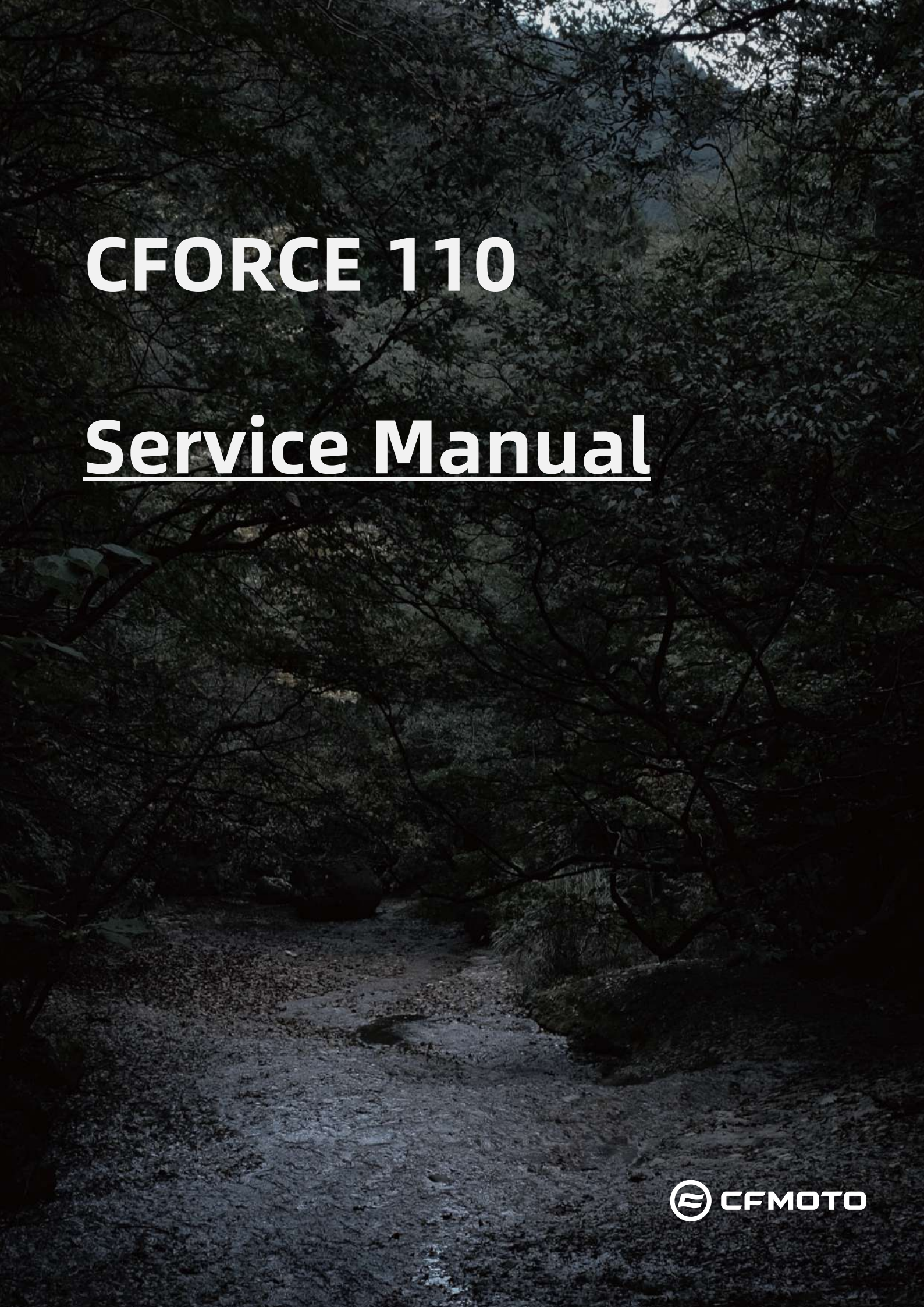

CFORCE 110

Service Manual

CFMOTO

Edition NO. : 20220211
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FOREWORD INDEX

This manual introduces Youth ATV maintenance information, removal & installation procedure, inspection & adjustment methods, trouble shooting and technical specifications in detail. There are illustrations to guide your operations.
Please read this manual carefully and maintain the vehicle according to the standard operation method, which can effectively prolong parts service life, improve the engine performance and the reliability of the vehicle.

Part 1: Chapter 1, 2 and 3 introduce safety information, general information and maintenance information.
Part 2: Chapter 4 to 9 introduce parts removal, inspection, repair and installation procedures of each system, and points for attention as well;
Appendix: Special tool, start circuit diagram, EFI schematic diagram and electrical schematic diagram.

CFMOTO reserves right to make improvements and modifications to the products without prior notice. Overhaul and maintenance should be done according to actual condition of vehicle.

This manual is applicable to the following vehicle:
CF110AY10

INDEX

1.1 Service manual

Before performing the work, please be sure to read this manual carefully and completely. This service manual introduces the disassembly and assembly essentials, maintenance points, troubleshooting methods and maintenance technical data in detail, and with detailed graphic information to guide maintenance technicians to operate, which is helpful to improve the efficiency of vehicle repair and maintenance.

1.2 Safety instruction

In order to use the vehicle safely, you need to follow the safety instructions, so please read this manual carefully. Safety instructions are highlighted in text and linked to the relevant location.

⚠WARNING：Set different labels/warning labels at visible locations on the vehicle. Please do not remove any labels or warning labels. If these are missing, you or others may not be able to recognize the danger, which could result in injury.

1.3 Hazard level and symbols

DANGER/WARNING/NOTE

Please read the following explanations carefully. They emphasize the specific meanings of DANGER, WARNING, and NOTE. Pay special attention to their salient meanings when performing engine repairs.

⚠DANGER： A risk of death or injury may occur if precautions are not taken.

⚠WARNING：Failure to take appropriate precautions may result in minor or moderate personal injury and/or vehicle failure.

⚠CAUTION：Failure to take appropriate precautions may lead to vehicle failure.

NOTE： Alerts you to important information or instructions.

But please note that this service manual contains "DANGER" and "WARNING" cannot cover all the potential danger in the process of vehicle use and maintenance, therefore, in addition to the relevant provisions of the "DANGER" and "WARNING", service personnel must also have the basic mechanical safety common sense, if you are not sure whether can finish the whole operation process of maintenance, please ask more experienced senior technicians.

1.4 Operation regulation

For some jobs, specialized tools are required that are not an integral part of the vehicle and can be ordered by the number indicated in parentheses. During assembly, parts that cannot be reused (such as seals, O-rings, cotter pins, etc.) must be replaced with new parts. If thread glue is used on bolts, the manufacturer's special instructions for use should be followed. The parts that need to be reused after disassembly should be cleaned and checked for damage or wear, and the worn or damaged parts should be replaced. After the repair or maintenance is completed, the vehicle must be ensured to operate safely.

1.5 General precautions

1.5.1 Avoid carbon monoxide poisoning

⚠WARNING：It is forbidden to run the engine for a long time in a closed or poorly ventilated place because of the harmful components in the exhaust gas.

1.5.2 Avoid battery solution corrosion

⚠WARNING：
1 Battery solution (dilute sulfuric acid) is a strong corrosive agent, there is a risk of burn and blindness if contact skin and eyes. If stained, rinse immediately with plenty of water and go to the hospital for treatment.
2. When the battery solution gets on your clothes, change your clothes to avoid skin burns.
3. Batteries and battery solutions should be kept in a safe place out of reach of children.

1.5.3 Avoid injuries

⚠WARNING：Must wear appropriate work clothes (overalls, etc.), hats, safety boots, and if necessary, should also wear dustproof glasses, dustproof mask, gloves and other safety protective equipment to protect bodies.

1.5.4 Avoid burns on high-temperature parts

⚠WARNING：When the engine has just stopped, the temperature of the engine and muffler is still very high. Do not touch it with bare hands to avoid burn. Please wear long sleeve overalls and gloves during maintenance.

1.5.5 Avoid toxic liquid coolants

⚠WARNING：
1. Coolant is toxic liquid. Please do not drink it and do not let it touch your skin, eyes or clothes. If it touches your skin or clothes, rinse immediately with soap water. In case of contact with eyes, wash thoroughly with plenty of water immediately and seek medical treatment.
2. In case you drink coolant by mistake, please spit it out immediately and rinse your mouth before going to the hospital for treatment.
3. The coolant should be kept strictly in a safe place out of reach of children.

1.5.6 Avoid explosions or fires

⚠WARNING：

1. Because gasoline is flammable, no fireworks are allowed in the working site. Pay attention not only to the open flame, but also to the electric spark. In addition, the evaporated gasoline can cause explosion, please choose a well-ventilated site for the operation.

2. Flammable and explosive hydrogen will be generated during battery charging. Once there is a fire source or electric spark close to it, there is a risk of explosion. Charge in a well-ventilated site.

1.5.7 Operation safety

⚠WARNING：

1. When maintenance, pay attention not to let the rear wheel, clutch and other rotating parts and movable parts clamp hands and clothes.

2. When more than two people are working, they must constantly call out to each other to confirm safety.

1.6 Precautions for disassembly and assembly

⚠WARNING:

1. Parts, lubricants and lipids must use authentic parts or recommended products of CFMOTO.

2. Parts of each system should be sorted out and kept separately, so that the parts can be installed back to their original positions.

3. Please clean the dirt and dust on the vehicle before maintenance.

4. Gasket, O-ring, piston pin retaining ring, cotter pin must be replaced with new ones after disassembly.

5 Elastic retainers will become deformated in the disassembly if the opening is too large , easy to fall off after re-assembly. Do not use elastic retainers that have loosened and lost their elasticity.

6. After disassembly and inspection, the parts should be cleaned and compressed air blown to remove the cleaning agent before measurement. Lubricate the moving surface before assembly.

7. During disassembly, inpect necessary places and determine the relevant data , so that the assembly can be restored to the state before disassembly.

8. Fasteners of bolts, nuts and screws shall be pre-tightened first, and then tightened with specified tightening torque on the diagonal according to the principle of from large to small and from inside to outside.

9. Rubber parts should be checked for aging when disassembling and replaced in advance if necessary. In addition, because the rubber parts are not resistant to the erosion of gasoline and kerosene, try not to get volatile oil and grease attached to them.

10. The recommended grease shall be coated or injected in the specified parts according to the requirements of the service manual.

11. Proper special tools shall be used for disassembly and assembly operations.

⚠WARNING:

12.Ball bearings can be used to rotate the inner or outer ring with fingers to confirm whether the rotation is flexible and smooth, if the demolition method of applying force on the ball is adopted during disassembly, the removed bearings should not be used again.

Replace if bearing axial and radial clearance is too large.

The bearings with stalling feeling should be cleaned and replaced if they still feel stalled after cleaning, or replaced directly if they cannot be cleaned;

The bearing should be replaced if it is not tight after disassembly and assembly.

13. bearing in the assembly before the oil or grease to apply. Single-sided dustproof bearings in the assembly should pay attention to the installation direction. Open type or double-sided dustproof bearings in the assembly to be engraved with the manufacturer's logo, size of the face outward installation.

14. When installing rectangular retaining ring to have chamfered side towards the direction of force. Do not use again loosened retaining rings that had lost elasticity. After assembling, turn the rectangular retaining ring to confirm that it is securely installed in the slot.

15. After assembly, check whether the fastening parts are tightened and work normally.

16. Brake fluid and coolant can damage the painted surface, plastic parts, rubber parts, etc. Do not allow them to adhere to such parts, and flush them with water immediately if they do.

17. Install the oil seal with the manufacturer's logo facing outward (the direction without oil).

Be careful not to curl the oil seal lip and not to let the burr scratch the oil seal lip when assembling.

Apply grease on the oil seal lip before assembling.

18. When installing hose parts, insert the hose to the root of the joint. Have the hose clamp to install the hose clamp in the indentation of the tube. The hoses that are not tight when installed should be replaced.

19. Do not get dust, dirt, etc. inside the engine and inside the oil pressure system of the brake.

20. The gasket material attached to the combination surface of each engine case should be cleaned before assembly. Bump marks on the contact surface must be removed by evenly polishing with oil stones.

21. Do not twist or bend the cable excessively. Deformed and damaged cables may cause poor movement or breakage.

22. When assembling the cap parts, make sure to insert the cap into the groove if there is a groove.

1.7 Engine break-in

Engine has many moving parts, such as pistons, piston rings, cylinder, intermeshing transmission gears, etc. Therefore, in the early stage of its use, the standard break-in is necessary, break-in can make the moving parts to adapt to each other, correct the working gap, the formation of a good smooth friction surface can withstand large loads, only engines with standard break-in process have excellent performance and reliability.

Recommended break-in 320km, the specifications are as follows.

0~320km： Avoid running continuously at more than 1/2 throttle, change the speed frequently, and it is not recommended running at a fixed throttle position for a long time; cool the engine for 5 to 10 minutes after every hour of work; avoid rapid acceleration, and change the throttle slowly, without sudden large or small changes.

NOTE：
1.Maintenance during the break-in period should be in accordance with the routine maintenance regulations, and troubleshooting in a timely manner.
2.When the break-in period is over, do a maintenance of the after 320km break-in period on it before entering the normal driving stage.

1.8 Warranty

The operations specified in the maintenance schedule are only allowed to be performed at an authorized CFMOTO after-sales service center, otherwise any warranty or warranty claim rights will be forfeited. In the event of damage caused by incorrect operation or modification of the vehicle, no warranty can be provided.

Please refer to the maintenance and warranty manual for more information about the warranty or guarantee and its handling.

1.9 Fuel, auxiliary materials

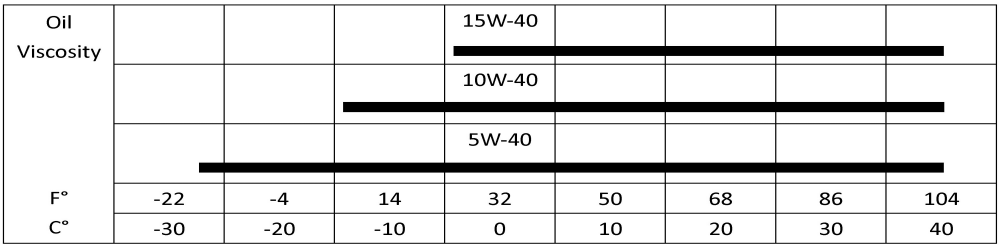
Fuel: Use octane EPA: RQ-87 and above unleaded gasoline; 167: E10/95 and above unleaded gasoline;.

Oil: Use of any non-recommended oil may cause engine failure. CFMOTO recommends using 10W-40 type oil for 4-stroke engines. It is acceptable to change the oil viscosity to 5W-40 based on extreme cold ambient temperatures or to 15W-40 type based on high ambient temperatures. Refer to the following recommended table for ambient temperature and oil viscosity selection.

API classification: engine oils of SJ grade or better.

Gear oil: Use 75W-90-GL5 gear oil for gearboxes.

Engine coolant: Since antifreeze provides both proper corrosion and rust protection, engine coolant contains antifreeze and should have a freezing point below the minimum ambient temperature for engine use, generally 5°C lower.



⚠WARNING：Fuel is not allowed to enter groundwater, soil or piping systems because improper disposal of fuel can be harmful to the environment.

NOTE：Recommended to use - 35 ℃ advanced anti-freeze, anti-corrosion, high boiling point coolant.

Please use only CFMOTO approved or recommended spare parts and accessories, CFMOTO is not responsible for the use of other products and the resulting damage.
For the latest information on the use of the vehicle, please visit the official website of CFMOTO :http://www.cfmoto.com

1.10 Illustrations

The illustrations shown in this service manual contain some optional equipment.
Some parts may have been disassembled or are not illustrated in the drawings for better presentation and illustration. However, not all illustrations require disassembly, so please note the text description.
The numbers in the lower right corner of the illustrations in this service manual are for internal use only by CFMOTO and have no special meaning.

2.1 Unit Conversion Table and Symbol Used in the Manual

Unit Conversion Table

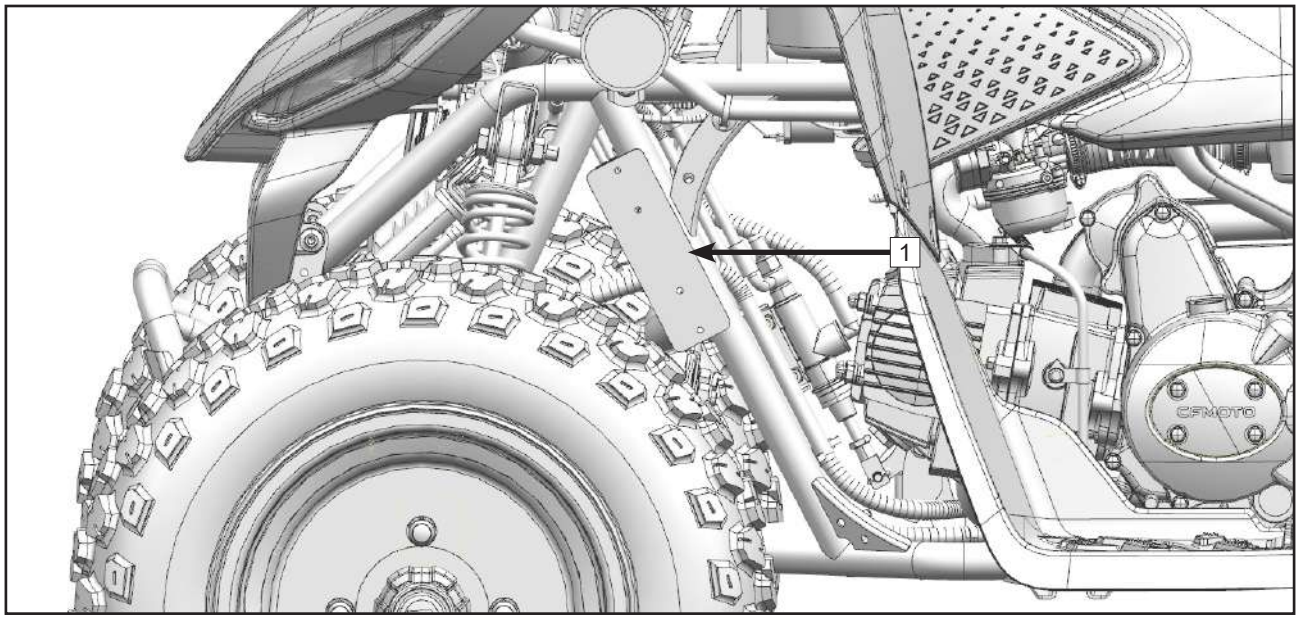
Item	Unit conversion
Pressure	1kgf/cm^2=98.0665kPa
	1psi=6.895kPa=0.06895bar
	1mmHg=133.322Pa=0.133322kPa
Torque	1kgf·m=9.80665N·m
	1N·m= 8.85(lbf·in)
	1N·m= 0.73756 21(lbf·ft)
Volume	1mL=1cm^3=1cc
	1L=1000cm^3
Force	1kgf=9.80665N
Length	1in=25.4mm

Symbol used

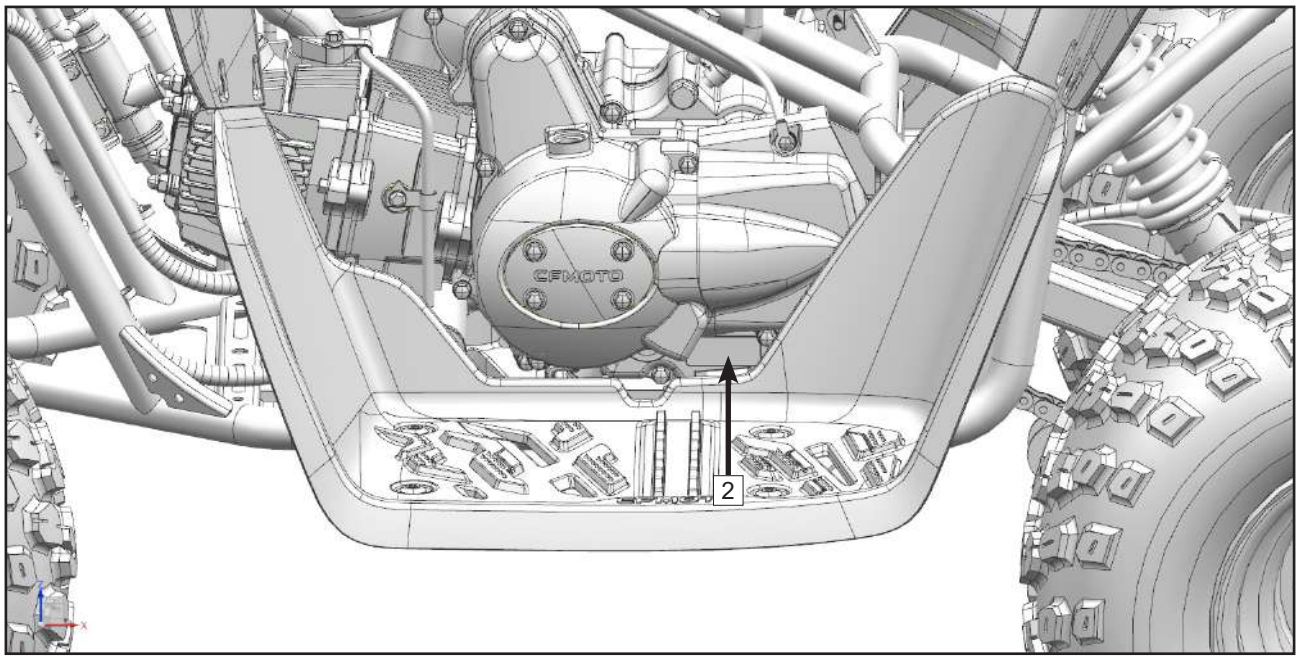
V	Voltage
A	Current
Ω	Resistance
VAC	Voltage of alternating current
Vdc	Voltage of direct current

2.2 VIN Position

Model: YOUTH ATV
1. VIN:
2. Engine number:



1	VIN(Rear part of frame LH brace beam)



2	Engine number

2.3 Main Specifications

Items of Vehicle	Specification
Model	CF110AY10
Length×Width×Height(mm)	1483×943×925
Length×Width×Height(in)	58.4×36.8×36.4
Wheel base	40.2 in (1020 mm)
Ground clearance(Idling)	4.3 in (110 mm)
Gross weight (Fuel included)	34.3 in (130 kg)
Passengers	1
Load	451.9 lb (205kg)
Frame	Steel tube

Engine		Specification
Model		1P52YH-2
Type		Single cylinder horizontal
Bore×Stroke(mm)		52.4×49.5
Displacement		107cc
Compression ratio		9.1:1
Low idling speed(Idling)		1500r/min±100r/min
Overall size(mm)		152.1×130.6×97.5
Dry weight		21kg
Output type		Left side
Rotation of engine output		Counter clockwise-forward, Clockwise-backward
Electrical system	Ignition type	ECU
	Spark plug type	A7RTC
	Magneto type	
	Starting	Electric
EFI system	ECU	FAI
	Fuel injector	FAI
	Idle	1500r/min±100r/min
Lubrication system	Lubrication type	Pressure and splash
	Oil pump type	Rotor drive
	Engine oil type	SAE 15W-40/SAE 10W-40/SAE 5W-40
Cooling system	Cooling type	Closed coolant circulation
Valve system	Dia. of throttle body	
Air filter type		Sponge filter

Driving System	Specification
Drive mode	Chain drive

Fuel System	Specification
Fuel type	US: RQ-87 octane or higher unleaded gasoline EU167: E10/95 or higher unleaded gasoline EU168: E5/95 or higher unleaded gasoline
Fuel tank volume	6.4L
Remaining fuel indicator	When remaining fuel is below 2L, indicator flashes.
Fuel pump	300kPa ± 10 kPa
Fuel filter	15-micron, inline type

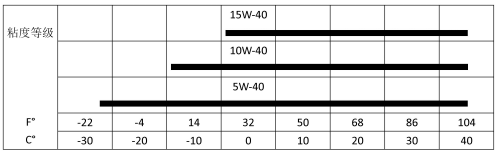
Steering System	Specification	
Turning circle radius(At the farthest point)	4750mm	
Steering angle	IN	39.5°
	EX	29°

Brake System	Specification
Front brake	Dual hydraulic disc
Rear brake	Dual hydraulic disc
Parking brake	Integrated handbrake/only rear brake disc

Suspension System	Specification
	CF110AY10
Type	**Front: Double swing arm independent suspension** Stroke: 65mm(Shock pad undeformed)
	Rear: Double swing arm independent suspension Stroke: 60.5mm(Shock pad undeformed)
Shock absorber	Front: Spring shock absorber/Hydro-pneumatic shock absorber Rear: Spring shock absorber/Hydro-pneumatic shock absorber
Shock absorber standard	Front: 46mm Rear: 45mm

Wheel/Tire	Specification
Front wheel	AT19×6-10 14F
Rear wheel	AT18×9-8 26F

2.4 Maintenance Specifications

Lubrication System		
Item		**Standard**
Oil capacity	Change oil: change oil filter	730ml
	Full capacity	930ml
Recommended oil		Use of any oil not recommended may cause engine fault. We recommends that 5W-40 engine oil be used for 4-stroke engine. It is acceptable to replace with 10w-40 or 15w-40 oil under high temperature. Refer to the following environment temperature and oil viscosity to choose recommendation table. API classification: SJ or oil of higher class.
Oil pressure	When RPM is 3000rpm, oil pressure is 11.5~17.5Kpa, 14.5Kpa	
	When RPM is 8000rpm, oil pressure is 40~46Kpa, 43Kpa	

Wheel(Front and Rear)			
Item		Standard	Service limit
Rim run-out	Longitudinal	1.0mm	2.0mm
	Horizontal	1.0mm	2.0mm
Tire	Remaining groove	--	3.0mm
	Front tire pressure	5 psi (35kPa)	--
	Rear tire pressure	5 psi (35kPa)	--

Brake System		
Item	Standard	Service limit
Brake fluid	DOT 4	--
Front brake disc thickness	4.0mm	3.0mm
Front brake disc abrasion	1.0mm	
Brake pedal travel	60mm~70mm	——
Rear brake disc thickness	4.0mm	3.0mm
Rear brake disc loss	1.0mm	

Battery/Charger			
Item		Standard	
Battery	Type	6-FM-5L	
	Capacity	12V 5Ah	
	Voltage between terminals	Lightening	13.5V
AC magneto	Type	Flywheel permanent-magnet three-phase AC motor outer rotor	
	Output	Three-phase AC	
	Maximum output power	160W, 8000r/min	
	Stabilized voltage	13.5V~15.0V, 5000r/min	
	Regulator type	Three-phase annular regulator/12Vdc power output	

Ignition Device/EFI Device/Electrical System		
Item		**Standard**
Ignition controller		FAI ECU
Spark plug	Type	Resistor spark plug
	Standard	A7RTC
	Gap	0.6~0.7mm
Ignition coil resistance	Primary	0.6Ω±10%
	Secondary	7.9KΩ±10%
Peak voltage	Ignition coil	≥1.5V, 200r/min
	Secondary peak voltage	≥25kV
Starter relay coil resistance		3Ω~5Ω
Trigger coil peak voltage	≥1.5V, 200r/min	
Magneto trigger coil resistance	250Ω~300Ω	

Fuse/Lights		
Item		**Standard**
Fuse	Main fuse	15A
	Regulator fuse	15A
Light, bulb	Front position light	80mA
	Brake light	235mA
	Tail light	45mA

Drive Mechanism				
Item	**Standard**		**Service limit**	**Remark**
Clearance between gearshift fork and groove	0.05~0.168		0.22	
Thickness of gearshift fork	4.85~4.95		4.8	
Width of shift drum groove	5~5.08		5.18	
Dia. of shift drum	33.936~33.975			
Inert aperture	12~12.2			
Dia. of drive mainshaft	φ12	11.984~11.973		
	φ17	16.984~16.966		
Dia. of drive countershaft	φ12	11.984~11.973		
	φ17	16.984~16.966		

Valve/Camshaft/Swing Arm/Cylinder Head				
Item		**Standard**	**Service limit**	**Remark**
Dia. of valve disc	IN. valve	φ23	——	
	EX. valve	φ20	——	
Thickness of valve disc	Air IN. and EX.	0.7	0.3	
Valve clearance(Cold engine)	Air IN.	0.02~0.08	——	
	Air EX.	0.02~0.08	——	
I.D. of valve guide	Air IN. and EX.	5.000~5.012	5.030	
O.D. of valve stem	IN. valve	4.970~4.985	4.940	
	EX. valve	4.955~4.970	4.925	
Clearance between valve guide and valve stem	IN. valve	0.015~0.042	0.09	
	EX. valve	0.03~0.057	0.105	
Valve stem roundness(Dia. difference)		0.008	0.016	
Valve stem end run-out	Air IN. and EX.	0.03	0.06	
Valve length	IN. valve	65.9		
	EX. valve	64.9		
Valve disc conical surface run-out	Air IN. and EX.	0.02		
Width of valve seat sealing belt	IN. valve	1~1.4	1.8	
	EX. valve	1~1.4	1.8	
Length of valve spring	Air IN. and EX.	IN: 32.4 EX: 35.55	38.2	
Valve spring force(Compressed)	Air IN. and EX.	Inner spring: 88~92 Outer spring: 191~219	——	
Cam convexity	Air IN.	26.566~26.686	26.532	
	Air EX.	26.327~26.447	26.297	
Camshaft journal	Φ32	31.987~32		
	Φ35	34.987~35		
I.D. of camshaft mating hole	Φ32	32.015~32.039		
	Φ35	35.015~35.039		
Clearance between camshaft O.D. and mating hole	Φ32	0.015~0.052		
	Φ35	0.015~0.052		
Camshaft axial clearance	0.12~0.48		——	
Camshaft run-out	0.05		0.10	
Rocker arm shaft bore	Air IN. and EX.	10~10.015	10.03	
Dia. of rocker arm shaft	Air IN. and EX.	9.986~9.995	9.971	
Rocker arm shaft fit clearance	Air IN. and EX.	0.005~0.029	0.06	
Rocker arm axial clearance	Air IN. and EX.	0.1~0.6	1	
Cylinder head bottom flatness	0.03		0.05	
Cylinder head surface flatness	0.05		0.08	
Cylinder surface flatness	0.03		0.05	

Cylinder/Piston/Piston Ring/Connecting Rod				
Item	**Standard**		**Service limit**	**Remark**
Electric starting cylinder pressure	800~1400kPa		——	
Clearance between piston and cylinder	0.019~0.037		0.10	
Dia. of piston	52.375~52.385		52.3	
Dia. of cylinder	52.404~52.412		52.8	
Cylinder surface flatness	0.03		0.05	
Piston ring free opening	1 Ring	5.5~8.5	~~8.9~~	
	2 Ring	5.5~7.5	~~9.5~~	
Piston ring closed clearance	1 Ring	0.1~0.25	0.5	
	2 Ring	0.1~0.25	0.5	
	Oil ring	0.2~0.8	1.1	
Clearance between piston ring and groove	1 Ring	0.02~0.06	0.095	
	2 Ring	0.02~0.06	0.095	
Thickness of piston ring	1 Ring	0.97~0.99	——	
	2 Ring	0.97~0.99	——	
	Oil ring	1.75~2.15	——	
Width of piston ring groove	1 Ring	1.85~1.23	——	
	2 Ring	1.95~2.25	——	
	Oil ring	1.9~2.3	——	
I.D. of piston pin hole	13.002~13.008		13.03	
O.D. of piston pin	12.994~13		12.98	
I.D of connecting rod small end	13.01~13.021		13.037	
Clearance between connecting rod and pin	0.002~0.019		0.049	
Connecting rod big end side clearance	0.1~0.3		0.6	
Thickness of connecting rod big end	22.95~23.00			
Crankshaft run-out	0.03		0.06	
Clearance between inner and outer rotor	0.1~0.15			
Clearance between outer rotor and seat	0.15~0.21			
Rotor end face clearance	0.03~0.09			

Oil Pump		
Oil pump rotor	Clearance between inner and outer rotor	0.07mm~0.15mm
	Clearance between outer rotor and box	0.03mm~0.10mm
	Rotor end face clearance	0.023mm~ 0.055mm

2.5 Tighten Torque

Please use standard torque if torque value is not mentioned below.

CAUTION: Engine oil should be applied on screw thread and contact surface.

No.	Item	Fastener code	Qty.	Torque(N·m)
1	Connecting front bumper and frame	Bolt M6×12	4	9~12
2	Connecting muffler and frame	Bolt M8×12	1	20 ～ 30
3	Rear brake disc installation	Bolt M8×12	4	20 ～ 30
4	Connecting steering bearing seat and frame	Bolt M8×16	2	20 ～ 30
5	Connecting torque rod cover and frame	Bolt M8×16	2	20 ～ 30
6	Big sprocket installation	Bolt M8×16	4	20 ～ 30
7	Connecting engine and base plate	Bolt M8×16	4	20 ～ 30
8	Connecting rear bumper and swing arm	Bolt M8×16	2	20 ～ 30
9	Connecting exhaust pipe and muffler	Bolt M8×20	2	20 ～ 30
10	Connecting LH and RH steering knuckle and inlay	Bolt M8×20	4	20 ～ 30
11	Fixing rear inlay	Bolt M8×25	2	20 ～ 30
12	Connecting rear bumper and swing arm	Bolt M8×25	2	20 ～ 30
13	Connecting muffler and frame	Bolt M8×35	1	20 ～ 30
14	Brake pedal installation	Bolt M8×45	1	20 ～ 30
15	Fixing rear brake caliper mounting bracket	Bolt M8×50	1	20 ～ 30
16	Handle press block	Bolt M8×50	4	20 ～ 30
17	Connecting engine and base plate	Bolt M8×120	1	20 ～ 30
18	Connecting engine and frame	Bolt M8×150	1	20 ～ 30
19	Front shock absorber installation	Bolt M10×40	4	45 ～ 50
20	Rear shock absorber installation	Bolt M10×45	2	45 ～ 50
21	Swing arm installation	Bolt M10×70	8	45 ～ 50
22	Rear shaft clamp	Bolt M10×90	2	45 ～ 50
23	Tire installation	Cap nut M10*1.25	16	45 ～ 50
24	Rear swing arm welding assy. installation	Front lower swing arm installation shaft M12×275	1	85 ～ 90
25	Fixing steering knuckle and front wheel bracket	Thin slotted nut M14×1.5	2	120 ～ 125
26	Fixing rear shaft and rear wheel bracket	Thin slotted nut M14×1.5	2	120 ～ 125
27	Rear shaft axial lock nut(IN)	Lock nut Ⅰ	1	220 ～ 250
28	Rear shaft axial lock nut(EX)	Lock nut Ⅱ	1	110 ～ 150

Torque table - Engine

No.	Item	Fastener code	Torque(N·m)
1	Guide wheel bolt	M8×21	10~15
2	Ratchet plate bolt	M6×20	10~15
3	Shift arm limit bolt	M8	10~15
4	Five-star bolt	M6×20	10~15
5	Box bolt	M6×50 M6×60 M6×65	10~15
6	Tensioning rod sealing bolt	M14×1.5	10~15
7	Tensioner arm bolt	M8×20	10~15
8	Stop plate bolt	M6×16	10~15
9	Oil pump screw	M5×10	5~9
10	Clutch nut	M14	38~45
11	End cap screw	M5×12	5~9
12	RH cap bolt	M6×40 M6×65 M6×80	10~15
13	Cylinder connection with nut	M6×20	10~15
14	Cylinder head connection bolt	M6×23	10~15
15	Cylinder head nut	M6×14	10~15
16	Cylinder head nut	M6×14	18~22
17	Adjusting screw lock nut	M5	8~12
18	Timing sprocket bolt	M5×12	8~12
19	Plate screw	M6×16	5~9
20	Spark plug	M10	10~15
21	Gear sensor press plate bolt	M6×12	10~15
22	Rotor nut	M10	38~45
23	Motor bolt	M6×20	10~15
24	Valve cover	M30	12~18
25	Cylinder head connecting bolt	M6×196 M6×204	10~15
26	Cylinder head LH cover bolt	M6×110	10~15
27	LH cover bolt	M6×28 M6×32 M6×50 M6×70	10~15
28	Deco cover	M6×12	10~15
29	Drive sprocket	M6×8	10~15

General standard tighten torque are as follows:

No.	Type	Torque(N•m)
1	M5 bolt, nut	5
2	M6 bolt, nut	10
3	M6 flanged bolt, nut	12
4	M8 bolt, nut	20 ～ 30
5	M10 bolt, nut	40 ～ 45

2.6 Grease Lubricant, Sealant

Application position	Note	Lubricant
Brake pedal moving part Rocker arm moving part Direction column inner surface Seat lock moving part Shift mechanism moving part		Multipurpose lithium lubricating grease

Control Pull Cable, Bearing and Moving Parts Lubricating

Position	Content	Lubricant
Rear axle bracket	Grease	General lithium lubricating grease GB/T5671
Front and rear shock absorber knuckle bearing		
Parking cable connection		

2.7 Engine Maintenance Materials

Engine maintenance materials include engine oil, lubricant grease, plane sealant, thread-locking adhesive, cylinder surface adhesive, etc.

Item	Specification	Using parts	Remark
Engine oil	4-stroke motorcycle use: SAE 10W-40 / SAE 5W-40 / SAE 15W-40 API classification: SJ or higher class(Viscosity grade selection refer to 02-6)	Cylinder rotating part, sliding part crankcase, sliding part, cylinder head rotating part See lubrication system diagram for details.	Capacity: 650mL(Maintenance) 930mL(Engine overhaul)
Lubricant oil with molybdenum		Piston pin, valve stem, valve oil seal, camshaft	
Lubricant grease	#3 MoS2 lithium grease	Oil seal lip, O-Ring and other seal surface of rubber sealing compounds, bearing with seal	
Plane sealant		Mating surface between left crankcase cover and rubber sealing boot of magneto stator cable, mating surface joint between crankcase and cylinder block, mating surface between water seal assy. and water pump shaft, mating surface between water pump shaft and washer	
Thread-locking adhesive		Part of threads	
648 cylinder surface adhesive		Mating surface of oil seal and box	

2.8 Engine Maintenance Tools

Measuring Instruments

No.	Tool	Specification	Use	Remark
1	Vernier caliper	0~150mm	Measuring length and thickness	
2	Micrometer	0~25mm	Measuring O.D. of rocker arm shaft, valve stem, camshaft, etc.	
3	Micrometer	25mm~50mm	Measuring maximum lift of camshaft	
4	Micrometer	75mm~100mm	Measuring piston skirt size	
5	Cylinder I.D. gauge		Measuring I.D. of cylinder	
6	I.D. micrometer	10mm~34mm	Measuring rocker arm I.D., piston pin hole and connecting rod small hole	
7	Dial indicator	1/100	Measuring run-out value	
8	Knife straight edge		Measuring flatness	
9	Feeler gauge		Measuring flatness and adjusting valve clearance	
10	Plastic wire clearance gauge		Measuring clearance	
11	Spring scale		Measuring spring force	
12	Tachometer		Measuring RPM	
13	Cylinder pressure gauge and connecting seat		Measuring cylinder pressure	
14	Oil pressure gauge		Measuring oil pressure	
15	Barometer		Measuring opening pressure of radiator cap	
16	Ohmmeter		Measuring resistance and voltage	
17	Ammeter		Measuring turn-on of current/switch	
18	Thermometer		Measuring fluid temperature	
19	Timing light		Checking ignition timing	
20	Torque measure wrench	In whole set	Measuring tighten torque	

General and Auxiliary Tools

21	Spirit lamp		Heating	
22	Magnetic stand		Installing dial indicator	
23	Tablet		Assisting measurement	
24	V-shape block		Assisting in measuring run-out	
25	Tweezer		Installing valve lock clamp	
26	Circlip plier		Removing and installing circlip	
27	Nipper plier		Removing and installing retainer ring	
28	Impact screwdriver		Removing cross recessed bolt	
29	Flat head screwdriver			
30	Phillips screwdriver			

3.1 Maintenance information

The following icons are used to mark special cases:
► = Severe Use Item. Reduce interval by 50% on vehicles subjected to severe use.
■ = Have an authorized dealer perform repairs that involve this component or system.
● = Emissions-related components, have an authorized dealer repair the component or system involved.

3.1.1 Pre-ride maintenance checklist

Perform the following checks before operating the vehicle：

Item		Pre-ride maintenance (Service whichever interval comes first)			Remarks
		Hour	Calendar	Miles (km)	
■	Steering system	--	Pre-ride	--	Visually inspect, test, or inspect parts. Adjust or arrange maintenance schedule when required.
■	Throttle return	--	Pre-ride	--	
	Front suspension and shaft	--	Pre-ride	--	
	Rear suspension and shaft	--	Pre-ride	--	
	Tire	--	Pre-ride	--	
	Brake fluid level	--	Pre-ride	--	
	Brake lever/foot pedal function	--	Pre-ride	--	
	Brake system function	--	Pre-ride	--	
	Wheel/fasteners	--	Pre-ride	--	
■	Headlight ilumination	--	Pre-ride	--	Inspect, replace if necessary.

3.1.2 Break-in Maintenance Schedule

Perform the following maintenance items at the expiration of 20 hours or the specified mileage interval, whichever comes first.

Item		Break-in Maintenance (Service whichever interval comes first)			
		Hour	Calendar	Miles (km)	Remarks
	Regular lubrication	20h	-	320Km	Lubricate all grease points, oiling nozzles, cables, etc.
	Engine oil/oil filter/oil strainer	20h	-	320Km	Change the oil and filter. Clean the strainer.
►	Engine air filter	20h	-	320Km	Inspect，change if dirty, do not clean.
■	Engine valve clearance	20h	-	320Km	Inspect, adjust if necessary.
►	Brake pad	20h	-	320Km	Inspect thickness of brake pad.
	Battery	20h	-	320Km	Check terminals, clean, test battery condition if necessary.
■	Idle	20h	-	320Km	Check the suitable speed, if it does not match the specifications or is unstable, please contact your dealer for repair.
■	Steering/wheel alignment	20h	-	320Km	Check the steering system and contact your dealer for wheel alignment if necessary.
►	Foot brake/hand brake	20h	-	320Km	Check the function and adjust it if necessary.
	Engine oil hose，gaskets and seals	20h	-	320Km	Check for leakage.

3.1.3 Periodic Maintenance Schedule

After the 20-hour break-in period, perform maintenance according to the maintenance schedule interval, whichever comes first.

Item		Periodic Maintenance Interval (Service whichever interval comes first)			Remarks
		Hour	Calendar	Miles (km)	
►	Brake disc	10h	1M	160Km	Check brake disc thickness.
	Battery	20h	-	320Km	Check terminals. Clean and test battery condition if necessary.
	Engine oil hoses, gaskets and seals	20h	-	320Km	Check leakage.
►	Empty filter	50h	-	800Km	Be sure to check before riding, more frequently if subjected to bad use. Change if dirty, do not clean.
►	Regular lubrication	50h	3M	800Km	Lubricate all grease points, cables, etc.
►	Engine oil/filter replacement/ oil strainer	100h	1M	1600Km	Check for color changes. Replace if dirty, clean strainer. Replace annually if hours or distance interval is not reached.
►	Radiator	50h	6M	800Km	Inspect and clean the exterior surface. If it suffers from bad use, it must be cleaned more frequently.
■	Steering system	50h	6M	800Km	Inspect, lubricate.
►	Front suspension	50h	6M	800Km	Lubricate and check fasteners.
►	Rear suspension	50h	6M	800Km	Lubricate and check fasteners.
►	Gearshift	50h	1M	800Km	Inspect, lubricate, adjust if necessary.
► ■	Throttle valve body, throttle cable	50h	6M	800Km	Check and clean the carbon deposit. Check cables and lubricate them more frequently if they are in bad use.
►	Front suspension	50h	6M	500 (800)	Lubricate and check fasteners.
►	Rear suspension	50h	6M	500 (800)	Lubricate and check fasteners.
►	Gearshift	50h	1M	500 (800)	Inspect, lubricate, adjust if necessary.

► ■	Throttle valve body, throttle cable	50h	6M	500 (800)	Check and clean the carbon deposit. Check cables and lubricate them more frequently if they are in bad use.
	Fuel filter and fuel line	100h	2 yrs	3200Km	Check the wiring and replace the filter element and high-pressure fuel line every four years.
►	Valve clearance	100h	-	3200Km	Check, adjust if necessary, contact dealer for maintenance.
●	Fuel system	100h	1 yr	800Km	Check fuel tank, fuel cap, fuel pump and fuel pump relay.
	Spark plug	100h	2 yrs	3200Km	Check and replace if worn or contaminated.
■	Engine bracket	100h	1 yr	2400Km	Check condition.
	Exhaust pipe and spark collector	100h	1 yr	800Km	Check and clean the spark collector.
►	Circuits, fuses, connectors, relays and cables	100h	1 yr	1600Km	Check line wear, safety, use necessary non-conductive grease for joints in contact with water, mud, etc.

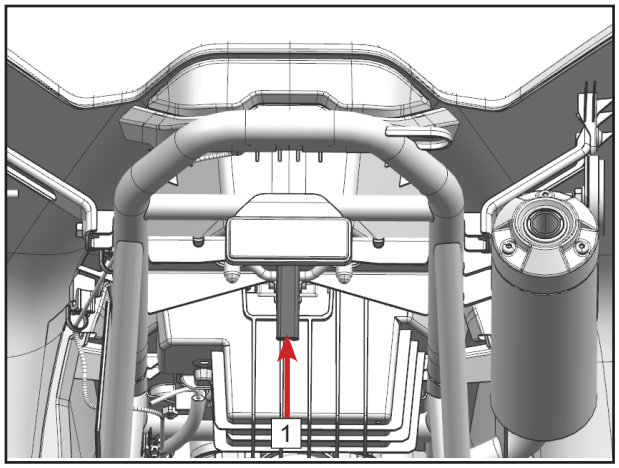
Item		Periodic Maintenance Interval (Service whichever interval comes first)			Remarks
		Hour	Calendar	Miles (km)	
●	Fuel system	100h	1 yr	800Km	Check fuel tank, fuel cap, fuel pump and fuel pump relay.
	Spark plug	100h	2 yrs	3200Km	Check and replace if worn or contaminated.
■	Engine bracket	100h	1 yr	2400Km	Checn condition.
	Exhaust pipe and spark collector	100h	1 yr	800Km	Check and clean the spark collector.
►	Circuits, fuses, connectors, relays and cables	100h	1 yr	1600Km	Check line wear, safety, and use necessary non-conductive grease for contact with water, mud, etc.
► ■	Vehicle bearing	100h	1 yr	2400Km	Check for noise and looseness and replace if necessary.
►	Brake fluid	200h	2 yrs	1600Km	Check brake fluid color changes and replace brake fluid every two years.
	Idle	-	1 yr	-	Check whether the RPM is correct, if not consistent with the specification or unstable, contact the dealer for maintenance.
■	Steering/wheel alignment	-	1 yr	-	Check the steering system. If you require steering accessories or wheel alignment, contact the dealer for maintenance.
►	Foot brake height	-	1 yr	-	Check, replace brake pad or adjust height if necessary.

During the maintenance of the vehicle, attention should be paid to turn off the power.

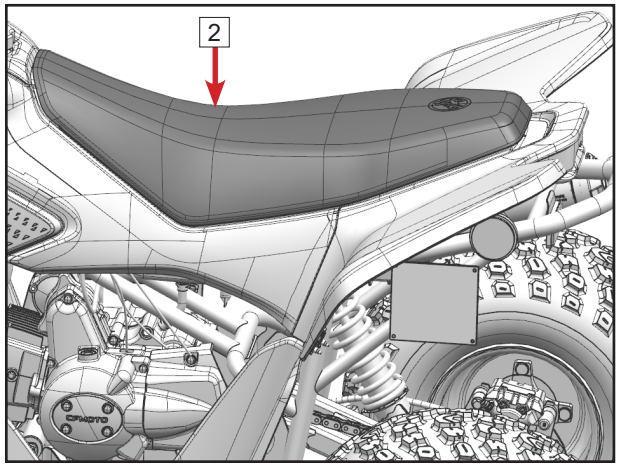
4.1 Seat

Removal

Unlock the seat hook 1.



Remove seat 2.

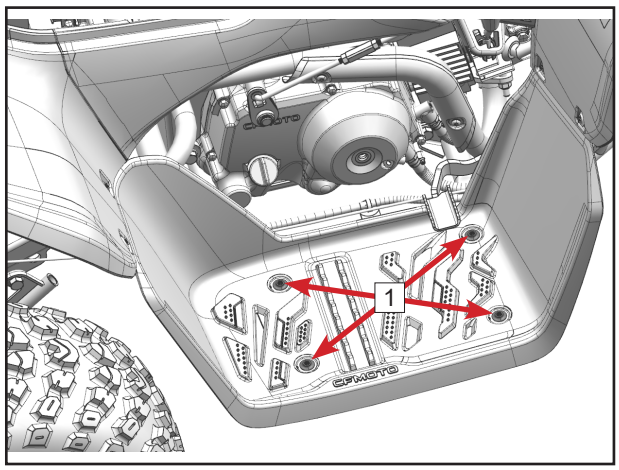


4.2 Foot pedal

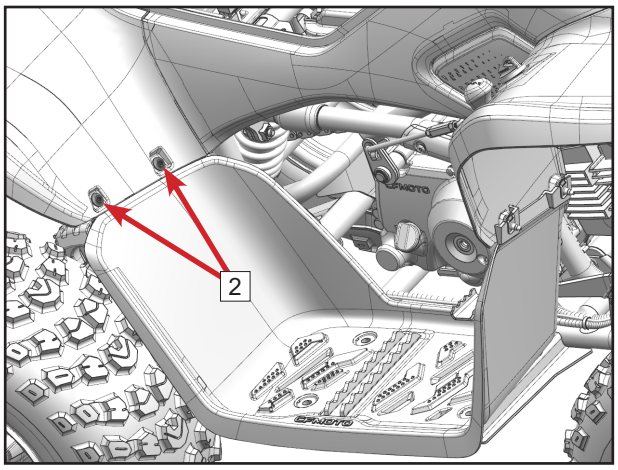
4.2.1 RH foot pedal

Removal

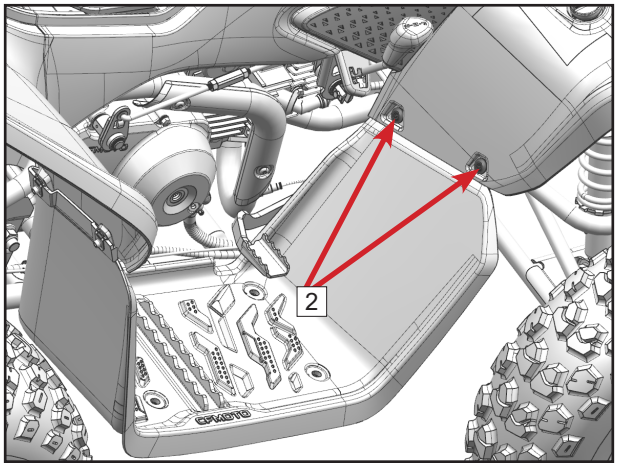
Remove bolt 1.



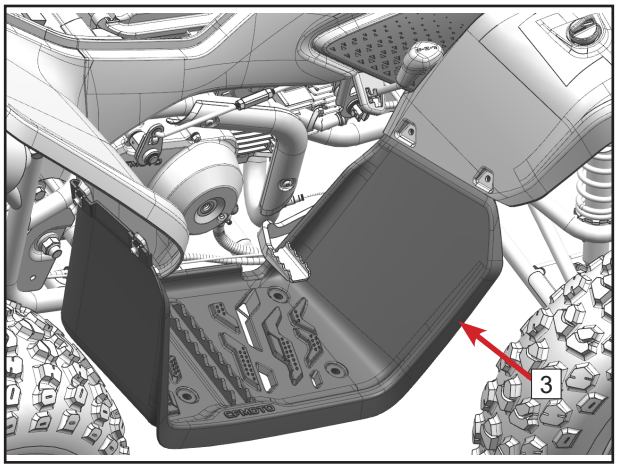
Remove bolt 2.



Remove bolt 2.

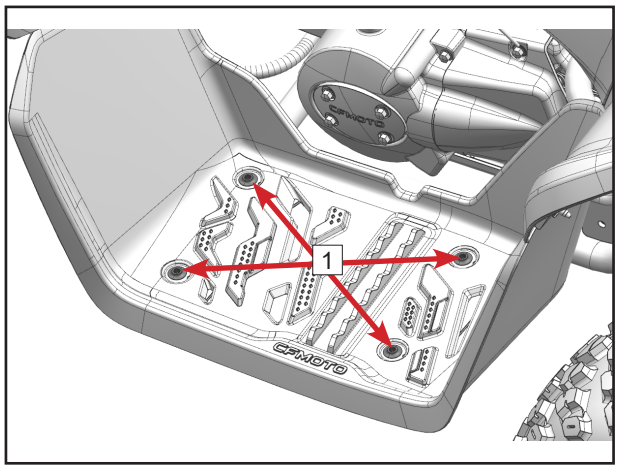


Remove RH foot pedal 3.

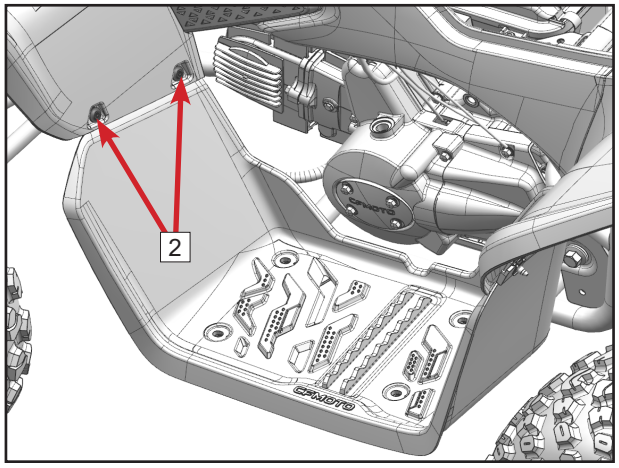


4.2.2 LH foot pedal
Removal

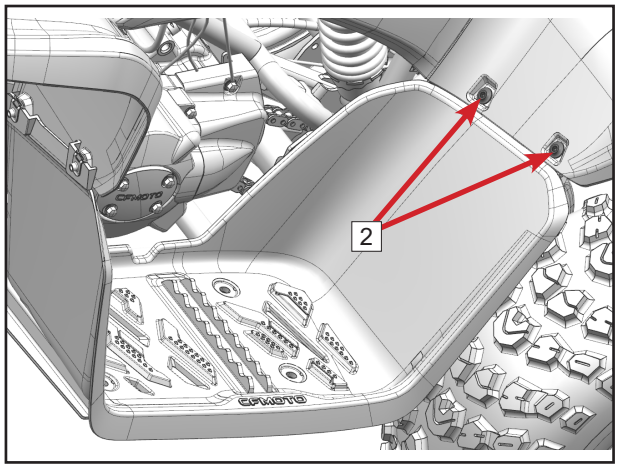
Remove bolts 1.



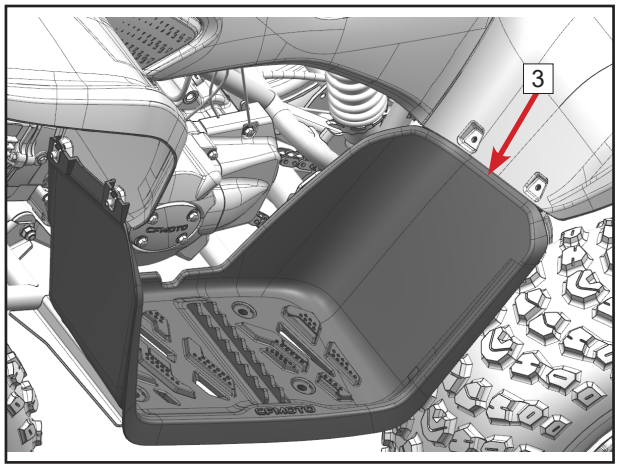
Remove bolts 2.



Remove bolts 2.



Remove LH foot pedal 3.

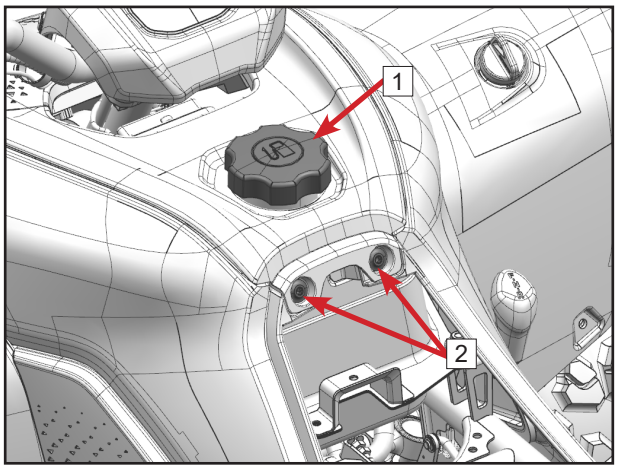


4.3 Fuel tank cover

4.3.1 Fuel tank rear cover

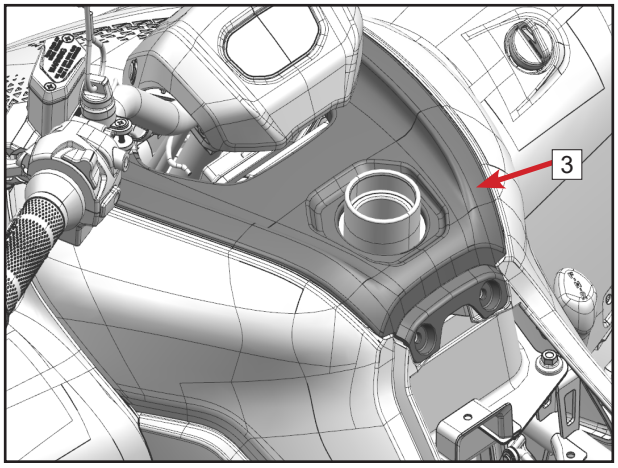
Removal

Unscrew fuel tank cover 1.

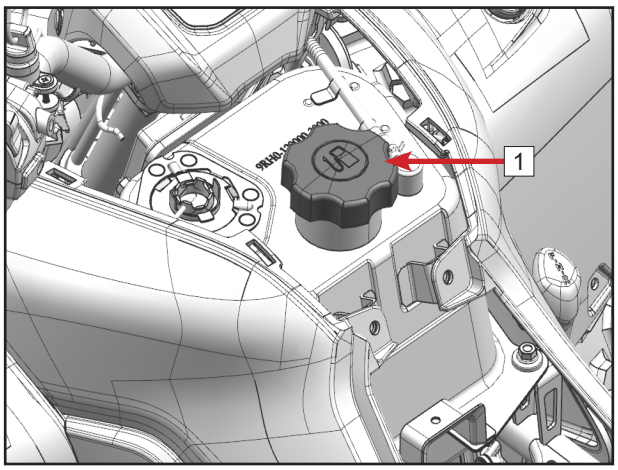


Remove bolts 2.

Remove fuel tank rear cover 3.

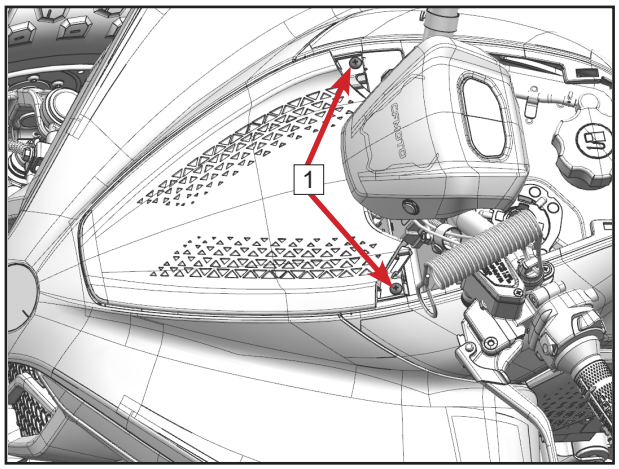


Put back and tighten fuel tank cover 1.

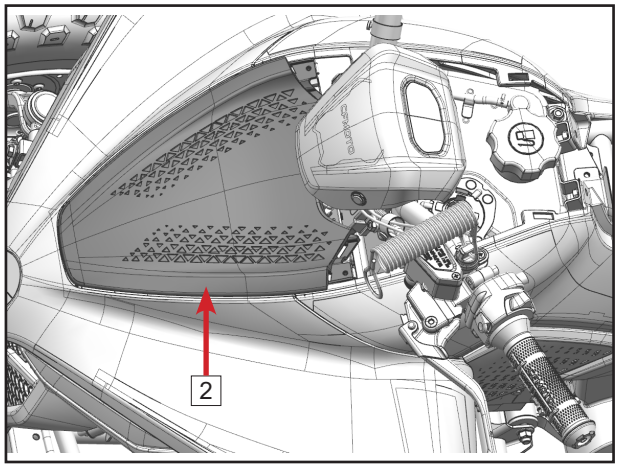


4.3.2 Fuel tank front cover
Removal

Remove bolts 1.

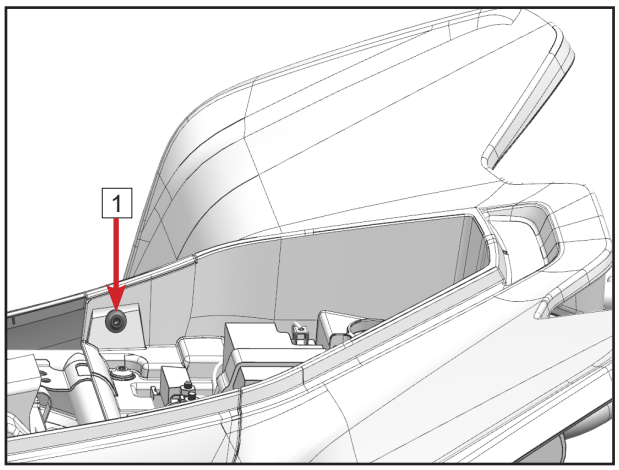


Remove fuel tank front cover 2.

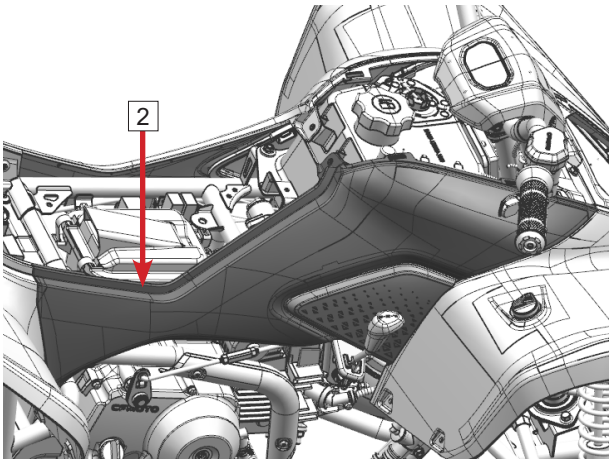


4.4 Side cover deco plate
4.4.1 RH side cover deco plate
Removal

Remove bolts 1.



Remove RH side cover deco plate 2.

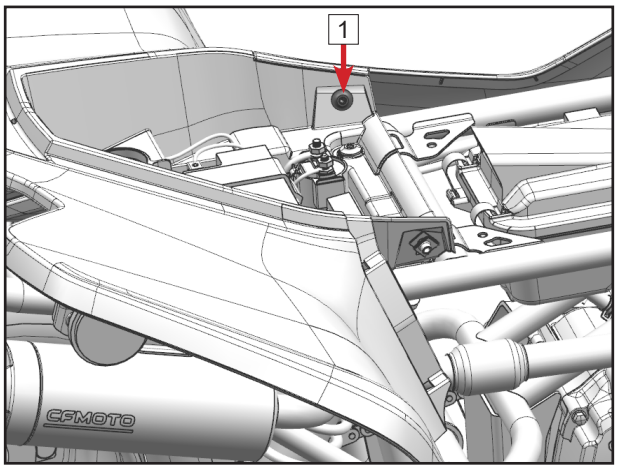


Installation

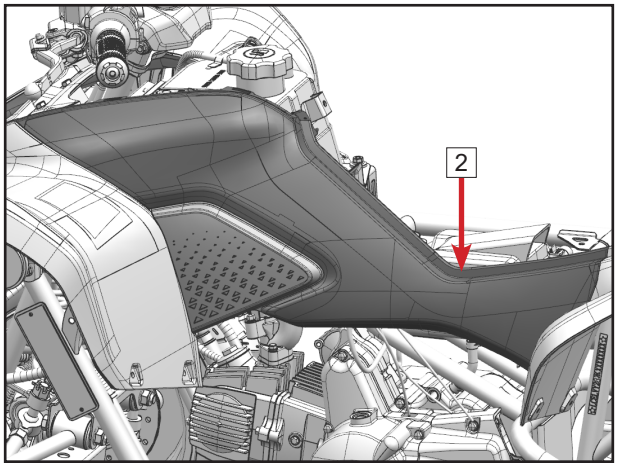
Reverse the removal procedures for installation.

4.4.2 LH side cover deco plate
Removal

Remove bolts 1.



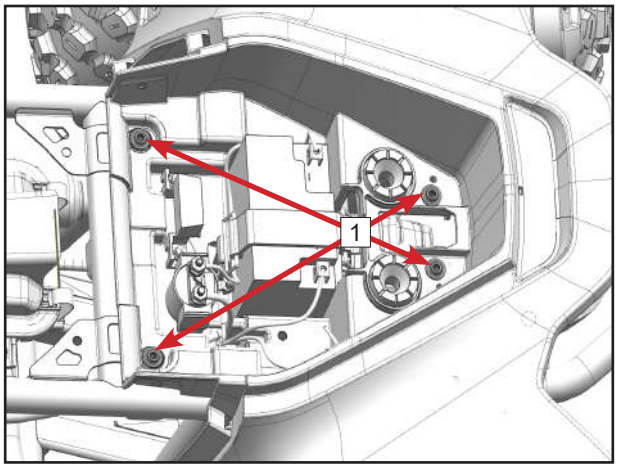
Remove LH side cover deco plate 2.



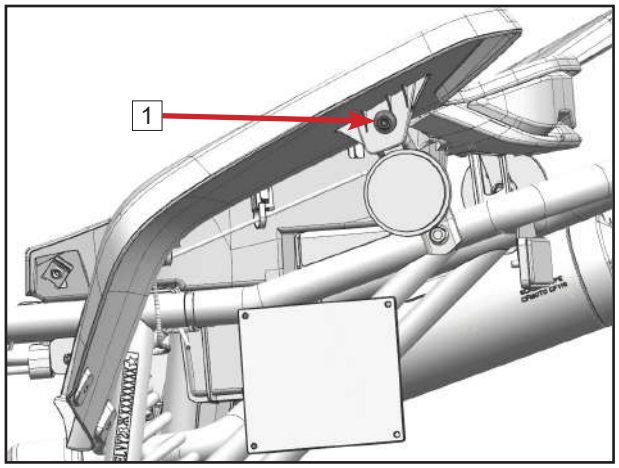
4.5 Fender
4.5.1 Rear fender
Removal

Unplug tail light connectors.

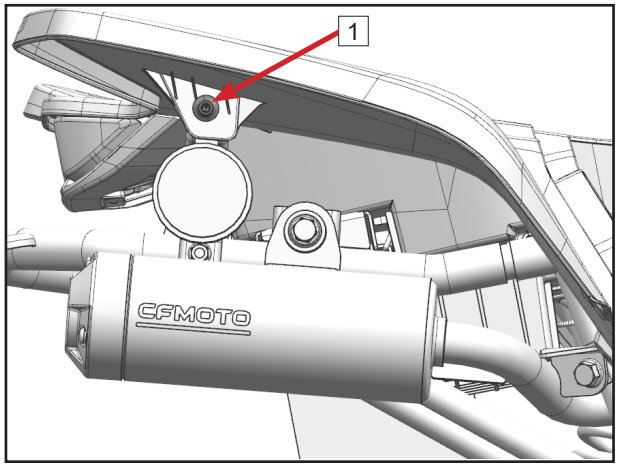
Remove bolts 1.



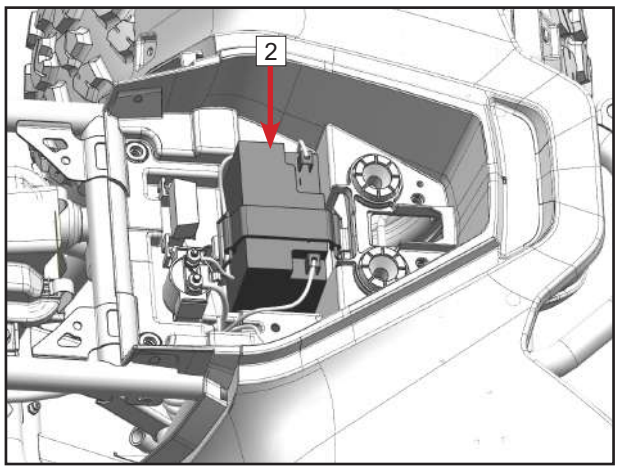
Remove bolts 1.



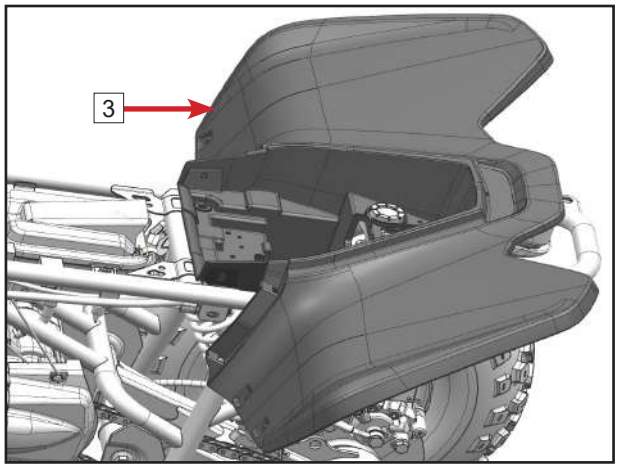
Remove bolts 1.



Remove battery 2 and its electric parts.



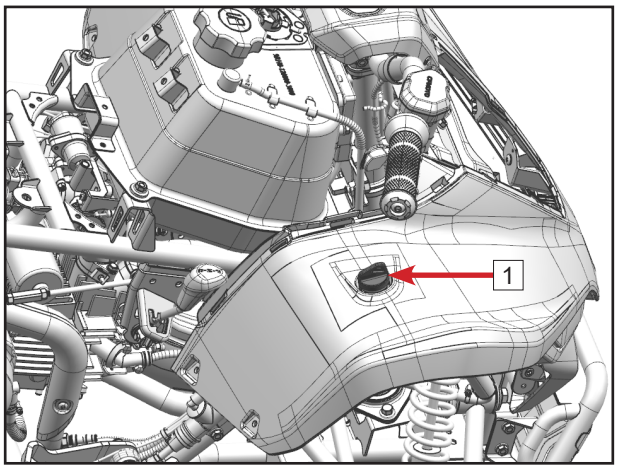
Remove rear fender 3.



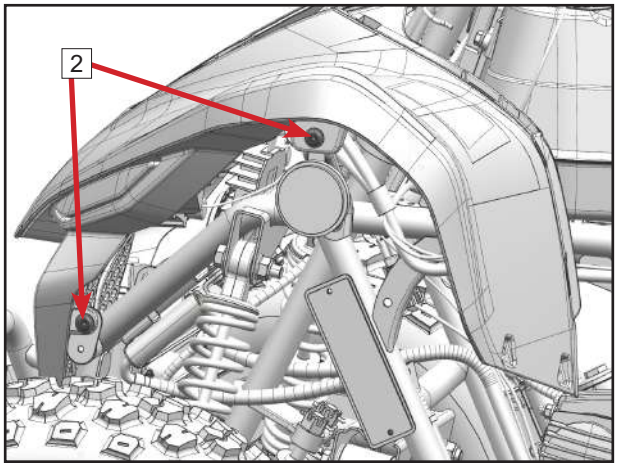
4.5.2 Front fender
Removal

Unplug headlight connectors.

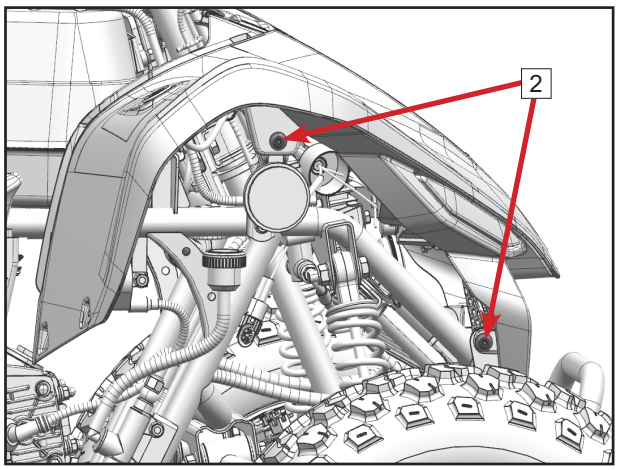
Unplug key and lock kit 1.



Remove bolts 2.

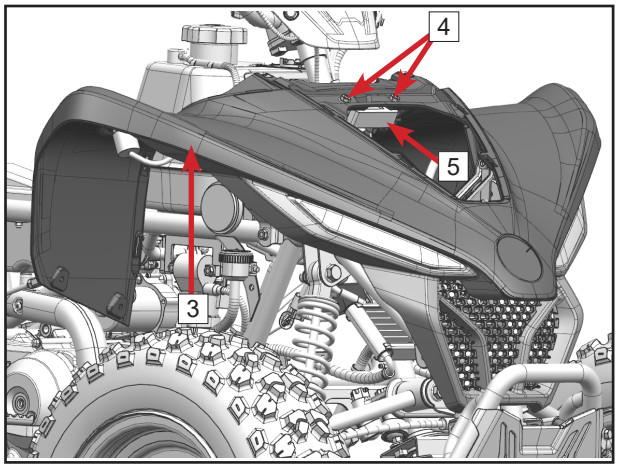


Remove bolts 2.



Unplug electric fence transmitter connectors.

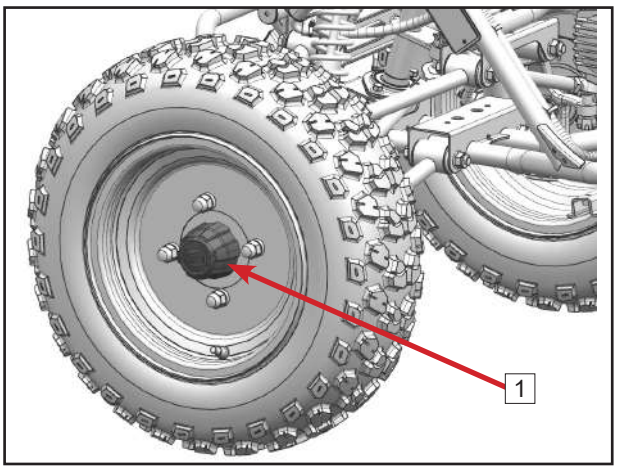
Remove front fender 3.
Remove bolts 4 and electric fence transmitter 5.



4.6 Rim deco cover

Removal

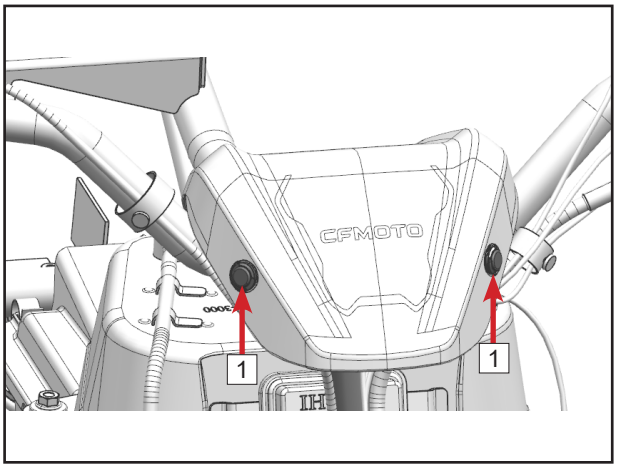
Front and rear rim deco cover 1 can be directly removed.



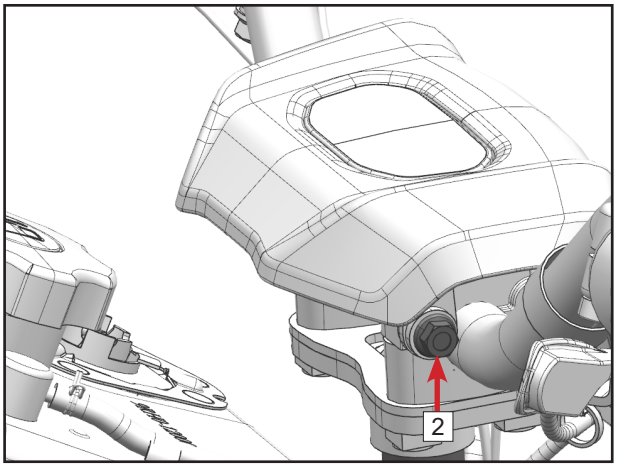
4.7 Dashboard guard

Removal

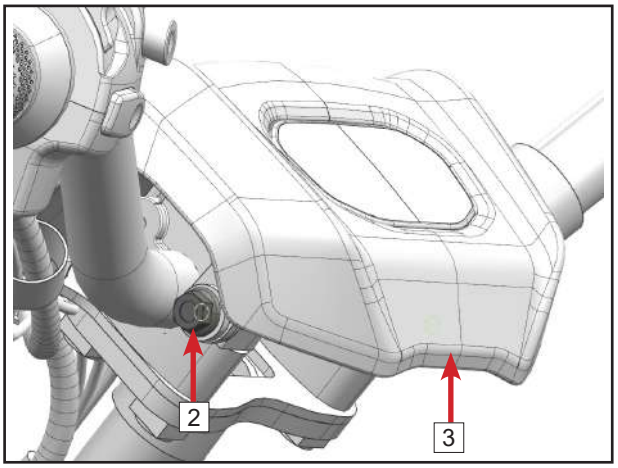
Remove screws 1.



Remove bolts 2.



Remove bolts 2.
Remove dashboard guard 3.
Remove dashboard connectors.

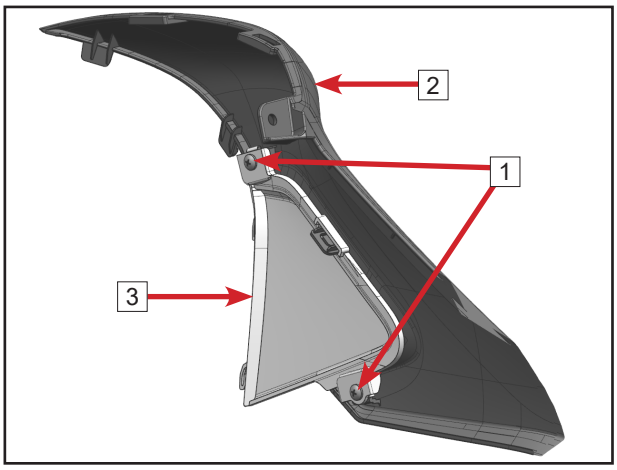


4.8 Inspection

Check whether the parts are damaged, and contact the dealer for replacement if necessary.

4.8.1 RH side cover deco plate Removal

NOTE：If the parts are not damaged or need not be replaced, do not remove them.



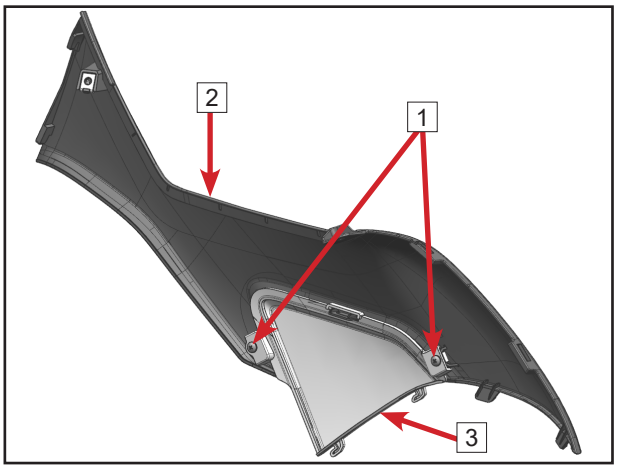
Remove bolts 1.
Remove RH side cover 3 from RH side cover deco plate 2.

Installation

Reverse the removal procedures for installation.

4.8.2 LH side cover deco plate Removal

NOTE：If the parts are not damaged or need not be replaced, do not remove them.



Remove bolts 1.
Remove LH side cover 3 from LH side cover deco plate 2.

Installation

Reverse the removal procedures for installation.

4.8.3 Rear fender

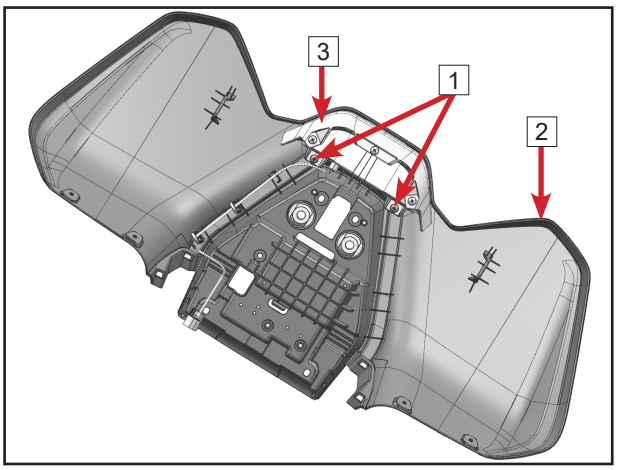
Removal

NOTE：If the parts are not damaged or need not be replaced, do not remove them.

Remove bolts 1.
Remove rear light assy 3 from rear fender 2.

Installation

Reverse the removal procedures for installation.



4.8.4 Tail light

Inspection

Check tail light for damages, replace if found any.

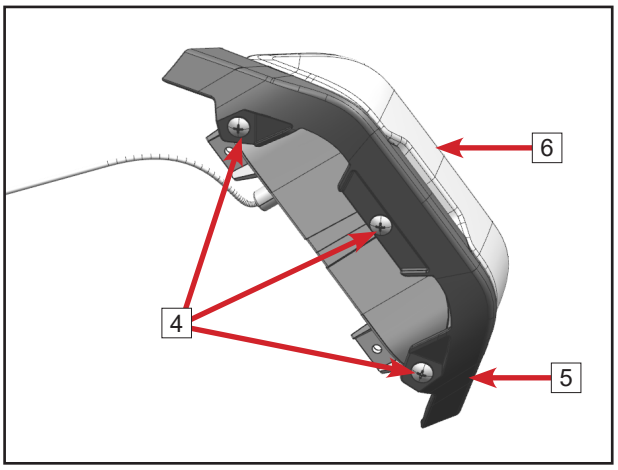
Removal

NOTE：If the parts are not damaged or need not be replaced, do not remove them.

Remove bolt 4.
Remove tail light 6 from tail light panel 5.

Installation

Reverse the removal procedures for installation.

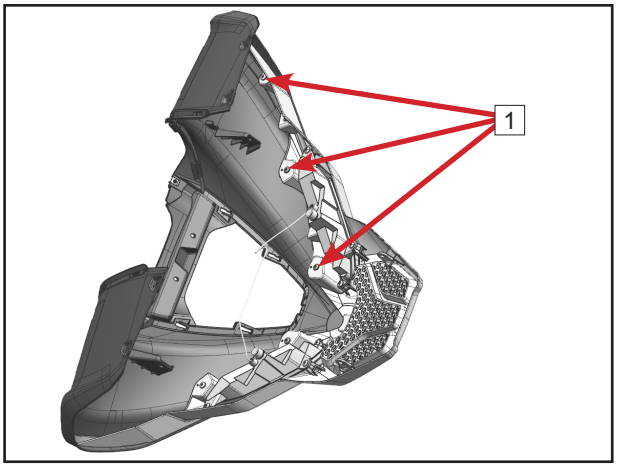


4.8.5 Front fender

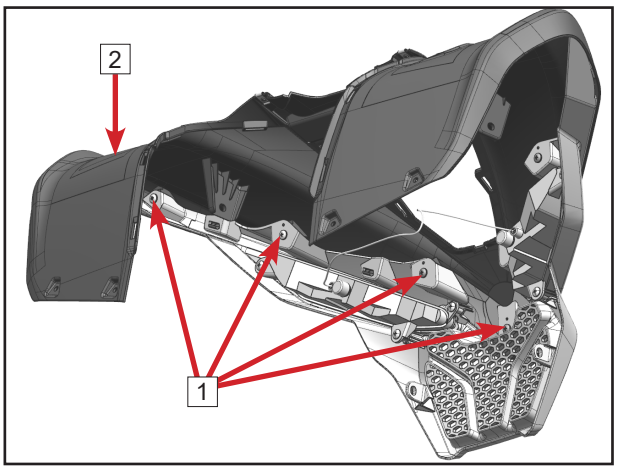
Removal

NOTE：If the parts are not damaged or need not be replaced, do not remove them.

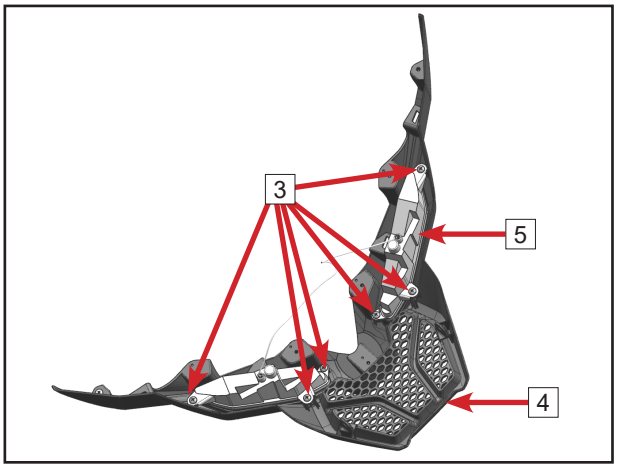
Remove bolts 1.



Remove front fender 2.



Remove bolts 3.
Remove headlight 5 from headlight panel 4.

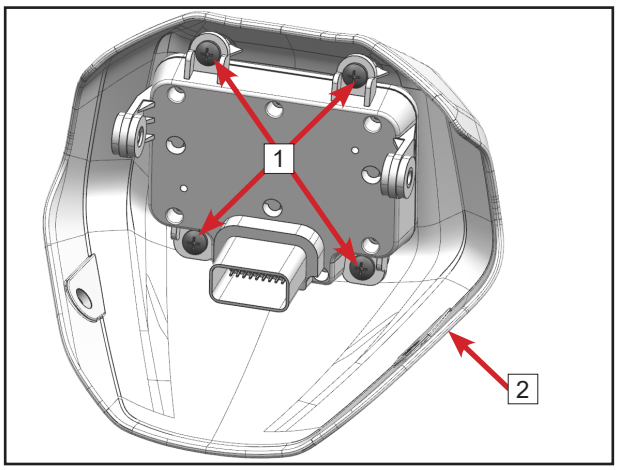


Installation
Reverse the removal procedures for installation.

4.8.6 Dashboard cover

Removal

NOTE：If the parts are not damaged or need not be replaced, do not remove them.



Remove bolts 1.
Remove dashboard cover 2.

Installation
Reverse the removal procedures for installation.

4.9 Installation

Reverse the removal procedures for installation.

5.1 Overview

5.1.1 Specification

5.1.1.1 Engine specification

General specifications

	Item	Data
Engine	Model	LX152FMH
	Displacement	110ml
	Cylinder alignment and inclination	Single cylinder, 10° perpendicular to the ground
	Cylinder diameter * stroke	52.4×49.5mm
	Combustion chamber volume	10.4±0.3mL
	Compression ratio	9.1：1
	The valve body	Overhead-cam
	Maximum power and corresponding speed	4.7（1±10%）kW/（7500±500）rpm
	Maximum torque and corresponding speed	7.5（1±10%）N•m/（5500±500）rpm
	Intake valve	1
	Exhaust valve	1
	Lubrication system	Pressure lubrication + splash lubrication
	The cooling system	Oil cooling
	Net engine mass	19.4kg（oil included）
Drivetrain	Clutch	Wet, multi-piece automatic clutch
	Transmission	Single pole built-in reverse gear
	Primary gear ratio	4.059
	Gear ratio	1st gear（forward gear）：1.350 R gear：2.583
	Gearshift method	1-N-R
Electricals	Ignition system	FTI
	Starting system	Electric start
	Lighting system	Battery
	Model of spark plug	A7RTC
	Spark plug clearance	0.6-0.7mm
	Rgulator	Three-phase full-wave rectification

5.1.1.2 Lubrication specification

Unit：mm

Item		Standard	Service limit
Engine oil capacity	After discharging oil	0.6 L（oil cooler included）	—
	After disassembling crankshaft body	0.8 L（oil cooler not included）	—
Oil recommended	brand	Shell	—
	model	API quality rating: SG or higher (do not use oil that is energy efficient on the circular API repair label) Viscosity grade：10W-40	—
Oil pump rotor	tip clearance	0.1-0.15	0.15
	pump body clearance	0.15-0.21	0.26
	End clearance	0.03-0.09	0.15

5.1.1.3 Cylinder head/Valve specification

Unit：mm

Item			Standard	Service limit
Electric starting cylinder pressure			（800-1400）kPa	—
Cylinder head flatness			—	0.05
Valve clearance		EX	0.02-0.08	—
		EX	0.02-0.08	—
Camshaft	Cam projection height	IN	26.566-26.686	26.532
		IN	26.327-26.447	26.297
Valve, valve guide	Valve stem diameter	IN	4.970-4.985	4.940
		IN	4.955-4.970	4.925
	Valve guide inner diameter	IN/EX	5.000-5.012	5.030
	Valve stem to valve guide clearance	IN	0.015-0.042	0.09
		IN	0.03-0.057	0.105
	Valve seat width	IN/EX	0.8-1.0	1.5
Valve spring free length		IN/EX	IN 32.4 OUT35.55	IN 31.55 OUT 34.70

5.1.1.4 Clutch and gearshift specification

Unit：mm

Item		Standard	Service limit
Clutch	Spring free length	28.5	28
	Tellurium sheet thickness	4	3.9
	Driven pulley flatness	—	0.10
Clutch bushing	inner diameter	16.988-17.006	17.049
	outer diameter	20.93-20.95	20.91
Clutch bushing crankshaft outer diameter		16.966-16.84	16.87

5.1.1.5 Magneto and starter clutch specification

Unit：mm

Item	Standard	Service limit
Starter motor driven pulley outer diameter	45.66-45.673	45.642

5.1.1.6 Crankshaft, piston, cylinder specification

Unit：mm

Item			Standard	Service limit
Crankshaft	Connecting rod big head side clearance		0.1-0.3	0.6
	Crankshaft radial side clearance		0.004-0.012	0.05
Cylinder	Cylinder diameter		52.404-52.412	52.8
Piston, piston pin, piston ring	Piston base circle diameter		52.375-52.385	52.3
	Pin hole diameter		13.002-13.008	13.03
	Piston pin diameter		12.994-13	12.98
	Clearance between piston and piston pin		0.002-0.014	0.075
	Piston ring closure clearance	First ring	0.1-0.25	0.5
		Second ring	0.1-0.25	0.5
		Scraper ring	0.2-0.8	1.1
	Piston ring and ring groove clearance	Clearance between first ring and groove	0.02-0.06	0.095
		Clearance between second ring and groove	0.02-0.06	0.095
Matching cylinder clearance			0.019-0.037	0.1
Connecting rod small big head inner diameter			13.01-13.021	13.037
Connecting rod and pin fit clearance			0.002-0.019	0.049

5.1.2 Torque value

5.1.2.1 Standard parts torque value

Fastener type	Torque N•m	Fastener type	Torque N•m
5mm bolt and nut	5.2	5mm screw	4.2
6mm bolt and nut	10	6mm screw	9.0
8mm bolt and nut	22	6mm flange bolt（8mm head, small flange）	10
10mm bolt and nut	34	6mm flange bolt（8mm head, big flange）	10
12mm bolt and nut	54	6mm flange bolt（10mm head）and nut	10
		8mm flange bolt and nut	27
		10mmflange bolt and nut	39

5.1.2.2 Engine torque value

Item	Amount	Thread diameter mm	Torque N•m	Remarks
Spark plug	1	10	12	
LH deco cover	4	6	7	
Inspection hole cover	1	14	4	
Engine drain bolt	1	12	23	

5.1.2.3 Cylinder head and valve torque value

Item	Amount	Thread diameter mm	Torque N•m	Remarks
Cylinder head bolt	3	6	12	
Cylinder head/cylinder body connecting bolt	1	6	12	
Cylinder head round cap screws	1	6	10	
Valve cover	2	30	16	
RH side cover bolt	2	6	12	
Timing bolt	3	5	10	

5.1.2.4 Clutch and gearshift torque value

Item	Amount	Thread diameter mm	Torque N•m	Remarks
Clutch lock nut	1	14	42	
End cover bolt	3	6	3	Apply thread locker
RH crankcase cover bolt	8	6	12	
Five-star toggle plate screws	1	6	12	Apply thread locker

5.1.2.5 Magneto and starter clutch torque value

Item	Amount	Thread diameter mm	Torque N•m	Remarks
Magneto rotor nut	1	10	42	Apply oil on thread and surface
Magneto stator bolt	2	6	12	Apply thread locker
Trigger fixed bolt	2	5	7	
LH crankcase cover bolt	4	6	12	

5.1.2.6 Crankcase torque value

Item	Amount	Thread diameter mm	Torque N•m	Remarks
Crankcase closing bolts	8	6	12	

5.1.2.7 Crankshaft, piston, cylinder torque value

Item	Amount	Thread diameter mm	Torque N•m	Remarks
Tension arm core shaft	1	7	12	
Guide pulley pin shaft	1	8	12	

5.1.3 Lubrication and seal position

Engine

Material		Location	Remarks
Sealant	1596/1590	Crankcase and cylinder body joint surface at paper pad	
Engine oil		The whole surface of inner and outer rotors of oil pump Valve stem sliding surface and rod end Timing chain entire surface Rolling surface of camshaft Inner surface of cylinder hole Piston outer surface, piston pin hole and piston ring groove Exterior surface of piston pin The entire surface of the piston ring Clutch lining disc entire surface Gearshift shaft rod Entire surface of starter clutch The entire surface of the fork shaft Crankshaft connecting rod big end bearing bush inner surface Crankshaft connecting rod small head end inner hole Gear teeth (primary drive, crankcase, starting and decelerating) disc tooth sliding surface Rotation area of each bearing Surface of each O-ring	
Molybdenum disulfide oil		Camshaft surface Cylinder head CAM shaft hole	
Multipurpose grease		Starter motor seal ring LH deco cover seal ring	
Degreaser		All joint surfaces	

5.2 Maintenance

5.2.1 Maintenance specification

General information

Place the vehicle on a flat surface before any operation begins.

Under certain concentrations, gasoline is an extremely flammable and explosive substance.

The workplace shall be well ventilated. Smoking, creating open flames or sparks in the work area or gasoline storage area may result in fire or explosion.

The exhaust contains toxic carbon monoxide gas, which can cause coma and even death. Run the engine outside or in an enclosed area with a ventilation system.

In order to ensure that the vehicle runs with good power, please check according to the maintenance schedule in the Owners Manual.

Ⅰ: Check, clean, adjust, lubricate or replace if necessary. C: Cleaning; R: replacement; L: Lubrication.

The following maintenance items require some mechanical knowledge. Certain items (especially those marked with an *) may require additional technical information and tools.

5.2.2 Maintenance interval table

period / maintenance item	Mileage or time of purchase					
	During break-in			After break-in		
	300KM	600KM	1000KM	3000KM	5000KM	7000KM
Spark plug	I	I	I	R	I	R
Engine oil	R	R	R	Replace every 1000KM or two months		
Centrifugal filter						C
Valve clearance	I	I	I	I	I	I
Engine idle	I	I	I	I	I	I
Engine oil filter						C

NOTE:

1. If the vehicle is used in a harsh environment such as abnormally wet and dusty, it should be maintained more frequently.
2. * Marking project requires special tools, data and professional skills, which shall be carried out by CFMOTO dealers.
3. Maintenance cycle displays data according to the odometer , mileage and service life, whichever comes first.

5.2.3 Spark plug

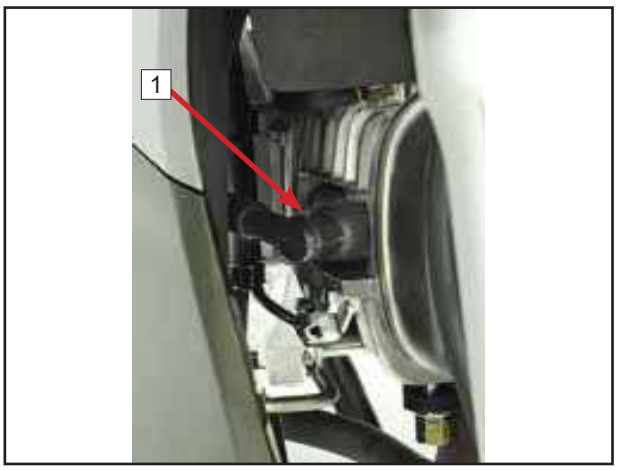
5.2.3.1 Spark plug removal

Remove spark plug[1].

NOTE：

Use an air gun to blow around the base of the spark plug before removing it, ensuring that no debris falls into the combustion chamber.

Check insulators for cracks or damage, electrodes for damage, dirt, and discoloration. Replace spark plugs if necessary.



5.2.3.2 Spark plug inspection

Clean spark plug electrodes with wire or a special spark plug cleaner.

Check the gap between the center electrode and the side electrode with a plug gauge.

Spark plug clearance：0.60-0.70mm

If necessary, bend the side electrode carefully to adjust the gap.

Install and manually tighten the spark plug to the cylinder head, then tighten the spark plug to the specified torque value.

Torque value：12N•m

5.2.4 Valve clearance

5.2.4.1 Inspection

NOTE：

Check and adjust the valve clearance under the cooling condition (below 35℃).

Remove the following parts:

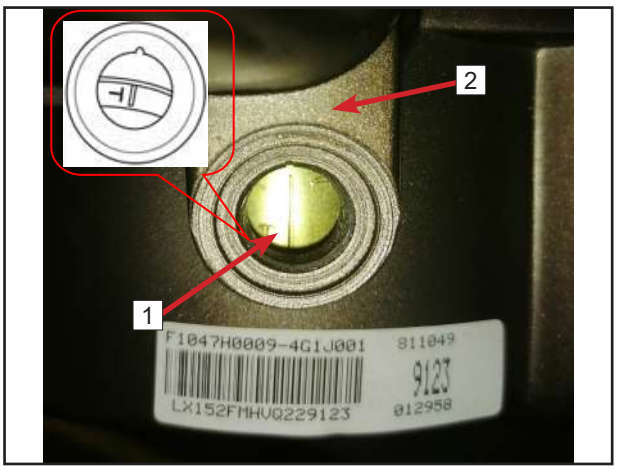
- 2 valve covers for cylinder head.
- Deco cover on LH front cover and O-ring.
- Inspection hole cover and O-ring on LH front cover.

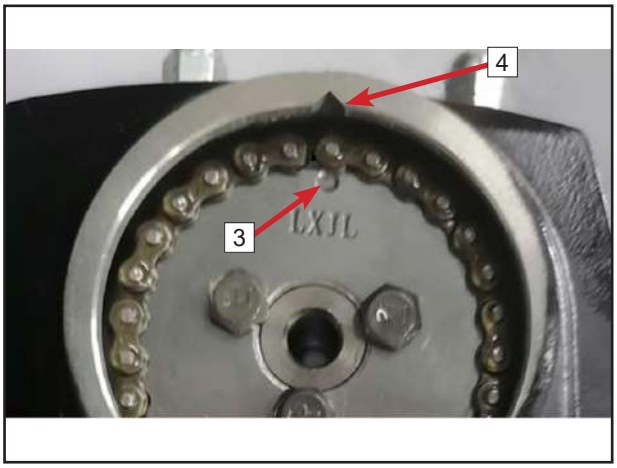
Installation status：

With 14 mm socket wrench counterclockwise rotate the crankshaft, ensure "|" mark on the magnetic cylinder [1] (EFI status only "|") appears in the hole inside the bolt of inspection hole cover, and align with the scribed line on LH front cover [2].

Make sure the positive driven sprocket dot [3] is aligned with the cylinder head notch [4].

If not, turn the crankshaft one turn counterclockwise to ensure that the "|" mark on the magnetic cylinder [1] (EFI status only "|") appears in the hole inside the bolt of inspection hole cover, and align with the scribed line on LH front cover [2].





Check each valve clearance by inserting a feeler gauge between the valve adjusting screw and the valve stem.

Valve clearance：

Intake valve/exhaust valve：0.05±0.2mm

5.2.4.2 Adjustment

Loosen the lock nut [1] and turn the adjusting screw [2] until the feeler gauge (0.05mm) feels a slight tug.

Tool：

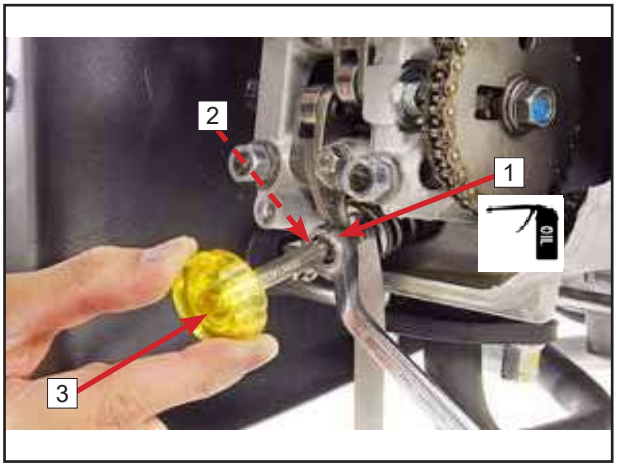
[3] Valve adjustment wrench M8

Tighten the lock nut to the specified torque value while applying engine oil to the valve screws to stabilize the adjusting screws.

Torque value：9N•m

Re-check valve clearance as described above.

Install valve cover, deco cover and seal ring, inspection hole cover and seal ring, torque value see torque table above.



5.2.5 Engine oil

5.2.5.1 Oil level inspection

Start the engine and let it idle for 3-5 minutes.
Stop the engine and wait 2-3 minutes.
Prop up the vehicle in a horizontal position.
Remove the oil dipstick [1] and wipe the grid part with a clean cloth.
Insert the oil dipstick into the oil filling port, but do not screw it in, then remove it to check the oil level.
If the oil level is below or near the lower limit of the oil dipstick, inject the recommended oil into the crankcase until the level reaches the upper limit.

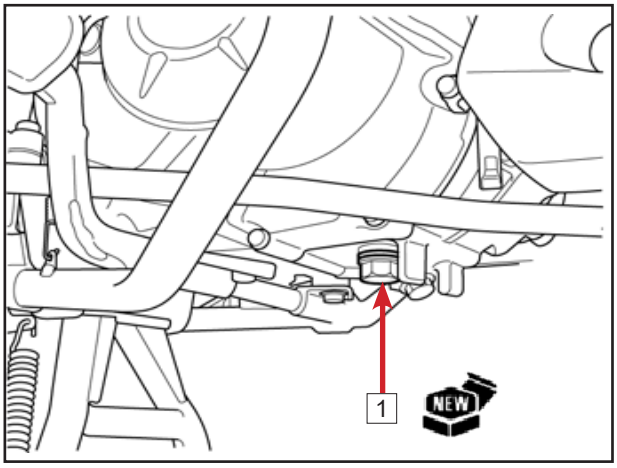
Recommended engine oil：Shell

API quality level is：SG or higher(Do not use oil that is labeled energy efficient on the circular API service label)
Viscosity Grade：10W-40

Install oil dipstick.

5.2.5.2 Engine oil changing

Heat the engine.
Stop the engine, remove the oil dipstick, and wipe the oil stains from the oil dipstick with a clean cloth.
Remove drain bolt and seal gasket assy [1] and drain engine oil (leave for 5 minutes).
Replace a new seal gasket, install to the drain bolt and tighten to its indicated torque value.
Torque value：24N•m
Fill with recommended Shell oil.



Engine oil capacity：
After oil drain：0.6L
After disassembly：0.8L

Check the O-ring of the oil dipstick is in good condition and replace it if necessary.
Install the oil dipstick.
Make sure there is no oil leak.
Check the oil level (as above).

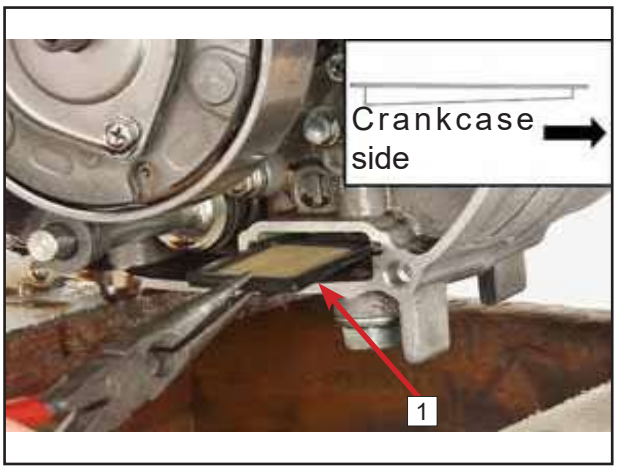
5.2.6 Engine oil strainer

Remove RH crankcase cover.

Remove the oil strainer [1] and clean with a non-flammable solution with a high flash point.

With the tapered side facing the crankcase, install the oil strainer [1] with the narrow side facing up as shown.

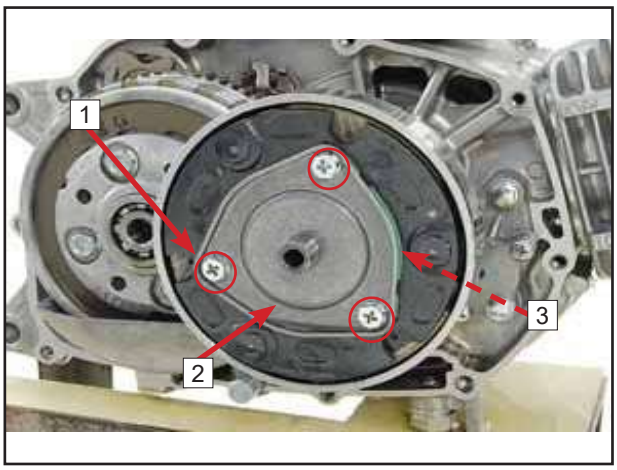
Install RH crankcase cover.



5.2.7 Engine centrifugal filter

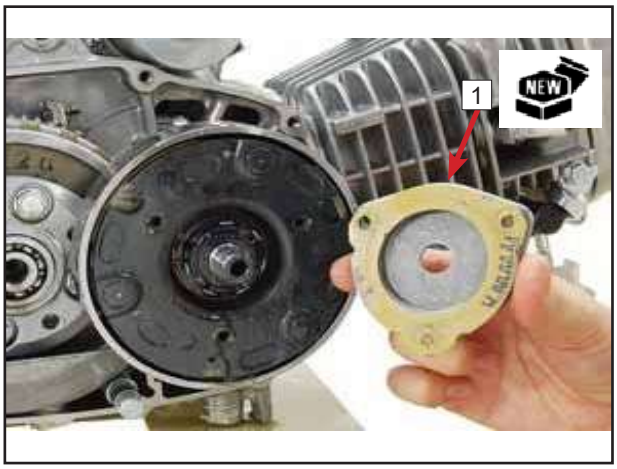
Remove RH crankcase cover.

Remove bolt [1], clutch end cap [2] and paper pad [3].



With a clean cloth without lint, wipe the clutch cover inner cavity.

Place the sealing surface toward the clutch cover plate and install the new paper pad [1].

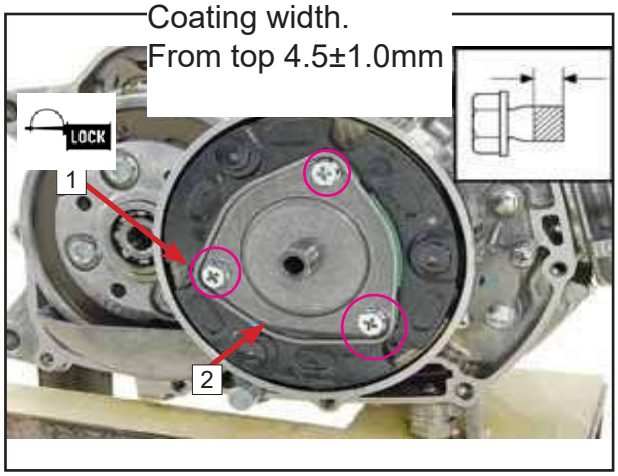


Apply thread locker to the thread of clutch end cover bolt [1], install clutch end cover [2] and bolt.

Tighten bolts to specified torque value.

Torque value：5N•m

Install RH crankcase cover.



5.2.8 Engine idle speed

After completing all engine maintenance items and confirming that all is within the specified range, then check idle speed.
Before checking idle speed, check the following items:
- No fault indicator is blinking.
- The spark plug status.
- Filter element status of the air filter.
-Throttle switch and free travel of throttle lever.
The idle speed can be accurately checked and adjusted only under condition of heated engine. Start the engine and let it idle for 20 minutes to heat the vehicle to normal working condition.
Check the idle speed.
Idle speed：1500±150rpm

If idle speed is not within service limits, check the following components:
- Air intake or engine end tip problem.
- Idle control valve operation.
- Cable lines and connectors.

5.3 Lubrication system

5.3.1 Service information

5.3.1.1 Overview

⚠WARNING
Repeated, long-term exposure to used engine oil may lead to skin cancer. This case is rare, unless you have daily contact with used engine oil. However, we recommend that you wash your hands with soap and water as soon as possible after disposing of used oil.

NOTE:

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

The premise of each maintenance step in this chapter is to drain the engine oil.

When removing and installing the oil pump, be careful not to let dust and dirt into the engine.

If any of the oil pump components are worn out beyond the specified service limits, replace the entire oil pump assembly.

After installing oil pump, check whether there is oil leakage.

5.3.2 Lubrication system specification

Unit：mm

Item		Standard	Service limit
Engine oil capacity	After oil drain	0.6L（oil cooler not included）	—
	After disassembly crankcase body	0.8L（oil cooler not included）	—
Oil recommended	Brand	Shell	—
	Model	API quality level is：SG or higher(Do not use oil that is labeled energy efficient on the circular API service label) **Viscosity Grade：10W-40**	—
Oil pump rotor	Tip clearance	0.1-0.15	0.15
	Pump body clearance	0.15-0.21	0.26
	End clearance	0.03-0.09	0.15

5.3.3 Trouble shooting

Oil level too low
Large oil consumption
Oil leakage from external components
Piston rings are worn or improperly installed
Cylinder wear
Valve guide wear

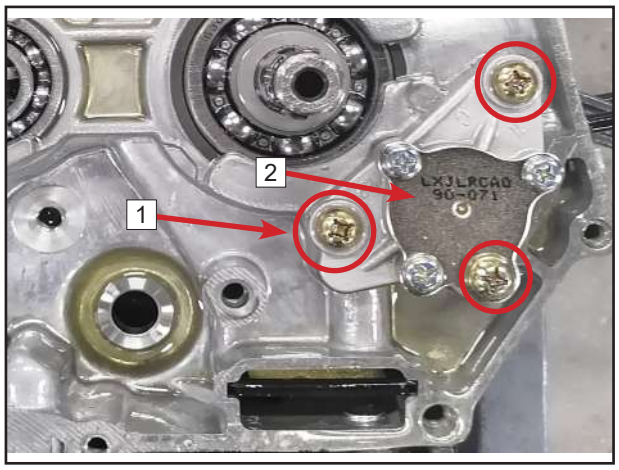
Oil level dirty
Failure to change oil and filter regularly
The piston ring is damaged

Oil emusified
Water got in engine

5.3.4 Oil pump

5.3.4.1 Removal/installation

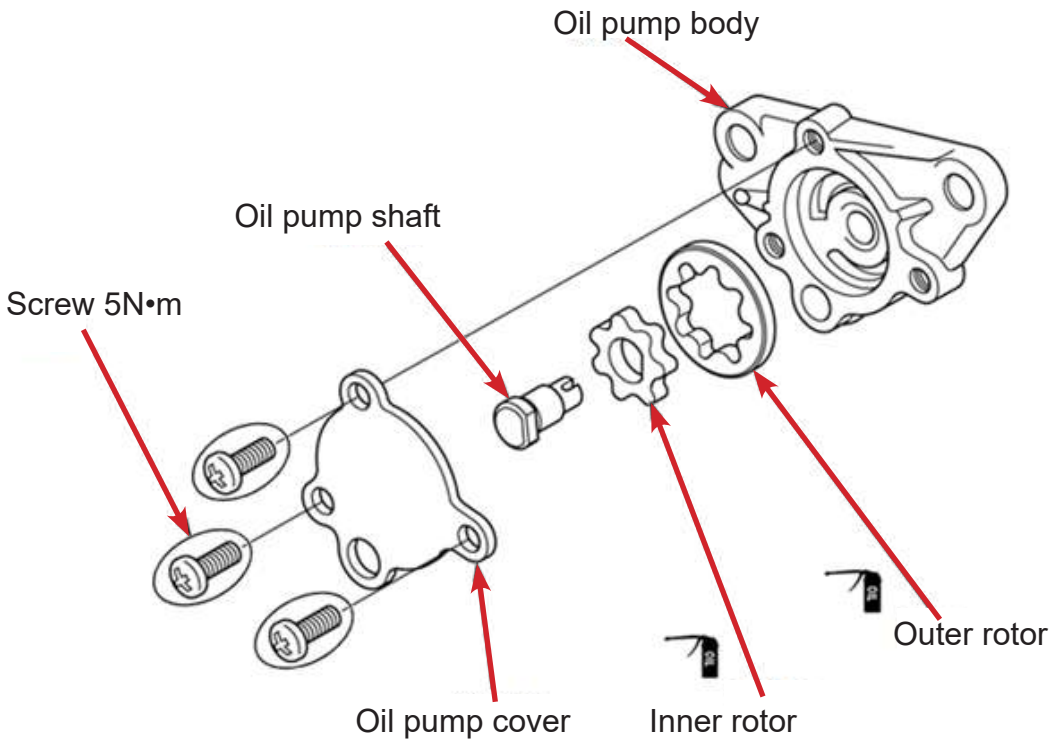
Drain the engine oil.
Remove RH crankcase cover assy.
Remove clutch assy.
Remove fastening bolts [1] and oil pump [2].
Reverse the removal procedures for installation.



NOTE：Before assembly, manually turn the oil pump shaft to ensure that there is no stuck phenomenon.
Torque value：
Oil pump bolt：8N•m

5.3.4.2 disassembly/assembly

The disassembly and assembly of oil pump are as follows:



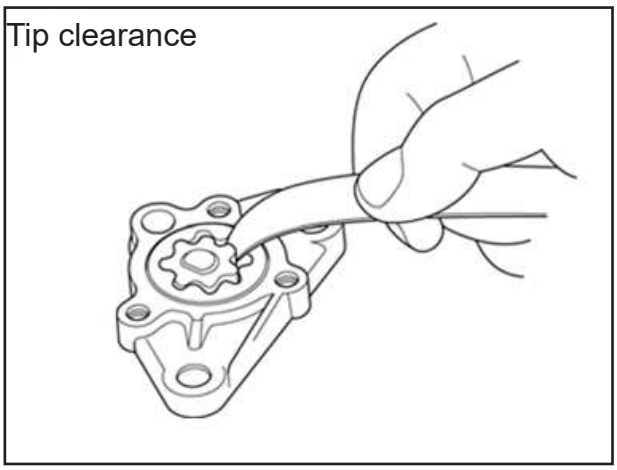
5.3.4.3 Inspection

Disassemble oil pump.

Temporarily install the outer and inner rotors to the oil pump body and install the oil pump shaft. Measure the clearance between the inner rotor and the outer rotor at the top.

Service limit：0.15mm

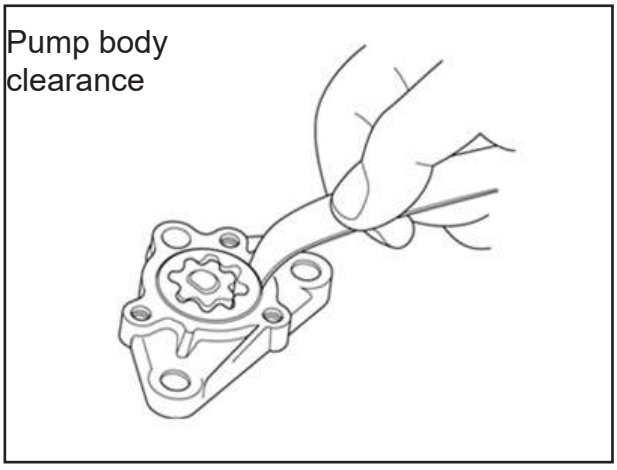
Tip clearance



Measure the clearance between the outer rotor and the oil pump body.

Service limit :0.26mm

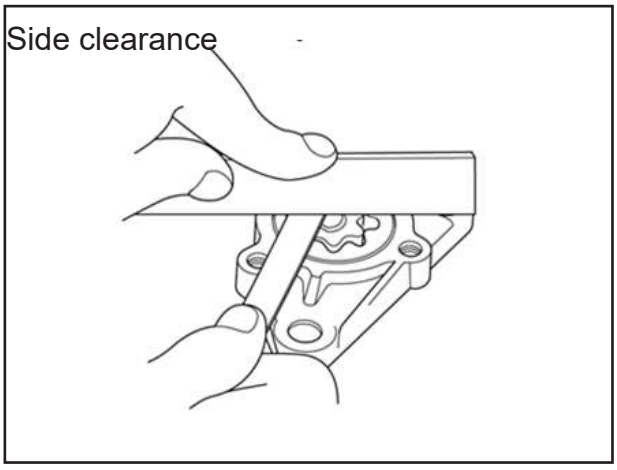
Pump body clearance



Using a ruler and a feeler, measure the side clearance.

Service limit:0.15mm

Side clearance



5.4 Cylinder head and valve

5.4.1 Service information

5.4.1.1 Overview

This section describes the cylinder head, valve, swing arm shaft and CAM chain tensioner.

These parts can be repaired while the engine is mounted on the frame.

At the time of disassembly, the removed parts should be marked and stored to ensure that they can be installed in their original position when reassembled.

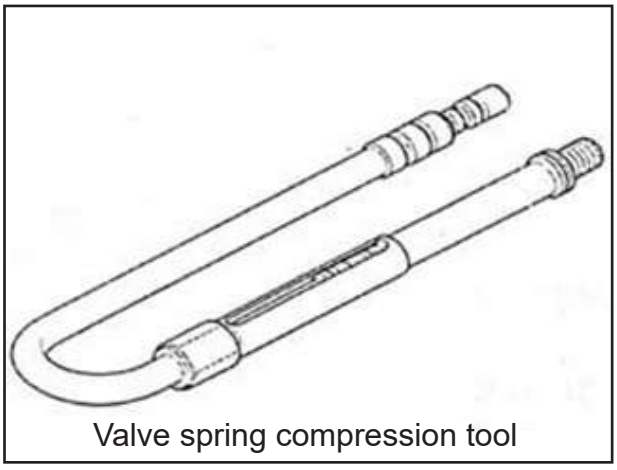
Before inspection, clean all removed parts with a clean solvent and blow dry them with compressed air.

Camshaft and swing arm lubricants are injected through the oil pipe in the cylinder head and camshaft bracket. The oil pipe should be cleaned before assembling the cylinder head.

When removing the cylinder head cover and cylinder head, take care not to damage the mating surface.

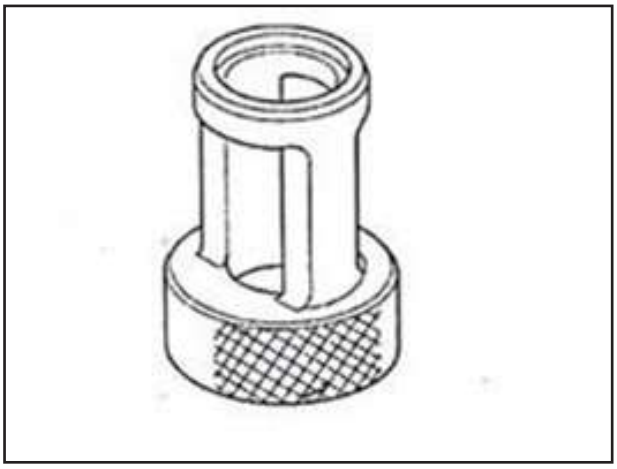
5.4.2 Tools

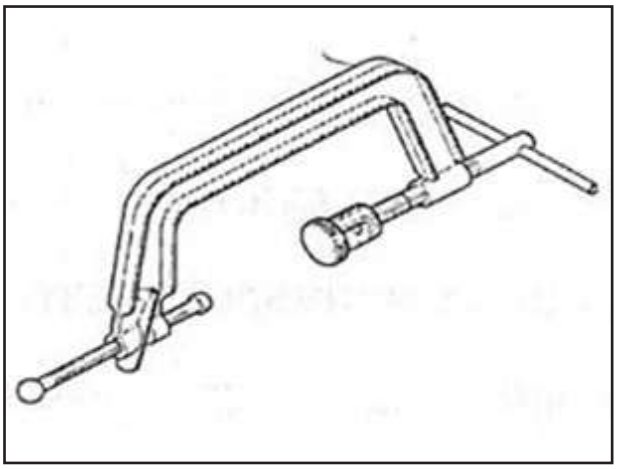
Compression table attachment



Valve spring compression tool

Valve spring compression attachment





5.4.3 Cylinder head/valve specification

Item			Standard	Service limit
Electric starting cylinder pressure			（800-1400）kPa	—
Cylinder head flatness			—	0.05
Valve clearance		IN	0.02-0.08	—
		EX	0.02-0.08	—
Camshaft	Height of CAM projection	IN	26.566-26.686	26.532
		EX	26.327-26.447	26.297
Valve, valve guide	Valve stem diameter	IN	4.970-4.985	4.940
		EX	4.955-4.970	4.925
	Valve guide inner diameter	IN/EX	5.000-5.012	5.030
	Valve stem to valve guide clearance	IN	0.015-0.042	0.09
		EX	0.03-0.057	0.105
	Valve seat width	IN/EX	0.8-1.0	1.5
Valve spring free length		IN/EX	Inner 32.4 outer 35.55	inner 31.55 outer 34.70

5.4.4 Trouble shooting

Failure at the top of the engine usually affects engine performance. These faults can be diagnosed by compression testing, the source of engine noise can be traced using a probe rod or stethoscope.

If the engine does not perform well at low speeds, check the crankcase vent for white smoke. If the hose is smoking, check whether the piston ring is stuck.

When the engine is running at low speed, the compression pressure is too low, difficult to start, or the performance is bad.

Valve

- Improper valve clearance adjustment
- Valve burning or bending
- Improper valve timing
- The valve spring is broken

Cylinder head

- Cylinder head gasket leaks or is damaged
- Cylinder head warped or cracked
- The spark plug is loose

Cylinder, piston, piston ring wear

Excessive compression pressure, overheating, or crackling sound

Excess carbon accumulation in piston head or combustion chamber

Too much smoke

Cylinder head

- The valve stem or valve guide is worn
- Valve stem seals are damaged

Cylinder, piston, piston ring damaged

Noise too loud

Cylinder head

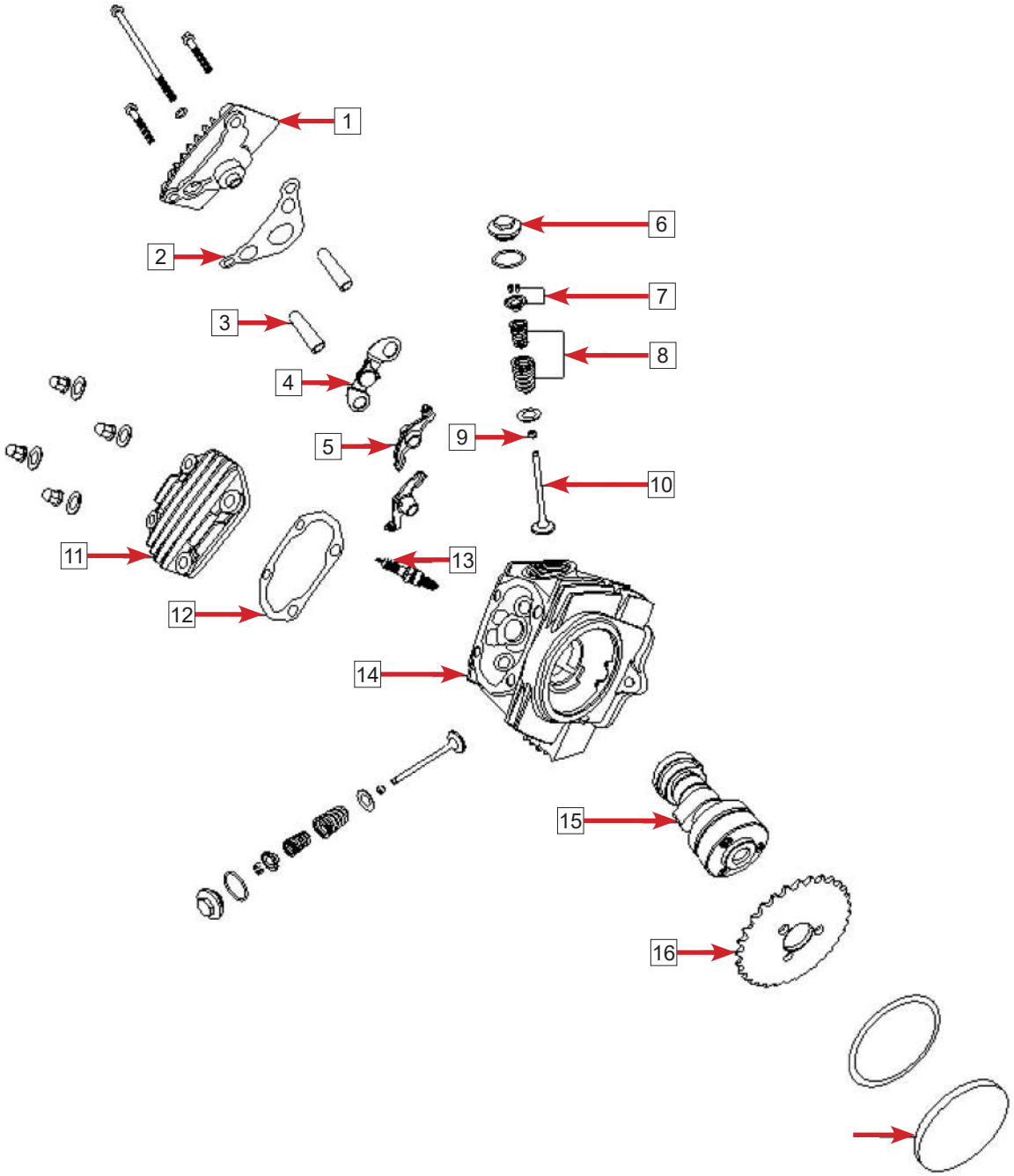
- Improper valve clearance adjustment
- The valve is stuck or the valve spring is broken
- The camshaft is worn or damaged
- The swing arm or swing arm shaft is worn
- Valve stem ends are worn
- The CAM chain is loose or worn
- The timing chain is worn
- CAM sprocket teeth are worn

Cylinder, piston, piston ring wear

Idle is poor

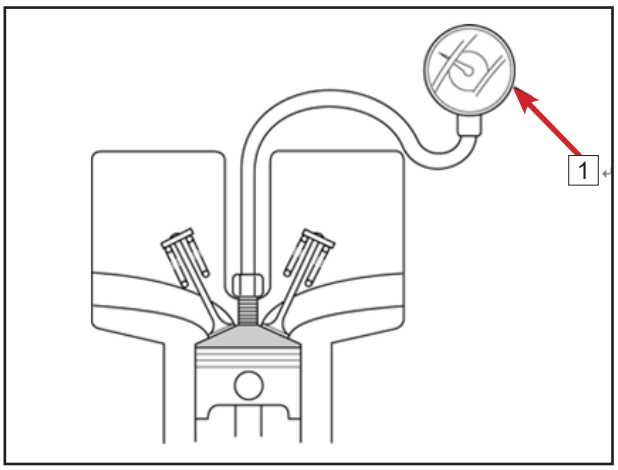
The cylinder compression pressure is too low

5.4.5 Component location



1	Cylinder head RH side cover	2	Cylinder head RH side cover gasket	3	Valve swing arm shaft
4	Cylinder head stop assy	5	Valve swing arm	6	Valve cover
7	Valve spring seat lock clip kit	8	Valve spring assy	9	Valve kit
10	Cylinder head cover	11	Cylinder head cover gasket	12	Spark plug
13	Cylinder head assy	14	Camshaft assy	15	Timing driven sprocket
16	Cylinder head LH side cover				

5.4.6 Cylinder compression test



Burn the engine for a few minutes to warm it up.
Stop the engine and remove the spark plug.
Install the threaded end of the cylinder compression gauge into the spark plug hole.
Tool：Compression gauge

Switch the ignition to "ON" and switch the engine to "on".
Shift the gear to neutral.
Throttle remains tight to full throttle and start engine until pressure gauge reading no longer rises.
The maximum reading usually lasts for 4-7 seconds.

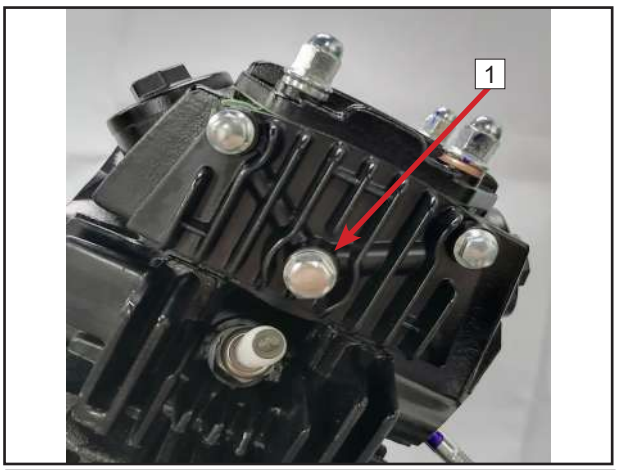
Compression pressure：
When 390rpm, 800-1400kPa.
Low pressure cause analysis:
- Cylinder head gasket leaks
- Improper valve clearance adjustment
- Valve leaks
- The piston ring or cylinder is worn
- Battery loss or starting weak

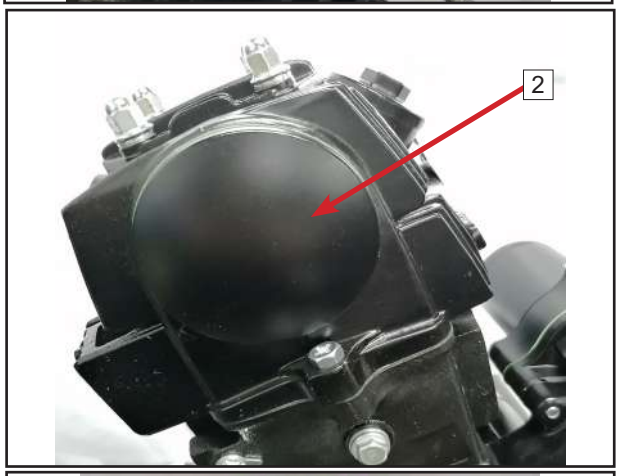
High pressure reason analysis:
- Carbon accumulation in combustion chamber or on top of piston

5.4.7 Camshaft/swing arm

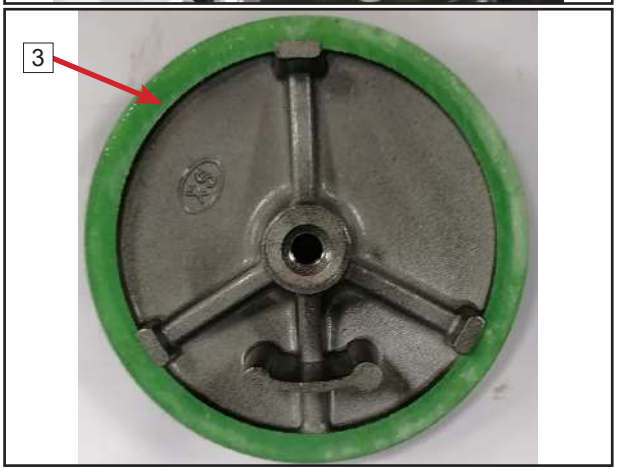
5.4.7.1 Removal

Remove vehicle shielding parts.
Remove the spark plug cap.
Make sure the piston is in the TDC (upper stop point) position of the compression stroke.
Remove the following parts:
Remove LH cover bolt and flat washer assy of cylinder head [1].

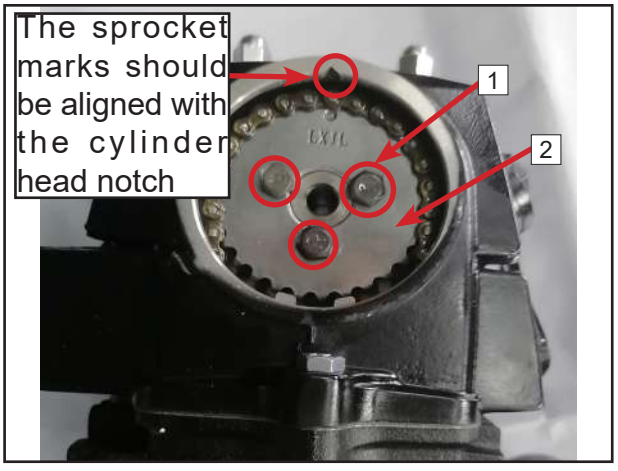




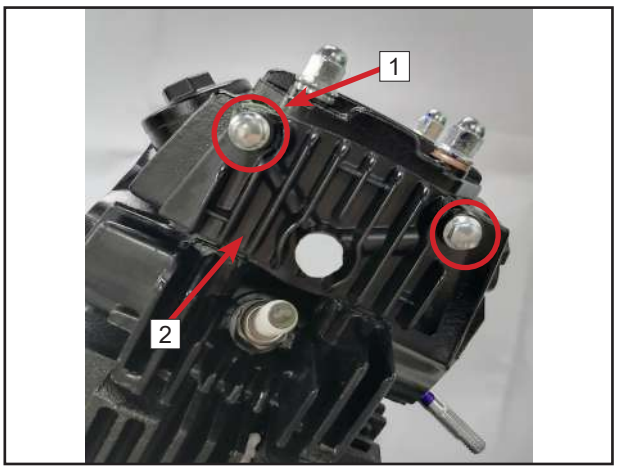
Remove LH cover of cylinder head [2] and LH cover gasket of cylinder head [3].



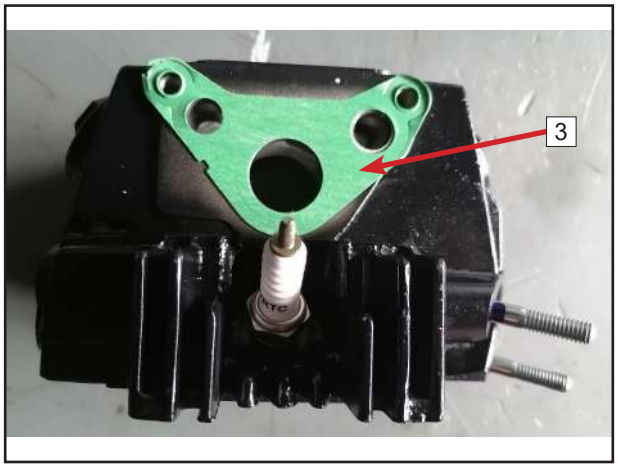
Remove timing bolts[1]，and remove the timing driven sprocket[2].

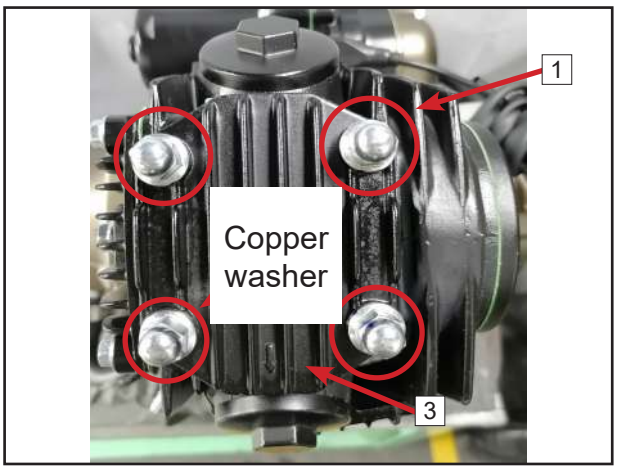


Remove the RH cover bolt of cylinder head [1].
Remove the RH cover of the cylinder head [2].

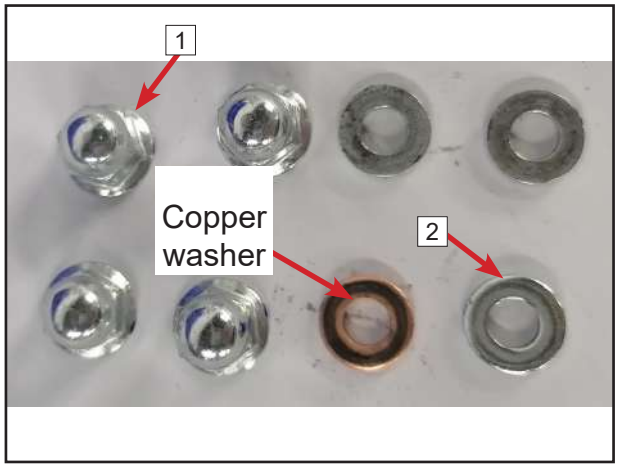


Remove RH cover gasket of cylinder head[3].

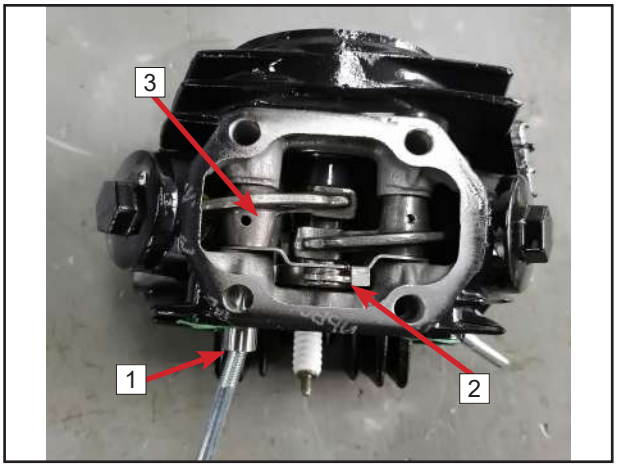




Remove cylinder head nut [1] and flat washer [2].
Remove the cylinder head cover [3].
NOTE:
The oil channel location is copper washer



Remove cylinder head cover seal gasket[4].
NOTE:
Replace the cylinder head cover seal gasket, the cylinder head LH cover seal gasket, and the cylinder head RH cover sealgasket.

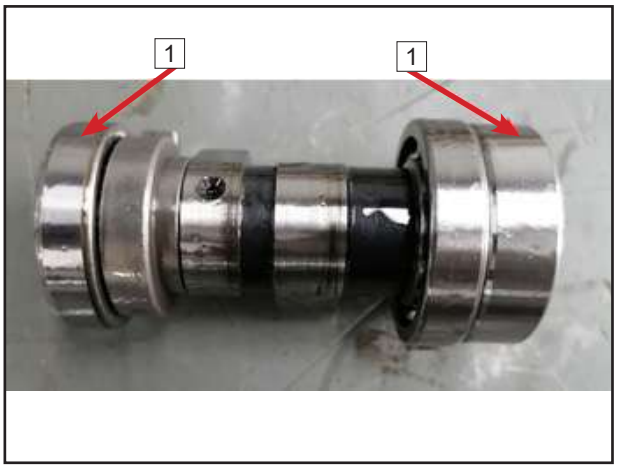


Use bolts to remove swing arm shaft [1] and stop plate [2] and valve swing arm [3] from cylinder head.

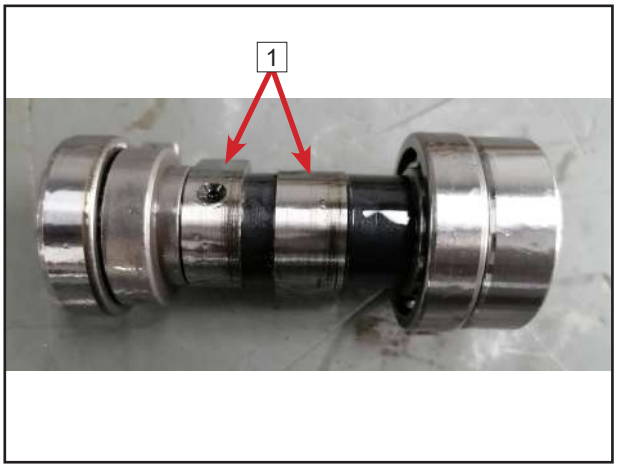
Remove camshaft assy from cylinder head[1]

5.4.7.2 Inspection

By turning the outer seat of each bearing [1] with your fingers, the bearing should be able to rotate smoothly and quietly.
At the same time, check whether the inner seat of the bearing is tightly buckled with the camshaft.
Replace the camshaft assembly if the bearing does not spin smoothly and quietly or if the camshaft is mounted loosely.
Observe the working surface of the swing arm for abnormalities such as pits and ablations.

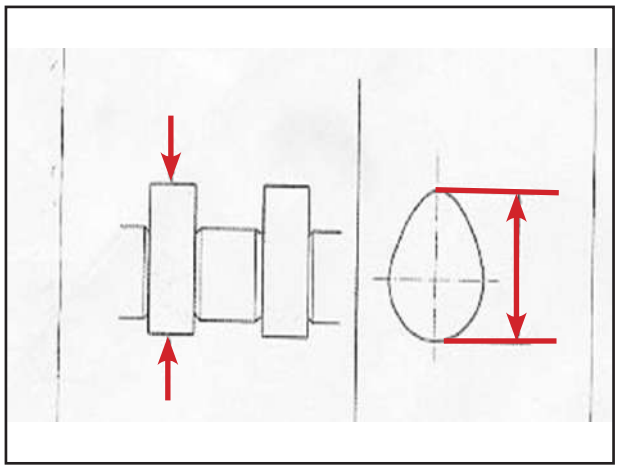


Check the swing arm and shaft for wear or damage. Rotate the swing arm with your fingers [1].Should rotate smoothly and quietly.
Measure the inner diameter of swing arm.
Service limit: IN/EX 10.10mm
Measure the outer diameter of swing arm shaft.
Service limit: IN/EX 9.91mm
Calculate the clearance between swing arm and shaft.
Service limit: IN/EX 0.095mm



Check the CAM flange for excessive wear and damage. Measure the height of each CAM flange.

Service limit：
Intake：26.532mm
Exhaust：26.297mm



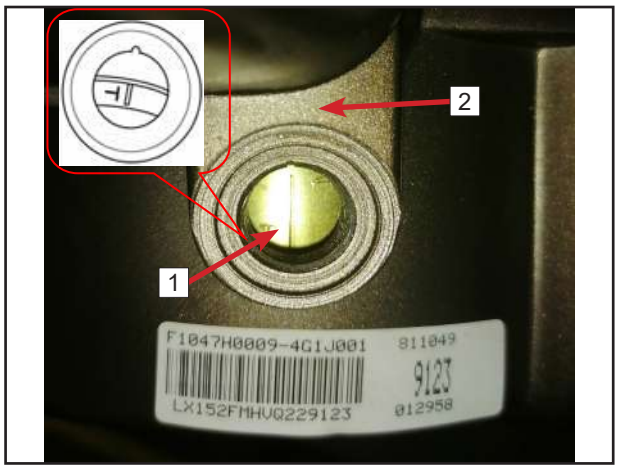
5.4.7.3 Installation

In reverse process, install camshaft assembly, valve swing arm, timing driven sprocket, cylinder head LH cover, RH cover, head cover.

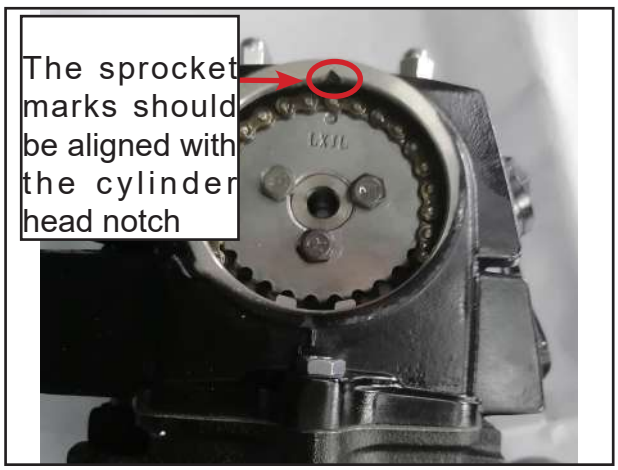
NOTE：

Coat camshaft assembly, valve swing arm, swing arm shaft, timing chain and timing driven pulley with engine oil before installation/

Counterclockwise rotate the crankshaft, align the "|" mark [1] on the flywheel to the LH front cover indicating mark [2].



When installing the cam chain to the sprocket, align the sprocket mark with the cylinder head mark to ensure that the piston is at the upper stop of the TDC (upper stop) compression stroke.



5.4.8 Cylinder head/valve

5.4.8.1 Removal

Remove the following components in turn：

-Muffler

- Air filter and inlet pipe
- Electrical connectors

-The rest of the vehicle shielding parts

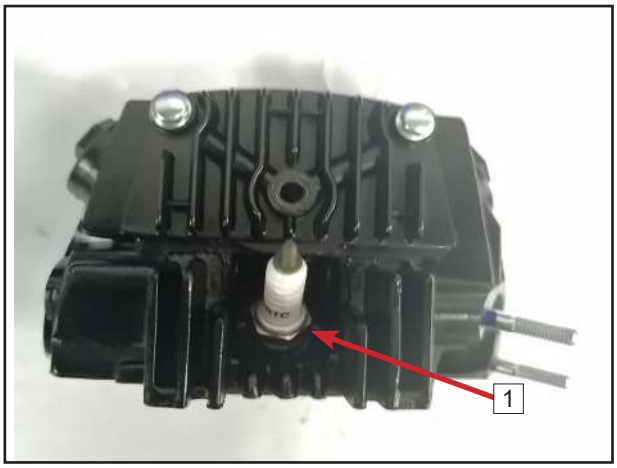
Remove camshaft assembly and swing arm according to the above method.

Remove cylinder head.

NOTE

Do not knock the cylinder head too much, and do not damage the joint surface by using any tool as a lever.

Do not let the dowel pin, oil tube, sealing ring fall into the engine.

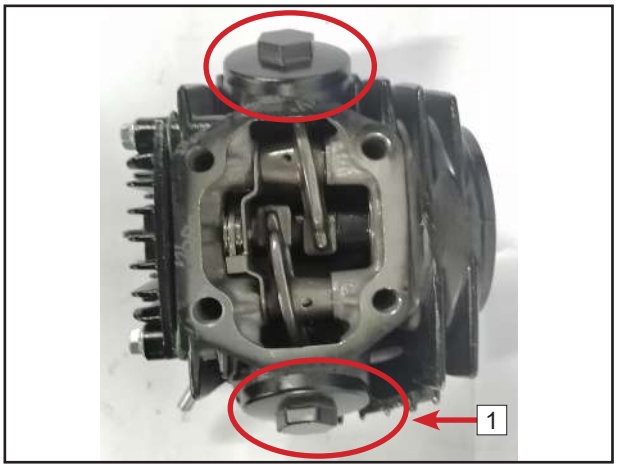


5.4.8.2 disassembly

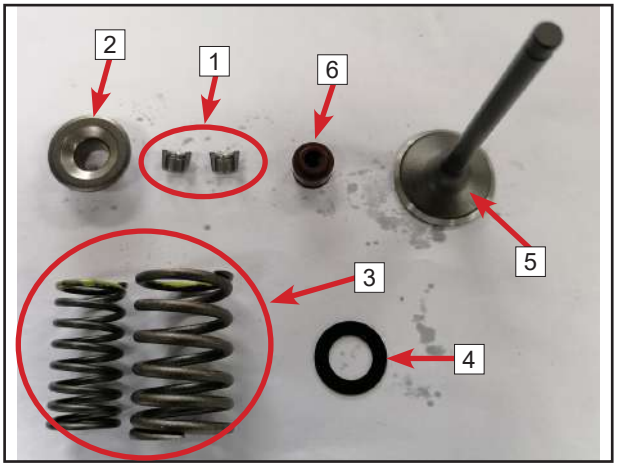
Remove the following components：

—Spark plug[1]

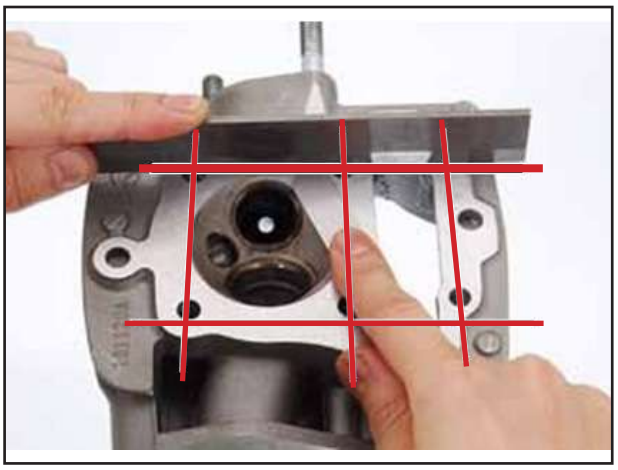
Remove valve cover [1]



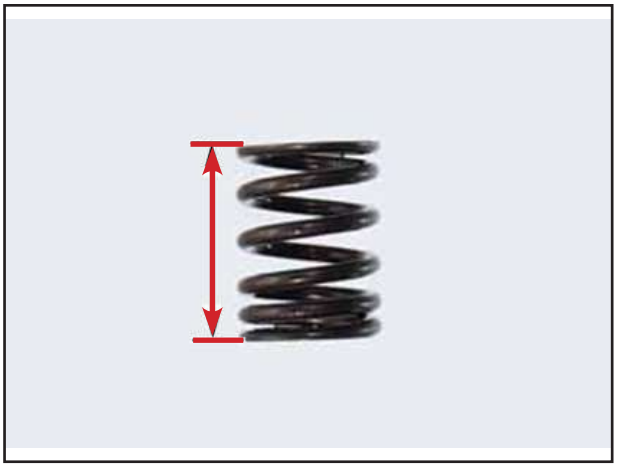
Use special tool to remove valve lock clip.
Tools：
Valve spring compression tool
Valve spring compression accessory
Remove valve spring compression tool and below：
-Lock clip [1]
-Valve spring seat [2]
-Valve inner and outer springs [3]
-Valve washer [4]
-Valve [5]
-Oil baffle [6]
NOTE：
Do not damage the cylinder joint and valve seat surface.
To prevent permanent deformation of the valve spring, do not compress the valve spring too much when removing it.
When disassembling, mark each component to facilitate installation and return it to its original position.



5.4.8.3 Inspection
Check the following components for damage, abnormal wear, deformation, burning, or blockage of the oil channel.
—Cylinder head
—Outer spring
—Valve
—Valve guide



Check spark plug holes and valve areas for cracks.
Check cylinder head for deformation with ruler and plug gauge.
Service limit:0.05mm



Measure the free length of the valve spring.
Service limit：IN/EX：IN 31.55 EX 34.70
If the spring is shorter than the service limit, replace the spring.

5.4.8.4 Valve/valve guide

Check if the valve moves smoothly in the guide. Check the valve for bending, burn marks, scratches, or abnormal wear on the valve stem.

Measure the outer diameter of each valve stem and record the measurement result.

Service limit：

IN：4.940mm

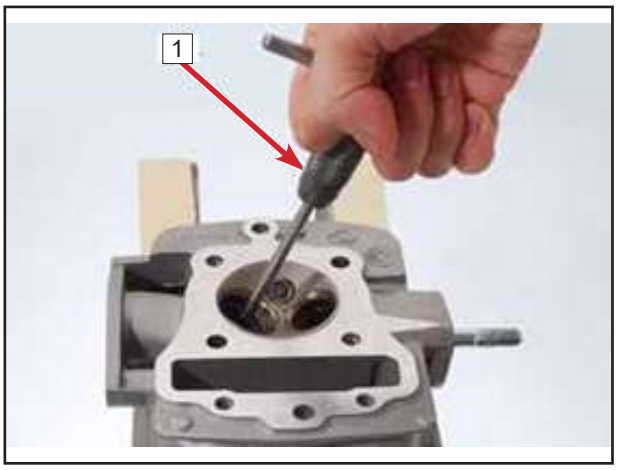
EX：4.925mm

Before measuring the valve guide bore, remove the carbon build-up in the valve guide. Insert the reamer from the combustion chamber side of the cylinder head and be sure to turn the reamer clockwise.

Tool：

[1]Valve guide reamer，5.0mm

NOTE：Be sure to rotate the reamer clockwise and never counterclockwise when inserting the reamer for eradication.



Measure the inner diameter of each valve guide and record the measurement.

Service limit：

IN/EX：5.03 mm

Calculate the clearance between the outside diameter of the valve stem and the inside diameter of the valve guide.

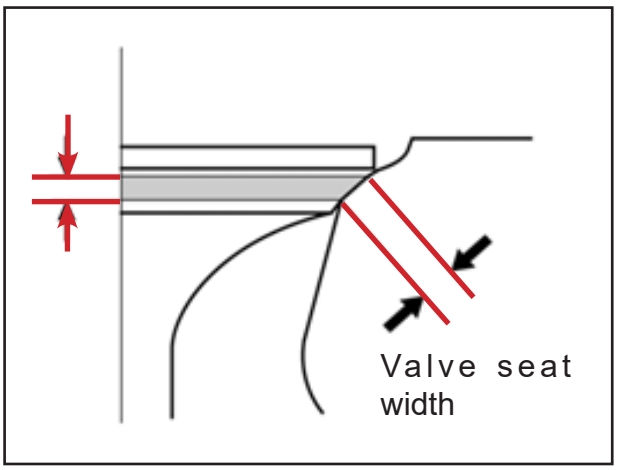
Service limit：

IN：0.045mm

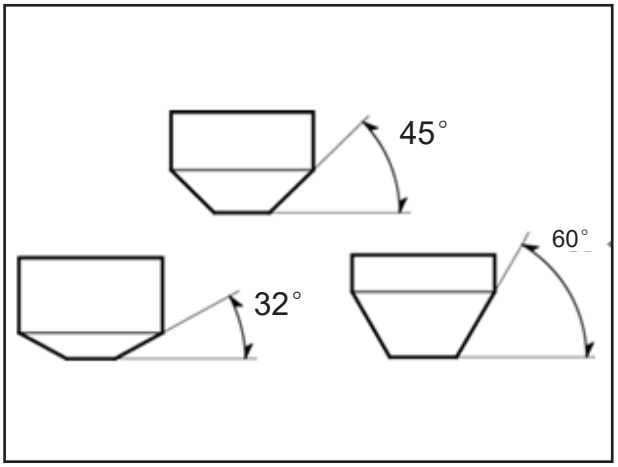
EX：0.05mm

If the clearance between the valve stem and valve guide exceeds the service limit, replace the cylinder head and valve kit.

Check the width of each valve seat of the cylinder head.
The width of the contact surface of the valve seat shall be within the range specified in the specification, and the surrounding of the valve seat shall be flat.
Standard：0.8–1.0mm
Service limit：1.5mm
If the valve seat width does not meet the specifications, trim the valve seat or replace the cylinder head.
Replace the valve if the valve contact surface is ablated or severely worn, or if the contact surface is uneven with the seat surface.



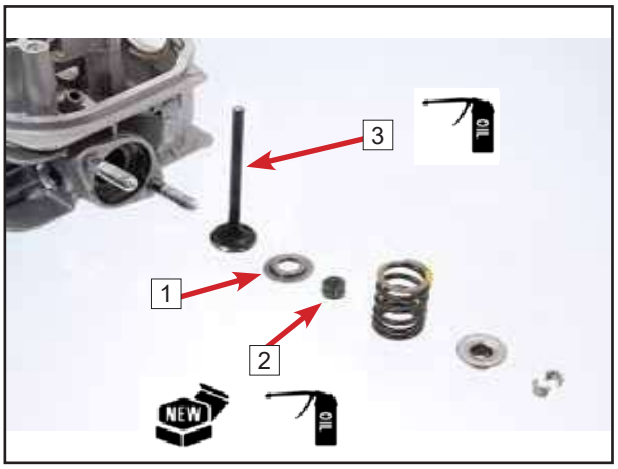
After valve guide replacement, be sure to grind seat face with a 45 degree reamer.
With a 45 degree reamer, draw down any uneven or irregular points from the base.
Tool：
Valve seat reamer，27.5mm(45°IN)
Valve seat reamer，24mm(45°EX)
Reamer bracket, 5.0mm
Using a 32° flat reamer, ream off a portion of the valve seat material present in the top ¼ of the valve seat.
Tool：
Flat reamer,27mm(32°IN)
Flat reamer,22mm(32°EX)
Reamer bracket,5.0mm
Using a 60° internal reamer, ream off the bottom 1/4 of the valve seat material.
Tool：
Internal reamer,26mm(60°IN)
Internal reamer,22mm(60°EX)
Reamer seat,5.0mm
Using a 45° valve seat reamer, ream off the proper width of the valve seat.
Valve seat width：0.9–1.1mm



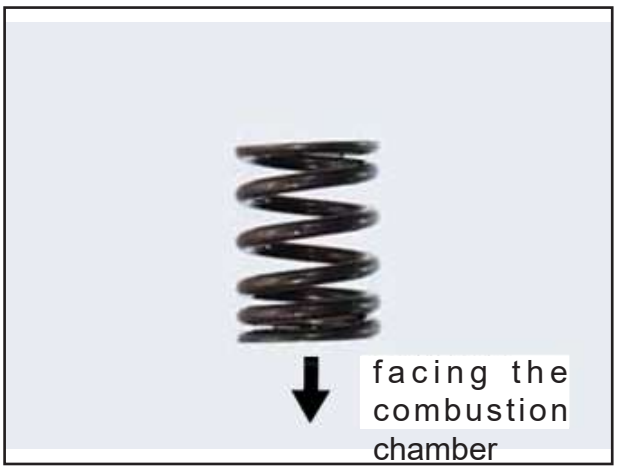
Make sure that all etched spots or irregularities on the valve seat are reamed out.
Excessive pressure may damage or deform the valve seat. Frequent changes in the angle of the trimmed seating surface will prevent the valve seat from being ground flat.
Do not drop grinding debris into the guide.
After dressing the valve seats, apply abrasive to the valves and gently press and grind the valves.
After grinding, clean any abrasive left on the cylinder head and valves and recheck the valve seat engagement.
Assemble the cylinder head.

5.4.8.5 Valve installation

Clean the combustion chamber of carbon and cylinder head gasket surface.
Blow through the oil passage with a compressed air gun. Install valve spring gasket [1].
Apply engine oil to the new valve stem seal [2] and install.
Apply engine oil to the outer ring of the valve [3] and the end of the valve stem. Rotate slowly to avoid damaging the valve seals while installing the valve into the valve guide.

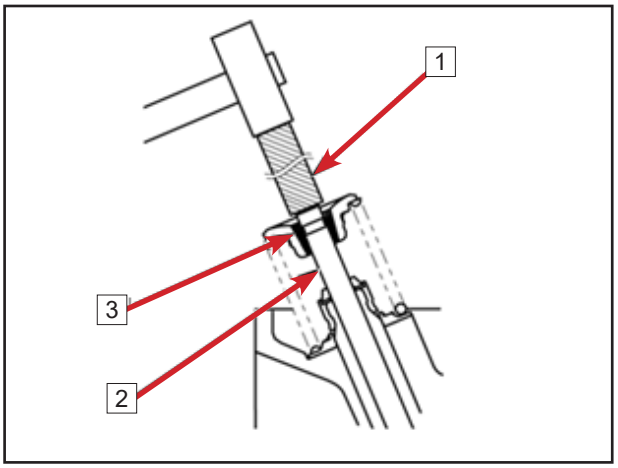


With the tight end facing the combustion chamber, install the valve spring.



Install valve spring retainer [1].
With special tools, install the valve lock clip [2].
Tool：
[3]Valve spring compressor
[4]Valve spring compressor

Place an appropriate tool [1] on the valve stem [2].
Using a plastic hammer, gently tap the tool so that the seat [3] is firmly in place.



Install spark plug, cylinder head in reverse order.

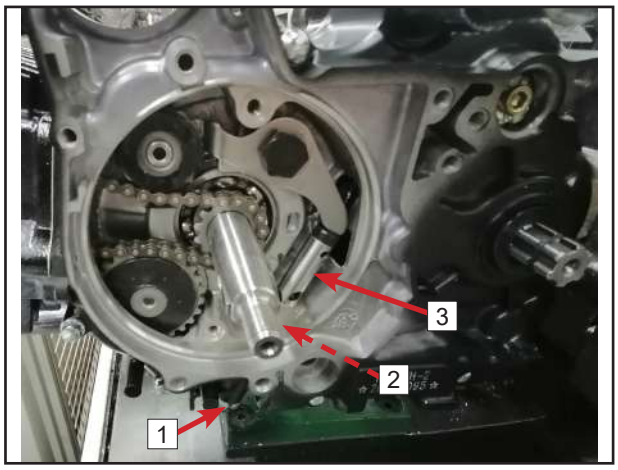
5.4.9 Timing chain/sprocket

5.4.9.1 Chain tensioner removal

Remove LH front cover, magneto assembly, electric driven sprocket and disk cover (see 5.7 Magneto and starter clutch for details).

Remove the following parts：

CAM chain tensioner seal bolt and washer combination [1] tensioner spring [2] tensioning rod [3].

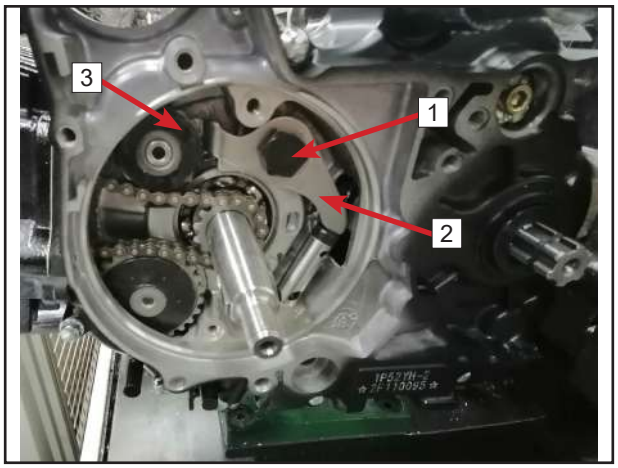


Remove the following parts：

Tensioner arm core shaft [1].

Tensioner arm [2].

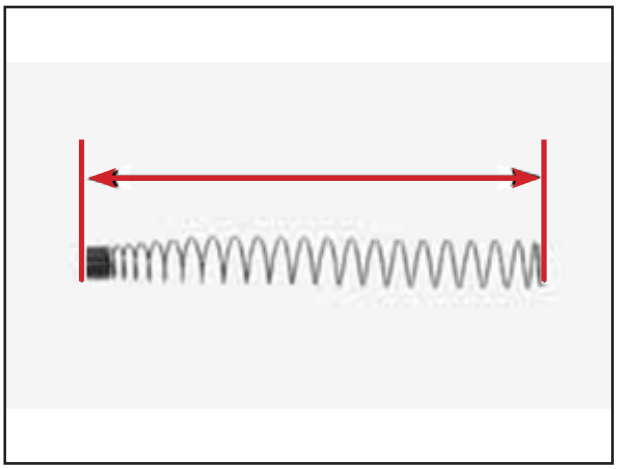
Tension pulley [3].



5.4.9.2 Inspection

Measure the free length of the tensioner spring.

Service limit：109mm



Check the tensioning rod for wear or damage.

Measure the outer diameter of the tensioning rod.

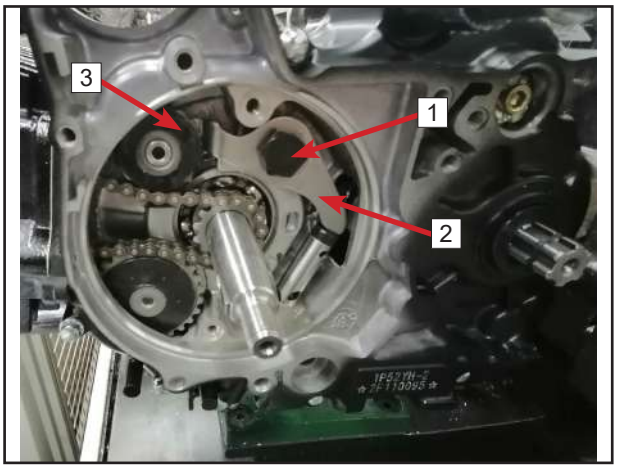
Service limit：11.94mm

Check the control valve [1] on the tensioning rod for wear or damage.

5.4.9.3 Installation

Install the tensioning arm [2], tensioning arm core shaft [1] and chain tensioning pulley [3], then tighten to the specified torque.

Torque value：16N•m



Install the following components：

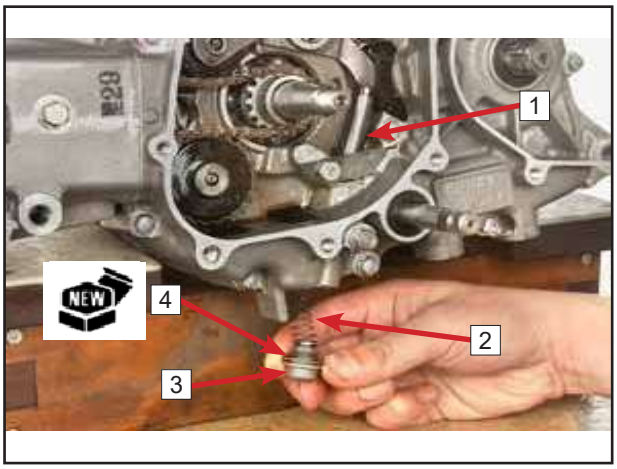
Tension rod [1]

Tensioner spring [2]

Install and tighten the sealing bolts [3]

Replace the new gasket [4] and tighten to the specified torque.

Torque value：22N•m



5.5 Piston/cylinder

5.5.1 Service information

This chapter covers cylinder and piston maintenance. These repairs can be made while the engine is mounted on the frame.
Be careful not to damage the cylinder walls and pistons
Care should be taken not to damage the mating surface when removing the cylinder. When disassembling, do not knock the cylinder too hard.
When disassembling, store the parts so that they can be installed in their original positions.
Clean all removed parts with cleaser, then blow dry thoroughly with a compressed air gun.

5.5.2 Specification

Cylinder	Cylinder diameter		52.404~52.412	52.8
Piston, piston pin, piston ring	Piston base circle diameter		52.375~52.385	52.3
	Pin hole diameter		13.002~13.008	13.03
	Piston pin diameter		12.994~13	12.98
	Clearance between piston and piston pin		0.002~0.014	0.075
	Piston ring closure clearance	First ring	0.1~0.25	0.5
		Second ring	0.1~0.25	0.5
		Scraper ring	0.2~0.8	1.1
	Piston ring and ring groove clearance	Clearance between first ring and groove	0.02~0.06	0.095
		Clearance between second ring and groove	0.02~0.06	0.095

5.5.3 Trouble shooting

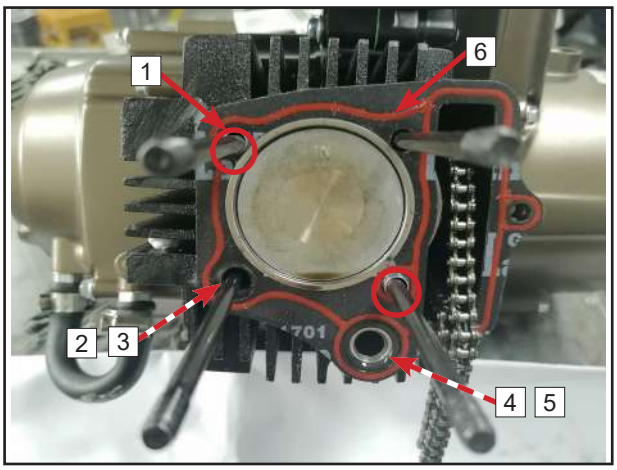
When the engine is running at low speed, the compression pressure is too low, difficult to start, or the performance is poor

Cylinder head gasket leakage
Wear, adhesion, or rupture of piston rings
Cylinder and piston wear or damage
Connection rod bending compression pressure is too high, engine overheating or makes blasting noise
too much smoke on piston top
Cylinder, piston or piston ring wear
The piston ring is improperly installed
The piston or cylinder wall is scratched
Cylinder head/valve failure

Abnormal noise

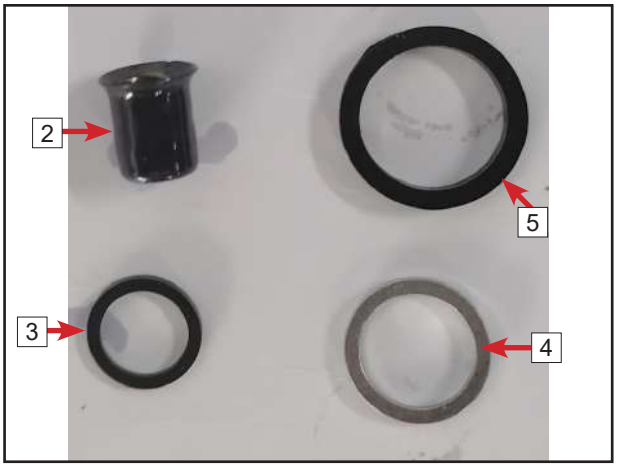
Piston pin or piston pin hole wear
Cylinder, piston or piston ring wear
Small end of connecting rod is worn

5.5.4 Cylinder body

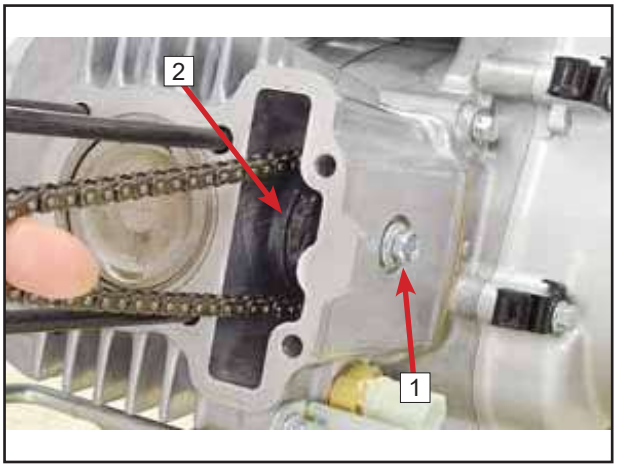


5.5.4.1 Cylinder removal

-Remove the dowel pin [1], oil tube [2], sealing ring [3], bushing [4], sealing ring [5], cylinder head gasket [6].

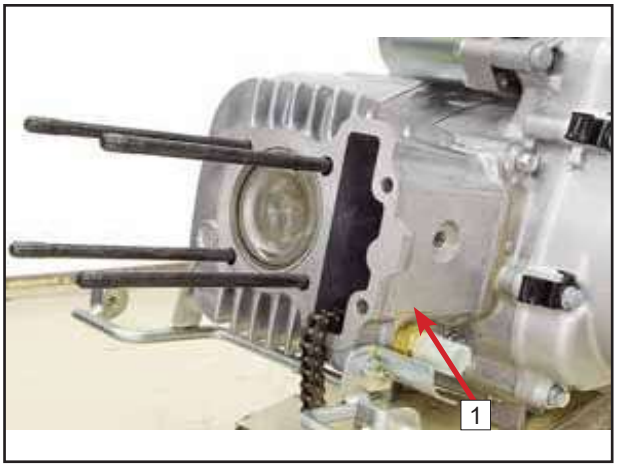


Remove the following parts:
CAM chain guide wheel pin bolt and seal washer assy [1], chain guide wheel [2].



Remove cylinder[1]

NOTE：Do not damage the mating surface.



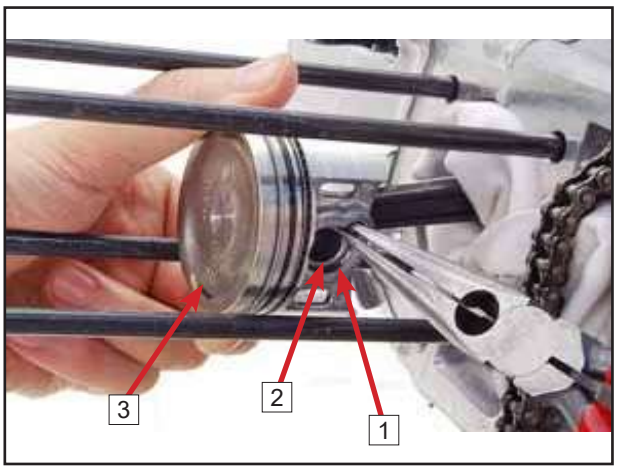
5.5.5 Piston

5.5.5.1 Piston removal

Remove piston pin clamp spring with pliers [1].

Remove piston by pushing piston pin [2] out of piston [3] and connecting rod.

NOTE: Place a clean commercially available towel over the crankcase to prevent the spring from falling into the crankcase.



Break open the piston ring, lift the opposite point of the opening, and remove the ring.

NOTE：Do not break the piston ring too much to avoid ring damage.

From the piston ring groove [1], use an old discarded piston ring to remove carbon from the piston ring groove.

If necessary, use a high pressure air gun to blow through the oil over oil path.

NOTE：Do not use a steel brush, as this will damage the groove.

5.5.5.2 Cylinder inspection

Check cylinder wall for scratches and wear.

Measure the inner diameter of the cylinder in the X and Y axes direction in three planes, and record the measurement results. Take the maximum reading to determine whether the cylinder is worn.

Service limit：52.80mm

Calculate the clearance between cylinder and piston.

5.5.5.3 Piston outer diameter measurement

Service limit：0.10mm

Calculate the taper and roundness on the X and Y axes of the three planes.

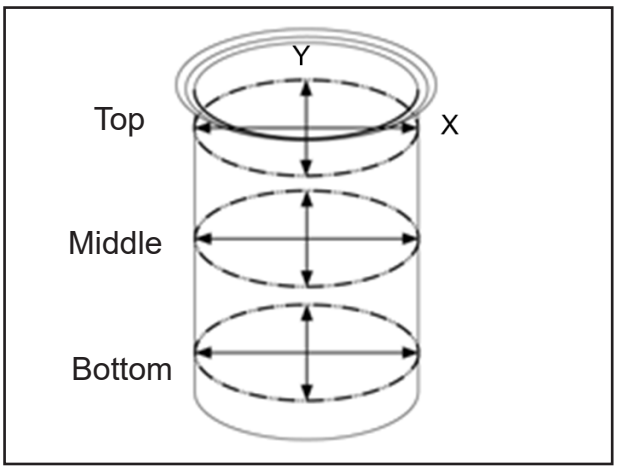
Take the maximum reading to determine the taper and roundness of the cylinder.

Service limit：

Roundness：0.10mm

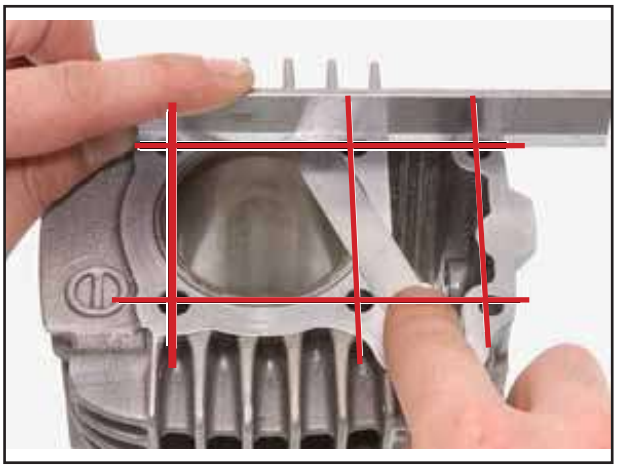
Taper：0.10mm

If the service limit is exceeded, the cylinder must be boring and an enlarged piston and ring must be installed.



Place a straightedge and plug gauge across the two double-headed bolt holes to check for cylinder distortion.

Service limit：0.05mm



5.5.5.4 Piston/piston ring

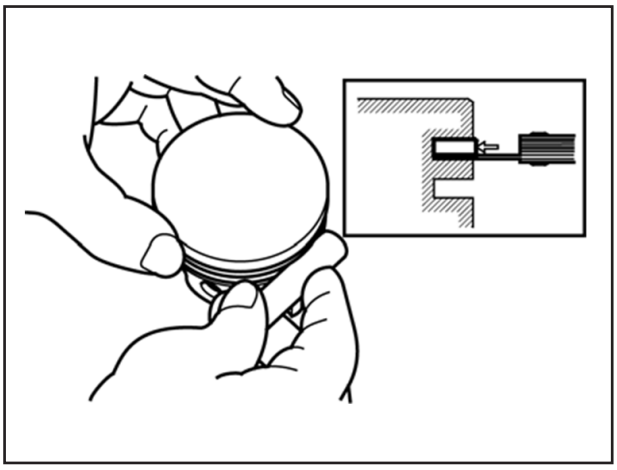
Rotate the piston rings and check that they move smoothly. The piston rings should be able to move smoothly in their respective grooves.

Push the piston ring inward until the outer surface of the piston ring is almost flush with the piston, then use a plug gauge to measure the clearance between the piston ring and the piston ring groove.

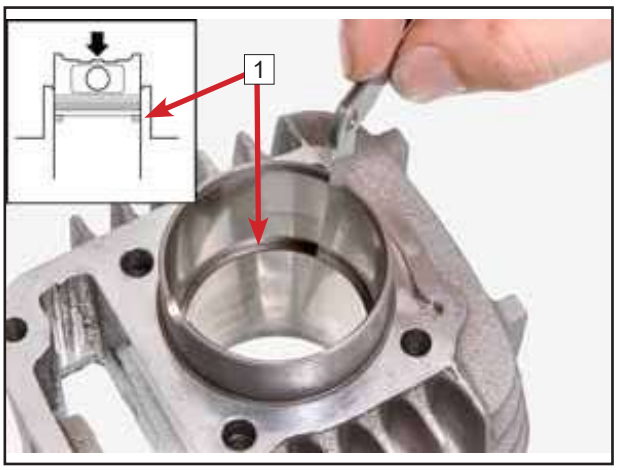
Service limit：

Top ring：0.095mm

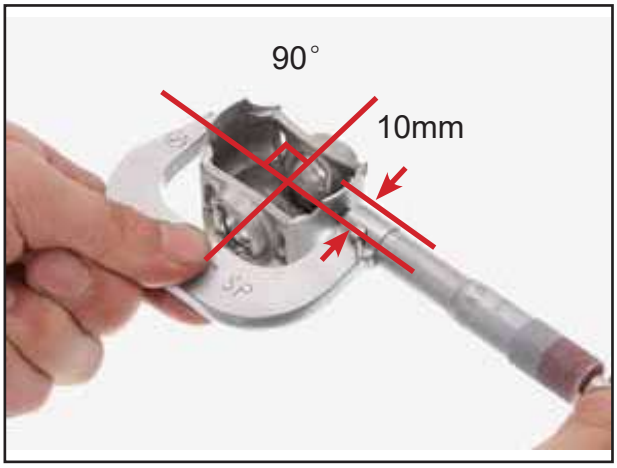
Second ring：0.095mm



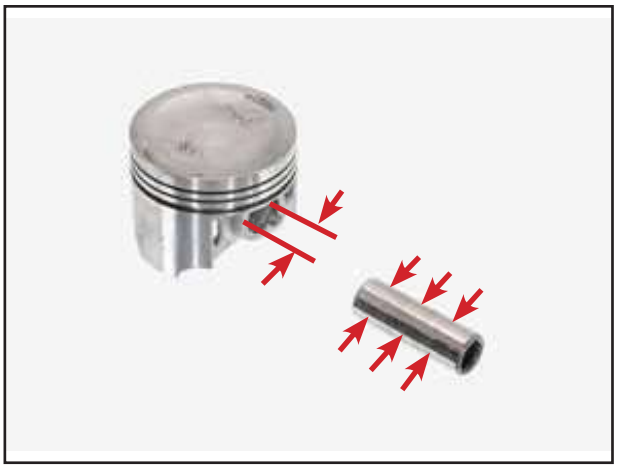
NOTE：Be sure to replace the piston rings in sets.
Insert the piston ring [1] into the bottom of the cylinder using a piston.
Use a plug gauge to measure the piston ring end gap.
Service limit：
Top ring：0.5mm
Second ring：0.5mm
Oil ring：1.1mm



Measure the piston outer diameter at a position 10mm from the bottom of the piston skirt and at a 90° angle from the piston pin hole.
Service limit：52.30mm
Measure inside diameter of cylinder.
Use it to calculate the clearance between the cylinder and piston.
Service limit : 0.10mm



Measure the inner diameter of the piston pin hole in the X and Y axes.
Take the maximum reading to determine the inner diameter.
S Service limit：13.03mm
Measure piston pin outer diameters at three locations.
Service limit：12.98mm
Calculate the clearance between piston and piston pin.
Service limit：0.075mm



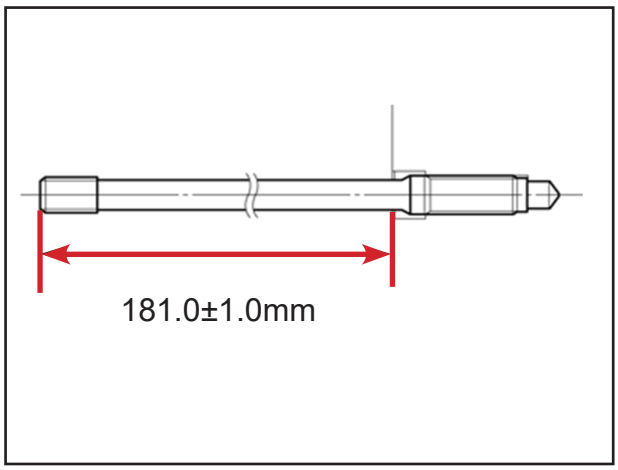
5.5.5.5 Connecting rod
Measure the inner diameter of small end of connecting rod.
Service limit：13.05mm
Calculate the clearance between connecting rod and piston pin.
Service limit：0.07mm

5.5.5.6 Cylinder stud replacement

If studs need to be replaced, be sure to install them as shown. Screw the two nuts onto the stud and tighten it, then use a wrench to turn the stud outward.

Load the new stud into the crankcase and tighten it to the specified torque.

After tightening the studs, measure the bolt column height from the crankcase surface to see if it is within the specified range.



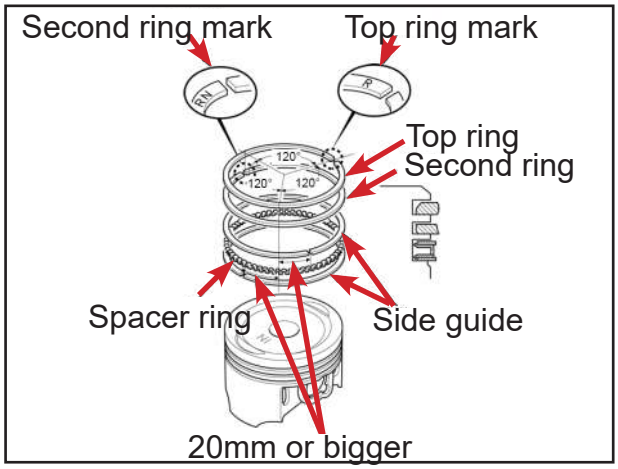
5.5.5.7 Piston installation

Clean piston head, piston ring groove and piston skirt.

Carefully install the piston ring into the piston ring groove with its marked side facing up.

NOTE：Do not line up the gap between the oil ring and the side rails.

Please be careful not to damage the mating surface.



Please be careful not to damage the piston ring and piston during installation.

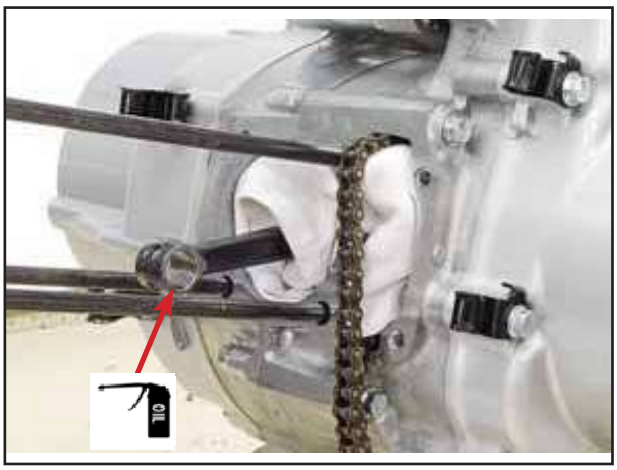
Do not use the top ring interchangeably with the second ring.

When installing the oil ring, install the spacer ring first and then the side rail.

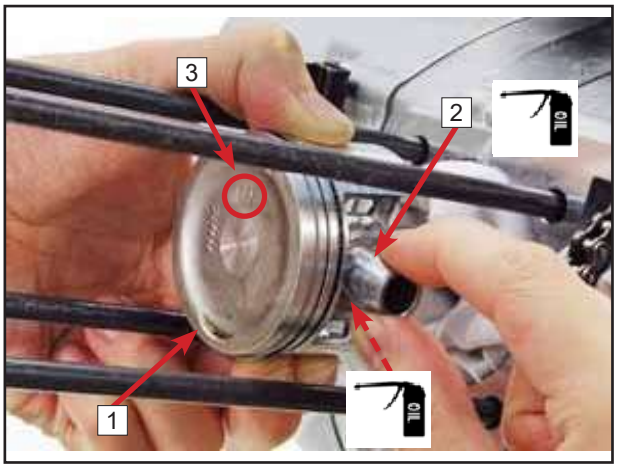
The end gaps between each piston ring are staggered at 120 degrees. Stagger the track end gap as shown in the figure.

After installation, the piston ring should be able to rotate freely in the ring groove.

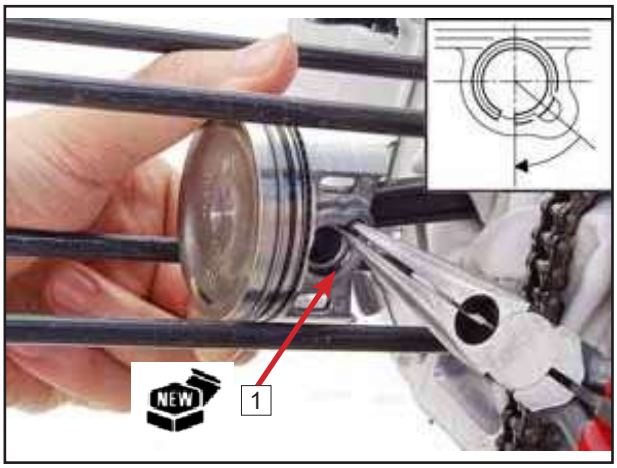
Place a clean commercially available towel over the crankcase to prevent dust and piston pin springs from falling into the crankcase.
Clean any gasket material from the crankcase or cylinder head mating surface.
Lubricate the outer surface of the piston pin and the inner surface of the small end of the connecting rod.
NOTE：Please be careful not to damage the mating surface.



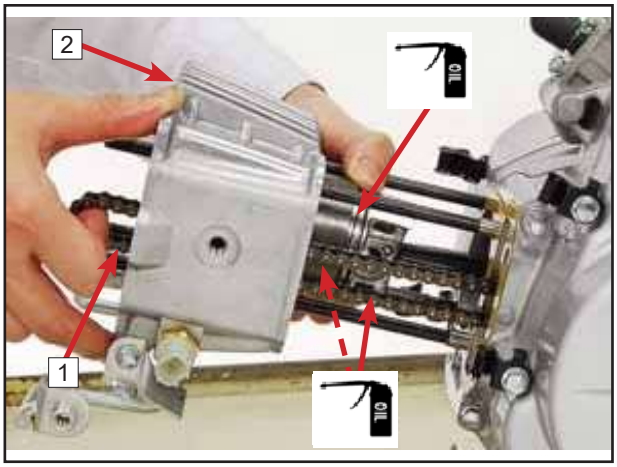
Apply engine oil to the inner surface of the piston [1] pin hole and the outer surface of the piston pin [2].
Install the piston so that the "IN" mark [3] faces the intake side.
Install the piston pin.



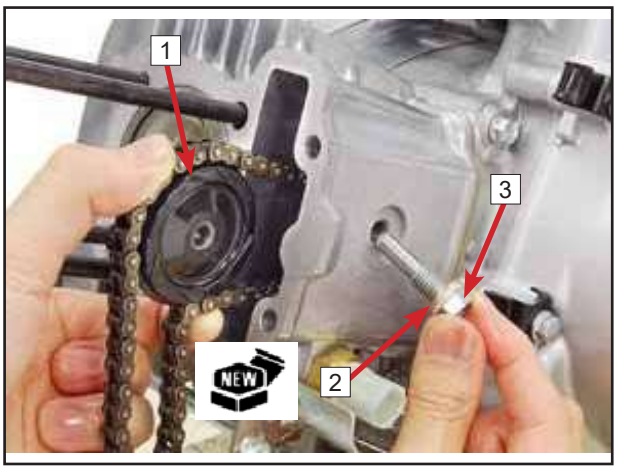
Install new piston pin clamp spring [1].
Ensure that the piston pin clamp spring is fully secured.
Do not align the piston pin clamp spring end gap with the piston notch.



Apply engine oil to the cylinder walls, piston sliding surfaces, piston ring grooves, and the entire surface of the ring.
Pass the CAM chain [1] through the cylinder [2].
Compress the piston ring with your fingers and install the cylinder from the upper part of the piston.
NOTE：Be careful not to damage the piston ring and cylinder wall.



Install CAM chain guide wheel [1], new sealing washer in [2], and CAM chain guide wheel pin bolt [3].
Tighten the guide wheel pin bolt to the specified torque.



Install cylinder heads in reverse order according to the upper section.

5.6 Clutch and gearshift

5.6.1 Service information

This section describes the maintenance of the clutch and gearshift rod. These repairs can be made with the engine mounted on the frame.

Engine oil viscosity, oil level and the use of oil additives can have an effect on the operation of the clutch. It is especially recommended never to use any type of oil additive. When the clutch does not disengage, or when the motorcycle climbs a hill and the clutch slips, check the engine oil viscosity as well as the oil level before servicing the clutch system.

5.6.2 Clutch and gearshift specification

Unit：mm

Item		Standard	Service limit
Clutch	Spring free length	28.5	28
	Tellurium piece thickness	4	3.9
	Flatness of the driven disk	—	0.10
Clutch bushing	inner diameter	16.988-17.006	17.049
	outer diameter	20.93-20.95	20.91
Crankshaft OD at clutch bushing		16.966-16.84	16.87

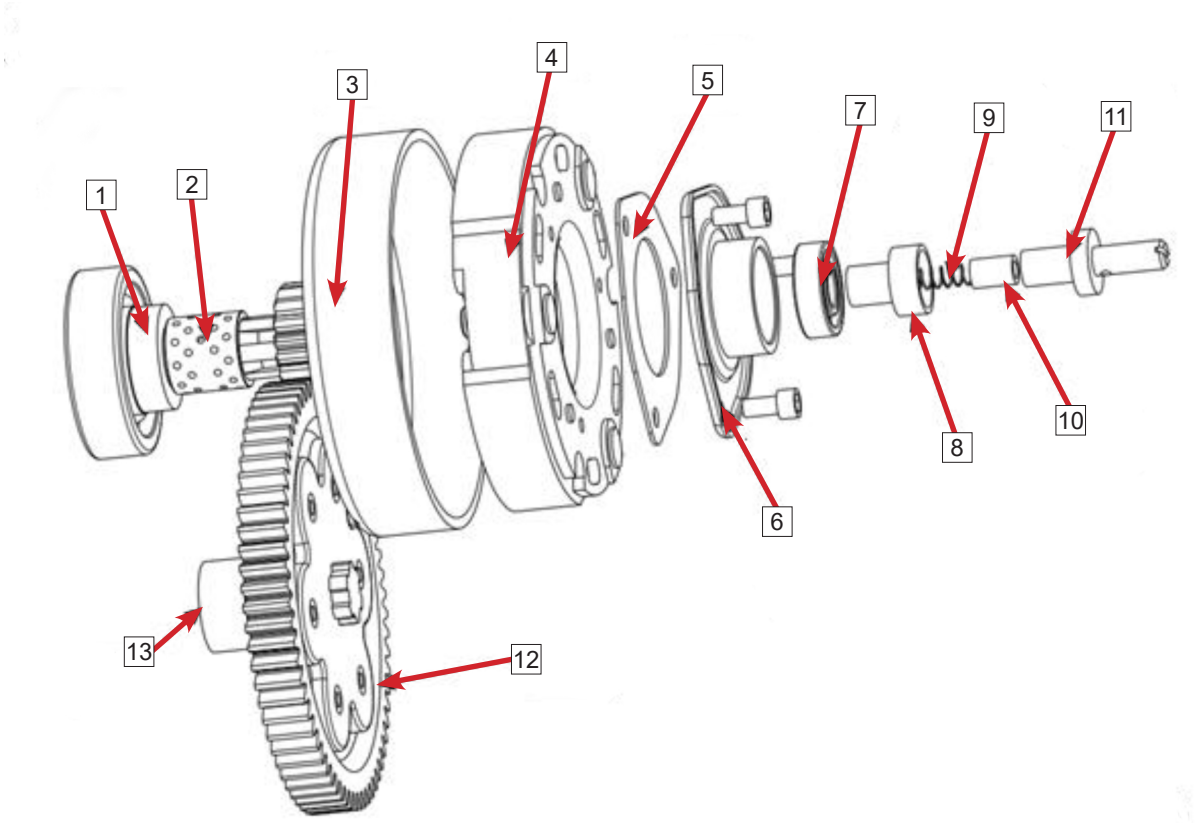
5.6.3 Trouble shooting

Clutch slipping on acceleration
Clutch shoe failure
Faulty centrifugal clutch driven disc
Molybdenum or graphite additives in engine oil

Motorcycle crawling
Clutch shoe failure
Clutch shoe spring failure
Idle air screw incorrectly adjusted

Difficulty in shifting gears
Gearshift rod combination shaft bent
Damaged gearshift rod and pin
Loose stop plate bolt

5.6.4 Component placement

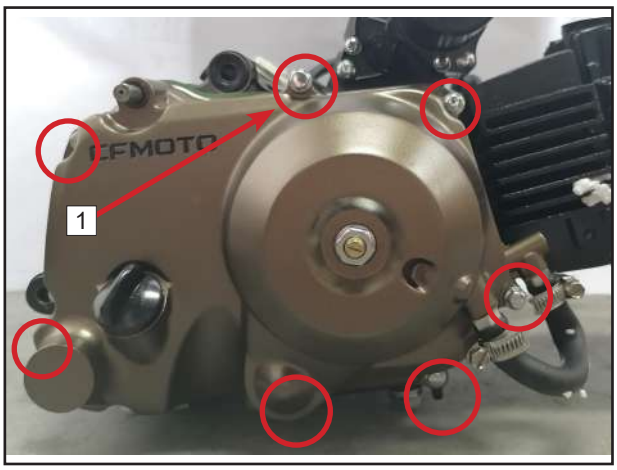


1	Crankshaft
2	Crankshaft bushing
3	Clutch housing assy
4	Drive disk assy
5	Paper washer
6	Clutch end cap
7	Bearing
8	Oil conduit 1
9	spring
10	Oil conduit 2
11	Oil passage nozzle
12	Secondary clutch gear
13	Countershaft

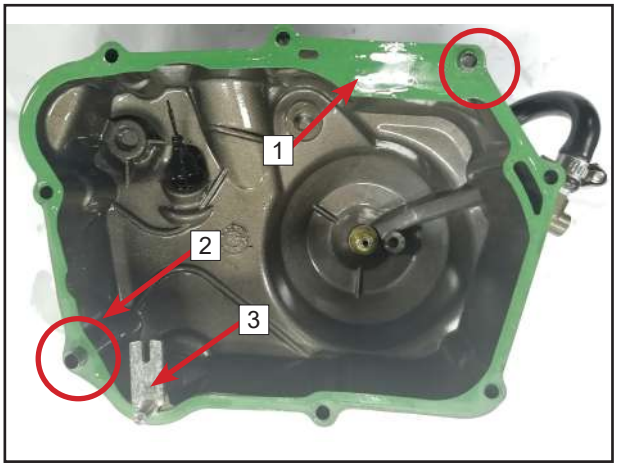
5.6.5 RH crankcase cover

5.6.5.1 Removal

Drain the engine oil clean.
Remove the gearshift rod.
Remove the bolts in a cross-over manner in several steps [1].
Remove RH crankcase cover

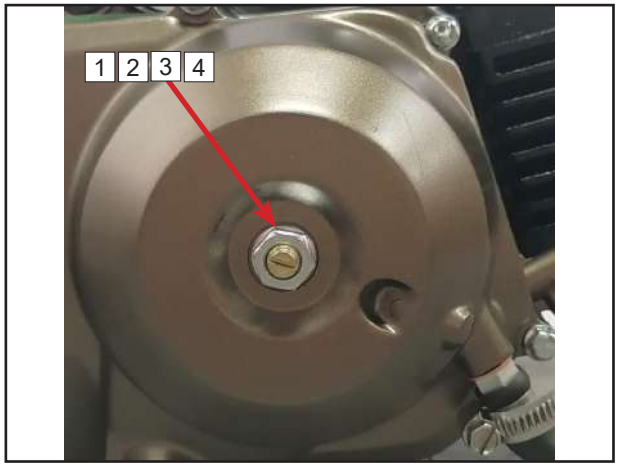


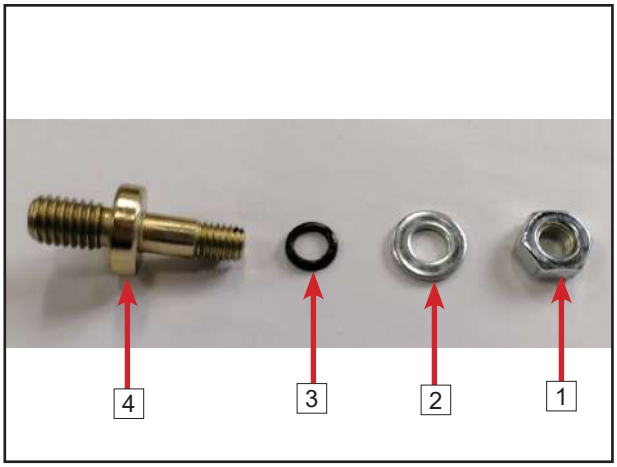
Remove the following parts：
–RH crankcase cover gasket[1]
–Dowel pin[2]
–Gearshift shaft assy[3]



Removal

Remove the following parts：
–Clutch adjustment lock nut[1]
–Flat washer[2]
–O-ring[3]
–Clutch adjustment bolt[[4]l



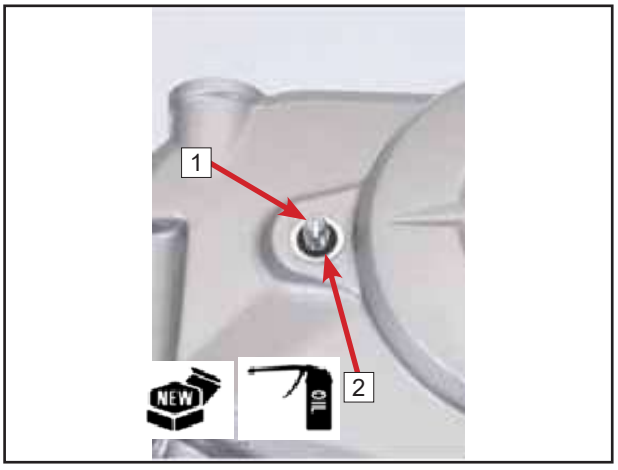


5.6.5.2 Oil passage

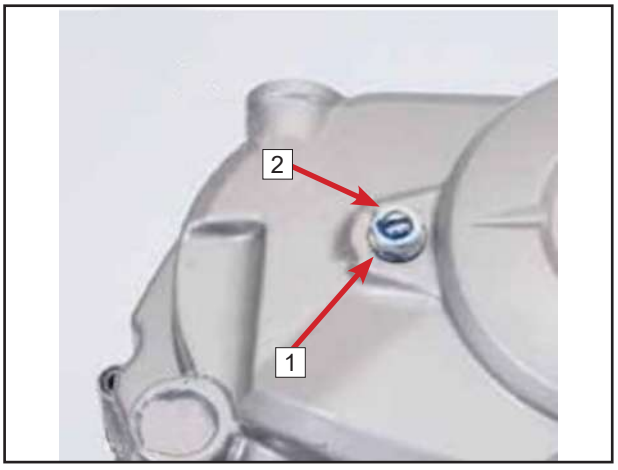
Blow compressed air through the oil passage on the RH crankcase cover. Check the oil access for blockage.

Attach the clutch adjuster rod [1] to the RH crankcase cover.

On the new O-ring [2], apply engine oil. Install the new O-ring to the clutch adjuster rod.



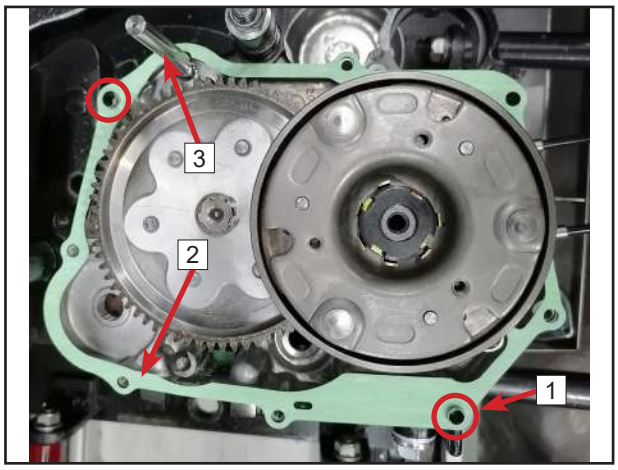
Install washer [1] and clutch adjusting lock nut [2].



5.6.5.3 Installation

Remove all gasket material from the RH crankcase and the RH crankcase cover fitting surface.

Install the dowel pin [1] and new gasket [2] and gearshift assembly [3] onto the crankcase.

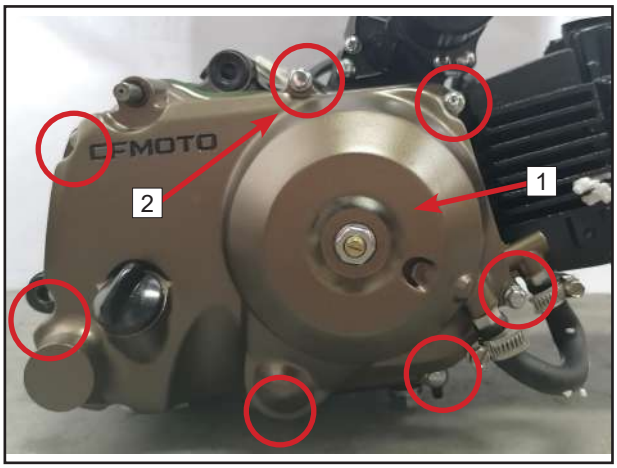


Install RH crankcase cover [1].

Tighten the RH crankcase cover bolts in several staggered steps in the diagonal direction [2].

Install the gearshift rod.

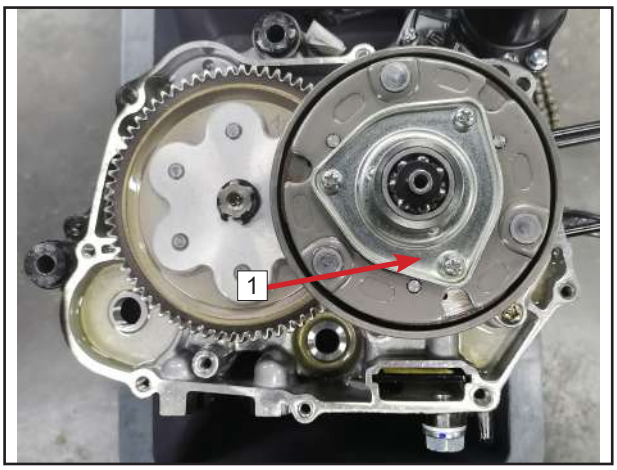
Fill the crankcase with the recommended engine oil. Please make sure there is no oil leak.



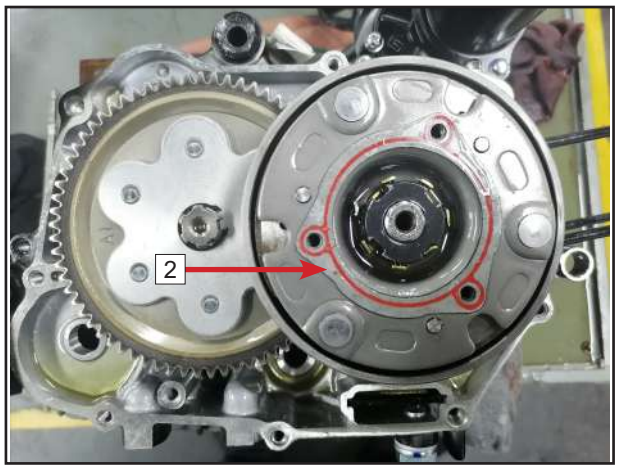
5.6.6 Clutch

5.6.6.1 Removal

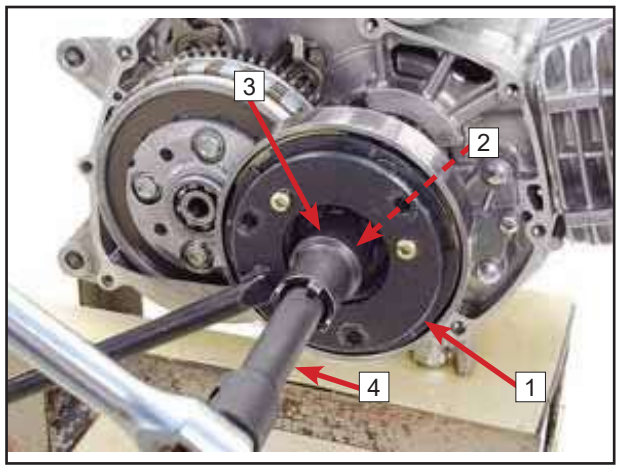
The clutch system can be serviced while the engine is mounted on the frame.
Remove the following parts:
RH crankcase cover.
Clutch end cap component [1].



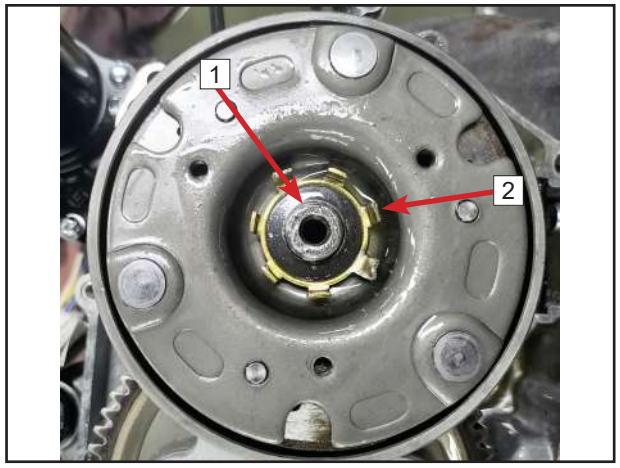
Remove the clutch end cap washer[2].



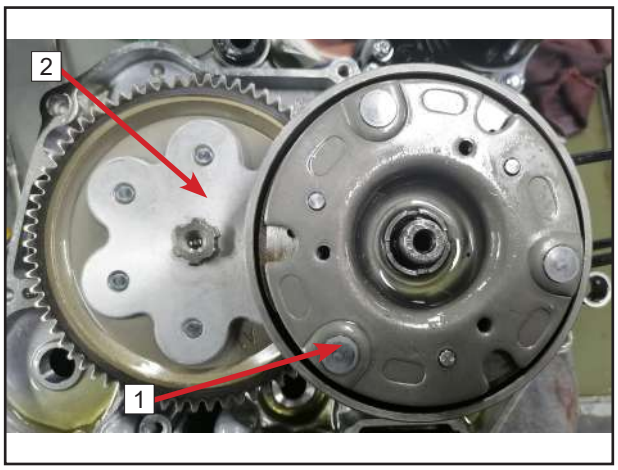
Install special tools with appropriate bolts and screws.
Tool： [1]Clutch driven hub bracket
Remove the clutch lock nut[2] .
Tool： [3]Lock nut wrench
Tool： [4]Extension bar



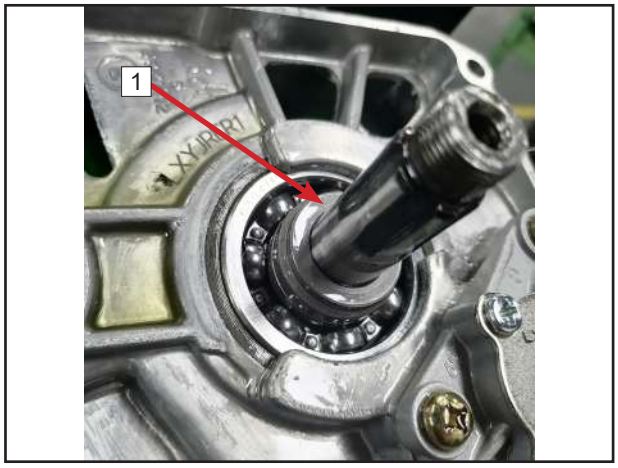
Remove washer [1] and lock washer [2].



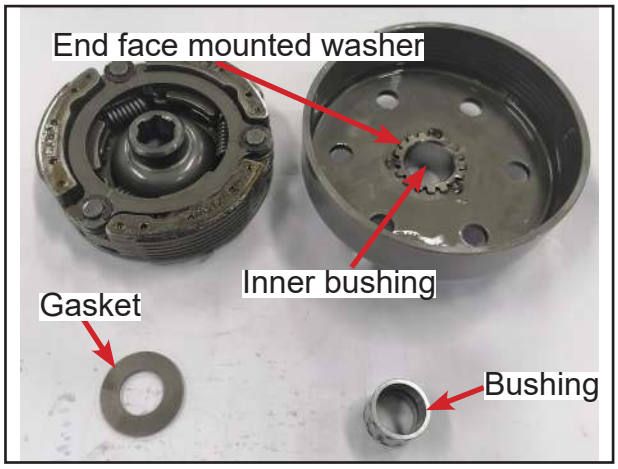
Remove clutch counterweight assembly [1]
Remove primary driven teeth [2]



From the crankshaft, remove bushing [1].



5.6.6.2 Installation
Install the clutch in reverse order
NOTE：A gasket is arranged between the clutch cover housing assembly and the driving disc assembly, and a bushing is arranged in the clutch cover housing assembly.



5.6.6.3 Inspection

Check the clutch driven disc sliding surface for excessive wear or damage.

Check the inside of the clutch drum for scratches or excessive wear.

Measure clutch drum inner diameter.

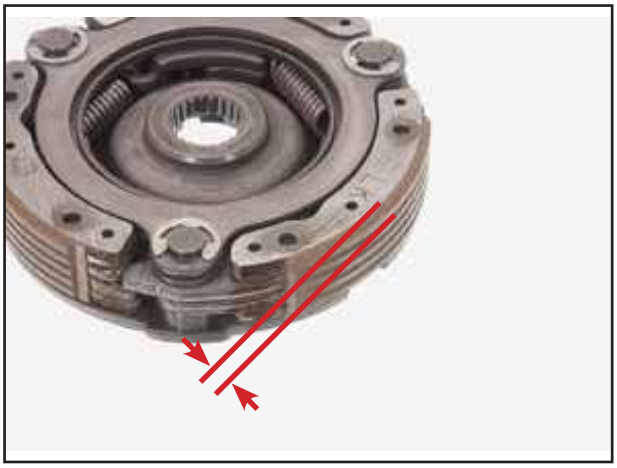
Range：105.95-106.05

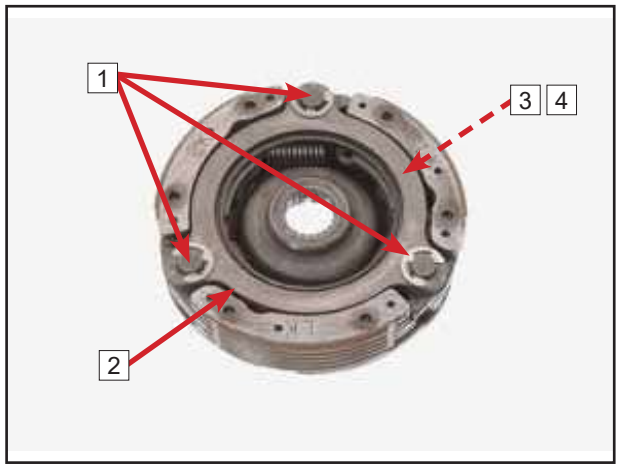
Clutch shoe

Check clutch shoe assembly for damage.

Measure the lining thickness of clutch shoe .

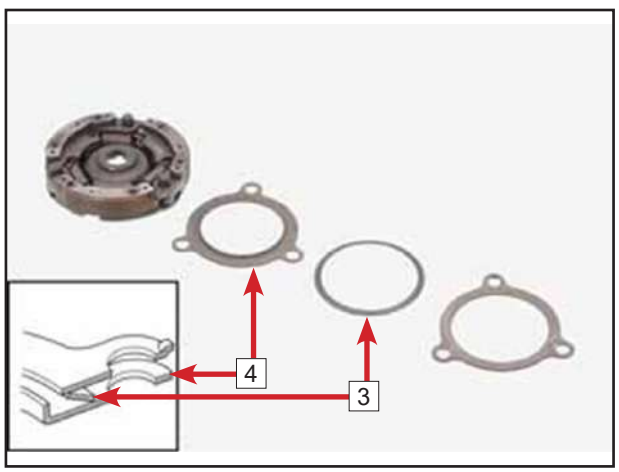
Service limit：1.0mm



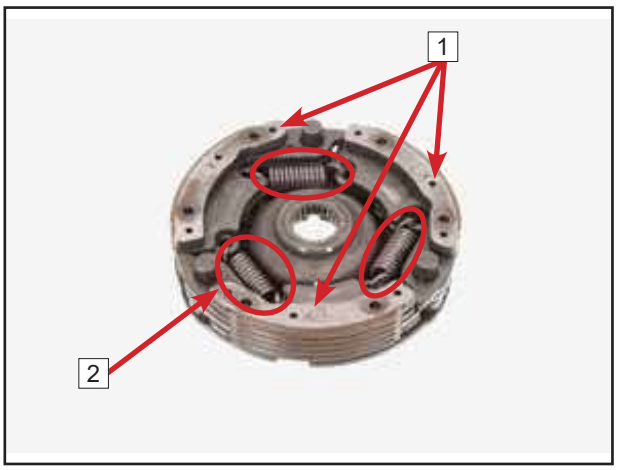


Remove the E-shaped clip spring [1].

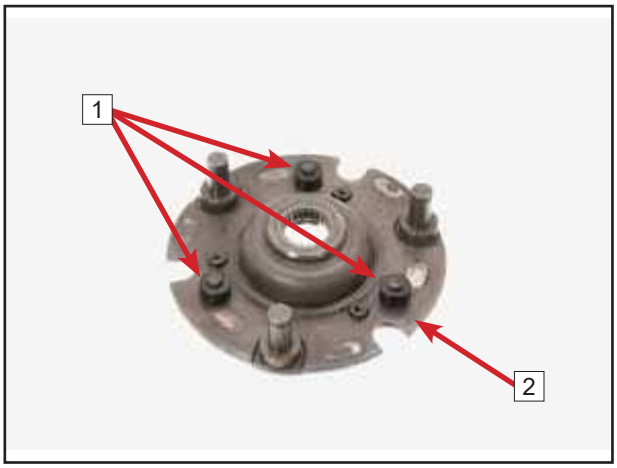
Remove side plate [2], friction spring [3] and spring holder [4].



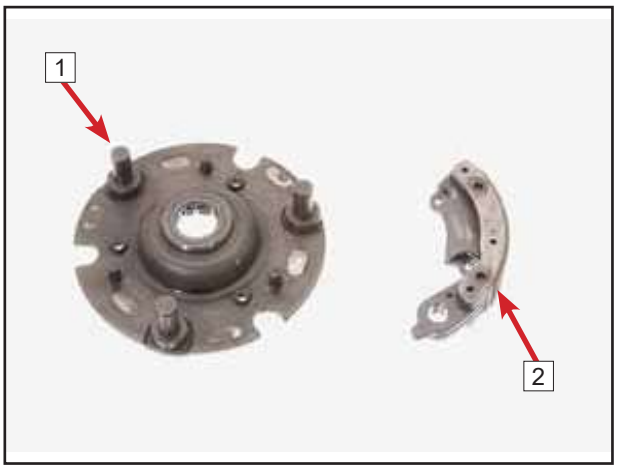
Lift the clutch shoe one by one [1], then remove the clutch shoe and spring [2].



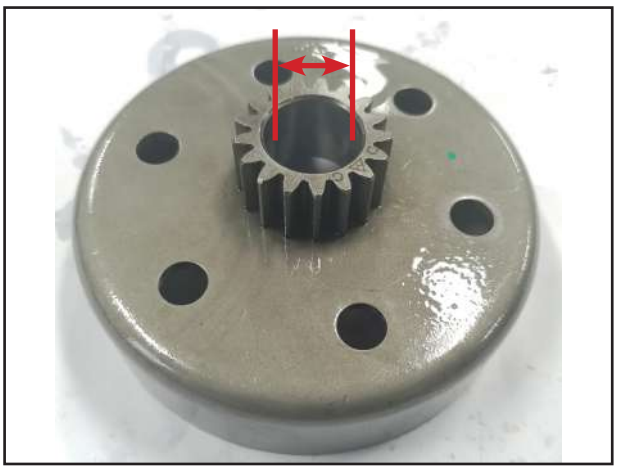
Remove the rubber pad [1] from the driving plate [2].



Check the driving plate fixing pin [1] for wear or damage.
Check each clutch shoe [2] for wear or damage.



Primary driving gear
Measure the inner diameter of primary drive gear [1].
Service limit：20.91mm



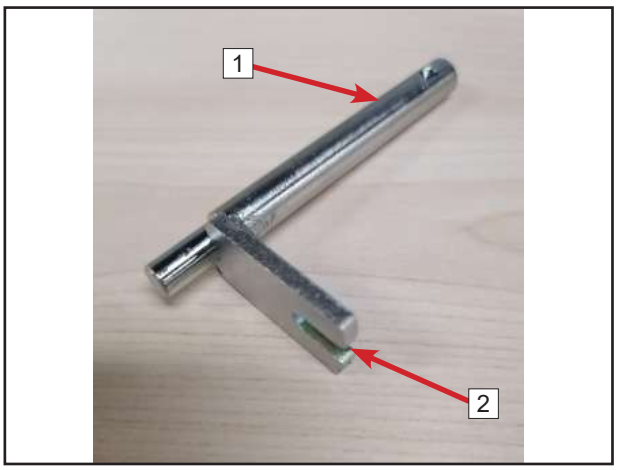
Crankshaft
Measure crankshaft outer diameter.
Service limit：16.87mm

5.6.7 Gearshift

5.6.7.1 Inspection

Check the gearshift shaft [1] for wear, bending, or damage.

Check the gearshift shaft slot [2] for wear or damage.



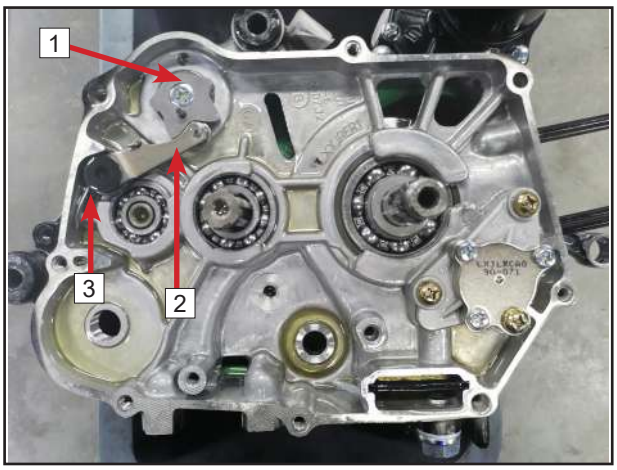
Check whether the oil seal [1] of the gearshift shaft is aged or damaged, and replace it as needed. If the oil seal is to be replaced, secure it completely.

5.6.7.2 Installation

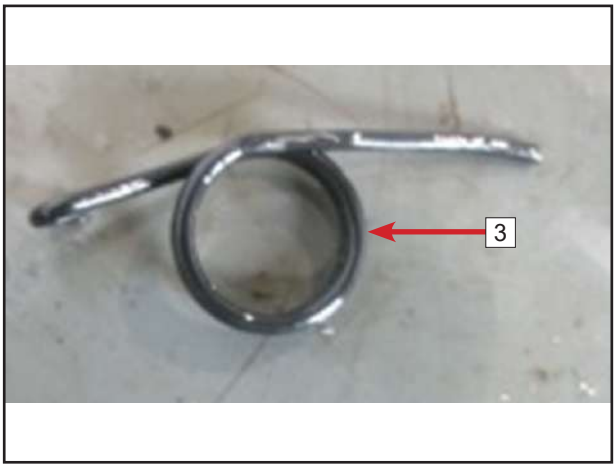
Apply grease to the lips of the gearshift rod oil seal [1].

5.6.7.3 Removal/installation

Remove the five-star dial plate [1].
Remove the stop plate [2].



Remove the stop plate reset spring [3].



5.7 Magneto and starter clutch

5.7.1 Service information

This section describes the maintenance information of the magneto and the starter clutch

These repairs can be performed with the engine mounted on the frame

Inspection of magneto

Inspection of CKP sensor

5.7.2 Magneto and starter clutch specification

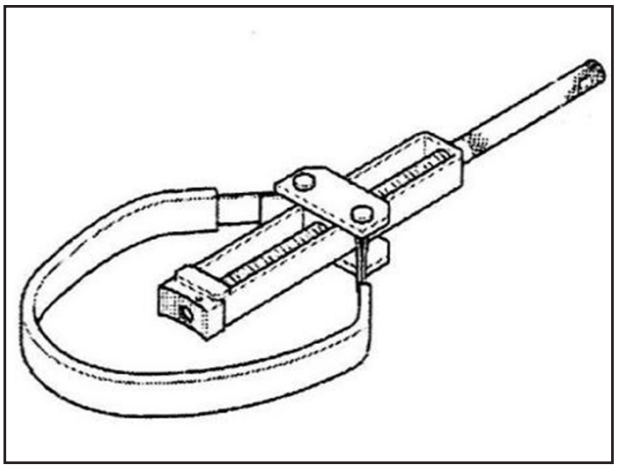
specification

Unit：mm

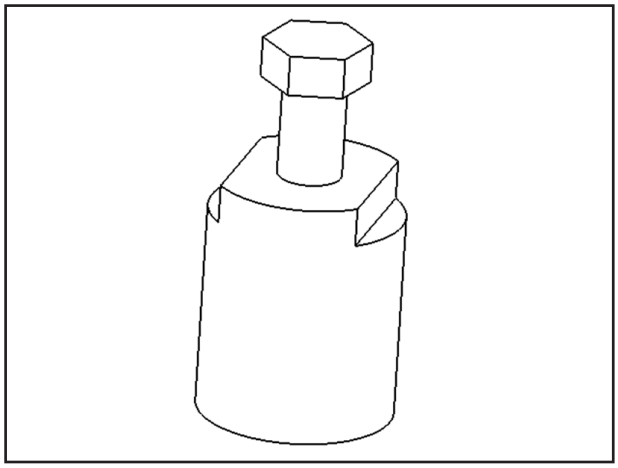
Item	Standard	Service limit
Outer diameter of starter driven gear	45.66-45.673	45.642

5.7.3 Tools

Rotor fixing tool



Magneto disassembly tool



5.7.4 Trouble shooting

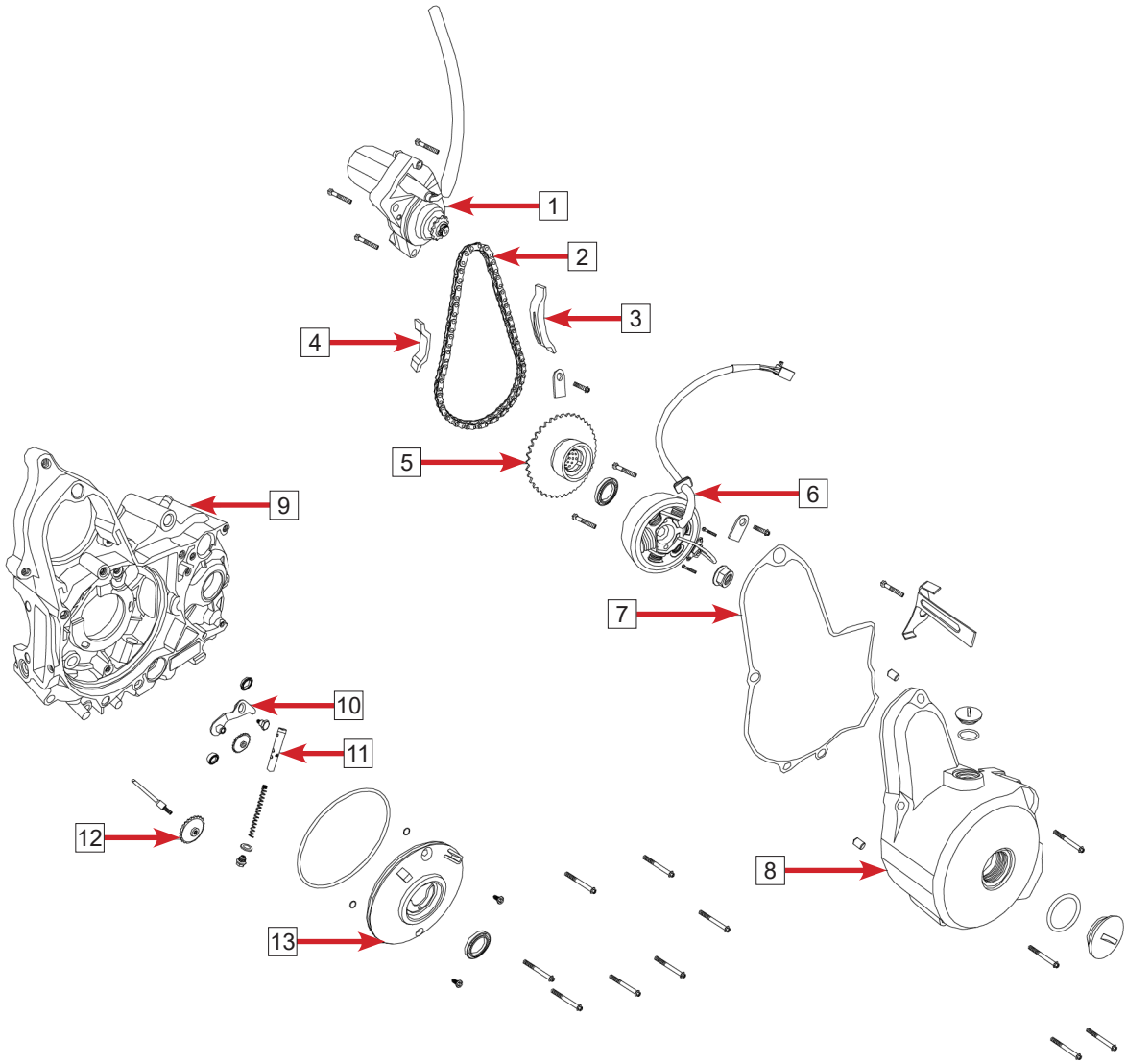
The starter motor runs and the engine does not start

Starter clutch failure

Break of starter chain

Electric starting driven sprocket failure

5.7.5 Component Location Relationship



1	Starter motor assy	2	Starter chain	3	Chain guide
4	Chain tension plate assy	5	Starter chain assy	6	Magneto assy
7	LH front gasket	8	LH front cover	9	LH crankcase
10	Chain tension arm assy	11	Chain tension rod assy	12	Fuel pump drive sprocket
13	Disc cover				

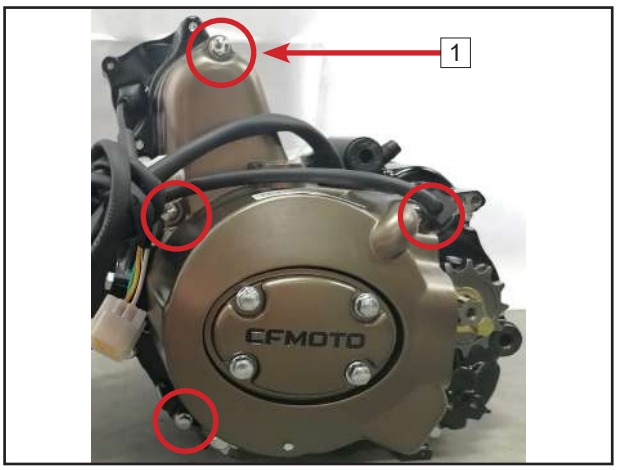
5.7.6 LH front cover

5.7.6.1 Removal/installation

Remove the following parts:
Vehicle cover parts
Plug for magneto assembly
Loosen the bolt on the LH front cover in several diagonal steps [1].

NOTE：

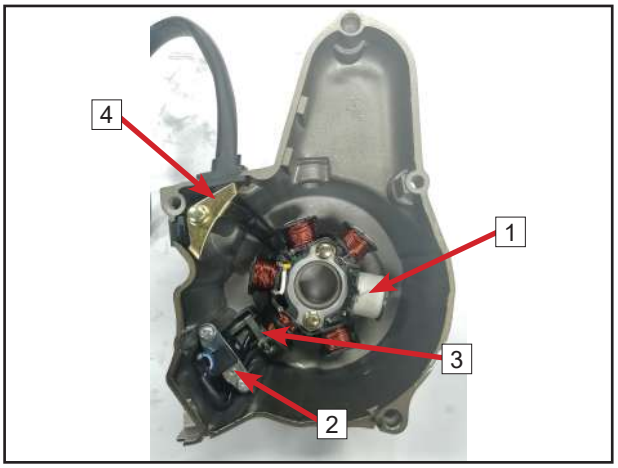
The LH front cover (stator) bears the magnetic force of the rotor,
Be careful when removing and installing.
Install in reverse order of disassembly.



5.7.7 Magneto stator and trigger

5.7.7.1 Removal/installation

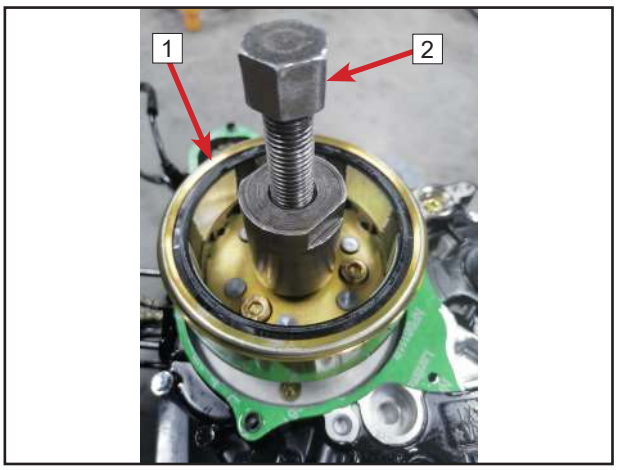
Remove LH front cover.
Remove and install stator [1], trigger [2].
Remove the wire pressing plate [3] [4].
Install in reverse order of disassembly.



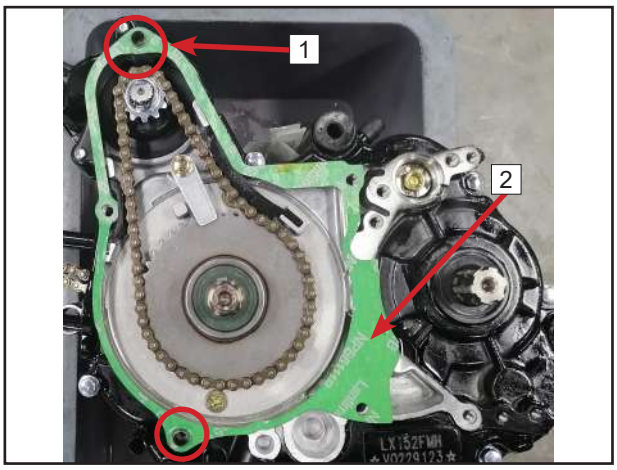
5.7.8 Magneto rotor

5.7.8.1 Removal

Remove LH front cover.
Remove the rotor nut.
Remove the rotor with a tool [1].
Tool：[2]Rotor removal tool
NOTE：
–In order to prevent the taper end thread of the crankshaft from being damaged by the tool, the tool cannot be directly jacked on the crankshaft, and the end face of the tool top nut should be used.
–Remove the rotor nut
–Remove rotor



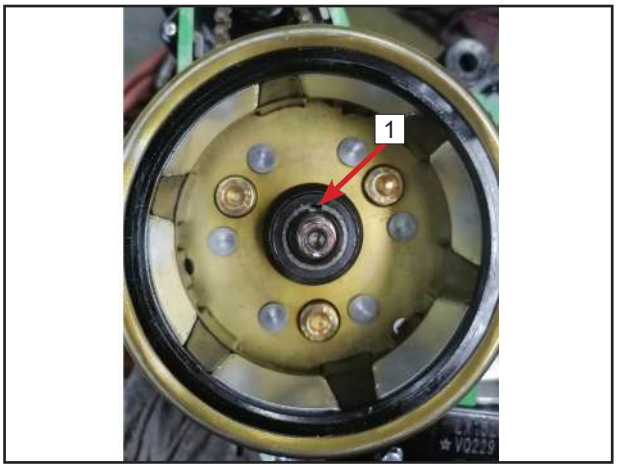
Remove the dowel pin [1] and gasket [2].
Install in reverse order of disassembly.



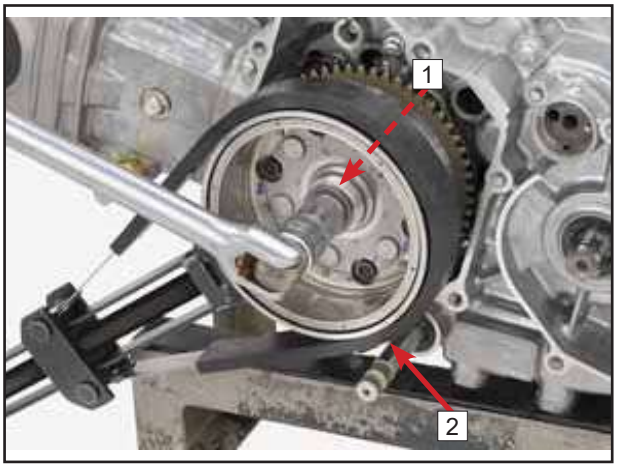
5.7.8.2 Installation

Check the woodruff key [1] for damage.
Thoroughly clean the crankshaft cone and the oil and impurities of rotor inner hole.

Install the rotor [1], careful to align the woodruff keys on the crankshaft with the keyways on the rotor.



Secure the rotor with nuts and tighten the bolts to the specified torque.
Remove flywheel nut with special tool [1].
Tool：[2]Flywheel retainer



5.7.9 Starter clutch

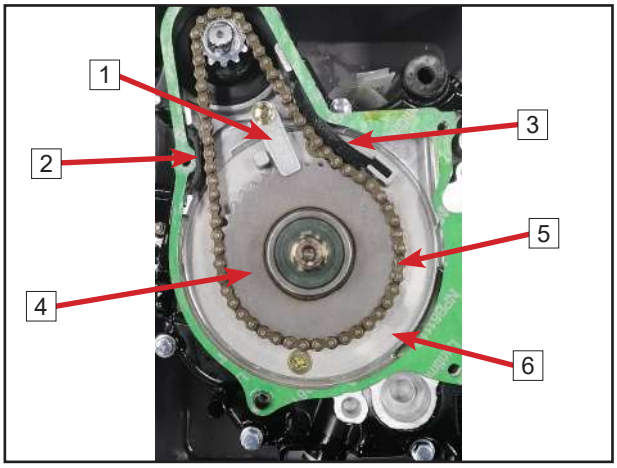
5.7.9.1 Inspection

Check whether the overriding clutch roller has fallen off or has abnormal wear, toggle the roller and see if the return is flexible. Replace it if necessary.

5.7.9.2 Removal/installation

Remove starter motor[1]

Remove pressure plate [1]
Remove tensioning plate [2] and guide plate [3]
Remove electric starting driven sprocket [4], starting chain [5], disk cover [6]
Install in reverse order of disassembly.



Inspection

Check whether the electric starting driven sprocket has abnormal wear, replace if necessary.
Check whether the starting chain is stuck, elongated, corroded, etc., replace it if necessary.

5.8 Crankcase and drivetrain

5.8.1 Service information

The crankcase must be disassembled when repairing the crankshaft, transmission system and CAM chain guide wheel.

Before disassembling the crankcase, the following components must be removed.

–engine

–stator

–flywheel

–clutch

CAM chain tensioner

–cylinder head

–cylinder/piston

Oil pump

Starter motor

–gear switch

Be careful not to damage crankcase joints during maintenance.

Before assembling the crankcase, apply sealant to the joint and remove excess sealant.

Before assembly, wash all removed parts with detergent and blow dry them with compressed air.

5.8.2 Crankcase, drivetrain specification

Specification

Unit：mm

Item			Standard	Service limit
crankshaft	End clearance of connecting rod		0.10–0.35	0.60
	Radial clearance of connecting rod		0.004–0.012	0.05
shift drum	Inner diameter of shift fork		34.075–34.100	34.14
	Shift fork claw thickness		4.85–4.95	4.60
	Outer diameter of shift drum	LH	33.750–33.36	33.93
		RH	26.750–33.36	26.93

5.8.3 Trouble shooting

Hard time gearshifting

The shift fork is bent
Gearshift shaft is bent
Guide groove of shift drum is damaged
Incorrect oil viscosity

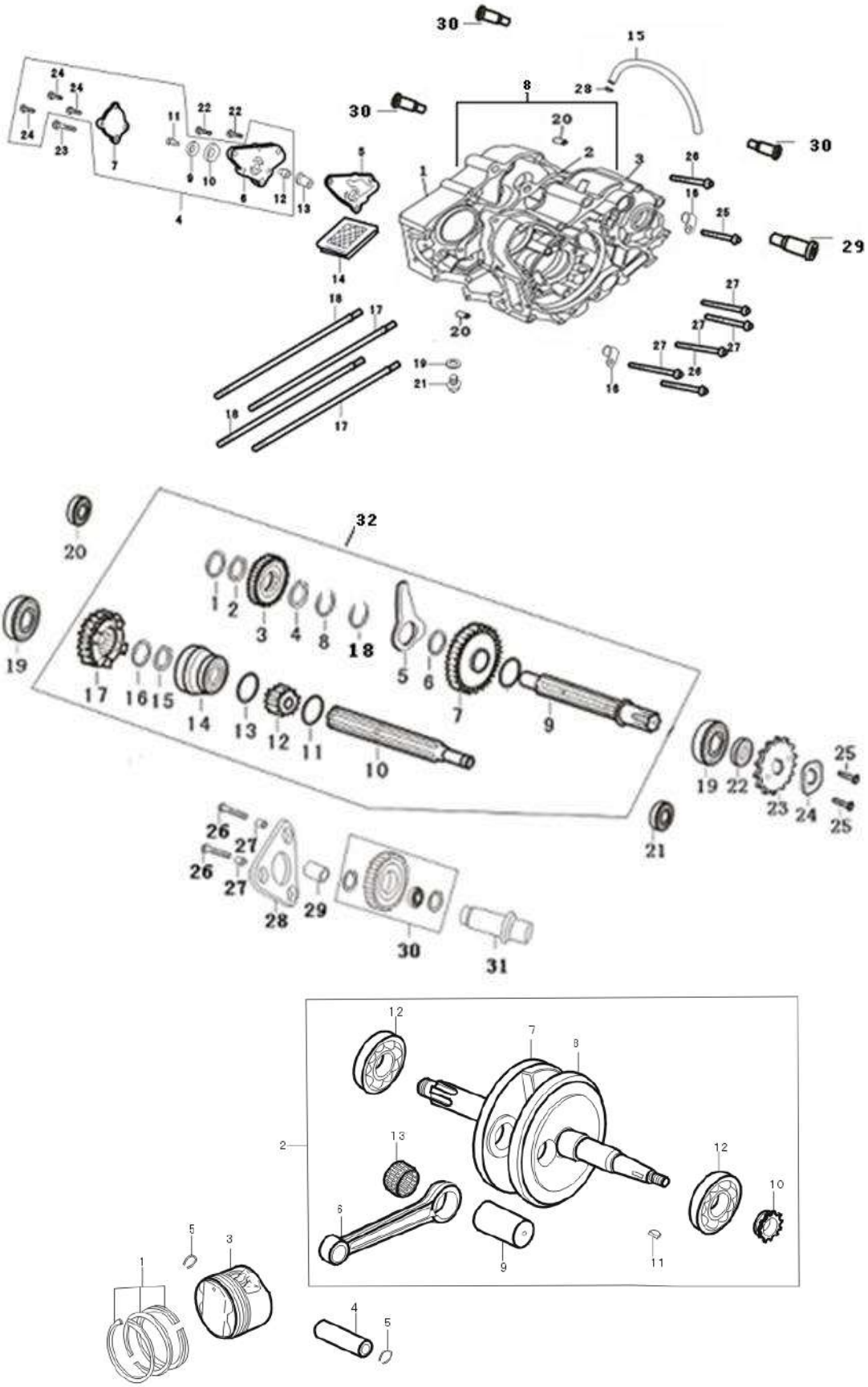
Gear disengagement of gearshift system

Wear of gear teeth or gear teeth holes
Gearshift drum stop arm damaged
The stop arm spring of the gearshift drum is damaged
The gearshift shaft return spring is damaged
Shift fork worn or bent
Gear shift groove wear

Noise too loud

Large end bearing of connecting rod is worn
Crankshaft bearing wear
Gearbox bearing wear
Gearbox gear wear or damage

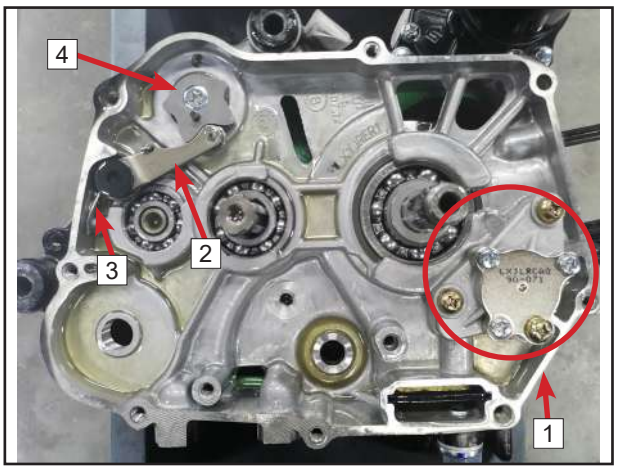
5.8.4 Component placement



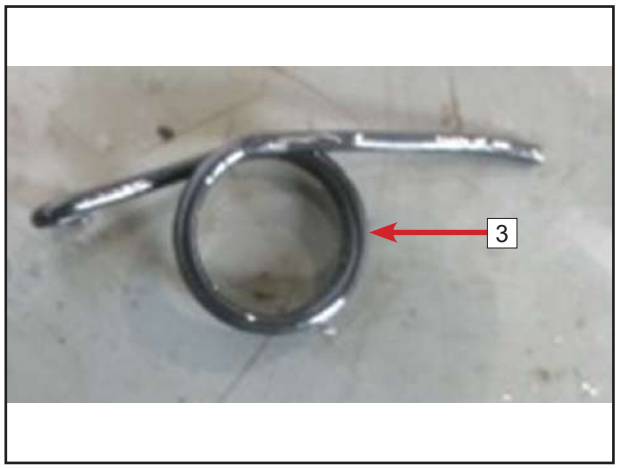
5.8.5 Crankcase

5.8.5.1 Removal/installation

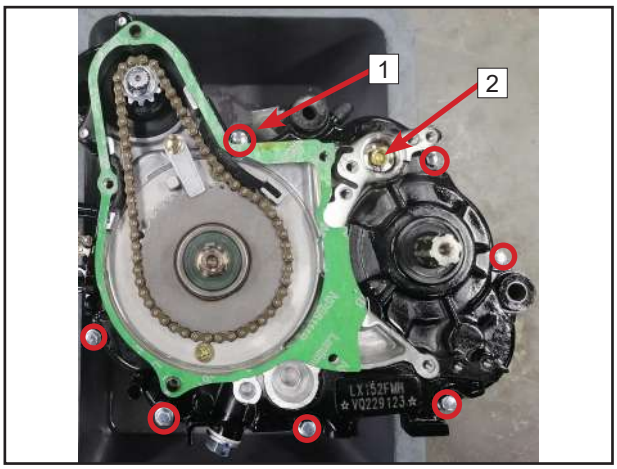
Remove following components.
—LH front cover assy
—RH crankcase cover assy
—Starter motor assy
—Clutch assy
—Oil pump assy
—Cylinder head assy



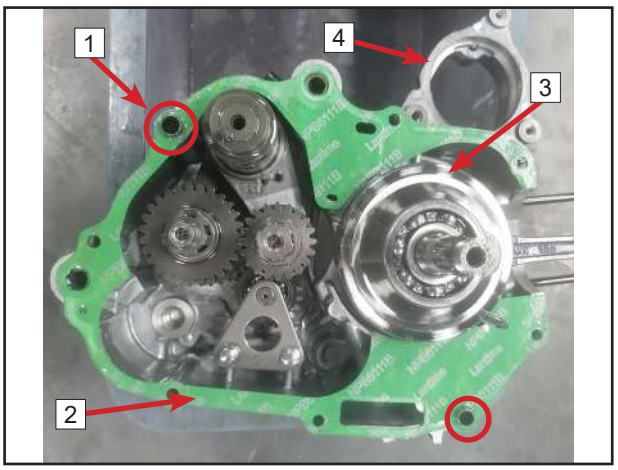
Remove the necessary parts such as the cylinder.
Put the RH crankcase on top.
Remove oil pump parts [1].
Remove stop plate [2] and reset spring [3].
Remove the five-star plate [4].



Loosen and remove the crankcase bolts in a cross-over manner in several steps [1].
Loosen and remove the crankcase bolts in a diagonal direction in several steps [1].
Remove the gear display bolt [2].
Put the RH crankcase on top of it, and with a soft hammer, in several places, gently tap, carefully from the LH crankcase, to disassemble the RH crankcase.

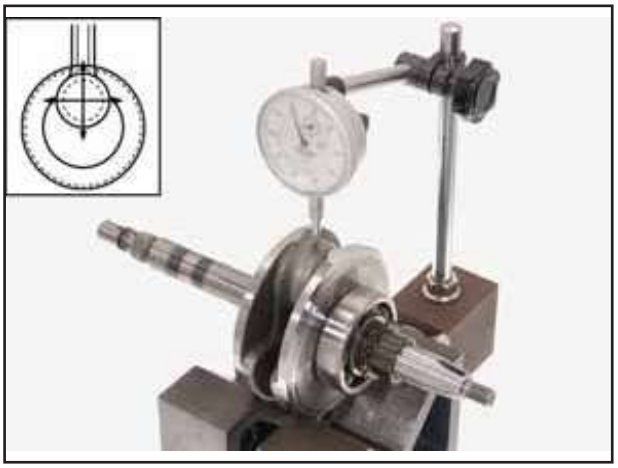


Remove the dowel pin [1] and crankcase gasket [2].
Remove the sealing material from the LH and RH crankcase joint surfaces.
NOTE：
–Please be careful not to damage the joint surface
–Disassemble the crankcase
–Remove the crank rod components [3] from the LH crankcase [4].
–Install in reverse order of disassembly



5.8.5.2 Side clearance inspection
Insert the feeler gauge [1] between the crankshaft and the large end of the connecting rod to measure the side clearance.
Service limit：0.60mm

5.8.5.3 Radial clearance
Place the crankshaft on the V-block and measure the big end radial clearance of the connecting rod.
Service limit:0.05mm

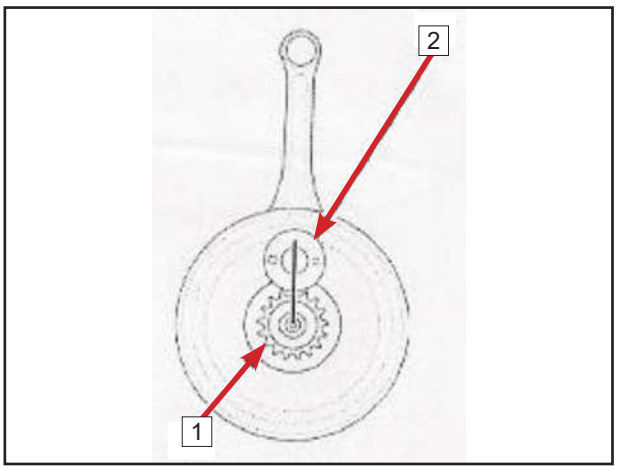


5.8.5.4 Crankshaft

Check timing sprocket [1] for wear or damage.

Check the teeth of the timing sprocket for wear or damage.

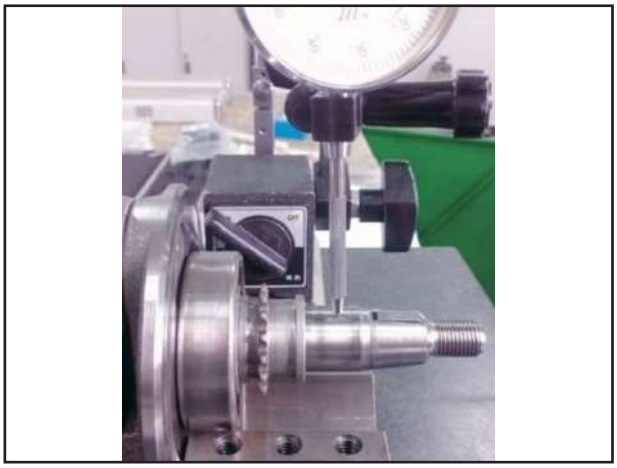
When replacing the timing sprocket [1], align the center of the timing sprocket teeth with the center of the crank pin [2].



Place the crankshaft on a platform or V-block and measure its skewness with a micrometer.

The measurement position is shown in the figure.

Service limit：0.10mm



Rotate the LH crankshaft bearing outer ring with your finger.

Bearings should rotate smoothly and silently.

At the same time, it is also necessary to check whether the bearing inner ring installation is tight.

If the outer ring does not rotate smoothly or the inner ring is loose, please replace the crankshaft.

5.8.6 Drivetrain

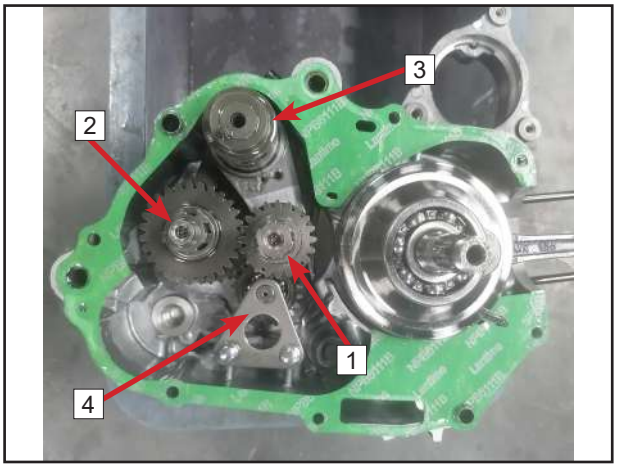
5.8.6.1 Removal

Separate crankshaft housing.

Split the crankcase in half.

Remove the main shaft part [1], the countershaft part [2] and the shift drum [3] in sets.

Remove the idler gear [4].



Remove countershaft oil seal from LH crankcase [1].

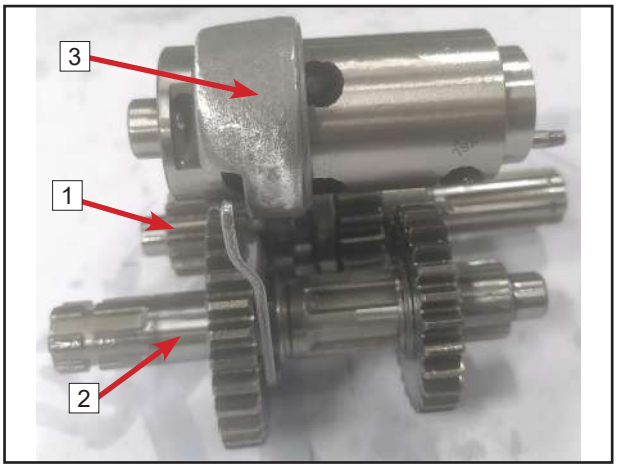
5.8.6.2 Disassembly

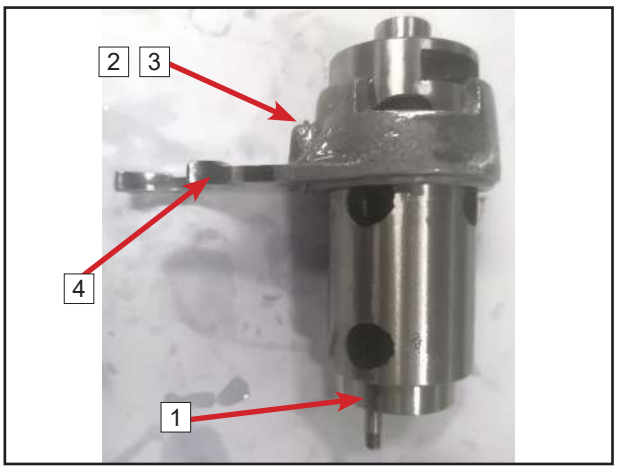
Remove the main shaft part [1], the countershaft part [2] and the shift drum [3].

Clean all removed parts thoroughly with detergent.

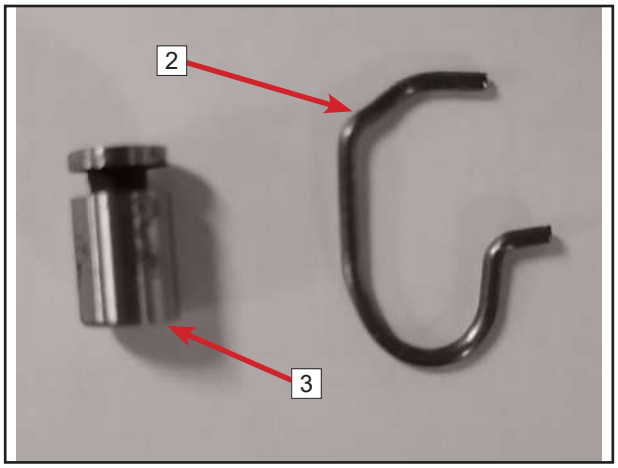
NOTE: Position all the removed parts (gears, lining rings, lock plates, friction springs, washers, and clamping springs) and slide them onto the tool or string them on a wire.

When removing the spring, please do not break the spring too much.

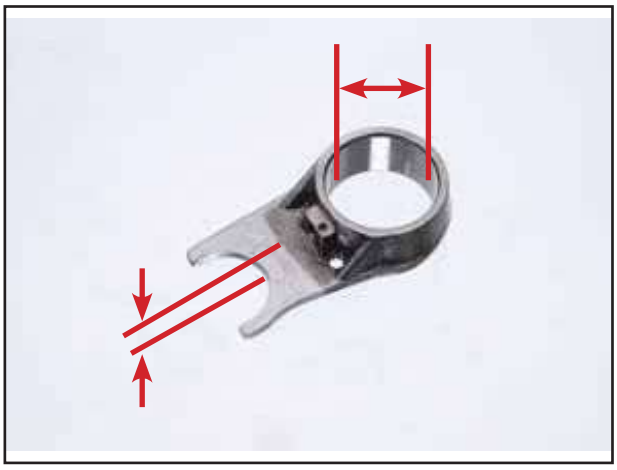




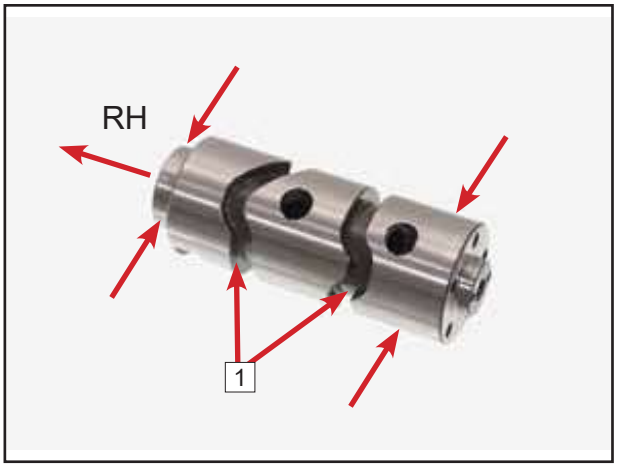
Remove the following components from the shift drum [1]
–Guide pin clip[2]
–Guide pin[3]
–Shift fork[4]



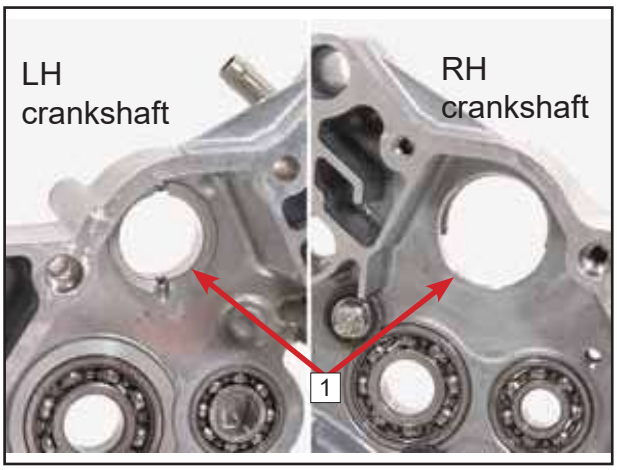
Shift fork inspection
Check whether the shift fork has aged or has abnormal wear.
Measure the thickness of each shift fork claw.
Service limit：4.60mm
Measure the inner diameter of each shift fork.
Service limit：34.14mm



Gearshift drum
Check the groove [1] of the gearshift drum for wear or damage.
At each end, measure the outside diameter of the gearshift drum.
Service limit：
RH side：26.93mm
LH side：33.93mm

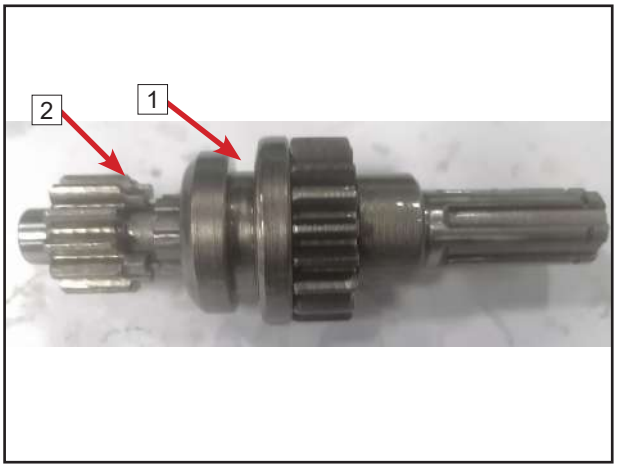


Check the contact [1] of the gearshift drum for abnormal wear or damage.



Gear/bushing/shaft

–Check the shift gear groove [1] for abnormal wear or damage.
–Check the gear teeth [2] and for abnormal wear or lack of lubrication.
–Check gear bushing for wear or damage



–Check gear spline holes for abnormal wear or lack of lubrication
–Check gear bushing for wear or damage
–Replace if neccesary

5.8.6.3 Drivetrain bearing

–Rotate each bearing inner ring with your finger. Bearings should rotate smoothly and silently.
–Check if the bearing outer ring is securely mounted on the crankcase
– If the inner ring does not rotate smoothly and silently, or if the outer ring is loose from the crankcase installation, replace the bearing.
–Oil passage
Using a compressed air gun, blow through the oil passage on the RH crankcase.
–Check oil passage for blockage, wear or damage.

Assembly

Wash all removed parts in solvent and allow to dry thoroughly.

Apply molybdenum disulfide solution to the inner surface of each rotating gear and the entire surface of the bushing to ensure initial lubrication.

Install all parts to their original locations.

NOTE:

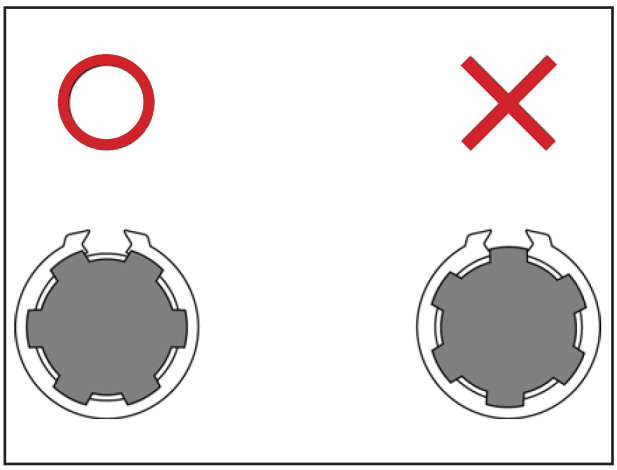
-Check whether the gears are free to move or rotate on the shaft

-When installing thrust washers and clamp springs, be sure to keep the back of the chamfered (rolled) edge facing the load.

-Do not re-use worn clasp rings, which can easily rotate in the groove.

-Check if the spring is securely mounted so that the end cap is aligned with the notch in the spline.

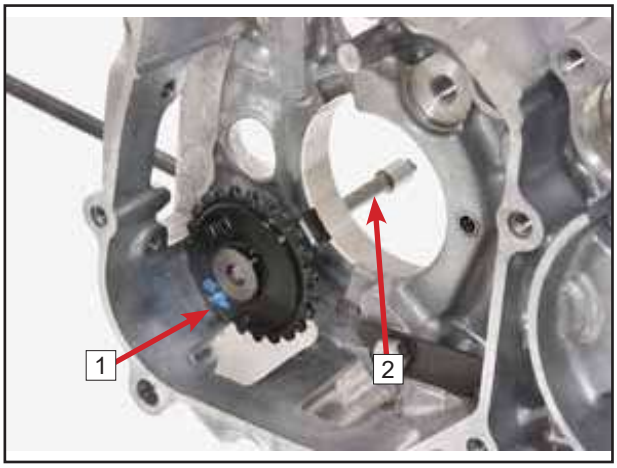
-Check if the special washer is securely installed in the shaft groove

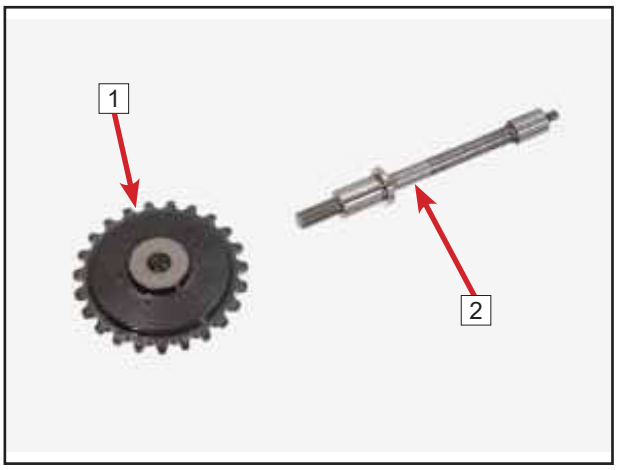


Removal

Disassemble the crankcase.

Fix the CAM chain guide wheel [1], rotate the CAM chain guide wheel support [2] counterclockwise, and remove it from the LH crankcase.



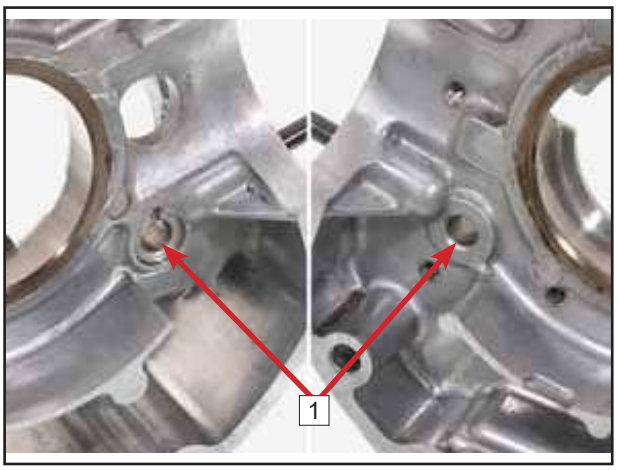


Inspection

Check the following:

- Whether the CAM chain guide wheel [1] is worn or damaged.
- Whether the CAM chain guide wheel support [2] is worn or damaged.

Check whether the journal [1] is abnormally worn or damaged.

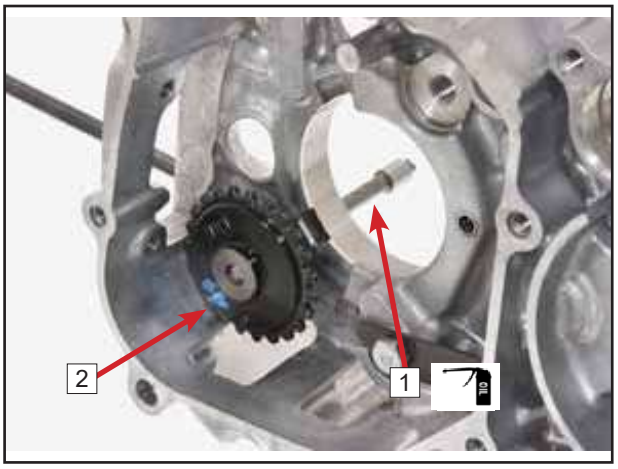


5.8.6.4 Installation

Add engine oil to the entire surface of the CAM chain guide rod [1].

Attach the guide rod to the LH crankcase, secure the guide wheel [2], and tighten the guide wheel to the specified torque.

Reverse the removal procedures for installation.



NOTE:

Remove the sealing material from the LH and RH crankcase joint surface.

Apply oil on moving parts, friction parts.

5.9 Trouble shooting

5.9.1 Engine does not start or has difficulty starting

Direction of inspection

1、Check whether the fuel reaches the carburetor → it does not enter the carburetor → it has entered the carburetor (see table on the right for cause analysis)

No	Possible reason
1	No fuel in the tank
2	Blockage of oil switch
3	line plugging
4	Carburetor float needle stuck

2、Remove the spark plug to check the spark → spark weak or completely none → spark normal (see table on the right for cause analysis)

No	Possible reason
1	Spark plug damaged or not clean
2	Fault of magneto
3	Ignition switch fault
4	Sensor fault
5	Ignition fault
6	Ignition coil fault
7	High voltage cable fault
8	Power circuit has short circuit

3、Check cylinder pressure → pressure low→ pressure normal (see table on the right for cause analysis)

No	Possible reason
1	The starting system is slipping and cannot turn the engine.
2	Valve clearance too little or none
3	Valve guide rod bent
4	The cylinder seat doesn't fit well with the valve
5	Cylinder and piston ring wear
6	The cylinder head gasket does not seal well
7	Assembly not in place
8	Incorrect timing of air distribution

4、Start the engine again → engine can ignite but still cannot start → engine does not ignite (see table on the right for cause analysis)

No	Possible reason
1	Throttle opening too wide
2	Carburetor plunger fine-tuning screw is not properly adjusted
3	Inlet pipe is leaking
4	Ignition timing is incorrect

5、Remove spark plug → spark plug wet→ spark plug dry (see table on the right for cause analysis)

No	Possible reason
1	Carburetor oil-rich
2	Too much throttle opening

6、Close the choke valve and restart the engine.

Fault diagnosis

5.9.2 Lack of engine power

Direction of inspection

1、Rapid increase from idle speed to high speed → no change in speed → normal speed (see table on the right for cause analysis)

No	Possible reason
1	Clutch slipping
2	Clutch wear

2、Gradually increase the engine RPM → no change in engine RPM → normal engine RPM growth rate（see table on the right for cause analysis）

No	Possible reason
1	Fuel supply to the fuel system is poor
2	Air filter is clogged
3	Carburetor cover air hole blocked
4	Blockage of muffler

3、Check ignition timing (with ignition timing lamp) → Ignition switch incorrect → Ignition timing correct（see table on the right for cause analysis）

No	Possible reason
1	The CDI igniter is damaged
2	Magneto fault
3	Pulse generator failure

4、Check valve clearance → Incorrect valve clearance → correct valve clearance （see table on the right for cause analysis）

No	Possible reason
1	Improper valve clearance adjustment
2	Valve seat wear

5、Check the cylinder pressure → cylinder pressure low→ cylinder pressure normal（see table on the right for cause analysis）

No	Possible reason
1	Valve clearance is too small
2	Valve bent or jammed
3	Valve seat wear
4	Cylinder and piston ring wear
5	Cylinder gasket damaged
6	Incorrect timing of air distribution
7	Spark plug is not in place

Fault diagnosis
Lack of engine power

6、Check carburetor → carburetor blocked → carburetor not blocked（see table on the right for cause analysis）

No	Possible reason
1	Fuel is not clean
2	Carburetor is not cleaned regularly

7、Check spark plug → spark plug carbon accumulation is too much or color is wrong → spark plug normal（see table on the right for cause analysis）

No	Possible reason
1	Not doing regular maintenance work
2	Heat value of spark plug incorrect
3	The spark plug electrode gap is too small

8、Take out the oil gauge and check the oil quantity → the oil quantity is incorrect → the oil quantity is normal（see table on the right for cause analysis）

No	Possible reason
1	Oil level too high
2	Oil level too low
3	Oil is not clean

9、Remove the cylinder head cover and check the valve lubrication → abnormal valve lubrication → normal valve lubrication（see table on the right for cause analysis）

No	Possible reason
1	Oil pipe blockage
2	Oil pump is not working properly

10、Check whether the engine is overheating → the engine is overheating → the engine is not overheating（see table on the right for cause analysis）

No	Possible reason
1	Excessive carbon accumulation in combustion chamber
2	The fuel used was non-compliance
3	Clutch slipping
4	The mixture is too thick
5	Too much oil

Fault diagnosis

5.9.3 The engine performs poorly at low speed and idle

1、At high speed → the engine makes knock sound → the engine has no knock sound（see table on the right for cause analysis）

No	Possible reason
1	Piston and cylinder wear
2	Excessive carbon accumulation in combustion chamber
3	The fuel used was non-compliance
4	Ignition timing is too far ahead

2、Check whether the carburetor connection leaks → leaks → no leak（see table on the right for cause analysis）

No	Possible reason
1	Carburetor seal ring is deformed
2	Loose carburetor connection
3	Seal ring rupture

3、Check the spark plug spark condition → spark is weak or intermittent spark → spark is normal（see table on the right for cause analysis）

No	Possible reason
1	Spark plug damaged
2	Fault of magneto
3	Fault of igniton coil
4	Fault of CDI
5	Fault of sensor
6	Fault of ignition switch
7	Fault of spark plug cap
8	The power circuit is incorrectly connected or short-circuited

Fault diagnosis

5.9.4 The engine performs poorly at high speed

Direction of inspection

1、Check ignition timing and valve clearance → incorrect → correct（see table on the right for cause analysis）

No	Possible reason
1	Fault of magneto
2	CDI fault
3	Sensor fault
4	Improper valve clearance

2、Disassemble the carburetor fuel line → fuel flow is restricted → fuel can flow freely（see table on the right for cause analysis）

No	Possible reason
1	The fuel tank has been used up
2	Tank lock cover vent blocked
3	Fuel line from tank to carburetor blocked
4	Blockage of switch
5	filter is clogged
6	The negative pressure pipe of the circuit is not properly connected

3、Check carburetor → carburetor blocked → carburetor not blocked（see table on the right for cause analysis）

No	Possible reason
1	The float needle is blocked
2	Float level is too low
3	Carburetor gauge hole blocked
4	Float stuck

4、Check valve timing → incorrect → correct（see table on the right for cause analysis）

No	Possible reason
1	Timing chain and timing sprocket are not properly installed
2	Gear wear is serious

5、Check the spark plug high-speed fire - abnormal fire - normal fire（see table on the right for cause analysis）

No	Possible reason
1	Fault of magneto
2	CDI fault
3	Sensor fault
4	Ignition switch fault
5	Ignition coil fault
6	Spark plug cap fault
7	Spark plug damaged
8	Power circuit has a short circuit

Fault diagnosis

5.9.5 Strange noise from engine

Direction of inspection

1、Noise from valve（see table on the right for cause analysis）

No	Possible reason
1	Valve clearance is too large
2	Valve wear

2、Piston and cylinder knocking（see table on the right for cause analysis）

No	Possible reason
1	Piston and cylinder block wear
2	Piston pin and connecting rod small end wear
3	Large head of crank connecting rod wear

3、Bearing noise（see table on the right for cause analysis）

No	Possible reason
1	Crank connecting rod bearing damaged
2	Camshaft bearing wear

4、CAM chain noise（see table on the right for cause analysis）

No	Possible reason
1	Chain stretching
2	Timing sprocket tooth wear
3	Wear of chain tensioning plate or guide plate
4	Improper adjustment of chain tensioner

5、Drive gear and driven gear noise（see table on the right for cause analysis）

No	Possible reason
1	Insufficient machining accuracy of gears

6.1 Brake system

Pre-work

Remove front wheel.

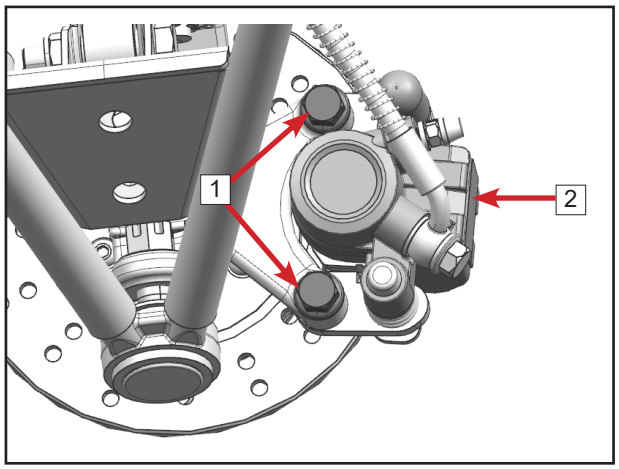
Remove plastic parts，refer to“vehicle parts”.

6.1.1 Brake caliper

Removal

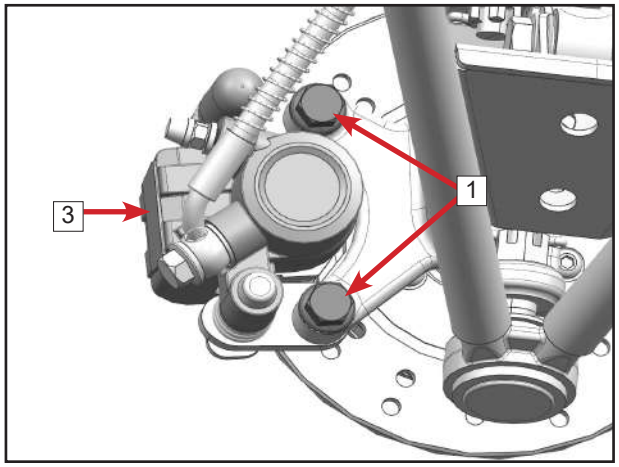
Remove bolts 1.

Release front LH brake caliper 2.



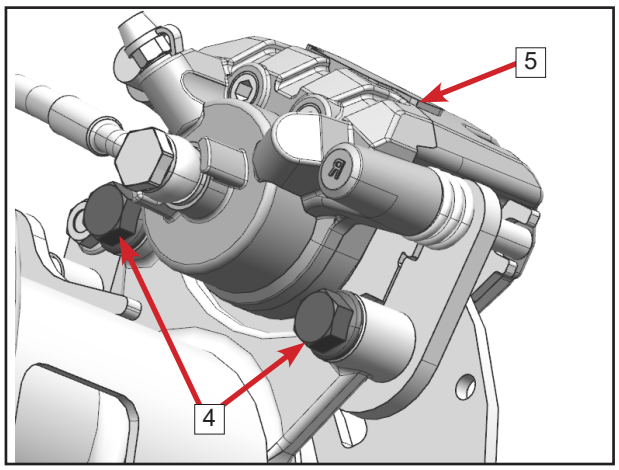
Remove bolts 1.

Release front RH brake caliper 3.



Remove bolts 4.

Release rear brake caliper 5.

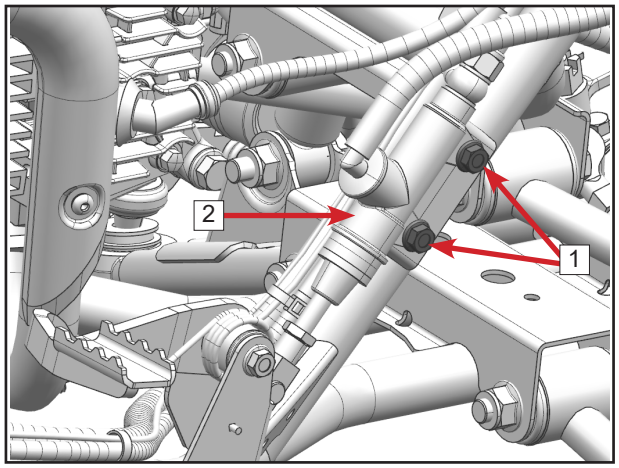


6.1.2 Brake pump

Removal

Remove bolts 1.

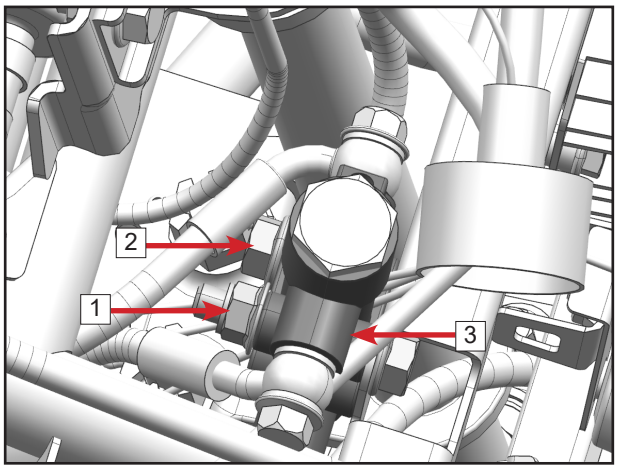
Release foot brake pump 2.



6.1.3 Hydraulic distribution valve

Removal

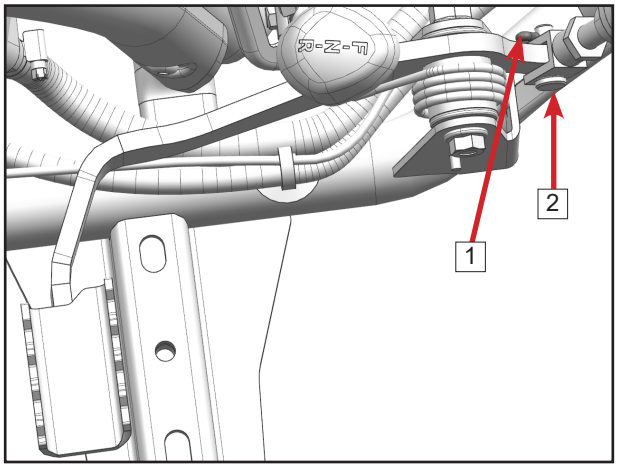
Remove bolts and nuts 1.
Remove bolts 2.
Release hydraulic distribution valve 3.



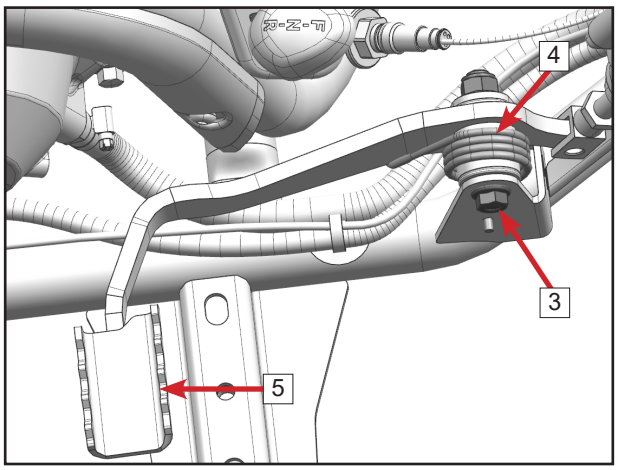
6.1.4 Brake pedal

Removal

Take out pin 1 .
Remove pin shaft 2 .



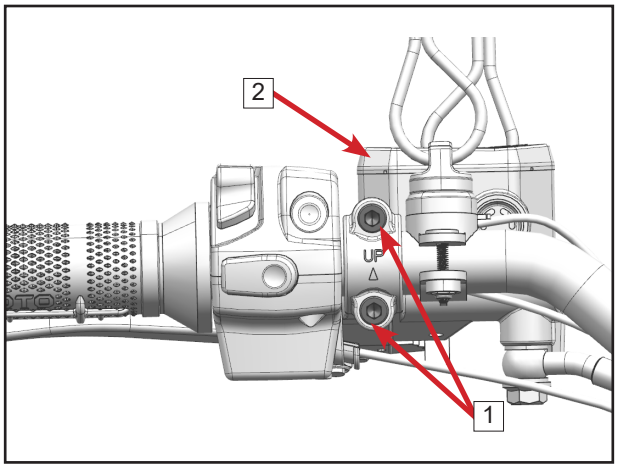
Remove bolts and nuts 3.
Remove spring 4.
Remove brake pedal assy 5.



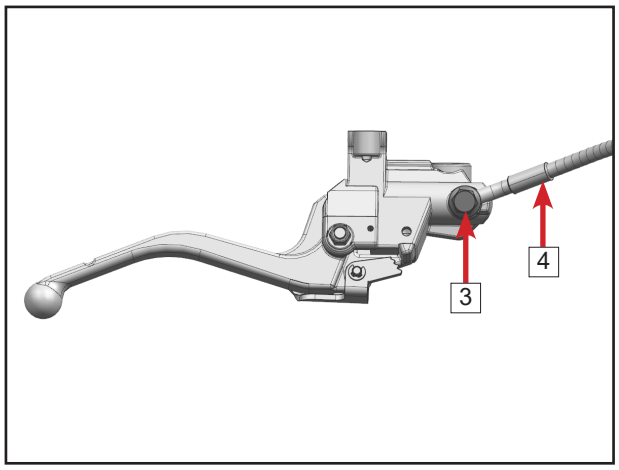
6.1.5 Brake handle

Removal

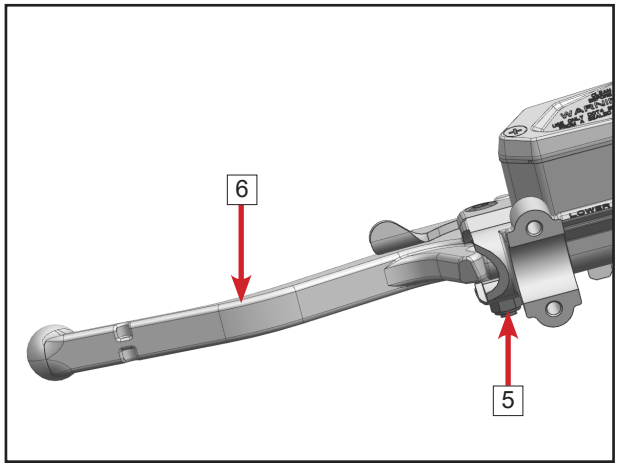
Remove bolts 1.
Remove brake handle assy 2.



Remove bolts 3.
Remove brake fluid hose 4.

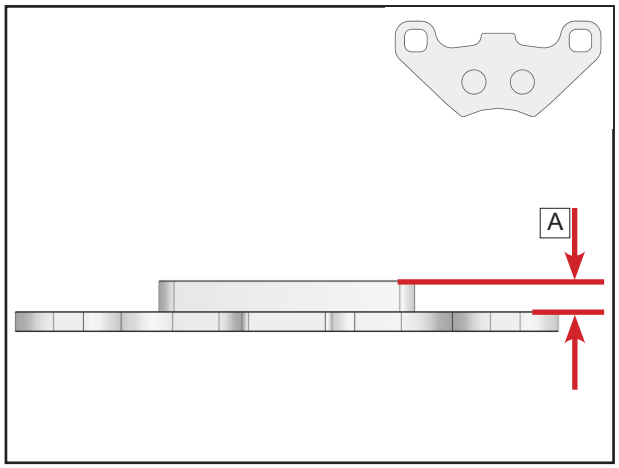


Remove screws and nuts 5.
Remove brake handle 6.

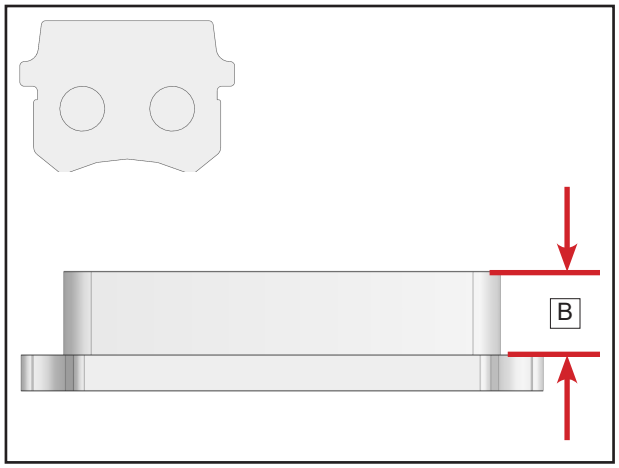


6.2 Inspection

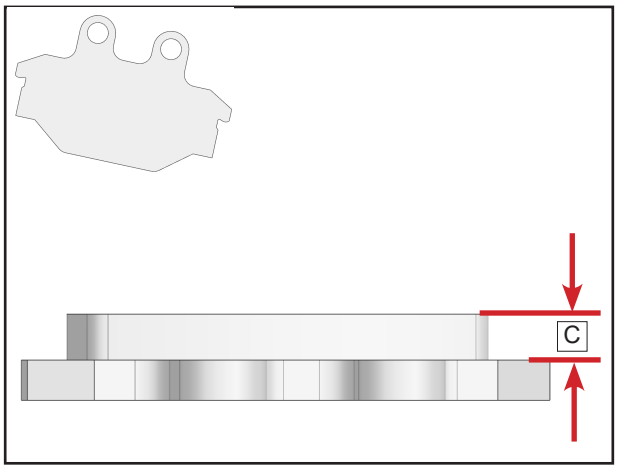
Inspect the thickness A of the brake pad Ⅰ (front wheel).
If A ＜ 1.5mm，change new brake pad.



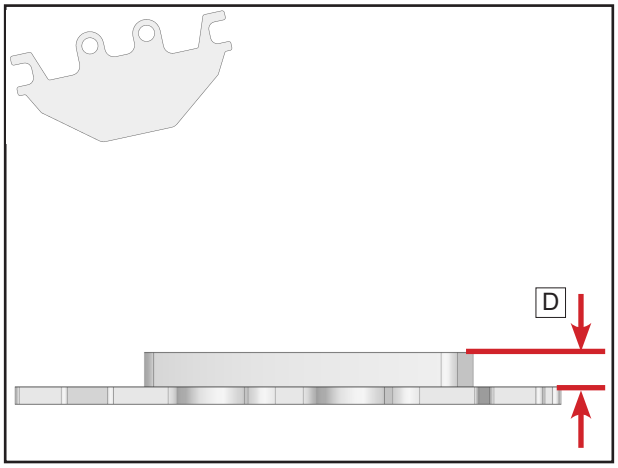
Inspect the thickness B of the brake pad Ⅱ (front wheel).
If B ＜ 1.5mm，change new brake pad.



Inspect the thickness [C] of the brake pad Ⅲ (rear wheel).
If [C]＜ 1.5mm，change new brake pad.



Inspect the thickness [D] of the brake pad Ⅳ (rear wheel).
If [D]＜ 1.5mm，change new brake pad.



Check the brake pad for damage or cracks, If there is damage or crack, please replace with new ones.

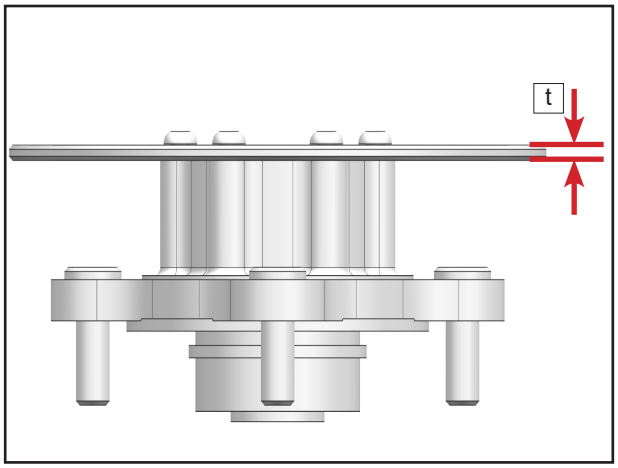
⚠WARNING

Brake pad damage will reduce the braking effect, easy to cause accident risk. If the brake pad is replaced too late, the steel brake pad bracket will rub the brake disc, which will seriously reduce the braking effect and damage the brake disc, so it is necessary to check the brake pad regularly.

NOTE：Always change brake pad in pairs.

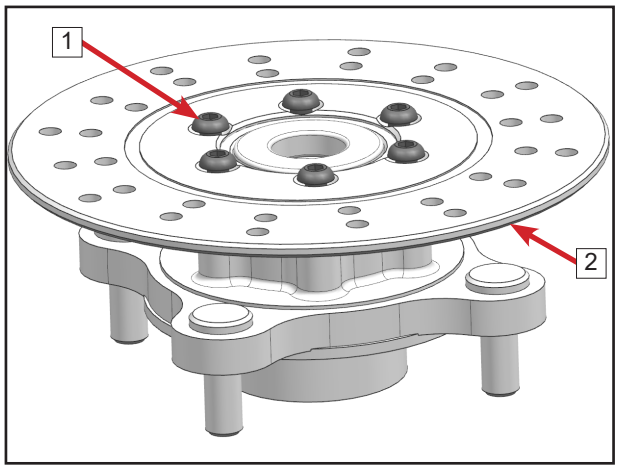
Check brake caliper body for damage or cracks, If yes, replace it in time.

Check the brake disc for damage or cracks, If there is damage or crack, please replace with new ones.
Measure brake disc thickness [t]，If [t] ＜ 3mm，replace.



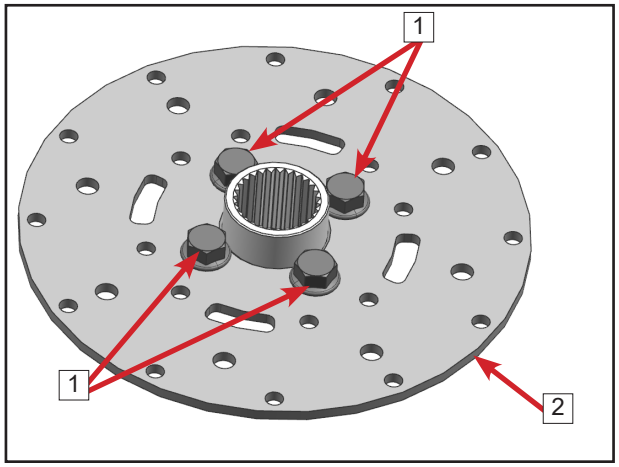
Changing brake disc（front wheel）
Remove 6 inner hex screw[1], remove brake disc[2].
Change new brake disc[2], install inner hex screw [1].

Inner hex screw torque：12N•m



Changing brake disc（rear wheel）
Remove bolts[1], remove brake disc[2].
Change new brake disc[2], install bolts[1].

Bolt torque：20N•m~30N•m



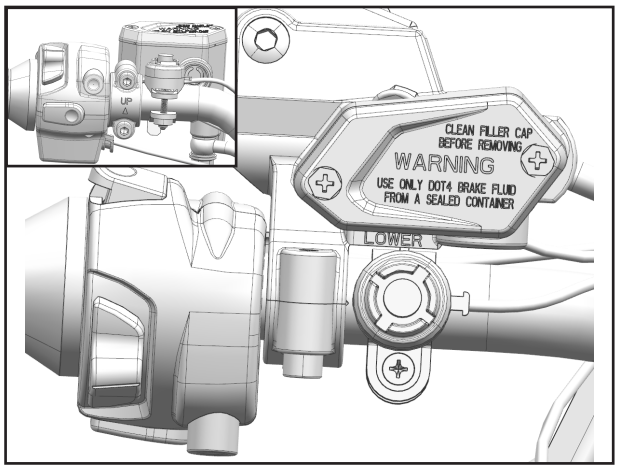
6.3 Brake fluid

⚠CAUTION
Brake fluid has a strong water absorption, if water gets into the brake fluid, it will cause the boiling point to drop, may cause brake failure, so the brake fluid storage should be sealed, away from the humid environment. If the brake fluid is contaminated, do not reuse.

NOTE：If the brake fluid is used for too long, the braking effect will be reduced. Please replace the brake fluid according to the maintenance schedule.

6.3.1 Inspection

Brake fluid should be between the upper limit line and lower limit line.
When the brake fluid is below the lower limit line or near the lower limit line, brake fluid should be added.
Brake fluid should be reduced when the brake fluid is above or near the upper limit line.

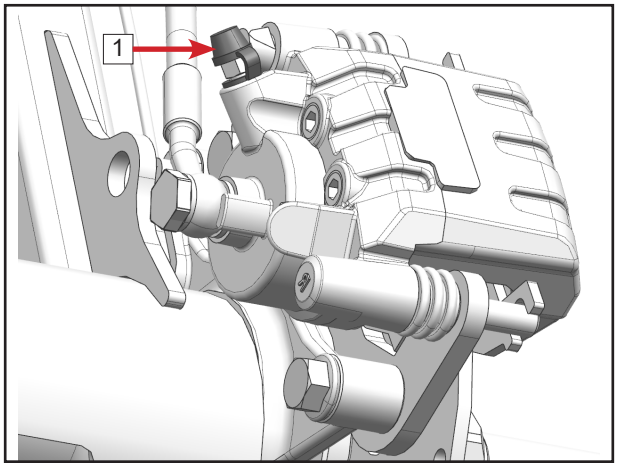


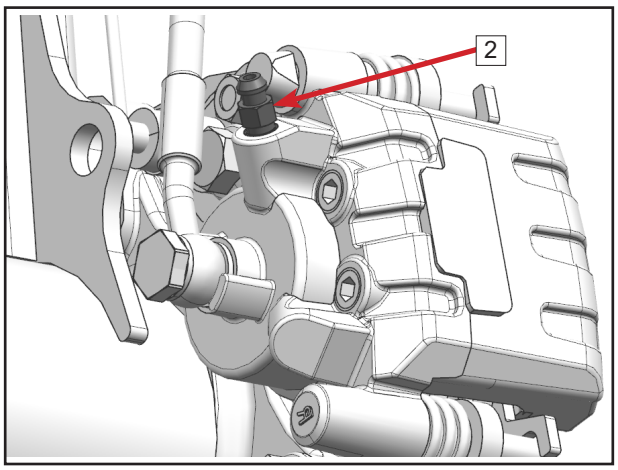
NOTE：
1. Dust and water shall not be mixed with brake fluid.
2. To prevent chemical changes, please use the specified model of brake fluid from CFMOTO.
3. Contact with brake fluid may irritate skin.
4. Please do not let the brake fluid contact the painted parts, brake fluid will corrod the paint.
5. Dry brake fluid immediately to prevent corrosion of exterior parts.
6. Do not open the brake fluid cover for a long time.

6.3.2 Brake fluid changing and brake exhaust

Please use the brake fluid designated by CFMOTO for replacement.
Brake fluid type： DOT4

If there is a special exhaust device, please follow the exhaust device operation manual for operation.
If no exhaust device is available, exhaust as follows:
Remove the dust cap 1.
Connect a clean transparent hose to the brake caliper exhaust screw 2, place the other end of the hose in a clean container, and ensure that the hose is fastened to the exhaust port.
Ask the assistant to slowly depress the brake pedal and maintain it.
Loosen the fluid exhasut bolt, immediately lock the bolt and return the brake pedal to place.





NOTE： Make sure that the fluid surface in the storage tank is kept at higher than half the height when exhaust, and below the upper limit line.

NOTE： Before tightening the drain bolt, do not release the brake pedal, otherwise it will cause the master cylinder to inhale air.

Repeat the above until there is clean brake fluid in the hose and no air in the brake fluid discharged.
Tighten the drain bolt and maintain the liquid level in the storage tank after finishing exhaust or changing brake fluid.
After the replacement of brake fluid is completed, carry out a simple brake test to check whether the brake function and brake pedal stroke are good.
If no significant braking effect, please repeat the above procedures.

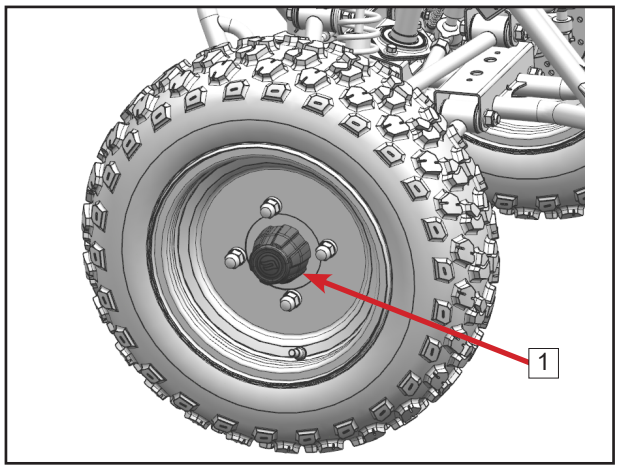
6.4 Installation

Reverse the removal procedures for installation.

7.1 Tire

Removal

Remove rim deco cover 1.



Remove rim shaft nut 2.

Remove tire 3.

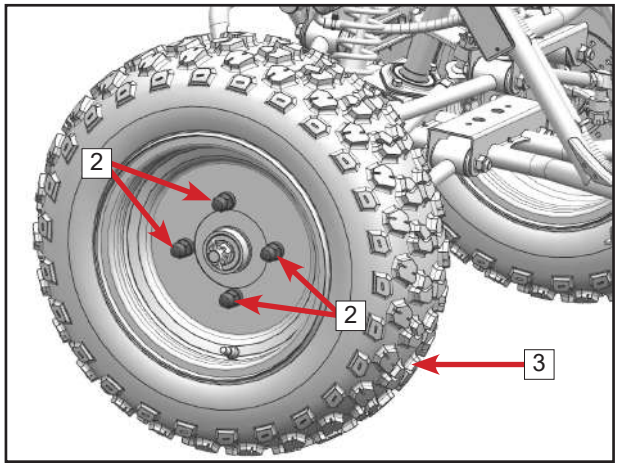
Inspection

DANGER: Please operate on a level ground and make sure the vehicle is fixed firmly. Do not stay under the tires in case vehicle falls during maintenance and causes accidents.

Put tire into water to see if there is bubbles, if yes, it means that tire leaks and replace with new tire.

Inspect front and rear tires for cuts, inserted foreign objects or other damage. Replace with new tires if any defect is found.

If stones or other foreign objects are in the tread pattern, use tools to remove them.



DANGER: Check tire condition before driving. Tire burst will cause vehicle run out of control, which finally causes accidents. In order to ensure safety, please replace the damaged or worn tires immediately.

WARNING: Using tires and rims that are not approved or recommended by CFMOTO will affect the performance and safety of the vehicle. Please use CFMOTO approved or recommended tires and rims.

WARNING: New tires have poor grip, might cause accidents. Please do break-in according to the schedule. The new tire tread is coated with release glue, so it does not have the ability to completely grip. The first 200km must be modeled in a moderate manner at different angles, so that the entire tread is rubbed against the ground.

DANGER: Tire pattern used on front and rear wheels should be consistent. If tire is aged and cracked, replace with new tire immediately.

Tire status

AT19×6.0-10

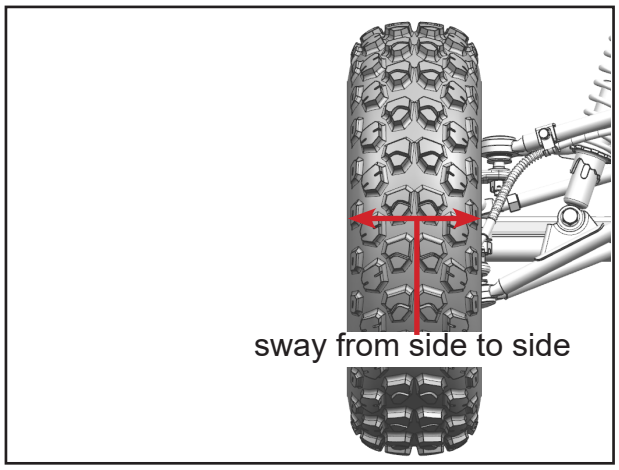
AT18×9-8

Tire pressure：

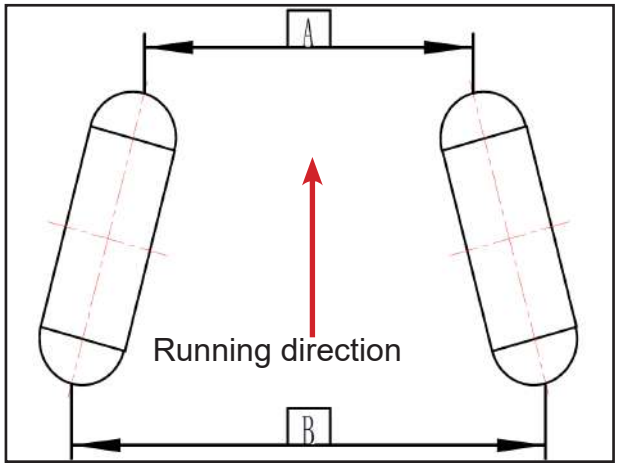
Item			Standard	Service limit
Front wheel	Rim runout	Longitude	/	0.5mm
		Transverse	/	0.5mm
	Tire	Remaining groove	/	3.0mm
		pressure(US)	Factory recommended: 35kPa （ 5.0PSI）	

Item			Standard	Service limit
Rear wheel	Rim runout	Longitude	/	0.5mm
		Transverse	/	0.5mm
	Tire	Remaining groove	/	3.0mm
		pressure	Factory recommended: 35kPa （5.0PSI）	

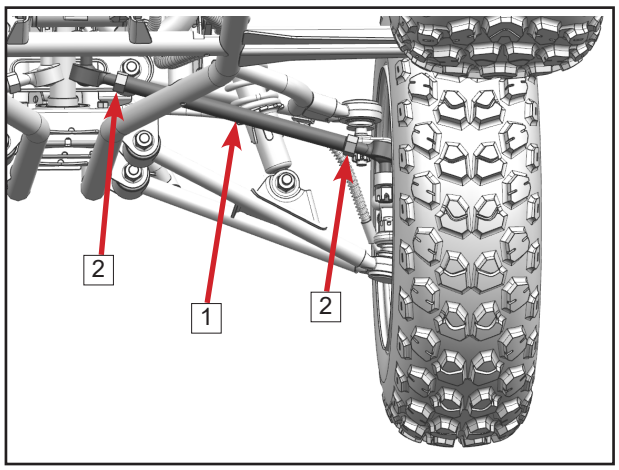
Position the vehicle on a level ground.
Elevate the appropriate side of the vehicle by using a suitable stand or other tools and make sure there is no force on the wheels. Shake the wheel to check for free play or looseness. If any free play or looseness is found, inspect A-arms, axle, rim bolts and nuts and tighten them if necessary. If free play or looseness still remains, inspect bearing, A-arm bushings and ball joint pin and replace if needed.



7.1.1 Wheel Toe-in
Position the vehicle on a level ground to measure the front wheel toe-in.
Comparing to vehicle running direction, the front is A, back is B.
Toe-in: B~A=5mm~10mm



If the measurement is out of specification, adjust the lock nut 2 of steering rod 1.



Drive the vehicle slowly after the adjustment is completed. Ensure that steering wheel works properly.

7.2 Shock absorber

Pre-work

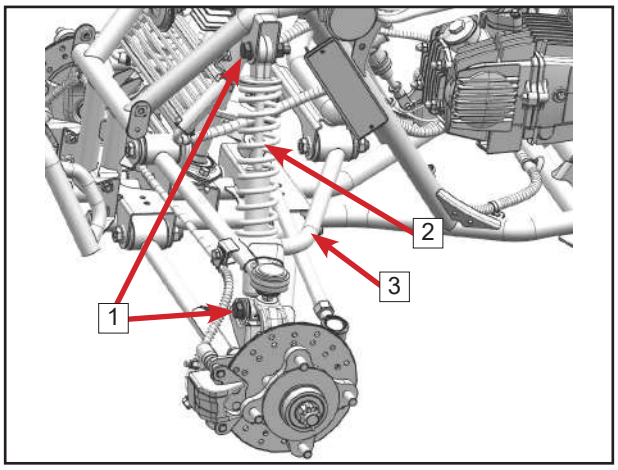
Remove tire.

7.2.1 Front shock absorber

Removal

Remove bolts and nuts 1.

Remove shock absorber 2.



⚠WARNING: When removing shock absorber 2, ask assistant to hold on to the swing arm assy 3, to prevent swing arm from falling and hurting people or damaging parts.

Inspection

Inspect shock absorber appearance for cracks or damage. Replace if any defect is found.

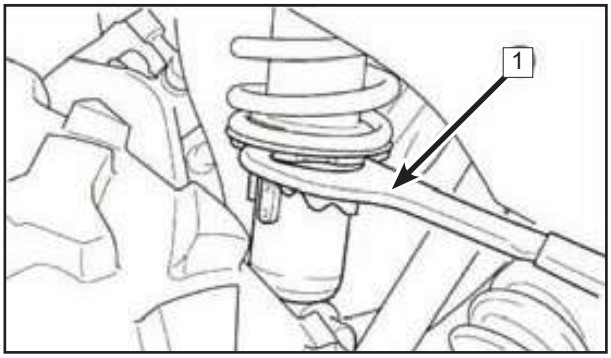
Inspect for leaking, replace if necessary.

Clean dirt on shock absorbers.

Adjusting shock absorber

Use absorber wrench to adjust circlip 1.

Adjust the shock absorber according to the load. Harden clockwise. Softening counterclockwise.



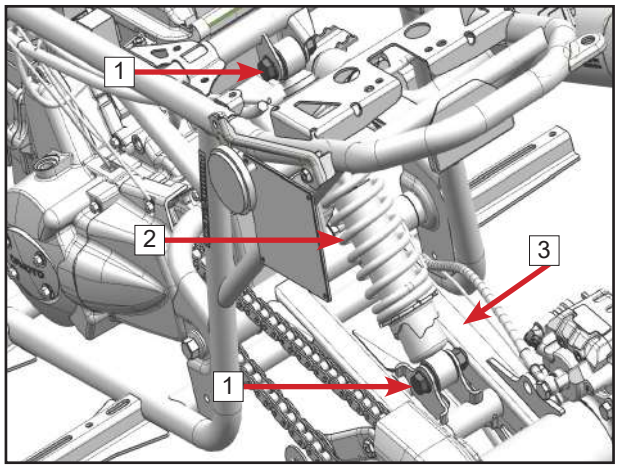
NOTE: LH and RH shock absorbers must be symmetrical in gears after adjustment.

7.2.2 Rear shock absorber

Removal

Remove bolts and nuts 1.

Remove rear shock absorber 2.



⚠WARNING：When removing shock absorber 2，ask assistant to hold on to the swing arm assy 3，to prevent swing arm from falling and hurting people or damaging parts.

Inspection

Inspect shock absorber appearance for cracks or damage. Replace if any defect is found.

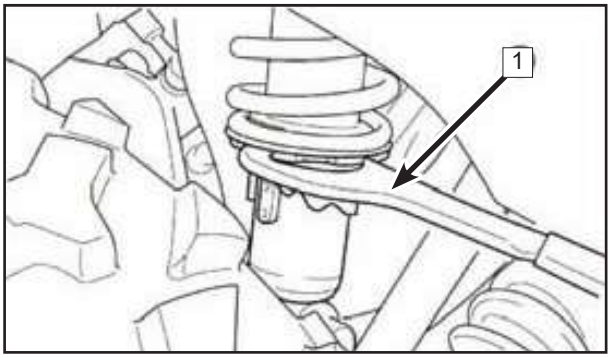
Inspect for leaking, replace if necessary.

Clean dirt on shock absorbers.

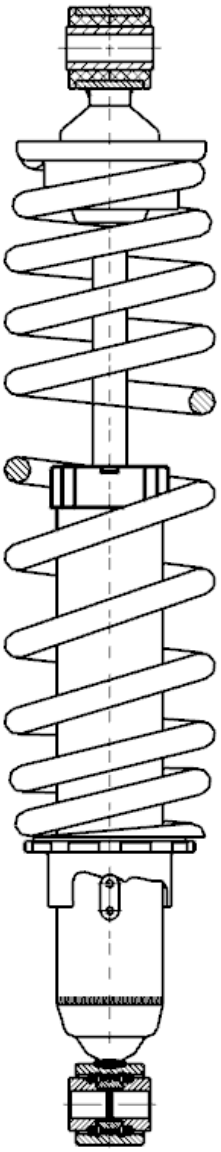
Adjusting shock absorber

Use absorber wrench to adjust circlip 1.

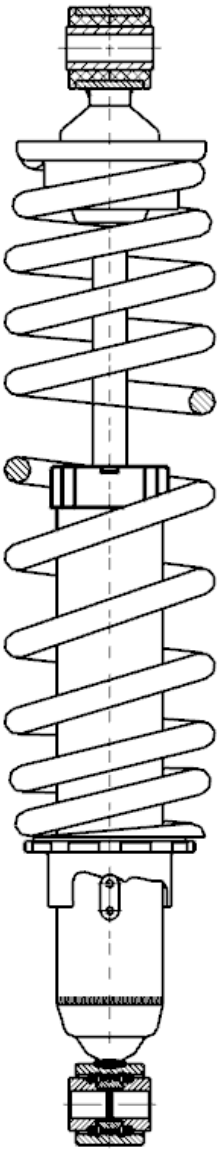
Adjust the shock absorber according to the load. Softening clockwise. Hardening counterclockwise.



Front shock absorber



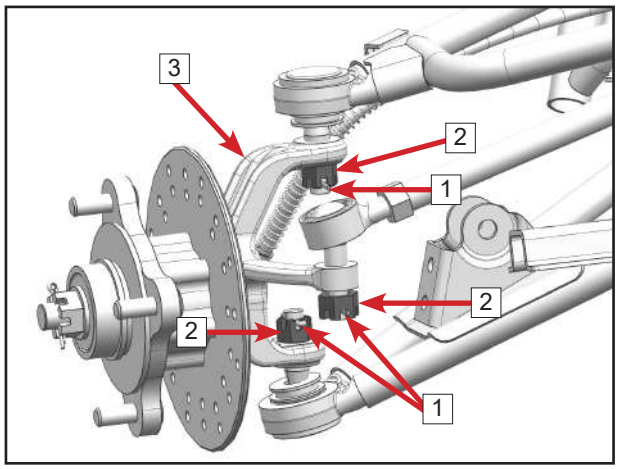
Rear shock absorber



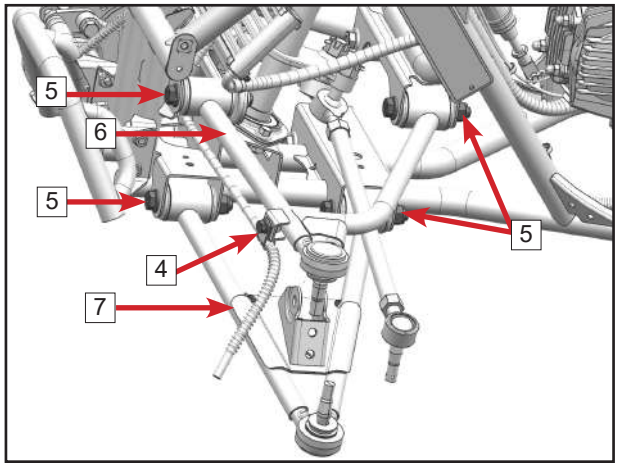
7.3 Front suspension

Removal

Unplug pin [1].
Remove slotted nut [2].
Remove steering knuckle assy [3].



Remove bolt [4].
Remove bolt and nut [5].
Remove front upper swing arm [6].
Remove front lower swing arm [7].



Inspection

Inspect swing arm for cracks or damage. Replace if any defect is found.

Inspect swing arm for smooth movement. Add grease to oil nozzle if stuck or block ed.

Inspect steering knuckle for water, dirt, rust or damage. Replace if any defect is found.

Installation

Reverse the removal procedures for installation.

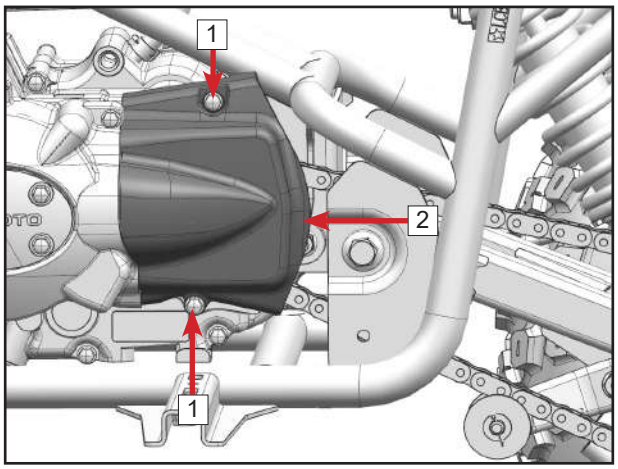
7.4 Rear suspension

7.4.1 Chain

Removal

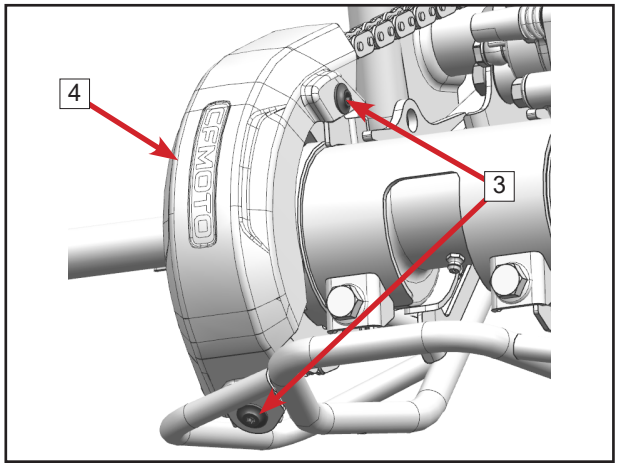
Remove bolt 1.

Remove deco cover 2.

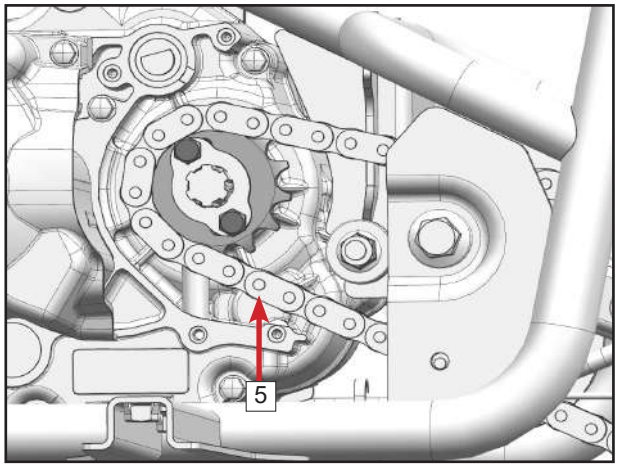


Remove bolt 3.

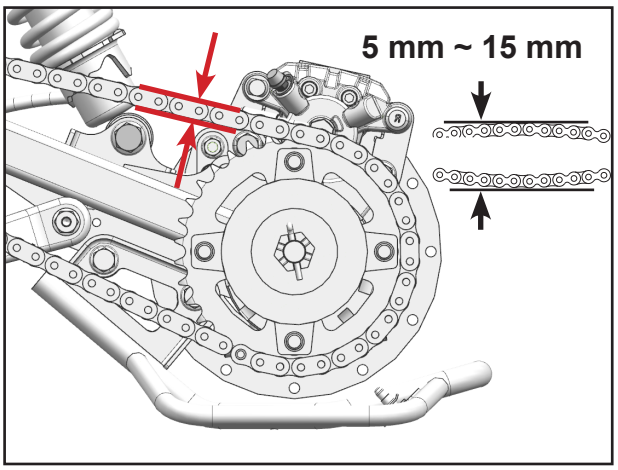
Remove big sprocket guard 4.



Release and remove chain 5.



Chain tightness inspection
Put into neutral.
Push the chain up to confirm the tightness of the chain. If the tightness of the chain does not meet the standard, adjust to the standard value.
Standard value: 5mm to 15mm

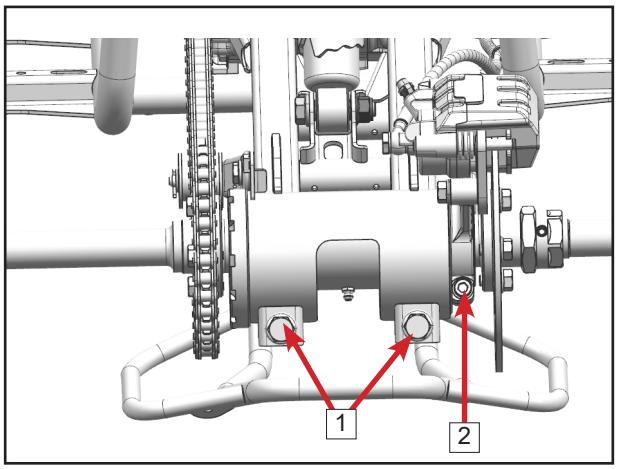


NOTE:
The wear of the chain is not always uniform, and the tightness is measured repeatedly at different locations by rotating the rear wheel several times.

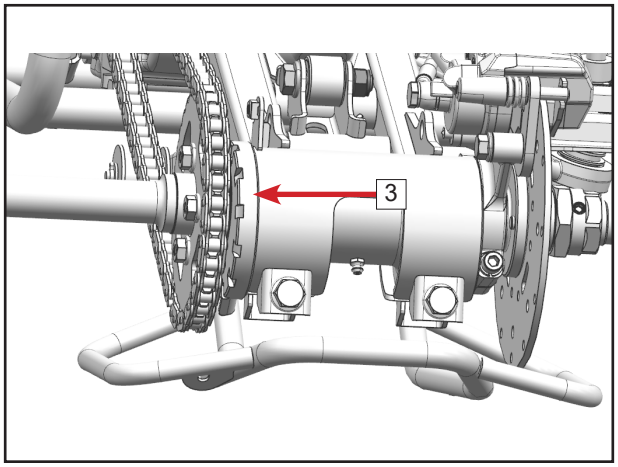
Drive chain inspection
Before daily driving, the tightness and lubrication of the drive chain must be checked, and regular maintenance must be observed to prevent excessive wear and tear of the drive chain. If the drive chain is too worn or adjusted improperly, it will cause the chain to be too loose or too tight.
If the chain is too tight, it will accelerate the wear of the chain, sprockets, rear sprockets, and rear wheel rims, and some parts will break or shatter when overloaded.
If the chain is too loose, the chain can come off the sprocket or the rear sprocket, which can cause the rear wheel to lock up or damage the motor.
The service life of a chain depends heavily on maintenance.
Chain dirt inspection
Check chains for dirt regularly or after driving in harsh conditions.
If the chain is severely soiled, use a gentle water beam to rinse off large pieces of dirt and use a suitable chain cleaner to remove residual dirt and lubricant residues.
Wait for the chain to dry and spray on the appropriate amount of chain lubricant.

⚠**NOTE**:
Be careful not to sputter the lubricant on other parts when spraying the chain lubricant. The lubricant on the tire will reduce the tire grip, the lubricant on the brake disc will reduce the braking effect, use the appropriate cleaner to remove.

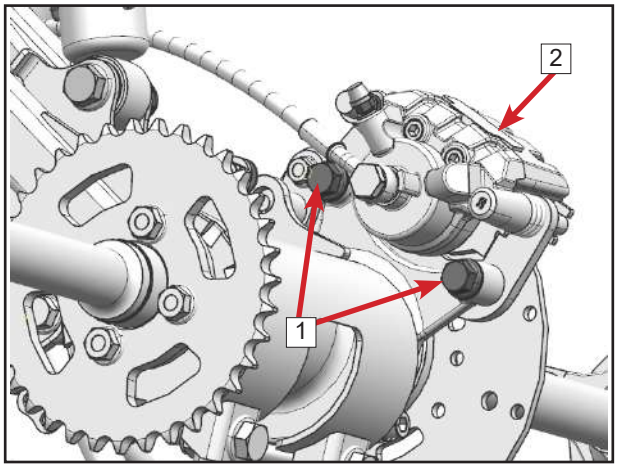
Chain adjustment
Remove bolt 1.
Remove screw 2.



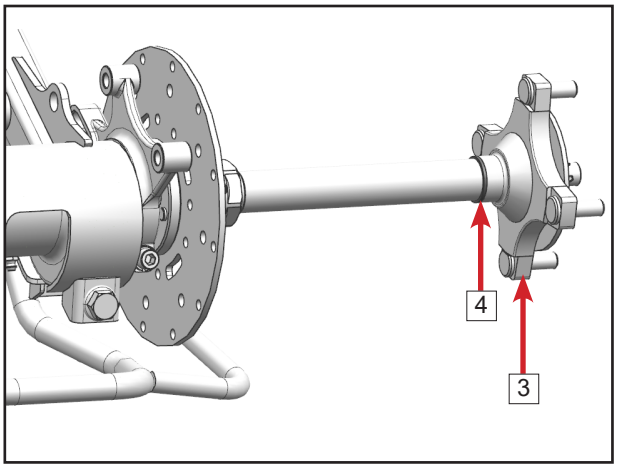
Use vehicle tool to adjust at place 3
After adjustment, re-tighten bolt 2 and bolt 1.



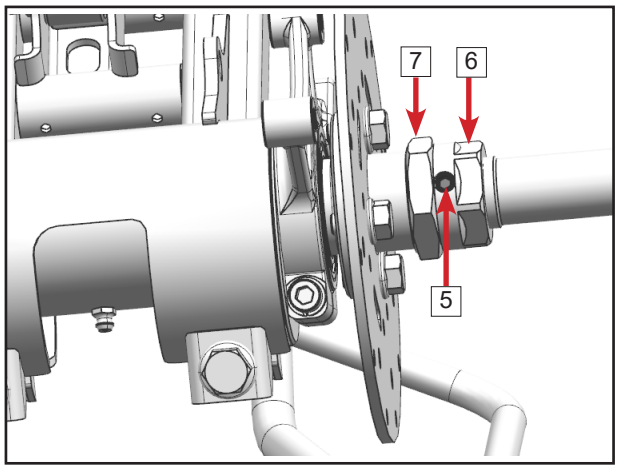
7.4.2 Rear swing arm
Removal
Remove bolt 1.
Release rear brake caliper 2.



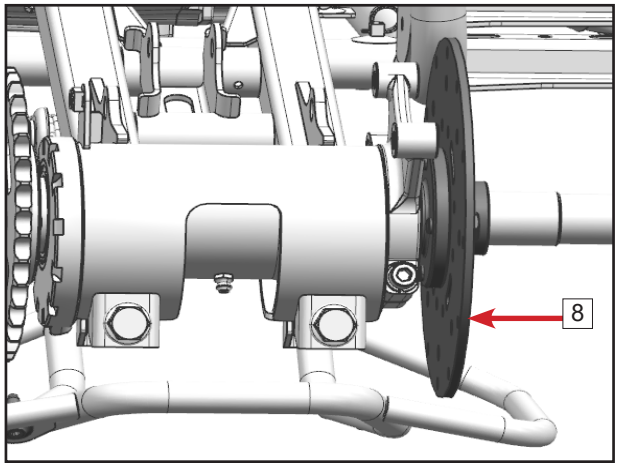
Remove rim bracket 3.
Remove washer 4.



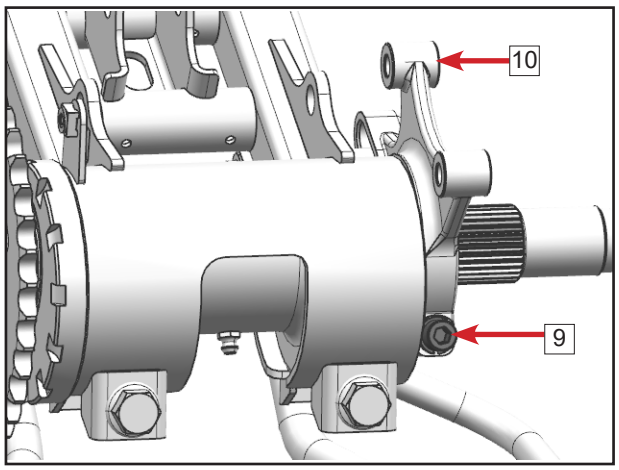
Remove inner hex screw 5.
Remove nut 6 and nut 7.



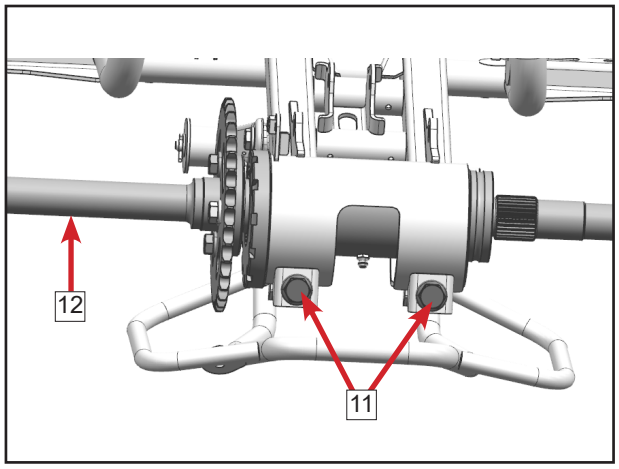
Remove brake disc assy 8.



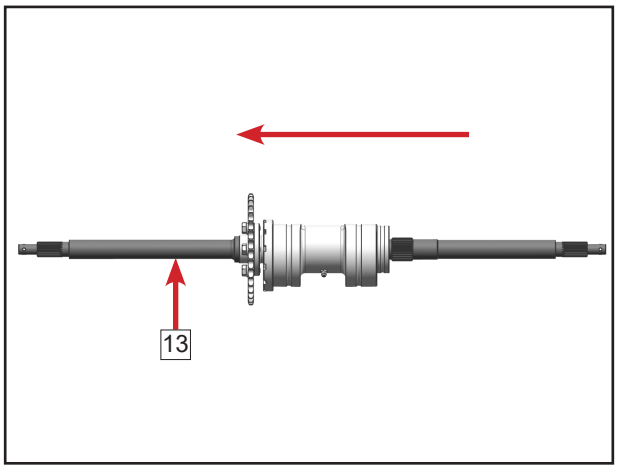
Remove bolt and washer 9.
Remove bracket 10.



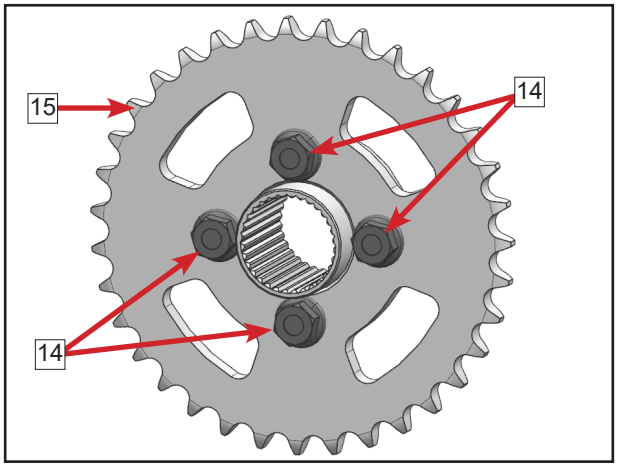
Remove bolt and nut 11.
Remove rear shaft assy 12.



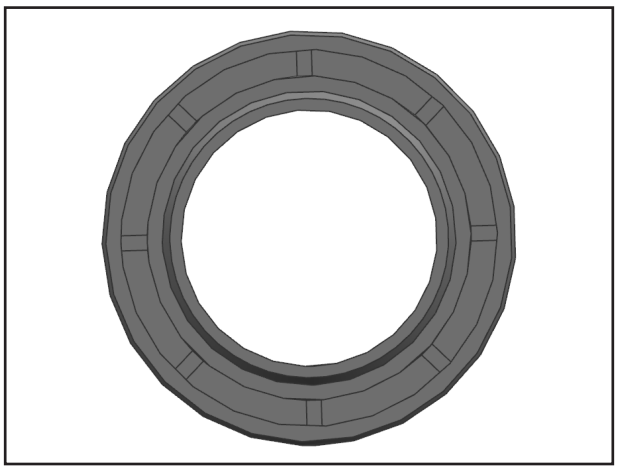
Remove rear shaft from vehicle LH side13.



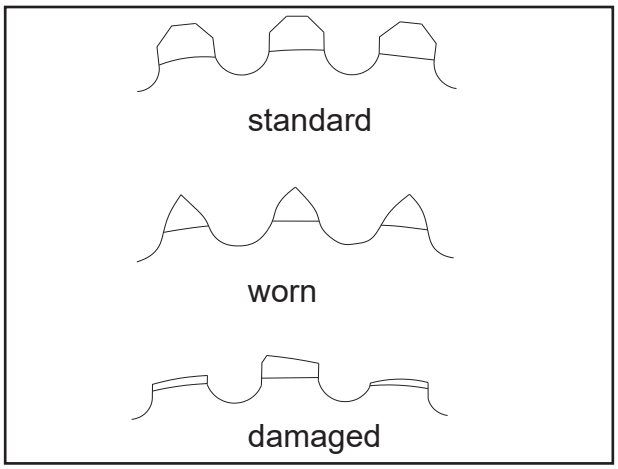
Remove bolt14.
Remove sprocket15.



Inspection
Check whether the oil seal is damaged. If yes, replace it with a new one.



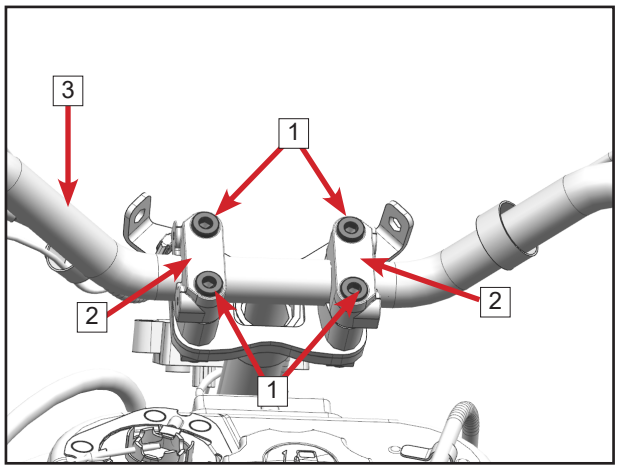
Check the degree of sprocket wear.
If the sprocket is damaged, replace it in time.



Pre-work
Remove plastics parts.（Refer to“Vehicle parts”）.

8.1 Handlebar

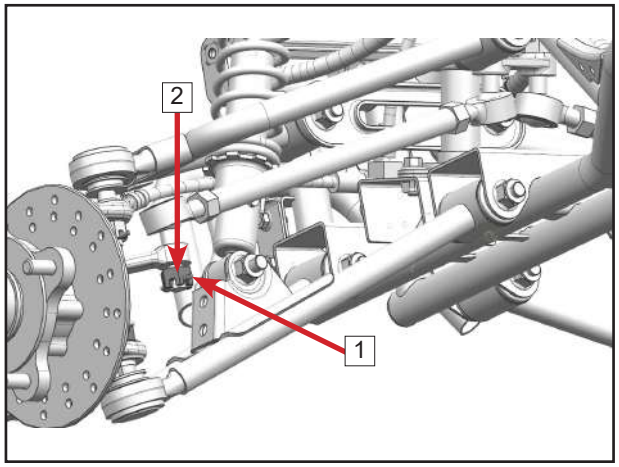
Removal
Remove screws 1.
Remove handlebar cover 2.
Remove handlebar 3.



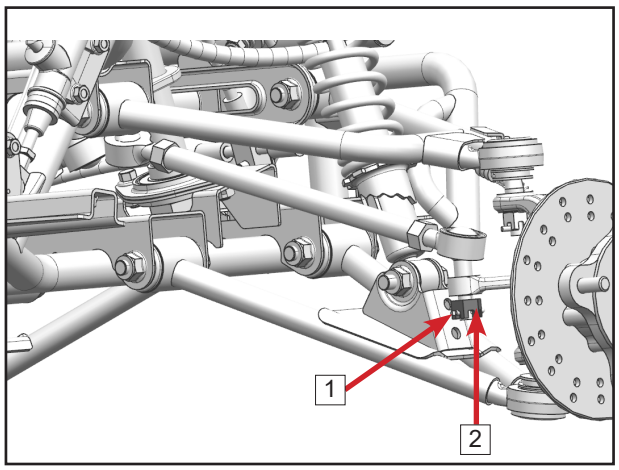
8.2 Steering system

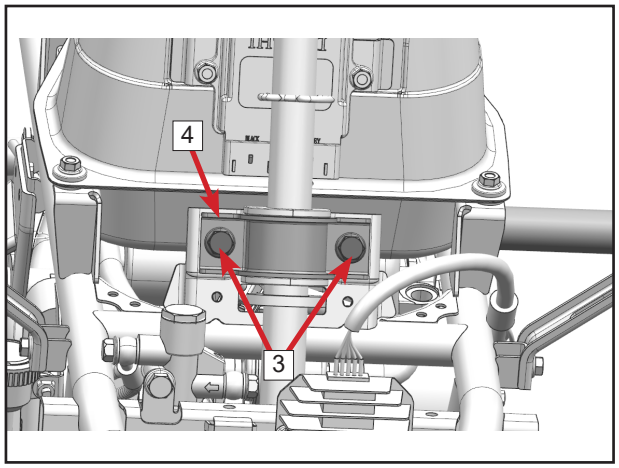
8.2.1 Steering assy

Removal
Remove pin 1.
Remove slotted nut 2.

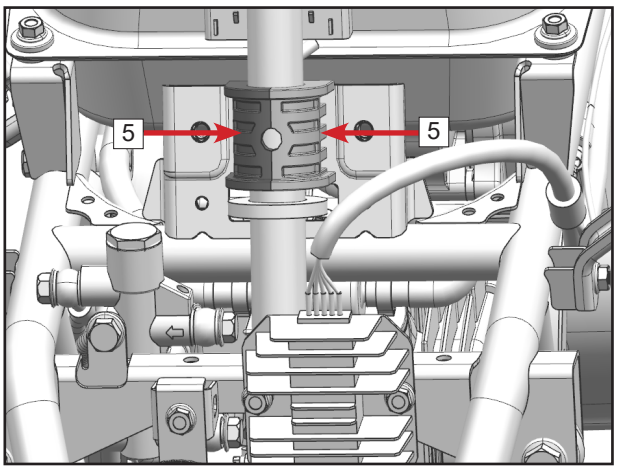


Remove bolt 3 and cover 4.

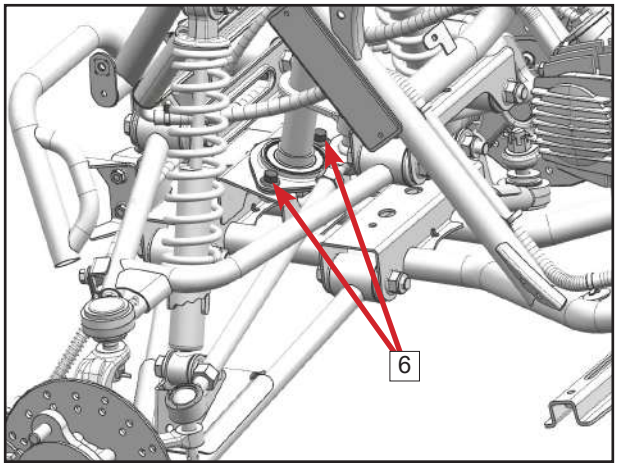




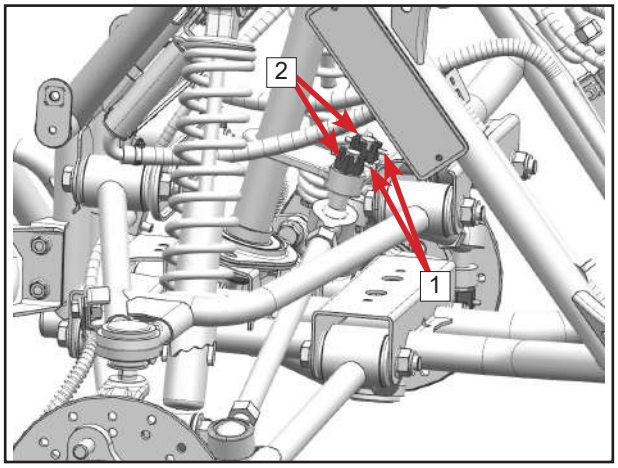
Remove rubber sleeve 5.



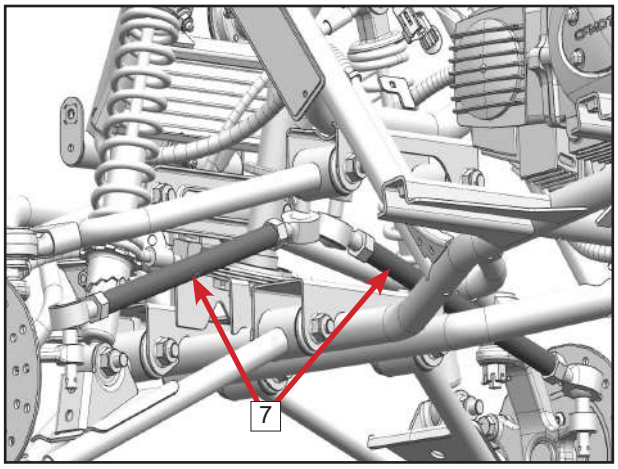
Remove bolt 6.



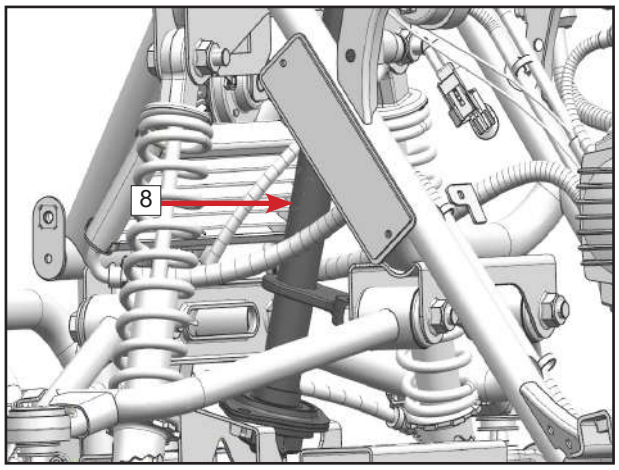
Remove pin 1.
Remove slotted nut 2.



Remove steering rod 7.



Remove steering shaft assy 8.



8.2.2 Inspection

Check whether the parts of the steering system are damaged. If so, replace them with new ones.

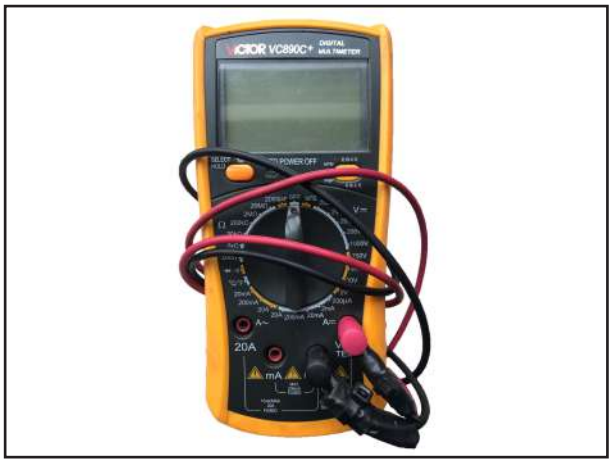
8.3 Installation

Reverse the removal procedures for installation.

9.1 Diagnosis Tools

Tool: OBD

Function:
Read/Clear EFI system fault codes, observe the data flow, test component actions, etc.



Tool: Digital multimeter

Function:
Measure voltage, current, resistance and other parameters in EFI system.

9.2 Signal and Illumination System

9.2.1 Battery

⚠WARNING

1. Avoid contact with battery acid and battery gas because they can cause serious corrosion.
2. Keep the battery out of reach of children.
3. Please rinse the skin with plenty of water after it touches the battery acid. If the battery acid enters the eyes, rinse with water for at least 15 minutes and go to a doctor.

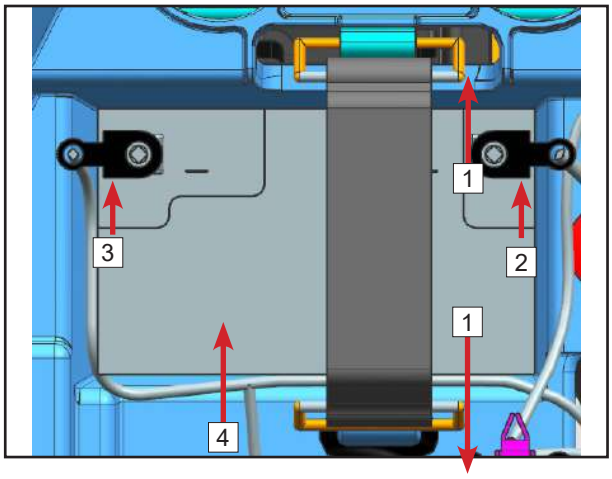
⚠WARNING

1. Please wear protective clothing and goggles, keep the battery away from sparks and open fires, and only charge it indoors with adequate ventilation.
2. When connecting the battery, the positive and negative poles of the battery must be connected in a right way. To avoid damaging the electronic components, remove the negative wire before removing the battery because this system uses negative pole ground connection.
3. It is not allowed to remove the battery cable when the engine is running.
4. Before the electric welding on the whole vehicle, the positive and negative cables of the battery and ECU must be removed.
5. It is forbidden to detect the input and output electrical signals of parts by piercing the conductor skin.
6. Establish the awareness of environmental protection, and effectively deal with the waste generated during maintenance.

Shut down all electrical devices and engine during removal.

Removal

Remove the battery band 1.
Remove the positive cable's fixed bolt of the battery and battery negative cable 2.
Remove the positive cable's fixed bolt of the battery and battery positive cable 3.
Take out the battery 4.



Battery Charging

CAUTION
1. Even if the battery is not used, it still loses power every day. **2. Charging condition and charging mode are very important for the service life of the battery. Using high charging current will have a negative impact on the service life.** **3. If the charging current, charging voltage and charging time are exceeded, the battery will be damaged.** **4. If the battery becomes empty due to repeated start of the vehicle, it needs to be charged immediately.** **5. When the battery is stored in the discharge condition for a long time, deep discharge and sulfation will occur, which will damage the battery.** **6. There's no need to maintain the battery, which means there's no need to check the acid level.**

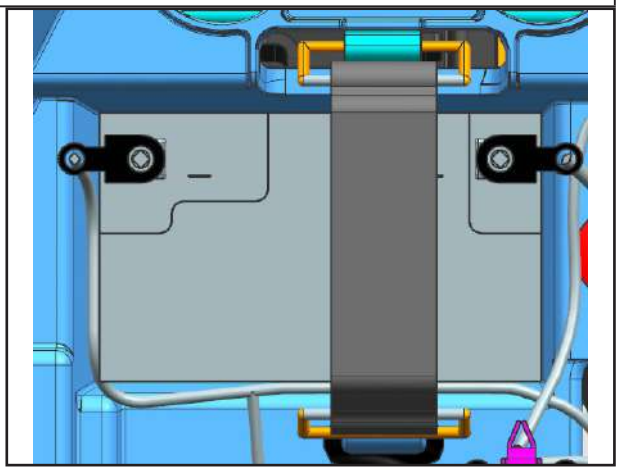
Charging

Shut down all electrical devices and engine.

Remove the seat and battery.

Connect charger to battery.

After charging, remove the charger from battery.



NOTE：If the vehicle is not used, recharge the battery every 3 months.

9.2.2 Charging voltage check

Preparatory work

The battery has proper performance and is fully charged.

Main work

Start the vehicle and measure the voltage.

One measuring point is positive(+), the other connects ground(-).

Charging voltage	
5,000rpm	13.5V~15.0V

If less than the specified value:

Check the connector between from engine and regulator.

Check the connector between regulator and cable.

Check the engine electronic windings.

If greater than the specified value:

Change regulator.

Installation

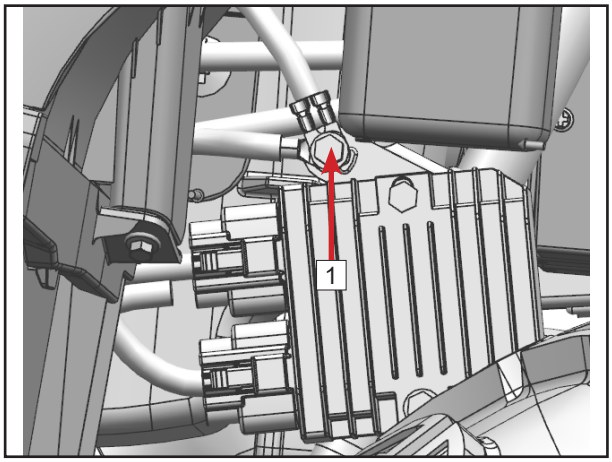
Reverse the removal procedures for installation.

9.3 Ground Wire Inspection

Shut down all electrical devices and engine.

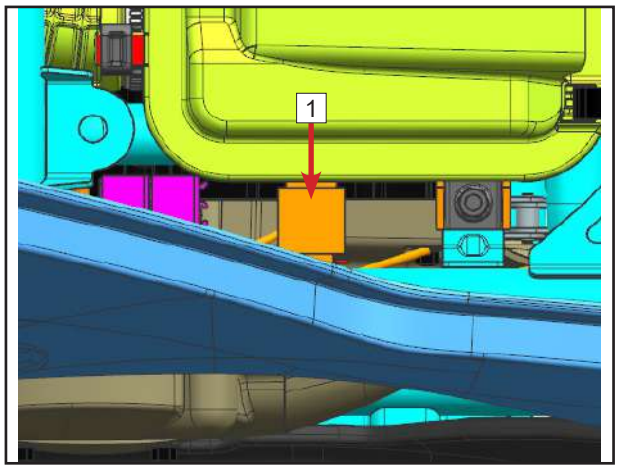
Check ground wire for normal function.

Check bolt for looseness 1.



9.4 Fuse Box

The fuse box 1 is between air filter and the LH front frame of the vehicle.



9.5 Light Maintenance Information

Precautions

CAUTION
1. Both headlight and taillight use LED. The light housings and light covers are sealed with sealant. Once opening them, poor water tightness may occur during subsequent reinstallation. **2. When repairing lights, vehicle power must be cut down, keys be removed, and light connector be disconnected. Pay attention to anti-static operation during maintenance.** **3. Possible reasons of lights dimming and dying: light housing turns yellow; power wire is disconnected; LED bulb current is too large; static electricity is too large.** **4. When LED bulb is confirmed to be damaged, contact the after-sales department for change in time.** **5. Check the battery performance when using the battery for inspection.**

Maintenance standards

Items		Standards
Fuse	Main	15A
	Auxiliary	15A
Light and bulb	LH and RH front position lights	LED
	Taillight assy	LED

Illumination and Signal Lights Inspection

Inspection

Turn ON ignition switch.
Shift illumination switch to lighting gear.
Inspect if illumination and signal lights are on or not:
1. ON: Normal；
2. OFF：
(1) Main cable open or shorted.
(2) Fuse burnt.
(3) Switch damaged.
(4) LED bulb damaged.

The vehicle is equipped with LED lights:

NOTE: LED light-emitting diodes are combined, so the bulb can't be changed separately. If it is damaged, only the whole headlight can be changed.

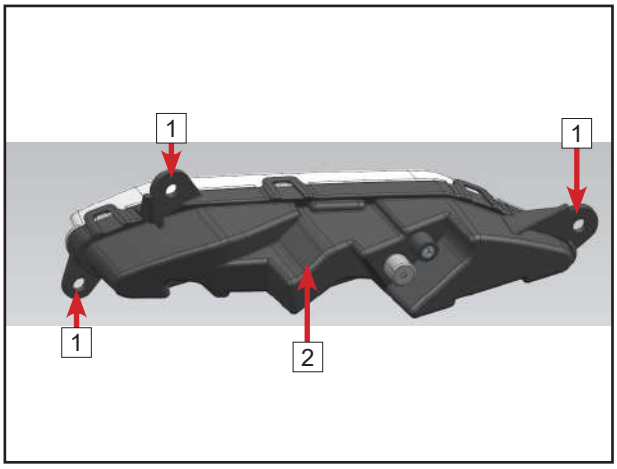
9.6 Light Removal and Installation

Headlight Assy

Refer to Chapter 06 when removing the headlight panel.
Remove self-tapping screws 1.
Remove headlight 2.

Installation

Reverse the removal procedures for installation.

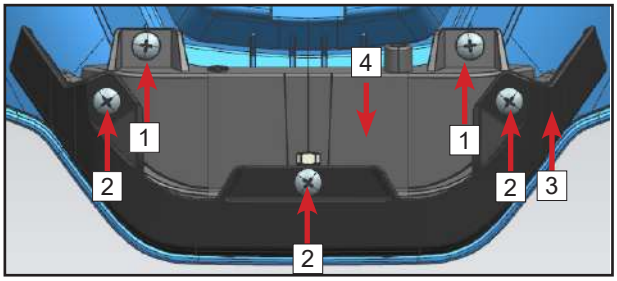


LH and RH headlights are completely symmetrical, and use the same removal and installation procedures.

Taillight

Removal

Taillight removed as follows:
Remove self-tapping screws 1.
Remove self-tapping screws 2.
Remove taillight deco cover 3.
Remove taillight 4.



Installation

Install the taillight 4 and deco cover 3 with self-tapping screws.
Fix it on the rear fender with self-tapping screws 1.

9.7 Horn

Inspection

Remove horn.

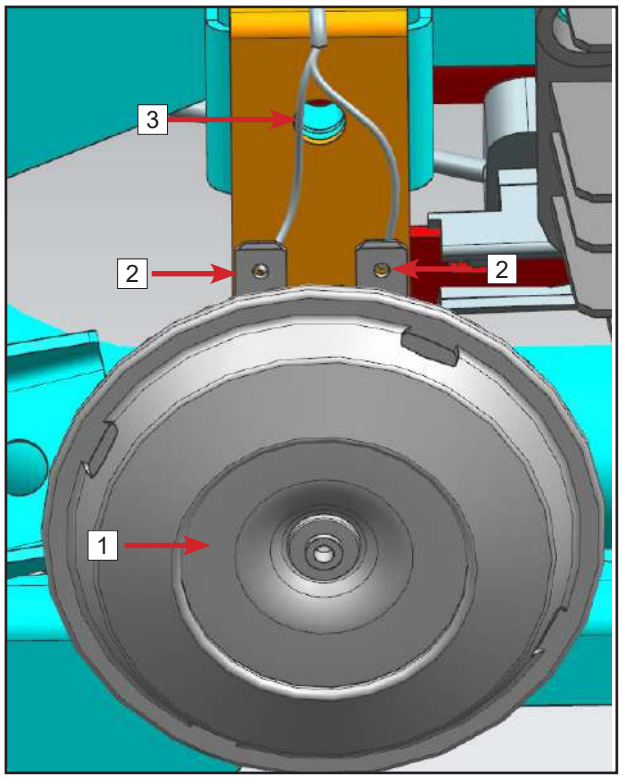
Connect horn with 12V battery to inspect horn for normal performance.

Change horn if any defect is found.

Later work

Install horn.

If the horn sound quality isn't good, turn the adjusting screw(connecting the horn body and the back bracket) to achieve the best sound quality.



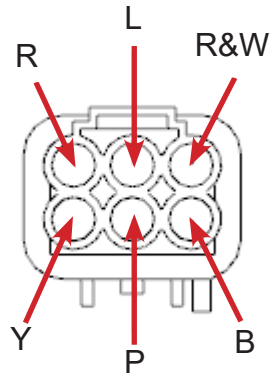
1	Horn	2	Wire connector	3	Bolt

9.8 Switches

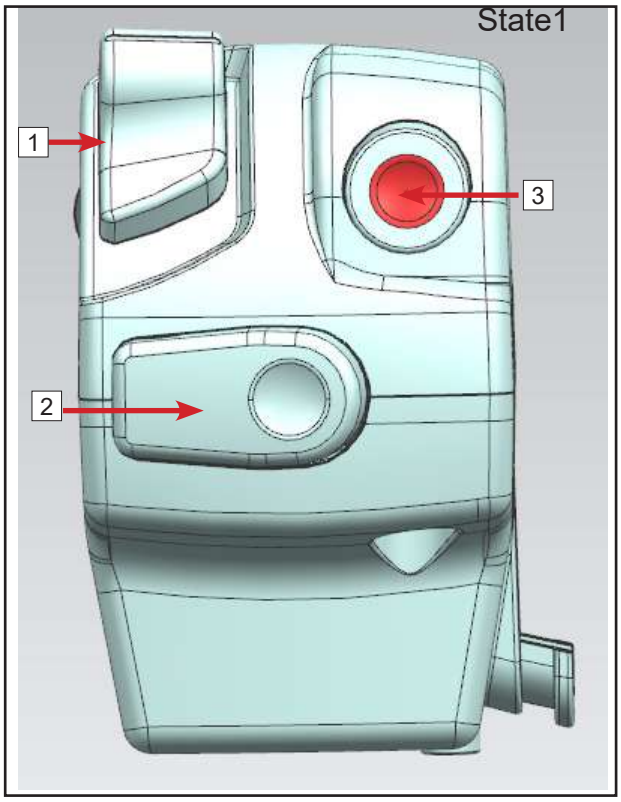
Unplug connectors between switches and main cable. Inspect switch performance.

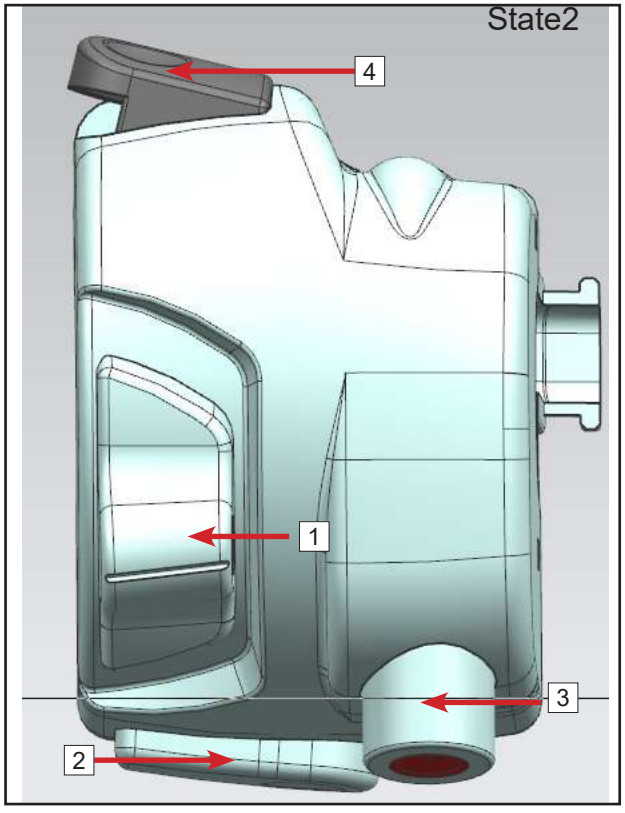
Illumination switch 1; Horn switch 2; Stop switch 3						
Color / Function	R	Y	P	R&W	B	L
1 OFF						
	●	●				
2 NC						
	●		●			
3				●	●	

Starter switch 4						
Color / Function	R	Y	P	R&W	B	L
NC						
	●					●

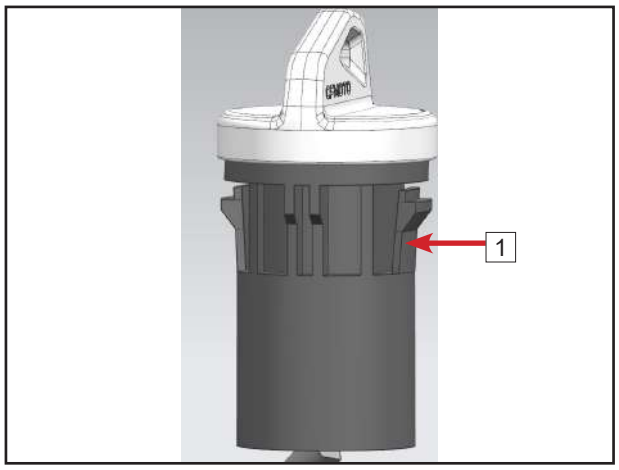


Take the incoming line segment as the view direction





Ignition Switch Assy



Removal

Refer to Chapter 06, disconnect connector and band.

Find the installation point of ignition switch on the right side of front fender.

Hold the lower LH and RH buckles with hands, press inward and push upward until buckles at both ends are out of the upper surface of front fender.

Then ignition switch components are removed 1.

Inspection

Follow the tables below to inspect ignition switch performance.

● - ● means the connection is normal.

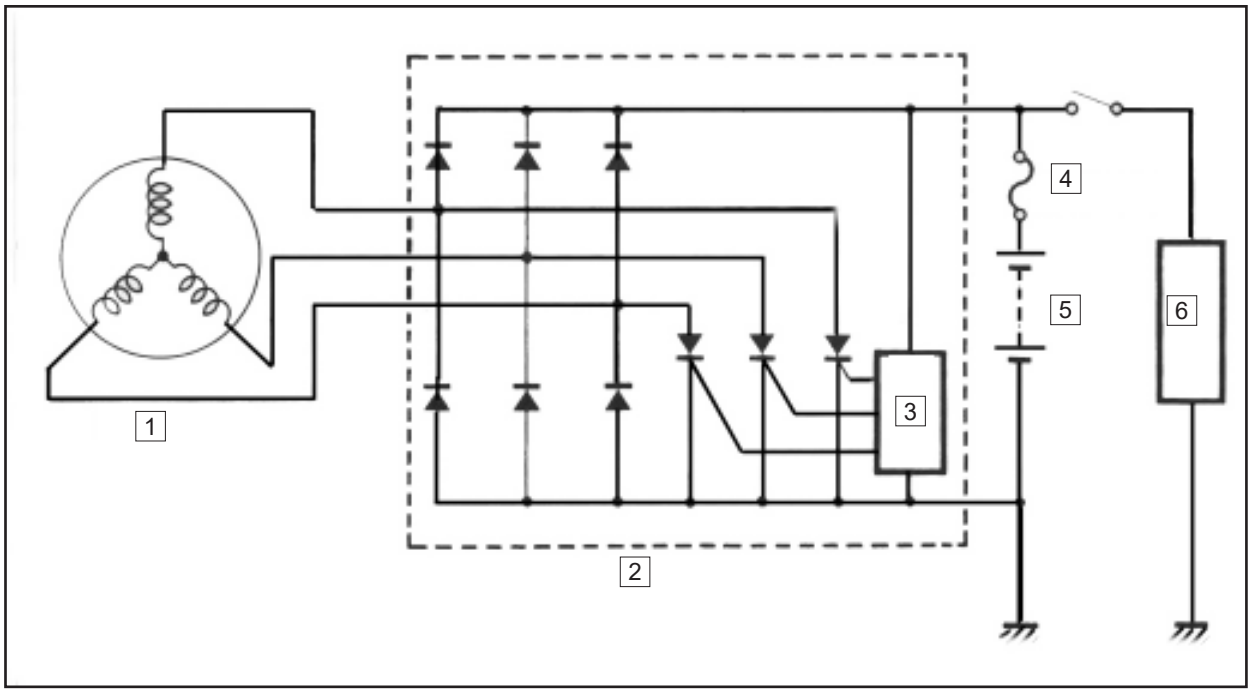
Color / Function	R	B/R	B	B/L
ON	●	●		
OFF			●	●

Installation

Find the corresponding slot and press it down until snap fits perfectly with the front fender 1.

9.9 Charging System

9.9.1 Charging System Wiring

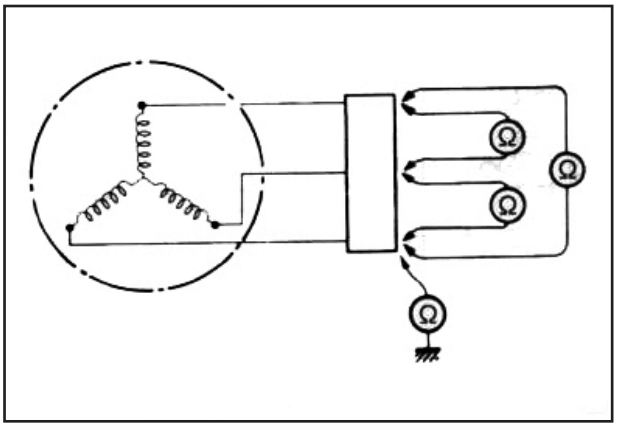


1	Magneto	3	Stable voltage	5	Battery
2	Regulator	4	Fuse	6	Load

Magneto Coil Resistance

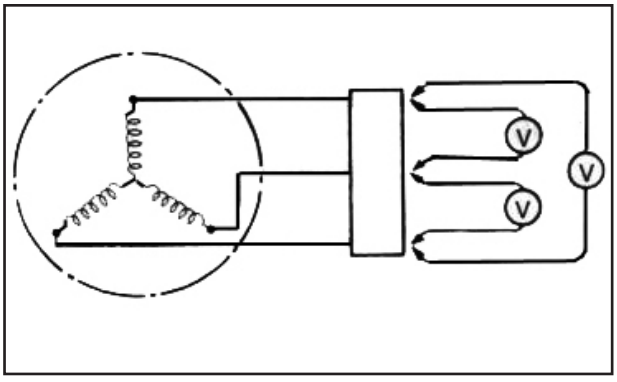
Measure resistance between 3-phase magneto stator coils.
If the resistance is out of specification, change the stator coil.
Check if the stator coil and stator center are insulated.

Turn multimeter to 1Ω×10Ω.
MAG Coil Resistance:
0.5Ω~1.5Ω (Yellow-Yellow)
Insulation resistance:
∞Ω (Yellow- Ground)



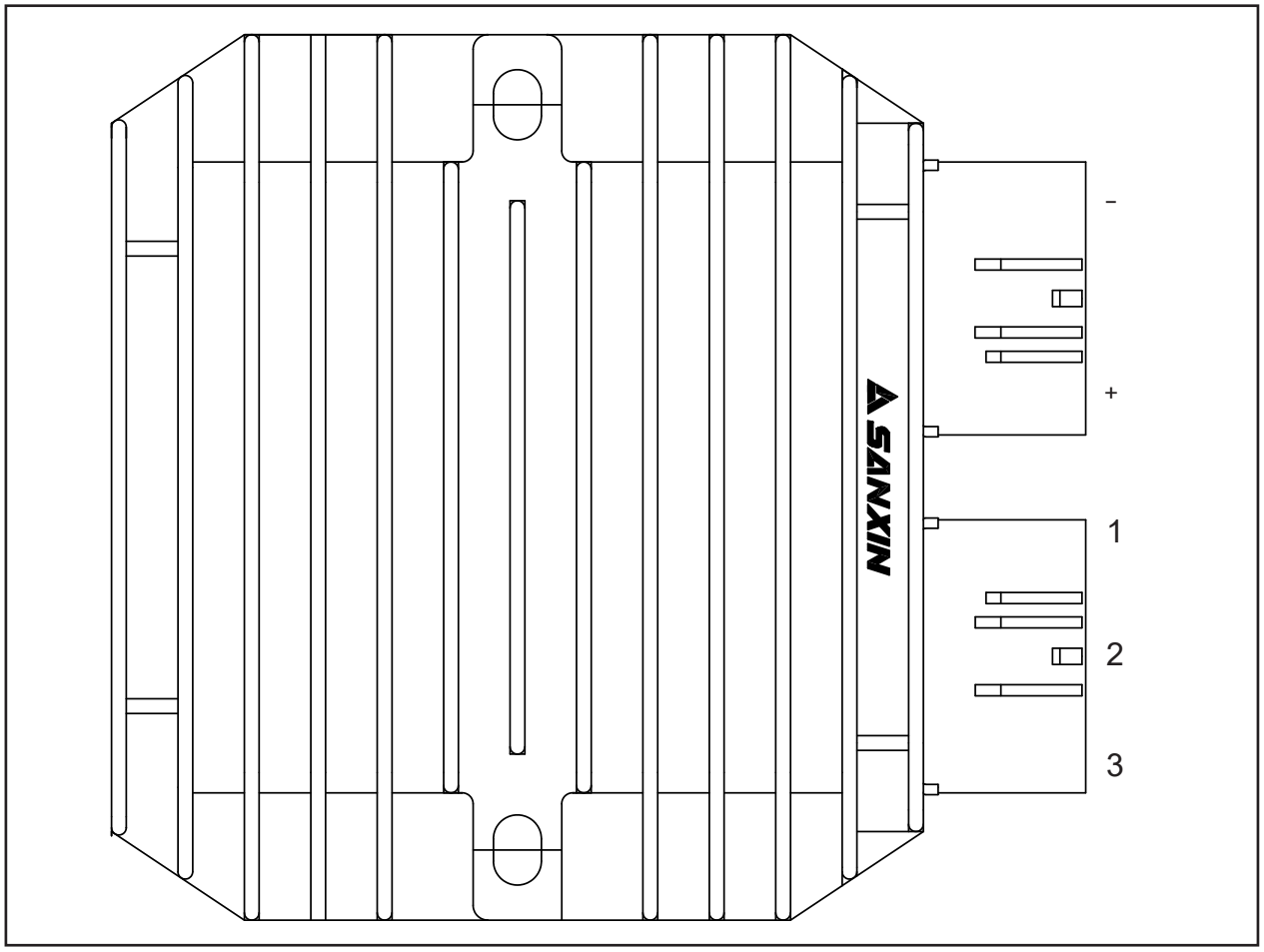
Resistance measurement

MAG Non-loaded Performance
Start the engine and keep it run at 5000r/min. Use a multimeter to measure the voltage between 3 output lines.
If the reading is below specification, replace with a new magneto.
Turn multimeter to **V(AC)**.
Voltage value between coils when magneto is non-loaded:
＞ 75V(**AC**) at 5000r/min



Voltage measurement

Regulator



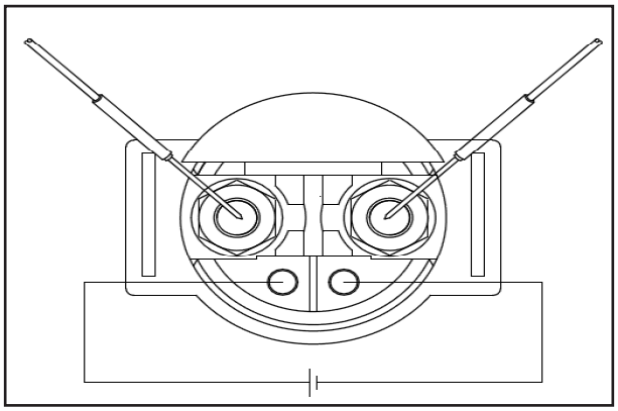
Use multimeter to measure resistance between connectors. Change the regulator if any data is beyond standard.

After the battery is fully charged and the engine works, if the voltage between positive and negative terminal is more than 15V or less than 12V, replace with a new regulator.

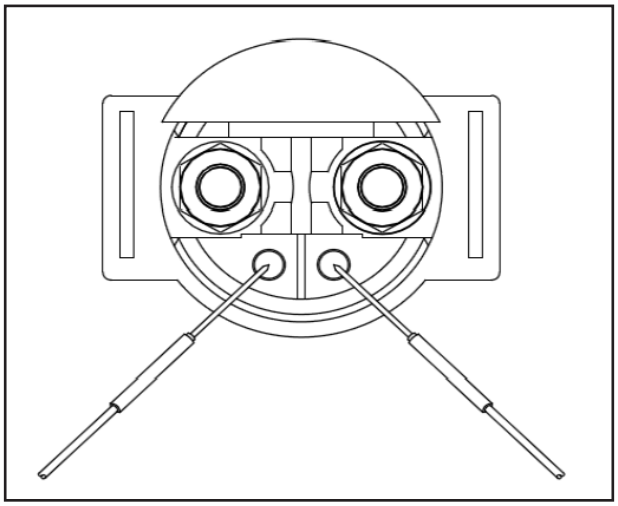
		(+)				
		1	2	3	(-)	(+)
(-)	1		∞	∞	100~800	∞
	2	∞		∞	100~800	∞
	3	∞	∞		100~800	∞
	(-)	∞	∞	∞		∞
	(+)	100~800	100~800	100~800	100~800	

9.9.2 Starter Relay

Put DC12V between positive and negative terminal. Use a multimeter to check connection between two contacts.
If multimeter clicks, there is connection.
If DC 12V is removed, no connection between two contacts.
If both two items above are proved, the relay is good.
Turn multimeter to DIODE.



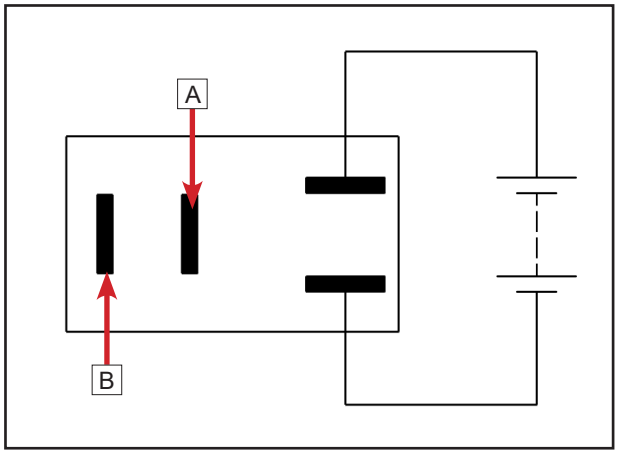
⚠Warning
The voltage loaded on starter relay can't exceed 2 minutes.(Continuous start for only 5 minutes. Only no load for two minutes. No extra load.) Otherwise, starter relay may overheat or burn.

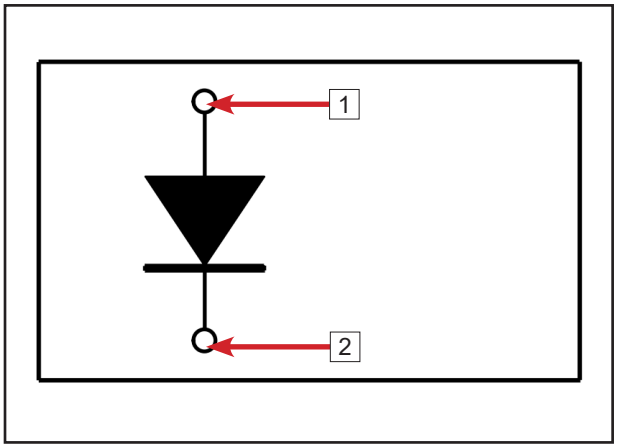


Use multimeter to measure the start relay coil resistance.
If the resistance is out of standard, replace with a new one.
Turn multimeter to 1×10Ω.
Excitation coil resistance: (3~5)Ω

9.9.3 Main Relay, Fuel Pump Relay

Put 12V between positive and negative terminal of starter relay coil.
Use multimeter to check the continuity between A and B.
Turn multimeter to DIODE.
If multimeter clicks, it indicates there is connection between A and B.
If 12V is removed, no connection remains between contacts.
If both two items above are proved, the relay is good.
Turn multimeter to 1×100Ω to measure the relay resistance.
Auxiliary relay coil resistance: (90~100) Ω





1	Ground	2	Battery positive pole

9.9.4 Engine Starting Note

Connect the circuit according to the starting circuit diagram.

Before starting engine, check if all parts are installed correctly. EFI parts connection refers to EFI section.

Check air intake system.

Check fuel system to ensure there is no block or leaks. Clean if blocked to make sure fuel tail is OK. In case of leakage, reconnect the leaking area to make sure there is no leaking.

Measure fuel pressure with fuel pressure gauge.

Pressure in fuel pump outlet: (300±10) kPa；

Shift gear in Neutral.

Check EFI with PDA for fault. Eliminate the trouble according to DTC(Diagnostic Trouble Code.

Turn on ignition switch and press start switch for 3-5s.

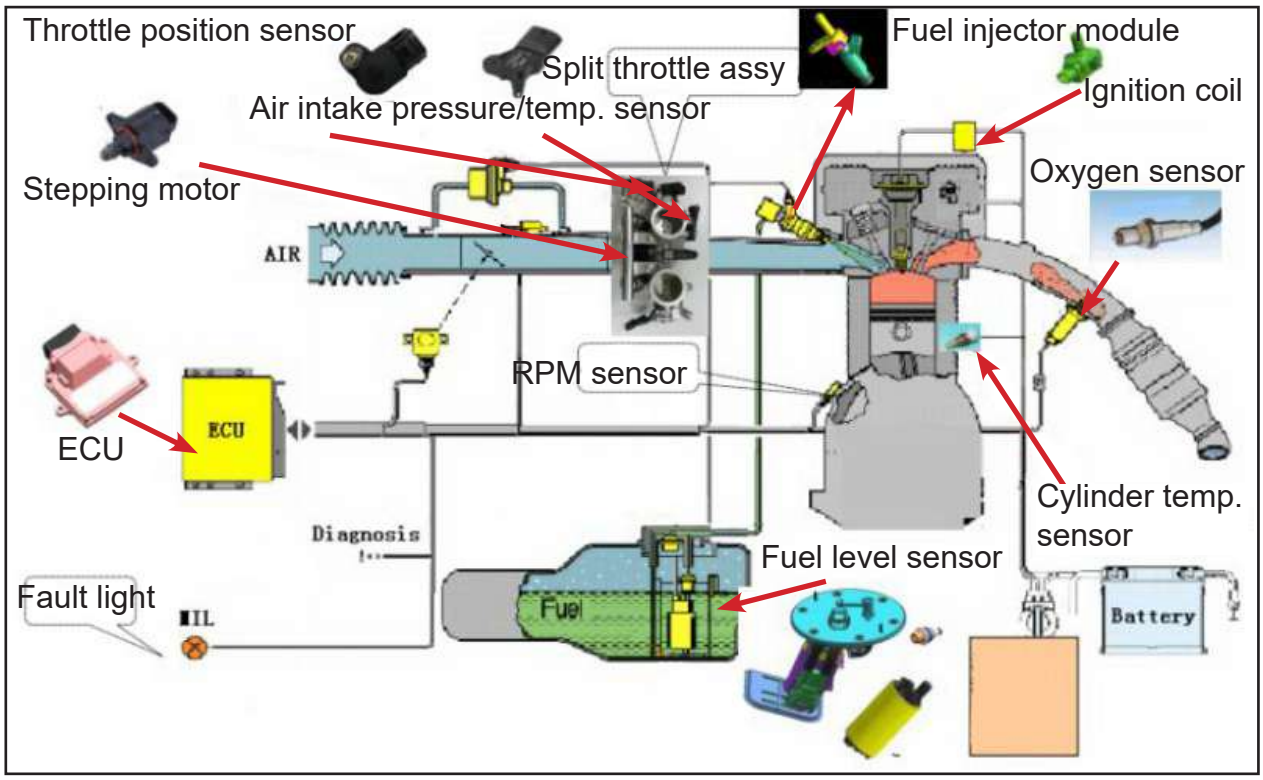
After engine starts, warm up until idle speed is stable, and check it.

Idle speed：(1500±150)r/min;

Fuel pressure gauge

9.10 EFI System

9.10.1 EFI Structure



9.10.2 Sensors

Sensors convert various non-electrical physical quantities into electrical quantities which are sent to ECU. They collect information for ECU. Sensors in EFI system include:

Three in one sensor(Including air intake pressure sensor, air intake temperature sensor, throttle position sensor)

Air intake pressure sensor(Load information)

Air intake temp. sensor(Air density information)

Throttle position sensor(Load, load range, speed information)

Cylinder temp. sensor(Engine temp. information)

Gear sensor(Gear information)

Oxygen sensor(Air factor=λ ＞ 1 or ＜ 1)

9.10.3 ECU

ECU, the brain of EFI system, analyzes and processes all kinds of information provided by sensors, and sends conclusions to actuators in the form of instructions, which enables engine run in the best state.

9.10.4 Actuators

Actuators execute ECU instructions. They are the performers of ECU. Main actuators include：

Fuel pump assy(Providing high-pressure fuel)

Fuel injector(Injecting fuel quantitatively to make it spray better)

Ignition coil(Providing high ignition energy for spark plug)

Throttle(Providing engine with air intake)

9.10.5 EFI System Maintenance Notice

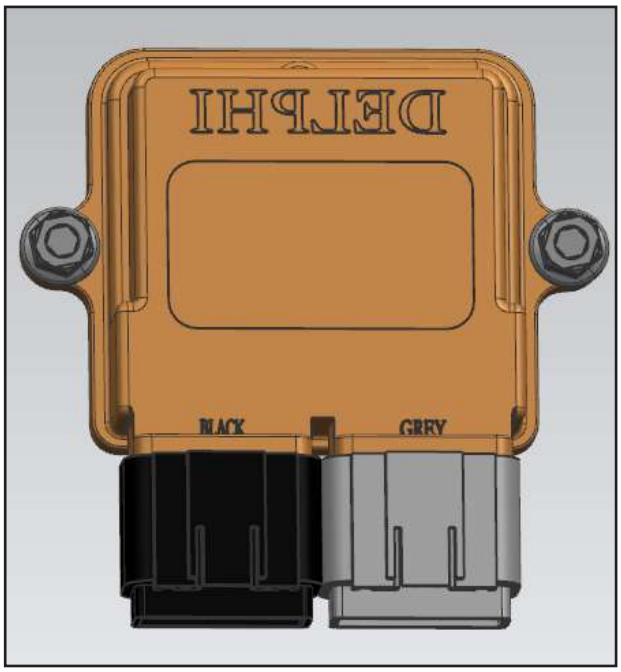
Always use genuine CFMOTO parts for maintenance, or a normal performance of EFI system cannot be guaranteed.
During the maintenance, never try to break down EFI parts.
During the maintenance, EFI parts must be handled carefully.
Before disconnecting or connecting the connector, be sure to shut off ignition switch, or EFI parts can be damaged.
When removing fuel pump from fuel tank, do not energize fuel pump. Otherwise, a spark can cause a fire.
Fuel pump is not allowed to operate in a dry environment or under water. Otherwise, its life will be shortened. Besides, reverse connections between positive and negative terminals of fuel pump is not permitted.
The fuel pressure in EFI fuel supply system is very high(about 300kPa), accordingly, all fuel lines are high pressure resisting. Even if the engine is not running, the fuel pressure remains high. Therefore, do not disassemble the fuel line unless it's necessary.
If possible, don't do spark test. If it must be done, try to complete the test as short as possible. Besides, don't open throttle, otherwise, large amounts of unburned fuel would enter exhaust pipe and damage the three-way catalytic converter.

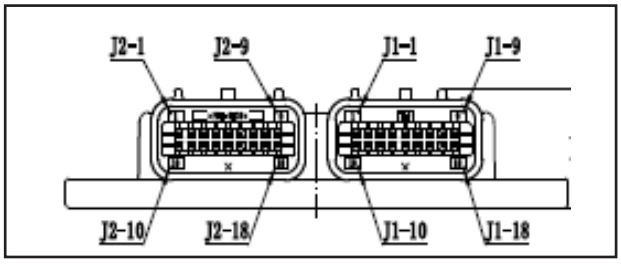
When the fuel system needs to be repaired, release the fuel pressure as follows:
Remove fuel pump relay, start the engine and make it idle until it stops by itself.
Fuel line removal and fuel filter replacement should be carried out by a professional person in a well-ventilated place.
Don't reverse the battery cable connections. This may damage electronic components. This system uses negative grounding.
Never remove the battery cables when the engine is running.
Always remove cables and ECU before welding the vehicle.
Never test the input and output electrical signals of components by piercing the cable plastic jacket.
Respect the environment and dispose of the waste left during maintenance.

9.11 Structure and Performance of EFI Parts

9.11.1 ECU

ECU(Electronic Control Unit) is the brain of EFI system. It analyzes and processes information provided by sensors, and sends the conclusions to the actuators in the form of instructions, so as to make the engine run in the optimal condition.





ECU pin functions:

Pin	Function	Pin	Function
J1-1	Idle control valve A(High)	J2-1	Ignition coil drive
J1-2	Canister magnetic valve	J2-2	Power (system) ground
J1-3	Fault light	J2-3	Programming port
J1-4	SRX	J2-4	Gear 23 signal(High)
J1-5	Linear oxygen sensor	J2-5	Injector
J1-6	Tachometer	J2-6	STX
J1-7	CAN(Low)	J2-7	Oxygen sensor heating
J1-8	CAN(High)	J2-8	Air intake temp. signal
J1-9	Power (system) ground	J2-9	Fuel pump control signal
J1-10	Null	J2-10	5V reference voltage ground (Signal ground)
J1-11	Idle control valve A(Low)	J2-11	Air intake pressure signal
J1-12	Idle control valve B(High)	J2-12	Throttle position signal
J1-13	Idle control valve B(Low)	J2-13	Gear 23 signal(Low)
J1-14	Roll-over switch	J2-14	Cylinder head temp. signal
J1-15	Speed sensor	J2-15	Ignition power
J1-16	Side stand switch	J2-16	5V reference voltage
J1-17	Null	J2-17	Oxygen sensor signal
J1-18	Speed limit switch	J2-18	Battery power

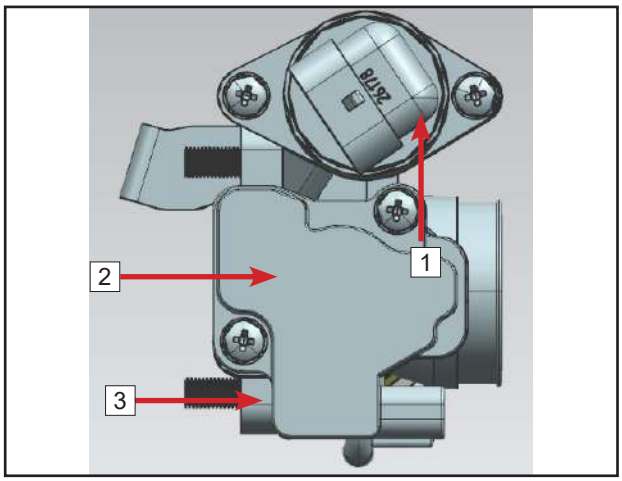
Limit data:

Item		Value			Unit
		Min.	Standard	Max.	
Battery voltage	Normal operation	9.0	14.0±0.1	16	V
Limit and time of battery over voltage	26.0V	Keep part of functions, can diagnose the fault		5	min
Working temp.		-20		85	°C
Storage temp.		-40		105	°C

⚠NOTE:
Never load on housing or cover. Handle with care. Never drop on the ground. Prevent water from entering connectors.

9.11.2 Throttle Body Assy

Connect air filter with engine; control the on-off angle of throttle by motor; send out the angle signal through throttle position sensor to ECU; combine the air intake pressure/temperature sensor and idle stepping motor to form throttle body assy.



1	Idle stepping motor	3	Throttle body assy
2	Three-in-one sensor		

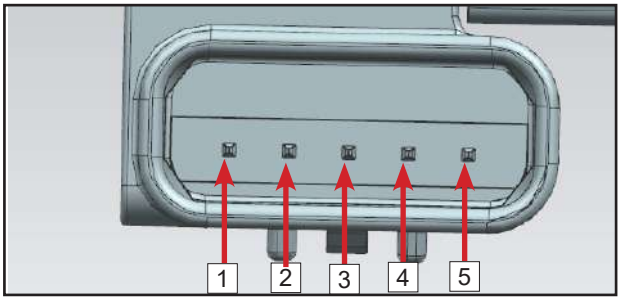
Three-in-one(Including throttle position sensor and air intake pressure/temp. sensor)

Throttle position sensor: Detecting the on-off angle of throttle and providing angle signal for ECU.

Air intake pressure sensor: Monitoring the intake pipe pressure and providing ECU with engine load information.

Air intake temp. sensor: This sensor is an NTC thermistor resistance. The resistance decreases with the increase of coolant temperature, but not in linear relationship.

Air intake temp. sensor and pressure sensor are sealed together.



1	Signal GND	4	Air intake pressure signal
2	Throttle position signal	5	Air intake temp. signal
3	5V power		

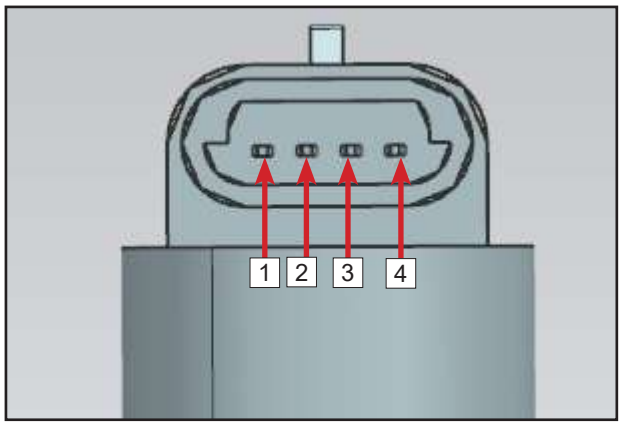
Pin function:

1. Ground
2. Throttle position signal output
3. 5V power
4. Air intake pressure signal
5. Air intake temp. signal

Circuit connecting with ECU.

Idle Stepping Motor

Control the bypass air flow. The stepping motor is controlled by ECU according to engine load through electric pulse duration and frequency (i.e. duty ratio). The air flow changes with pressure difference, so it should be connected correctly, otherwise, it may cause wrong idle speed. When there is no electric pulse, idle valve is closed.



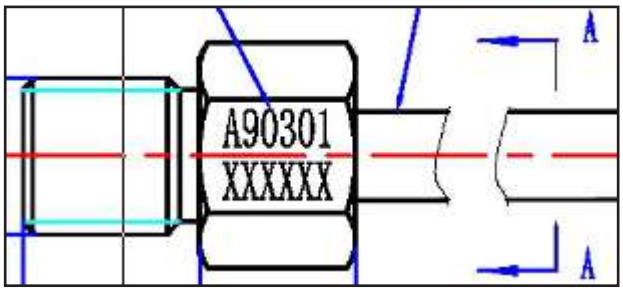
Pin function:

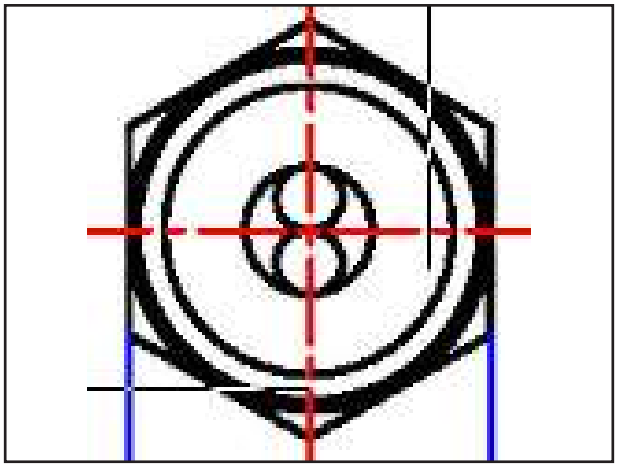
1.Idle control valve B(Low)
2.Idle control valve B(High)
3.Idle control valve A(Low)
4.Idle control valve A(High)

Circuit connecting with ECU.

9.11.3 Cylinder Temp. Sensor

This sensor is an NTC thermistor resistance. The resistance decreases with the increase of coolant temperature, but not in linear relationship. Cylinder head temp. signal is sent to ECU.

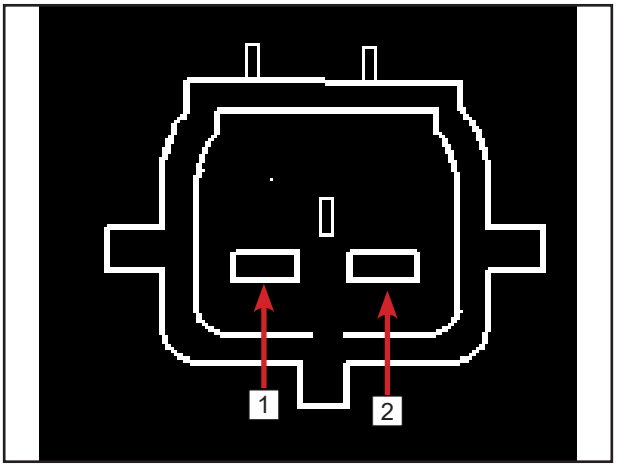




Pin function:

1.Cylinder head temp. signal output

2.5V ground



Use multimeter to measure resistance between two pins:

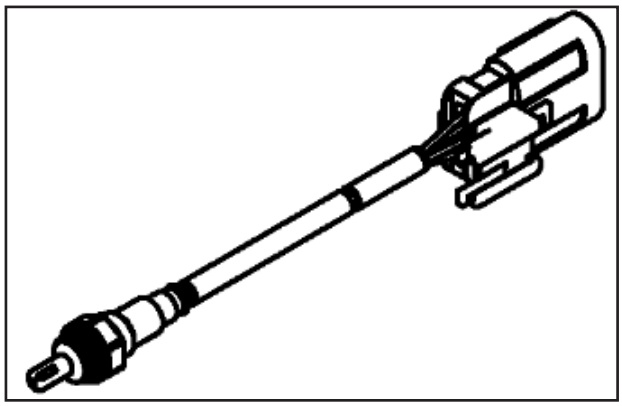
Resistance			
Temp.(°C)	Min.(Ω)	Standard(Ω)	Max.(Ω)
25	9000	10000	11000
110	487	506	526

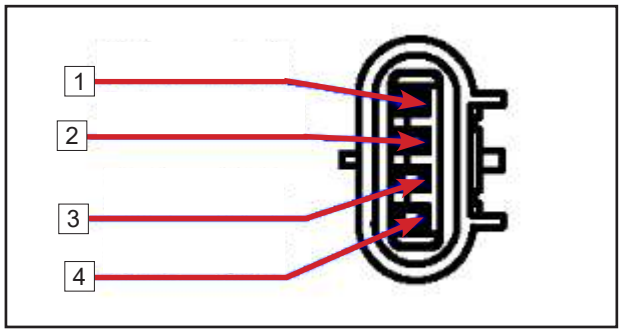
If the resistance is beyond standard, the sensor is damaged. Replace with a new one.

9.11.4 Oxygen Sensor

This sensor is used in closed-loop feedback controlled fuel injection to remove the air-to-fuel ratio accuracy and control the emission.

It's located in the exhaust stream to measure the amount of oxygen in exhaust and send the signal to ECU, which can revise the fuel injector output, so as to reduce the amounts of unburnt fuel and make catalytic converter convert HC, CO and NO_X efficiently.





Pin function:

1. to heated power+
2. to heated power -
3. Induction signal output
4. Induction signal ground

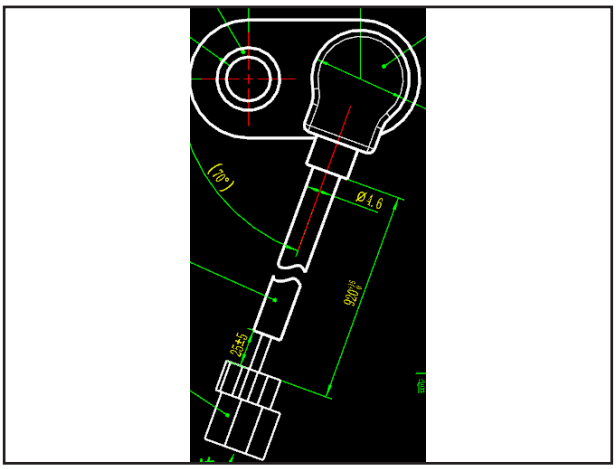
1	V: +heating	3	GR: signal
2	W: -heating	4	B: ground

Oxygen sensor characteristic table

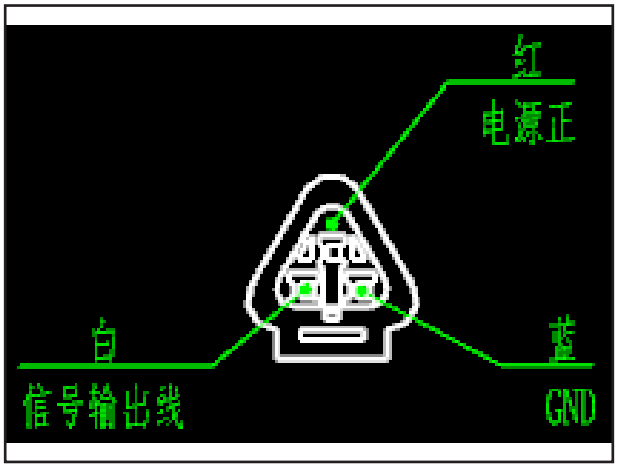
Parameters	
Exhaust air temp.(°C)	450
Sensor voltage (mV) at λ=0.97(CO=1%)	≥720
Sensor voltage (mV) at λ=1.10	≤120
Sensor inner resistance (kΩ)	≤0.5
Response time (ms) (600mV to 300mV)	≤120
Response time (ms) (300mV to 600mV)	≤80
Heating current (A) U=13.5V	0.30±0.2

9.11.5 Trigger (RPM Sensor)

The trigger transfers RPM signal to ECU, according to which ECU confirms ignition angle and injecting phase, etc.



Trigger circuit.



Trigger

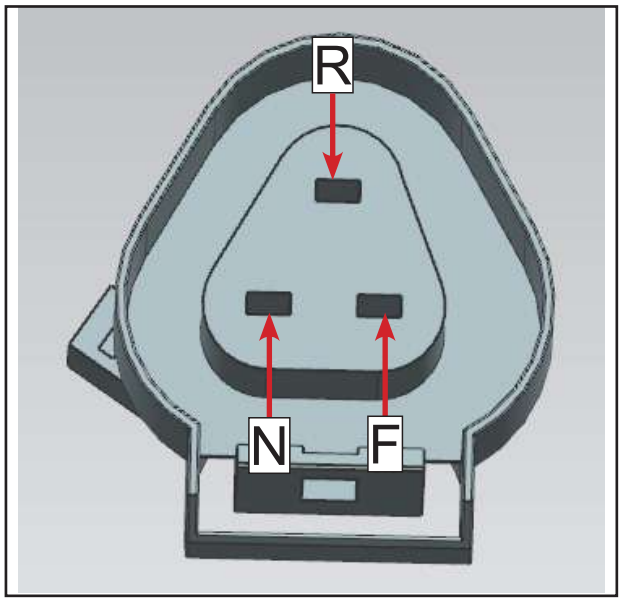
9.11.6 Gear Sensor

This sensor is used to provide the gear position signal for meter display and works as startup protection together with cables.

Pin function:

F(Forward gear)
R(Reverse gear)
N(Neutral gear)

When each pin is at certain gear position, there is connection between this pin and engine. Otherwise, no connection exists.



Gear sensor connectors

WARNING:
The vehicle is allowed to be started only when in neutral gear, with neutral gear grounding and starter relay negative grounding at the same time.

9.11.7 Fuel Pump

This fuel pump assembly includes fuel pump, plastic support, primary filter, fine filter and pressure regulator. It supplies fuel for engine under a certain pressure and flow.

Pin function:

1. Fuel pump -
2. Fuel pump +

Parameters:

Fuel pump pressure: 0.30MPa±0.01MPa, flow=25L/h.

Fuel pump pressure: 0.25MPa±0.01MPa, flow≥25L/h.

This fuel pump is located in fuel tank.

Don't operate the fuel pump in dry condition to prevent damage.

Always handle fuel pump with care. Never drop it.

The battery supplies power to the fuel pump through fuel pump relay. The relay circuit is connected only when vehicle starts and engine is running.

Fuel Pressure Measurement:

Connect the fuel pressure gauge with fuel outlet and tighten the joint with a clamp to prevent fuel leaks.

Route according to the circuit.

Turn ON both ignition switch and stop switch.

At this time, fuel pump will operate for 5 seconds. After fuel pump stops running, fuel pressure should reach standard value. Otherwise, change the fuel pump assy.

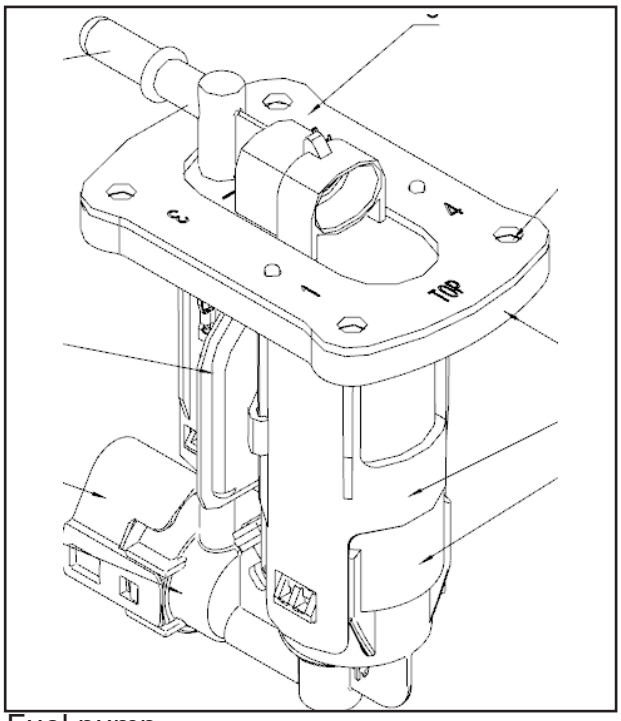
After engine stops, fuel pressure should be kept at 0.2MPa for more than 5 minutes. Otherwise, change the fuel pump assy.

Pressure Relief in Fuel System:

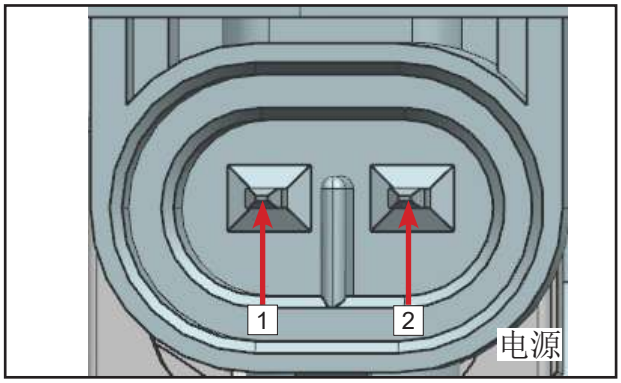
Fuel pressure in EFI fuel supply system is very high, accordingly, all fuel lines are high pressure resisting. Even if the engine is not running, fuel pressure remains high. Therefore, do not remove the fuel line unless it's necessary.

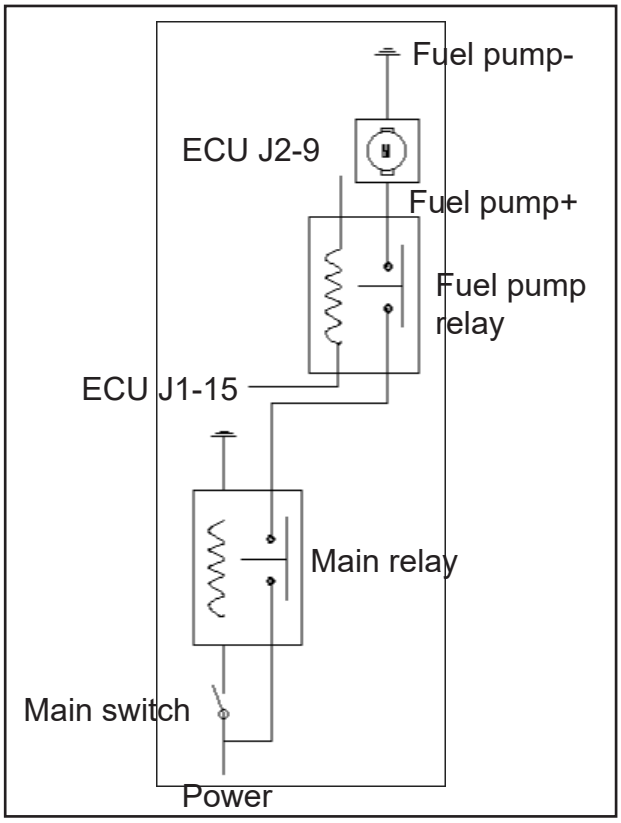
Follow the procedure below to perform pressure relief:

Remove fuel pump relay. Start the engine and make it idle until it stops by itself.



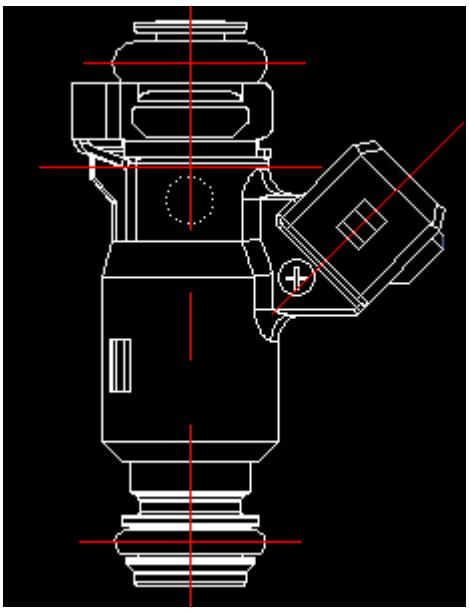
Fuel pump





9.11.8 Fuel Injector

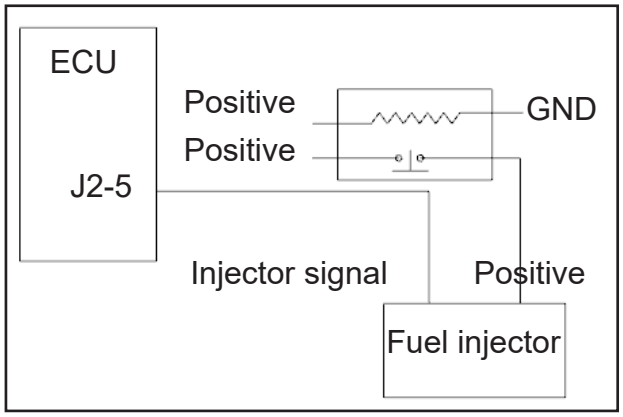
One end of fuel injector is installed on fuel injector seat, and the other attaches to the injector cap. Controlled by ECU, fuel injector injects fuel into the engine in the given time and make it spray.
The fuel injector adopts double hole injection. Don't turn injector after the join is installed.



Pin function:
"+"(Connector side): to main relay output terminal.
Fuel injector unmarked: to ECU J2-5.

Fuel injector resistance: 12Ω ± 0.6Ω (20°C ± 2°C)

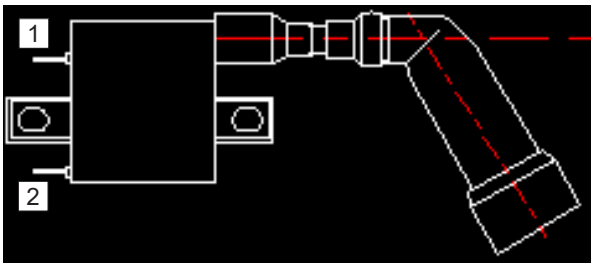
Circuit connecting with ECU.



Fuel injector installation:
Install fuel injector manually. Never knock fuel injector with a hammer.
Replace o-rings during fuel injector removal and installation.
Perform pressure relief before fuel injector removal if necessary.
Inspect the fuel injector for sealing after installation to ensure there is no leak.

9.11.9 Ignition Coil

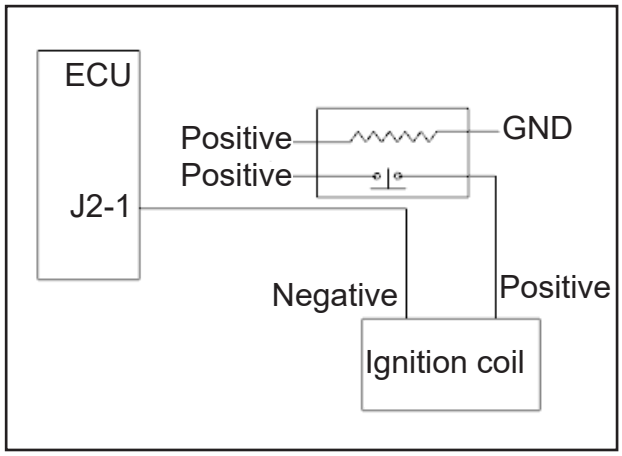
Ignition coil transforms the low voltage of primary coil to high voltage of secondary coil by sparking from spark plug and igniting the mixture of air and fuel in cylinder.



Pin function:

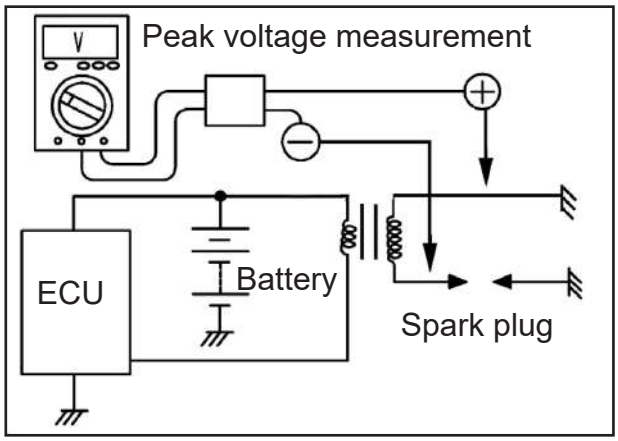
1 to power +12V;
2 to ECU control signal J2-1;

Circuit connecting with ECU.



Secondary Ignition Voltage Measurement:

Connect with engine according to EFI wiring diagram.
Connect the peak voltage tester according to the right diagram.
Start the engine.
Secondary ignition voltage should be >15000V.



Ignition coil parameter table:

Item		Value			Unit
		Min.	Standard	Max.	
Stated voltage			12		V
Running voltage		8		16	V
Resistance(20℃~25℃)	Primary	0.54	0.60	0.66	Ω
	Secondary	7.11	7.9	8.69	kΩ

9.12 EFI Self-diagnosis

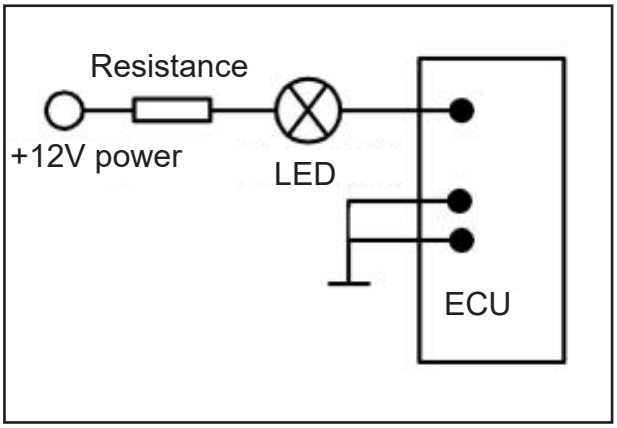
ECU constantly monitor sensors, actuators and circuits, MIL and battery voltage, etc., even ECU itself and inspect the sensor output signal, actuator drive signal and internal signal(such as λ close loop control, coolant temp., idle speed control and battery voltage control, etc.) for reliability. If any process or signal is suspect, ECU records the fault code in the RAM memory. Fault information is recorded in the form of fault code, and in the sequence of which fault comes first. Fault type can be divided into "current fault" and "history fault". When servicing, using PDA and MIL, the defective parts can be promptly found to improve the service efficiency and quality.

EFI fault diagnosis mainly uses PDA and MIL.

9.12.1 Malfunction Indicating Lamp(MIL)

MIL is fixed on the dashboard. It uses LED. When the light is on, there is fault.

Circuit connecting with ECU.

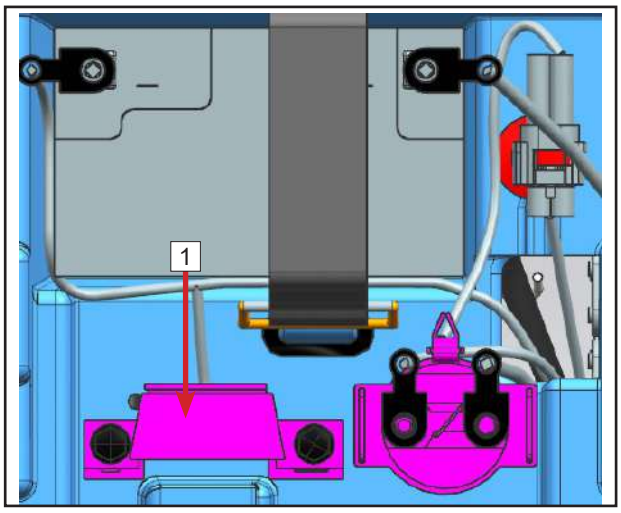


MIL indications:
When ECU reports the fault code or the engine is not started, MIL is on.
When the engine starts and there is no fault, MIL goes off.
After ECU is formatted, MIL flashes.

9.12.2 Diagnosis Tool and Connector

OBD diagnosis connector 1 is located under front service cover.

There are 16 pins on diagnosis tool, which are connected to OBD diagnosis connector.



Refer to PDA manual for detailed operations and functions.

Basic operations:

1. Prepare an Android mobile phone with normal functions. Use the browser code scanning or WeChat code scanning to scan the QR code 1 on PDA.
2. Download Android package, and install the app as the right picture shows. (Before moving to the next step, make sure PDA is connected to OBD diagnosis connector, the vehicle is charged, and the green light under QR code is on.)
3. Open the app, click Bluetooth icon on the upper left corner, find "FAI_bluetooth" and connect.
4. Return to the main page to check related information.

PDA function:

Information display

Engine information, current/past fault information.

Fault display

Air intake pressure sensor fault, air intake temp. sensor fault, engine temp. sensor fault, TPS fault, oxygen sensor fault, fuel injector fault, ignition coil fault, corner mark fault, idle speed fault, power supply voltage fault, ECU fault.

Engine parameters display

Battery voltage, engine RPM, throttle opening, ignition angle, oxygen sensor sampling, cylinder temp. sampling value, self-learning.

9.13 Fault Diagnosis

9.13.1 Engine Body

Trouble	Reason	Solution
Engine cannot start	1. Inspect electrical system	
	• Fuse melted	
	• Battery low	Inspect or replace
	• Cable problem	Inspect or charge
	2. Inspect spark plug	Inspect or replace
	• Ignition coil bad connection	
	• High voltage bad connection	Inspect or replace
		Inspect or replace
	• Magneto trouble	Inspect or replace
	• Spark plug gap not fit	Adjust or replace
	• Spark plug dirty	Clean or replace
	• Spark plug too wet	Dry or replace
	3. Inspect fuel supply system	
	• Fuel pump leak or bad effect	Repair or replace
		Inspect tightening
	• Fuel line leak	Inspect fuel tank
	• Fuel low	Replace
	• Injector jammed	
	4. Inspect cylinder pressure	
	• Cylinder worn	Replace
	• Piston ring worn	Replace
	• Gasket leak	Replace
	• Valve conducting pipe worn	Replace
	• Valve seat bad sealing	Repair or replace
	• Valve worn	Replace
	• Spark plug loose	Tighten
	• Starting RPM low	Inspect or replace
	• Valve TDC wrong	Adjust
	• Valve clearance not fit	Adjust
	5. Idle bypass valve jammed	Clean or replace
	6. Not in N gear	Shift to N gear
	7. Trouble code	Inspect
Engine hard to start	1. Idle valve bad	See engine
	2. TPS not in 0	See engine
	3. Adjust the throttle cable	
	4. Engine pressure low	
	5. Inspect spark plug	Find reason and replace
	• Spark plug bad	
	• Spark plug setting bad	
	• Spark plug damage	
	• Spark plug dirty	
	6. Fuel low or pressure low	

Trouble		Reason	Solution
Engine overheat		1. Cylinder temp. sensor machine/electricity failure	Replace
		2. Inspect the pipe and clamp	
		• Pipe cracked or old	Replace
		• Clamp loose	Tighten
		3. Cooling oil pump cover gasket leak	Replace
		4. Cylinder head/gasket leak	Tightening or replace
		5. Water supply insufficient caused by cooling oil pump gear worn or broken	Replace
		6. Cooling oil pump shaft stuck	Replace bad parts
Lubrication	**Oil wasting high/Oil pressure low or no oil pressure**	1. Inspect engine oil level to see the crankcase and oil seal leak	
		• Crankcase damage leak	Replace and reassemble
		• Crankcase bolt loose	Tighten
		• Sealing ring/O-ring/Gasket cracked, old or damaged	Replace
		• Piston ring damaged(Blue smoke)	Replace
		• Piston ring damaged(Pressure low)	Replace
		• Valve oil seal damaged. Lip cracked or old	Replace all oil seals
		2. Oil filter jammed	Replace filter and oil
		3. Inspect oil drain bolt	
		• Case bottom bevel bolt loose	Tighten
		• Oil drain bolt loose or without washer	Tighten or install washer
		4. Oil leak	Replace oil seal
		5. Inspect oil pump	
		• Oil pump rotor worn	Replace
		• Oil pump jammed caused by oil leak or air inlet	Replace
		• Oil pump gear damaged	Replace
		• Use wrong oil	Use oil recommended

Trouble		Reason	Solution
Engine noise or shocked	Cylinder head noise	1. Valve clearance not fit	Adjust or replace
		2. Tensioner bad	Replace
		3. Chain conductor worn	Replace
		4. Chain getting longer or sprocket worn	Replace
		5. Sprocket bolt loose	Tighten
		6. Valve rocker arm or camshaft worn	Adjust or replace
		7. Camshaft TDC wrong	Adjust or replace
	Crankshaft noise	1. Main bearing damaged	Replace
		2. Connecting rod bearing damaged	Replace
		3. Magneto bolt loose	Tighten or replace
	Crankcase noise	1. Oil leak	Replace,tighten and fill
		2. Gear teeth damaged	Replace

9.13.2 EFI Fault Code Table

No.	Fault	Code	Fault statement	Verification mode	Remarks
1	Air intake pressure sensor fault	P0107	Voltage low	Air intake pressure sensor is built in ECU and sensor output cannot be simulated	
2		P0108	Voltage high or circuit open	Air intake pressure sensor is built in ECU and sensor output cannot be simulated	
3	Air intake temp. sensor fault	P0112	Circuit low or short to ground	Use a special small resistor(<10Ω) to connect atmospheric temp. terminal at the cable end	
4		P0113	Circuit high or circuit open	Disconnect sensor	
5	Cylinder head temp. sensor fault	P0117	Circuit low or short to ground	Use a special small resistor (<10Ω) to connect atmospheric temp. terminal at the cable end	
6		P0118	Circuit high or circuit open	Disconnect sensor	
7	TPS fault	P0122	Circuit low or circuit open	Disconnect sensor	
8		P0123	Circuit high or short to ground	Rotate TPS sensor clockwise and adjust resistance output to max(TPS sampling is about 251)	
9	Oxygen sensor fault	P0131	Circuit short or signal low	Replace oxygen sensor with ground signal and make it idle	
10		P0132	Circuit bad/open/ high	Disconnect oxygen sensor and make it idle	
11	Fuel injector fault	P0261	Circuit low(circuit bad)	Unplug fuel injector/fuse	
12		P0231	Feedback T3 abnormal	Make oil circuit fault, oil pipe bending, exhaust bubble not smooth	
13	Ignition coil fault	P2300	Ignition coil main control circuit low (circuit bad)	Unplug terminal between high-voltage package and cable	
14	Angle mark fault	P0335	No crankshaft angle mark	Disconnect angle mark signal wire/ crankshaft angle mark ground	
15		P0336	Crankshaft angle mark disturbed(signal poor)	/	
16	Idle speed fault	P0506	Idle air volume low	Adjust idle speed screw position	
17	Battery voltage fault	P0562	Voltage low	Adopt feed battery	

18	ECU fault	P0602	ECU unnumbered or information lost	Use ECU uninitialized	
19		P14AC	Uninitialized(no recorded offset)	Use ECU unadjusted	

9.13.3 Diagnosis by Trouble Code

Instructions:

1. Make sure the trouble is stable at the moment. Or it may cause wrong diagnosis.
2.The AVO meter mentioned below is digital AVO meter. Do not use analog style meter to test the electrical parts.
3. If the trouble code shows some circuit is voltage low, it means short to the ground or open to the ground. If the voltage is high, that means short to power. If trouble code shows some wiring trouble, it means circuit open or different troubles in wirings.

Diagnosis help:

1. If the trouble code can't be cleared, this trouble is stable.
If it happens occasionally, please check if the cable connector is loose.
2. Do not ignore the vehicle maintenance information, cylinder pressure, mechanical timing effect.
3. Replace ECU for testing.
If the trouble code can be cleaned, that means the trouble part is located in ECU. If the code still cannot be cleaned, replace with the original ECU and test again.

Fault code: P0112/P0113 Air intake temp. sensor fault

Maintenance tips: Fault	Maintenance tips: Check
1)Shorted between sensor signal wire and frame. 2)Sensor ground wire open. 3)Sensor signal wire open. 4)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Sensor fault.	1)If sensor signal wire is connected to frame. 2)If sensor ground wire is open. 3)If sensor signal wire is open. 4)If sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Replace sensor and test.

Fault code: P0117/P0118 Cylinder head temp. sensor fault

Maintenance tips: Fault	Maintenance tips: Check
1)Shorted between sensor signal wire and frame. 2)Sensor ground wire open. 3)Sensor signal wire open. 4)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Sensor fault.	1)If sensor signal wire is connected to frame. 2)If sensor ground wire is open. 3)If sensor signal wire is open. 4)If sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Replace sensor and test.

Fault code: P0122/P0123 Throttle position sensor fault

Maintenance tips: Fault	Maintenance tips: Check
1)Sensor signal wire open or connected to frame. 2)Sensor ground wire open. 3)Sensor signal wire open or connected to frame. 4)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Sensor fault. 6)Sensor initialization position change.	1)If sensor signal wire is open or connected to frame. 2)If sensor ground wire is open. 3)If sensor signal wire is open or connected to frame. 4)If sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Replace sensor and test. 6)If sensor initialization position changes.

Fault code: P0131/P0132 Oxygen sensor fault

Maintenance tips: Fault	Maintenance tips: Check
1)Sensor signal wire connected to frame. 2)Open between sensor and ECU. 3)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 4)Sensor fault.	1)If sensor signal wire is connected to frame. 2)If circuit between sensor and ECU is open. 3)If sensor terminal has corrosion, looseness, needle withdrawal, etc. 4)If detector is damaged.

Fault code: P0261/P0231 Fuel injector unit fault

Maintenance tips: Fault 1)Power supply abnormal. 2)Fuse damaged. 3)Open between fuel injector unit and ECU. 4)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Open inside fuel injector unit.	Maintenance tips: Check 1)If power supply is normal. 2)If fuse is damaged. 3)If circuit between fuel injector unit and ECU is open. 4)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)If fuel injector unit is open inside.

Fault code: P2300 Ignition coil fault

Maintenance tips: Fault 1)Power supply abnormal. 2)Open between ignition coil and ECU. 3)Sensor terminal has corrosion, looseness, needle withdrawal, etc.	Maintenance tips: Check 1)If power supply is normal. 2)If circuit between ignition coil and ECU is open. 3)Sensor terminal has corrosion, looseness, needle withdrawal, etc.

Fault code: Crankshaft position(angle mark) sensor fault

Maintenance tips: Fault 1)Magneto error(carburetor fault). 2)Sensor ground wire open. 3)Sensor signal wire open. 4)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Sensor fault.	Maintenance tips: Check 1)If magneto is in EFI mode. 2)If sensor ground wire is open. 3)If sensor signal wire is open. 4)Sensor terminal has corrosion, looseness, needle withdrawal, etc. 5)Repalce sensor and test.

Fault code: P0562 Battery voltage high/low

Maintenance tips: Fault 1)Battery cable badly contacted; fuse damaged; ECU connector loose, badly contacted or eroded, etc. 2)Regulator or charging coil abnormal. 3)Power consumption of vehicle is greater than power generation. 4)Battery aging.	Maintenance tips: Check 1)If battery cable is badly contacted; If fuse is damaged; If ECU connector is loose, badly contacted or eroded, etc. 2)If regulator or charging coil normal; the charging voltage. 3)If power consumption of vehicle is greater than power generation. 4)If battery is aging.

Fault code: P0107/P0108 Air intake pressure sensor fault

Maintenance tips: Fault	Maintenance tips: Check
1)Sensor power wire open or connected to frame.	1)If sensor power wire is open or connected to frame.
2)Sensor ground wire open.	2)If sensor ground wire is open.
3)Sensor signal wire open or connected to frame.	3)If sensor signal wire is open or connected to frame.
4)Sensor terminal has corrosion, looseness, needle withdrawal, etc.	4)Sensor terminal has corrosion, looseness, needle withdrawal, etc.
5)Sensor fault.	5)Replace sensor and test..

Fault code: P0602/P14AC System not initialized

Maintenance tips: Fault	Maintenance tips: Check
1)ECU uninitialized.	1)Reinitialize system as required.

9.13.4 Fault Diagnosis by Engine Problems

Before trouble diagnosis by engine problems, initial check should be done as follows:

1. Confirm if engine MIL is normal.
2. Confirm there is no fault code record by PDA checking.
3. Confirm the fault complained by the owner and conditions of fault occurrence.

Then check the following points.

(1)Check if there is leakage in fuel lines.
(2)Check if there is break, twist or improper connection in vacuum lines.
(3)Check if there is block, leakage, damage in air intake lines.
(4)Check if there is break or aging in high-tension lines of ignition system, or ignition order is correct.
(5)Check if wire grounding point is clean and firm.
(6)Check if any connector of all sensors and actuators is loose or badly contacted.
IMPORTANT NOTE: If the above fault exists, repair this fault first, otherwise the subsequent fault diagnosis and maintenance will be affected.

Diagnosis help:

1. Confirm engine without any trouble record.
2. Confirm that there is fault complained by the owner.
3. During checking, do not neglect vehicle maintenance, cylinder pressure, mechanical timing, fuel supply, etc.
4. Replace ECU to test.

If trouble disappears, then it is a problem of ECU. If trouble still exists, then replace with the original ECU and test again.

Common faults:

- When starting engine, engine cannot rotate or rotate slowly.
- When starting engine, starter motor can rotate but cannot start engine.
- Difficult to start warm or hot engine.
- Difficult to start cold engine.
- RPM is OK, but difficult to start engine at any time.
- Starting is OK, but idle speed is unstable at any time.
- Starting is OK, but idle speed is unstable during engine warm-up period.
- Starting is OK, idle speed is unstable after engine warm-up.
- Starting is OK, idle speed is unstable or engine stop during part load(e.g. headlight on).
- Starting is OK, but idle speed is too high.
- RPM cannot go up or engine stop when acceleration.
- Slow acceleration.
- Insufficient power and bad performance when acceleration.

(1)When starting engine, it can't rotate or rotate slowly.

Possible fault parts: 1.Battery; 2. Starter motor; 3. Wiring harness or ignition switch; 4. Engine mechanical parts.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Use multimeter to check battery voltage if voltage is between 8V~12V or not when engine starts.	YES	Next Step
		NO	Replace battery
2	Turn on ignition switch, and use multimeter to check if voltage of starter motor anode is over 8V.	YES	Next Step
		NO	Repair or replace harness
3	Remove starter motor and check its working status, especially if it has circuit open or is jammed by bad lubrication.	YES	Repair or replace starter motor
		NO	Next Step
4	If fault only occurs in winter, check if starter motor resistance is too big caused by improper oil used.	YES	Replace with proper oil
		NO	Next Step
5	Check if mechanical resistance is too big inside engine, causing starter motor to not rotate or rotate slowly.	YES	Check and repair resistance inside engine
		NO	Repeat the above procedures

(2)When starting engine, it can rotate but can't start.

Possible fault parts: 1. No fuel in fuel tank; 2. Fuel pump; 3. Trigger; 4. Ignition coil; 5. Engine mechanical parts.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Connect fuel pressure gauge, turn on ignition switch(repeat when necessary) or start engine, and check if pressure is around 300kPa.	YES	Next Step
		NO	Repair fuel supply system
2	Connect PDA and check if there is signal of RPM data after starting engine.	YES	Next Step
		NO	Check and repair RPM sensor circuit
3	Connect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next Step
		NO	Check and repair ignition system

No.	Procedures	Results	Next
4	Test cylinder pressure and check if pressure is enough.	YES	Eliminate engine mechanical fault
		NO	Next step
5	Connect EFI adapter, turn on ignition switch, check ECU, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Repair related circuit

(3)Difficult to start hot engine.

Possible fault parts: 1. Water in fuel tank; 2. Fuel pump; 3. Trigger; 4. Ignition coil.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Connect fuel pressure gauge, start engine, and check if pressure is around 300kPa.	YES	Next Step
		NO	Repair fuel supply system
2	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next Step
		NO	Check and repair ignition system
3	Disconnect cylinder temp. sensor connector and start engine to check if engine can start(or use 300ohm resistance to replace cylinder temp. sensor).	YES	Check and repair circuit or change sensor
		NO	Next Step
4	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
5	Connect EFI adapter, turn on ignition switch, check ECU, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit

(4)Difficult to start cold engine.

Possible fault parts: 1. Water fuel tank; 2. Fuel pump; 3. Engine cylinder temp. sensor; 4. Fuel injector; 5. Ignition coil; 6. Throttle body and by-pass; 7. Engine mechanical parts.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Connect fuel pressure gauge, start engine, and check if pressure is around 300kPa.	YES	Next Step
		NO	Check and repair fuel supply system
2	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next Step
		NO	Check and repair ignition system
3	Disconnect coolant temp. sensor connector and start engine to check if engine can start(or use 2500ohm resistance to replace coolant temp. sensor)	YES	Check and repair circuit or change sensor
		NO	Next Step
4	Slightly draw throttle cable and check if engine could start easily.	YES	Clean throttle and by-pass
		NO	Next Step
5	Disassemble injector and use special tool to check if there is leak or block.	YES	Replace a new injector
		NO	Next Step
6	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical fault
		NO	Next Step
8	Connect EFI adapter, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check related circuit

(5) RPM normal, but difficult to start in any conditions.

Possible fault parts: 1. Water in fuel tank; 2. Fuel pump; 3. Coolant temp. sensor; 4. Fuel injector; 5. Ignition coil; 6. Throttle body and idle by-pass; 7. Air intake pipe; 8. Ignition TDC; 9. Spark plug; 10. Engine mechanical parts.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next Step

No.	Procedures	Results	Next
2	Connect fuel pressure gauge, start engine, and check if pressure is around 300kPa.	YES	Next Step
		NO	Check and repair fuel supply system
3	Disconnect spark plug cap, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next Step
		NO	Check and repair ignition system
4	Check if cylinder spark plug is suitable for requirement(including its type and clearance).	YES	Next Step
		NO	Adjust or replace
5	Disconnect coolant temp. sensor connector and start engine to check if engine can start.	YES	Check and repair circuit or change sensor
		NO	Next Step
6	Slightly draw throttle cable and check if engine could start easily.	YES	Clean throttle body and by-pass
		NO	Next Step
7	Disassemble injector and use special tool to check if there is leak or block.	YES	Replace with a new injector
		NO	Next Step
8	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
9	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical fault
		NO	Next Step
10	Check if ignition TDC complies with standard regulation.	YES	Next Step
		NO	Check and repair ignition TDC
11	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Repair related circuit

(6)Normal starting, but unstable idle speed.

Possible diagnosis procedures: 1. Water in fuel tank; 2. Fuel injector; 3. Spark plug; 4. Throttle body and by-pass; 5. Air intake pipe; 6. Air control valve; 7. Ignition TDC; 8. Engine mechanical parts.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next Step

No.	Procedures	Results	Next
2	Check if idle air control valve is blocked.	YES	Clean or replace
		NO	Next Step
3	Check if cylinder spark plug is suitable for requirement(including its type and clearance).	YES	Next Step
		NO	Adjust or replace
4	Check if there is carbon deposit inside throttle body and by-pass.	YES	Clean
		NO	Next Step
5	Disassemble injector and use special tool to check if there is leak, block or wrong fuel flow.	YES	Replace with a new injector
		NO	Next Step
6	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
7	Check if cylinder pressure	YES	Eliminate engine mechanical fault
		NO	Next Step
8	Check if ignition TDC complies with standard regulation.	YES	Next Step
		NO	Check and repair ignition TDC
9	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit

(7)Normal starting, but idle speed unstable during engine warming.

Possible fault parts: 1. Water in fuel tank; 2. Coolant temp. sensor; 3. Spark plug; 4. Throttle body and by-pass; 5. Air intake pipe; 6. Air control valve; 7. Engine mechanical parts.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next Step
2	Check if spark plug is suitable for requirement (including its type and clearance)	YES	Next Step
		NO	Adjust or replace
3	Check if there is carbon deposit inside throttle body, air control valve and by-pass.	YES	Clean related parts
		NO	Next Step
4	Disconnect coolant temp. sensor connector ans start engine to check if engine can start. Check if idle speed is unstable during engine warming.	YES	Check and repair circuit or change sensor
		NO	Next Step
5	Disassemble injector, and use special tool to check if there is leak, block or wrong fuel flow.	YES	
		NO	Next Step

No.	Procedures	Results	Next
6	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical fault
		NO	Next Step
8	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 is normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit

(8)Normal starting, but unstable idle speed after engine warming.

Possible fault parts: 1. Water in fuel tank; 2. Coolant temp. sensor; 3. Spark plug; 4. Throttle body and by-pass; 5. Air intake pipe; 6. Air control valve; 7. Engine mechanical parts.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next Step
2	Check if spark plug is suitable for requirement (including its type and clearance).	YES	Next Step
		NO	Adjust or replace
3	Disconnect air control valve and check if there is carbon deposit inside throttle body, idle regulator and by-pass.	YES	Clean related parts
		NO	Next Step
4	Disconnect coolant temp. sensor connector, and start engine. Check if idle speed is unstable during engine warming.	YES	Check and repair circuit or change sensor
		NO	Next Step
5	Disassemble injector and use special tool to check if there is leakage, block or wrong fuel flow.	YES	Replace with a new injector
		NO	Next Step
6	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical fault
		NO	Next Step
8	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit
9	Close switch lock for 3 seconds, then reopen and start it.	YES	
		NO	Check and repair related circuit

(9)Normal starting, but unstable idle speed or engine stops when it is electronic loaded(e.g. headlight is on).

Possible fault parts: 1. Air control valve; 2. Fuel injector.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Disassemble air control valve and check if there is carbon deposit inside throttle body, idle regulator and by-pass.	YES	Clean related parts
		NO	Next Step
2	Check if output power increases when lighting by using PDA to test if ignition advance angle, fuel spray and air intake volume is normal.	YES	To Step 4
		NO	Next Step
		NO	Check and repair air-conditioning system
3	Disassemble injector and use special tool to check if there is leak, block or wrong fuel flow.	YES	Replace with a new injector
		NO	Next Step
4	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit

(10)Normal starting, but idle speed is too high.

Possible fault parts: 1. Throttle body and by-pass; 2. Fuel injector seat; 3. Air control valve; 4. Coolant temp. sensor; 5. Ignition TDC.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if throttle cable is jammed or too tight.	YES	Adjust
		NO	Next Step
2	Check if there is leak between air intake pipe and injector seat.	YES	Check and repair air intake system
		NO	Next Step
3	Disassemble air control valve and check if there is carbon deposit inside throttle body, air control valve and by-pass.	YES	Clean related parts
		NO	Next Step
4	Disconnect coolant temp. sensor connector, and start engine. Check if idle speed is too high.	YES	Check and repair circuit or replace sensor
		NO	Next Step
5	Check if ignition TDC complies with standard regulation.	YES	Next Step
		NO	Check and repair ignition TDC
6	Close switch lock for 3 seconds, then reopen and start it.	YES	
		NO	Check and repair related circuit

No.	Procedures	Results	Next
7	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18、J2-15 are normal. Check if J1-9、J2-2,J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Chekc and repair related circuit

(11)RPM cannot increase or engine stops when accelerating.

Possible fault parts: 1. Water in fuel tank; 2. Air intake pressure sensor and TPS; 3. Spark plug; 4. Throttle body and by-pass; 5. Air intake pipe; 6. Air control valve; 7. Fuel injector; 8. Ignition TDC; 9. Exhaust pipe.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked.	YES	Check and repair air intake system
		NO	Next Step
2	Connect fuel pressure gauge, start engine and check if pressure is around 300kPa at idle.	YES	Next Step
		NO	Check and repair fuel supply system
3	Check if spark plug is suitable for requirement (including its type and clearance).	YES	Next Step
		NO	Adjust or replace
4	Disassemble air control valve and check if there is carbon deposit inside throttle body, idle regulator and by-pass.	YES	Clean related parts
		NO	Next Step
5	Check if air intake pressure sensor, TPS and its circuit is normal.	YES	Next Step
		NO	Check and repair circuit or replace TPS
6	Disassemble injector and use special tool to check if there is leak or block.	YES	Replace with a new injector
		NO	Next Step
7	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
8	Check if ignition TDC and ignition order comply with standard regulation.	YES	Next Step
		NO	Check and repair ignition TDC
9	Check if exhaust gas exhausts smoothly.	YES	Next Step
		NO	Repair or replace exhaust pipe
10	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit

(12)Low acceleration.

Possible fault parts: 1. Water in fuel tank; 2. Air intake pressure sensor and TPS; 3. Spark plug; 4. Throttle body and by-pass; 5. Air intake pipe; 6. Air control valve; 7. Fuel injector; 8. Ignition TDC; 9. Exhaust pipe.

General diagnosis procedures:

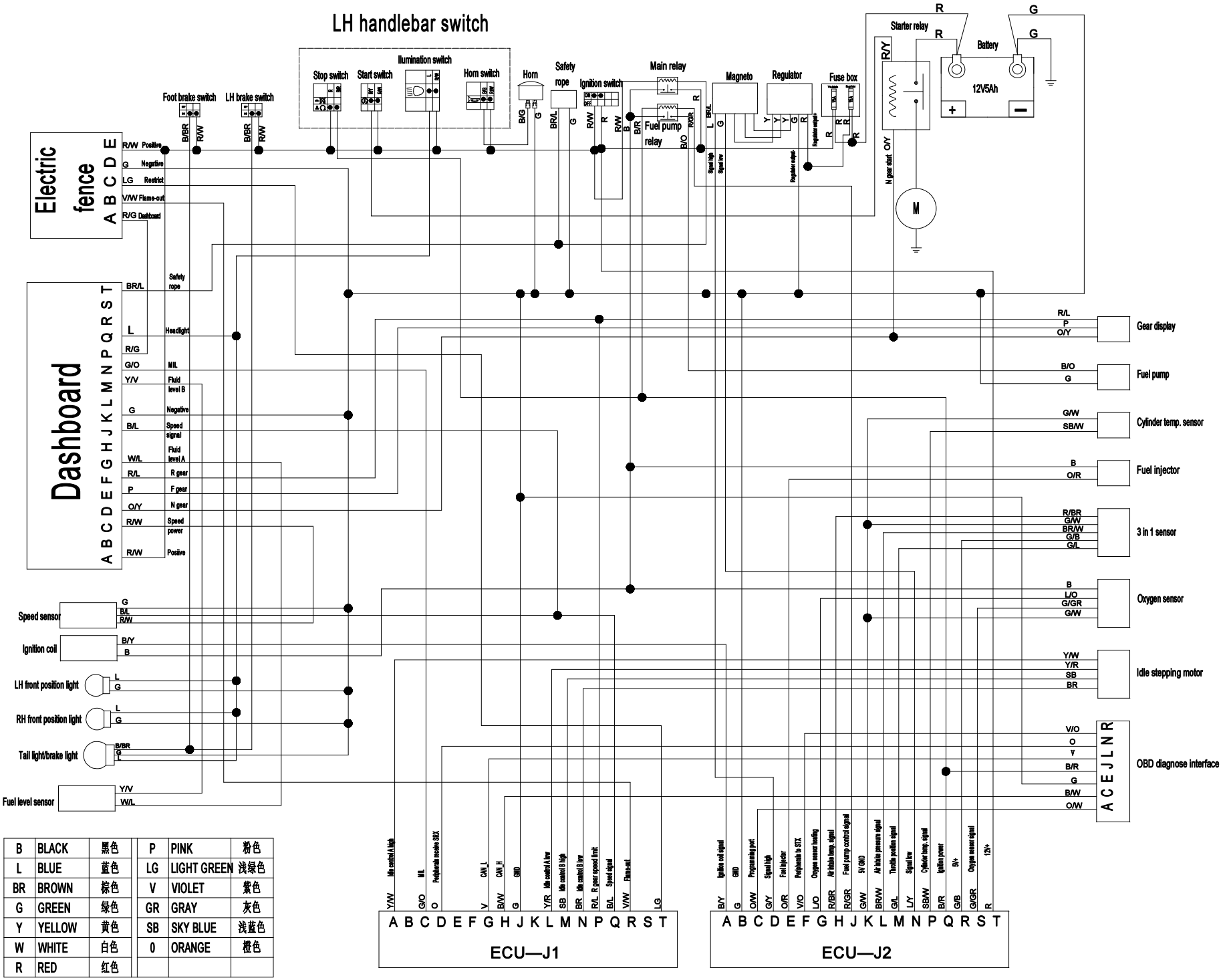
No.	Procedures	Results	Next
1	Check if air filter is blocked.	YES	Check and repair air intake system
		NO	Next Step
2	Connect fuel pressure gauge, start engine, and check if pressure is around 300kPa at idle.	YES	Next Step
		NO	Check and repair fuel supply system
3	Check if spark plug is suitable for requirement (including its type and clearance).	YES	Next Step
		NO	Adjust or replace
4	Disassemble air control valve and check if there is carbon deposit inside throttle body, air control valve and by-pass.	YES	Clean related parts
		NO	Next Step
5	Check if air intake pressure sensor, TPS and its circuit is normal.	YES	Next Step
		NO	Check and repair circuit or replace sensor
6	Disassemble injector and use special tool to check if there is leak or block.	YES	Replace with a new injector
		NO	Next Step
7	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
8	Check if ignition TDC and ignition order comply with standard regulation.	YES	Next Step
		NO	Check and repair ignition TDC
9	Check if exhaust gas exhausts smoothly.	YES	Next Step
		NO	Repair or replace exhaust pipe
10	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit

(13)Difficult to accelerate and bad performance.

Possible fault parts: 1. Water in fuel tank; 2. Air intake pressure sensor and TPS; 3. Spark plug; 4. Ignition coil; 5. Throttle body and by-pass; 6. Air intake pipe; 7. Air control valve; 8. Fuel injector; 9. Ignition TDC; 10. Exhaust pipe.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if there is clutch sliding, low tire pressure, bad brake or wrong tire size.	YES	Repair
		NO	Next Step
2	Check if air filter is blocked.	YES	Check and repair air intake system
		NO	Next Step
3	Connect fuel pressure gauge, start engine, and check if pressure is around 300kPa at idle.	YES	Next Step
		NO	Check and repair fuel supply system
4	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if spark is strong enough.	YES	Next Step
		NO	Check and repair ignition system
5	Check if spark plug is suitable for requirement (including its type and clearance).	YES	Next Step
		NO	Adjust or replace
6	Disassemble air control valve and check if there is carbon deposit inside throttle body, air control valve and by-pass.	YES	Clean related parts
		NO	Next Step
7	Check if air intake pressure sensor, TPS and its circuit is normal.	YES	Next Step
		NO	Check and repair circuit or replace sensor
8	Disassemble injector and use special tool to check if there is leak or block.	YES	Replace with a new injector
		NO	Next Step
9	Check if the fault happens right after filling fuel.	YES	Change fuel
		NO	Next Step
10	Check if ignition TDC complies with standard regulation.	YES	Next Step
		NO	Check and repair ignition TDC
11	Check if exhaust gas exhausts smoothly.	YES	Next Step
		NO	Repair or replace exhaust pipe
12	Connect EFI adapter, turn on ignition switch, and check if power supply of ECU pin J2-18, J2-15 are normal. Check if J1-9, J2-2, J2-10 pin ground are normal.	YES	Use PDA to check
		NO	Check and repair related circuit



B	BLACK	黑色	P	PINK	粉色
L	BLUE	蓝色	LG	LIGHT GREEN	浅绿色
BR	BROWN	棕色	V	VIOLET	紫色
G	GREEN	绿色	GR	GRAY	灰色
Y	YELLOW	黄色	SB	SKY BLUE	浅蓝色
W	WHITE	白色	O	ORANGE	橙色
R	RED	红色			

COLOUR TABEL