieve the engine idling control.

16.2.9.1 Appearance of idling stepper engine:



16.2.10 Fuel pump

16.2.10.1 Working principle of fuel pump:

The electric oil pumps and pressure regulator works together to provide 250Kp gas pressure to the engine, installed at the bottom of the fuel tank.

16.2.10.2 Appearance of fuel pump:



16.2.10.3 Fuel pumps fault diagnosis:

1. After the key is turned on, the pump will operate for about 3 seconds or so; if you can hear the pump running, please go directly to 4;
2. Disconnect the pump connector, detect whether the supply voltage of the pump is about 12V;
3. If there is no problem for step 2, make external connection to battery to provide 12V DC to test whether the pump is operating well.
4. If the pump is operating normally, use petrol pressure gauge to test the tubing pressure of the front-end of engine is about 250Kpa during idling of engine;
5. If the line pressure is lower than 220Kpa, check if there is leakage for the oil pipeline, if oil pump is inverted, or if there is blockage for filter.

16.2.10.4 Common problems for fuel pump:

1. The fuel pump assembly plug is reversed, resulting in the reversal of the fuel pump, so it cannot provide sufficient fuel pressure to the engine, causing the engine does not work.
2. Pump cannot rotate because of damage.

16.2.10.5 Notes for use of fuel pump:

1. There is no petrol in the fuel tank for the new engine cycle at the beginning, and there is much air in the fuel oil pipeline after the petrol is filled, so it needs to move the engine for a lot to let the air out completely and the engine can work properly; this is normal; being unable to start for a long time will not appear in the following start-up.
2. Because petrol can cool the fuel pump, do not let the pump work with little oil or no oil; otherwise it will burn the fuel pump.

16.3 Troubleshooting diagnosis

Fault light is located on the dashboard with a FI mark below. Under normal circumstances, open the key, the fault light will be on, which means that the EFI system is in power state and can work; the fault light are not on, which said EFI circuit is out of power supply, and will not work, and it needs to check the fuse and the battery positive and negative connections. After the engine is started, the fault light is off, which means there is no fault; conversely, if the engine is started the fault light is still on for long, which said the EFI system is not working properly, and there is a failure needing to troubleshoot.

At present there are three ways to detect fault:

16.3.1 Directly use fault light (F1) flashing on the instrument for diagnosis.

After confirming there is a fault, if open and close the key for three times switch three times, namely, open — close—open—close—open the key, the fault light will come to a flash code corresponding to the fault. And then through the fault code table identify the corresponding fault.

With fault light reading fault, the rules of the flash code are as follows, for example, if the fault is the intake air pressure sensor is disconnected or the signal-side pin shorts to battery negative, after the key is opened and closed for three times the fault light will first flicker for 10 times on behalf of 0, flicker for 1 times on behalf of 1 after an interval of 1.2 seconds, flicker for 10 times again on behalf of 0 after an interval of 1.2 seconds, and after an interval of 1.2 seconds flicker for 7 times on behalf of 7 , namely, P0107.it is thus clear that other figures from 0 to 9 are expressed by the times of the flicker of the fault light except that figure 0 is expressed by flicker for 10 times. If there are other fault codes, such as fault P0201, which means there is a fault in the front cylinder injector, the fault light will continue to flicker P0201 fault code in 3.2 seconds after finishing P0107; if there is no other fault, the fault light will flicker P0107 and P0201 circularly, and then check the fault code table for related faults.

While using PCHUD software, the software will use the decimal number to report fault code, and in fault code table decimal system is corresponding with hex one to one, so the corresponding fault can be found according to the correspondence between them. For example, in software MULFCURR (current fault) = 263, and it corresponds to P0107 in the fault code table, namely, the intake air pressure sensor fault.

16.3.2 Make use of diagnostic equipment for fault diagnosis



Operational approach:

1. Locate the 6-hole diagnostic interface on the enginecycle;
2. Connect the connecting wire and diagnostic equipment interface;

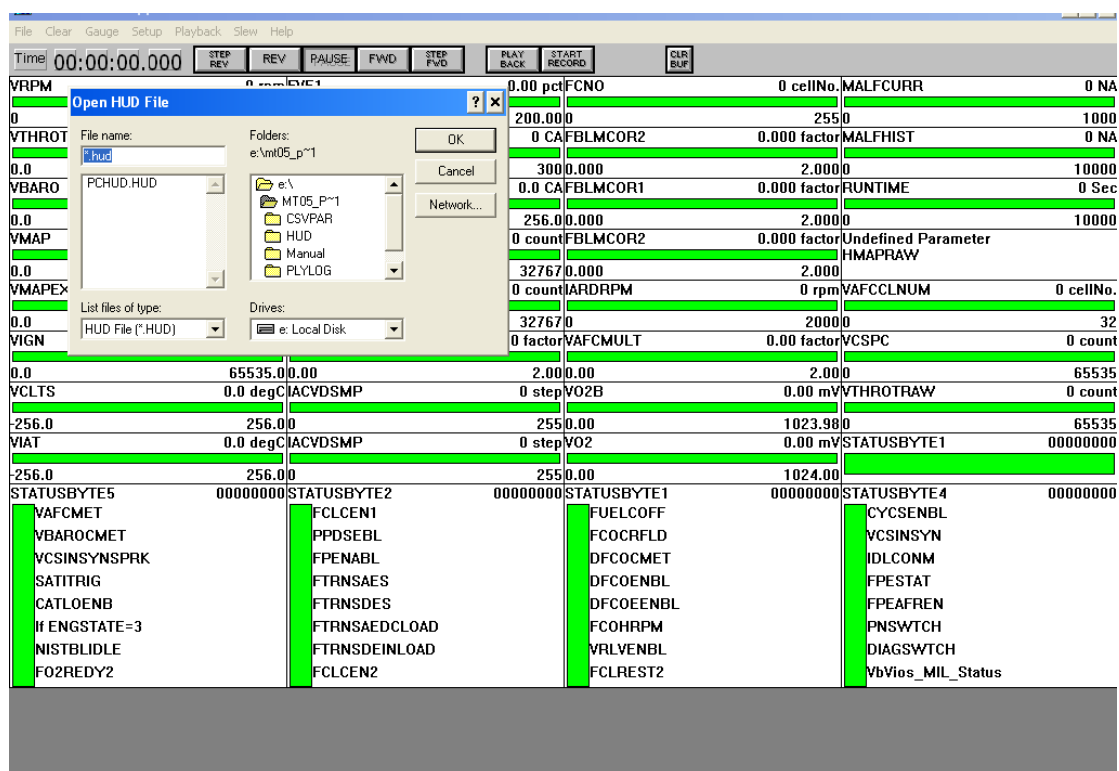
3. Open the key for diagnosis.

16.3.3 Use diagnostic software PCHUD on the laptop to check fault.

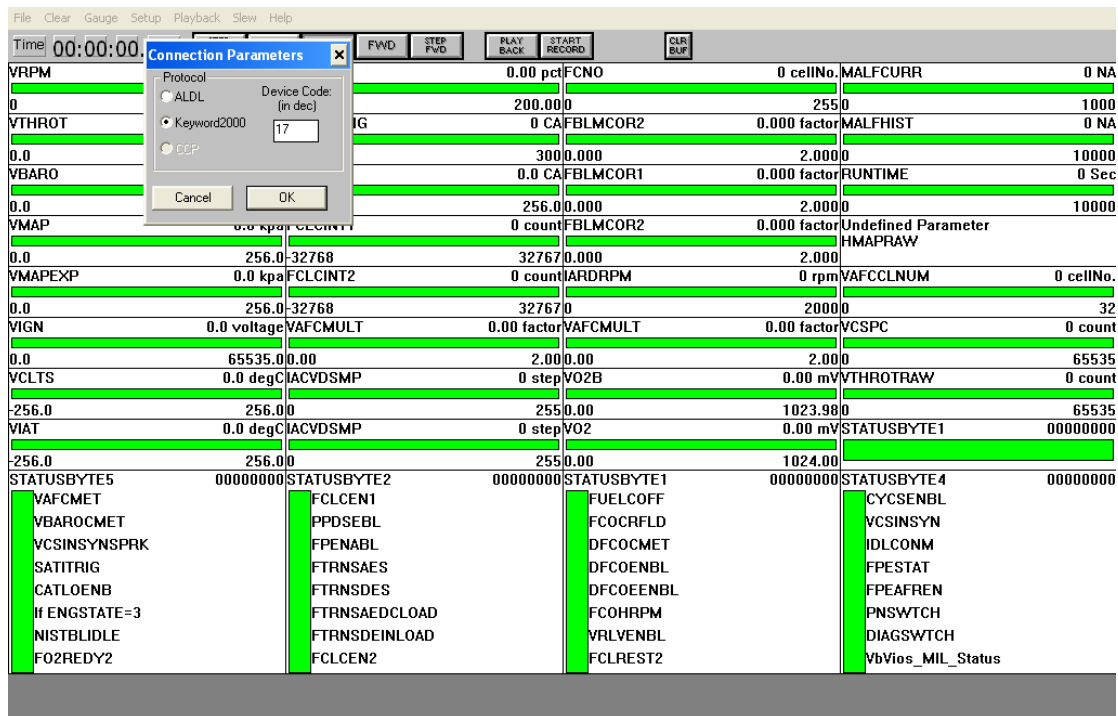
PCHUD software is used to detect and record engine operating data, and it needs to connect the laptop with the six-hole diagnostic port of the enginecycle through K-line prior to the use. It needs to install the driver software for the K-line in the laptop before use.

Instructions to PCHUD software use:

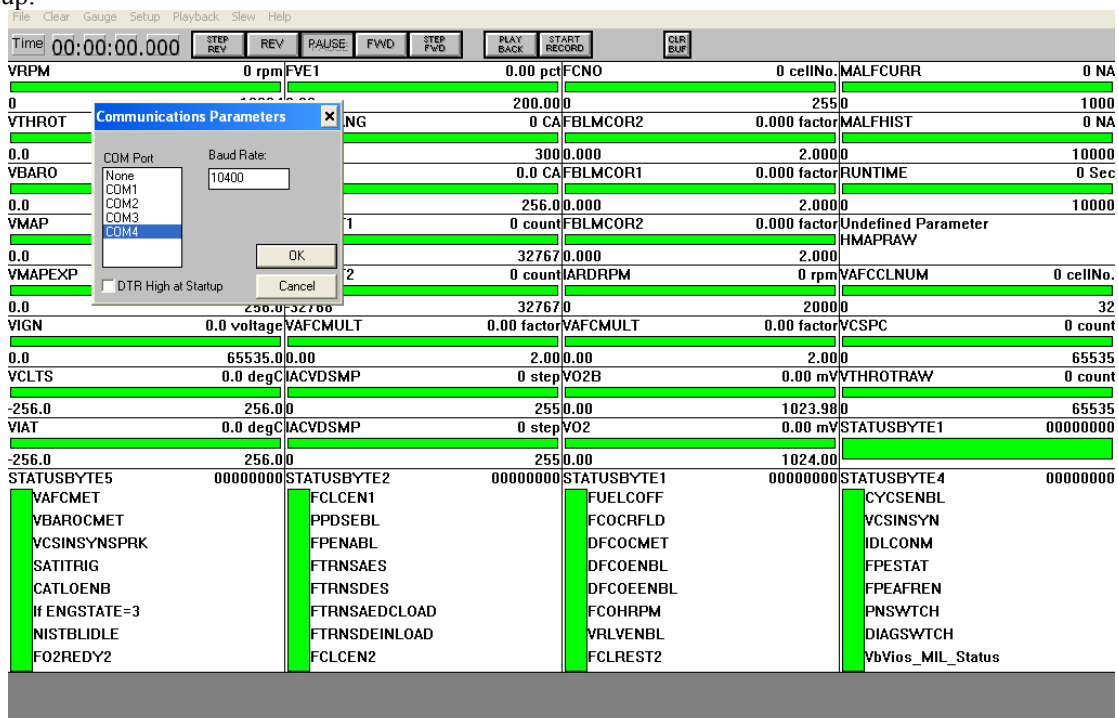
- (1) Use the K line to connect the 6 -hole diagnostic port of the enginecycle and the notebook computer, and open the key
- (2) Click "HUD.EXE" icon to start PCHUD software
- (3) On the software interface, select "File"; click the "Open" to select "PCHUD.HAD", and select OK to confirm.



- (4) Select "Parameter File" under the "Setup"; click MT05common.par file; select "Comm protocol" under the "Setup"; select "Keyword2000," and then click OK, at the same time Device Code selects 17.



(5) If the software interface cannot display real-time communication data in the case of power, it needs to continue the following work, under "Setup" check whether there is problem with COM port connection settings, and the usual settings are COM Port: 4, the Baud Rate: 10400; do not Select the DTR High at the startup.



Then it can communicate properly, in the MALFCURR displays the current fault code while history fault codes are displayed in MALFHIST

MALFCURR	0 NA
0	1000
MALFHIST	0 NA
	10000

Inquire the fault code table for the corresponding fault.

Attached Table 1: PCHUD software parameters explanations:

VRPM	engine speed
VTHROT	throttle position
VBARO	BARO
VMAP	manifold air pressure
VMAPEXP	expect manifold air pressure
VIGN	ignition key voltage
VCLTS	cylinder temperature or coolant temperature
VIAT	intake air temperature
STATUSBYTE5	STATUSBYTE5
VAFCMET	airflow correction met
VBAROCMET	Baro update met
VCSINSYNPRK	sequential spark enable
SATITRIG	tip-in Spark Advance retard trigger
CATLOENB	catalyst light-off logic enable
IF ENGSTATE=3	engine work in run state
NISTBLIDLE	stable warm idle
FO2REDY2	O2 ready
FCNO	block learn memory cell
FBLMCOR1	cylinder 1 block learn memory
FCLCINT1	integral of close loop correction
FCLCMUL1	close loop correction
IARDRPM	desired idle rpm
IARPMERR	idle rpm error
FPWVC1	base pulse width of cylinder 1
VO2	Oxygen sensor signal
STATUSBYTE3	STATUSBYTE3
FO2STAT1	cylinder 1 oxygen sensor signal rich lean state
FCLREST1	cylinder 1 close loop correction reset
FOSHTREN	Oxygen sensor heater enable
FO2REDY1	cylinder 1 Oxygen sensor ready
IF IACV MODE=0	idle airflow control valve close loop correction enable
IAMTRLOST	IACV lost
IACMVIHB	IACV move disable
VIGNS	ignition state
FVE1	cylinder 1 Volumetric efficiency
VMAPRANG	MAP read angle
AFFNLAFR	target air fuel ratio
SAESTA	cylinder 1 Spark Advance
SAIDLDYN	idle dynamic Spark Advance
SPDWELL	dwel time
IAINTEGOFST	airflow integral of idle air control valve
IACVDSMP	desired position of idle air control valve

STATUSBYTE2	STATUSBYTE2
FCLCEN1	cylinder 1 close loop correction enable
PPDSEBL	prime pulse disable
FPENABL	fuel pump enable
FTRNSAES	acceleration enrich enter
FTRNSDES	deceleration enlean enter
FTRNSAEDCLOAD	acceleration enrich exit
FTRNSDEINLOAD	deceleration enlean exit
FCLCEN2	cylinder 2 close loop correction enable

Attached Table 2: Fault code table

The MT05 fault code table		
The fault code	description	Corresponding to the decimal number
P0107	Open circuit for intake pressure sensor or signal end pins shorted to battery negative	263
P0108	Intake air pressure sensor signal end pins shorted to battery positive	264
P0112	Intake air temperature sensor signal end pins shorted to the battery negative	274
P0113	Open circuit for Intake air temperature sensor or signal end pins shorted to battery positive	275
P0117	Cylinder head temperature sensor signal end pins shorted to battery negative	279
P0118	Open circuit for cylinder head temperature sensor or signal end pins shorted to the battery positive	280
P0122	Open circuit for throttle position sensor or the signal end pins shorted to battery negative	290
P0123	Throttle position sensor signal end pins shorted to battery positive	291
P0131	Front cylinder oxygen sensor signal end pins shorted to battery negative	305
P0132	Front cylinder oxygen sensor signal end pins shorted to battery positive	306
P0031	Front cylinder oxygen sensor heating end pins shorted to battery negative	50
P0032	Front cylinder oxygen sensor heating end pins shorted to battery positive	49.
P0201	Front cylinder injector fault	513
P0202	Back cylinder injector fault (such as fuel injector plug is not plugged in)	514
P0230	Pump open or short circuit to the battery negative	560
P0232	Pump short circuit to battery positive	562
P0336	Crankshaft position sensor interference	822
P0337	Crankshaft position sensor without signals	823
P0351	Front cylinder ignition coil fault	849
P0352	Back cylinder ignition coil fault	850
P0562	EFI system voltage is too low	1378
P0563	EFI system voltage too high	1379
P0560	Fault for fault lamp (bad filament or plug-in board is not plugged in)	1616
P1693	Tachometer line short-circuit to the battery negative	5779
P1694	Tachometer line short-circuit to the battery positive	5780
P0137	Back cylinder oxygen sensor signal end pin shorted to the battery negative	311
P0138	Back cylinder oxygen sensor signal end pin shorted to the battery positive	312
P0038	Back cylinder oxygen sensor heating end pins shorted to battery positive	56
P0037	Back cylinder oxygen sensor heating end pins shorted to battery negative	55.

16.4 Common troubleshooting

16.4.1 Maintenance tools

- a) Disassemble of the electronic control system components - withdrawal tools of automotive mechanical parts are often used
- b) Electronic control system circuit and system signals - digital multimeter (with buzzer)
- c) Fault diagnosis of electronic control system and detection of engine's working condition
 - Electronic control system malfunction diagnostic apparatus (recommended)
 - Failure diagnostic software (PCHUD,) and interface connection wire (conditional use)
- d) Electronic control system failure fault code table (emergency use)
- e) Fuel pressure gauge, range 0 ~ 300kPa



16.4.2 Diagnostic apparatus displays engine operating data stream

Use the engine operational data stream the diagnostic apparatus displays to analyze and determine the engine failure.

16.4.2.1 Step 1

- a) Engine wiring harness and vacuum tube - may affect the system to control air flow and fuel supply

- b) Whether the oxygen sensor installation is in place - may affect system's judgment of the air-fuel ratio.
- c) Engine fault indicator - impacts system failure alarm
- d) Battery voltage - to determine the adequacy of battery power
- e) According to experience to judge whether the displayed value of coolant temperature sensor, intake air temperature sensor, intake manifold absolute pressure sensor and oxygen sensor is normal
- f) Operating range of the throttle position sensor - that it cannot be fully opened or fully closed may affect engine dynamic performance and some system functions

16.4.2.2 Step 2

Whether the ECU power supply is turned off - communication between the diagnostic apparatus and system is terminated after the key switch is turned off.

16.4.2.3 Step 3

- a) Coolant temperature and coolant temperature cycling - indicates whether the thermostat is working properly

- b) Battery voltage - indicates whether the generator is working properly.

Too high: It may be the generator regulator failure;

Too low: It may be the improper generator connection or generator failure

- c) Intake manifold pressure - may indicate whether there is leakage in inlet air and problem for valve clearance.

Valve clearance is too small: this value is on the high side; it may affect the power of the engine, and because of the exhaust valve too early to open, that the exhaust temperature increases greatly shortens the life of the oxygen sensors and catalytic converters;

The valve clearance is too large: it will cause the intake manifold pressure is on the low side, and impact judgment of the system on the engine operating state, resulting in idling exception while warming up the engine cycle.

In addition, if the exhaust system is blocked, for example, foreign body presents in the exhaust passage, excessive oil consumption resulting in clogging catalytic converter and blockage resulting from the internal fragmentation of the catalytic converter, and it will cause this value is too high.

- d) Number of cycles of the oxygen sensor values - too little number of cycles, indicating the oxygen sensor failure.

16.4.3 Concise troubleshooting

Please repair fuel injection systems according to the following sequence of steps; if troubleshooting can be finished in some step, the follow-up steps may be omitted. And then with use of diagnostic equipment, make inspection and erase the fault code according to 14.4.2.

In use of diagnostic equipment, the battery voltage is not less than 8.5 volts.

16.4.3.1 Daily use and maintenance

- Petrol should be such high quality unleaded petrol as 92# or 95#.
- ECU has a moisture barrier, but its shell may not be washed with water cannon.3}
- Replace the fuel filter every 7,000 ~ 10,000km.
- Under normal conditions of use, clean the throttle body once every 10,000 km or 1 year.

16.4.3.2 Fault phenomenon - unable to start

a) Make the ignition switch at "ON" file to check whether the engine fault light is on

If not on:	<ul style="list-style-type: none"> ◆ Check the fuse and earth wire ◆ Check whether the ECU's patch plug is securely connected ◆ Diagnostic apparatus may also be used to execute agency check function to check whether the light and line are normal ◆ Check and repair the bulb and its line ◆ Use another ECU to determine
If on:	◆ Connect the diagnostic equipment to the system diagnostic socket

b) Whether the diagnostic apparatus can connect and communicate with the system

If not:	<ul style="list-style-type: none"> ◆ Check the fuse and earth wire ◆ Check whether the ECU's patch plug is securely connected ◆ Check whether the diagnostic apparatus in another normal vehicle is working properly ◆ Use another ECU to determine
If so:	◆ According to the fault indicated by the diagnostic apparatus for troubleshooting.

c) Check the ignition system failure - whether the spark plug is normal ignition

If not:	<ul style="list-style-type: none"> ◆ Check whether the high-voltage lines and spark plug patch firmly or are damaged ◆ Use another ignition coil assembly to judge ◆ Use another ECU to determine
If so:	◆ Check whether the high-voltage lines is properly connected to the ignition coil and spark plug

d) Check the fuel supply system failure

Whether the fuel pump is working - working of pump can be hears near the tank when starting the engine

If not:	<ul style="list-style-type: none">◆ Check whether the fuel pump relay is working properly◆ Check whether the crankshaft position sensor is connected and work is normal.◆ Use another ECU to determine◆ Check the fuel pump lines	
If so:	1) Whether the supply pressure is greater than 220Kpa	
	2) Pressure is insufficient:	<ul style="list-style-type: none">◆ Check the fuel tank if there is sufficient oil◆ Check the fuel filter whether it should be replaced (Note: The EFI dedicated fuel filter is replaced once every 7000 to 10000 km)◆ Whether the oil supply line and return line are damaged
	3) Pressure is normal:	<ul style="list-style-type: none">◆ Check whether the nozzle control circuit is normal◆ Whether the glib should be cleaned

e) Determine whether the cylinder is submerged

If so:	<ul style="list-style-type: none">• Fully open throttle, connected to the starter, after a few seconds, the engine should begin to work
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f) Whether the crankshaft position sensor clearance is too large

16.4.3.3 Fault phenomenon - unable to start and accompanied by a tempering

a) Check whether high-voltage lines of the ignition coil high-voltage are tightened

b) Whether the timing gear ring is loose.

16.4.3.4 Fault phenomenon - unstable idle

Idle speed control system:	Check whether idle speed bypass bolt of the is screwed too tight or loose, usually 2 laps
Fuel supply system:	Whether there is leakage for tubing pipe.

16.4.3.5 Fault phenomenon—the idle is too high or too low (idle speed does not match obviously)

Idle speed is too high:	<ul style="list-style-type: none">◆ When the water temperature is below 68 degrees, the system will increase the idle to accelerate the warm-up process, which is a normal phenomenon. Except for that, make inspection according to the following steps◆ Check whether the idle bypass holes are too big◆ Valve clearance, especially whether the exhaust valve clearance is too large
Idle speed is too low:	<ul style="list-style-type: none">◆ Check the fuel tank, fuel filter, oil pressure and nozzle◆ Check whether the idle bypass holes are too small◆ Check the valve clearance, whether the clearance is too small

16.4.3.6 Fault phenomenon—instable idle speed with deceleration flameout

a) Check the valve clearance

b) Check whether the idle bypass holes and throttle body are too dirty

16.4.3.7 Fault phenomenon—inability to accelerate

a) Whether the parameters are normal during Idle and high idle;

b) Check the fuel tank, fuel filter;

- c) Check whether the exhaust system is blocked, for example, whether the three-way catalytic converter is blocked due to burning oil or broken;
- d) Check oil pressure and nozzle.
- e) Check whether the fault lights are normal, or whether it is because only one cylinder can make normal ignition

16.4.3.8 Fault phenomenon—slight fire phenomenon

Check whether the spark plug clearance is in line with the specification, 0.7 ~ 1 mm

16.4.3.9 Fault phenomenon—fault lights on, but code and fault do not match

Maybe the system ground wire connection is not solid, and reconnects the ground wire; reconnect it in 3 minutes after disconnecting the battery power leads and start the engine

16.4.3.10 Fault phenomenon—abnormal high fuel consumption

- a) Check whether the oxygen sensors of both cylinders are installed in place; if in loose state, the oxygen sensor makes wrong judgment that there is oil combustion in the cylinder, resulting in abnormally high fuel consumption.
- b) Observe the oxygen sensor readings in running of the engine after the engine mechanical parts and the oxygen sensor are in normal state, in a normal water temperature, if the reading is always greater than 500 mV, check whether the injector spills

Attentions:

- Most of the EFI parts are not repairable, so it is usual to replace the damaged parts after confirmation.
- When starting the engine, do not operate any organization on the engine (including the throttle, do not pull the throttle to start).
- If the engine fault light is on in the engine running, make sure to identify the cause as soon as possible and to debug it.
- Leaded gasoline must be used, because lead can damage the oxygen sensors and three-way catalytic converters.
- For oil consumption anomalies it should be resolved as soon as possible. Some substances in the oil will damage the oxygen sensor and three-way catalytic converters.
- The valve clearance should not be too small; if the exhaust does not close well; it will make the exhaust temperature too high and shorten the life of three-way catalytic converters.
- When temperature below 10 °C, if the finished engine cycle and engine run at low speed for too long, the exhaust pipe may have a coke and go black, which is a normal phenomenon. It would disappear after a high-speed operation for some time, or take appropriate means to make the engine coolant temperature maintained at the specified temperature range.

QJ125GY-16A circuit diagram