

Lambretta

Model G350 Scooter

Service Manual

Chongqing Gaokin Industries Co., Ltd.

Model G350 Scooter

Service Manual

Chief Editor:

Edited by:

Chongqing Gaokin Industries Co., Ltd.

Foreword

With the increasing variety of scooters, new structures and new technologies have been adopted continuously. To better master the maintenance, adjustment, and repair technology of G350 two-wheel scooter, we have compiled this maintenance manual. May this manual bring convenience to customers and maintenance personnel and provide guidance on maintenance technology.

This manual takes the G350 two-wheel scooter as the main line, and the contents of Chapter I to Chapter III are applicable to the adjustment of each part of the scooter. Chapters IV to XX are described separately according to the components of scooters. Chapter XX lists electrical system diagrams.

Standard maintenance procedures, maintenance precautions, and general repair knowledge are not included in this manual. If the user or maintenance personnel need to consult the above contents, please refer to relevant information.

All the data, charts and various data, and performance indicators recorded in this manual are the latest product data until this manual is printed. Chongqing Gaokin Industries Co., Ltd. has the right to modify this manual at any time without prior notice. Any part of this manual is reserved by all rights of Chongqing Gaokin Industries Co., Ltd. Any unit or individual may not be reproduced without the consent of the Company.

Thank you for choosing the “lambretta” G350 two-wheel scooter!
Wish you enjoy the comfort and pleasure it brings to you in the future!

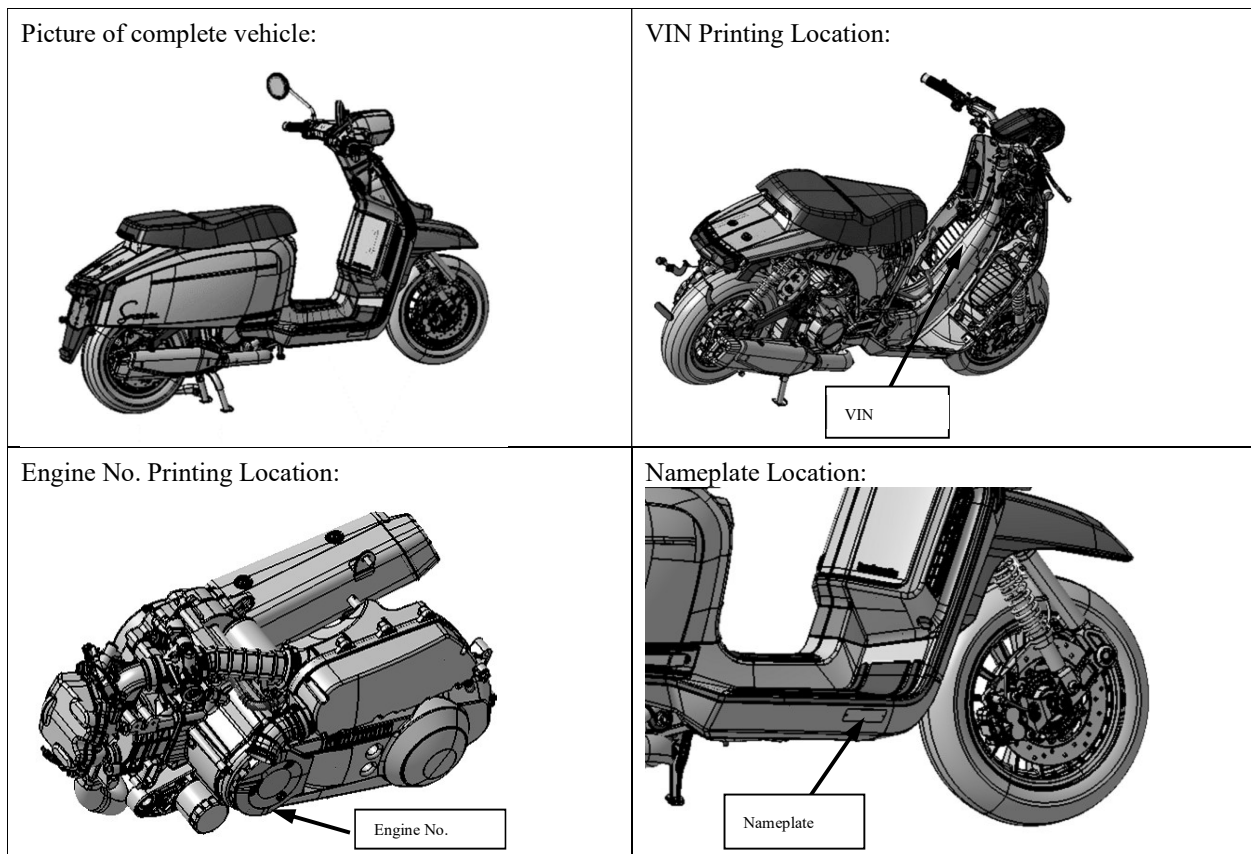
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1 Overview

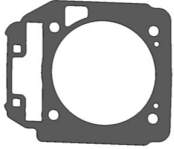
Printing position of engine No.	Maintenance cycle table
Maintenance Precautions	Wiring Diagram
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Printing position of engine No. And VIN

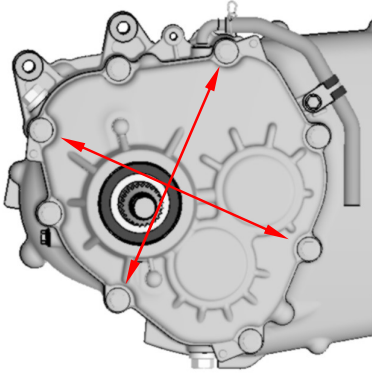


Maintenance Precautions

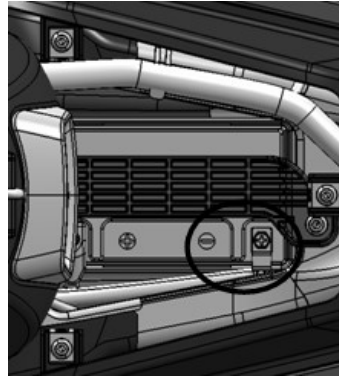
1. Parts, fittings, lubricants, and other auxiliary materials produced by Chongqing Gaokin Industries Co., Ltd. or approved and recommended by Chongqing Gaokin Industries Co., Ltd. shall be used. Damage to the motorcycle may occur if the parts used do not meet the “Gaokin” specifications or requirements.
2. When reassembling after disassembly, replace new grommets, split pins of seals, etc.



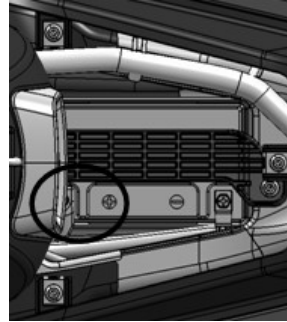
3. When tightening bolts or nuts, they shall be carried out in diagonal crossing sequence, and gradually tightening for 2~3 times to reach the specified torque.



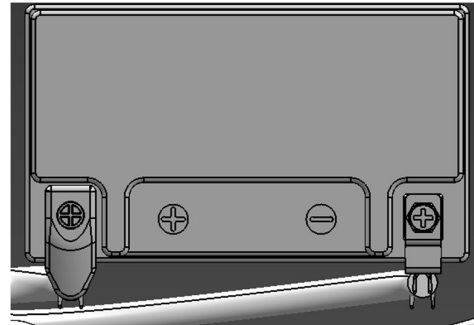
4. After disassembly, the parts shall be cleaned before inspection and measurement.
When cleaning parts, use cleaning fluids that are unflammable or have high ignition points.
Before assembly, use specified lubricants to the sliding surfaces of the parts.
After assembly, inspect whether parts of each part are installed correctly. Rotate, move, and operate.
5. Special and general tools must be used when disassembling and assembling motorcycle.
6. The specified or equivalent grease (lubricants) must be applied, filled in the specified place.
7. When more than two people operate, pay attention to safety, and cooperate with each other.
8. When removing the battery, remove the negative electrode (-) of the battery before removing the positive electrode (+). When disassembling and assembling the battery, take care not to allow the wrench, etc. to touch the frame.



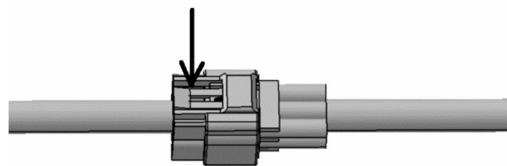
When assembling the battery, first connect positive electrode (+) and then connect negative electrode (-). After assembly, it is required to confirm the connection, fixation, and connection of each part again.



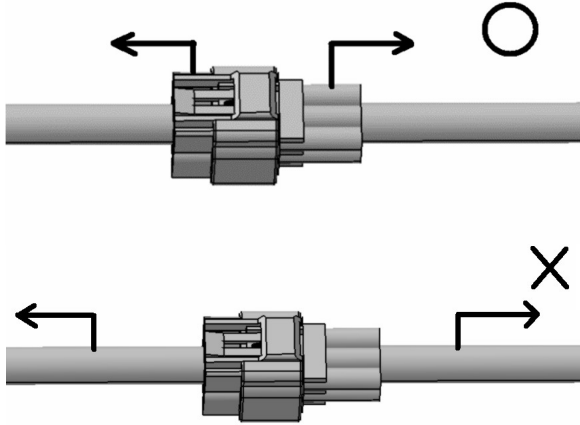
9. When the circuit is abnormal, inspect whether the fuse is normal at the first time. When the fuse is blown, inspect the cause, and replace the fuse according to the specified capacity after repair.
10. The covers shall be reliably covered terminals after operation.



11. When removing the connectors with buckles, the buckles must be released before operation.



When removing the connectors, hold the connector body, and do not pull the wire harness.



The terminals shall not be broken or bent before connecting the connector

Make sure that the terminal is not too long or fall off, and the connector shall be fully inserted.

12. Harness fixing strap shall be fastened tightly to the specified position of frame.

Clamp the wire harness correctly.

Wire harnesses shall be clamped where they do not contact with parts where high temperatures occur.

Wire harnesses shall be clamped where they do not

contact with the car body edges and sharp corners.

The wire harness shall not pass through where it contacts the head and front end of the bolt and screw.

The wire harness shall not be loose or pulled by force.

If the wire harness is in any way required to contact with edges and sharp corners, it shall be protected with hoses or tapes etc. where they come into contact.

Do not break the overlay of the wire harness.

If the wire harness is damaged, it shall be repaired with plastic tape.

Do not press onto the wiring harness when assembling components.

Do not twist the wiring harness.

13. During wiring, it shall be noted that when turning the handlebar left and right to the limit position, the wire harness shall not be tightened and loose, and it shall be confirmed that there is no protruding bending, pressing phenomenon, and interference of edge.

14. When using the test meter, follow the instructions in the manual and follow the maintenance manual.

15. Do not drop or throw parts.

16. If the terminal is rusted, use sandpaper and other treatment before connecting.

17. Do not forcefully twist or bend cables. Cables that are deformed or injured are the cause of poor operation and damage.

Main Performance Technical Data

	Projects	Data
Size and weight	Total length Total width Total height Wheelbase Minimum ground clearance Maximum total mass	1956mm 770mm 1129mm 1400mm 153mm Empty vehicle: 166kg, refurbish: 173kg, full load: 343kg
Vehicle body	Frame type Front suspension caster Front suspension Rear suspended device Front Tire Size Rear Tire Size Front wheel pressure Rear wheel pressure Front brake Rear brake Fuel Tank Volume Fuel label	Monocoque frame ≥25° Connecting rod type hydraulic shock-absorption with five-speed adjustable spring Hydraulic shock-absorption with five-speed adjustable spring 120/70-12 M/C 130/70-12 M/C Single person: 200kPa, Double: 200kPa Single person: 220kPa, Double: 240kPa Disk-shape Diameter Φ240mm Disk-shape Diameter Φ240mm 9.5L 92#
Engine	Type Cylinder diameter × stroke Exhaust capacity of cylinder Compression ratio Maximum power Maximum torque Valve Clearance (Cold status) Valve transmission mechanism Air cleaner Cooling mode Cooling water filling amount Crankshaft balancing mode Lubrication mode Type of oil pump Crankcase oil mark Filling amount of crankcase oil Oil filter element Gear oil mark of reducer case Filling amount of gear oil in reducer case Starting mode Idle speed Engine Net Weight	Water cooling Single cylinder Four-stroke Four-valve 82mm×62.5mm 330ml 10.7:1 19kw/7500rpm 25.5N.m/6250rpm IN: 0.1mm, EX: 0.15mm Chain drive Paper filter element type Water cooling 2.5L Balance shaft Splashing, pressure lubrication, replaceable oil filter Internal meshing gear oil pump SAE 10W/40 (grade SL) 1.8L (replacement of fine filter), 1.6L (without replacement of fine filter) Integral (paper filter), replaceable Gear oil 85W-140 0.2L-0.25L Motor starting 1550 r/min±150 (thermal engine status) 52kg

	Projects	Data
Transmission system	Clutch	/
	Transmission mode	CVT
	Ratio of transmission	CVT Ratio of transmission 0.81-2.20
	Final transmission ratio	6.790
Electrical and electric injection	Generator	420w/5000rpm, permanent magnet AC magneto
	Battery capacity	12V8A.h
	Power supply system	DC power supply. The generator is only responsible for charging the battery
	Fuse	30A*1, 20A*2, 15A*1, 10A*1, 5A*2
	Spark plug	Model NGK DCPR7E
	Spark plug clearance	0.8~0.9mm
	Type of anti-theft device	Type 2 Lock the steering column through the ignition switch and close the ignition circuit
	Fuel supply mode	Electric injection, and ECU control
	Ignition mode	Electric injection
	Headlights	1×13.5V 31W
	Steering lamp	Front: 2×13.5V 3.2W Rear: 2×13.5V 3.3W
	Brake light/rear position lamp	13.5V 2.8W/2.3W

Standard torque value Engine

Projects	Quantity	Thread diameter mm	Torque value N. m
Bolt M6	30	6	10
Screw M6	6	6	10
Bolt M5	2	5	8
Bolt M8	16	8	25
Magneto rotor bolt M12	1	12	130
Spark plug M12	1	12	15
Cylinder bolt M10	4	10	50
Oil drain bolt M12	1	12	25
Timing driven sprocket bolt M8	1	8	25
CVT master/driven wheel nut M12	2	12	70
One-way bolt M8	6	8	25
Oil pressure alarm switch M10	1	10	12
Fitting of fine filter pipe	1	/	16~20
Fine filter	1	/	8~12
Water temperature sensor M12	1	12	15

Torque range of standard components at important parts of car body is shown in the following table:

Projects	Quantity	Thread diameter mm	Torque value N. m
Connecting shaft of front hanger	1	12	50~60
Connecting shaft of hanger	1	12	46~50
Engine connecting shaft	1	14	80~90
Front absorber connection to steering column	2	8	28~32
Front absorber connection to front left and right rocker arms	2	10	55~60
Front left and right rocker arms connection to the steering column	2	10	55~60
Welding combination of handle tube and steering column	1	10	55~60
Front wheel	1	14	80~90
Rear wheel	1	16	90~100
Mounting point for rear absorber and frame	2	10	50~60
Rear absorber and lower connecting plate of rear absorber	2	10	50~60
Rear absorber lower connecting plate connection to engine and rear rocker arm	4	8	25~30
Rear rocker arm connection to engine	2	10	50~60
Brake disc connection to front and rear hubs	10	8	28~32
Front and rear brake caliper mounting and connection	4	8	25~30
ABS connection to oil inlet and outlet tubing	4	10	20~23
Front and rear brake pump and connection to oil pipe	2	10	30~33
Front and rear brake calipers connection to oil pipe	2	10	29~31
Silencer connection to rear rocker arm	3	8	25~30

Torque range of other standard components of car body is shown in the following table:

Name and size	Torque value N. m
5mm bolts and nuts	4~6
6mm bolts and nuts	8~12
8mm bolts and nuts	18~25
10mm bolts and nuts	30~40
Screw 5mm	4~6
Screw 6mm	7~11
6mm reel bolts and nuts	10~14
8mm reel bolts and nuts	20~30
10mm reel bolts and nuts	30~40

Periodic Maintenance Sheet

Inspection cycle	Mileage/Km	Initial 1000	Every 5000	Every 10000	Every 15000	Every 20000
Inspection items	Time/month	Initial 3	Every 15	Every 30	Every 45	Every 600
Secure fastening		J		J		
Spark plug*				J		R
Drive belt*				J	R	
Throttle Valve Controller*		J		A		
Buffer rubber of side bracket and main bracket				R		
CVT transmission box and dust cover			J			
Air filter element				R		
Engine crankcase oil*		R	J	R		
Gear oil in Engine and reducer		R	J			R
Sliding shoe/CVT roller*				R		
Oil filter*				R		
Coolant*/▲		J	J			
Tire pressure and wear		J	J			
Valve Clearance*						A
Suspension*		J		J		
Brake lining*		J	J			
Brake fluid*/▲		J		J		
Steering System*				A		

Attention:

J: Inspect and clean, adjust or replace if necessary.

R: Replace.

A: Inspect and adjust.

▲: Replace every two years.

Attention:

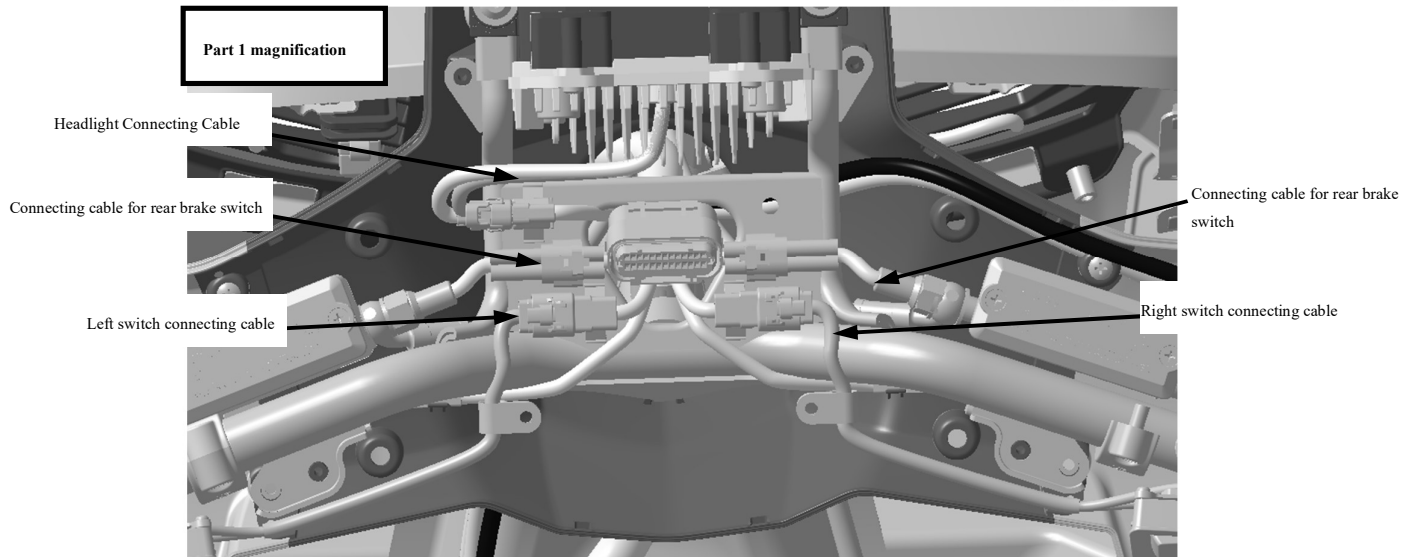
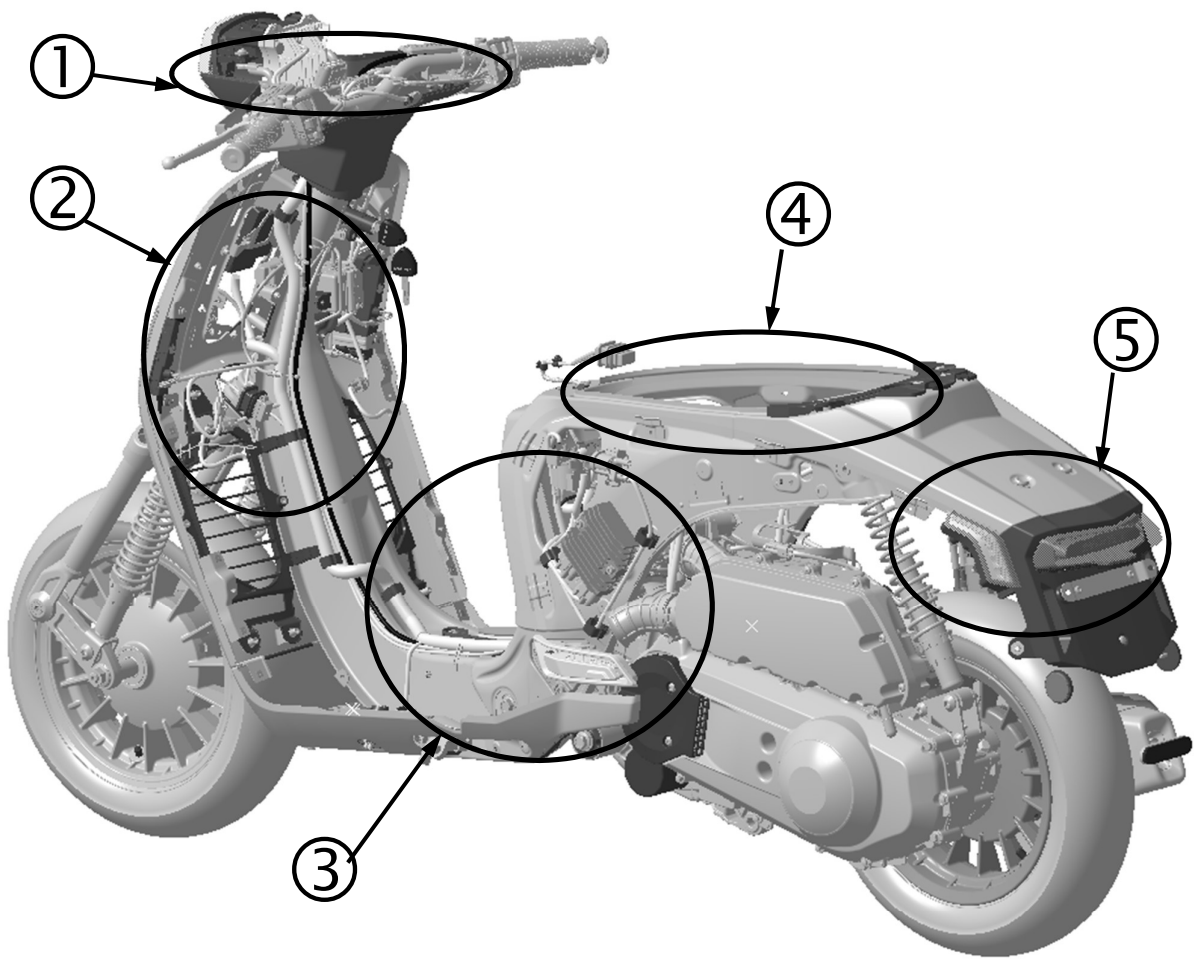
The maintenance period after the vehicle travels 20,000Km shall be in accordance with the above-mentioned “Periodic Maintenance Sheet”.

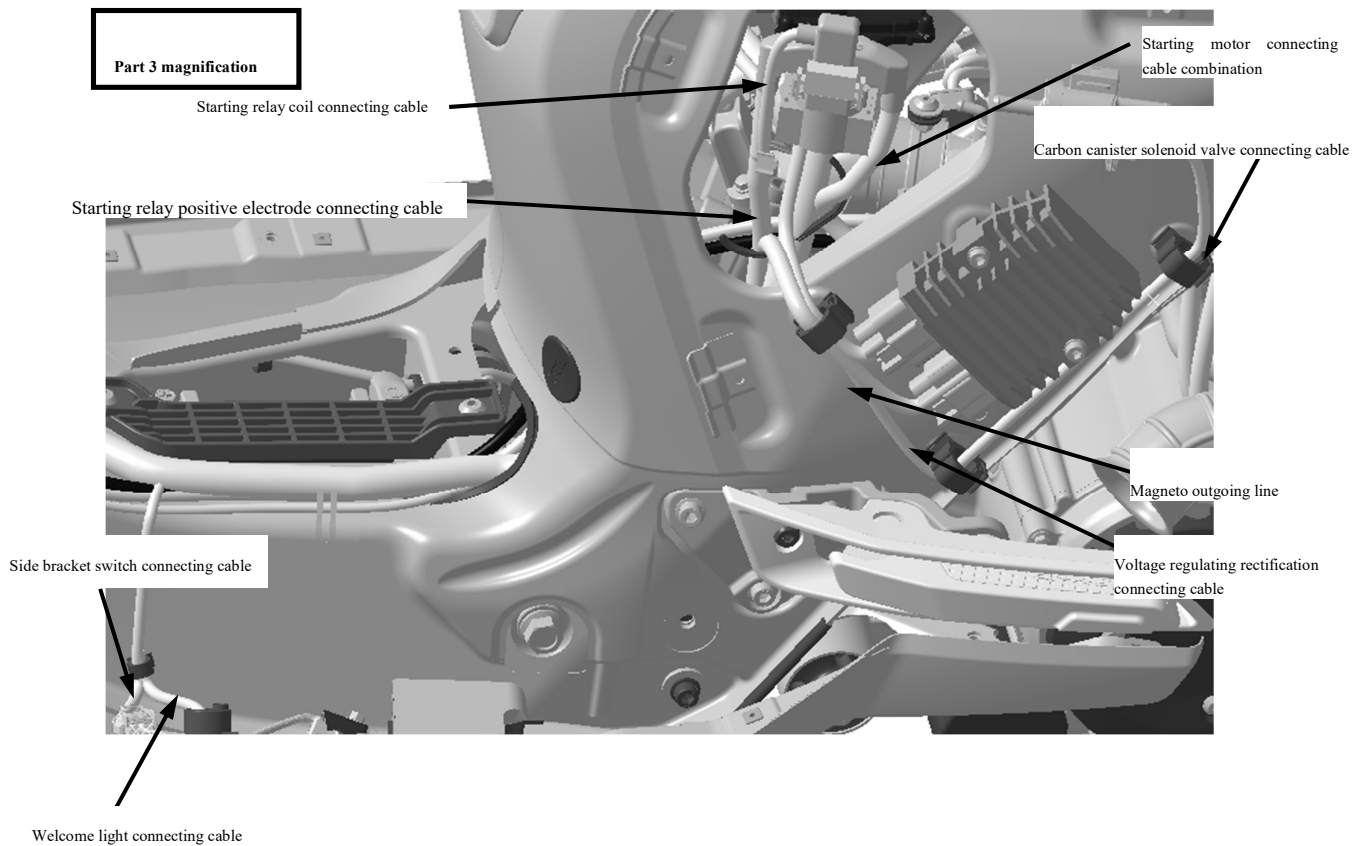
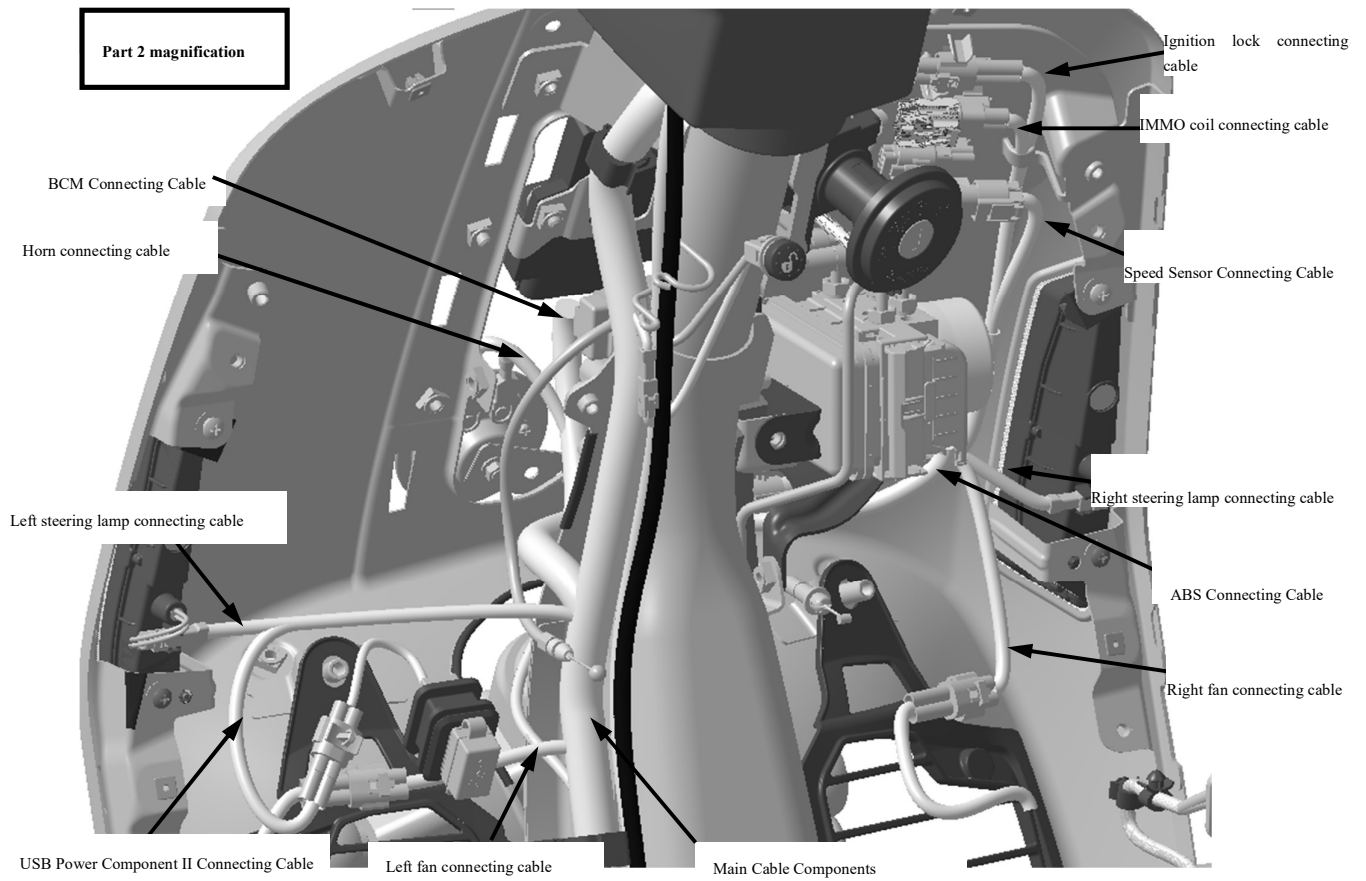
Items marked with “*” on the table shall be handed over to a qualified licensed maintenance shop for disposal.

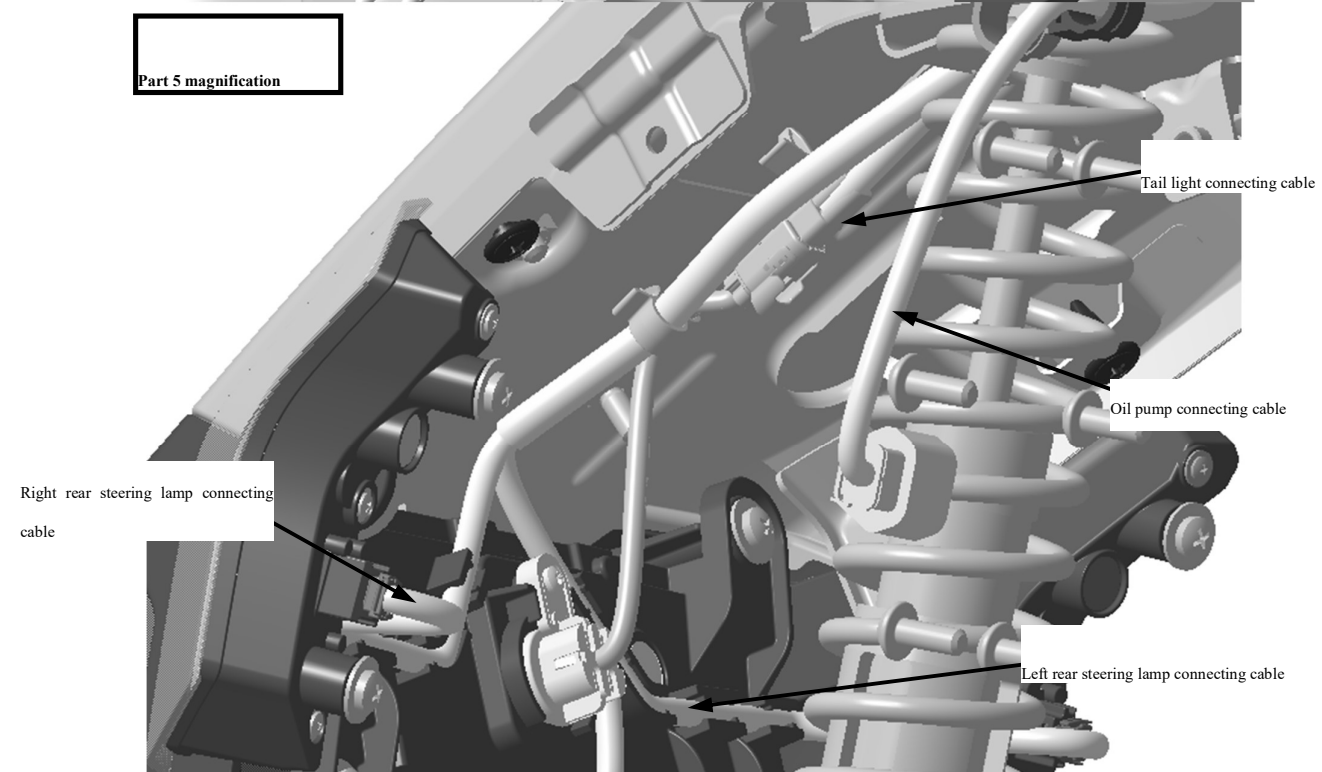
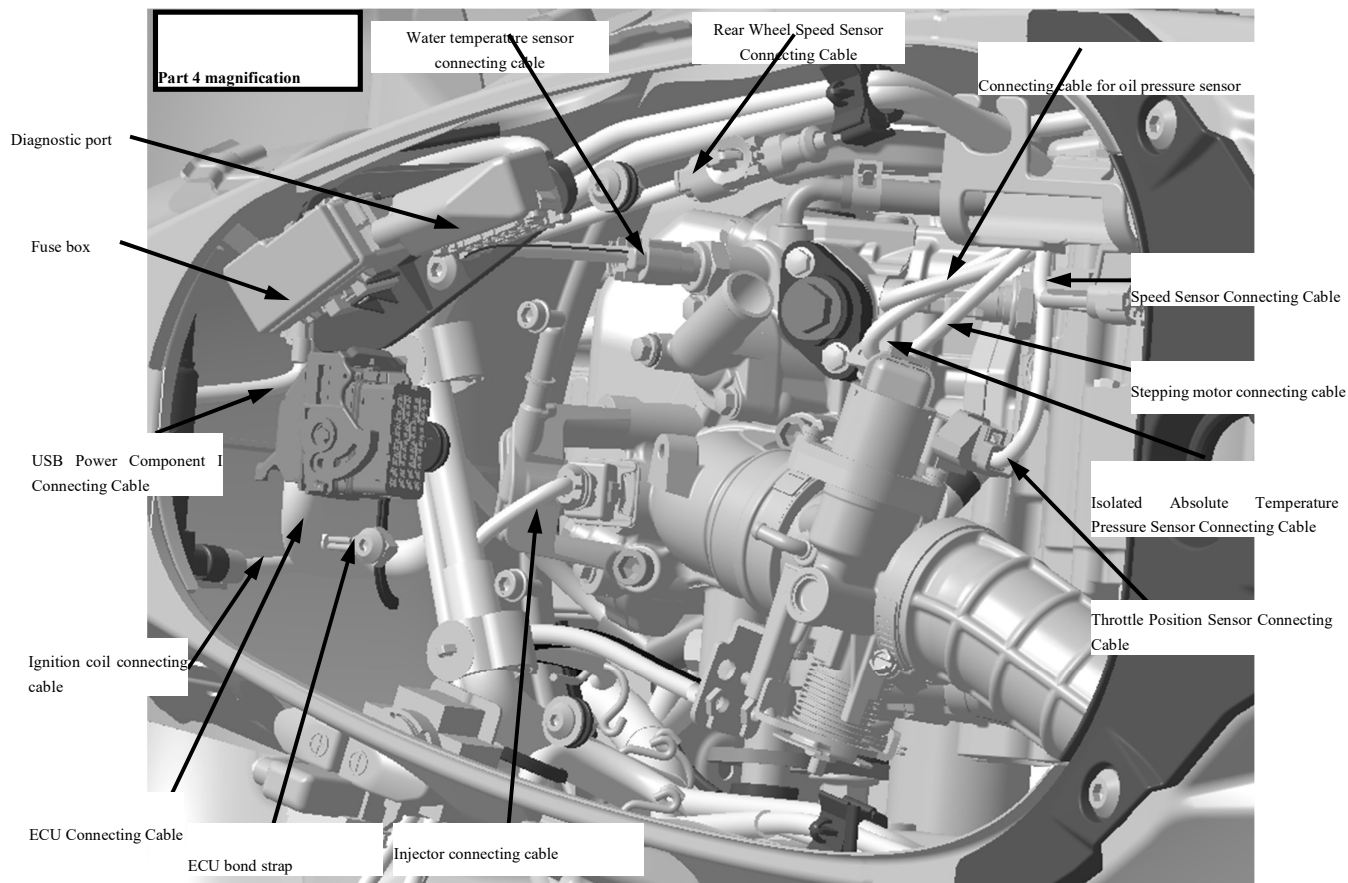
Increase the frequency of cleaning the CVT air inlet dust cover in the dusty areas or seasons where there is catkin.

Blow out the dust and foreign matters in the dust cover with compressed air every half a month or 1000Km, so as to avoid affecting the heat dissipation of the CVT transmission box and causing damage to the CVT belt in advance.

Wiring Diagram







Symbol Description

Meaning of symbols in this manual:



Description:

Measures to be prompted during operation, inspection, and maintenance.





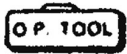




Attention:

Special instructions or measures to prevent the vehicle from being damaged.



Warning:

Special instructions or measures proposed to avoid major injury or personal injury.

	When reassembled after each disassembly and assembly, new parts must be replaced.
	Use special tools.
	Use general tools.
	Tightening torque specification: 50N.m.
	Use the recommended oil.
	Use threadlocker agent.
	Use lithium-based grease.

2

Lubrication system

Maintenance Instructions	Inspection and replacement of reducer oil
Troubleshooting	Oil Filter Replacement
Engine Lubrication System Diagram	Inspection of oil pump
Inspection and replacement of oil	Model selection of oil

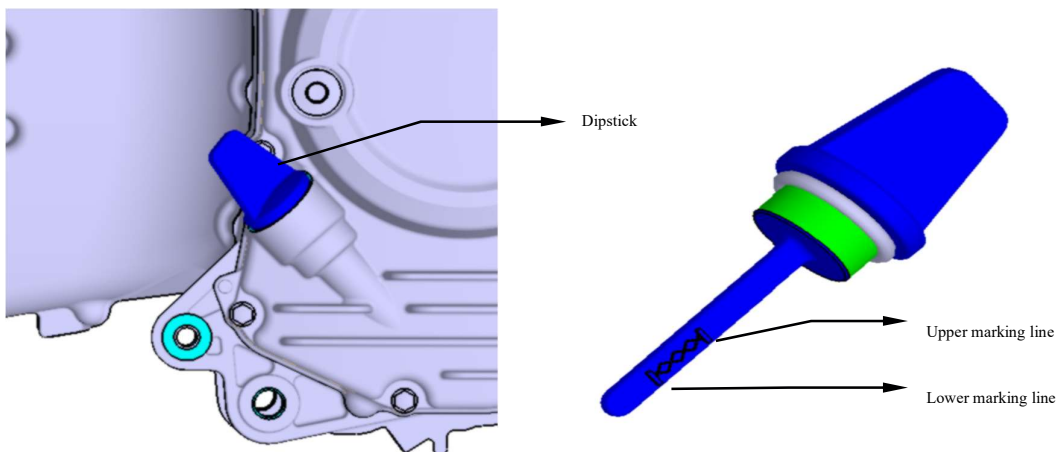
Maintenance Instructions

This section describes the inspection and replacement of engine oil, as well as the methods for cleaning the primary oil screen and oil filter. At the same time, it introduces all parts of the motorcycle.

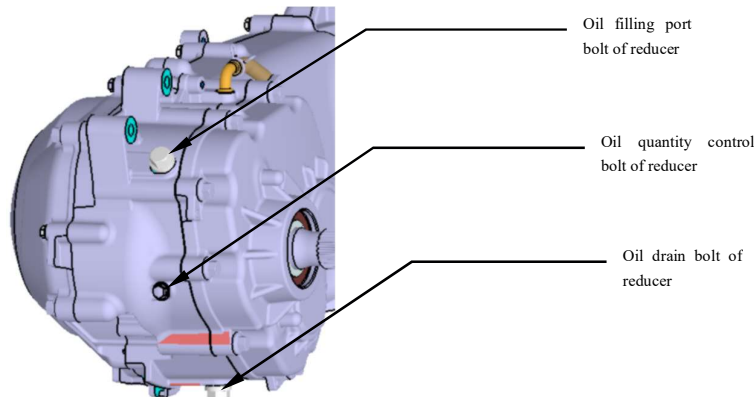
Oil is an important factor affecting engine performance and service life. It must be selected according to regulations. Normal oil, gear oil and vegetable oil are not allowed to replace crankcase oil. When the engine is sold and delivered, the crankcase is filled with SAE 10W-40 SL grade oil, and the reducer is filled with 85W-140 gear oil. When changing the oil, drain out the original oil in the crankcase and reducer, and then fill with new oil as specified.

Inspecting the oil quantity, adding, and changing the oil don not need to remove the engine.

When inspecting the oil quantity of the crankcase, Place the vehicle on a level ground and support it with a main support. If the engine is cold and idle for more than 5 minutes, turn off the engine and let it sit for 3-5 minutes. Unscrew the dipstick and wipe off the oil on the dipstick. Insert the dipstick hole again, keeping the dipstick perpendicular to the end face without screwing it in. Remove the dipstick and observe if the oil level is between the upper and lower notches. If new engine oil is added after draining, tighten the drain bolts and fine oil filter as required. After adding engine oil, ignite the engine and idle for more than 5 minutes before turning it off and letting it sit for 3-5 minutes. Then, check the oil level again according to the above method to check if it is between the upper and lower marking lines. If it is below the lower mark, add it within the upper and lower marking line.



When inspecting the oil quantity of the reducer, place the vehicle on the horizontal ground with the main bracket, loosen the oil quantity control bolt, slowly fill the oil from the oil filling port, and stop the oil filling when the oil quantity control bolt flows out (or take out the oil level position after inserting from the oil injection port with a clean small screwdriver, and inspect whether it reaches the position of the reducer oil quantity control bolt according to the same angle ratio outside the reducer cover).



When replacing the oil of the reducer, loosen the oil drain bolt, collect the oil with the oil pan, and tighten the oil drain bolt according to the torque requirements after the oil flows out. Loosen the oil inlet bolt of the reducer, inject new oil as required, and confirm whether the oil quantity is appropriate according to the above method for inspecting the oil quantity of the reducer.

Specification: Crankcase oil filling quantity:

- 1) 2L – after disassembly and cleaning of engine;
- 2) 1.8L – change oil filter;
- 3) 1.6L – change oil only.

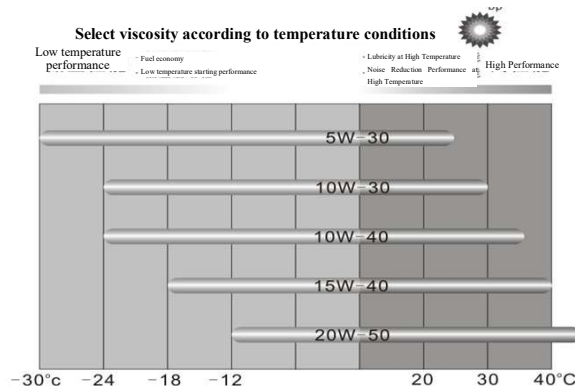
Oil filling quantity of reducer

- 1) 250ml – after disassembly and cleaning of reducer;
- 2) 200ml – only change oil



Warning

Repeated exposure to engine oil for prolonged periods may cause skin cancer. Although this is unlikely, unless you handle used oil every day, be careful to wash your hands thoroughly with soap and water immediately after handling the used oil. Access to children is prohibited.



Troubleshooting

⌘ Oil contamination

1. Failure to change oil according to maintenance cycle table;
2. Damaged thread of oil filling port and poor sealing;
3. The piston ring is worn.

⌘ Low oil pressure

1. The oil level is too low;
2. Blockage of oil passage or oil filter screen;

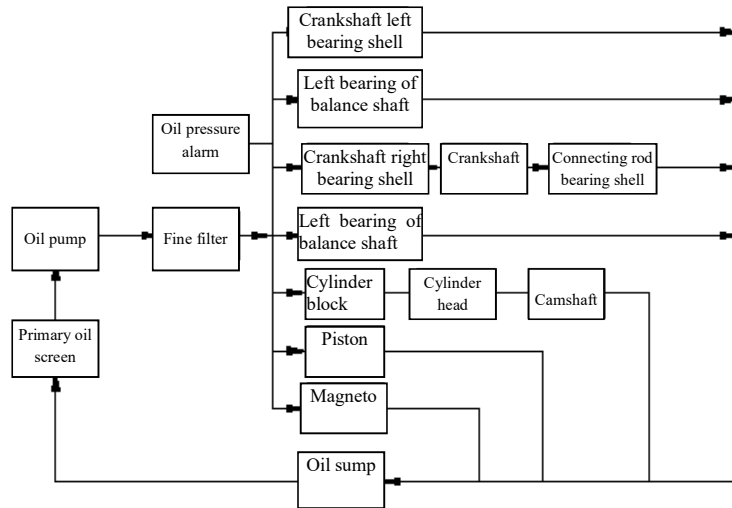
3. Failure of oil pump;

4. Crankshaft bearing shell, connecting rod bearing shell and other mating parts are worn.

⌘ Too fast oil consumption

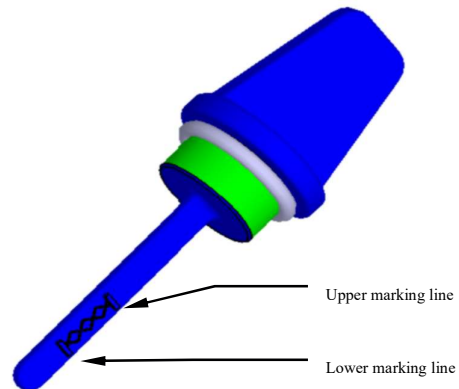
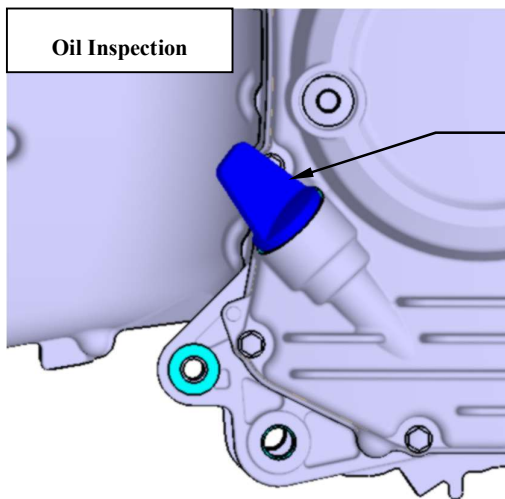
1. There is oil leakage in the engine;
2. The piston ring is worn;
3. Guide rod of intake and exhaust valve is worn;
4. The oil shield is worn or damaged.

Engine Lubrication System Diagram



Inspection of oil

Stop the engine, place the vehicle on the horizontal ground and align it with the front and rear wheels on the ground. Screw out the oil dipstick and wipe out the oil on the dipstick, insert the oil dipstick hole again, and keep the dipstick perpendicular to the end face. Take out the dipstick and observe whether the oil level is between the upper and lower marking lines.



Supplementary method: from the dipstick hole, slowly inject the oil with a funnel until the oil level position is between the upper and lower marking lines. Then install the dipstick and tighten it.

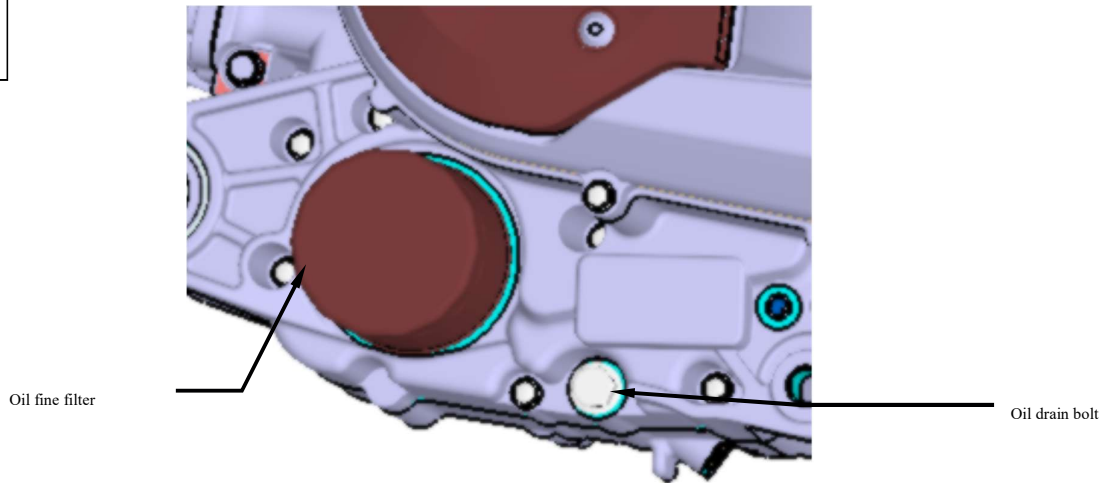
Oil Replacement

When changing the oil, it should be done before the engine has cooled down after the engine is stopped, so that the oil in the crankcase can be drained quickly and thoroughly. During oil draining, use the side bracket to tilt the vehicle to the left, unscrew the oil drain bolt, collect the oil in the crankcase with the oil pan, and clean the oil drain bolt. Install the oil drain bolt after the oil flows out, and tighten the oil drain bolt with the specified torque.

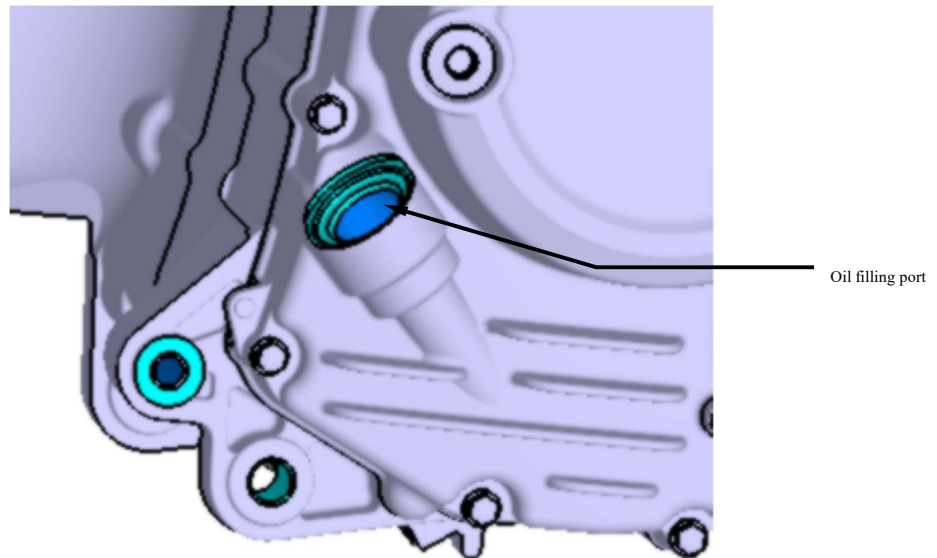
Replace the oil filter. Loosen the oil filter in the counterclockwise direction with special tools, collect the oil in the fine filter with the oil pan, install a new oil filter after the oil flows out, and tighten it with the specified torque.

When filling new oil: unscrew oil dipstick, measure 1.8L new oil of specified brand, and slowly fill into crankcase through funnel. Install oil dipstick, clean oil stain around oil filling port. If the main bracket is used for oil filling, the oil may overflow the oil filling port during the filling process, and the remaining oil shall be injected after 1 minute after starting the engine when filling 1.6L, and inspect whether the oil quantity is between the upper and lower marks lines of the dipstick according to the above method.

Drain oil



Oil filling



Oil pump

When the oil pump fails, remove the engine for repair or replacement. When doing this, remove the engine from the frame.

This part includes the following main contents:

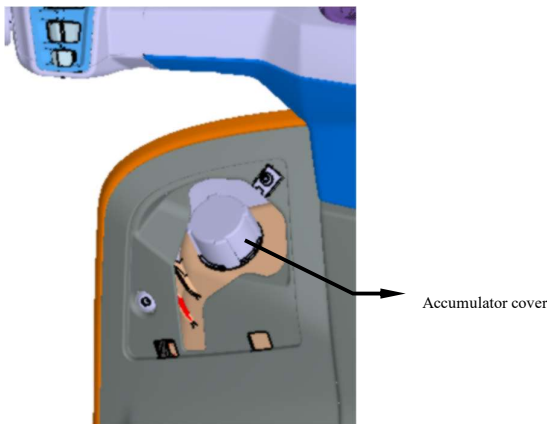
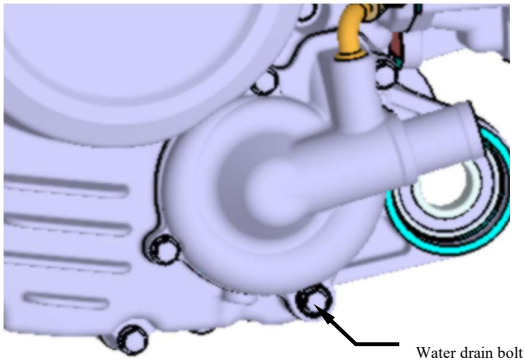
Removal procedure and diagram of oil pump;

Installation procedures of oil pump;

Disassembly and assembly of oil pump.

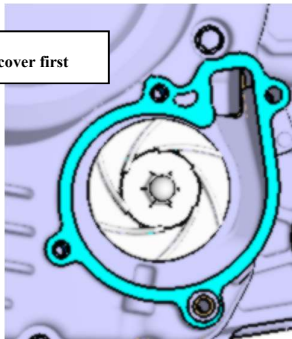
Removal procedure and diagram of oil pump:

1. Loosen the water drain bolt and collect cooling water with the container (to avoid contamination) and loosen the accumulator cover in front of the vehicle.

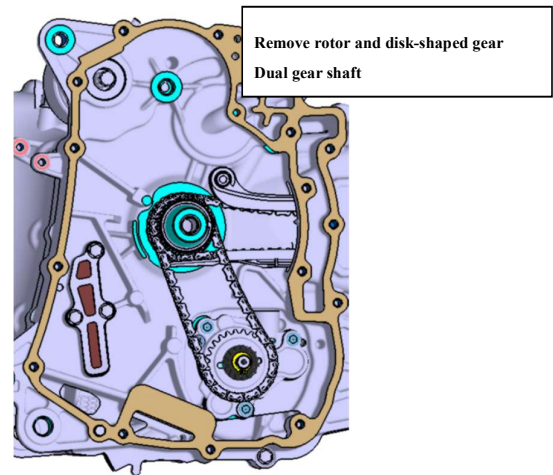


2. Remove the right crankcase cover; Remove the water pump cover and then the right crankcase cover after the water flow is finished.

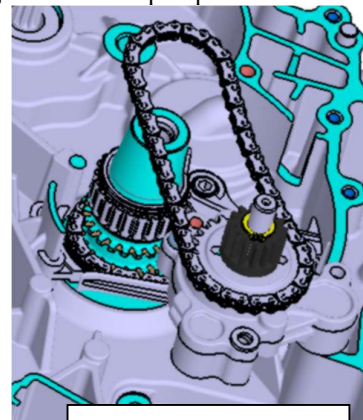
Remove water pump cover first



3. Remove oil pump bolts and remove oil pump together with oil pump chain. Remove rotor and disk-shaped gear



4. Remove oil pump bolts and remove oil pump together with oil pump chain



Installation procedures of oil pump:

The assembly procedure is the reverse of the removal procedure. During assembly, note the following points:

- 1 Parts are clean and intact;
- 2 When assembling the rotor, it is necessary to combine the disk-shaped gear and rotor and then put it on the crankshaft, so that the keyway of the rotor is aligned with the semicircular key of the crankshaft.
- 3 The rotor bolts shall be applied with

thread release glue, and the rotor bolts shall be tightened according to the specified torque.

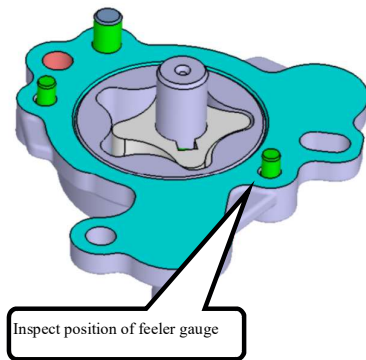
- 4 When the right crankcase cover is assembled, gently rotate the impeller of the water pump to align the gears to ensure that the right crankcase cover is in place smoothly;
- 5 Don't forget to fill in coolant and oil when all is done.

Sequence	Procedure	Remarks
	Removal sequence	Installation sequence is opposite to removal sequence
1	Unscrew the water drain bolt and loosen the accumulator cover	
2	Remove water pump cover	
3	Remove the right crankcase cover	
4	Remove magneto rotor and disk-shaped gear	Threadlocker shall be used for assembly. Tightening torque is 130N.m
5	Remove the dual gear shaft and dual gear	
6	Remove the oil pump fastening bolts	
7	Remove oil pump and oil pump chain	

Inspection of oil pump

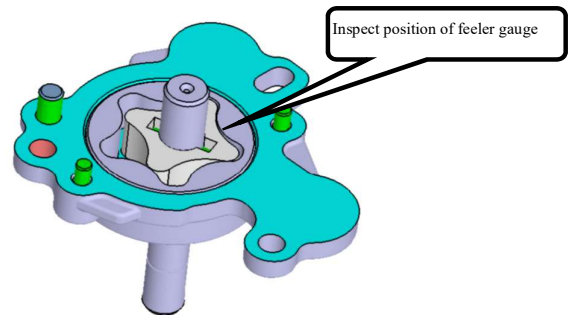
Radial clearance inspection

Maintenance limit value: 0.20mm



Clearance inspection of oil pump body

Maintenance limit value: 0.25mm



3

Inspection and adjustment

Maintenance Instructions

Spark plug

Timing phase

Lubricant

Coolant

Cylinder pressure

Air cleaner and oil collector

Throttle operation

Idle speed

Brake system

Running system

CVT and belt

Battery

Headlight Dimming

Standpipe steering bearing

Suspension system

Bolts, nuts, and fasteners

Maintenance Instructions

This section describes the inspection and adjustment of each part of the G350 two-wheel motorcycle. At the same time, the technical requirements for inspection and adjustment are also introduced.



Description:

Unless specified or indicated in the maintenance cycle table, please inspect and adjust each part of the G350 two-wheel motorcycle before each use in accordance with this section.

Specifications

“Engine”

Spark plug	NGK DCPR7E
Spark plug clearance	0.8~0.9mm
Valve Clearance (Cold status)	IN: 0.1~0.2mm EX: 0.15~0.25mm
Idle speed	1200r/min±120r/min
Cylinder pressure	≥1.2MPa/500rpm

“Vehicle body”

Free stroke of throttle handle	2~6mm
Free stroke of front brake control handle	11~19mm
Free stroke of rear pedal brake	11~19mm
Tire pressure	Front wheel: Single person: 200kPa, Double person: 200kPa Rear wheel: Single person: 220kPa, Double: 240kPa
Tire Size	Front Wheel: 120/70-12 51P Rear wheel: 130/70-12 62P

Spark plug

Remove spark plug cap. Remove spark plug with socket spanner. Visually inspect if there is damage on spark plug insulator, and ablation on the electrode. Replace it, if any.

Inspect the electrode clearance with a feeler gauge. Spark plug electrode clearance is 0.8 ~ 0.9 mm. Carefully adjust the clearance. Then remove carbon deposit and dirt with spark plug washer or steel wire. Inspect whether the spark plug sealing gasket is in good condition.

Install the spark plug and screw the spark plug straightly and

Clearance:

0.8~0.9 mm

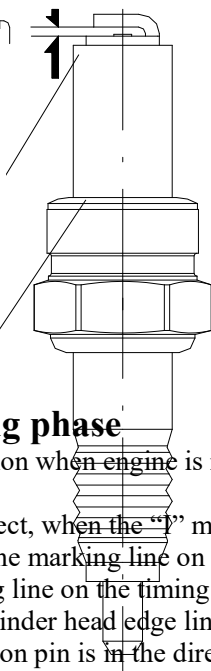
间隙: 0.7~0.8mm
Inspect: Clearance

Sedimentation

检查: Electrode corrosion

由极腐蚀
Inspect: whether gasket can be sealed

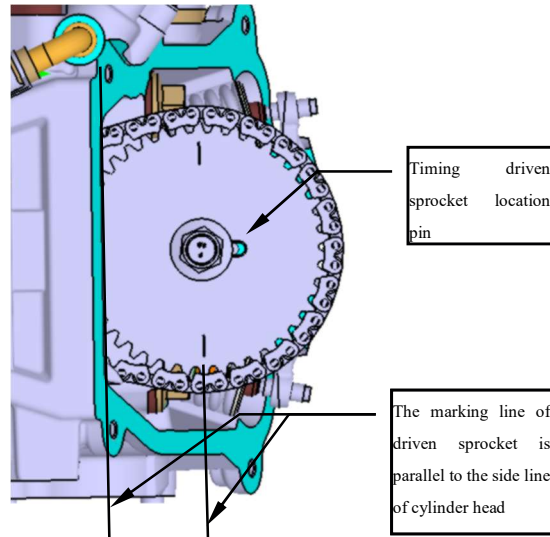
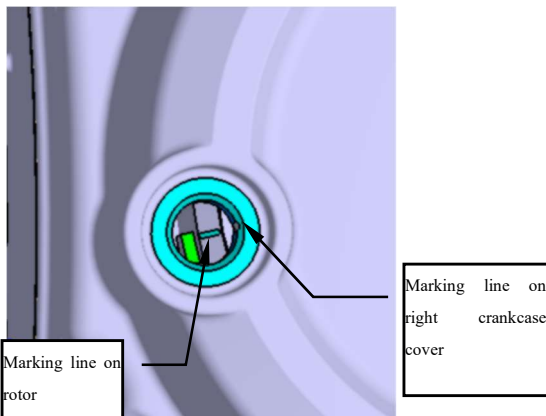
垫片: 气门出口密封



Timing phase

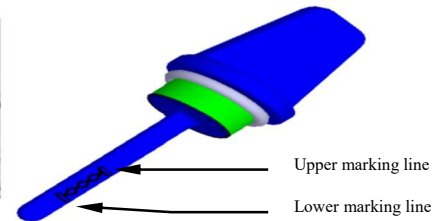
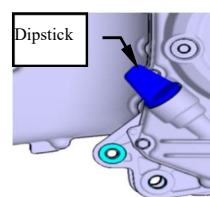
Proceed if there is any question when engine is reassembled or about the port timing.

When the port timing is correct, when the “1” marking line on the rotor is aligned with the marking line on the right crankcase cover, the marking line on the timing driven sprocket is parallel to the cylinder head edge line, and the timing driven sprocket location pin is in the direction shown in the figure. If the above requirements are not met, adjustment is required.



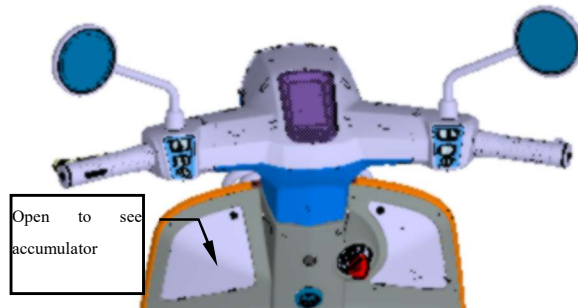
Lubricant

Inspect crankcase oil and reducer oil according to the method specified in lubricants section. If it is insufficient, timely replenish it.

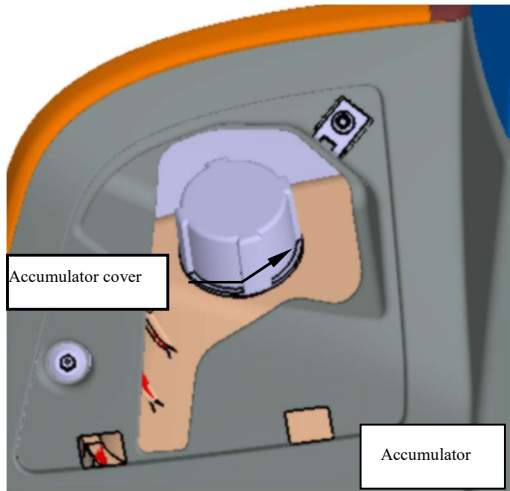


Coolant

Support the motorcycle on the horizontal ground with the main bracket, open the small cover on the left front of the vehicle, then see the accumulator. Inspect whether the coolant level is between the upper and lower marking lines. If it is lower than the lower marking line, then add it. Tighten the accumulator cover after inspection.



Inspect whether the coolant in the accumulator is between the upper and lower marking lines. If it is too little, replenish it in time.



Supplementary method: Remove the accumulator cover, and slowly introduce the coolant into the funnel until the liquid level of the coolant is between the mid-upper limit. Then close the accumulator cover.

The added coolant shall meet the requirements of minimum operating environment temperature of the whole vehicle.

A funnel should be used when filling to prevent coolant from flowing out. The water pipe of the accumulator shall also be inspected for leakage or damage. If any, it shall be replaced. If the accumulator has dried up, the entire water-cooling pipe, including those in the engine, shall be inspected for leaks and repaired.



Warning:

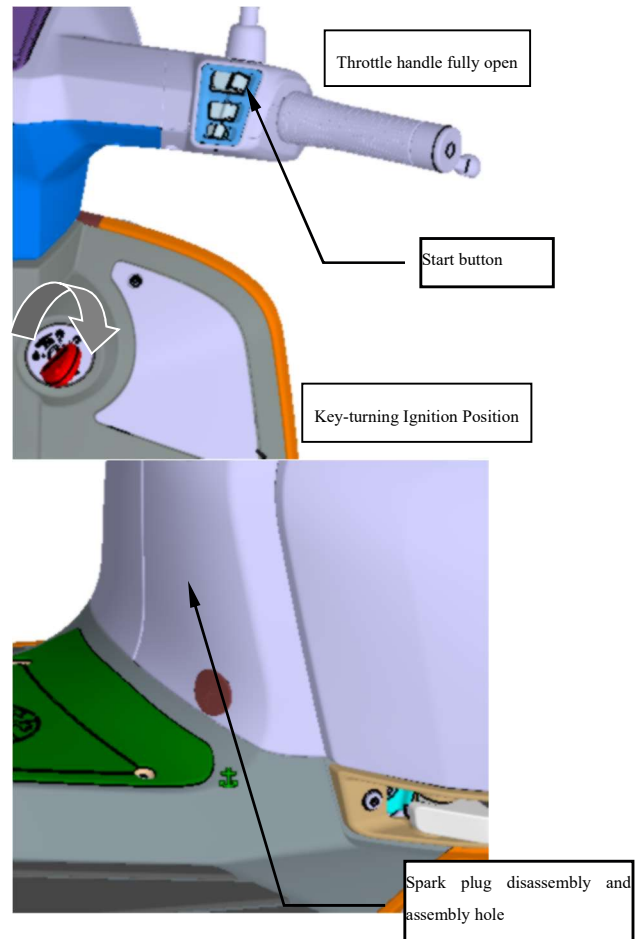
Before closing the accumulator cover, it must be confirmed that the engine and radiator are completely cooled, otherwise it may cause severe scalding by coolant discharge.

Cylinder pressure

When the engine cannot be started or it is difficult to start, and other faults have been corrected, if the cylinder pressure is suspected to be abnormal, inspect the cylinder pressure.

Cylinder pressure: $\geq 0.1.2\text{MPa}/500\text{rpm}$

When measuring, remove spark plug, install pressure gauge at spark plug installation position, fully open throttle knob, and press start button. Inspect whether there is leakage at connecting parts of pressure gauge. Set the pressure gauge to zero and press the start button again until the pressure gauge stops rising. It is usually achieved after 3~5 seconds of start-up. The maximum reading is cylinder pressure. Replace the spark plug after the test.

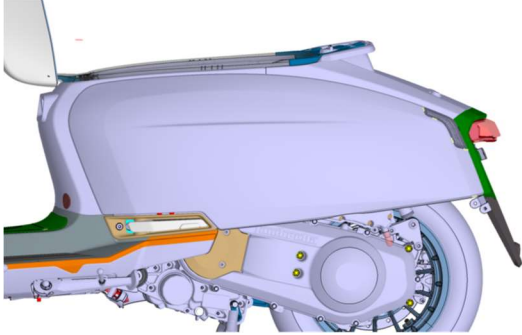


The reasons for too low cylinder pressure mainly include:

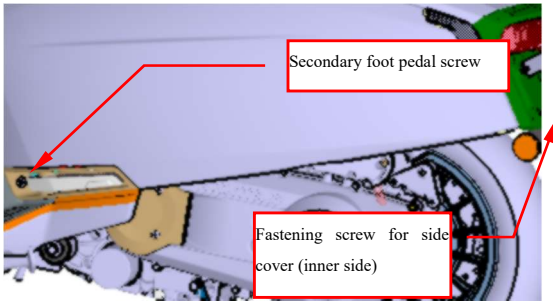
- Incorrect valve clearance adjustment
- Valve leak
- Ablation of cylinder head gasket
- Damage to piston ring, cylinder, or piston

Cleaning and replacement of air cleaner element

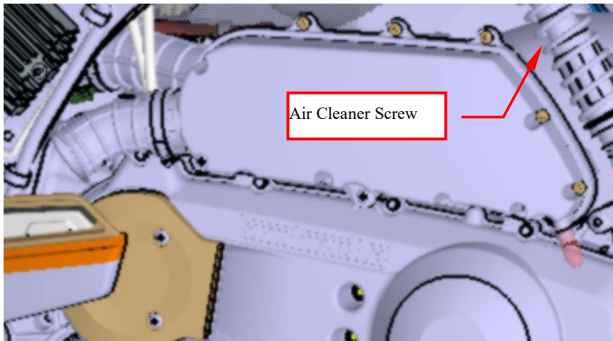
1. Use the key to open the seat cushion



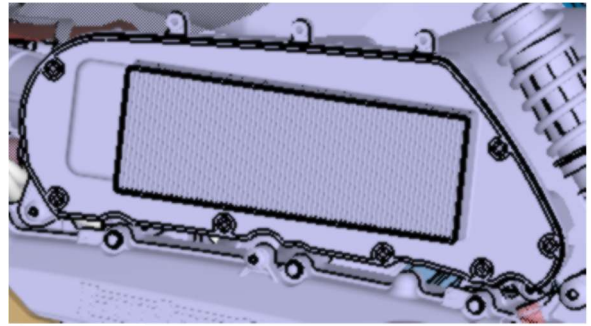
2. Remove the left side cover: remove the side cover fastening screw (1 piece) and auxiliary foot pedal screw (2 pieces) in the figure below, and remove the left side cover forward.



3. Loosen the air filter screw and remove the air filter cover;



4. Remove the filter element and clean it.



Description:

1. Remove the filter element and inspect whether the filter element is normal. The filter element is a paper filter element. The dust and foreign matters can be cleaned by vibration, or the dust on the surface can be blown by compressed air. When blowing the paper core, the direction of air flow is opposite to the working air flow. When compressed air is used, the air nozzle shall be more than 0.5m away from the filter element;
2. Replace the filter element if it is too dirty, cracked, or damaged;
2. The cycle of cleaning and replacing the air filter element shall be shortened when driving in the dusty area;
3. Keeping the air cleaner clean can improve the working efficiency of the engine and prolong the service life of the engine.

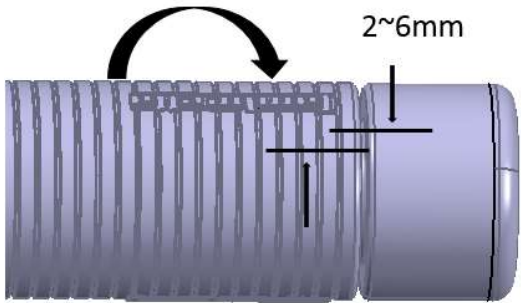
After cleaning or replacing the filter element, the whole vehicle shall be assembled in reverse order.

Throttle operation

First inspect the throttle control wire for deformation, kink, or damage.

Then measure the free play of the throttle handle. Turn the rotating handle to one side of free play, mark the straight line between the throttle handle and the counterweight with a marker pen, then turn the throttle handle to the other side of the free play, and measure the distance of straight line staggering, which is the free play of the throttle handle.

Free play is 2~6mm.



If the free play is insufficient or too large, the adjustment shall be made.

Adjustment method:

Fine adjustment: open the seat cushion to remove the storage box, loosen the locknut M6, rotate the adjusting screw to adjust to a satisfactory free stroke. Then tighten the locknut M6.



Idle speed



Attention:

Inspect and adjust idle speed after other engine items have been adjusted to the specified range.

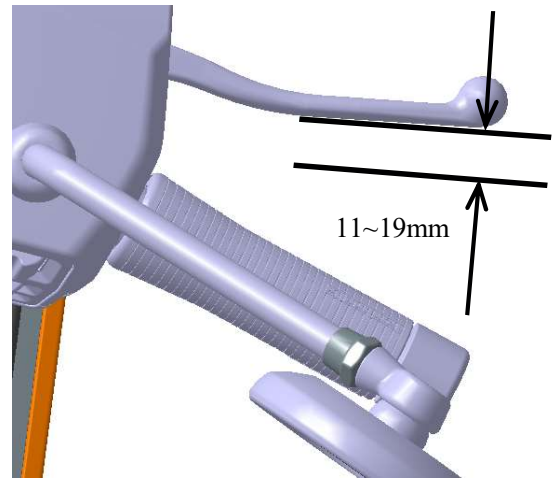
The idle speed of the vehicle is controlled by the ECU. The air flow of idle speed the throttle valve body has been adjusted at the factory. Therefore, do not adjust the idle speed adjusting screw. When the idle speed is unstable, there is no idle speed, or the idle speed is too high, please find out the cause of the fault according to the troubleshooting method of EMS system and eliminate the fault.

Idle speed 1200r/min \pm 120/min

Brake system

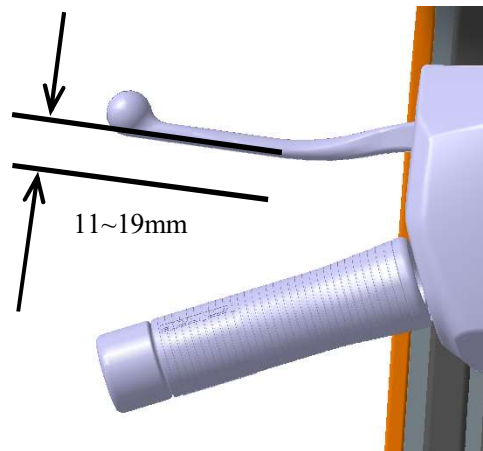
Inspect the free stroke of the front brake handle.

The free stroke of brake handle is 11~19mm.



Inspect the free stroke of the rear brake handle.

The free stroke of rear brake handle is 11~19mm.



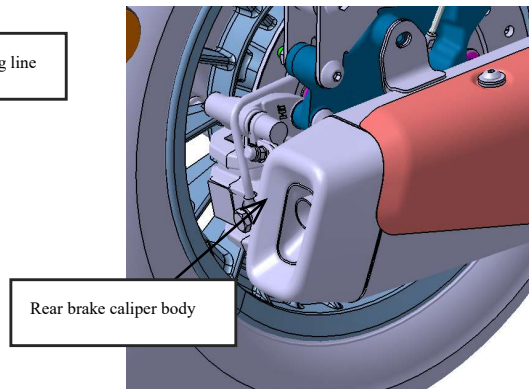
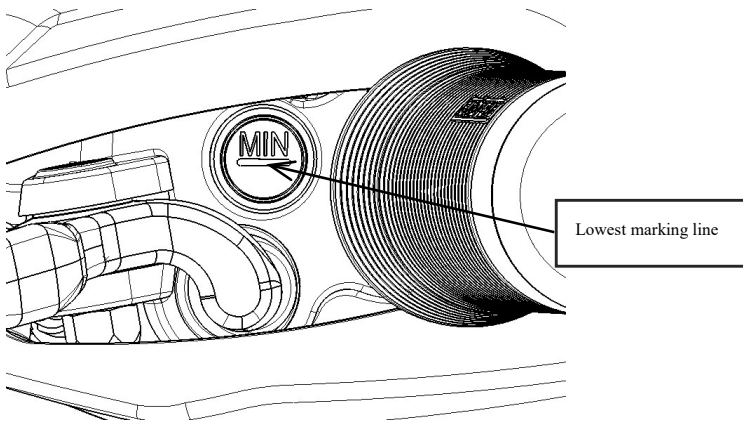
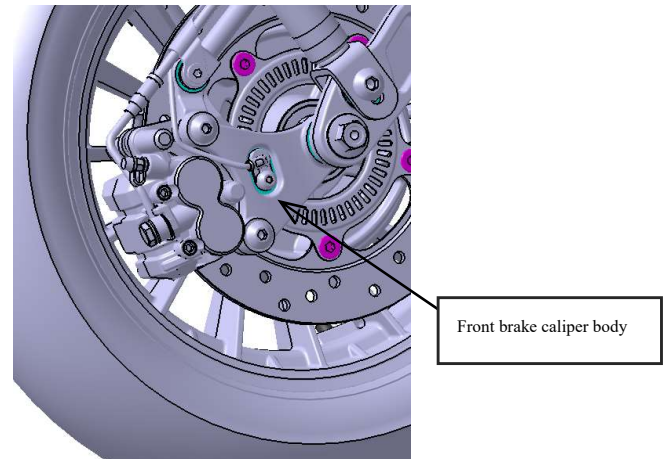
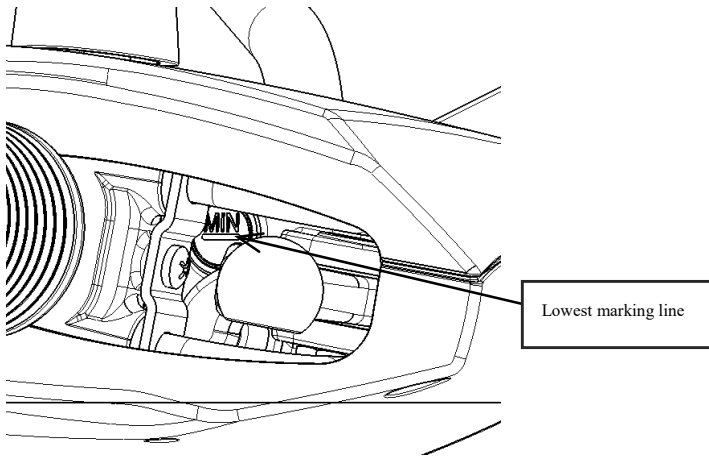
Level inspection of brake fluid:

Inspect the brake fluid level in the front brake cylinder block. If the liquid level is too low but the whole brake fluid is not exhausted, supplement the brake fluid directly. The specification of supplemental brake fluid is DOT 4.

Brake fluid vacuum filling method:

This method is applicable to the brake fluid filling when the brake fluid in a new vehicle or brake cylinder is empty.

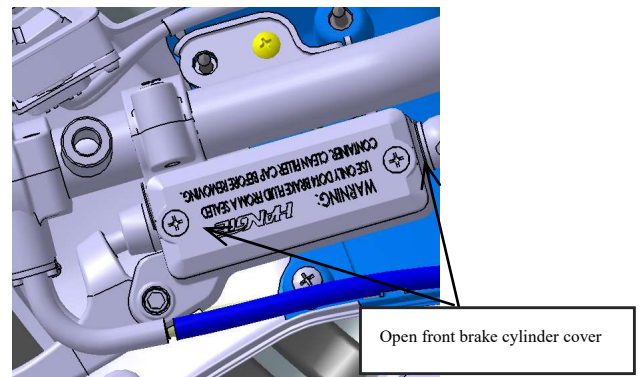
1. Use the vacuum pump to pump air at the brake caliper body venting nozzle.

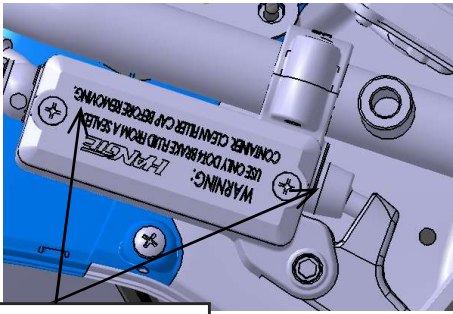


If the brake fluid in the cylinder block is found to be cloudy, impurity or smelly, drain the brake fluid and fill it again. Refer to the brake fluid vacuum filling method in the next section.

If the brake fluid in the front and rear brake cylinder blocks is empty, use the vacuum pump to pump air at the brake caliper body venting nozzle, and then fill the cylinder block. Refer to the brake fluid vacuum filling method in the next section.

2. Open brake cylinder cover and add brake fluid.





Open rear brake cylinder cover

3. Operate the brake handle to remove the dead angle inside the brake caliper body.
4. When the vacuum pump has completely exhausted the air inside the brake caliper body, after pumping the brake fluid, tighten the handle or step on the pedal, fast tighten the bolt of venting nozzle, with the tightening torque range of 7~9N.m.
5. Install the brake cylinder cover. The sealing gasket shall be leveled and replaced if necessary.
6. Inspect whether oil cup, hydraulic brake hose and all connecting parts are leaking after filling.



Attention:

1. The brand of brake fluid is DOT4 non-petroleum-based brake fluid.
2. The brake fluid shall not be mixed with other impurities, otherwise chemical changes will occur to reduce braking performance.



Warning:

The brake fluid is strongly corrosive, and shall not be splashed on the surface of painted parts or plastic parts; if it is touched on the eyes or skin, it shall be rinsed with plenty of water immediately. The doctor shall be consulted for treatment.

Running system

Tire specification and tire pressure

Inspect the tire pressure with a tire pressure gauge to see if it complies with the recommended tire pressure requirements.



Front tire pressure



Rear tire pressure

Attention



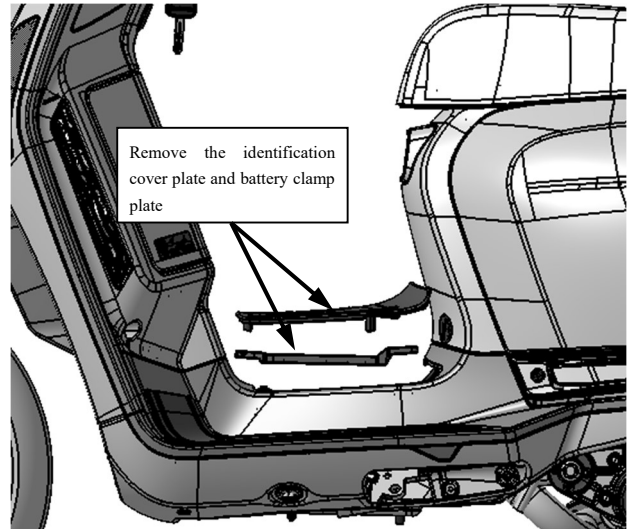
Attention:

The tire pressure inspected when the tire is cooled is accurate.

Tire specification and recommended tire pressure:

Tire specifications	Front tire		Rear tire	
	120/70-12 51P		130/70-12 62P	
Cold tire air pressure	Single person		Double person	
	Front tire	Rear tire	Front tire	Rear tire
	200kPa	220kPa	200kPa	240kPa

If the tire pressure does not meet the specified requirements, inspect the tire for cuts, nails, or other sharp objects.



CVT and belt

CVT and belt inspection

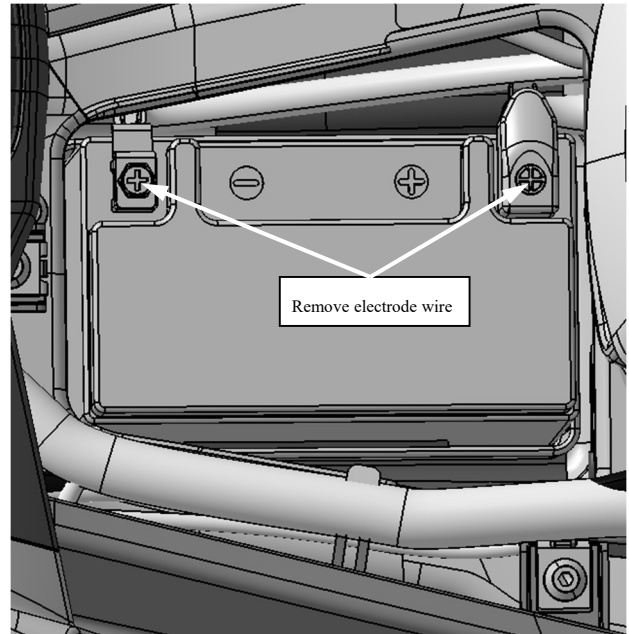
Support the motorcycle on a horizontal surface with the main bracket, remove the left side cover with reference to the cover disassembly. Inspect CVT and belt.

Battery

Removal of battery

First remove the identification cover plate and the battery clamp plate, remove the negative electrode of the battery, then remove the positive electrode, and then take out the battery.

Clean the positive and negative electrode connectors of the battery and the external surface of the battery.



Assembly of battery

Install in reverse order. When connecting electrode wire, make sure to connect positive electrode first.



Attention:

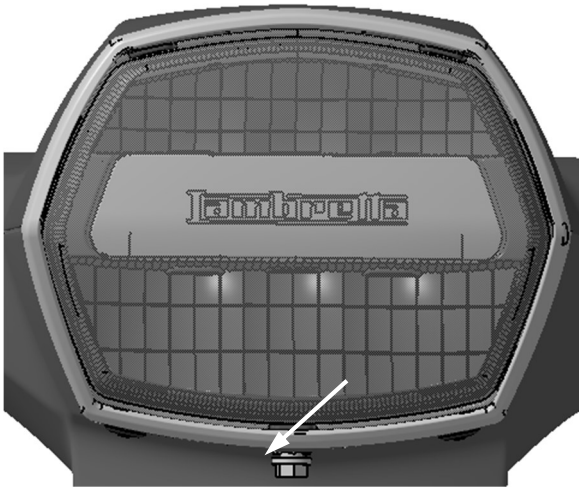
1. The start-up of the vehicle and the EMS system rely entirely on the battery for power supply, so it is very important to keep the battery charged sufficiently, otherwise it cannot be started.

Headlight Dimming

Inspect the headlight direction before driving.

The headlight can be adjusted vertically.

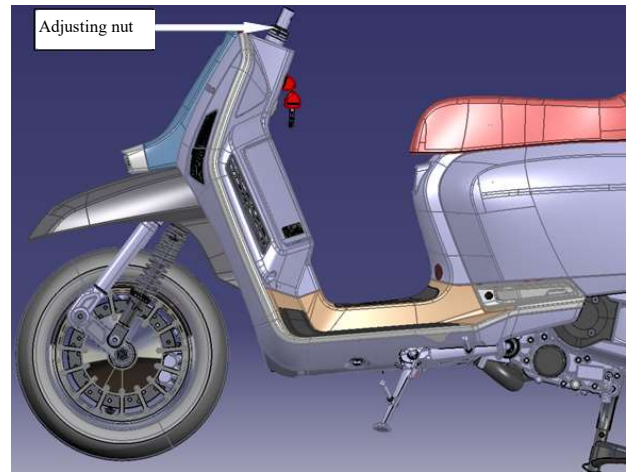
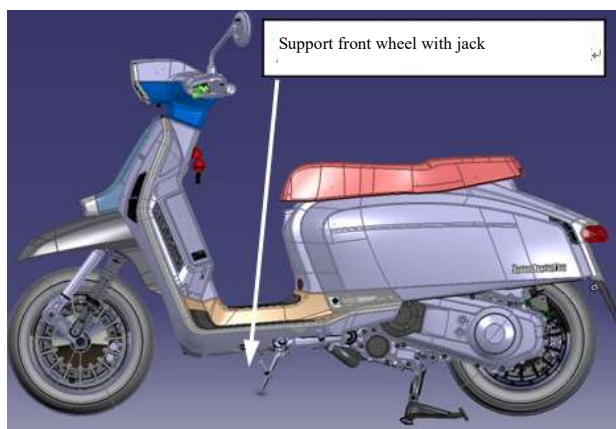
Adjustment method:



Unscrew the adjusting bolt under the headlight with a wrench, rotate the headlight up and down to the desired height and tighten the adjusting bolt.

Standpipe steering bearing

Support the motorcycle with jack or other supports to leave the front wheel from the ground and inspect whether the steering handle can rotate freely. If the steering handle cannot rotate in balance, and there is axial movement or jamming, adjust the adjusting nut of the front fork standpipe. For the disassembly method of the front cover, see the operating subassembly disassembly.



Suspension system

Front suspension

Keep the front brake in braking state, and press the front fork riser several times to inspect whether the front suspension works normally. In the event of abnormal noise or clicks, then inspect all fasteners and tighten to the specified torque value.

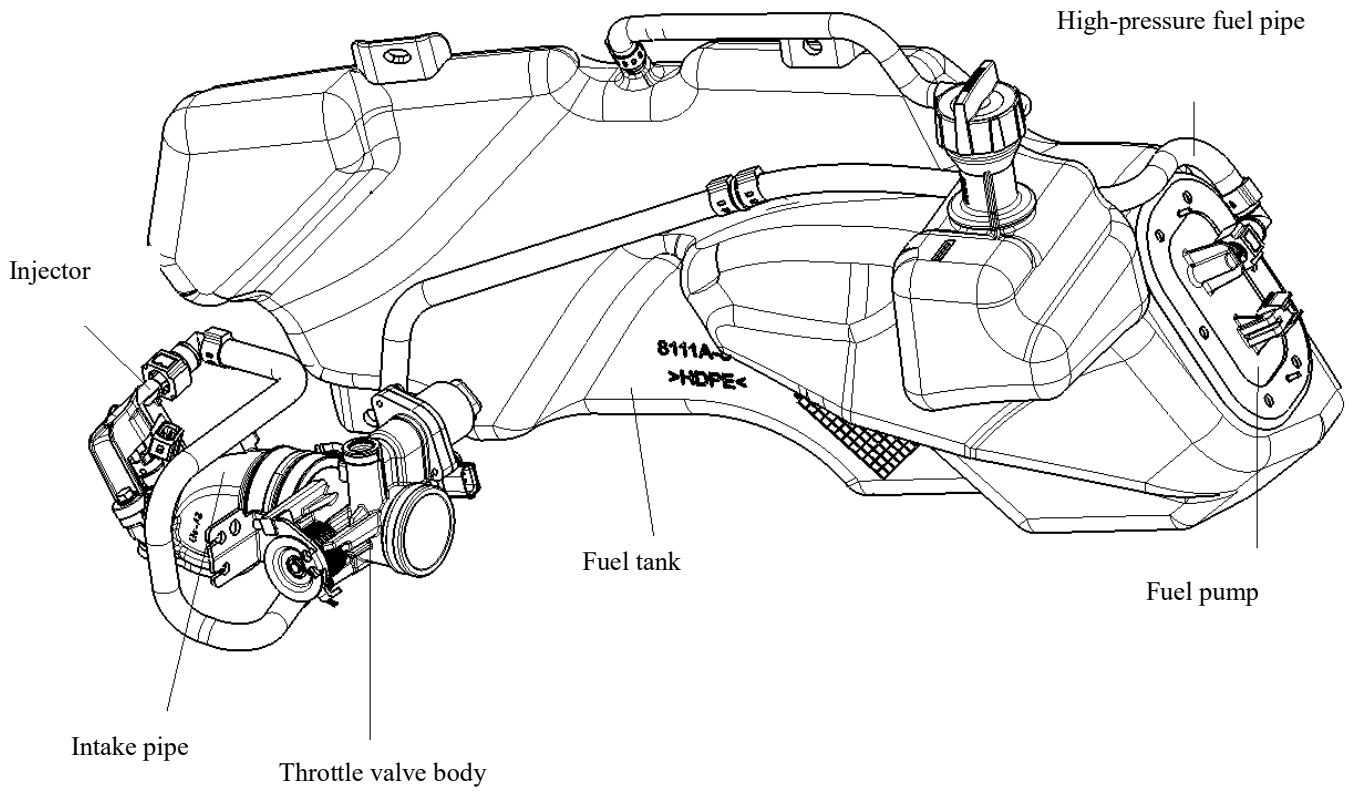
Rear suspension

Press the rear of the seat cushion firmly to inspect that the rear absorber returns correctly. In case of jamming and non-returning, inspect the absorber for oil leakage, bending and deformation, etc. If any, please replace it.

Bolts, nuts, and fasteners

All bolts, nuts and fasteners shall be tightened according to the maintenance cycle table. Inspect all split pins, safety forks, and locks, etc.

Fuel system



4

Fuel system

Maintenance Instructions	Fuel Fine Filter Replacement
Troubleshooting	Removal and installation of air cleaner
Removal and installation of fuel tank	Removal and installation of throttle valve body
Disassembly and Assembly of Fuel Tank	

Maintenance Instructions

This section describes the knowledge of the fuel system.



Warning:

Pay attention to fire prevention when handling gasoline!

When disassembling each component of the fuel system, pay attention to the installation position of the seal. Always replace with new seals during reassembly.

Do not disassemble the throttle valve body (the injector can be removed).

Specifications

Throat diameter	Φ38mm equivalent
Idle speed	1200r/min±120 r/min
Free stroke of accelerator handle	2~6mm

Troubleshooting

The engine can be ignited, but cannot start

1. There is no fuel or too little fuel in the fuel tank;
2. Too much fuel enters the cylinder;
3. The air cleaner is blocked;
4. The spark plug is brokenfire;
5. The flow of fuel pipe is not smooth;
6. Fuel quality (containing moisture);
7. The fuel is stored for too long;
8. Failure of fuel pump;
9. The injector is faulty (blocked).

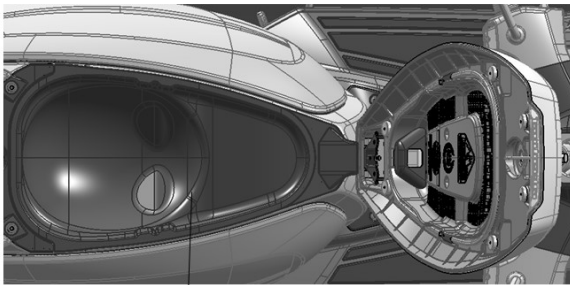
Removal and installation of fuel tank

Removal procedure:

1. Press key ① for 3 seconds to open the seat cushion.



2. Remove the storage box.



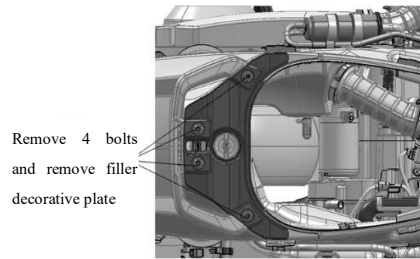
3. Remove the right side cover mounting bolt ③ and remove the right side cover.



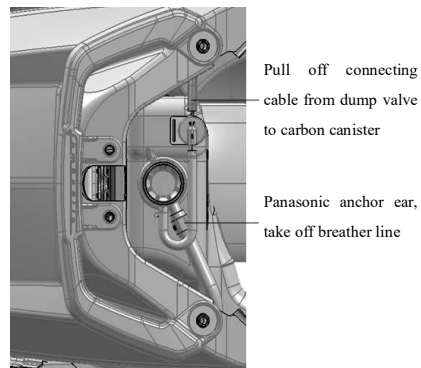
4. Remove the fuel tank cover.



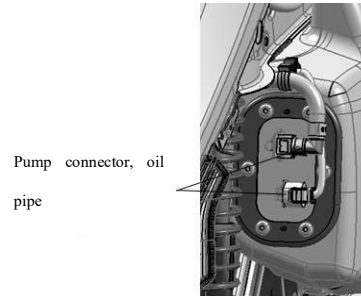
5. Remove the decorative plate and rear handrail of the fuel filler. (It is recommended to install the fuel tank cover back on the fuel tank after removing the fuel filler decorative plate)



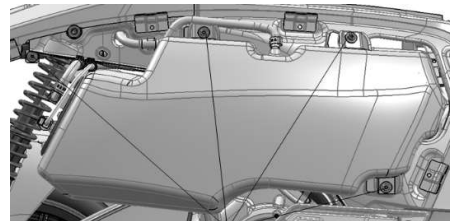
6. Remove fuel pipe A and the connecting pipe between dump valve-carbon canister connecting pipe.



7. Remove connector and pipe of fuel pump.



8. Remove 4 mounting bolts and remove fuel tank



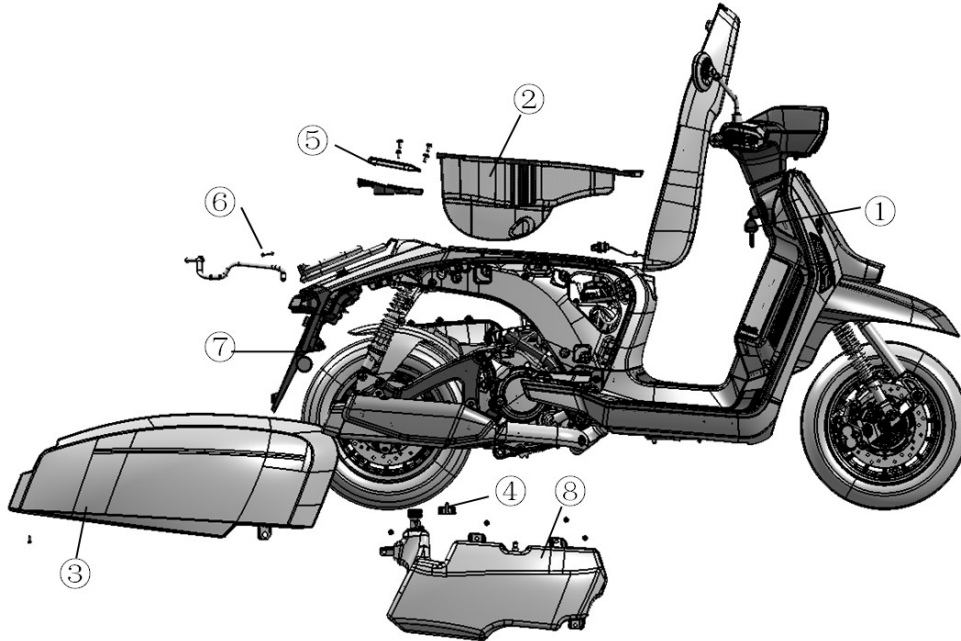
To avoid contamination of the fuel delivery line, after removing the fuel line, seal the connector with tape. When removing the fuel tank, the fuel tank is unstable. It is recommended that 2 persons assist in removing the fuel tank.

Installation procedure:

The fuel tank assembly procedure is the reverse of the disassembly procedure.

During assembly, pay attention to the wiring of fuel pump control line, and strictly follow the wiring diagram. Take care to avoid contamination of the fuel lines.

Removal/installation of fuel tank



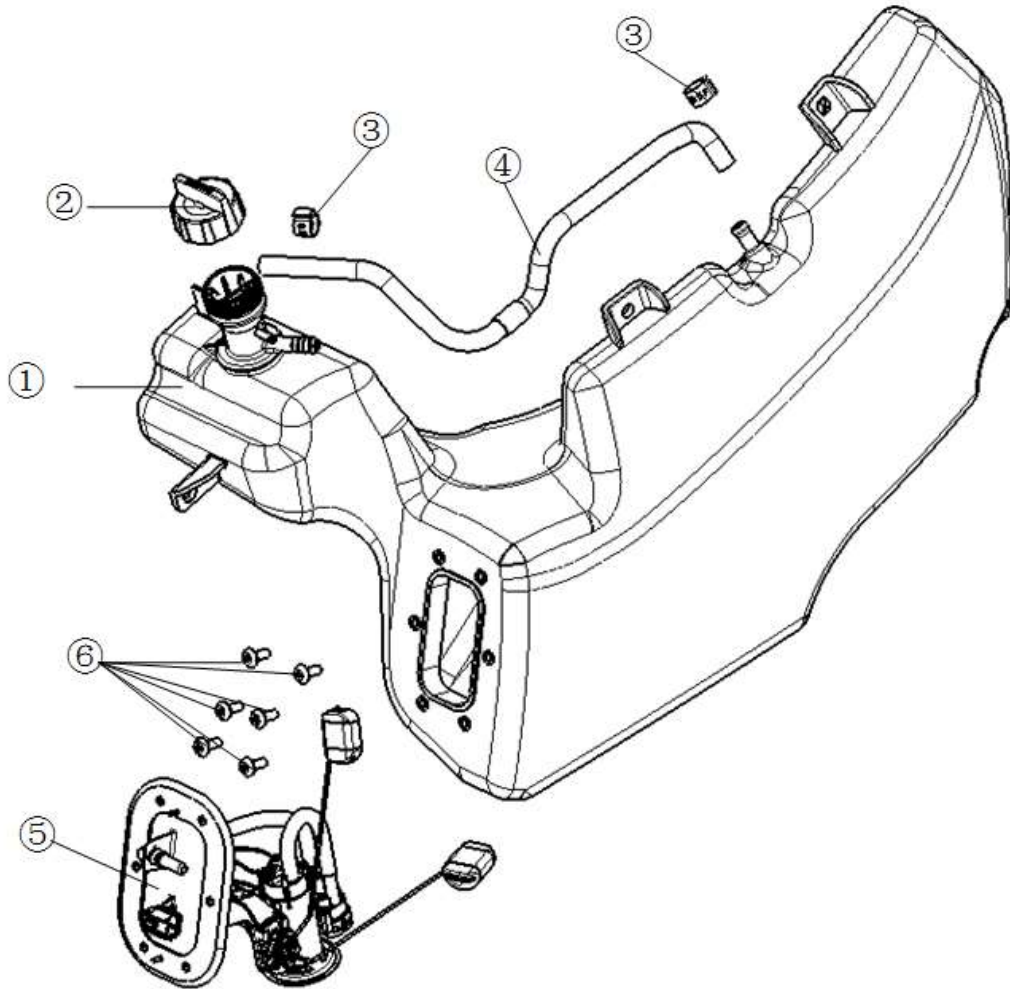
Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Remote control key combination	1	
2	Double seat cushion component	1	
3	Storage box	1	
4	Bolt M6X20	1	
5	Welding combination of side cover (R)	1	
6	Fuel tank cover combination	1	
7	Bolt M8X16	4	
8	Fuel filler decorative plate	1	
9	Rear handrail	1	
10	Anchor ear 8-16	2	
11	Fuel pipe A	1	
12	Bolt M6×12	6	
13	Large grommet A class 6	6	
14	Fuel tank welding combination	1	

Disassembly and Assembly of Fuel Tank

The fuel tank shall be disassembled and assembled according to the following figure.

The assembly procedure is the reverse of the installation procedure.

When assembling, take care to face the outlet port directly in front of the fuel tank.



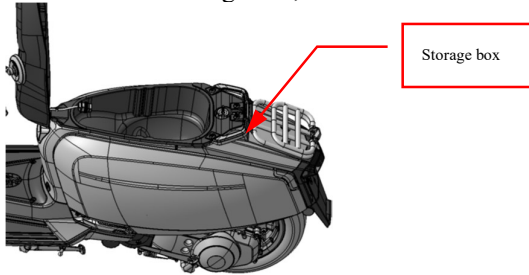
Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Fuel tank welding combination	1	
2	Fuel tank cover	1	
3	Anchor ear 8-16	2	
4	Fuel pipe A	1	
5	Fuel Supply Pump Components	1	
6	Bolt M6×16	6	

Removal and installation of air cleaner

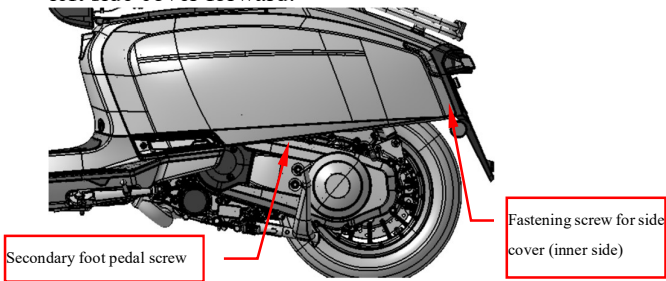
After removing the air cleaner, the upper and lower bodies can be removed to take out the filter element, and clean or replace the filter element.

Removal procedure:

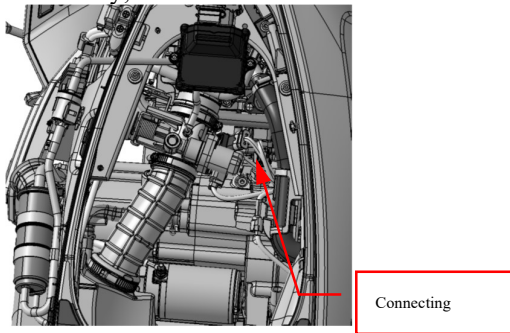
1. Use the key to open the seat cushion;
2. Take out the storage box;



3. Remove the left side cover: Remove the side cover fastening screws (1 piece) and the auxiliary foot pedal screws (2 pieces) in the figure below, and remove the left side cover forward.

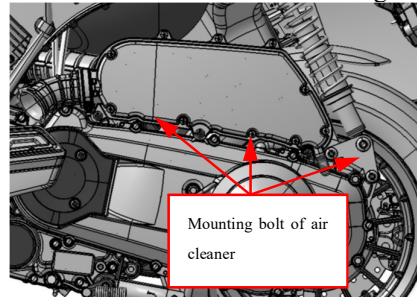


4. Remove the connecting anchor ear of air cleaner and valve body;

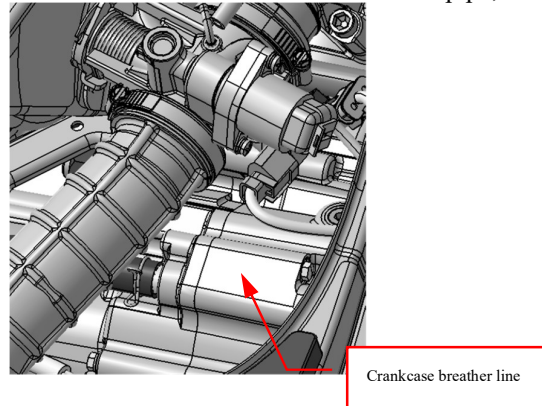


Take out the air cleaner.

5. Remove the air cleaner mounting bolts (3 pieces);



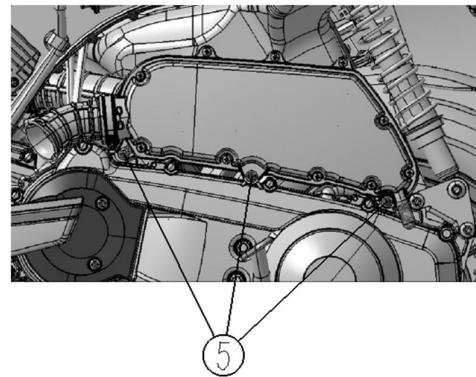
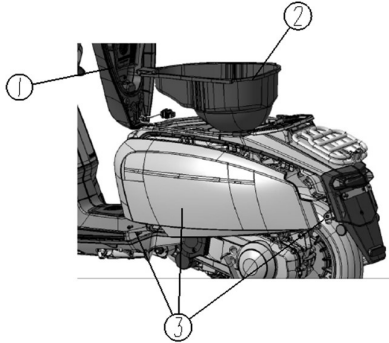
6. Pull out air cleaner crankcase breather pipe;



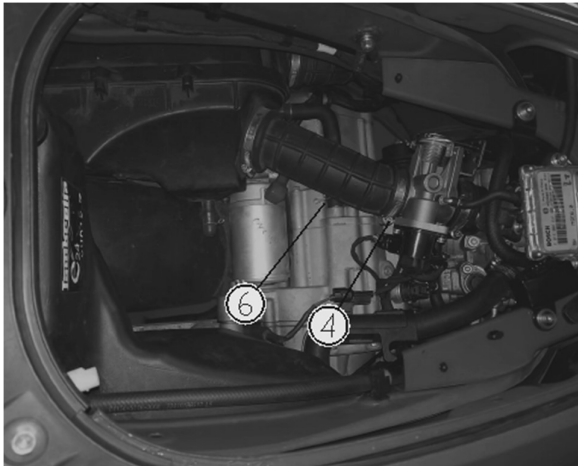
Removal/installation of air cleaner

The installation procedure is the reverse of the removal procedure.

1. Open the seat cushion ①, take out the storage box ②, remove the left side cover ③.
3. Remove the air cleaner mounting bolts ⑤



2. Remove air cleaner anchor ear ④ and crankcase breather line ⑥.



Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Opening seat cushion	1	Refer to Removal and Installation of Seat Cushion
2	Take out the storage box	1	
3	Remove the left side cover bolts	3	Side cover fastening screw (1 piece) and secondary auxiliary foot pedal screws (2 pieces)
4	Remove connecting anchor ear of air cleaner and throttle valve body	1	
5	Remove the air cleaner mounting bolts	3	
6	Pull out air cleaner crankcase breather pipe	1	
7	Take out the air cleaner	1	

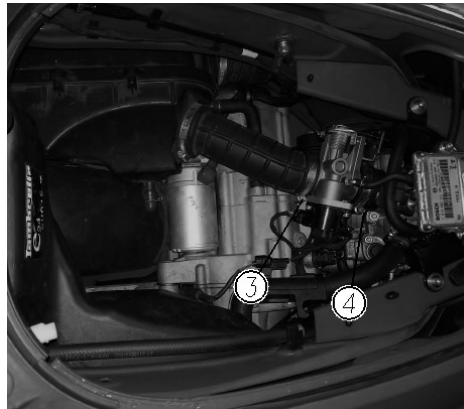
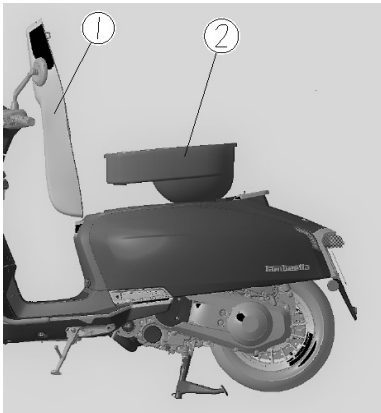
Removal and installation of throttle valve body

Installation procedure:

The installation procedure is the reverse of the removal procedure.

When installing, the location notch of the air inlet manifold connecting pipe must be aligned with the locating projection of the throttle valve body.

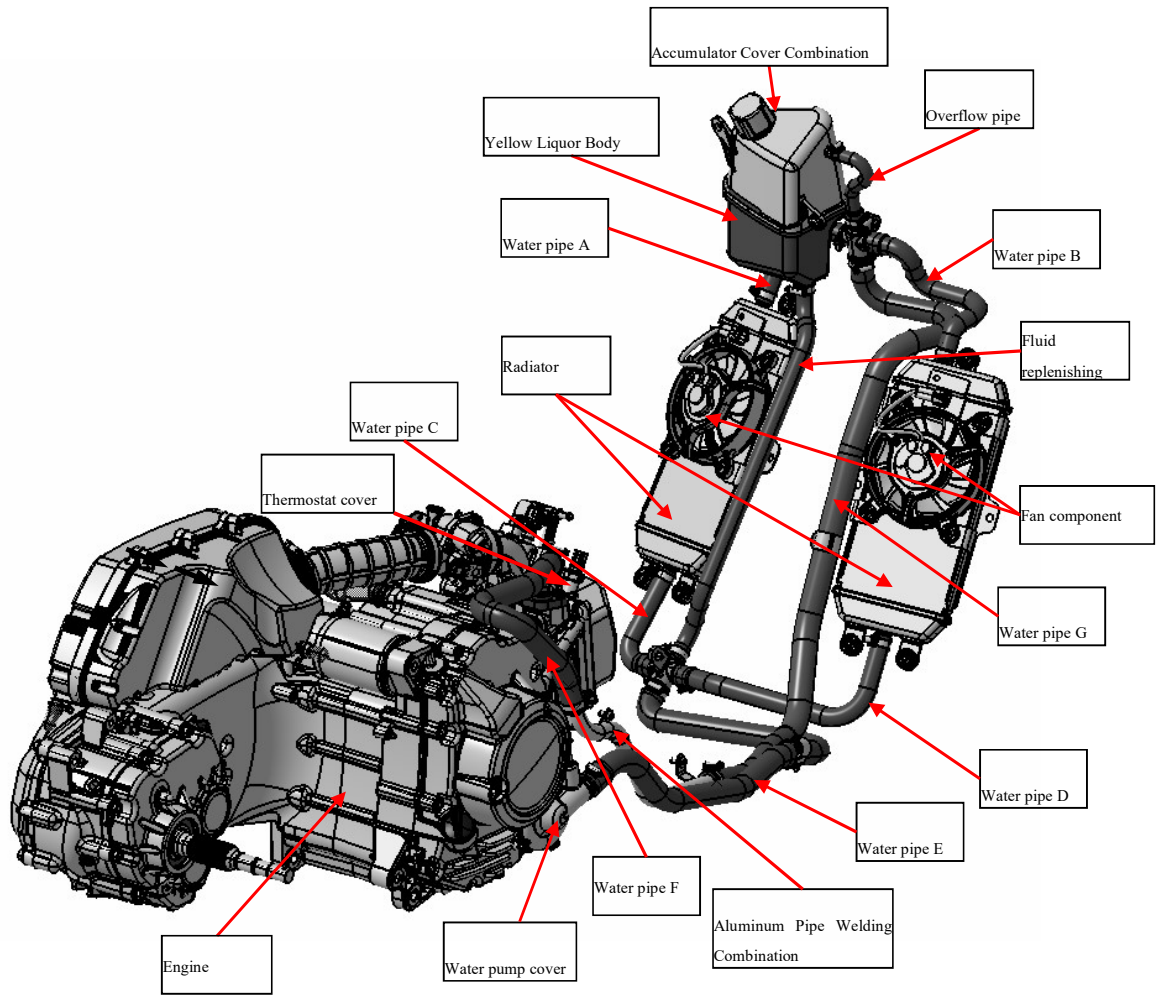
1. Open the seat cushion ① and take out the storage box ②
2. Remove the air cleaner connecting pipe anchor ear ③ and throttle valve anchor ear ④.



Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Open the seat cushion	1	Refer to Removal and Installation of Seat Cushion
2	Take out the storage box	1	
3	Remove the air cleaner connecting pipe anchor ear and pull off the air cleaner connecting pipe to separate from the throttle valve.	1	
4	Remove the connection anchor ear between the throttle valve body and the air inlet manifold connecting pipe	1	
5	Remove throttle valve body	1	

Removed throttle valve body shall not be further disassembled. If several sensors on the valve body need to be replaced, please proceed under the guidance of EMS system expert.

Cooling system



5

Cooling system

Maintenance Instructions	Troubleshooting
Performance Inspection	Radiator
Cooling electrical system	

Maintenance Instructions

Maintenance of this part must be carried out at normal or low temperature to avoid injury to maintenance personnel. Maintenance of this part can be carried out on the vehicle.

After inspection and maintenance, air tightness inspection shall be carried out on the radiator with airtight testing equipment.



Warning:

If the coolant temperature is above 100°C, opening the accumulator cover will cause the danger of violent boiling due to pressure drop, so never open the cover at high temperature.



Attention:

When the coolant adheres to the painted surface, it may sometimes damage the painted surface, and should be flushed quickly with water in case of adhesion.

Maintenance Basis

Projects	Standard value	Limits of Use
Temperature of thermostat valve opening	Start opening	60°C
	Fully Open	72°C
	Full opening degree (72°C)	3.5mm
Coolant boiling temperature (mixing ratio 50%)	Atmospheric Pressure	107.7°C
	1.1BAR	125.6°C
Coolant capacity	2.5L	Replenishment below minimum liquid level

Table of coolant mixing ratio

Minimum temperature in service area	Mixing ratio	Antifreeze (ml)	Purified water (ml)
-9°C	20%	500	2000
-16°C	30%	750	1750
-25°C	40%	1000	1500
-37°C	50%	1250	1250
-44.5°C	55%	1375	1125

The bold font is the mixing ratio of coolant filling when the vehicle leaves the factory.

When replenishing, use the coolant specified by Gaokin.

Avoid mixing with other brands of coolant.

This coolant is toxic, and is non-potable.

For the lowest air temperature in the service area, a mixing ratio with about -5°C should be selected.

Troubleshooting

∞ Water temperature rise too high

1. The fan switch is poor.
2. The thermostat is poor;
3. Too little coolant;
4. Water pipe or four-way pipe is blocked;
5. The radiator blade is blocked;
6. The radiator is blocked;
7. Abnormal water pump;
8. Short circuit of cable.

∞ Water temperature cannot rise or rise badly

1. The fan switch is poor;
2. The thermostat is poor;
3. Short circuit of cable.

∞ Water leakage

1. Poor mechanical seal;
2. Deterioration and poor adhesion of O-rings;
3. The water pipe is damaged and deteriorated.
4. The radiator is damaged.

Performance Inspection

Inspection of accumulator cover



Warning:

Ensure that the coolant cools completely before opening the cover.

Install the accumulator on the pressure gauge, and increase the charging pressure to 0.11Mpa. If it can be kept within the specified pressure range for 6 seconds.

Inspect the air tightness of radiator

Install the radiator on the airtight test equipment, supply 0.15-0.18Mpa compressed air into the water tank. If it keeps the pressure for 30s without leakage, and it is qualified.

Specified pressure: 0.15-0.18Mpa.

Inspect whether there is water leakage in the throat pipe and each connecting part.

Do not raise the pressure above the specified pressure, which may cause damage to the radiator and the

connecting parts.

Accumulator cover inspection



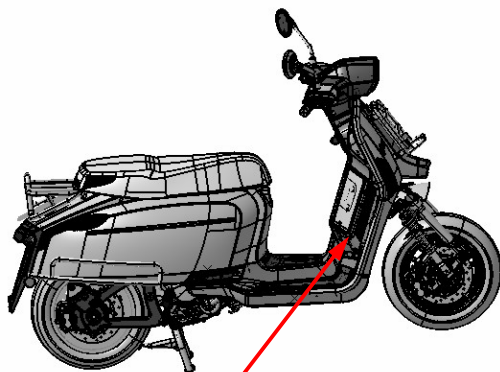
Inspect the air tightness of radiator



Radiator

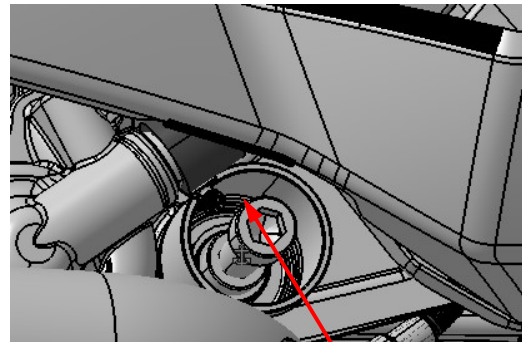
Removal of radiator

1. Park the motorcycle on the horizontal ground, lift the main bracket, keep the rear wheel off the ground, and then remove the file box and foot pedal cover (see the disassembly of cover).



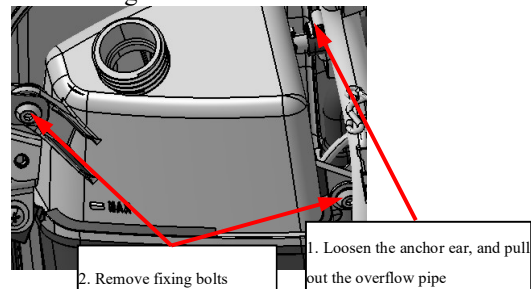
Remove the cover

2. Loosen the anchor ear, pull off the water pipe E, and simultaneously unscrew the accumulator cover to drain off the coolant.



Undo the anchor ear, pull out the water pipe E, and drain the coolant

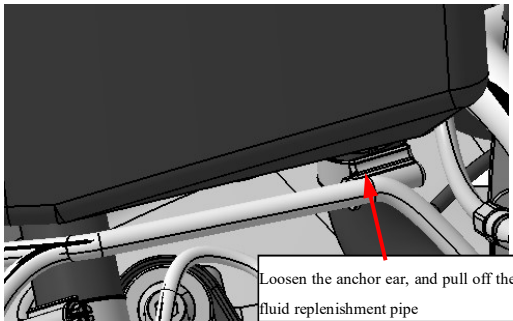
3. Loosen the anchor ear, pull out the overflow pipe, and remove the fixing bolt of the accumulator.



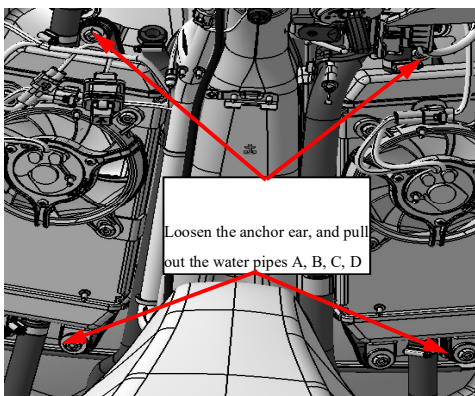
2. Remove fixing bolts

1. Loosen the anchor ear, and pull out the overflow pipe

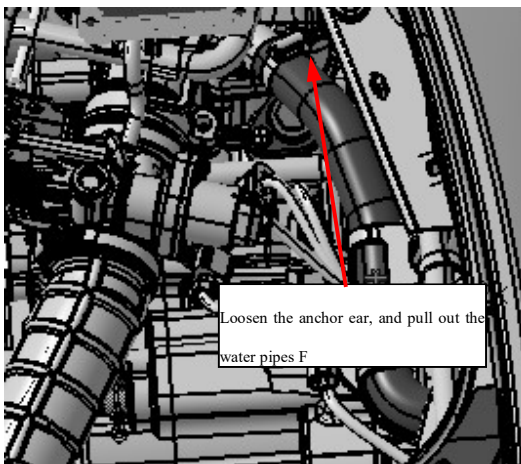
4. Loosen the anchor ear, pull out the fluid replenishing pipe and remove the accumulator.



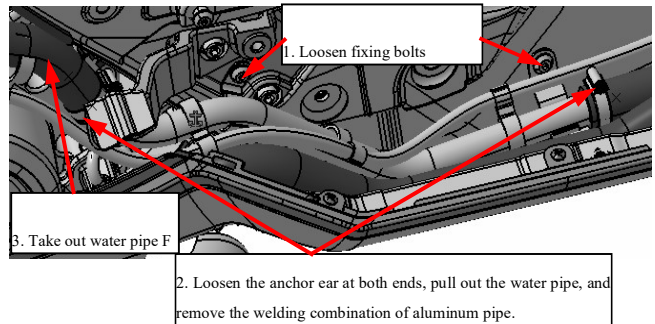
5. Loosen the anchor ear and remove water pipes A, B, C and D.



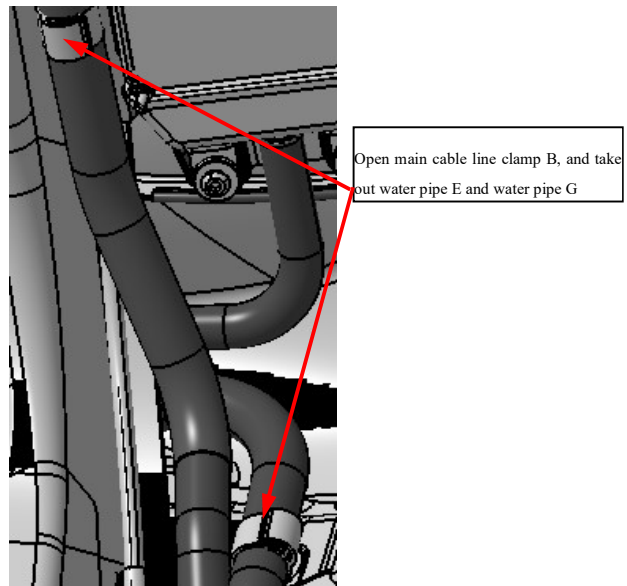
6. Open the seat cushion, remove the storage box, loosen the anchor ear, and pull out the water pipe F.



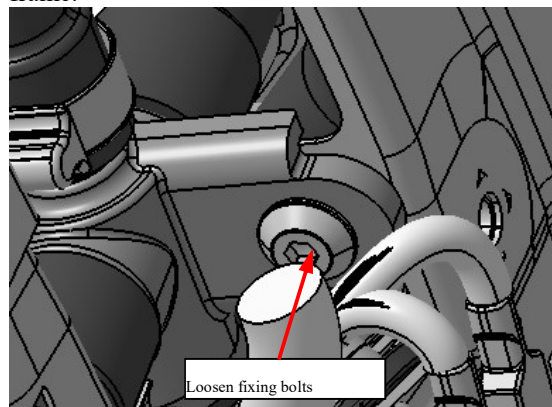
7. Remove the combination of right side cover and right foot pedal (see the disassembly of cover and foot pedal), then remove the fixing bolts of welding combination of aluminum pipe, loosen the anchor ears at both ends, pull out the water pipe, remove the welding combination of aluminum pipe, take down the fuel tank components, and take out the water pipe F.



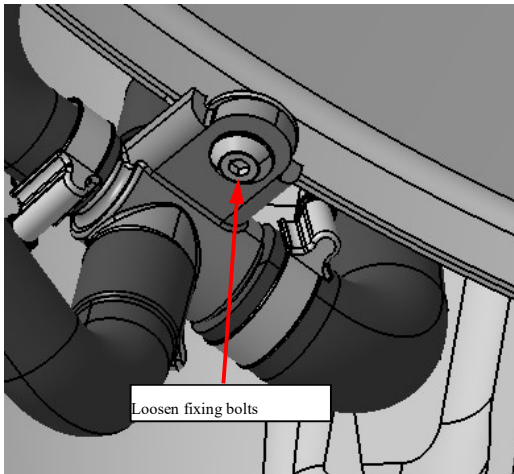
8. Open main cable line clamp B, and take out water pipe E and water pipe G



9. Remove the front cover components (see the disassembly of cover), remove the BCM combination, loosen the four-way pipe fixing bolts, and take out the four-way pipe and water pipe from the left side of the frame.



10. Loosen another four-way pipe fixing bolt, and take out the four-way pipe and water pipe from the left side of the frame.



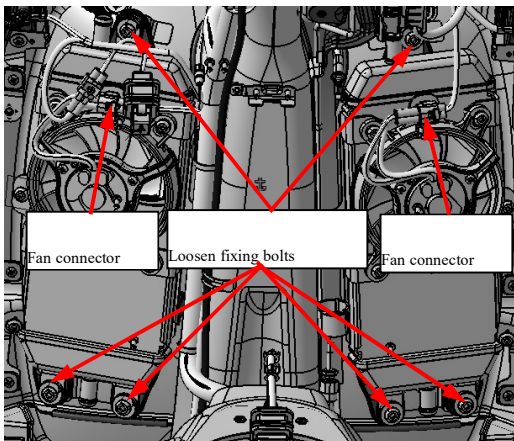
Installation of radiator

Proceed in the reverse order of disassembly.

Avoid bumping the radiator plate when disassembling and assembling.

After installing, don't forget to fill the coolant and inspect the connecting parts for water leakage.

11. Remove the fixing bolts of the lower left and right wind guide covers of the fender, loosen the connector between the main cable and radiator fan, loosen the fixing bolts of radiator, and finally remove the radiator from the frame.

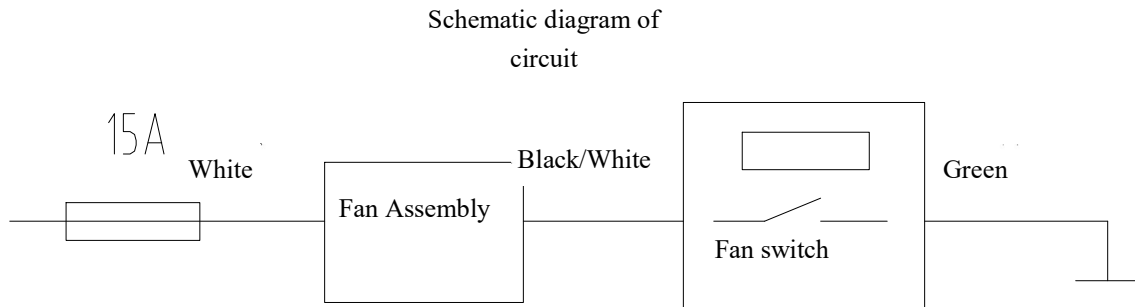


Cooling electrical system

Overview

When the operating temperature of the engine reaches a limit value, the cooling water will circulate through the radiator. The temperature will continue to rise. After reaching the set fan opening temperature, the fan on the radiator shall be operated through the control of the ECU to take away the engine heat generated in the cooling water circulation, so that the water temperature drops. The fan stops running after the temperature drops to the set value of stop operation.

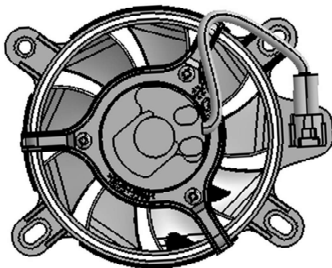
Schematic diagram of circuit



Introduction of Main Components

- Fan Assembly

1. Outline drawing



2. Working principle

The fan assembly consists of a fan motor, a flabellum, and a fan housing. The radiator cooling fan is generally axial flow fan. The air inlet is the flabellum end, the air outlet is the motor end. The inlet and outlet wind direction are the same direction. The motor uses 12V DC motor, and the motor drives the flabellum to rotate to form wind flow and take away heat from the radiator.

3. Basic parameters

Output air volume of fan $\geq 250\text{m}^3/\text{h}$;

Motor speed $(5500\pm 400)\text{r}/\text{min}$;

Rated operational current $\leq 2\text{A}$;

Fan rotation direction: clockwise when viewed from motor output shaft.

4. Failure mode

Open circuit failure of fan motor;

Short circuit failure of fan motor;

The flabellum interferes with the fan housing, so the noise is great when the fan runs;

The connection between the flabellum and the motor shaft slips;

The fan housing is broken.

Main Fault Diagnosis

Symptoms of failure	Possible causes	Solution
The water temperature has been alarmed and the fan still does not work	Circuit breakage; Failure of fan motor; The flabellum is stuck or slipped.	Connection repair; Replace the fan motor; Inspect and repair.
Excessive fan noise	Interference between flabellum and fan housing; The flabellum is loose or broken; The fan housing is broken.	Inspect and replace; Fasten or replace; Replace the fan housing.

6

Engine disassembly and installation

Maintenance Instructions

Installation of engine

Removal of engine

Maintenance Instructions

It is only necessary to remove the engine from the frame when maintaining the crankshaft, balancing shaft, cylinder head, etc. of the engine. When maintaining other parts of the engine, it is not necessary to remove the engine from the frame.

Before removing the engine, the motorcycle shall be supported on the horizontal ground with the main bracket to drain the cooling water and engine oil.

The sequence of installation is the reverse of the removal sequence.

When the installing, all wires and pipes shall be routed according to the wiring diagram, and the removed bands shall be replaced after inspection.

Specifications

Net weight of engine: 52kg

Engine crankshaft oil quantity: 2L

Engine rear reducer oil quantity: 0.25L

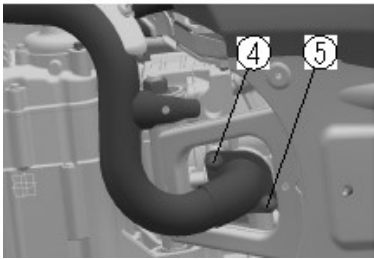
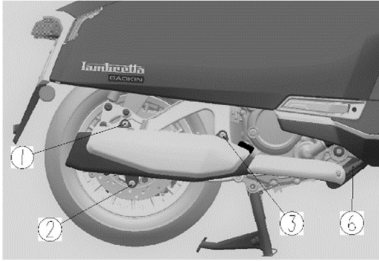
Cooling water capacity 2.5L

Important torque value

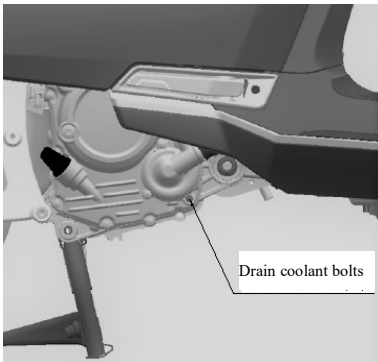
Engine connecting shaft M14 x1.5: 90~100N.m

Removal of engine

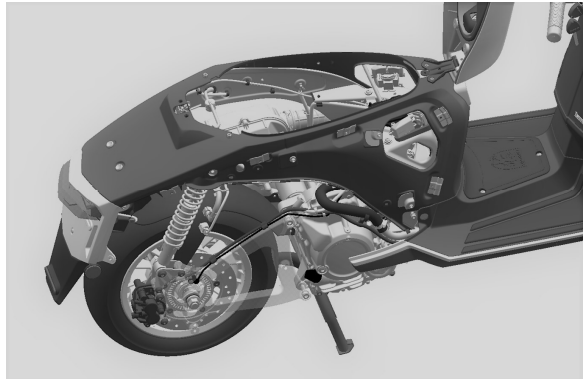
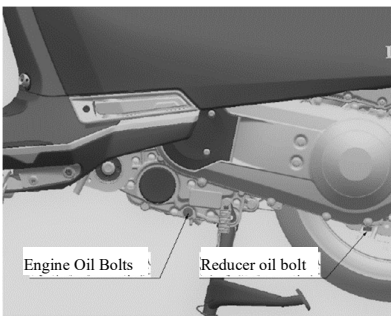
Park the motorcycle on a horizontal ground, remove ①-⑤ fasteners and ⑥ oxygen sensor and remove the silencer.



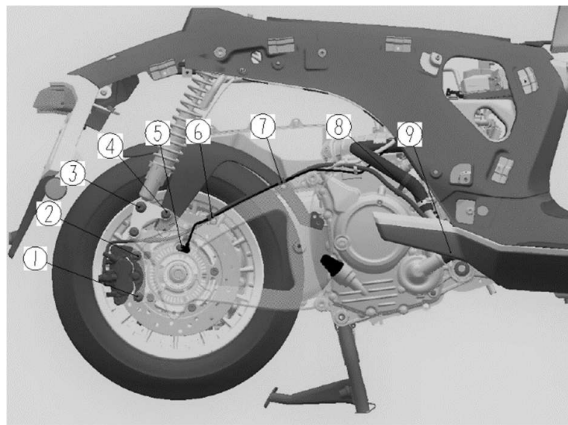
Loosen coolant bolts and drain off the coolant.



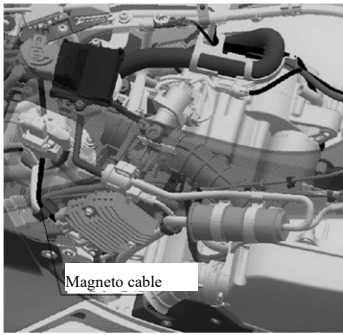
Loosen the engine oil bolts and the rear reducer oil bolts and drain off the oil. (see figure below)



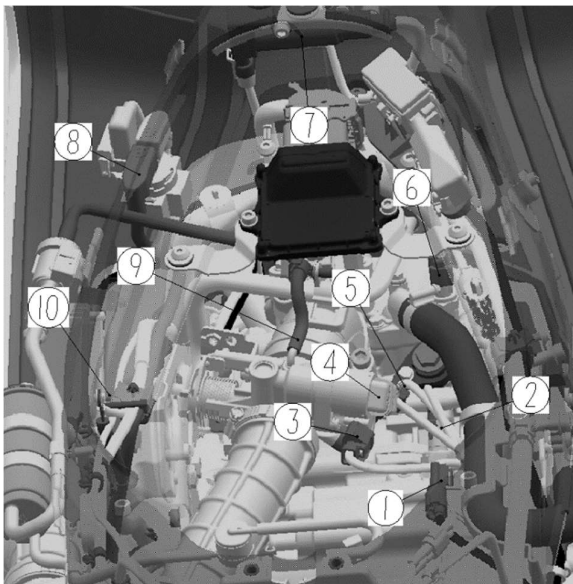
Remove rear brake caliper bolt ①-②, rear right absorber bolt ③, fender bolt ④, rear wheel speed sensor ⑤, line clamp ⑥-⑦, coolant outlet pipe ⑧ and coolant inlet pipe ⑨ and remove rear brake caliper, rear brake pipe, wheel speed sensor, wheel speed sensor line, line clamp, and coolant inlet and outlet pipe, etc., to make the above parts disconnect from the engine. (see figure below)



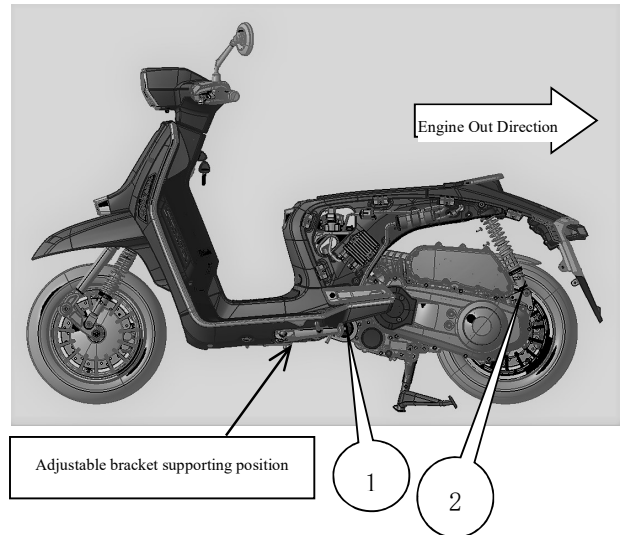
Remove the magneto cable away from the fixing points of the regulator and frame.(see figure below)



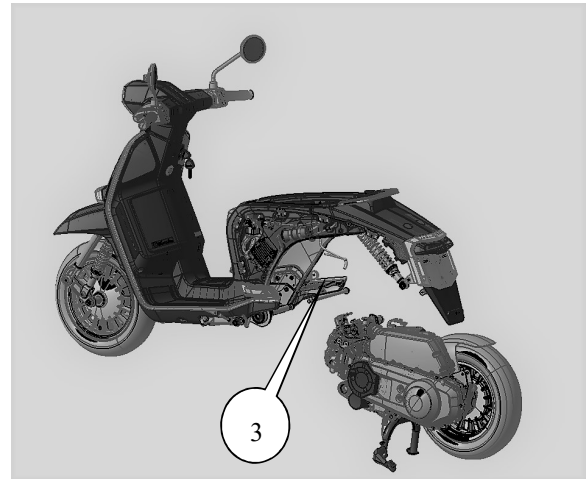
Remove the rear wheel speed sensor line clamp ①, oil sensor wire ②, throttle valve position sensor wire ③, stepping motor wire ④, inlet air pressure temperature sensor wire ⑤, water temperature sensor wire ⑥, ignition coil ⑦, starting motor cable ⑧, exhaust pipe ⑨, ground wire ⑩, etc. to disengage the above cables and connectors from the engine and frame fixing points.(see figure below)



Install the adjustable bracket on the bottom of the vehicle and adjust to the frame bottom height is inconsistent. Remove the engine connecting shaft locknut 1 and remove the engine connecting shaft 3, and remove the rear spring strut lower connecting bolt 2. Adjust the height of the bracket to meet the height space where the engine moves towards the rear.



Move the engine out in direction of arrow. (see figure below)

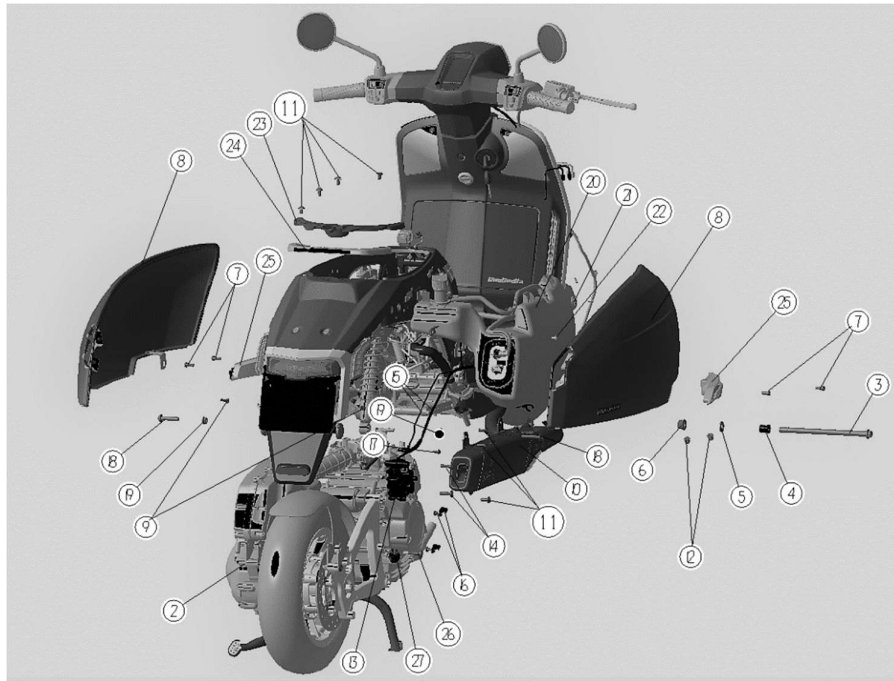


Installation of engine

The engine is installed in the reverse order of removal.

During installation, pay attention to the cable. The wiring shall be arranged according to the wiring diagram.

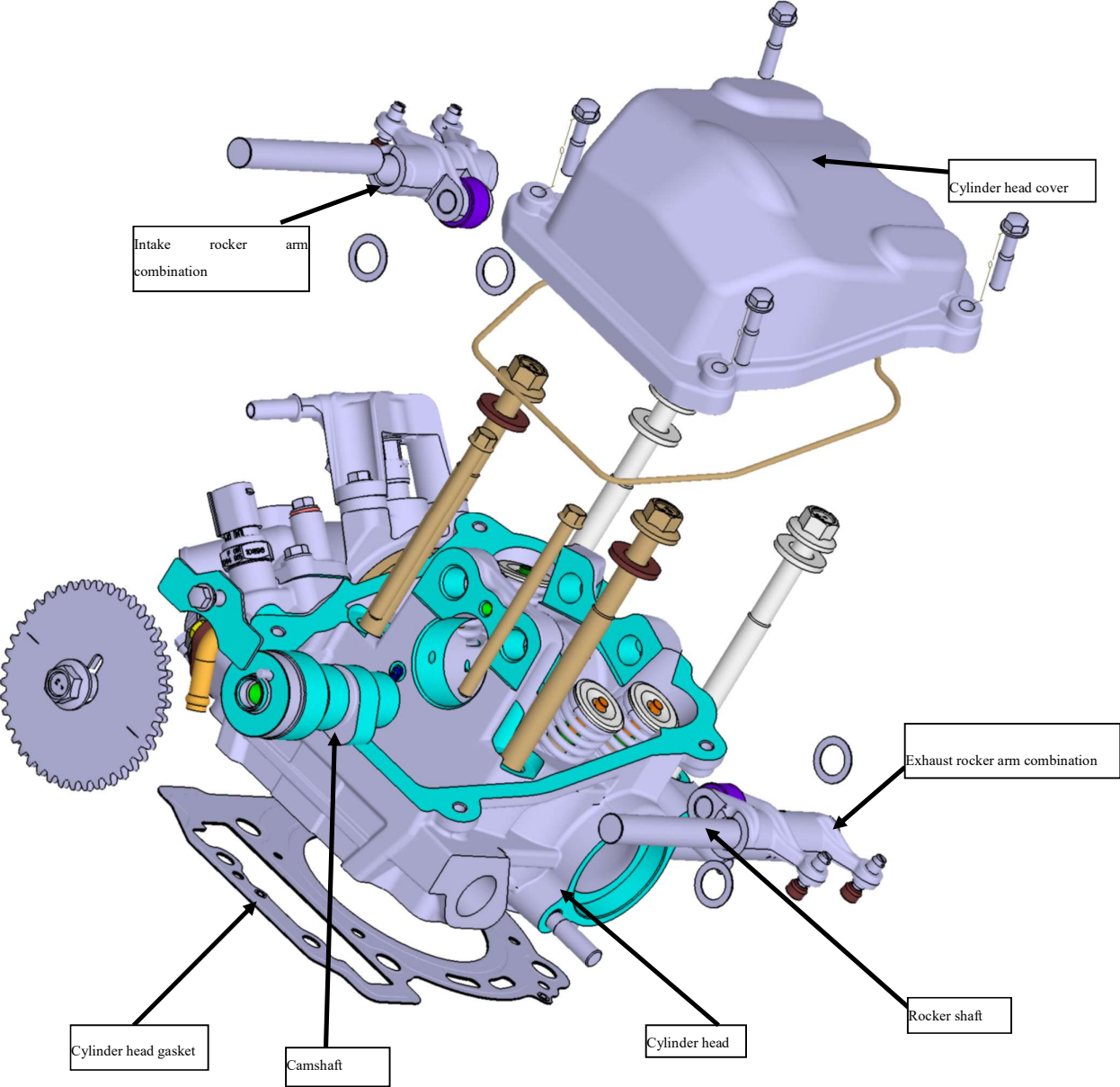
Engine removal/installation



Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	1.1 Remove silencer, drain coolant and engine oil, open seat cushion, remove storage box, remove left and right auxiliary foot pedals and side cover, rear handrail, oil filler cover plate, fuel tank, coolant inlet and outlet pipe, brake caliper and brake pipe, rear wheel speed sensor, connecting cable and fuel pipe of engine, etc. 1.2 Remove engine connecting shaft and right rear absorber bolt. 1.3 Adjust the height of the bracket to move out of the engine.		Refer to relevant sections
2	Engine	1	
3	Engine connecting shaft	1	
4	Engine connecting liner	1	
5	Flat grommet 14	1	
6	Nut M14X1.5	1	Requirements for tightening torque: 90~100N.m
7	Screw M8X20	4	Requirements for tightening torque: 15~25N.m
8	Left and right side cover combination	1 each	
9	Inner hexagon reel bolt M6X16	2	Requirements for tightening torque: 8~12N.m
10	Silencer assembly	1	
11	Screw M8x16	7	Requirements for tightening torque: 25~30N.m
12	Cap nut M8	2	Requirements for tightening torque: 25~30N.m
13	Rear brake caliper assembly	1	

14	Screw M8x32	2	Requirements for tightening torque: 25~30N.m/add threadlocker
15	Rear brake oil pipe and rear wheel speed sensor	1 each	
16	Convex bolt M6X12/rear brake pipe clamp	2 each	Requirements for tightening torque: 8~12N.m
17	Bolt M6×16	1	Requirements for tightening torque: 8~12N.m
18	Bolt M10×1.25×52	2	Requirements for tightening torque: 55~60N.m
19	Nut M10x1.25	2	Requirements for tightening torque: 55~60N.m
20	Fuel tank assembly	1	
21	Flat grommet 14	4	
22	Bolt M6×12	4	Requirements for tightening torque: 8~12N.m
23	Oil filler decorative plate	1	
24	Rear handrail	1	
25	Left and right auxiliary foot pedals	1 each	
26	Bolt M8X52	1	Requirements for tightening torque: 25~30N.m
27	Nut M8	1	Requirements for tightening torque: 25~30N.m

Cylinder head cover, cylinder head



7

Cylinder head cover, cylinder head

Maintenance Instructions	Cylinder head cover
Troubleshooting	Camshaft
Cylinder head	

Maintenance Instructions

The engine needs to be removed from the frame when performing maintenance repairs in this section.

Lubrication of camshaft and rocker arm is realized by oil pump through oil passage of cylinder head. Before assembly, please inspect whether oil passage is smooth and clean.

Before assembly, clean all parts with cleaning agent and blow dry with compressed air.

During assembly, apply oil to the surface of the camshaft lobes for initial lubrication.

Technical Specifications and Maintenance Basis

Projects		Standard value	Maintenance limit value
Camshaft	Left shaft journal	21.959~21.98	21.940
	Fit clearance	0.02~0.062	0.09
	Right shaft journal	34.95~34.975	24.94
	Fit clearance	0.02~0.033	0.09
Rocker arm	Shaft diameter	9.983~9.994	9.960
	Aperture	12.00~12.018	10.05
Rocker shaft	Fit clearance	0.006~0.035	0.09
Cylinder head	Left camshaft hole	22~22.021	22.05
	Right camshaft hole	35~35.035	35.05

Specifications and Maintenance Basis (continued)

Projects		Standard value	Maintenance limit value
Valve spring	Free length	40.5	40
	When installing elastic force is N/33mm	170~200	160
Valve	IN Valve Stem Outer Diameter	4.47~4.485	4.44
	Inner diameter of conduits	4.5~4.512	4.53
	Fit clearance	0.015~0.042	0.09
	EX Valve Stem Outer Diameter	4.455~4.47	4.425
	Inner diameter of conduits	4.5~4.512	4.53
	Fit clearance	0.025~0.052	0.10
Valve Clearance	IN	0.1~0.2	/
	EX	0.15~0.25	/
Piston and piston pin	Outer diameter of piston	81.947~81.953	81.93
	Fit clearance with cylinder hole	0.042~0.058	0.10
	Outer diameter of piston pin	19.995~20	19.985
	Inner diameter of piston pin hole	20.012~20.017	20.05
	Fit clearance	0.012~0.022	0.065
Small end of connecting rod	Inner diameter	20.01~20.02	20.05
	Clearance with piston pin	0.015~0.020	0.06
Piston ring	End gap of one ring	0.2~0.35	0.75
	End gap of two ring	0.3~0.5	0.75
	Side clearance of one ring	0.03~0.07	0.12
	Side clearance of two ring	0.02~0.06	0.12
	Side clearance of oil ring	0.04~0.16	0.40

Important torque value

Cylinder head cover bolt	10N.m
Cylinder head bolt	55N.m
Camshaft bolt	30N.m
Spark plug	15N.m

Troubleshooting

∞ Low cylinder pressure

1. Valve:

Incorrect valve clearance adjustment;

--Valve ablation or bending;

--The valve is not sealed tightly;

--Wrong valve timing;

--The valve spring is damaged.

2. Cylinder head:

--The spark plug is not tightly sealed;

--Leakage or damage of cylinder head gasket;

--Cylinder head crack or sand hole.

3. Piston:

--The piston ring clearance is too large or fractured;

--The piston is cracked or damaged;

--The piston ring is worn.

4. Cylinder block

--Damage of inner hole of cylinder block;

∞ The exhaust has blue smoke

1. The valve guide rod is worn;

2. Leakage or damage of oil shield;

3. The piston or piston ring is worn;

4. The piston ring clearance is too large;

5. The piston ring is installed incorrectly;

6. The piston or cylinder hole is scratched or scuffing.

∞ Excessive noise

1. Incorrect valve clearance adjustment

2. The valve is stuck or the valve spring is broken;

3. The camshaft is worn or damaged;

4. The timing chain is too long, worn or damaged;

5. Failure of timing chain tensioner;

6. The timing driven sprocket is worn;

7. Wear of cylinder and piston;

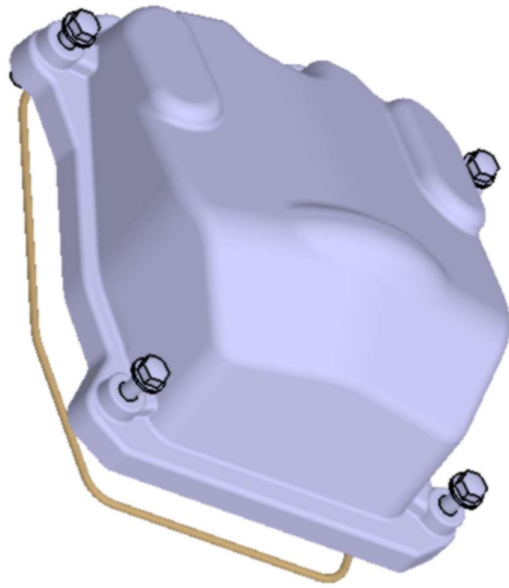
8. The rocker arm or rocker shaft is worn;

9. The piston pin hole and piston pin are worn.

∞ Overheating, knocking (high cylinder pressure)

1. Too much carbon deposit in the combustion chamber.

Removal/installation of cylinder head cover

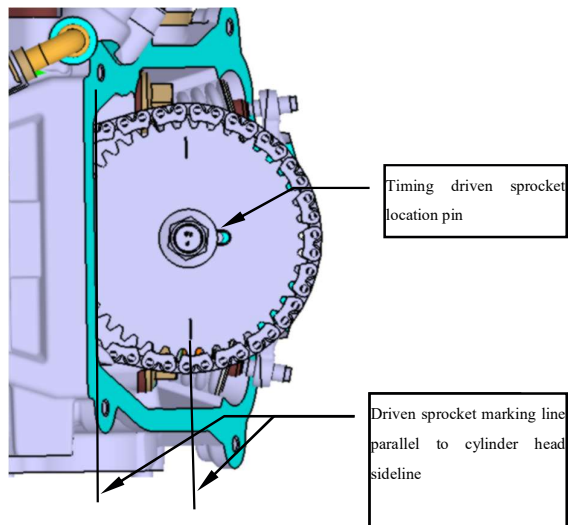


Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Cylinder head cover bolt	4	Tightening torque 10N.m
2	Cylinder head cover	4	
3	Sealing ring	1	Replace if damaged

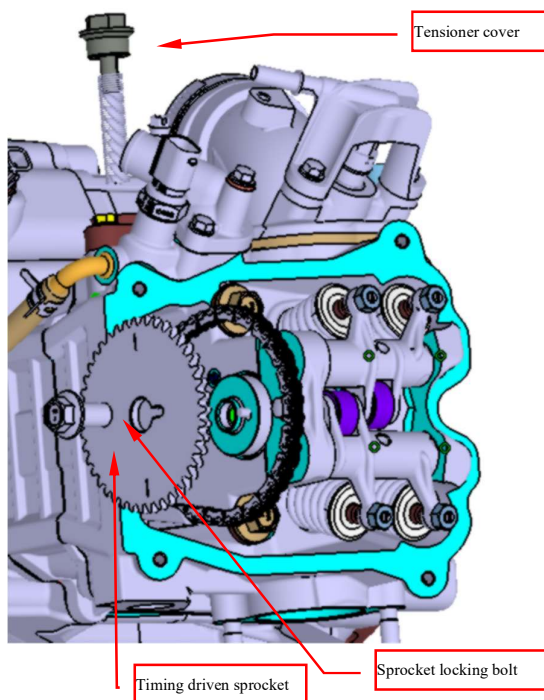
Camshaft

Removal procedure for camshaft:

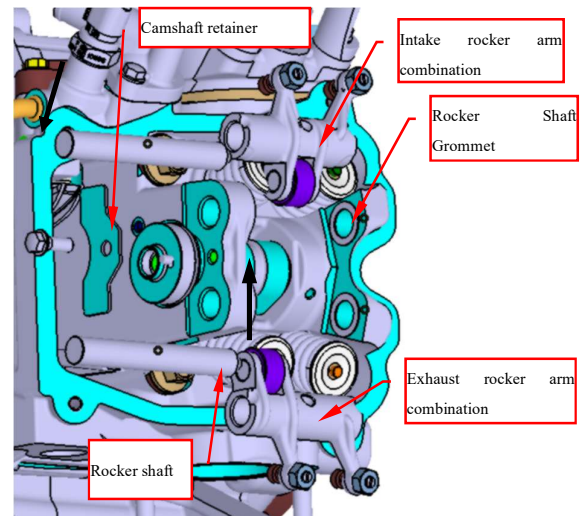
1. Remove the cylinder head cover (refer to the removal of cylinder head cover), rotate the locking bolt on the camshaft end face, so that the sprocket location pin faces upwards, and the marking line is parallel to the cylinder head edge line.



2. Loosen the sprocket locking bolt, loosen the tensioner cover and retract the tensioner plunger with a flat screwdriver to keep the chain in a loose state, and remove the timing driven sprocket.



3. Release camshaft retainer, pull out rocker shaft, and take out intake/exhaust rocker arm combination.



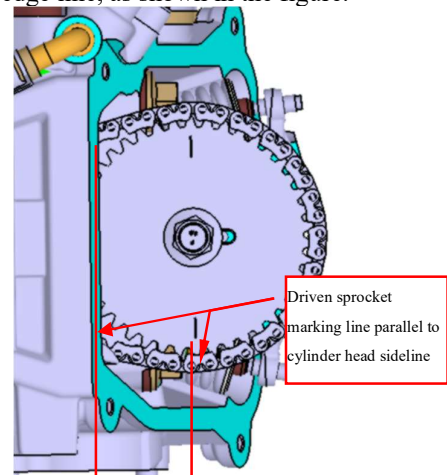
Installation procedure of camshaft:

1. Assemble the rocker arm, rocker shaft, camshaft, and camshaft retainer in place according to the reverse order of disassembly, and tighten the retainer bolt according to the torque requirements.

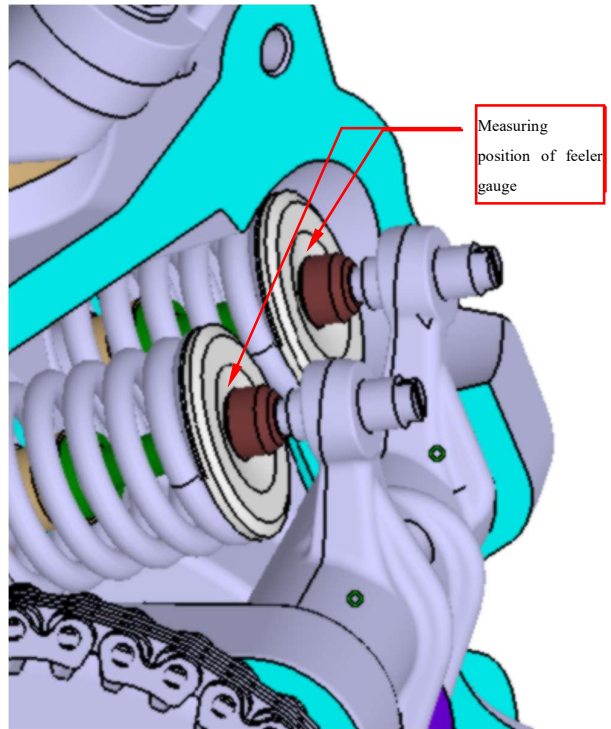
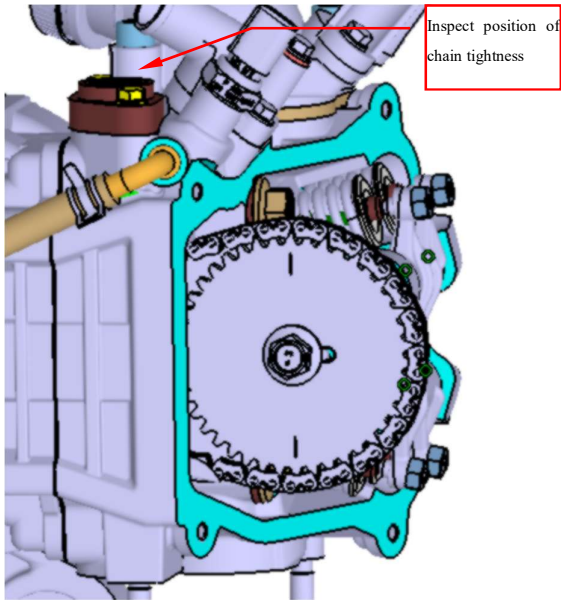
2. Rotate the crankshaft so that the piston is at the upper dead center of the compression stroke and the “J” line on the rotor is aligned with the line of the right cover.

3. Clean all parts, apply oil to the surface of camshaft lobes and shaft journal.

4. Align the timing, the driven sprocket location pin on the camshaft is facing upward (vertical to the cylinder head edge line), and the timing driven sprocket shall be fitted, so that the marking line is parallel to the cylinder head edge line, as shown in the figure.



5. After aligning timing, install camshaft fastening bolts, tighten according to torque requirements, insert tensioner hole with flat screwdriver, screw in tensioner plunger to make chain under proper tension state (upper and lower oscillator 0.5)



6. Verify that the valve clearance is within the required range.

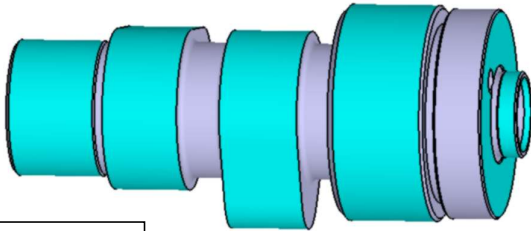
7. Install cylinder head cover, and tighten bolts according to torque requirements (refer to installation of cylinder head cover).

Removal/installation of camshafts

Sequence	Procedure	Remarks
	Removal sequence	Installation sequence is opposite to removal sequence
1	Cylinder head cover	
2	Tensioner cover	
3	Camshaft bolt	
4	Timing driven sprocket	
5	Camshaft retainer	
6	Intake rocker arm combination	
7	Intake rocker arm combination	
8	Cam	Ensure that the tensioner is properly tensioned, and the valve clearance meets the requirements

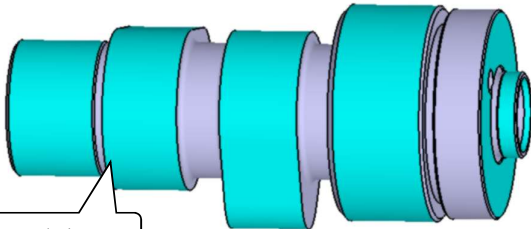
Inspection of camshafts

Inspect camshafts for abnormal wear.

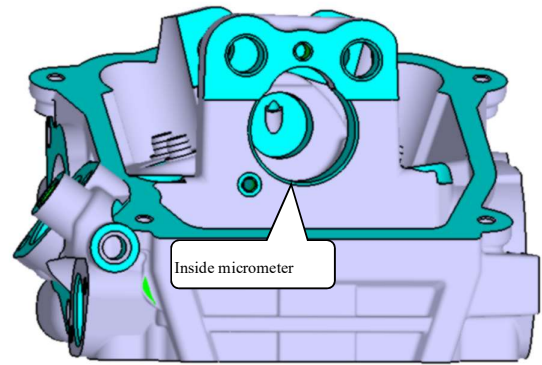


Camshaft Inspection

Measure the diameter of left, middle and right shaft journals of camshafts.



External micrometer



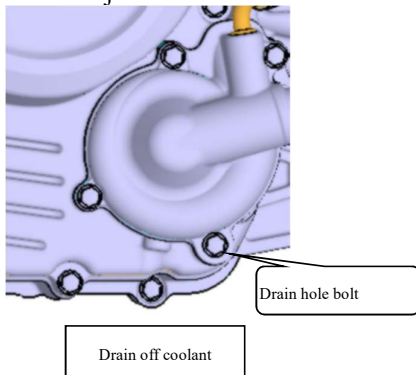
Inside micrometer

Measurement of inner diameter of camshaft hole

Cylinder head

Removal procedure of cylinder head:

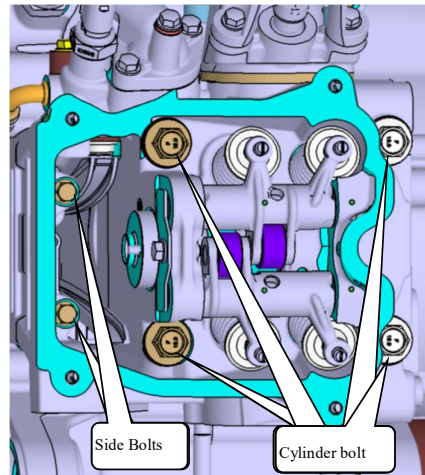
1. Unscrew and remove the drain bolt to drain the coolant from the water jacket.



Drain hole bolt

Drain off coolant

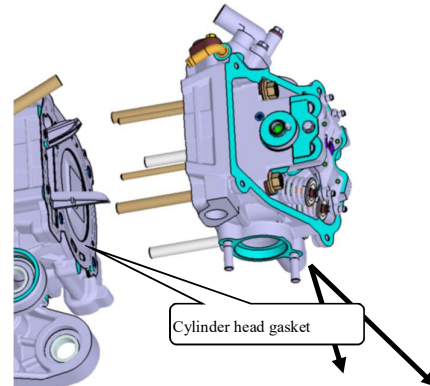
2. Remove the camshaft bolt and driven sprocket according to the above method of disassembling and assembling the camshaft, and remove the side bolt and cylinder bolt as shown in the figure.



Side Bolts

Cylinder bolt

3. Remove cylinder head.



Cylinder head gasket

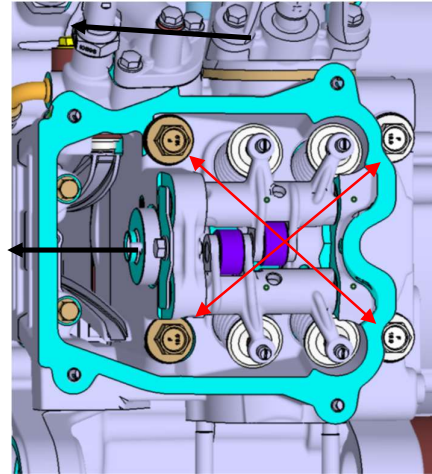
method of camshaft disassembly and assembly.

Installation procedure of cylinder head:

Proceed in the reverse order of disassembly. Note during installation:

1. Confirm location pin; clean parts and inspect whether oil passage of cylinder head is smooth and clean, without leakage.
2. Replace the cylinder head gasket with a new one.

3. Tighten the cylinder bolts twice crosswise, and tighten them in place according to the torque requirements. Tighten the side bolts successively after tightening the cylinder bolts, and tighten them in place according to the torque requirements.
4. Confirm timing position, chain tension status, valve clearance, etc. according to the

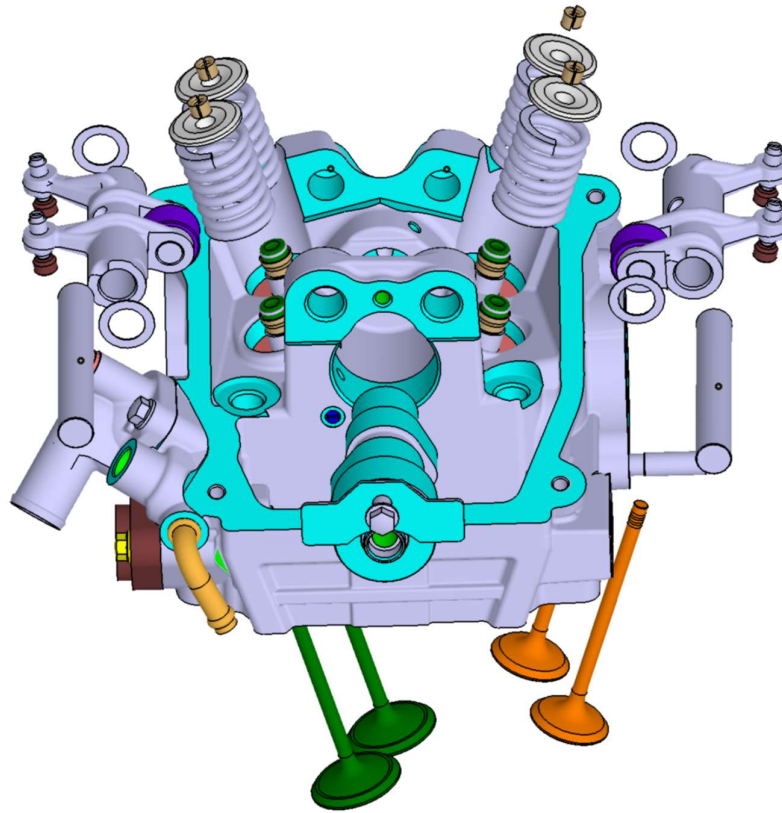


Removal/installation of cylinder head

Sequence	Procedure	Remarks
	Disassembly order	The assembly sequence is opposite to the disassembly order
1	Cylinder head combination	
2	Cam Bolts	
3	Timing driven sprocket	
4	Cylinder bolt	
5	Side Bolts	
6	Cylinder head	
7	Cylinder head gasket	Replace it with a new one during assembly

Disassembly/assembly of cylinder head combination

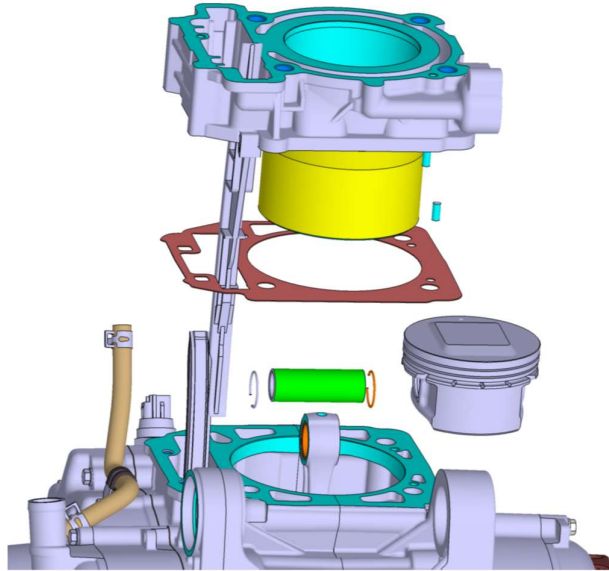
After removing the cylinder head combination, the cylinder head combination can be disassembled/assembled again, refer to the following figure.



Sequence	Procedure	Remarks
	Removal sequence	Installation sequence is opposite to removal sequence
1	Cylinder head cover	
2	Tensioner cover	
3	Camshaft bolt	
4	Timing driven sprocket	
5	Camshaft retainer	
6	Intake rocker arm combination	
7	Exhaust rocker arm combination	
8	Valve lock clamp	
9	Valve spring	
10	Valve	
11	Oil shield assembly	Replace the oil shield assembly when reassembled

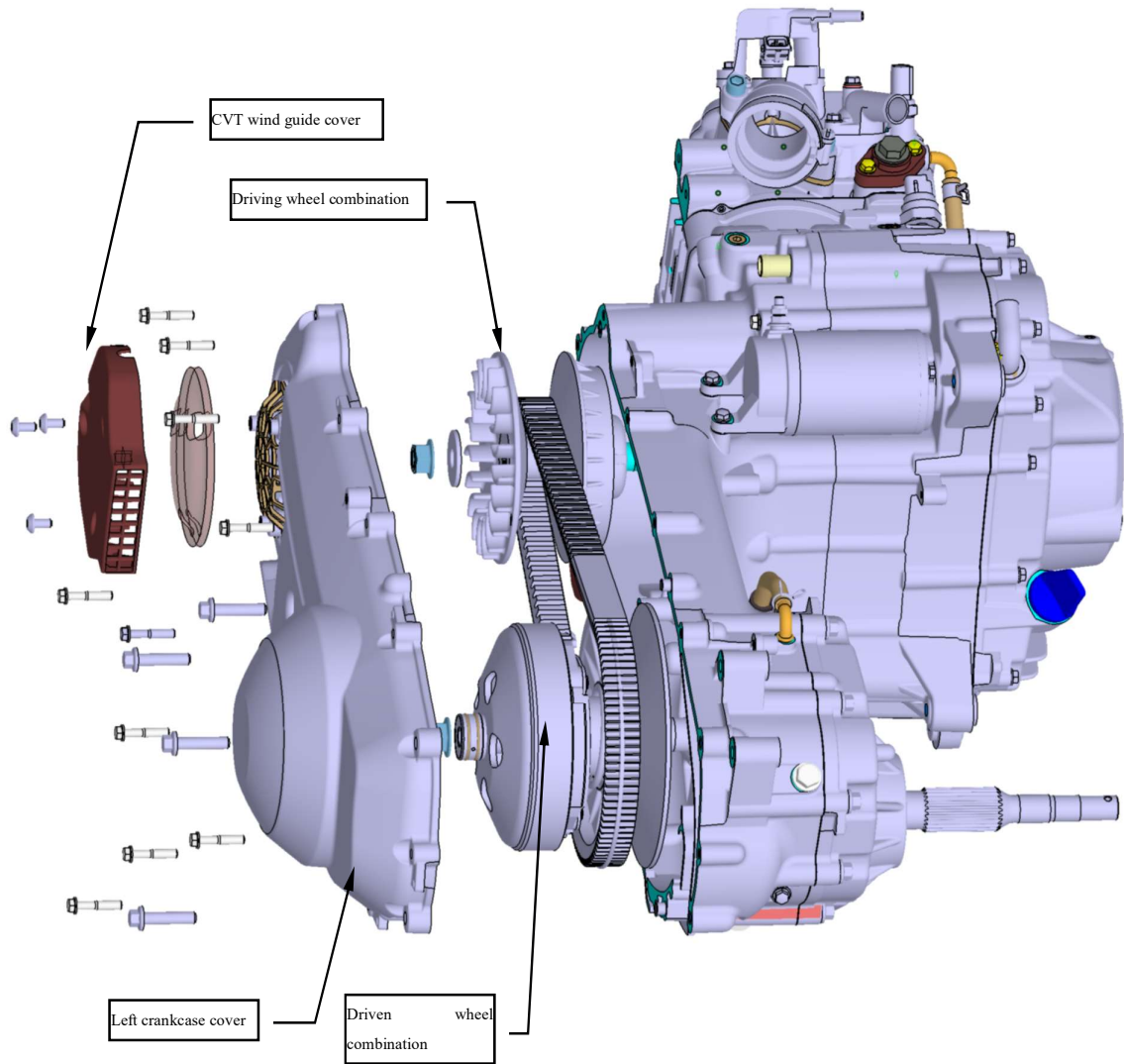
Disassembly/assembly of cylinder block and piston

The cylinder block and piston can be removed by removing the cylinder head as described above



Sequence	Procedure	Remarks
	Removal sequence	Installation sequence is opposite to removal sequence
1	Cylinder head cover	
2	Tensioner cover	
3	Camshaft bolt	
4	Timing driven sprocket	
5	Camshaft retainer	
6	Cylinder bolt	
7	Side Bolts	
8	Cylinder head combination	
9	Cylinder head gasket	Replace new cylinder head gasket during reassembly
10	Cylinder block	
11	Cylinder block gasket	Replace new cylinder block gasket during reassembly
12	Piston pin check ring	
13	Piston pin	
14	Piston	

CVT transmission reducer



8

CVT transmission reducer

Maintenance Instructions	Left crankcase cover
Troubleshooting	CVT transmission reducer

Maintenance Instructions

The engine may not have to be removed from the frame when performing maintenance and repairs in this section. First, unscrew the left crankcase cover bolts and remove the left crankcase cover bolts, and remove the CVT transmission device from the engine.

Before assembly, blow away dust and foreign matter attached to parts with compressed air. Apply grease on sliding or rotating parts, and apply thread release glue at the mating thread position of locking screw.

Important torque value

CVT Locknut 70N.m

Troubleshooting

∞ **The rear wheel does not rotate during acceleration**

1. The clutch slips;
2. The CVT belt is broken;
3. CVT ball is worn;
4. The CVT driven wheel spring fails.

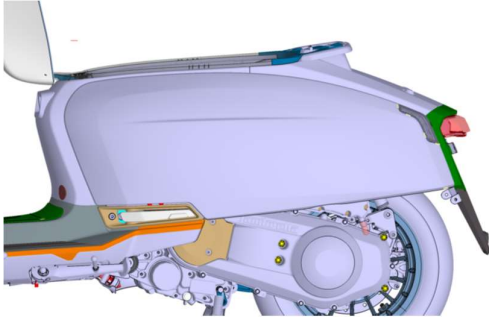
∞ **The vehicle is weak**

1. The clutch slips;
- Belt is worn

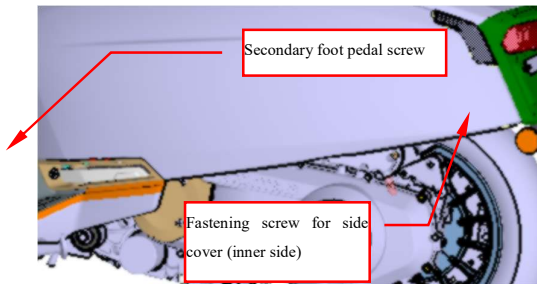
Left crankcase cover and CVT

Removal procedure of left crankcase cover and CVT:

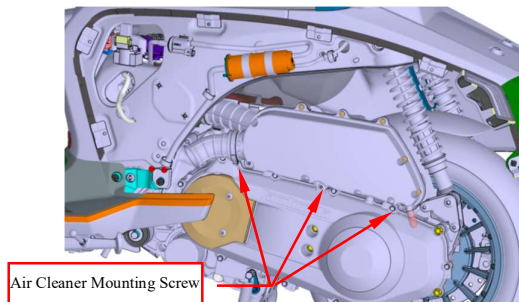
1. Open the seat cushion.



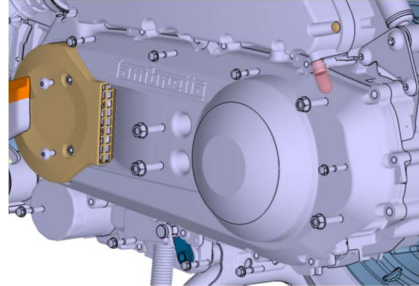
2. Remove the two screws at the auxiliary foot pedal (one of which can be seen only after opening the pedal) and the screw inside the rear end of the side cover.



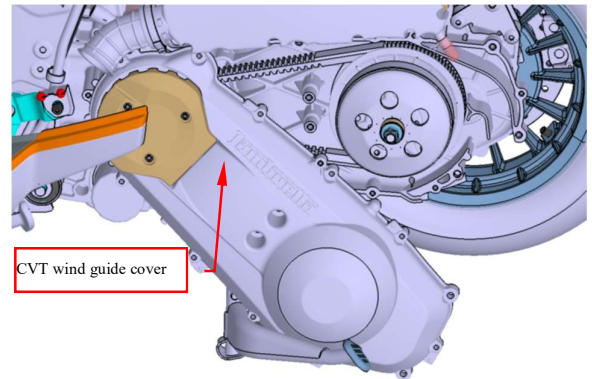
3. Tap and remove the left cover toward the upper left side of the figure, and remove the mounting screw of air cleaner.



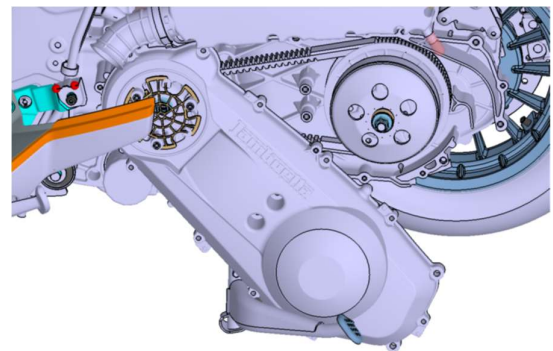
4. Remove two exposed CVT wind guide cover screws and left crankcase cover bolts.



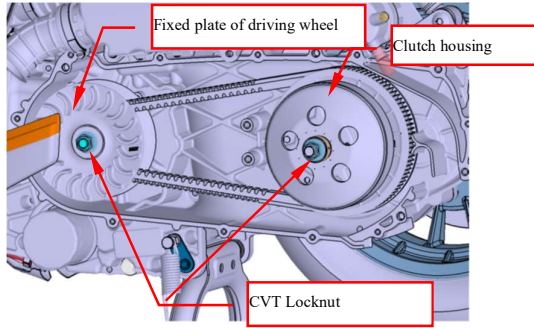
5. Remove the left crankcase cover from the left crankcase, rotate the left cover centered on the crankshaft, and remove the fastening screws of the concealed wind guide cover.



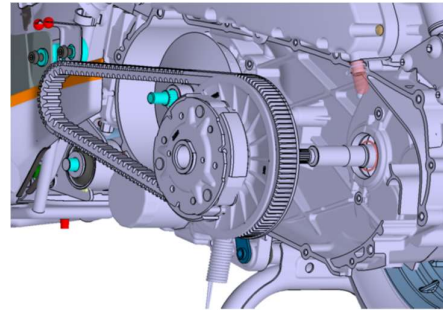
6. Remove the wind guide cover and filter sponge first, and remove the left crankcase cover.



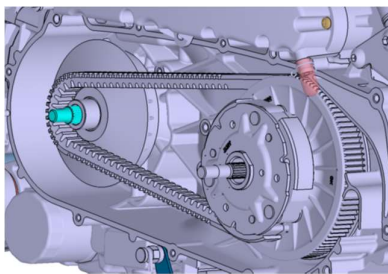
7. Loosen and remove the CVT locknut.



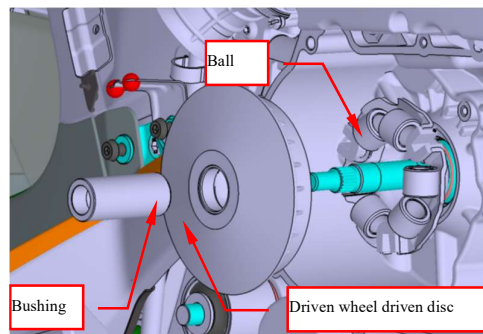
9. Take out the driven wheel from the input shaft together with the belt.



8. Remove the fixed plate of driving wheel and clutch housing.



10. Take out bushing, driving wheel driven disc, ball, etc. in sequence.

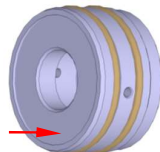


Removal/installation of left crankcase cover and CVT

Sequence	Procedure	Remarks
	Removal sequence	Installation sequence is opposite to removal sequence
1	Open the seat cushion	
2	Remove the left cover	
3	Take CVT wind guide cover and filter sponge	
4	Take the left crankcase cover	
5	Take fixed plate of CVT driving wheel and clutch housing	
6	Take the driven wheel and belt	
7	Take bushing, driving wheel driven disc, and ball	

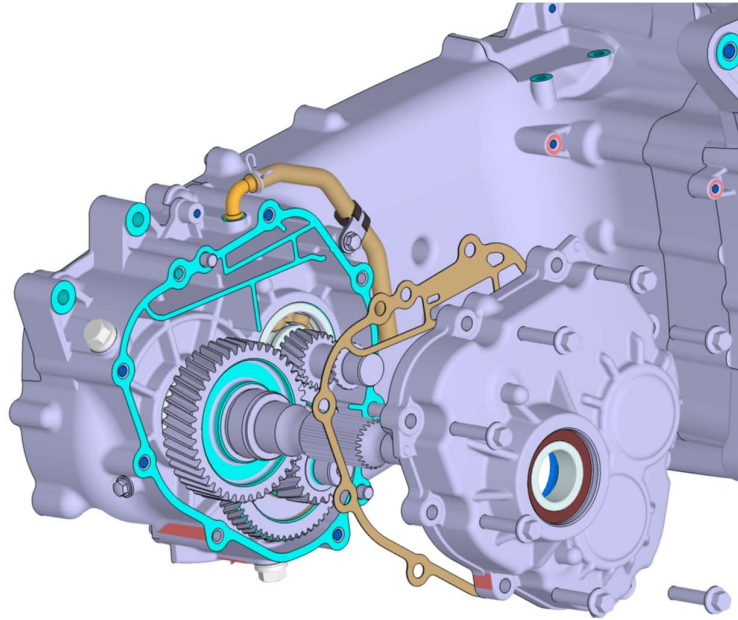


Attention



shaft sleeve

1. When disassembling and assembling CVT, do not damage the mating surface between the driving/driven wheel and the belt;
2. When assembling the driving wheel driven disc, first put the ball into the groove of the driven disc and then insert into the crankshaft together. At this time, it is necessary to tilt the vehicle to the left to avoid the ball slipping;
3. Fill the shaft sleeve with new grease, and apply thread release glue to the locknut.



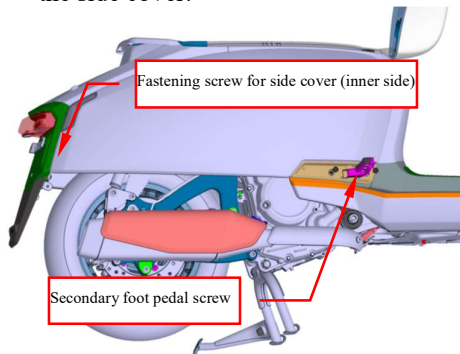
Maintenance Instructions

During maintenance and repair of this part, it is not necessary to remove the engine from the frame. Firstly remove the exhaust silencer, then loosen the bolt at the lower end of the right rear absorber and rear rocker arm, loosen the fender and take out the rear wheel to remove the reducer.

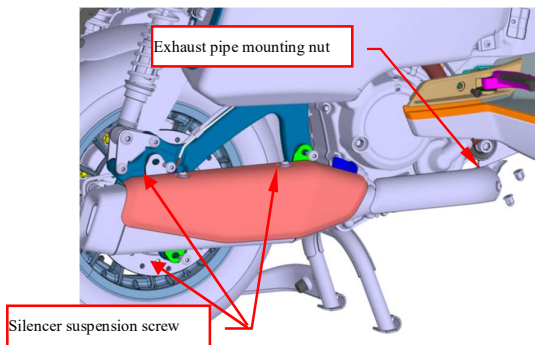
Before assembly, blow away dust and foreign matter attached to parts with compressed air. Apply grease on sliding or rotating parts, and apply thread release glue at the mating thread position of locking screw.

Removal procedure for reducer cover:

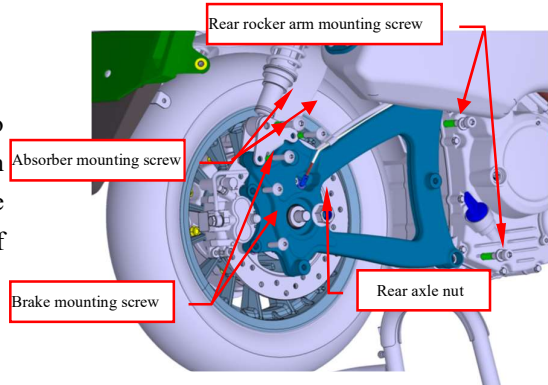
1. Place the vehicle smoothly on the horizontal ground with the main bracket. Unclip the seat cushion, and loosen the two screws at the auxiliary foot pedal (One of them can only be seen after opening the pedal), and the right cover with the screws inside the rear end of the side cover.



2. Remove exhaust silencer.

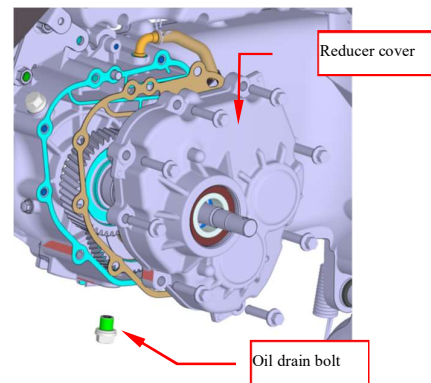


3. Loosen right rear absorber screw, rear rocker arm mounting screw and brake mounting screws, rear wheel locknuts, etc.

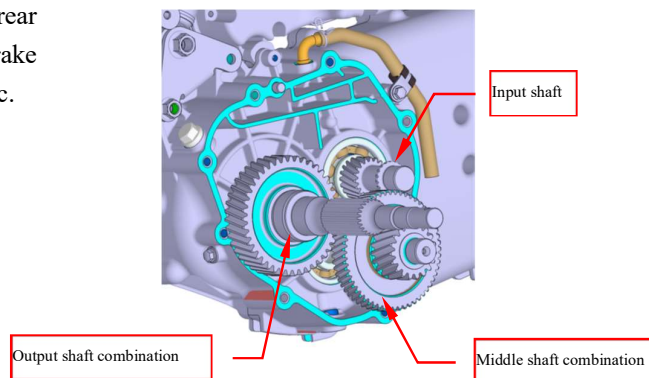


4. Take out the rear wheel

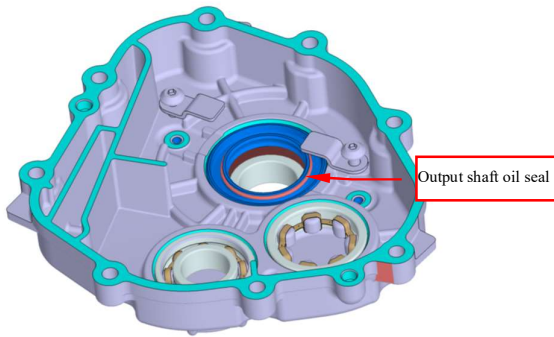
5. Take out the rear wheel, loosen the oil drain bolt, collect the oil with the oil pan, loosen the fastening bolts of the gearbox cover, and remove the gearbox cover.



6. Take out the transmission gear.



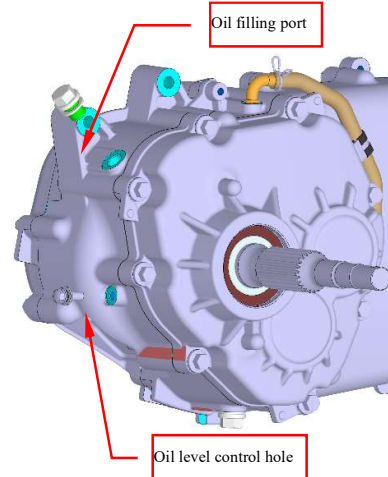
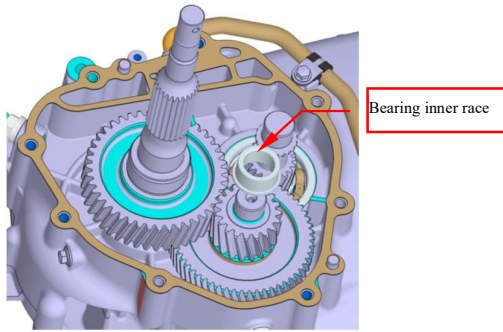
7. Disassemble the reducer cover, loosen the screw of clamp plate, and take out the oil seal, replace new parts.



2. Install the reducer cover, tighten the bolts according to the torque requirements, loosen the oil filler bolts and oil level control bolts, and slowly inject gear oil 0.2L~0.25L. Gear oil type: 85W-140, of lubricating oil from the oil filler, or until the lubricating oil flows out of the oil level control hole.

Attention:

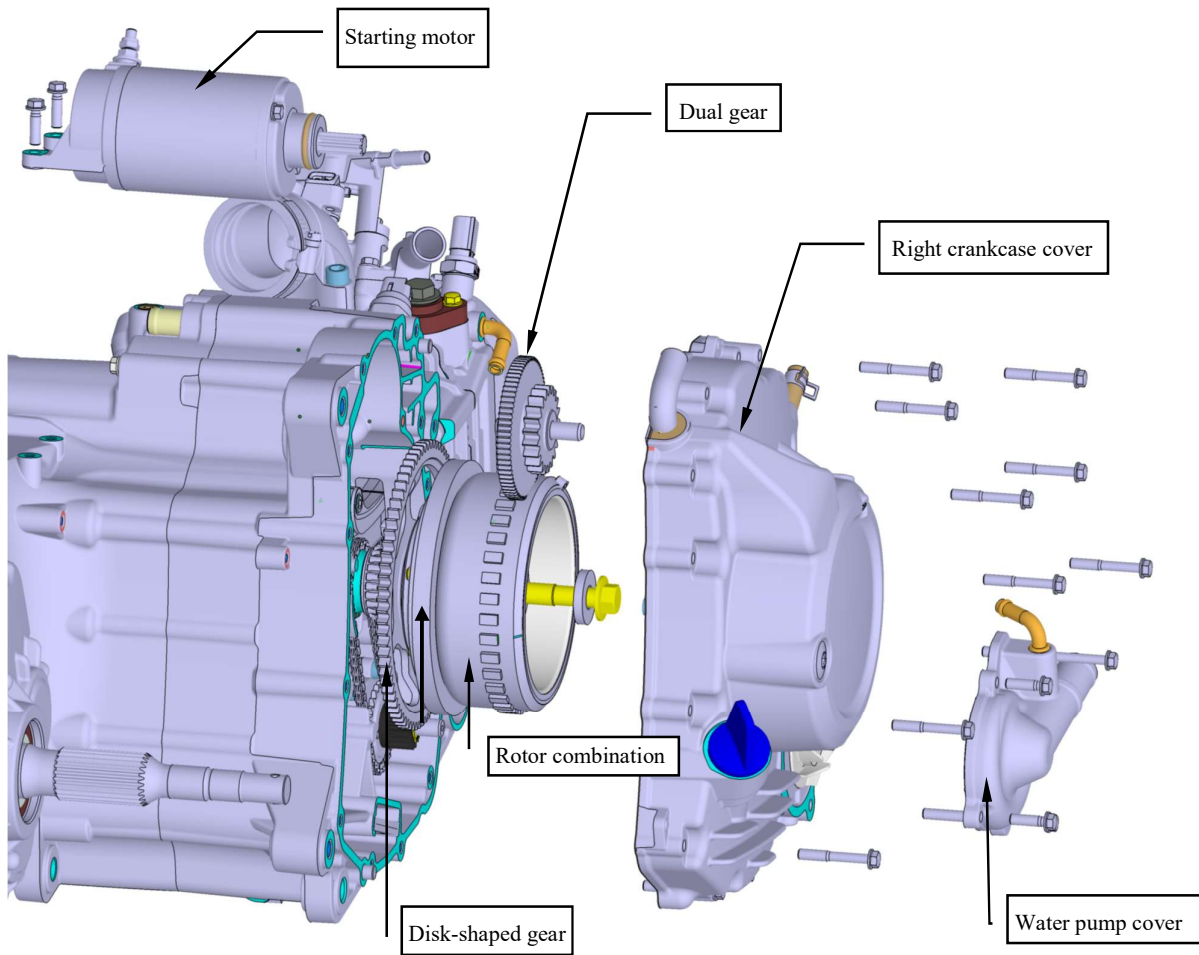
1. When assembling the reducer cover, first sleeve the inner ring of the intermediate shaft bearing on the shaft;



Removal/installation of reducer cover and reducer

Sequence	Procedure	Remarks
	Removal sequence	Installation sequence is opposite to removal sequence
1	Open the cushion, and remove the right cover	
2	Take exhaust silencer	
3	Take the rear rocker arm, and loosen the right absorber lower end bolt	
4	Loosen the rear axle nut, and take the rear wheel	
5	Loosen oil drain bolt, and drain lubricant	
6	Take the bolts of reducer cover, take the reducer cover and gasket	Replace new sealing gasket during reassembly.

Magneto and starting system



9

Magneto and starting system

Maintenance Instructions	Rotor combination
Right crankcase cover	Starting motor and starting drive system

Maintenance Instructions

The engine must be removed from the frame when performing maintenance and repairs in this section. Remove engine lubricants and coolant.

Before assembly, clean all parts with cleaning agent and blow dry with compressed air.

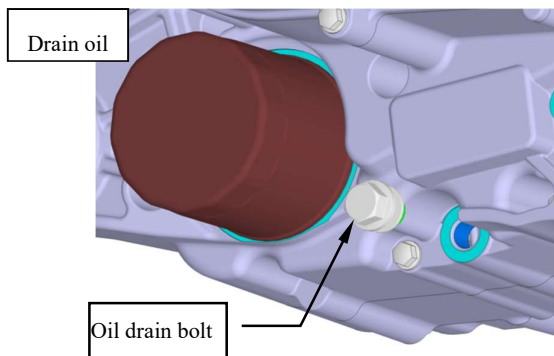
Important torque value

Rotor fastening nut	140N.m
Stator fastening bolt	10N.m
Tension disc fastening bolt	7N.m
Starting clutch connecting screw	25N.m

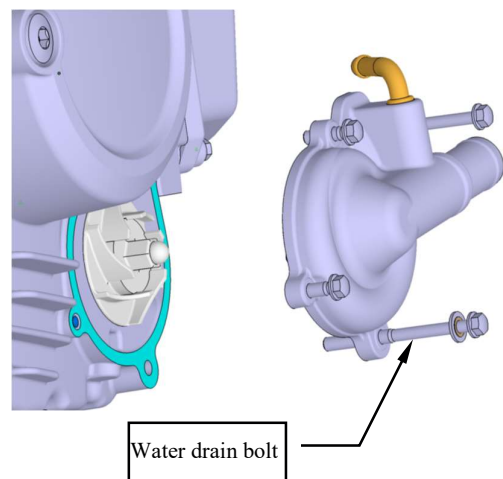
Right crankcase cover and magneto

Removal procedure for right crankcase cover:

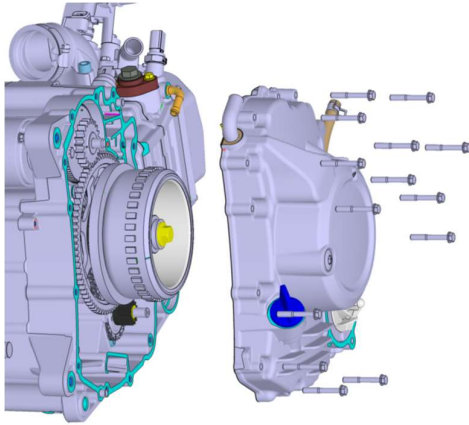
1. Unscrew the oil drain screw plug, and drain the engine lubricant.



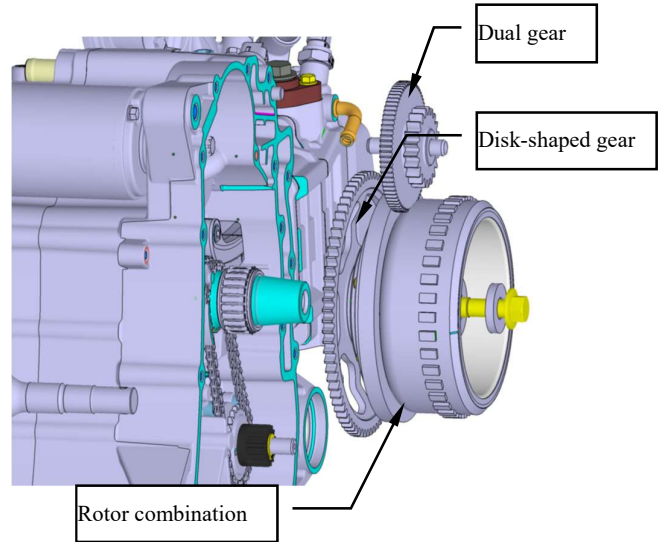
2. Remove the water drain bolt, drain the coolant, and remove the water pump cover.



3. Remove the right crankcase cover bolts, and remove the right crankcase cover.



4. Remove the combination of dual gear and rotor.

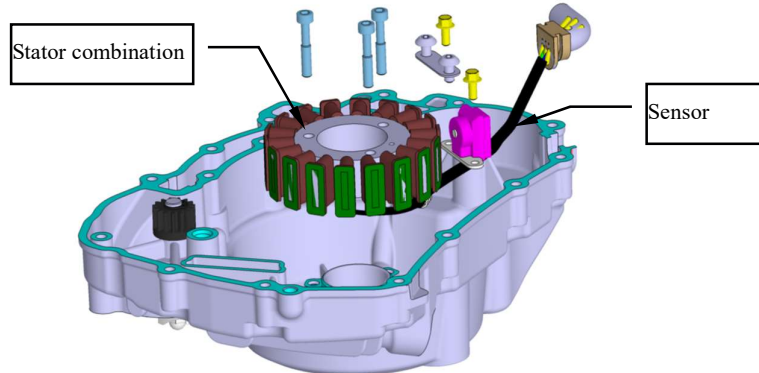


Removal/installation of right crankcase cover and magneto

Sequence	Procedure	Remarks
	Removal sequence	Installation sequence is opposite to removal sequence
1	Drain crankcase oil	
2	Drain coolant, and remove water pump cover	
3	Remove the right crankcase cover, and right cover gasket	Replace new gasket during assembly
4	Remove the dual gear shaft, and dual gear	
5	Remove rotor bolt, rotor combination, and disk-shaped gear	Apply thread release glue to rotor bolts during assembly

Disassembly/assembly of magneto stator

For the disassembly/assembly of the left front cover, refer to the figure below.





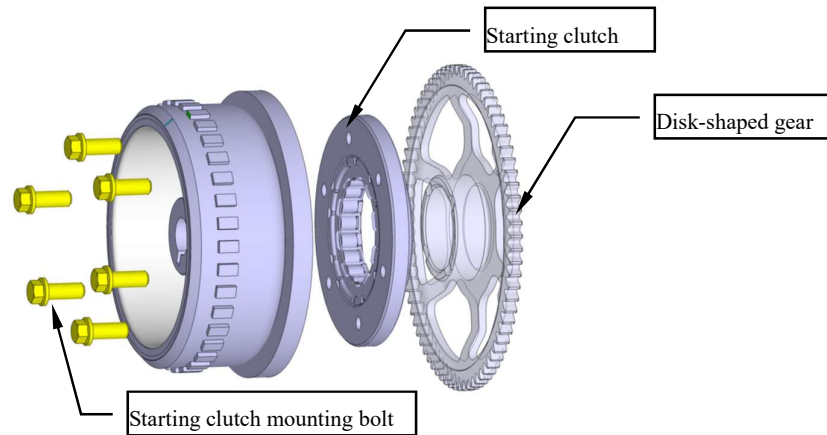
Attention:

- 1 Do not hurt the varnished wire, and do not crush the stator coil.**
- 2 Tension disc bolts, stator combination mounting bolts, and sensor mounting bolts shall be assembled with thread release glue, and tightened in place according to torque requirements.**

Rotor combination, and starting clutch

Procedure for removing the starting clutch of the rotor combination:

For disassembly and assembly of rotor combination, refer to the following figure.



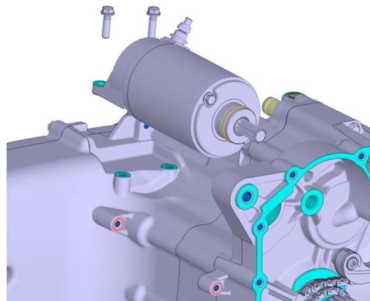
Attention:

- 1. Make sure the working direction of the clutch is correct before assembling the starting clutch. Inspect method: insert the disk-shaped gear according to the above figure direction, grasp the clutch tightly, and the disk-shaped gear rotates flexibly counterclockwise and cannot rotate clockwise.**
- 2. When the rotor fastening bolts are assembled, the thread release glue must be used, and tightened in place according to the torque requirements.**

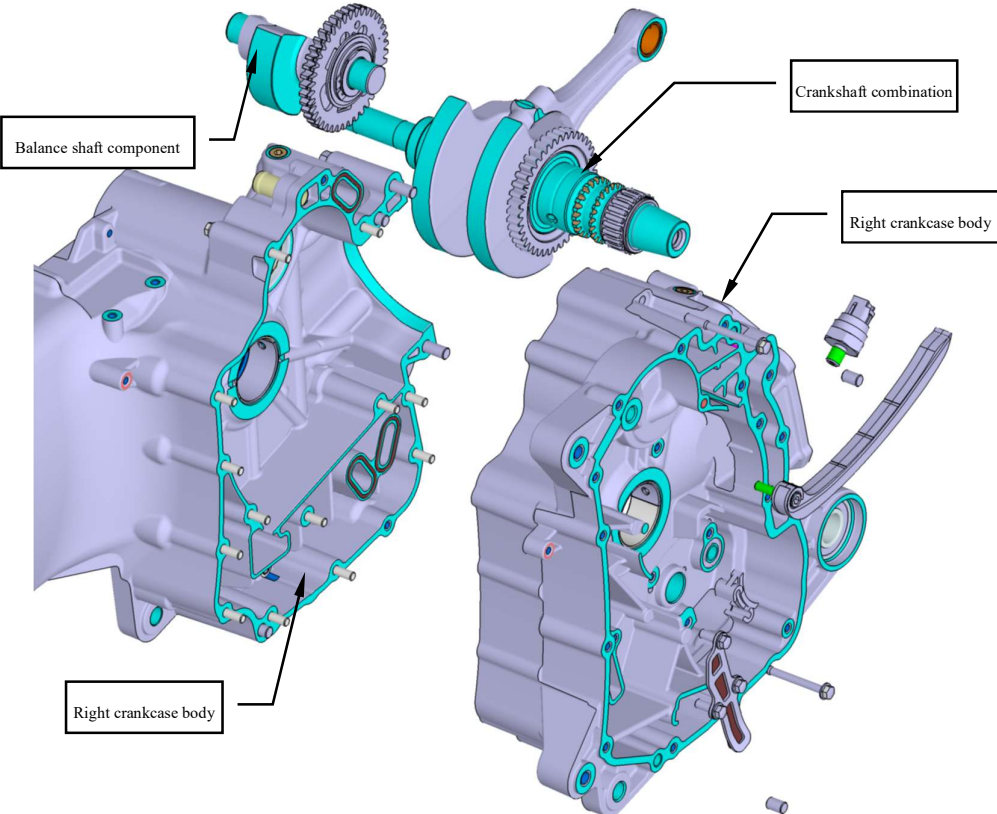
Starting motor

Starting motor removal and installation

Starting motor removal and installation refer to the following figure



Crankcase, crankshaft



10

Crankcase, crankshaft

Maintenance Instructions	Crankshaft and balance shaft
Troubleshooting	Crankcase

Maintenance Instructions

The engine must be removed from the frame when performing maintenance and repairs in this section.

In order to repair crankshaft and balance shaft, the left/right crankcase body must be separated, commonly known as box separation. Before separation, remove the following parts of the engine:

Right crankcase cover, magneto, and starting system [see “Right Crankcase Cover, Magneto, and Starting System”];

Left crankcase cover, CVT [see “CVT Transmission and Reducer”];

Cylinder head cover, camshaft, and cylinder head [refer to “Cylinder Head Cover, Cylinder Head, Cylinder Block, and Piston”];

Before assembly, clean all parts with cleaning agent and blow dry with compressed air.

Technical Specifications and Maintenance Basis

Projects		Standard value	Maintenance limit value
Crankshaft	Diameter of crankshaft journal	42.051~42.067	42
Balance shaft	Diameter of shaft journal of balance shaft	19.98~19.993	19.9

Troubleshooting

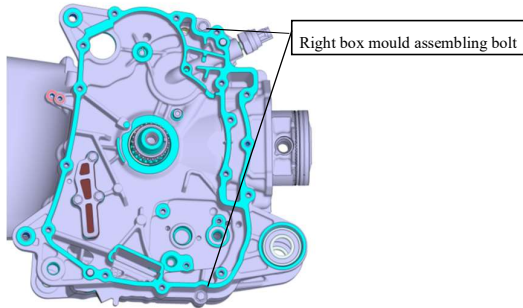
Engine Noise

1. The crankshaft bearing is damaged;
2. The big end bearing of connecting rod is damaged;
3. The balance shaft bearing is damaged;
4. The auxiliary tooth spring of balance shaft fails.

Crankcase

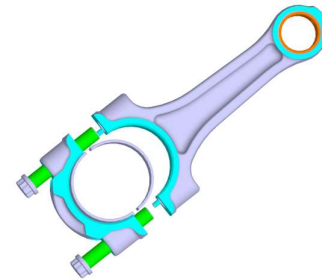
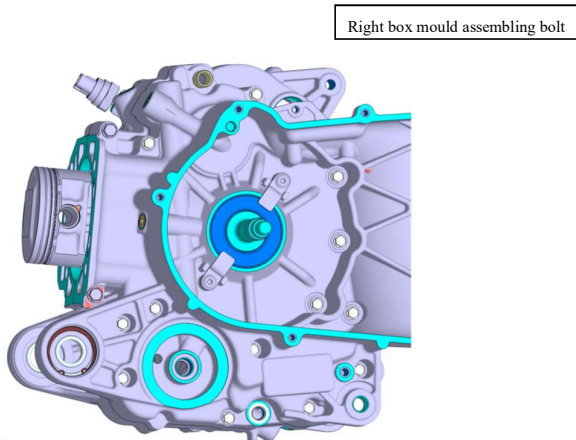
Removal procedure for crankcase:

1. Remove the engine from the frame (cooling water and oil have been drained), and place on the assembly table.
2. Remove the right crankcase cover, magneto rotor, oil pump, left cover, CVT parts, cylinder head parts, cylinder block, starting motor, etc. and other parts (see relevant chapter).
3. Remove the mould assembling bolts from the left/right case.



Crankshaft connecting rod piston combination, and balance shaft combination

7. Remove connecting rod bolts and open connecting rod cover.

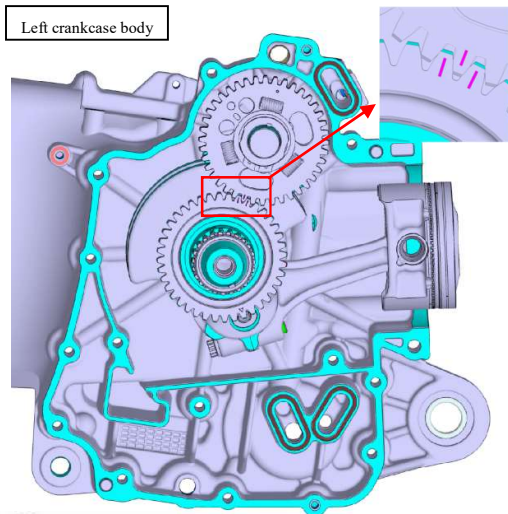


Attention:

1. Do not use a screwdriver or other tools to insert into the mould assembling surface to pry open the upper and lower crankcase body, which may damage the sealing surface.
2. Clean the sealant on the joint surface and gently grind it along the joint surface with fine oil stone if necessary, but remember not to leave scratches penetrating through the inside and outside of the crankcase on the joint surface, causing potential leakage.

Installation procedure of crankcase:

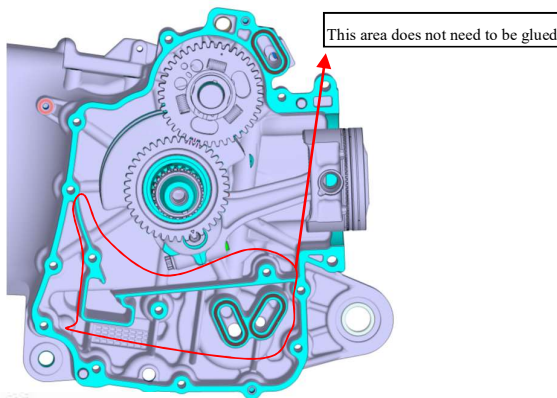
1. Place the left crankcase on the assembly table, crankshaft connecting rod combination, balance shaft combination into the crankcase with the teeth marks aligned.



Attention:

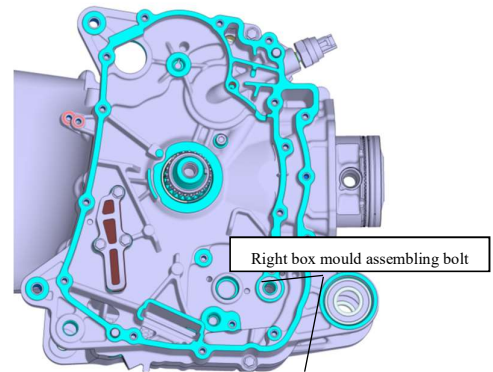
The marking teeth on the driven gear must be aligned with the driving gear markings.

2. Apply a layer of sealant evenly on the left crankcase sealing surface. Confirm the number of location pins and oil passage sealing rings, and confirm whether it is assembled in place or not.



Attention:

Only press in place smoothly by hand or gently knock with glue hammer when mould assembling. Do not knock hard.



4. Turnover assembly left box side box bolt
5. Assemble other engine parts in sequence. First, cylinder block, cylinder head components, timing chain and other parts, align valve timing and adjust valve clearance; secondly, install oil pump, magneto rotor and right crankcase cover; secondly, install CVT components, belt and left crankcase cover (see relevant chapters for details).
6. Install the assembled engine onto the frame, assemble the pipeline and fill enough engine oil and cooling water. After confirmation, erect the main support on the flat ground, ignite the engine, idle for 3~5 minutes, slowly refuel to 6000rpm~7000rpm, operate steadily for 3~5min, observe whether the cooling water level drops, and if it drops, add cooling water again.

Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Mould assembling bolt M6 (right box side)	2	Tightening torque, 10N.m
2	Mould assembling bolt M6 (left box side)	13	Tighten the torque after pre-tightening according to the diagonal, tightening torque is 10N.m
3	Mould assembling bolt M8	2	Tightening torque, 25N.m
4	Right crankcase body	1	
5	Crankshaft connecting rod piston combination	1	
6	Balance shaft combination	1	
7	Connecting rod bolt	2	Tightening torque, 40N.m

Vehicle body and exhaust system



11

Vehicle body and exhaust system

Maintenance Instructions	Removal/installation of rear fender
Troubleshooting	Removal/installation of exhaust silencer
Covers, headlights, instruments, and left and right switches	Tail lamp combination

Maintenance Instructions

During maintenance of this part, special attention shall be paid to cover, instruments, and lamps without scratching or damage.

Removing or repairing components may cause serious burns before the exhaust system cools down.

This part mainly includes the disassembly and installation of cover, rear fender, exhaust silencer, radiator, and lamp.

Troubleshooting

Excessive emission noise

1. The emission system is damaged;
2. Exhaust leakage;

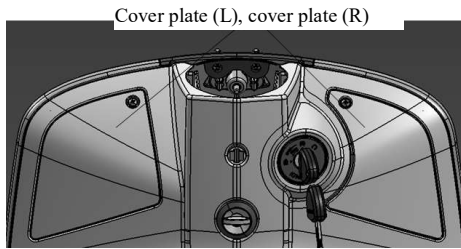
Abnormal operation

1. Exhaust system deformation;
2. Exhaust leakage;
3. The silencer is blocked.

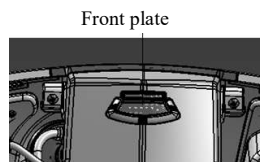
Covers, headlights, instruments, and left and right switches

Removal Procedure for Cover

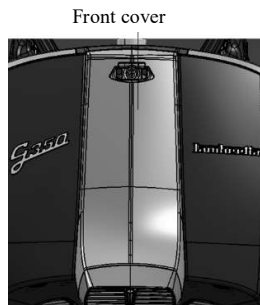
1. Support the motorcycle with side bracket or main bracket on the horizontal ground, and remove the cover (L) and cover (R);



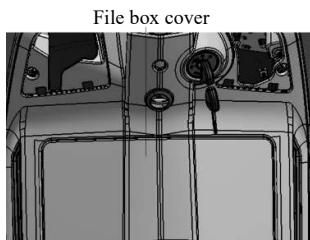
2. The front label adopts the clamping structure, and pulls out the front label forcefully;



3. Remove the mounting bolts of the front cover and remove the front cover upward;



4. Use the key to open the cover of the file box

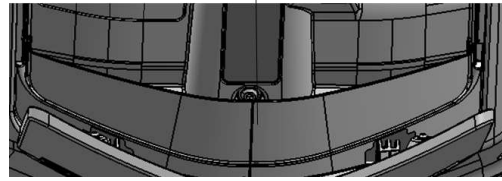


USB Mounting Board

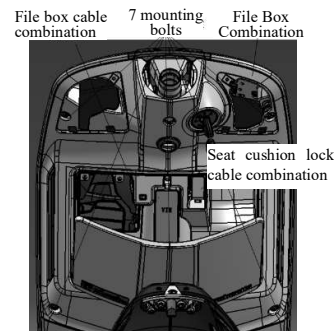
5. Remove the USB mounting plate bolts, remove the USB connector, and remove the USB mounting plate.

6. The storage baffle adopts clamping structure, and remove the storage baffle forcefully.

Storage baffle



7. Remove 7 mounting bolts. There is a clamping structure around the periphery. It is necessary to loosen the clamps forcefully, remove the ignition switch lock cable, and seat cushion lock cable, and remove the file box combination.



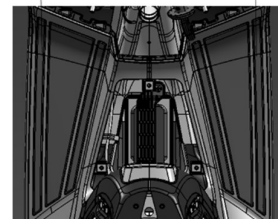
8. Remove 3 mounting bolts of the identification cover, slide forward and remove the identification cover;

Identification cover plate



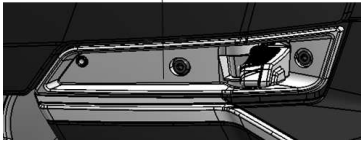
9. Left pedal glue I and right pedal glue I are installed with rubber parts back-buttoned and removed with force;

Left pedal glue I Right pedal glue



10. Remove two combination mounting bolts of left and right foot pedals, and remove left and right foot pedals combinations;

Right pedal combination



11. Remove the left and right cover mounting bolts, and remove the side cover combination (L) and side cover combination (R).

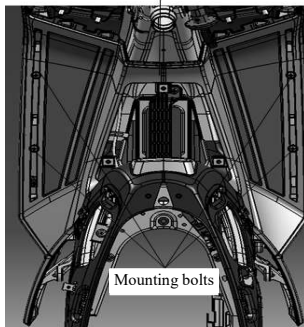
Welding combination of side cover



Mounting bolts

12. Remove the middle shield mounting bolt, and remove the middle shield.

Middle Shield



Mounting bolts

Installation procedure of cover:

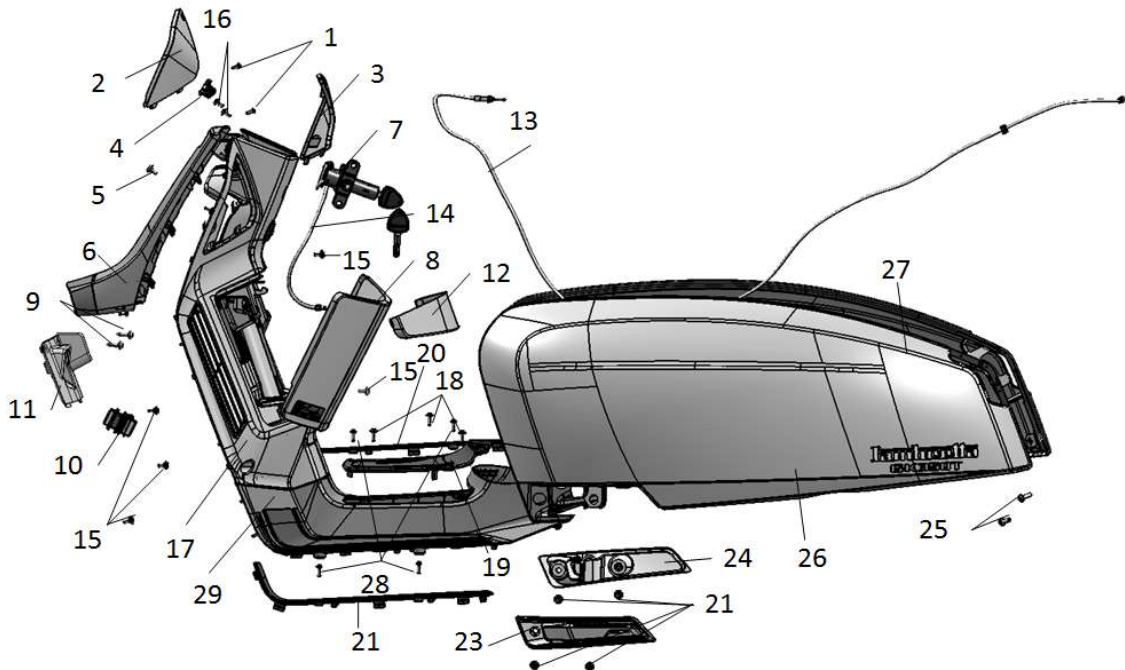
The installation procedure of the cover is the reverse order of disassembly. Be careful not to scratch the cover during installation.



Attention:

During disassembly and assembly, do not scratch the appearance surface of the cover, and do not break the buckle.

Removal/installation of cover

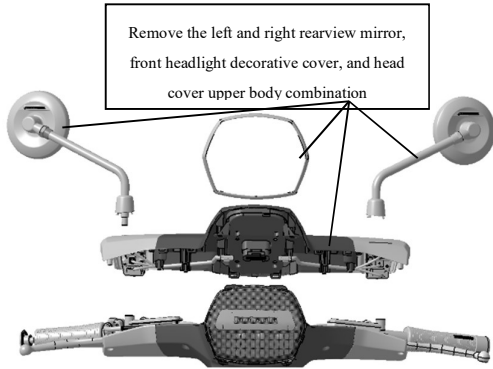


Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Large plate self-tapping nail st4.2×13	2	
2	Cover (L)	1	
3	Cover (R)	1	
4	Front plate	1	
5	Convex bolt M6×12	1	
6	Front cover	1	
7	Combined ignition switch components	1	
8	File box combination	1	
9	Large plate self-tapping nail st4.2×13	2	
10	USB Power Supply Unit I	1	
11	USB Mounting Board	1	
12	Storage baffle	1	
13	Seat cushion lock cable combination	1	
14	File box cable combination	1	
15	Convex bolt M6×12	5	
16	Bolt M6×12	2	
17	Front shield combination	1	
18	Convex bolt M6×12	3	
19	Identification cover plate	1	
20	Left pedal glue I	1	

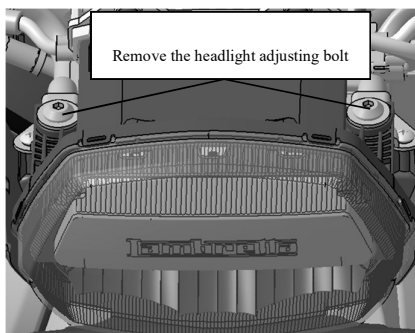
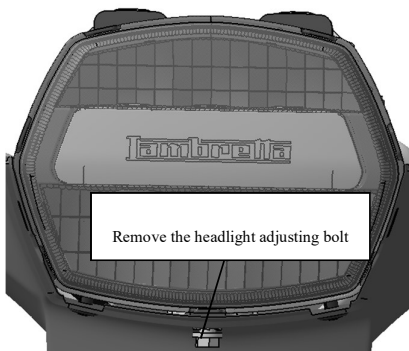
21	Right pedal glue I	1	
22	Hexagon socket button head screw M8×20	4	
23	Left pedal combination	1	
24	Right pedal combination	1	
25	Bolt M6×20	2	
26	Side cover combination (L)	1	
27	Side cover combination (R)	1	
28	Inner hexagon reel bolt M6×12	4	
29	Middle Shield	1	

Removal procedures for headlights, instruments, and left and right switches:

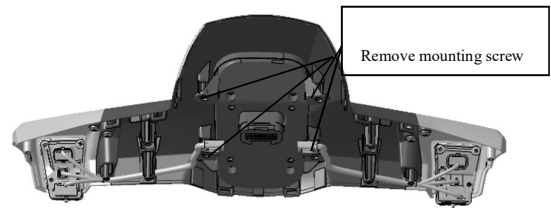
1. Support the motorcycle with side bracket on the horizontal ground, and remove the combination of left and right rearview mirror, headlight trim cover, and head cover upper body combination in sequence. Disconnect the connectors of instrument components, left and right switch components when removing the upper body combination of the head cover



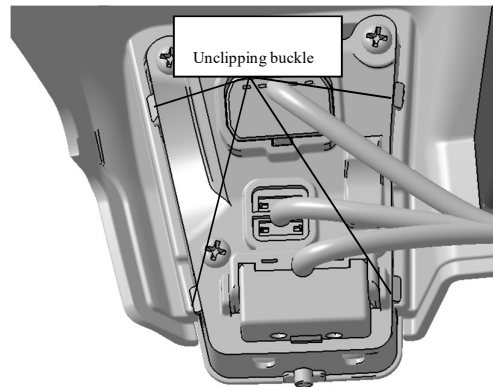
2. Remove the left headlight adjusting bolt first, and then remove two headlight mounting bolts. Disconnect the headlight connector and remove the headlight component. Take care to handle it gently, and do not scratch the exterior decoration surface.



3. Remove 4 mounting screws of instrument components, and remove the instrument.



4. Release 4 clamps of right switch, and remove right switch. Remove the left switch in the same way



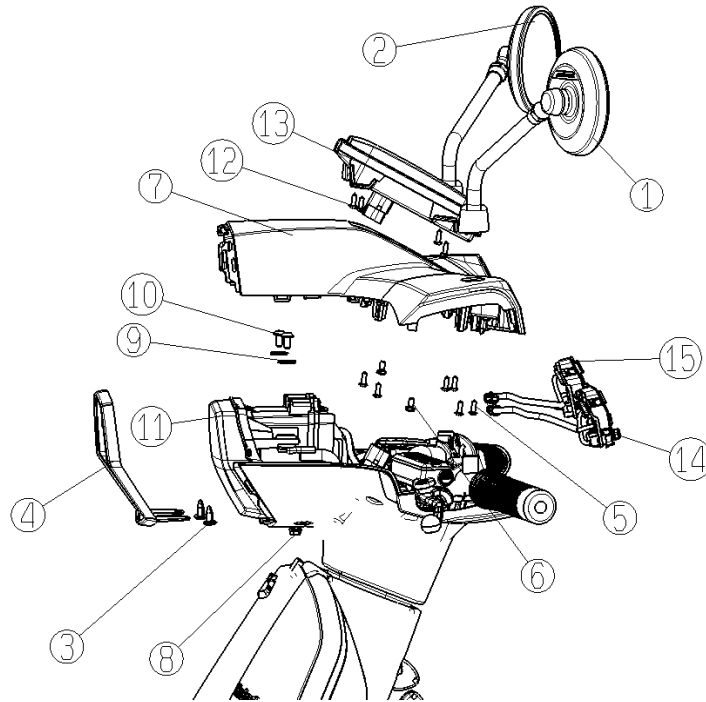
Installation procedures for cover, headlights, instruments, and left and right switches:

Installation of cover, headlights, instruments, and left and right switches shall be carried out in the reverse order of removal. During installation, take care not to scratch the cover or damage the bulb.



During disassembly and assembly, do not scratch the appearance surface of the cover, and do not break the buckle.

Removal/installation of headlights and instruments

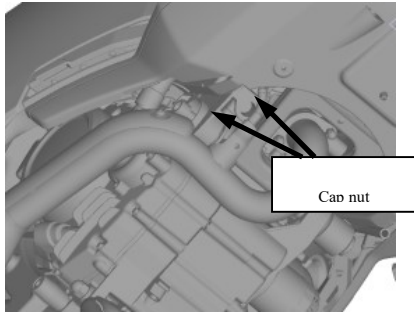


Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Left rearview mirror component	1	
2	Right rearview mirror component	1	
3	Expansion screw	2	
4	Headlight trim cover	1	
5	Large plate self-tapping nail st4.2×13	6	
6	Pan-head screw with cross recess M5×10	2	
7	Head cover upper body combination	1	
8	Bolt M5×16	1	
9	Large grommet A class 6	2	
10	Bolt M6×12	2	
11	Headlight components	1	
12	Pan-head self-tapping screw with cross recess and large grommet combination st4.2×13	4	
13	Instrument components	1	
14	Left switch components	1	
15	Right switch components	1	

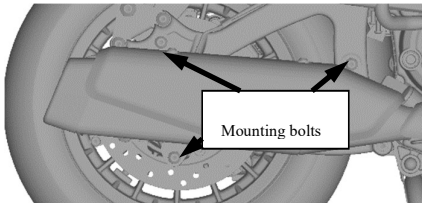
Removal/installation of exhaust silencer

Removal procedure of exhaust silencer:

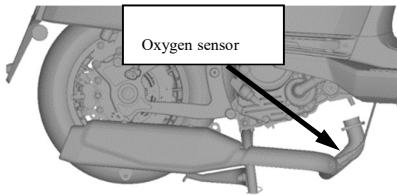
1. Support the motorcycle on the horizontal ground with the main bracket, and remove the cap nut connecting the exhaust silencer to the engine.



2. Remove the nut bolts connecting the exhaust silencer to the frame.



3. Remove exhaust silencer and remove oxygen sensor.



Installation procedure of exhaust silencer:

The silencer gasket at the engine exhaust port should be replaced with a new one.

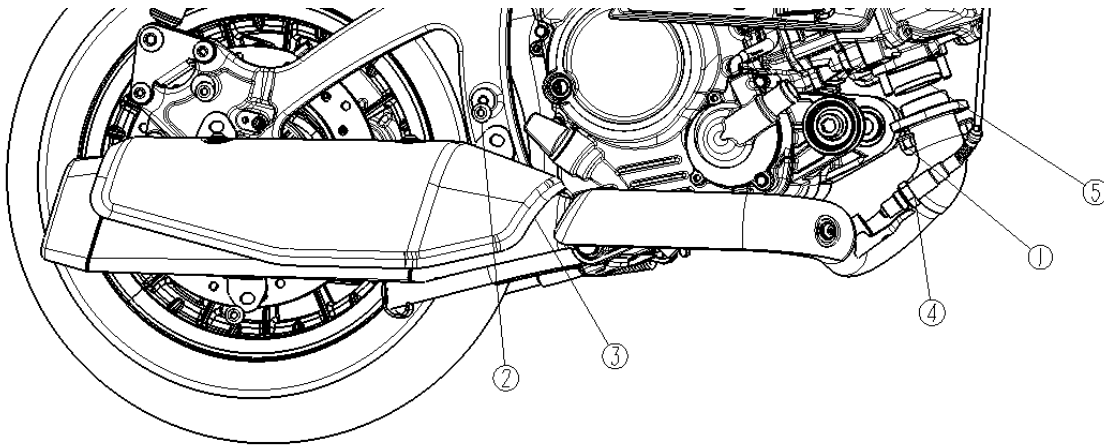
During installation, install and tighten oxygen sensor first, install exhaust silencer in place. Preinstall cap nut and bolt at the same time. After tightening the cap nut, tighten the bolt connecting the exhaust silencer and the bracket, otherwise it is easy to cause air leakage at the exhaust port of the engine.



Attention:

Make sure that the silencer is completely cooled before operating, otherwise it may cause scalding.

Removal/installation of exhaust silencer

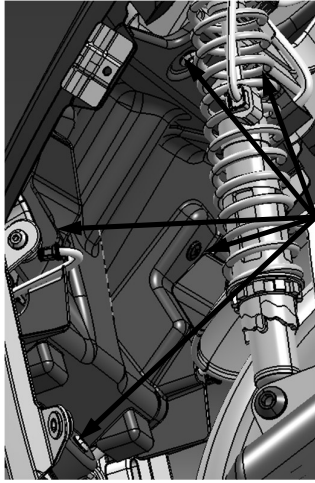


Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence
1	Cap nut M8	2	5
2	Bolt M8×23	3	4
3	Welding combination of silencer	1	3
4	Oxygen sensor combination	1	1
5	Gasket for exhaust port	1	2 Replace according to the situation after removal

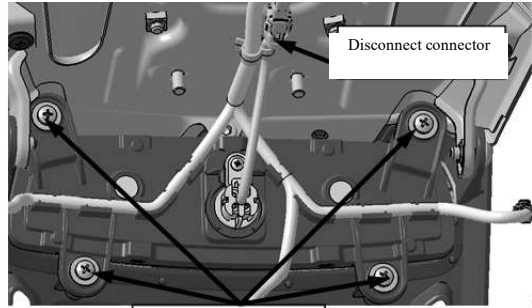
Tail lamp combination

Removal procedure for tail light:

1. Reference to removal of cover, remove the left and right side covers, then remove the rear inner cover mounting bolts, and remove the rear inner cover.
2. Disconnect the connector, remove the mounting bolts, and remove the tail light combination.



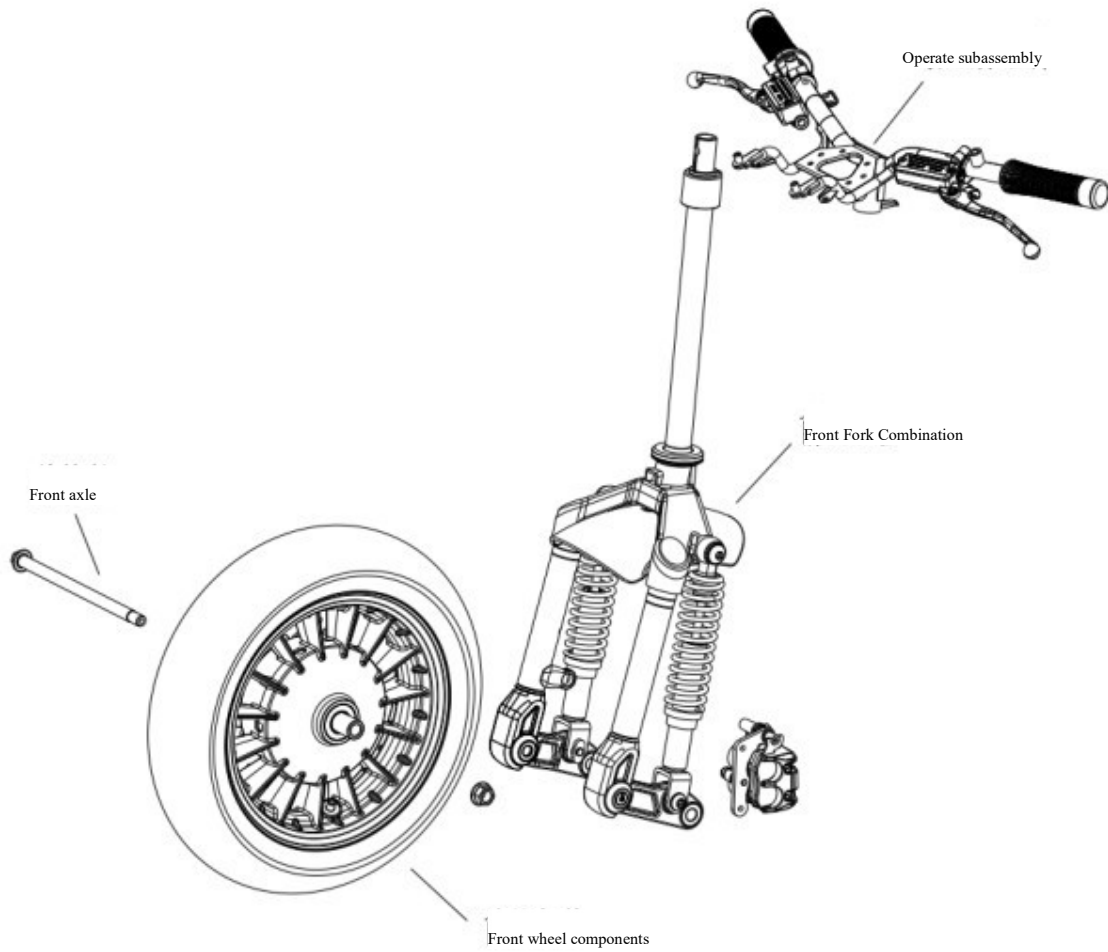
Remove the mounting bolts



Disconnect connector

Remove the mounting bolts

Front wheel, front suspension, steering column, front brake



12

Front wheel, front suspension, steering column, front brake

Maintenance Instructions	Front wheel
Important torque value	Front suspension
Troubleshooting	Steering column
Operate subassembly	Front brake

Maintenance Instructions

- When repairing the front wheel, park the vehicle on a horizontal ground and support with the main bracket. Support the vehicle with adjustable brackets on the bottom, and adjust the height of the bracket so that the front wheel is off the ground.
- Only use tire marked “TUBELESS” (without inner tube).
- Inhalation of braking lining dust may cause discomfort of respiratory system. Do not clean brake components with air duct or dry brush. Please go to professional maintenance network for repair and maintenance.

Important torque value

Front axle	80~90N.m	Front absorber lower fastening bolt	50~60N.m
Steering handle fixing bolt	50~60N.m	Front absorber upper fastening bolt	28~32N.m
Brake disc fastening screw	28~32N.m		

Troubleshooting

Steering instability

1. The bearing of standpipe is damaged;
2. The tire pressure is insufficient;
3. Damage of tires;
4. The wheel bearing is damaged.
5. The steering column adjusting nut is too tight or too loose.

The driving direction is deflected to one side or not straight

1. The adjustment of left and right absorbers are uneven;
2. The front fork is bent;
3. The front axle is bent, and the wheel is installed incorrectly;
4. The wheel bearing is damaged;

Front wheel is unstable

1. Bending deformation of wheel rim
2. Wheel bearing wear
3. Loose front axle
4. Damage of tires;

Wheel difficult to rotate

1. Damage of wheel bearing and shaft sleeve
2. The tire pressure is not enough.
3. Braking lining does not reset.

Suspension is too soft

1. The elastic force of front absorber spring is not enough;
2. The hydraulic oil level is too low or the liquid model is wrong.

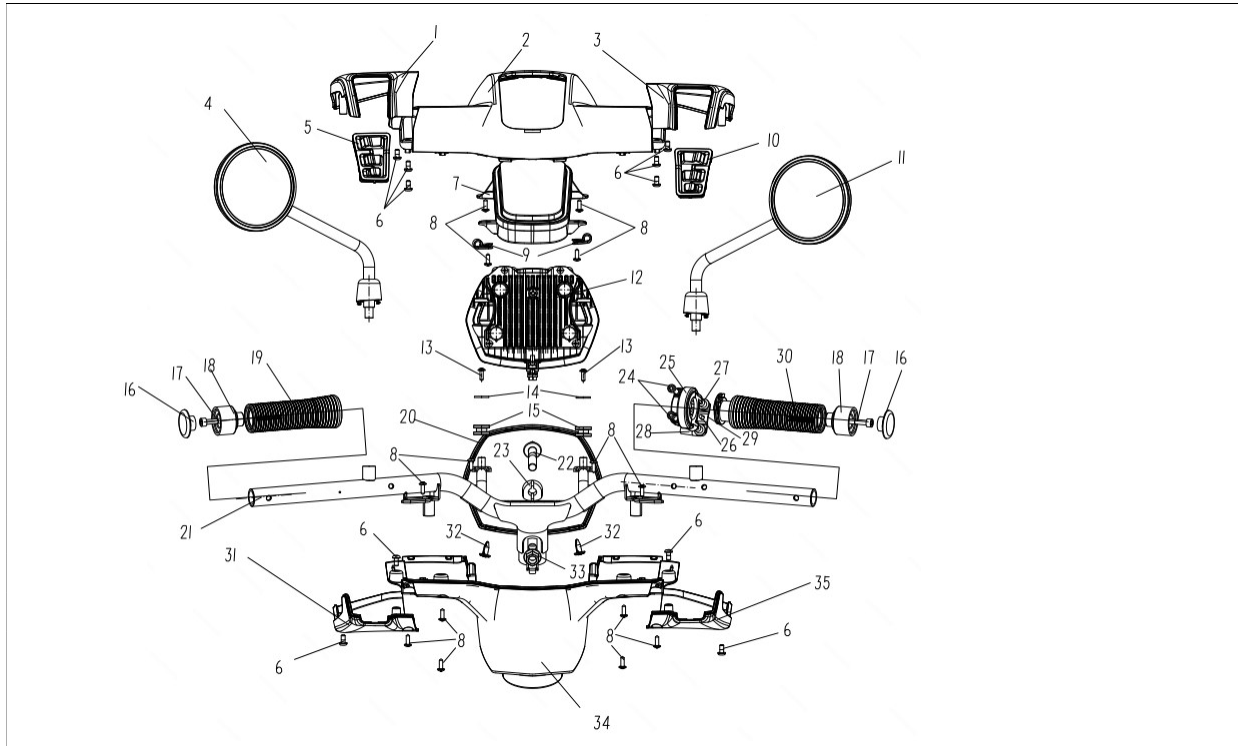
Suspension is too hard

1. The hydraulic oil level is too high or the liquid model is wrong.
2. Front absorber shaft is bent
3. Front absorber damper is blocked.

Poor brake performance

1. There is air inside the brake tube;
2. Brake shoe is worn;
3. There is water or oil stain on the brake shoe.

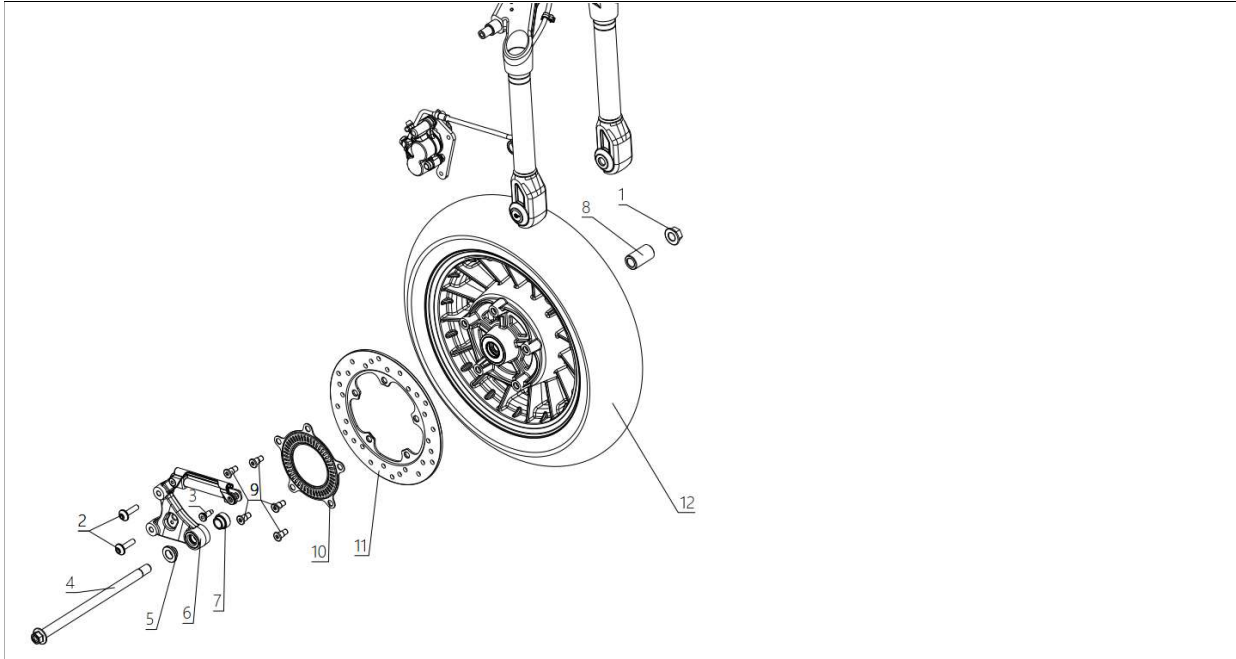
Removal/Assembly of Operating Subassembly



Maintenance Requirements

Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Remove the left rearview mirror component (4)	1	
2	Remove the right rearview mirror component (11)	1	
3	Remove the large plate self-tapping nail st4.2×13 (8)	6	
4	Remove the pan-head screw with cross recess M5X10 (6)	2	
5	Remove the inner hexagon reel bolt M6X16 (13)	2	
6	Remove the expansion screw (32)	2	
7	Remove the headlight trim cover (20)	1	
8	Remove the hexagon flange bolt M10x1.25X50 (22)	1	Note: Torque value 50-60N.m
9	Remove the large plate self-tapping nail st4.2×13 (8)	4	
10	Remove the counterweight trim cover (16)	2	Note: Counterweight trim cover is reverse thread
11	Remove socket head cap screw M6X40 (17)	2	
12	Remove the counterweight (18)	1	
13	Remove socket head cap screw M5X16 (24)	2	
14	Hexagon socket button head screw M4X10 (29)	1	

Removal/Assembly of Front Wheel



Attention

Contaminated brake discs and braking lining reduce braking performance, replace braking lining and clean dirty brake discs.

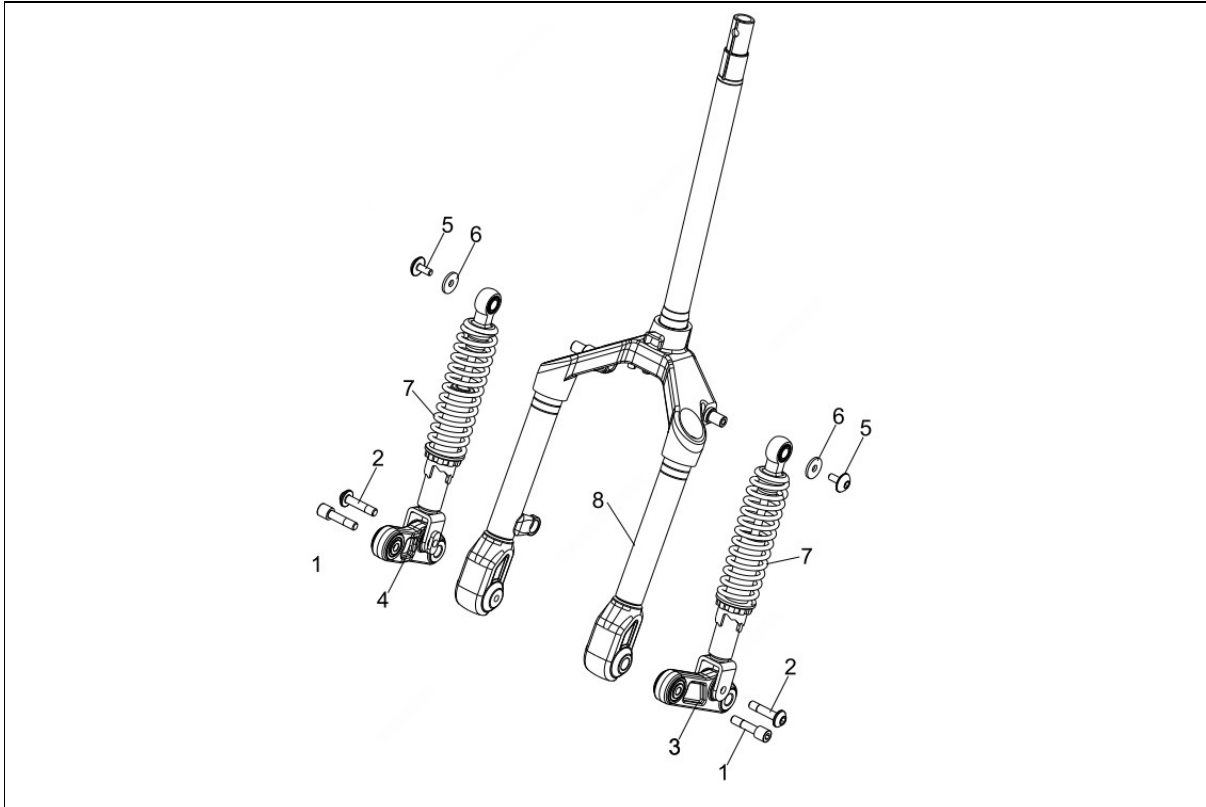
Do not pull the brake handle when the brake caliper is removed, otherwise it will be difficult to assemble the front wheel.

The vehicle bearing shall be replaced as a whole.

Maintenance Requirements

Sequence	Procedure	Quantity	Remarks
Removal sequence		Installation sequence is opposite to removal sequence	
1	Nut M14x1.5	1	Tightening torque 80-90N.m
2	Bolt M8x32	2	Tightening torque 25-30N.m
3	Mounting bolt of jackstay	1	Tightening torque 8-12N.m Apply thread fastening glue
4	Rear fork shaft	1	Apply lithium-based grease during assembly
5	Right shaft sleeve of front wheel II	1	Apply lithium-based grease during assembly
6	Front brake caliper mounting bracket/jackstay welding combination	1	
7	Right shaft sleeve of front wheel I	1	Apply lithium-based grease during assembly
8	Left shaft sleeve of front wheel	1	Apply lithium-based grease during assembly
9	Brake disc bolts	5	Tightening torque 28-32N.m Apply thread fastening glue
10	Speed signal panel	1	
11	Brake disc	1	

Removal/Assembly of Front Suspension



Attention

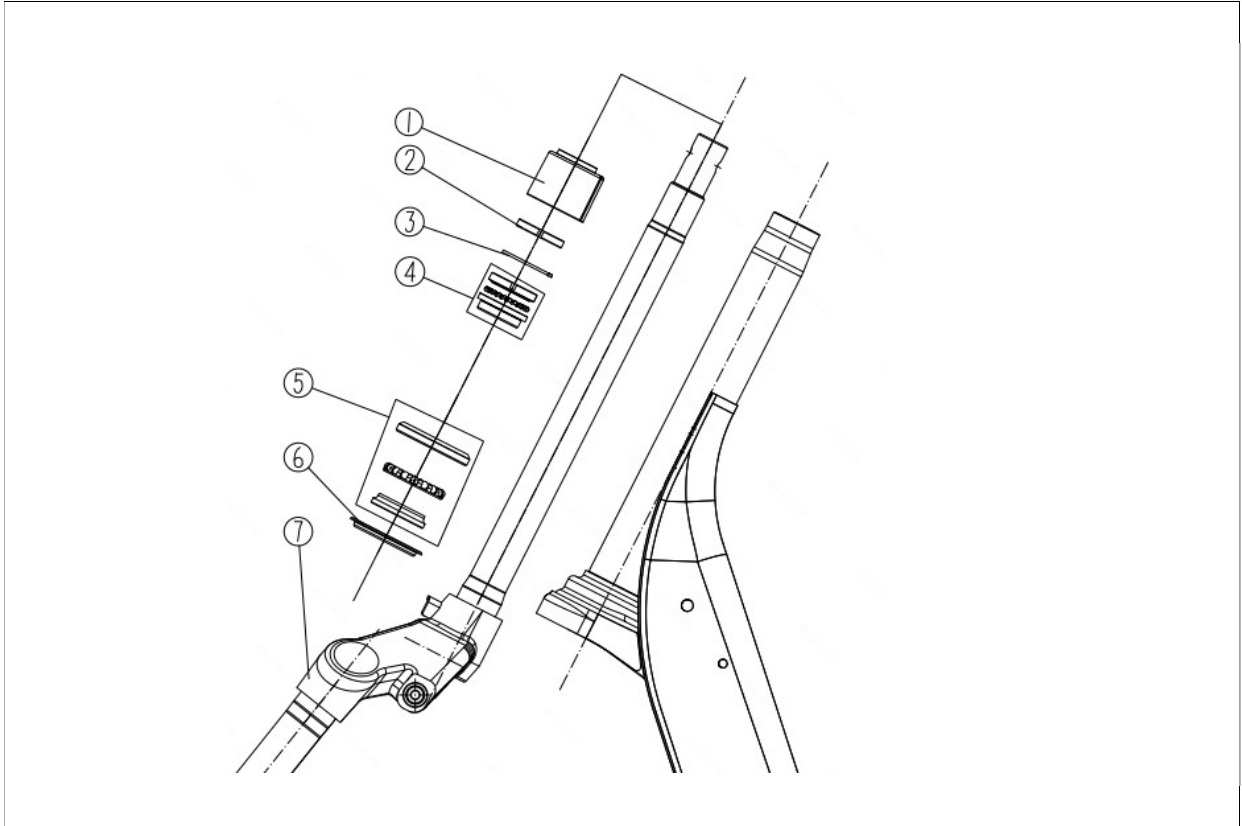
Lift the front brake main oil cylinder with wire rope at least the same height as the original installation position. Do not twist the brake hose.

Do not pull the brake lever when the brake caliper is removed, otherwise it will be difficult to assemble the front wheel.

Maintenance Requirements

Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Bolt M10X1.25X41	2	Requirements for tightening torque: 50~60N.m
2	Screw M10X1.25X45	2	Requirements for tightening torque: 50~60N.m
3	Front rocker arm combination (left)	1	
4	Front rocker arm combination (right)	1	
5	Screw M8X20	2	Torque requirements during tightening: 28~32N.m
6	Grommet 8	2	GB/T5287
7	Front absorber combination	2	
8	Welding combination of steering column	1	

Removal/Assembly of Steering Column

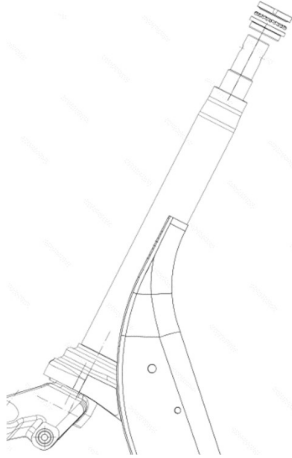


Maintenance Requirements

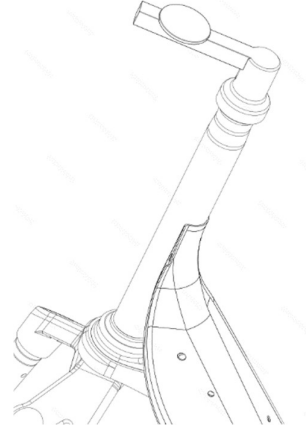
Sequence	Procedure	Quantity	Remarks
Removal sequence		Installation sequence is opposite to removal sequence	
1	Dust cap	1	
2	Steering column adjusting nut	1	Assembly torque 60-90N.m
3	Gasket	1	
4	Upper bearing combination	1	Assemble the bearing adjusting nut firstly with the torque of 33-43N.m, and then tighten it with the torque value of 8-10N.m after 1/4 turn.
5	Lower bearing combination	1	
6	Dust ring	1	
7	Welding combination of steering column	1	

Assembly of steering column

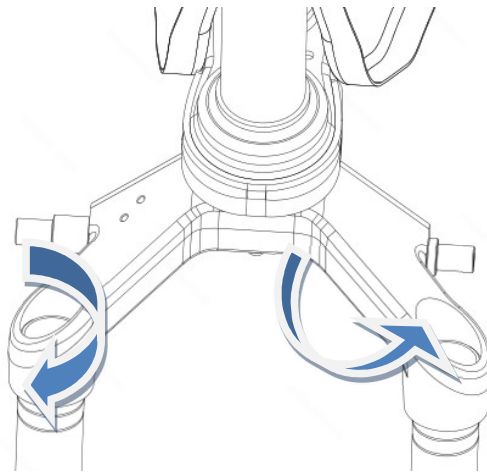
- 1 Apply sufficient lithium-based grease to the bearing roller surface and place the steering column into the frame standpipe. Put the bearing in sequence, tighten the upper bearing adjusting nut until the torque is 33-43N.m, then turn back to 1/4 circle and tighten the adjusting nut with the torque value of 8-10N. (Figures 1 and 2)
- 2 Install locknut after inserting gasket, torque value is 60-90N. m. (Figures 1 and 2)
- 3 Turn the steering column left and right to inspect for jamming. (Figure 3)



(Figure 1)



(Figure 2)



(Figure 3)

Front brake

Maintenance Instructions

- Dirty brake discs and braking lining will reduce braking performance, replace braking lining and clean dirty brake discs.
- Inhalation of braking lining dust may cause discomfort of respiratory system. Do not clean brake components with air duct or dry brush. Please go to professional maintenance network for repair and maintenance.
- The spilled brake fluid will seriously damage the surface of instrument glass and oil gas components, and is harmful to some rubbers. Be careful when removing the main cylinder, first make sure that the main cylinder is horizontal.
- Do not allow contaminants (dust, water, etc.) to enter the main cylinder.
- Once the hydraulic system is opened or the brake feels soft, the brake system must be exhausted.
- When overhauling the system, DOT4 brake fluid must be used. Do not mix with different types of brake fluid.
- Inspect the brake operation status before driving the motorcycle.

Troubleshooting

Brake soft

1. There is air in the pipeline;
2. The pipeline leaks;
3. The brake fluid level is low.
4. The braking lining is dirty;
5. The piston seal of brake auxiliary cylinder is worn and aged.
6. The piston seal of the brake main cylinder is worn and aged.
7. The piston of brake auxiliary cylinder is viscous and worn.
8. The piston of brake main cylinder is viscous and worn.
9. Brake shoe is worn.
10. Brake shoe slips badly.
11. The pipeline is blocked.
12. The brake disc is warped and deformed.
13. The pipeline is contaminated.

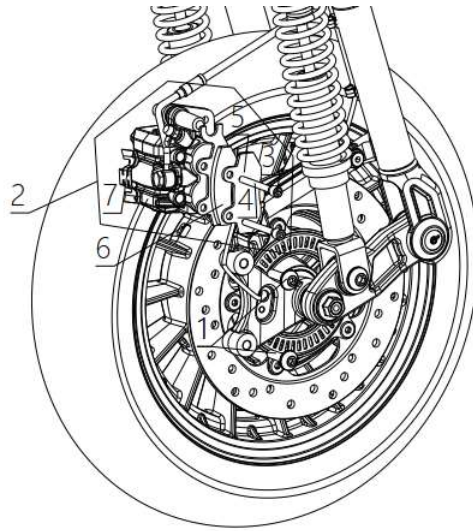
Brake handle is not flexible

1. The braking system is blocked and jammed.
2. The brake caliper piston is viscous and worn.
3. Brake shoe slips badly.
4. The pipeline is blocked and jammed.
5. The piston of brake main pump is viscous and worn.
6. The brake handle is bent.

The brake is off tracking to one side

1. The brake disc/braking lining is dirty.
2. The wheel is not calibrated.
3. The brake disc is warped and deformed.
4. Brake shoe slips badly.

Removal/Assembly of Front Brake Caliper Component



Attention

Dirty brake discs and braking lining will reduce braking performance, replace braking lining and clean dirty brake discs.

Lift the front brake main oil cylinder with wire rope at least the same height as the original installation position. Do not twist the brake hose.

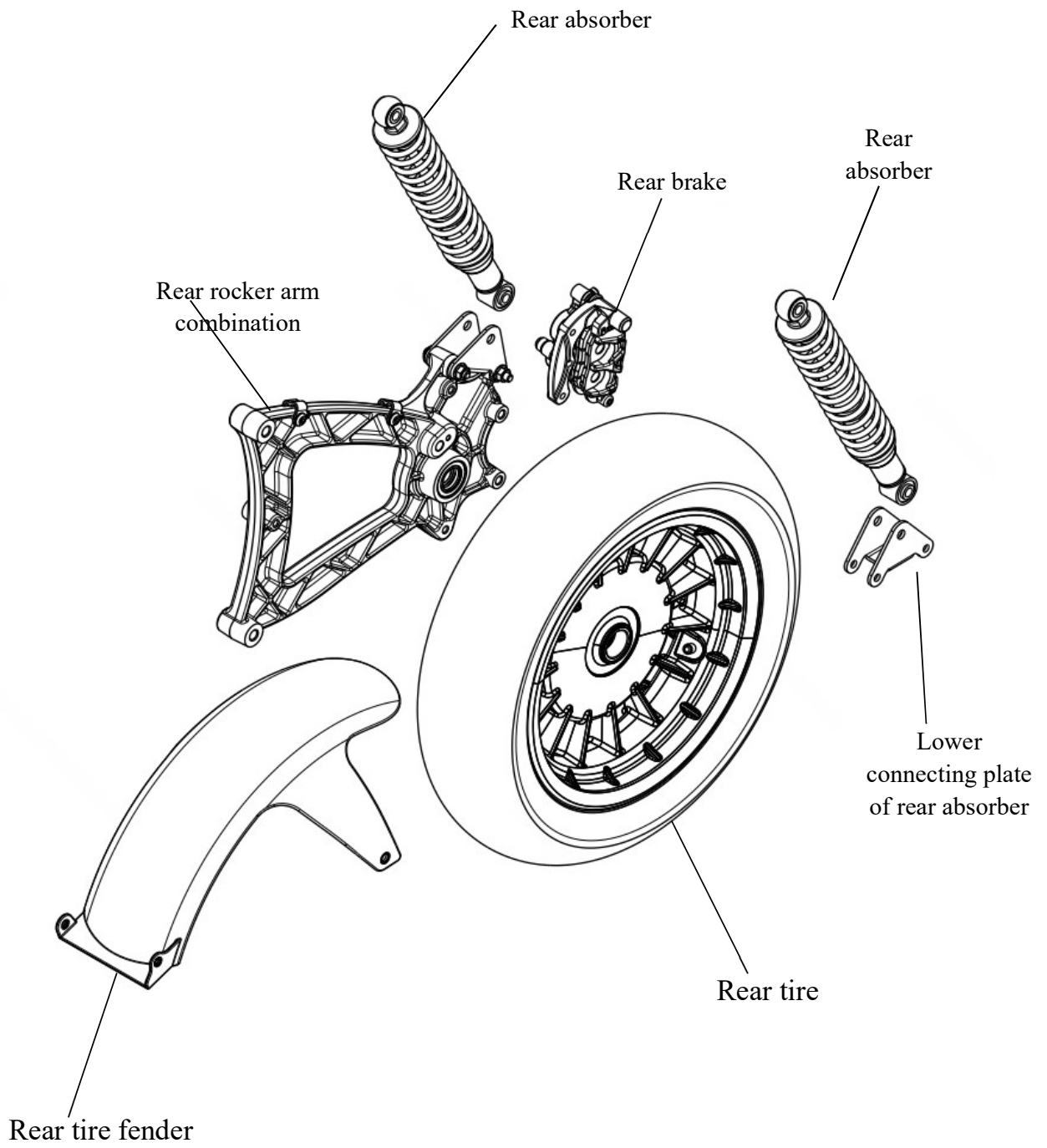
Do not pull the brake handle when the brake caliper is removed, otherwise it will be difficult to assemble the front wheel.

Inhalation of braking lining dust may cause discomfort of respiratory system. Do not clean brake components with air duct or dry brush. Please go to professional maintenance network for repair and maintenance.

After replacing the braking lining, operate the brake handle repeatedly to reset the caliper cylinder piston against the braking lining.

Maintenance Requirements

Sequence	Procedure	Quantity	Remarks
Removal sequence		Installation sequence is opposite to removal sequence	
1	Brake caliper bolt	2	Tightening torque 25-30N.m
2	Front brake caliper component	1	Lift the front brake main cylinder with wire rope, and do not twist the brake hose.
3	Screw plug	2	
4	Braking lining sliding shaft	2	
5	Internal braking lining	1	
6	External braking lining	1	
7	Brake caliper spring plate	1	



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Rear tire, rear brake, rear suspension device

Maintenance Instructions	Rear rocker arm
Troubleshooting	Rear absorber
Rear tire	Rear rocker arm combination

Maintenance Instructions

This section describes the removal, installation and maintenance of Rear tire, rear brake, rear rocker arm, and rear absorber. When repairing Rear tires and rear absorbers, the motorcycle shall be reliably supported by jacks or other brackets under the engine.

Important torque value

Fastening nut of Rear tire: 90~100N.m

Rear rocker arm bolt: 55 ~ 60N.m

Upper and lower bolts and nuts of rear absorber: 50~60N.m

Brake disc fastening screw: 28~32N.m

Troubleshooting

Swing of rear tire

1. The wheel is bent
2. Low tire pressure
3. Damaged wheel shaft sleeve

Abnormal suspension

1. The damping spring is too hard or too soft
2. Damaged rear fork bearing
3. The absorber is bent

Difficult rotation of rear tire

1. The shaft sleeve of the wheel is damaged
2. Incorrect wheel installation
3. Rear brake braking lining does not reset

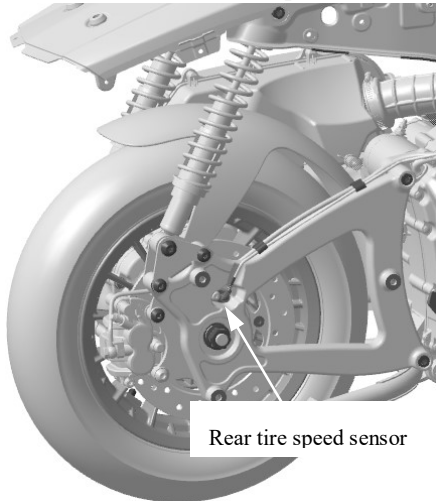
There is noise

1. The fasteners are loose

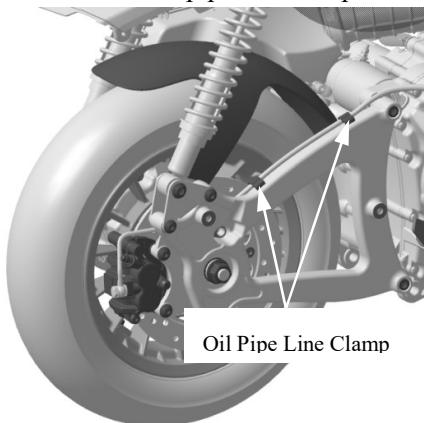
Rear rocker arm

Removal procedure of rear rocker arm and Rear tire:

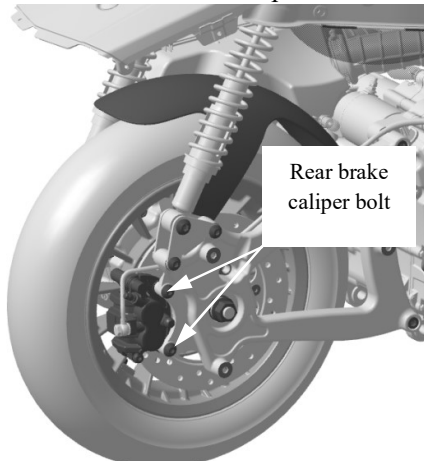
1. Remove the Rear tire speed sensor



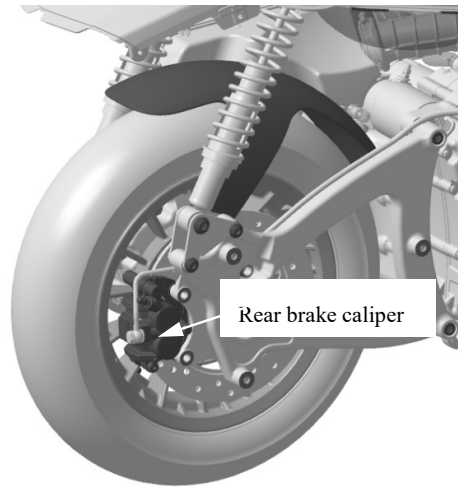
2. Remove the oil pipe line clamp



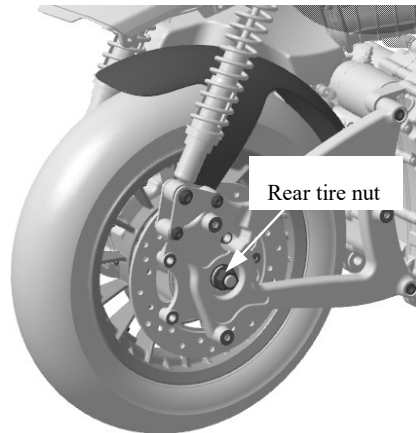
3. Remove the rear brake caliper screw



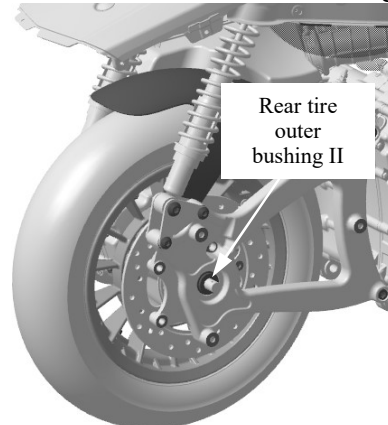
4. Remove the rear brake caliper



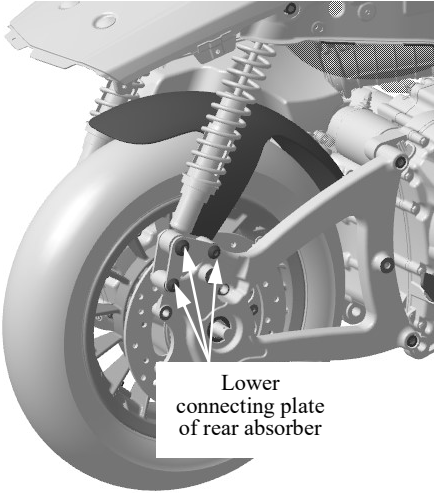
5. Remove the Rear tire nut



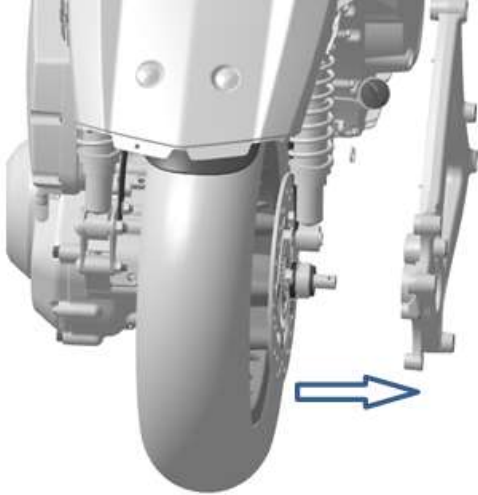
6. Remove the Rear tire outer bushing II



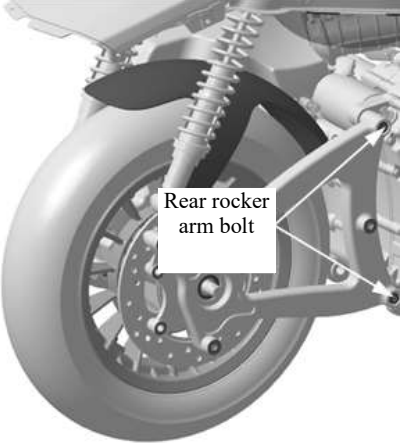
7. Remove the lower connecting plate of rear absorber



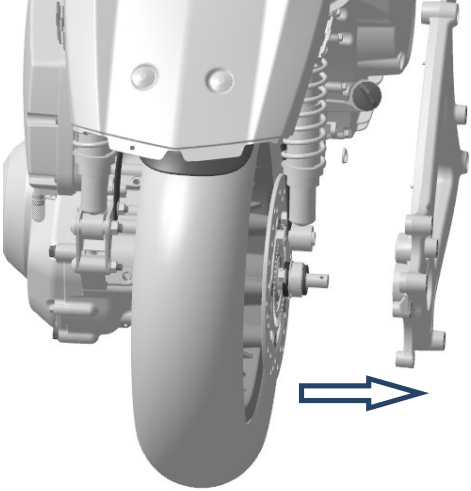
9. Remove the rear rocker arm to the right



8. Remove the rear rocker arm bolt



10. Remove the Rear tire combination to the right



Installation procedures of rear rocker arm and Rear tire:

Proceed in the reverse order of disassembly.

The tightening torque of rear rocker arm bolt is 55~60N.m.



Attention:

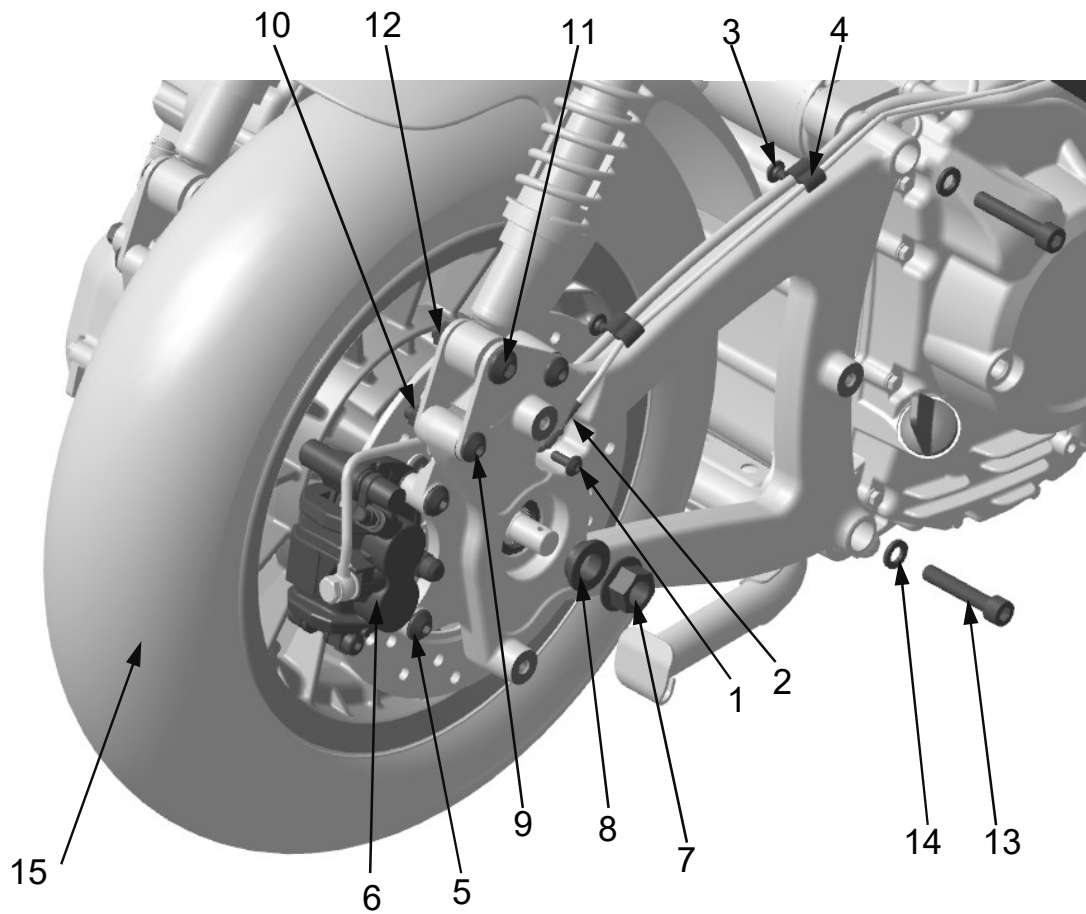
When removing the brake caliper body, ensure that the rear brake caliper body is lower than the rear brake cylinder block, to prevent air from entering the cylinder block and reducing the braking performance. After removing the rear brake caliper body, please do not operate the rear brake handle if there is no need to replace it.



Warning:

The rear rocker bolt must be tightened to the specified torque of 55~60N.m.

Removal/installation of rear rocker arm

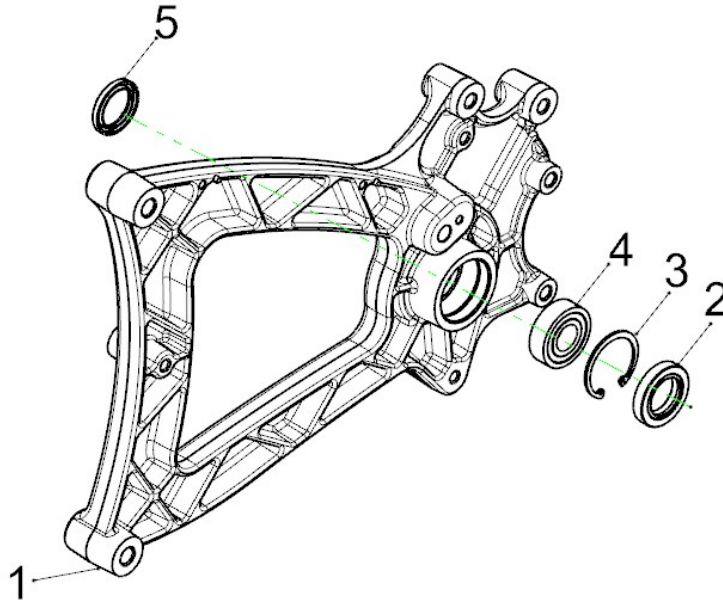


Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Reel bolt M6×16	1	
2	Wheel speed sensor	1	
3	Convex screw M6×12	2	
4	Oil pipe clamp	2	
5	Bolt M8×32	2	Fastening torque: 25~30N.m
6	Rear brake caliper	1	
7	Nut M16×1.5	1	Fastening torque: 90~100N.m
8	Rear tire outer bushing II	1	Apply lithium-based grease during assembly
9	Bolt M8×52	2	Fastening torque: 25~30N.m
10	Nut M8	2	Fastening torque: 25~30N.m
11	Screw M10×1.25×52	2	Fastening torque: 55~650N.m
12	Nut M10×1.25	2	Fastening torque: 55~60N.m
13	Bolt M10×1.25×53	2	Fastening torque: 55~60N.m
14	Grommet 10	2	GB/T97.3
15	Rear tire combination	1	

Disassembly/assembly of rear rocker arm combination

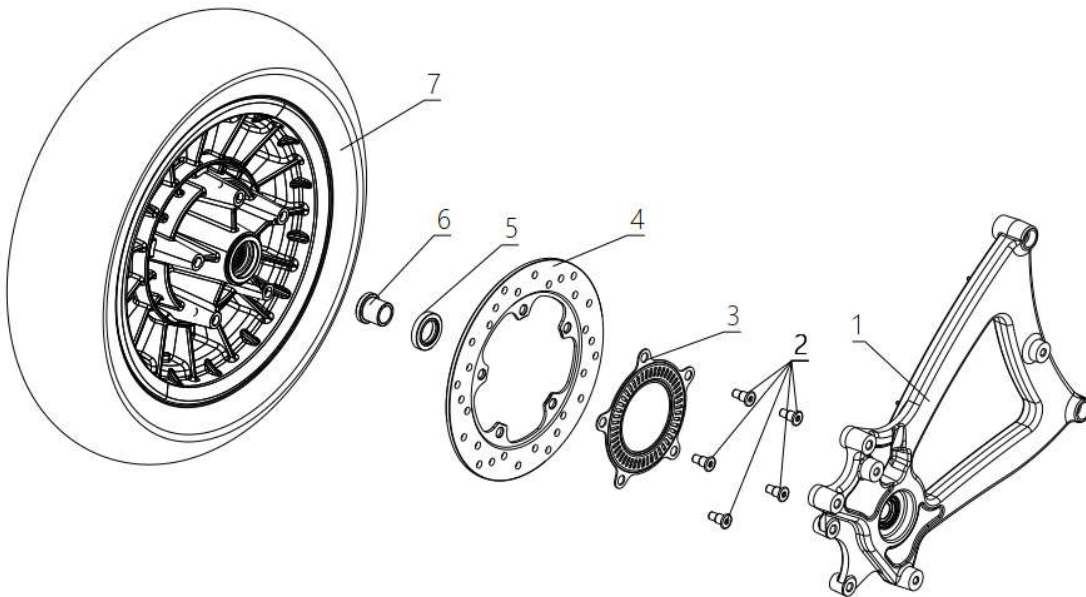
The rear rocker arm combination shall be disassembled / assembled according to the following figure.

Replace the sealing ring and deep groove ball bearing after removal. After installation, inspect whether the needle bearing rotates flexibly.



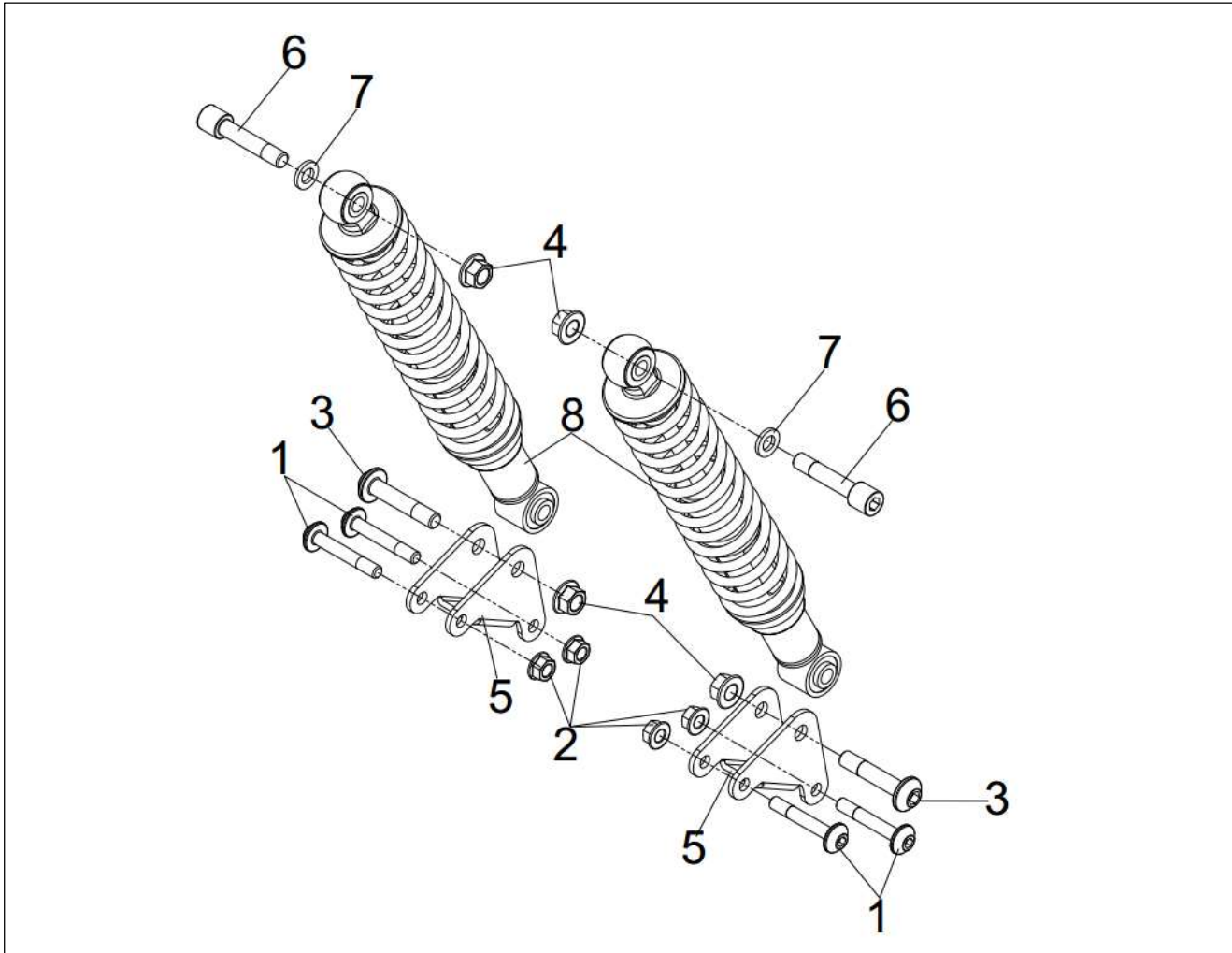
Sequence	Procedure	Quantity	Remarks
	Disassembly order		The assembly sequence is opposite to the disassembly order
1	Rear rocker arm	1	
2	Oil seal 25×40×7	1	Make sure shaft sleeve rotates flexibly during assembly
3	Snap ring for hole 35	1	GB/T893.1
4	Deep groove ball bearing 6203-2RS	1	
5	Oil seal 25×35×4	1	Make sure shaft sleeve rotates flexibly during assembly

Rear tire



Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Rear rocker arm combination	1	
2	Brake disc bolts	5	Tightening torque: 28~32N.m Apply threadlocker
3	Speed signal panel	1	
4	Brake disc	1	
5	Oil seal 25×40×7	1	
6	Rear tire outer bushing I	1	Apply lithium-based grease during assembly
7	Rear tire combination	1	

Removal/Assembly of Rear Suspension



Sequence	Procedure	Quantity	Remarks
	Removal sequence		Installation sequence is opposite to removal sequence
1	Screw M8×52	4	Fastening torque: 25~30N.m
2	Nut M8	4	Fastening torque: 25~30N.m
3	Screw M10×1.25×52	2	Fastening torque: 50~60N.m
4	Nut M10×1.25	2	Fastening torque: 50~60N.m
5	Lower connecting plate of rear absorber	2	
6	Bolt M10×1.25×53	2	Fastening torque: 55~60N.m
7	Grommet 10	2	GB/T97.3
8	Rear absorber	2	

14

General View of electrical system

Precautions for Circuit
Inspection

System Principle and
Composition

Precautions for Circuit Inspection

1. When disconnecting and connecting connector, turn the ignition switch to OFF position, otherwise it is easy to damage electrical components.
2. When inspecting the circuit, use the measuring probe which can be inserted from the front end and the rear end of the connector and reliably contact with the terminal.
3. Disconnect power supply and relevant electrical components during line on-off inspection.
4. When voltage inspection is adopted, the battery voltage shall be inspected first.
5. In case of electrical system failure, the following steps shall be followed for diagnosis:
 - A. Observe the fault performance, and determine which subsystem is faulty;
 - B. Use elimination method to minimize fault range according to circuit schematic diagram;
 - C. Inspect the circuit of subsystem for open circuit, short circuit, or wrong connection;
 - D. Inspect whether relevant components are invalid or damaged.
6. During finding out the fault of the circuit, it should be started from easy to difficult. Inspect the place where is easy to dismantle. Parameter detection and part replacement methods may be used, but the part replacement method shall be used to ensure that there is no overload in the line to avoid damage to new parts.
7. Multimeter and clamp meter shall be provided for circuit inspection.
8. Most instantaneous electrical failures are caused by failure of wire connector or wire.

System Principle and Composition

Electric system is an important guarantee that motorcycle can operate safely, reliably, and efficiently. It involves quite a lot of contents, including electric motor, electrical, electronic technology, computer, electrochemistry, acoustics, optical materials, and other subjects, especially the development of electronic technology. Motorcycle electrical system will also have significant changes. The G350 electrical system uses more advanced automotive electronics technology, which is much more complicated than the traditional motorcycle. It consists of the following subsystems.

- Power supply system
- Starting system
- Engine Management System
- Cooling system (electrical part)
- Lighting signal system
- Information display system

In the following chapters, we will discuss it separately. The cooling system has been described in Chapter 5 and will not be covered.

15

Battery and power supply system

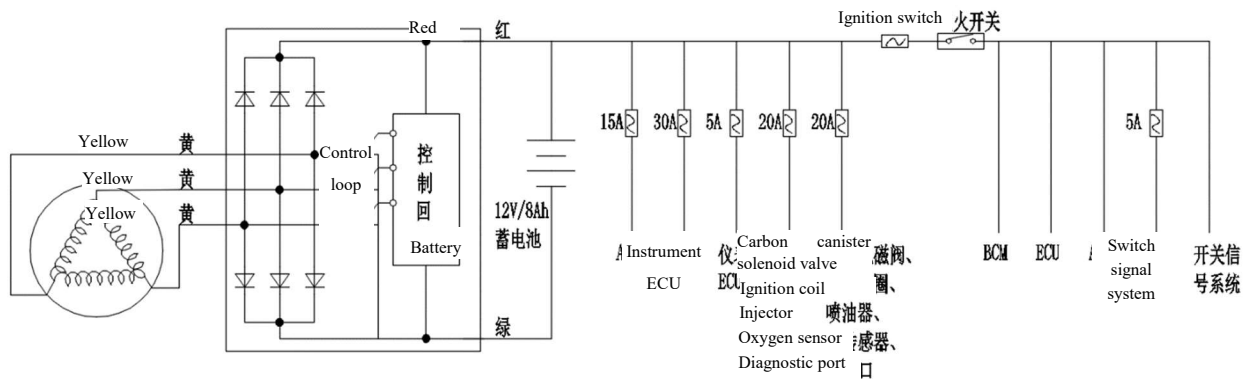
Overview	Introduction of Main Components
Schematic diagram of circuit	Main Fault Diagnosis
Parts Layout	

Overview

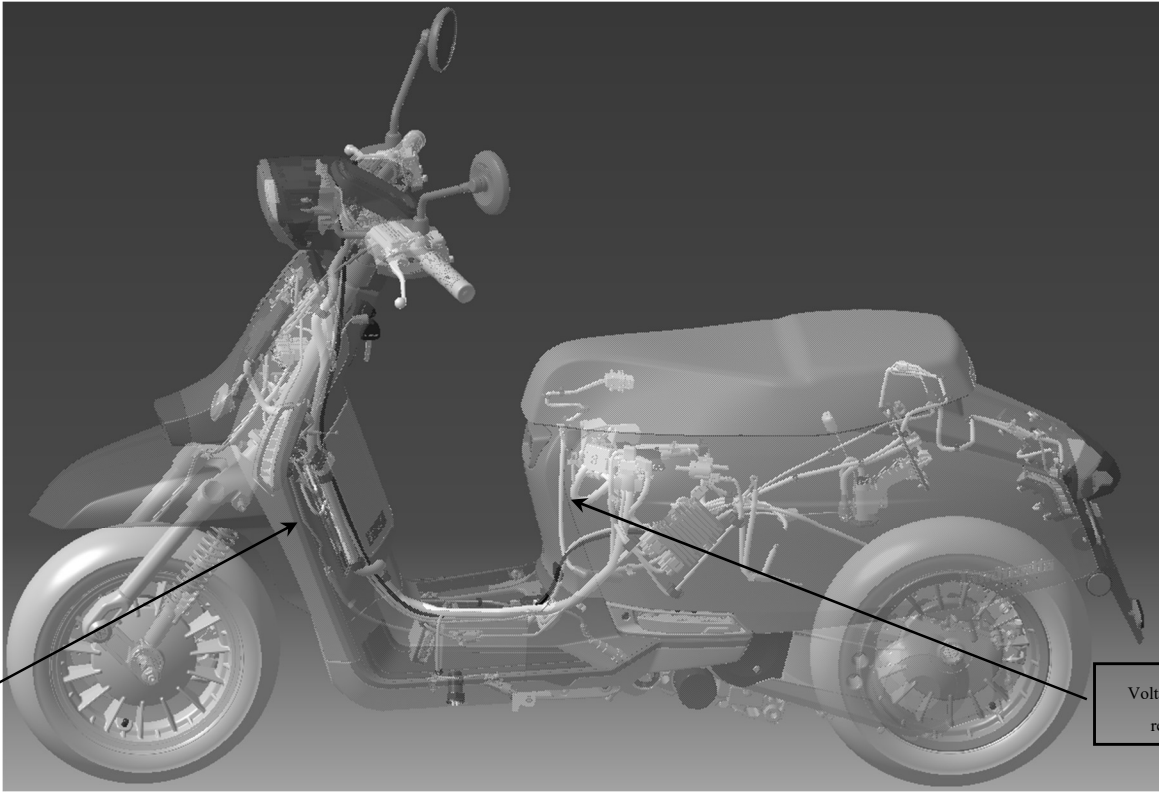
The power supply system is the premise of the whole vehicle electrical system, which can provide sufficient power for other electrical subsystems. Including: charging, storing, and discharging. G350 power supply system is characterized by large power supply capacity, up to 420W. It consists of the following components:

- Magneto
- Voltage regulating rectification
- Battery
- Combined ignition switch
- Insurance of each route

Schematic diagram of circuit

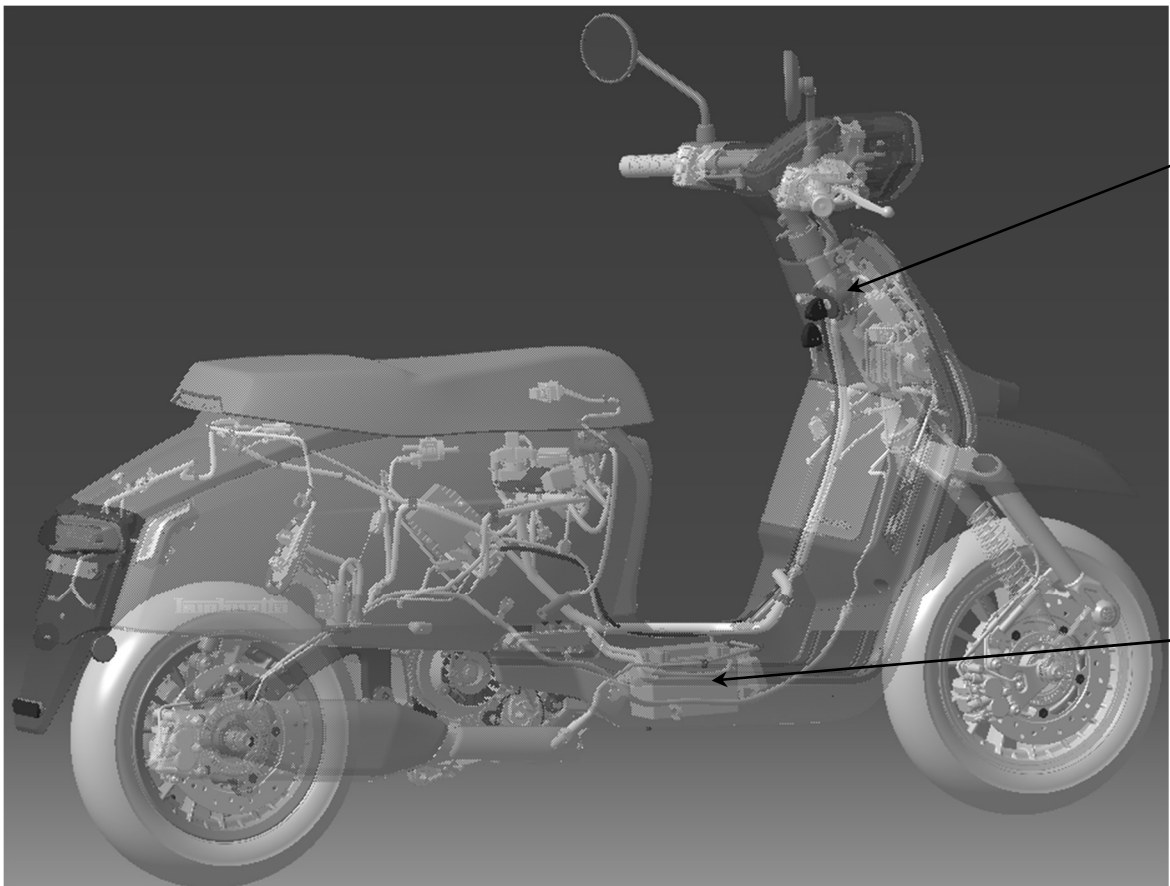


Parts Layout



Wire Harness

Voltage regulating
rectification



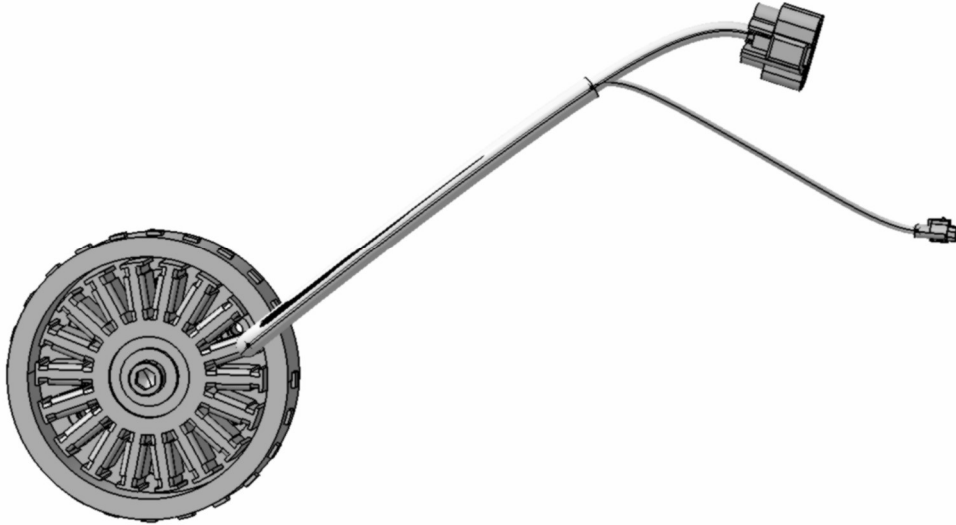
Ignition switch

Battery

Introduction of Main Components

○ Magneto

1. Outline drawing



2. Working principle

The crankshaft drives the rotor to rotate, and the stator winding coil cuts the magnetic line to produce induced electromotive force output alternating current, $E=Blv$. Motorcycle magneto is permanent magnet type alternator, permanent magnet steel is rotor, coil winding acts as stator. Magneto is the main power supply of electrical system.

3. Basic parameters

Six pieces of magnetic steel of rotor total 12 poles;

Totally 18 poles of stator winding are connected according to three-phase Δ , and the resistance value of each phase winding is 0.3-0.5 Ω ;

Rated power: 420W/5000r/min (cold state) (maximum attenuation of hot engine: 8%).

4. Failure mode

Fracture of rotor magnetic steel;

The magnetic properties of magnetic steel disappear;

Short circuit to ground of stator winding;

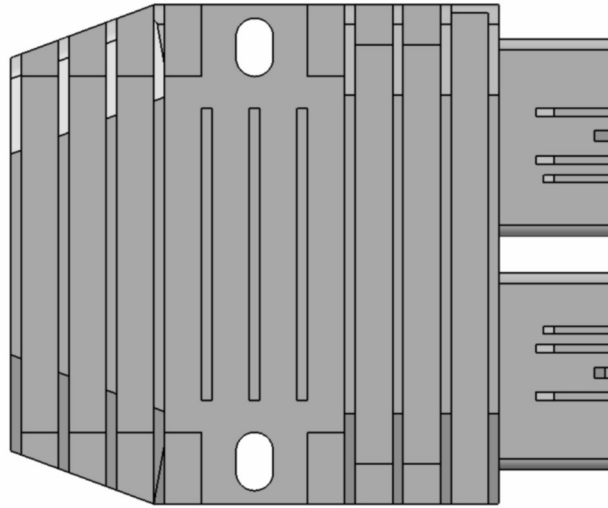
Turn-to-turn short circuit of stator winding;

The welding point of stator winding falls off and breaks;

Friction damage between rotor and stator (ingress of foreign matter).

○ Voltage regulating rectification

1. Outline drawing



2. Working principle

The three-phase sinusoidal alternating current outputted by the magneto fluctuates with the rotating speed is converted into stable direct current by full-wave rectification and controlled voltage-stabilizing charging circuit. Provide electrical energy to the load and charge the battery.

3. Basic parameters

Structure type: three-phase full-wave rectification, short circuit mode (MOS transistor);

Adjusting voltage: $14.5V \pm 0.3V$;

Maximum operational current: 30A.

4. Failure mode

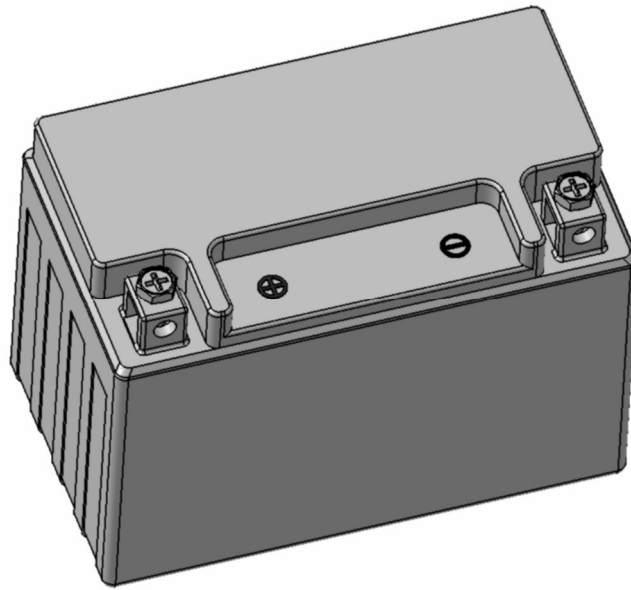
Overcharge the battery due to out-of-control voltage stabilizing circuit;

The rectification circuit is open or short circuited, and the battery cannot be charged or undercharged;

Short circuit or open circuit in outgoing wire.

○ Battery

1. Outline drawing



2. Working principle

Two kinds of materials, lead (negative electrode) and lead dioxide (positive electrode) immersion in electrolyte (sulfuric acid solution) can produce 2V voltage. Six cells connected in series, the voltage can reach 12~13V. It is the auxiliary power supply of the electrical system and can also absorb the overvoltage in the circuit.

3. Basic parameters

Battery type: valve-controlled lead-acid battery, model: 12V/8A·h;

10HR rated capacity: 8A·h (25°C±2°C);

4. Failure mode

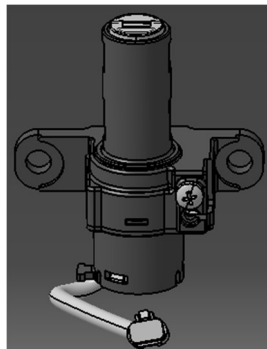
Polarization of electrode plate, capacity reduced, unable to provide electric energy required for starting, reduced charging performance;

Liquid leakage, corrosion electrode;

Internal resistance is too large. Self-discharge phenomenon is serious. Voltage is lower than 5V.

○ Combined ignition switch

1. Outline drawing













2. Working principle

The combined ignition switch is the main switch of the whole vehicle power supply, and combines the head steer locking function and file box opening function.

3. Basic parameters

Switch Function Menu:

Switch Function Menu				
Line color Gear position	Red	Black	Whether the key can be withdrawn	State of locking tab
			No	Not prominent
			Yes	Not prominent
			Yes	Prominence
OPEN			No	Not prominent

Inter-opening rate of switch key shall not exceed 0.1%;

Rated operational current of switch: 10A.

4. Failure mode

The lock cylinder fails, the switch is not opened flexibly, or the key cannot be opened;

Failure of switch contact causes switch failure;

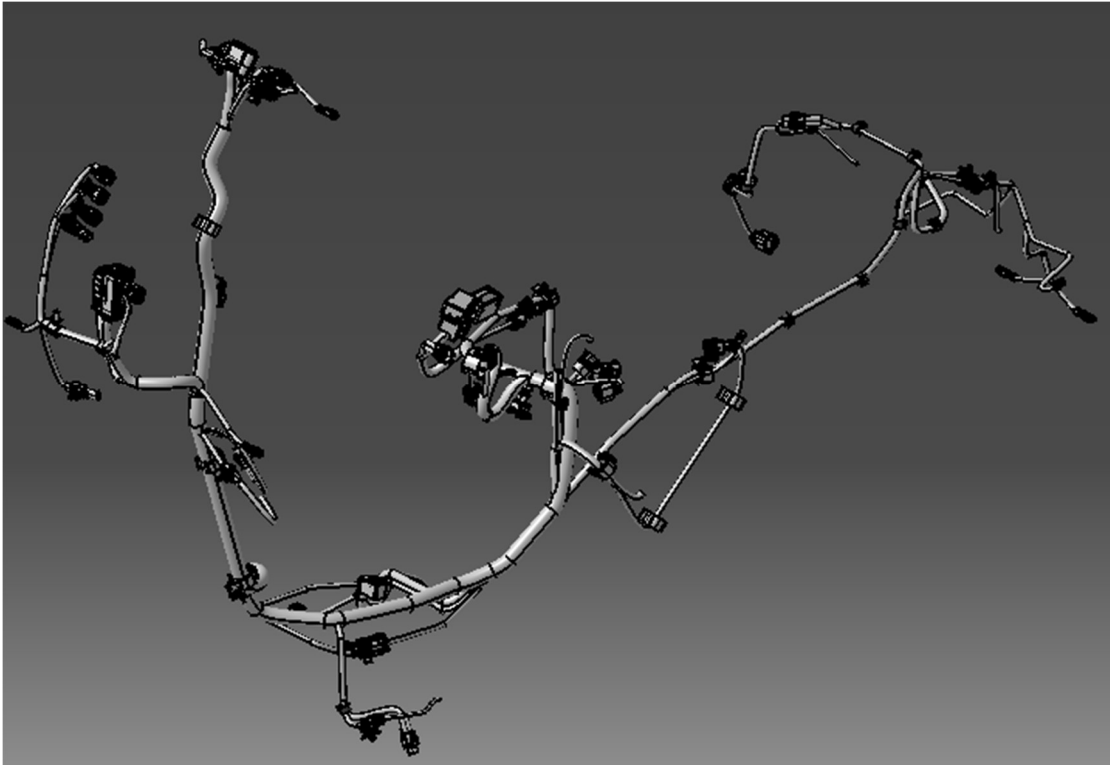
The short circuit between the switch contact and the shell causes the main fuse to burn out, and the whole vehicle has no power;

Open circuit of outgoing wire or short circuit to ground;

The locking tab cannot be extended, and the head steer cannot be locked.

○ Wire Harness

1. Outline drawing



2. Working principle

Wire harness is composed of various specifications of wires, connector sheaths, terminals, conduits, adhesive tapes, fuses, and other parts through bifurcation, riveting, winding and assembly. The electrical and electronic equipment of the whole vehicle can work normally only through the connection of wire harness.

3. Basic parameters

- On-off status of each stream line shall conform to electrical wiring diagram;
- The riveting of each bifurcation and terminal shall be firm and well connected;
- The conduit and adhesive tape shall be wrapped tightly without looseness;
- Each connector shall be reliably connected with corresponding electrical and electronic equipment.

4. Failure mode

- The terminal and connector are not assembled properly or loose;
- Short circuit to ground or adjacent wire with damaged sheath;
- Rusted connection at bifurcation is unreliable or open circuit;
- Instantaneous failure and poor connection of wire ends or wires (Most instantaneous electrical failures are caused by this);
- Poor contact or burn-out of the fuse;
- Wire harness is not securely tied on the vehicle body, resulting in failure of vibration wear or poor contact of wires.

Main Fault Diagnosis

Symptoms of failure	Possible causes	Solution
The whole vehicle has no electricity: When the key is turned on, the instrument does not have any indication, nor can it perform other electrical functions.	The fuse is burnt; Poor contact of fuse circuit; Poor connection of positive and negative electrode lines of battery; Battery is not powered; Failure of ignition switch; Poor connection between ignition switch outgoing wire and main cable; Open circuit or short circuit in the relevant circuit of the main cable.	Replacement of fuse; Reconnect; Reconnect; Charge or replace; Repair or replace; Reconnect; Repair or replace;
Battery voltage is too low: Turn on the power supply, and the voltage display on the instrument is lower than 12V.	The vehicle is stored for too long; Failure of the whole vehicle charging circuit, or large quiescent current of the vehicle; Attenuation of storage capacity of storage battery, self-discharge of storage battery.	Charge with DC voltage stabilizing charger; Inspect the charging circuit and the quiescent current of the whole vehicle; Replace the battery.
Battery undercharged: After the engine is started, the voltage display on the instrument is below 13V.	Poor connection between outgoing wire of voltage regulating rectification and main cable or magneto; Open circuit or short circuit in the relevant circuit of the main cable; Failure of magneto; Failure of voltage regulating rectification; Battery does not store electricity.	Reconnect; Repair or replace; Replace the magneto; Replace the voltage regulating rectification; Replace the battery.
Battery overcharge: The storage battery has large gassing or battery deformation.	Failure of voltage regulating rectification.	Replace.

Corresponding Table of Faults

Diagnostic Items	Fault symbol	Pcode	Description (UAES)	Decription (UAES)	Solution	
Oxygen sensor heating of upstream cylinder 1	E_hsve	B_sihsv	P0030	Open circuit in oxygen sensor heating control circuit of upstream cylinder 1	O2 Sensor 2 Heater Contr. Circ. Open	① Inspect the oxygen sensor connector; ② Inspect and replace oxygen sensor; ③ Inspect and replace the cable;
		B_mnhsv	P0031	Low voltage in oxygen sensor heating control circuit of upstream cylinder 1	O2 Sensor 1 Heater Contr. Circ. Low	
		B_mxhsv	P0032	High voltage in oxygen sensor heating control circuit of upstream cylinder 1	O2 Sensor 1 Heater Contr. Circ. High	
Intake pressure sensor	E_lm	B_mnlm	P0107	Short Circuit to Ground of Intake Pressure Sensor	Manifold Abs. Pressure or Bar. Pressure Low Input	① Inspect the connector of intake pressure sensor; ② Inspect and replace the intake pressure sensor; ③ Inspect and replace the cable;
		B_mxlm	P0108	Intake Pressure Sensor Short Circuit to Power	Manifold Abs. Pressure or Bar. Pressure High Input	
Intake temperature sensor	E_ta	B_mxta	P0112	Intake temperature sensor signal voltage is too low	Intake Air Temp. Circ. Low Input	① Inspect the connector of intake temperature sensor; ② Inspect and replace intake temperature sensor; ③ Inspect and replace the cable;
		B_mnta	P0113	Intake temperature sensor signal voltage is too high	Intake Air Temp. Circ. High Input	
Engine Coolant Temperature Sensor	E_tm	B_mxtm	P0117	Engine coolant temperature sensor circuit voltage is too low	Engine Coolant Temp. Circ. Low Input	① Inspect the connector of cylinder temperature sensor; ② Inspect and replace the cylinder temperature sensor; ③ Inspect and replace the cable;
		B_mntm	P0118	Engine coolant temperature sensor circuit voltage is too high	Engine Coolant Temp. Circ. High Input	
Throttle Valve Position Sensor	E_dk	B_mndk	P0122	Throttle valve position sensor circuit voltage exceeds the low limit value	Throttle Pos. Sensor Circ. Low Input	① Inspect the throttle valve position sensor connector; ② Inspect and replace throttle valve position sensor; ③ Inspect and replace the cable;
		B_mxdk	P0123	Throttle valve position sensor circuit voltage exceeds high limit value	Throttle Pos. Sensor Circ. High Input	
Signal of oxygen sensor in upstream cylinder 1	E_lsv	B_nplsv	P0130	Signal of oxygen sensor in upstream cylinder 1 is unreasonable	O2 Sensor Circ., Bank1-Sensor1 Malfunction	① Inspect the oxygen sensor connector; ② Inspect and replace oxygen sensor; ③ Inspect and replace the cable;
		B_mnlsv	P0131	Signal of oxygen sensor in upstream cylinder 1 is too low	O2 Sensor Circ., Bank1-Sensor1 low Voltage	
		B_mxslsv	P0132	Circuit voltage of oxygen sensor signal in upstream cylinder 1 is too high	O2 Sensor Circ., Bank1-Sensor1 High Voltage	
		B_silsv	P0134	Circuit signal fault of oxygen sensor in upstream cylinder 1	O2 Sensor Circ., Bank1-Sensor1 No Activity Detected	
Cylinder 1 injector	E_ev1	B_siev1	P0201	Open circuit of cylinder 1 injector control circuit	Cylinder 1- Injector Circuit	① Inspect the injector connector;

		B_mnev1	P0261	Short circuit to ground in the control circuit of cylinder 1 injector	Cylinder 1- Injector Circuit Low	② Inspect and replace the injector; ③ Replace the cable;
		B_mxev1	P0262	Short circuit to power supply in control circuit of cylinder 1 injector	Cylinder 1- Injector Circuit High	
Idle actuator	E_stpe	B_sistpe	P0511	Idle Actuator Control Circuit Fault	Idle Air Control Circuit	① Inspect the installation position of injector, intake pipe and engine mounting surface, throttle valve body assembly and intake pipe installation connection for air leakage ② Re-initialization and stepping motor reset, to eliminate step-missing problem of stepping motor ③ Inspect stepping motor, connector, and cable
		B_npstpe	P0511			
Battery	E_ub	B_npub	P0560	System battery voltage signal is unreasonable	System Voltage Malfunction	Inspect battery and voltage regulating rectification
		B_mnub	P0562	System battery voltage is too low	System Voltage Low Voltage	Replace the battery
		B_mxub	P0563	System battery voltage is too high	System Voltage High Voltage	Replace the voltage regulating rectification
Speed sensor	E_n		P0322	No speed sensor pulse signal (open or short circuit)	Ign. /Distributor Eng. Speed Inp. Circ. No Signal	① Inspect the speed phase sensor connector; ② Inspect the assembly of speed phase sensor; ③ Replace the speed phase sensor;
Roll sensor	E_dump	B_mndump	P1098	Roll sensor faulty	dump control circuit high	① Inspect the roll sensor connector; ② Inspect and replace the roll sensor; ③ Inspect and replace the cable;
Carbon canister solenoid valve	E_teve	B_siteve	P0444	Open circuit of carbon canister solenoid valve	canister purge valve Circuit open	① Inspect the connector of the carbon canister solenoid valve; ② Inspect and replace the carbon canister solenoid valve; ③ Inspect and replace the cable;
		B_mnteve	P0458	Short circuit to ground of carbon canister solenoid valve	canister purge valve Circuit low	
		B_mxteve	P0459	Short circuit to power supply of carbon canister solenoid valve	canister purge valve Circuit high	

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Starting system

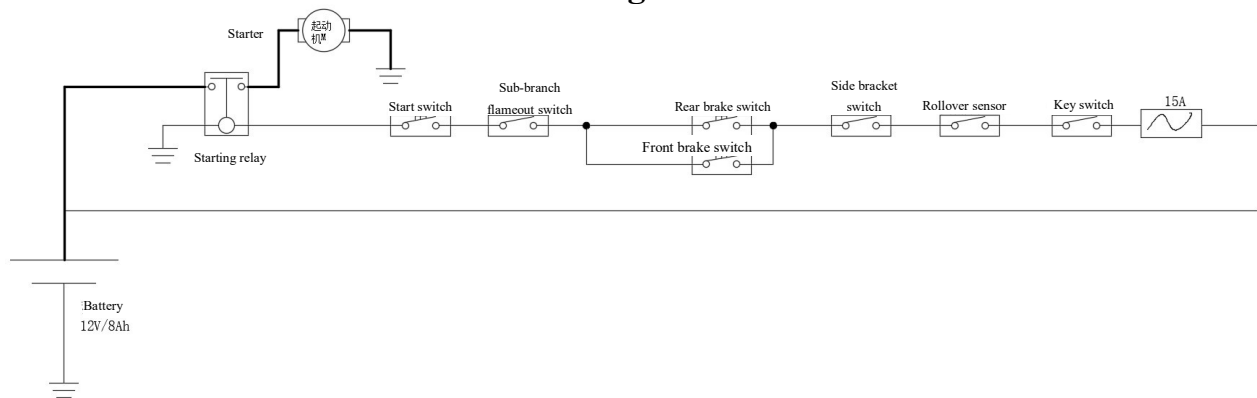
Overview	Introduction of Main Components
Schematic diagram of circuit	Main Fault Diagnosis
Parts Layout	

Overview

In the initial operation of the engine, it is necessary to rotate it by means of external force before it can enter the ignition and oil supply procedure, and the internal combustion engine can circulate and operate steadily. The G350 motorcycle is only equipped with electronic starting. First release the rollover sensor, side bracket switch, and brake switch protection. Then press the start button, connect the starting relay, start the motor to rotate, drive the intermediate gear and one-way device, make the engine enter the working cycle, normally ignite, fuel injection and combustion. The system consists of the following components:

- Starting motor;
- Starting relay;
- Battery;
- Starting switch and flameout switch;
- Rollover sensor, side bracket switch, and brake switch.

Schematic diagram of circuit



Parts Layout

Flameout switch

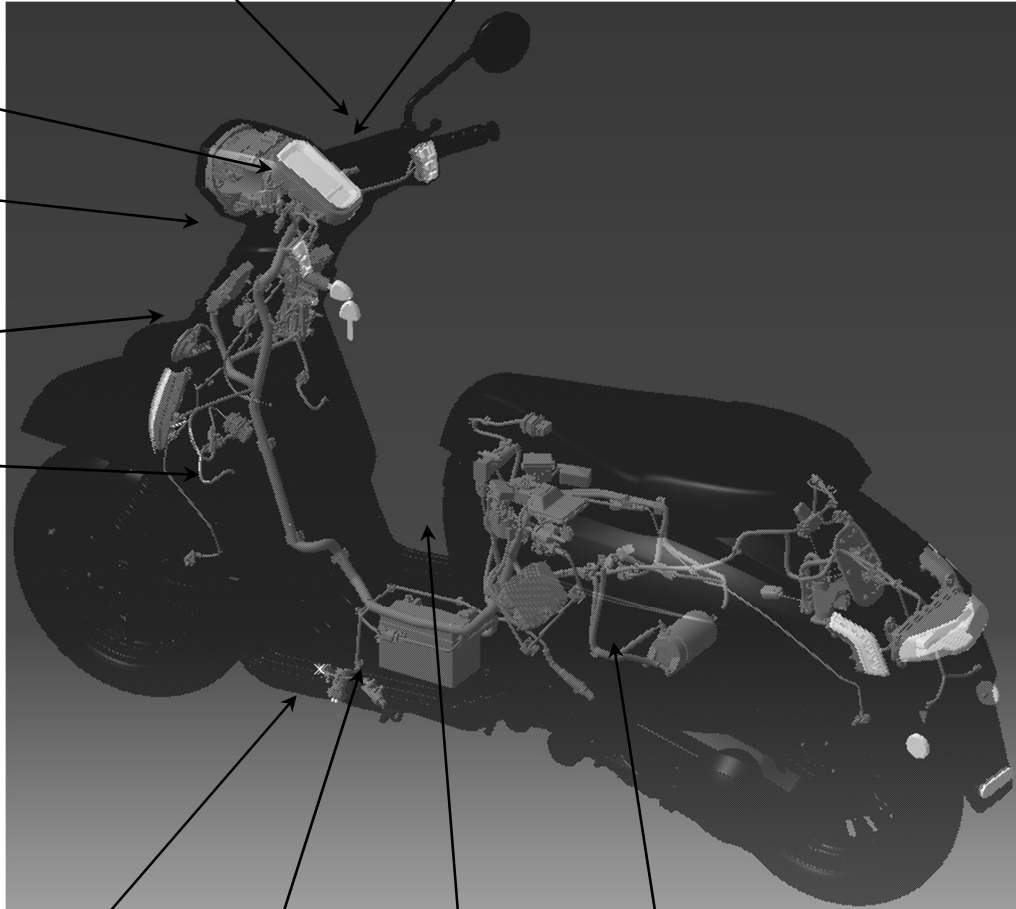
Start switch

Front brake switch

Rear brake switch

Rollover sensing

Wire Harness



Side bracket switch

Battery

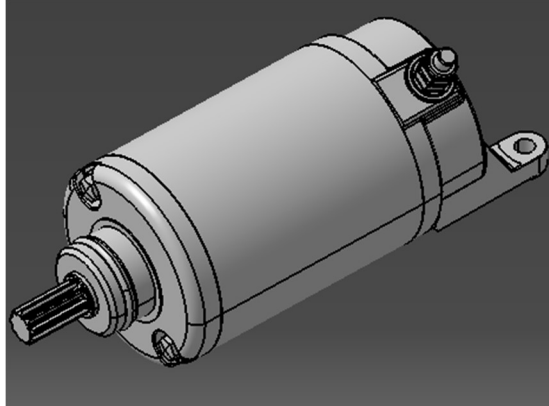
Starting relay

Starting motor

Introduction of Main Components

○ Starting motor

1. Outline drawing



2. Working principle

The current-carrying conductor shall be subjected to electromagnetic force in the magnetic field, $F=BlI$. Energize the positive and negative electrodes of the starting motor (negative electrode bond strap), rotate the motor shaft, and drive the engine to run initially through reduction gear, one-way device, and crank.

3. Basic parameters

There are 4 poles of stator four magnetic steels, and four carbon brushes;

Specifications: 12V940W

Output shaft rotation direction: clockwise from tooth end;

Output Characteristics:

	Status	Voltage V	Current A	Speed r/min	Torque N. m
Motor characteristics	No-load	11.5	≤ 40	≥ 10000	
	Load	10.0	≤ 160	≥ 7200	1.25
	Brake	6	≤ 500		≥ 4.3
Battery		7Ah			

4. Failure mode

Open circuit failure of motor;

Excessive worn of carbon brush;

Fracture of stator magnetic steel;

The magnetic properties of magnetic steel disappear;

Short circuit caused by friction of rotor winding varnished wire and stator;

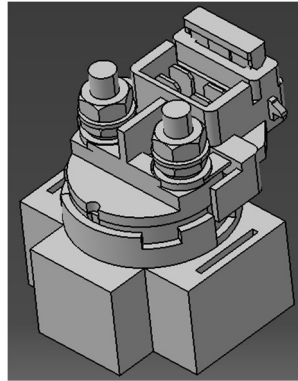
Bearing failure. Abnormal sound of motor operation;

Poor oil seal. Short circuit of oil leakage in the motor;

Poor waterproofing. Decreasing of performance caused by water leakage in the motor.

○ Starting relay

1. Outline drawing



2. Working principle

Switch on the voltage at both ends of the relay coil to generate electromagnetic force, and connect the moving contact and the static contact. The large current through the starting motor and relay contacts is controlled by small current through the operating switch and relay coil. The G350 starting relay also contains the power supply circuit (power pole B, coil binding post).

3. Basic parameters

Nominal voltage: DC 12V;

Rated current: DC150A (5S);

Closed voltage: DC (4.5~7.5) V;

Released voltage: DC (1~3.5) V;

Contact voltage pressure drop: below 0.2V (at 150A);

Coil current: below 3.5A (at 12V).

4. Failure mode

Open circuit of coil or lug plate, contact shall not be engaged;

The coil is short circuited and the contact shall not be engaged;

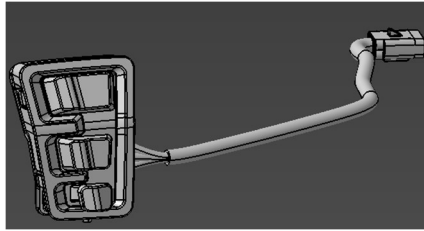
The contact is rusted or ablated, and cannot be connected even engaged;

Contacts cannot be disconnected due to excessive current;

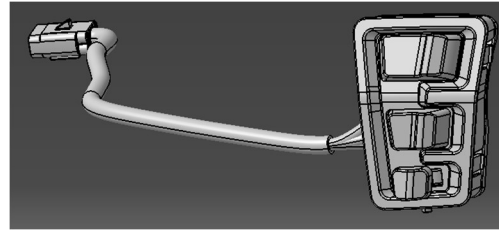
Open circuit of power circuit (power pole B, coil binding post) makes the vehicle unable to start.

○ Left and right combination switch

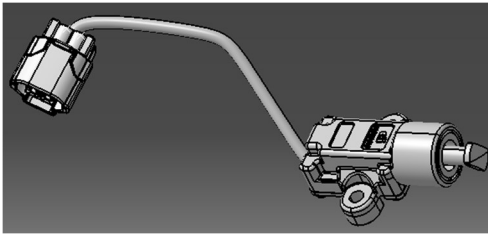
1. Outline drawing



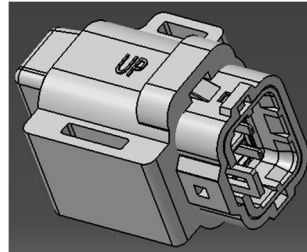
Left combination switch



Right combination switch



Side bracket switch



Rollover sensor

2. Switch function

Left Switch Function Menu

	Grey	Orange	Light blue	Blue and yellow	Blue	White	Red and white	Light green
○	○	○	○					
←	○	○						
→	○	○	○					
				○	○			
				○		○		
					○		○	
							○	○

Right Switch Function Menu

	Yellow	Black and white	Yellow and red	Red	Blue and yellow	Reddish yellow	Red and green
	○	○	○	○			
	○	○	○	○			
	○	○	○	○			
						○	○
	○				○		

Side Bracket Switch Function Menu

Stow up	○	○	Engine can be started
Put it down	○	○	The engine cannot be started and flameout

Rollover Sensor Performance

Rated voltage: DC 5V;

Operating angle: inclination above $65^{\circ} \pm 10^{\circ}$ (one side);

Normal output voltage (operating angle $< 65^{\circ} \pm 10^{\circ}$): 0.4~1.4V;

Output voltage during tipping (operating angle $> 65^{\circ} \pm 10^{\circ}$): 3.7V~4.4V.

3. Failure mode

The switch positioning buckle is broken, and is loose when used;

There is no sense of positioning or sense of positioning is weak;

The switch is stuck and cannot be reset;

Switch failure, and disconnection of outgoing wire make the switch unable to connect;

Short circuit of outgoing wire and disorder of switch function;

The switch of the side bracket is loose, and the contact is poor;

The outgoing wire of side bracket switch is worn out, open circuit, or open circuit;

Rollover sensor failure;

Switch worn out, vibration, and failure by water ingress and corrosion.

Main Fault Diagnosis

Symptoms of failure	Possible causes	Diagnostic methods	Solution
Starting relay does not engage: press the start button without hearing relay engaging, and the starting motor does not rotate.	<p>Battery voltage is too low;</p> <p>Corresponding fuse is not connected or burnt;</p> <p>The side bracket switch is not conducting;</p> <p>Open circuit failure of brake switch;</p> <p>Open circuit failure of starting button;</p> <p>Open circuit failure of flameout switch;</p> <p>Failure of starting relay;</p> <p>Open circuit in the relevant circuit of the main cable.</p>	<p>Detect battery voltage;</p> <p>Inspect whether the fuse is blown;</p> <p>Inspect whether the side bracket switch can be on and off normally;</p> <p>Inspect whether the brake switch can be on and off normally;</p> <p>Inspect whether the switch fails according to the switch function menu;</p> <p>Apply closed voltage to both ends of the coil of starting relay. If the contact terminal is not connected, it can be judged that the starting relay fails;</p> <p>Inspect whether there is an operational voltage between the two wires of the starting relay coil on the main cable.</p>	<p>Charging the battery;</p> <p>Switch on the fuse or replace it;</p> <p>Connect or replace the gear switch;</p> <p>Connect or replace the side bracket switch;</p> <p>Connect the circuit or replace the left switch;</p> <p>Connect the circuit or replace the left switch;</p> <p>Replace the starting relay;</p> <p>Repair or replace the main cable.</p>
Starting motor does not rotate: There is sound of relay engaging, but the motor does not rotate.	<p>Battery voltage is too low;</p> <p>The thick wire connector is loose;</p> <p>Open circuit failure of motor;</p> <p>Open circuit between pole contacts of starting relay;</p> <p>Short circuit failure of motor;</p> <p>The motor is blocked and the engine is jammed.</p>	<p>Inspect situation of the battery voltage drops. If it doesn't drop, inspect whether each connector is loose, then inspect whether the relay or motor is open circuit. If the drop is too large (lower than 5V), the motor is short circuited or the motor is jammed.</p>	<p>Charging the battery;</p> <p>Fasten the connector;</p> <p>Replace the motor;</p> <p>Replace the starting relay;</p> <p>Replace the motor;</p> <p>Inspect the engine.</p>
Motor speed is too low	<p>Battery voltage or capacity is too low;</p> <p>Poor connection of connector;</p> <p>The output torque of starting motor is insufficient;</p> <p>Engine resistance is too high.</p>		<p>Charge or replace the battery;</p> <p>Fasten the connector;</p> <p>Replace the motor;</p> <p>Inspect the engine.</p>

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Lighting signal system

Overview	Introduction of Main Components
Schematic diagram of circuit	Main Fault Diagnosis
Parts Layout	

Overview

The lighting signal system is an important guarantee for the safe running of the vehicle. It includes the headlight system, the signal lamp control system, and the horn system.

Headlight Lighting System:

When driving at night, the vehicle needs a headlight to light the road surface, and remind the surrounding vehicles and people of the existence of the vehicle. High beam lamps shall be used when driving at medium and high speeds, and low beam lamps shall be used when meeting the vehicle. The low beam lamp shall be anti-dazzle. The lighting of the headlights is controlled by the switch and the BCM (Body Controller).

Signal lamp control system:

When the vehicle is turning, it is necessary to prompt the surrounding vehicles and people to avoid reasonable avoidance through the flashing of the steering lamp; when driving at night, the tail light shall be used to indicate the existence of the vehicle and light the number of license plate; when braking, the brake lamp shall be turned on to remind the vehicle behind that this vehicle is braking and decelerating. The flashing of the steering lamp is controlled by the switch and BCM. The lighting of the rear position lamp and license plate lamp is only controlled by the BCM, and the lighting of the brake lamp is only controlled by the brake switch.

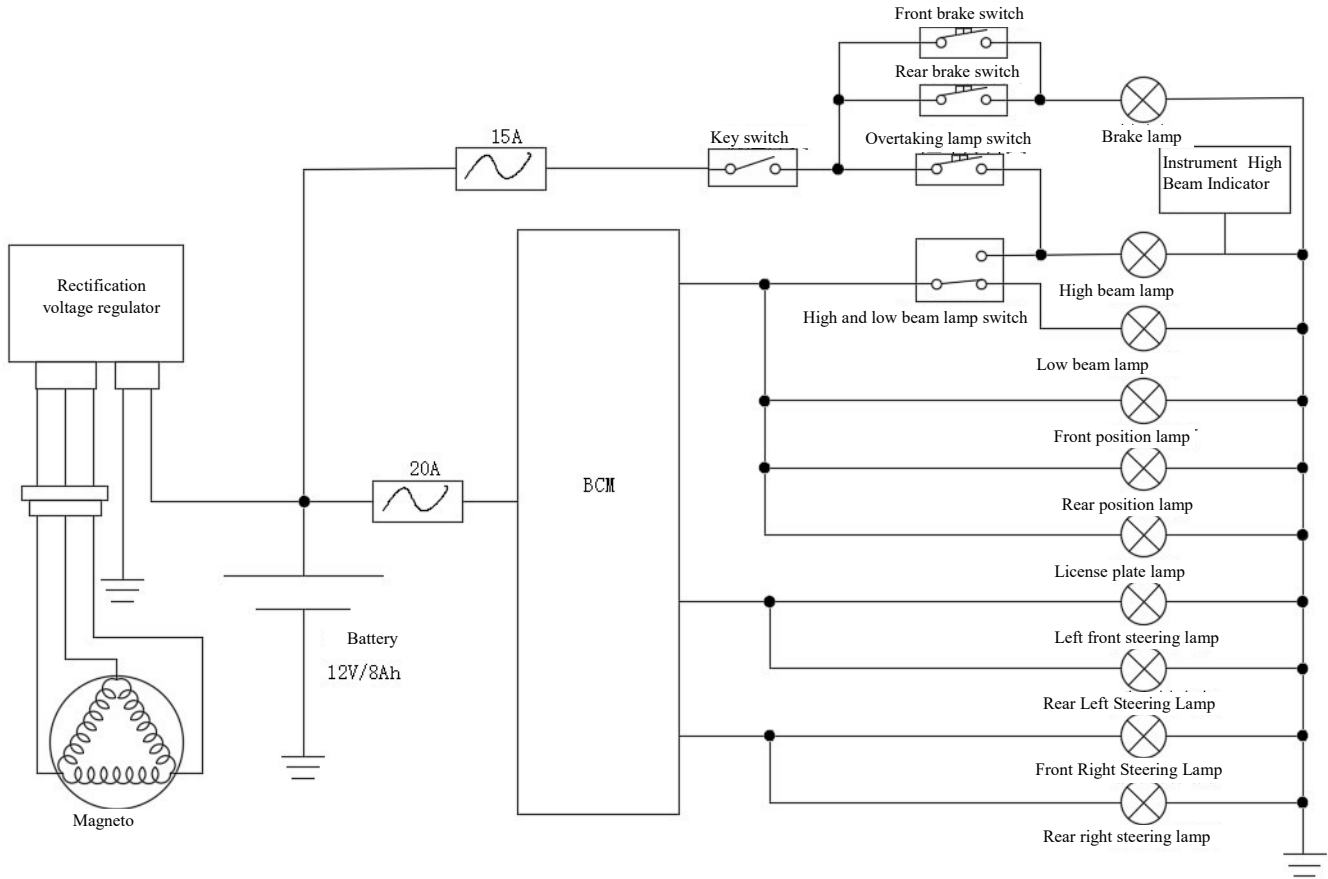
Horn system:

If other vehicles or pedestrians are obstructing or possibly obstructing the driving of the vehicle, use a horn prompt to ensure the safety of the vehicle. The operation of the horn is controlled by the horn button.

Components:

- Headlights
- Combined rear position lamp
- Steering lamp
- Horn
- Headlight relay
- BCM
- Front brake light switch
- Rear brake light switch
- Left and right combination switch

Schematic diagram of circuit



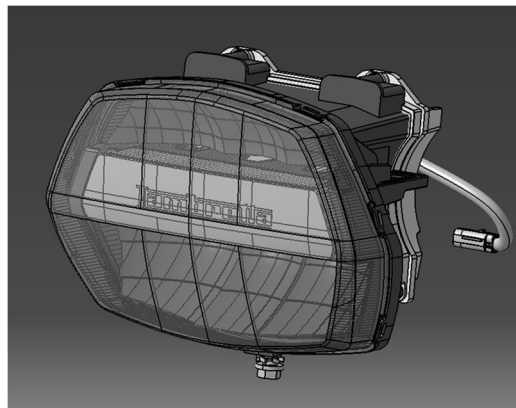
Parts Layout



Introduction of Main Components

○ Headlights

1. Outline drawing



2. Working principle

The headlight beads generally have high beam lamps and low beam lamps. The high beam filament is located on the focal point of the parabolic surface of the headlight mirror. The light is reflected by the reflector to become parallel beam and then scattered through the lamp glass, which can evenly light the road within 100m ahead; the low beam filament is located at the front and upper part of the focal point, and the light can light the road within 30m ahead after reflection. Because the light shielding plate is arranged under the lamp bead, the light will not be glared.

3. Basic parameters

Specification of high beam lamp: LED 30W;

Specification of low beam lamp: LED 12W;

Specification of position lamp: LED 3W.

4. Failure mode

Bead failure;

Water or dust in the lamp;

Welding of circuit board is loose;

Scratches of lamp housing glass;

Open circuit or short circuit of lamp wire;

High temperature deformation of mirror;

The light shield is broken or loose;

The lights are deflected.

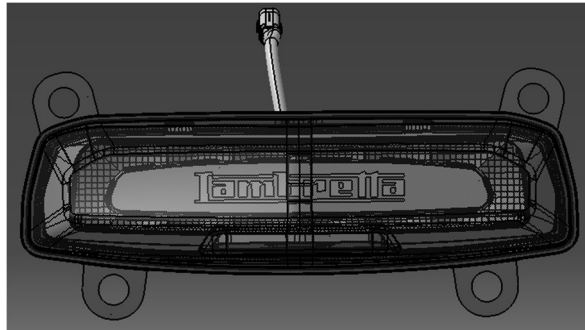
5. Light adjustment

Up and down adjustment: adjust the adjusting screw under the headlight, and adjust the light up and down after the adjusting screw is loose.

Left and right adjustment: the left and right of the car cannot be adjusted.

○ Combined rear position lamp

1. Outline drawing



2. Working principle

The combined rear position lamp integrates the functions of rear position lamp, brake lamp, and license plate lamp. The rear position lamp and brake lamp shall be red and the license plate lamp shall be white.

3. Basic parameters

Specification of rear position lamp bead: LED 2W;

Specification of license plate lamp bead: LED 1W;

Specification of brake lamp bead: LED 3W.

4. Failure mode

Bead failure;

The lamp socket is loose;

Open circuit or short circuit of light wire;

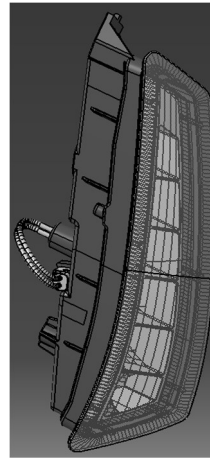
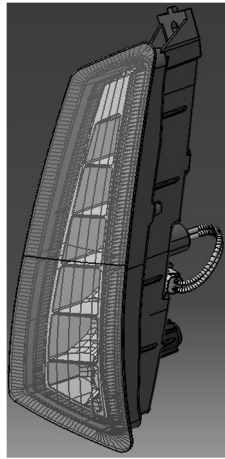
Ingress of water or dust in the lamp;

The lamp glass is scratched or damaged;

The reflection block fell off.

○ Front steering signal lamp

1. Outline drawing



Front left steering lamp

Front right steering lamp

2. Working principle

The front steering signal lamp consists of a lamp cover, a lamp housing, a mirror, a circuit board, and a bead. The light emitted by the bead is reflected by the mirror into concentrated light, and then scattered by the lamp glass into uniform and soft orange light.

3. Basic parameters

Specification of front steering lamp bead: LED 3W.

4. Failure mode

Bead failure;

The lamp socket is loose;

Open circuit or short circuit of light wire;

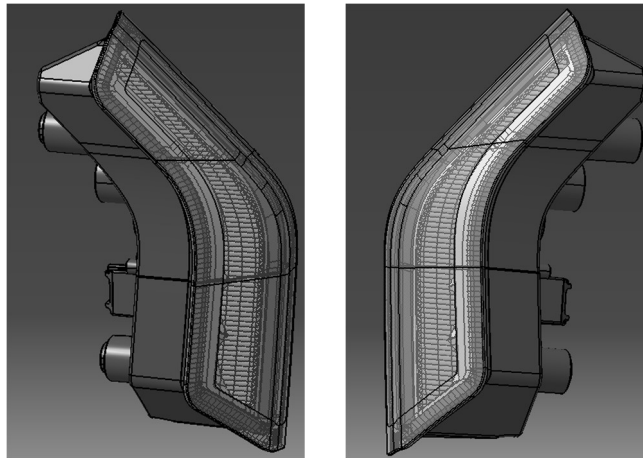
Ingress of water or dust in the lamp;

The lamp glass is scratched or damaged;

Handle loose or broken.

○ Rear steering signal lamp

1. Outline drawing



Rear left steering lamp

Rear right steering lamp

2. Working principle

The rear steering signal lamp consists of a lamp cover, a lamp housing, a mirror, a circuit board, and a bead. The light emitted by the bead is reflected by the mirror into concentrated light, and then scattered by the lamp glass into uniform and soft orange light.

3. Basic parameters

Specification of steering signal lamp bead: LED 3W.

4. Failure mode

Bead failure;

The lamp socket is loose;

Open circuit or short circuit of light wire;

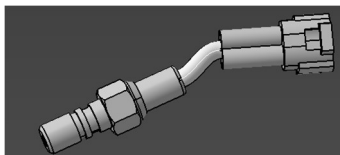
Ingress of water or dust in the lamp;

The lamp glass is scratched or damaged;

Handle loose or broken.

○ Brake switch

1. Outline drawing



2. Working principle

The brake switch is installed in the brake main pump. When braking, hold the brake handle tightly, and the hydraulic pressure in the brake main pump changes, thus connecting the circuit, and the brake light is on. Release the brake handle, the hydraulic pressure in the brake main pump recovers, the circuit is disconnected, and the brake light goes out.

3. Basic parameters

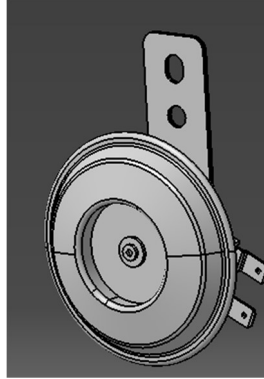
Connecting pressure: 0.1-0.6Mpa.

4. Failure mode

Switch corrosion, leakage, and failure.

○ Horn

1. Outline drawing



2. Working principle

Horn working current circuit: positive lug plate → horn coil → contact → negative lug plate. After the current passes through the horn coil, the magnetic field generates suction to the armature, which makes the bass diaphragm and the high-tone diaphragm move at the same time. The contact opens to interrupt the current. The electromagnetic force disappears. The diaphragm is returned by its own elastic force. The contact is closed again, and the circuit is connected again. So repeatedly, the diaphragm continuously vibrates and emits sound. The contact clearance can be adjusted by means of screws to change the diaphragm vibration frequency, thereby changing the sound level.

3. Basic parameters

Fundamental frequency: (450 ± 30) Hz, sound pressure level: $(105 \sim 118)$ dB.

4. Failure mode

Contact ablation;

Too large or too small of contact clearance (adjustable and repairable);

Short circuit or short circuit of coil;

The male tab is broken or rusted.

5. Horn adjustment

After long-term operation of the horn, the contact arm may be deformed, causing the contact clearance to be too large or too small, so that the volume of the horn is too low or cannot be sounded. At this time, it can be repaired by adjusting screw. Now loosen the locknut, turn the screw clockwise or counterclockwise, connect the horn power supply at the same time, adjust until to the loudest noise, and finally lock the locknut again.

Main Fault Diagnosis

Symptoms of failure	Possible causes	Solution
Headlight fail to be lit; High beam lamp fail to be lit; Low beam lamp fail to be lit; Front position lamp fail to be lit; Fail to be lit.	The engine is not started; Speed sensor failure; Failure of voltage regulator; Corresponding fuse is not connected or burnt; Corresponding switch failure; BCM failure; Bead failure; Poor connection on the circuit; Open circuit in the relevant circuit of the main cable.	Start the engine; Speed sensor failure; Replace the voltage regulator; Switch on the fuse or replace it; Repair or replace the switch; BCM Replace; Replace the bulb; Reconnect; Repair or replace the main cable.
Headlight fail to be lit reliably	Poor contact of fuses, lamp beads, or lines; BCM failure.	Reconnect the poor contacting place; BCM Replace.
Tail light fail to be lit; Rear position lamp fail to be lit; License plate lamp fail to be lit; Fail to be lit.	Bead failure; Poor connection on the circuit; Open circuit in the relevant circuit of the main cable.	Replace the bulb; Reconnect; Repair or replace the main cable.
Steering signal lamp fail to be lit; The front steering lamp fail to be lit; The rear steering lamp fail to be lit; Fail to be lit.	Battery voltage is too low; Corresponding fuse is not connected or burnt; Left steering lamp switch failure; Right steering lamp switch failure; Bead failure; BCM failure; Poor connection on the circuit; Open circuit in the relevant circuit of the main cable.	Charging the battery; Switch on the fuse or replace it; Repair or replace the left switch; Repair or replace the left switch; Replace the bulb; BCM Replace; Reconnect; Repair or replace the main cable.
Brake light fail to be lit	Corresponding fuse is not connected or burnt; Failure of front brake lamp switch; Failure of rear brake lamp switch; Bead failure; Circuit failure.	Switch on the fuse or replace it; Replace the front brake lamp; Adjust and replace the rear brake lamp on; Replace the bulb; Inspect and repair.
The horn doesn't sound	Corresponding fuse is not connected or burnt; Horn button failure; Failure of horn; Poor connection on the circuit; Open circuit in the relevant circuit of the main cable.	Switch on the fuse or replace it; Repair or replace the left switch; Adjust or replace the horn; Reconnect; Repair or replace the main cable.

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Information display system

Overview

Introduction of Main
Components

Schematic diagram of circuit

Main Fault Diagnosis

Parts Layout

Overview

The information display system displays the static and dynamic information of the vehicle through the instrument panel, and provides it to the driver to guide the driver to conduct safe operation.

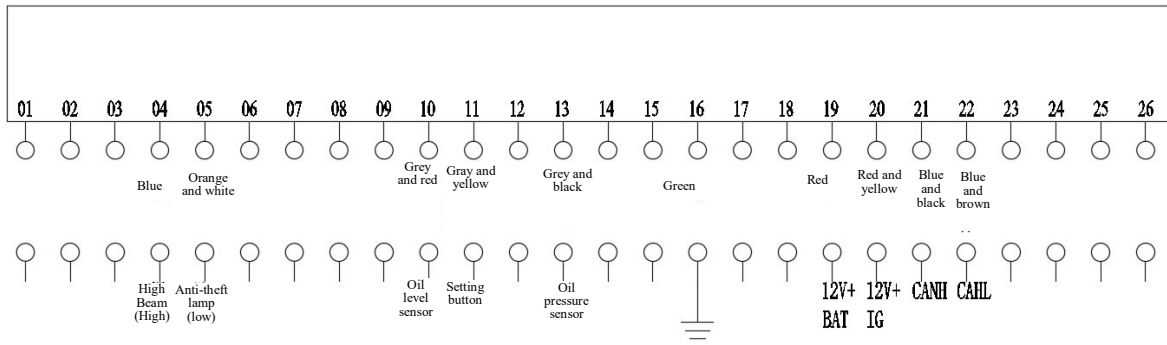
The vehicle information displayed on G350 includes the following contents: vehicle speed, engine speed, oil level, voltage, water temperature, steering indication, high beam indication, total mileage accumulation/subtotal driving mileage, clock, oil alarm, BCM fault light, Bluetooth, incoming-call display, ABS fault indicator, engine fault indicator, anti-theft indicator.

The transmission of G350 display system signal is all electronic signal, and the instrument is also full electronic instrument.

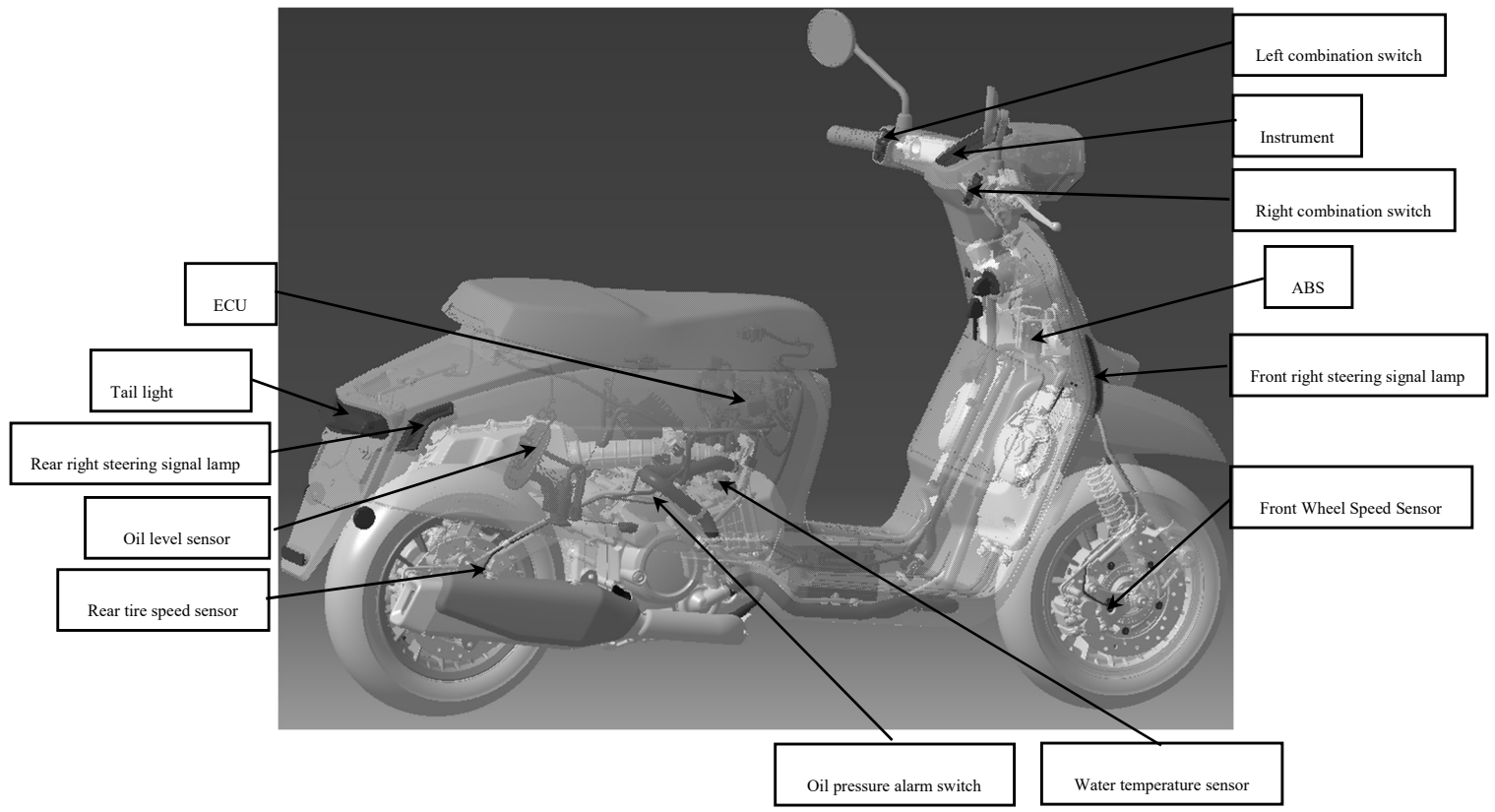
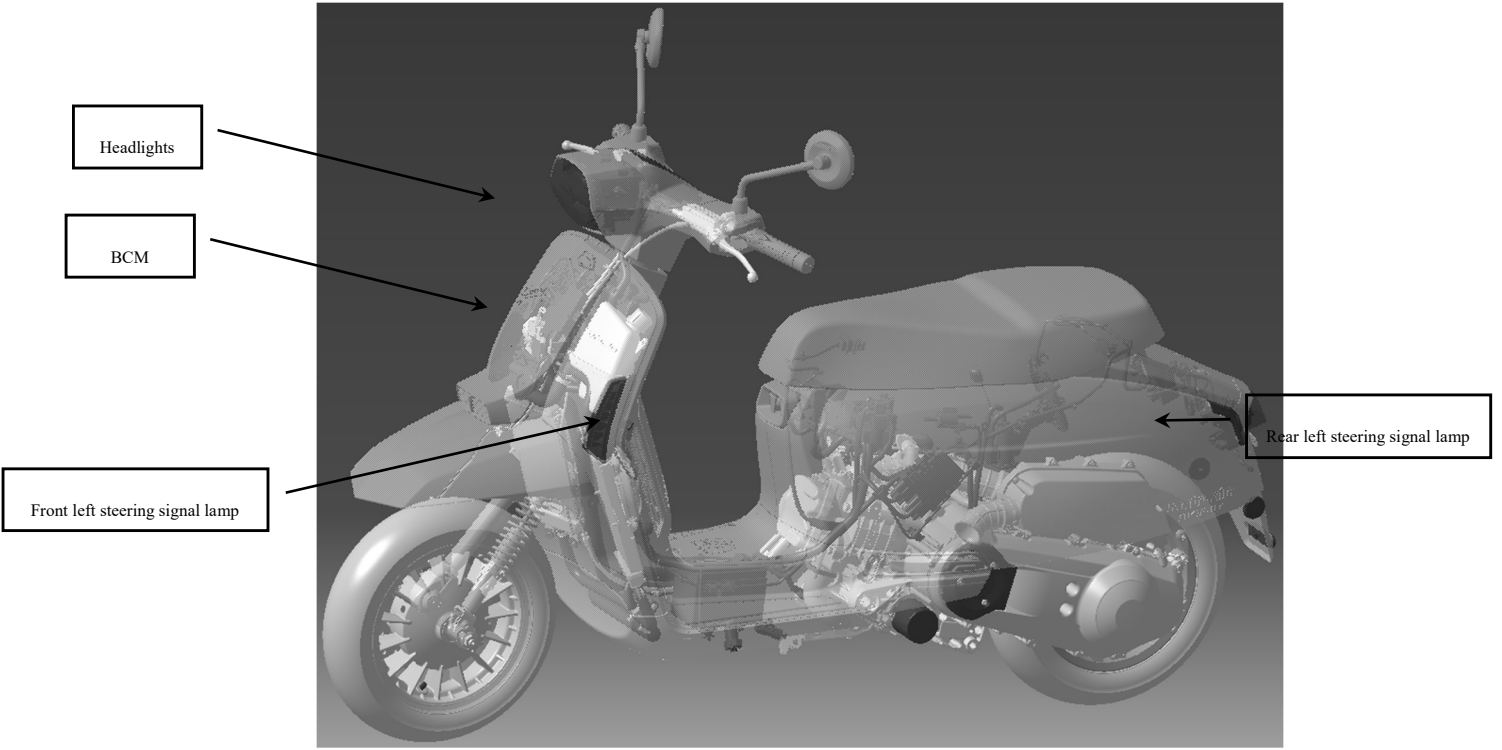
The components that make up the system include:

- Instrument
- Vehicle speed sensor
- Oil level sensor
- Oil pressure sensor
- Signal switch
- BCM
- ABS
- ECU

Schematic diagram of circuit



Parts Layout



Introduction of Main Components

○ Instrument

1. Outline drawing



2. Working principle

All-electronic instrument (also called digital instrument). Firstly input all electronic signals (including digital signal and analog signal), through circuit processing, all converted into digital signals, and output through CPU control, driving stepping motor pointer, LCD and LED to display various information.

3. Pin function menu

Pin No.	Function	Signal	Pin No.	Function	Signal
1			14		
2			15		
3			16	GND	Ground
4	HI-LIGHT	High beam lamp	17		
5	STEAL-LIGHT	Anti-theft lamp	18		
6			19	BAT	+ 12V
7			20	IGN	+ 12V
8			21	CAN-H	CAN-H
9			22	CAN-L	CAN-L
10	OIL	Quantity of oil	23		
11	SET	Setting button	24		
12			25		
13	ENGINE-OIL	Oil	26		

4. Basic functions

The instrument display contents include: vehicle speed, engine speed, oil level, voltage, water temperature, steering indication, high beam indication, total mileage accumulative/subtotal driving mileage, clock, oil alarm, BCM fault light, Bluetooth, incoming-call display, ABS fault indicator, engine fault indicator, anti-theft indicator, and photosensitive port.

5. Failure mode

Some functions cannot be displayed correctly;

Operation button fails to perform clock adjustment and mode switching;

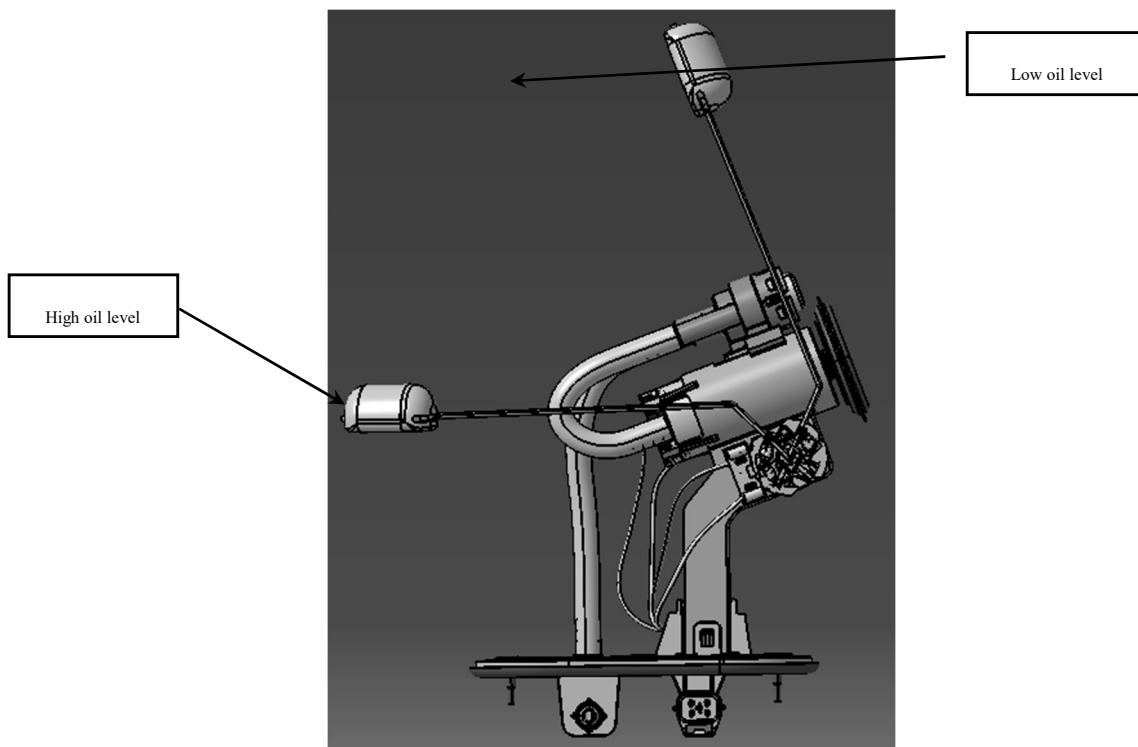
Water leakage in instrument;

Mechanical vibration rupture of shell;

Discoloration or scratches of the surface.

○ Oil level sensor

1. Outline drawing



2. Working principle

The oil level sensor and oil pump are integrated on the fuel pump assembly, which includes float, floating pole, contact plate, thick film circuit board, outgoing wire, etc. The contact plate and thick film circuit board constitute a variable resistance. The height of the float drives the floating rod to rotate with the change of oil level, and the position of the variable resistance tap changes accordingly, and the corresponding resistance value is output.

3. Corresponding relationship between instrument display scale and resistance value of oil level sensor

Warning light flashing (frequency 2Hz)	160Ω ~ 300Ω
Warning light flashing (frequency 1Hz)	120Ω ~ 160Ω
Display 1 box (warning light is on)	100Ω ~ 120Ω
Display 2 boxes	85Ω ~ 100Ω
Display 3 boxes	65Ω ~ 85Ω
Display 4 boxes	50Ω ~ 65Ω
Display 5 boxes	30Ω ~ 50Ω
Display 6 boxes	10Ω ~ 30Ω

4. Failure mode

The float falls off;

Poor contact between contact plate and thick film circuit board;

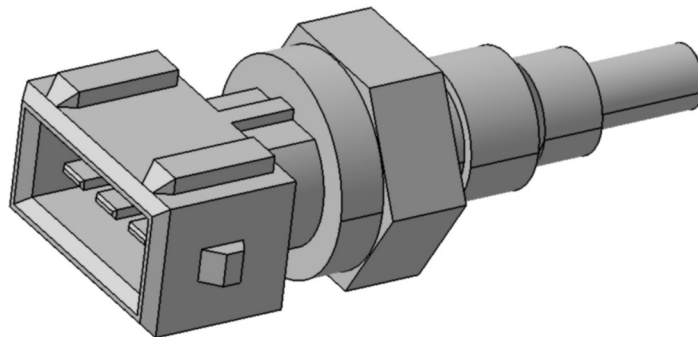
Fracture of bracket;

The circuit board is damaged;

The outgoing wire falls off.

○ Water temperature sensor

1. Outline drawing



2. Working principle

Water temperature sensor: after the engine is started, the temperature in the water tank rises and the resistance value of the water temperature sensor reaches the set value. At this time, the ECU receives this signal and transmits it to the instrument after processing. The instrument displays the water temperature scale to remind the driver.

3. Corresponding relationship between instrument display scale and water temperature

Temperature °C	Standard Resistance (Ω)
$T \leq 60^\circ\text{C}$	0 box, water temperature icon is displayed normally
$60^\circ\text{C} < T \leq 71^\circ\text{C}$	1 box, water temperature icon is displayed normally
$71^\circ\text{C} < T \leq 82^\circ\text{C}$	2 box, water temperature icon is displayed normally
$82^\circ\text{C} < T \leq 103^\circ\text{C}$	3 box, water temperature icon is displayed normally
$103^\circ\text{C} < T \leq 115^\circ\text{C}$	4 box, water temperature icon is displayed normally
$115^\circ\text{C} < T \leq 120^\circ\text{C}$	5 boxes, the water temperature alarm icon is displayed in red; the scale bar turns red
$120^\circ\text{C} < T$	The water temperature displays 6 boxes, and the water temperature display flashes simultaneously with the water temperature alarm icon; the scale bar is red.
120	23.0~27.0
125	2.05~24.5

Main Fault Diagnosis

Symptoms of failure	Possible causes	Solution
Speed indication fault: The vehicle speed figure is not displayed; Indicated vehicle speed deviation is large.	The distance between speed sensor and signal panel is too large; Failure of vehicle speed sensor; Failure of signal panel; Instrument failure; Poor connection, open circuit, or short circuit of circuit.	Reduce spacing to within 2mm; Replace the vehicle speed sensor; Replace the signal panel; Replace the instrument; Reconnect or repair.
Speed without mileage increase indication	Instrument failure.	Replace the instrument.
Engine speed indication faulty	Poor circuit connection or open circuit; Instrument failure; ECU failure.	Reconnect or repair; Replace the instrument; ECU Replace.
ABS fault lamp is normally on; When the whole vehicle is powered on, the ABS fault lamp for instrument self-inspection is not on.	ABS failure; Instrument failure; Poor connection, open circuit, or short circuit of circuit.	ABS Replace; Replace the instrument; Reconnect or repair.
There is oil but no indication; There is no oil but indication of oil.	Failure of fuel sensor or jamming of float; Instrument failure; Poor connection, open circuit, or short circuit of circuit.	Replace the fuel sensor; Replace the instrument; Reconnect or repair.
Water temperature alarm lamp is normally on	Poor circuit connection or open circuit; Instrument failure; Failure of water temperature sensor; ECU failure.	Reconnect or repair; Replace the instrument; Replace the water temperature sensor; ECU Replace.
False alarm of voltage alarm lamp Voltage alarm lamp fails to alarm	Poor circuit connection or open circuit; Instrument failure.	Reconnect or repair; Instrument failure.
ABS fault lamp is normally on;	BCM failure; Instrument failure.	BCM Replace; Replace the instrument.
The meter cannot display the information that the ECU should display	Poor circuit connection or open circuit; Instrument failure; BCM failure.	Reconnect or repair; Replace the instrument; ECU Replace.
Steering indicator is not lit High beam indicator is not lit	Poor circuit connection or open circuit; Instrument failure.	Reconnect or repair. Replace the instrument.
No clock display; The clock cannot be adjusted or the error is large.	The adjustment button on the right switch fails; Instrument failure.	Replace the right switch; Replace the instrument.
Unable to switch mode; Instrument function cannot be adjusted.	The adjustment button on the right switch fails; Instrument failure.	Replace the right switch; Replace the instrument.

Engine Management System

Overview

G350 engine management system adopts closed-loop electric injection system. By controlling fuel injection quantity, the air-fuel ratio of mixture can be effectively controlled, so that the air-fuel ratio of engine under various working conditions can reach the optimum value, to improve power, reduce fuel consumption, reduce exhaust pollution, improve driving performance, improve low temperature starting performance, and idle speed performance.

Closed-loop electric injection system control includes: fuel quantitative control, ignition timing control, ignition closing angle control, etc. Fuel quantitative control is the most important function of the system. It includes λ closed-loop control, starting control, post-start control, warm-up control, idle speed control, partial-load control, full-load control, acceleration and deceleration control, overspeed oil cut-off control, and deceleration fuel cut-off control.

Basic composition of the system:

1. Sensor:

- Two-in-one sensor, throttle position sensor (air density information, load information, load range information, acceleration and deceleration information)
- Engine temperature sensor (engine temperature information)
- Silencer oxygen sensor (information with excess air coefficient greater than 1 or less than 1)
- Engine speed sensor (speed information, crankshaft position)

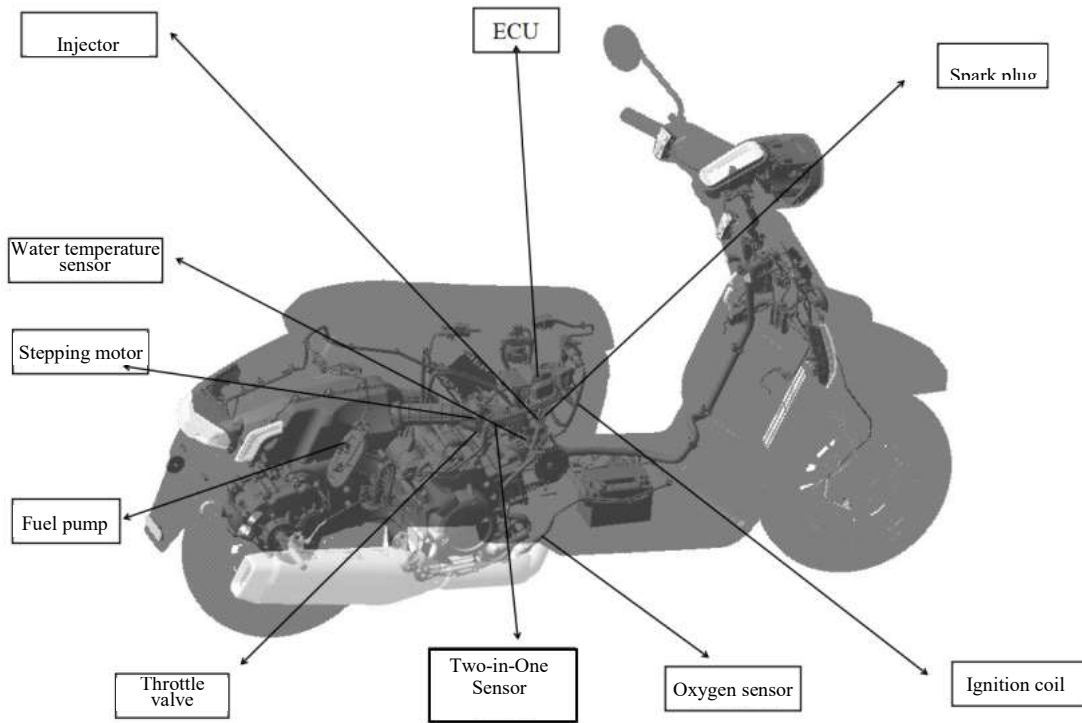
2. Actuator:

- Fuel pump
- Injector (Oil Supply)
- Ignition coil
- High voltage connecting line
- Spark plug (ignition)
- Throttle valve, idle stepping motor (intake air)

3. Electronic control unit:

- ECU

Parts Layout



Introduction of Main Components

Two-in-one sensor, throttle position sensor

1. Working principle

Two-in-one sensor is the function of intake manifold absolute pressure sensor, and the function of intake manifold absolute temperature sensor is integrated into one whole.

The intake manifold absolute pressure sensor consists of a pressure conversion element (elastic diaphragm + strain resistance) and a signal conditioning circuit that amplifies the output signal of the conversion element. One side of the pressure conversion element is the vacuum chamber, and the other side introduces the intake manifold pressure, so the absolute pressure in the intake manifold is high. The greater the deformation of the diaphragm and its deformation is proportional to the pressure. The resistance of the strain resistance attached to the elastic diaphragm changes in proportion to its deformation. With this principle, changes in pressure in the intake manifold can be converted into electrical signals.

The core temperature sensing element of the engine intake temperature sensor consists of a semiconductor thermistor with negative temperature coefficient (NTC) characteristic. This temperature sensor usually requires a special measuring circuit to test its resistance characteristics. The output characteristic of the semiconductor thermistor with negative temperature coefficient characteristic is that the resistance value of the thermistor is inversely proportional to the change of temperature: that is, when the temperature rises, the output resistance of the thermistor decreases; when the temperature decreases, the output resistance of the thermistor increases.

Throttle sensor is an angle sensor with linear output, which is essentially an angular displacement sliding rheostat, which consists of two arc-shaped isolated resistance and two isolated arms. The shaft of the isolated arm is connected to the throttle shaft on the same shaft. Add 5V supply voltage US to both ends of the isolated resistance. When the throttle rotates, the isolated arm rotates along with the isolated resistance. The potential UP of the contact is led out as the output voltage, so that the opening angle signal of the throttle can be converted into the voltage signal.

2. Basic parameters

Pressure test range: 10~115kPa;

Limit pressure: 655KPa (exceeding this pressure will cause permanent damage)

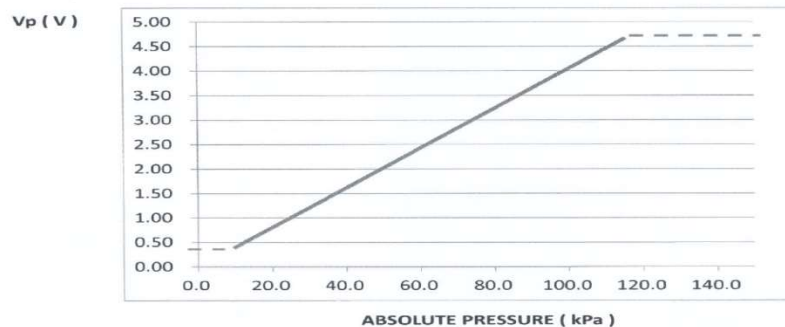
Operating temperature range: -40°C~130°C

Storage temperature range: 0°C~40°C

Operational voltage: 5V±0.25VDC;

Maximum operational current: <12.5mA DC

Diagram of Manifold Absolute Pressure and Output Voltage:



See the following table for the characteristic parameters of the thermistor when the intake temperature sensor is unloaded:

温度 (°C) TEMP.	电阻 (Ω) / RESISTANCE			公差 (K) TOLERANCE	T ± 1K 条件下的测试公差 TEST TOLERANCE WITH T ± 1K	
	额定值 NOM.	最小值 MIN.	最大值 MAX.		最小值 MIN.	最大值 MAX.
-40	45303	43076	47529	± 0.9	40730	50314
-35	34273	32643	35902	± 0.9	30908	37953
-30	26108	24907	27309	± 0.9	23603	28829
-25	19999	19108	20889	± 0.9	18142	22023
-20	15458	14792	16124	± 0.8	14055	16970
-15	12000	11499	12501	± 0.8	10945	13144
-10	9395	9015	9775	± 0.8	8595	10261
-5	7413	7123	7704	± 0.8	6801	8074
0	5895	5671	6118	± 0.8	5420	6403
5	4711	4537	4884	± 0.8	4343	5106
10	3791	3656	3927	± 0.8	3504	4100
15	3068	2962	3174	± 0.8	2842	3310
20	2499	2416	2583	± 0.8	2323	2690
25	2056	1990	2123	± 0.8	1916	2207
30	1706	1653	1760	± 0.8	1591	1827
35	1411	1368	1455	± 0.8	1318	1510
40	1174	1139	1209	± 0.8	1100	1254
45	987.4	959	1016	± 0.8	927	1051
50	833.8	810.5	857	± 0.8	783.1	886.3
55	702.7	683.	721.7	± 0.8	661.2	746.6
60	595.4	579.7	611	± 0.8	561.6	631.4
65	508.2	495.3	521.1	± 0.8	480.2	537.8
70	435.6	424.9	446.4	± 0.8	412.1	460.3
75	374.1	365.2	383.1	± 0.8	354.4	394.9
80	322.5	315	329.9	± 0.8	306	339.8
85	279.5	273.2	285.8	± 0.8	265.7	294
90	243.1	237.8	248.4	± 0.8	231.5	255.4
95	212.6	208.1	217.1	± 0.8	202.7	223
100	186.6	182.9	190.3	± 0.8	178	195.4
105	163.8	160.3	167.2	± 0.8	156.2	171.6
110	144.2	141	147.3	± 0.9	137.5	151
115	127.3	124.4	130.1	± 0.9	121.4	133.4
120	112.7	110.1	115.2	± 1.0	107.5	118
125	100.2	97.81	102.5	± 1.0	95.55	104.9
130	89.28	87.13	91.43	± 1.1	85.13	93.52

Throttle Position Opening

Measuring range: 3%~93% (from idle to fully open)

Throttle Position Sensor Reference Voltage: $5V \pm 0.1V$

When the throttle is fully closed, the normal output voltage is $0.3V \pm 0.1V$

When the throttle is fully open, the normal output voltage is $4.3V \pm 0.1V$

The operating characteristic curve of the throttle position sensor is shown in the following table:

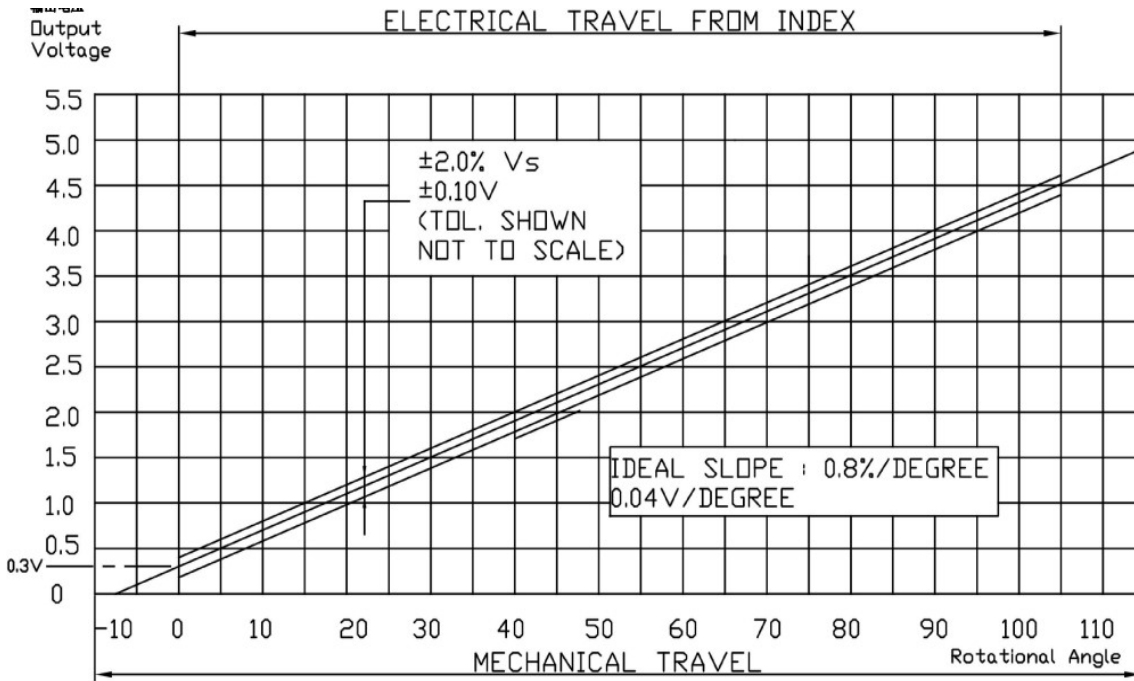


FIG. 1 Rotational Angle Mechanical Stroke

3. Fault mode

The sensor probe is blocked by foreign matters and fails;

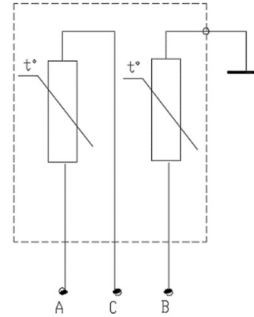
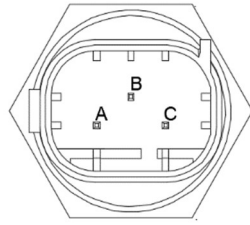
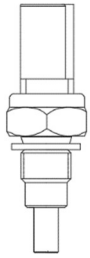
Sensor connection is in air leakage and fails;

Short circuit or open circuit failure of sensor;

Ingress of water in sensor and fails;

Mechanical failure of sensor.

★ Engine temperature sensor



1. Working principle

The engine temperature sensor is a negative temperature coefficient (NTC) thermistor. By using the temperature sensitive characteristic of the thermistor, the change of environment temperature is converted into the change of resistance value of the thermistor. And the voltage signal is output to the ECU through the bleeder circuit. The thermistor resistance value decreases as the coolant temperature increases, but is not linear.

2. Basic parameters

The engine temperature sensor temperature curve R-T table is as follows: (Refer to Attachment 2 for unknowns)

ECU 通道电阻 (a-c) ECU passageway resistance				仪表通道电阻 (b-壳体) Instrument passageway resistance (b-housing)	
温度 Temperature (°C)	标准电阻 Standard resistance (Ω)	电阻精度 Resistance precision (±%)	温度精度 Temperature precision (±?)	温度 Temperature (°C)	标准电阻 Standard resistance (Ω)
-40	100, 865	4.87	0.7	45	265.0 - 323.0
-35	72, 437	4.64	0.7	50	216.0 - 264.0
-30	52, 594	4.43	0.7	54	185.0 - 226.0
-25	38, 583	4.21	0.7	60	148.5 - 180.5
-20	28, 582	4.00	0.7	80 (*)	74.6 - 90.6
-15	21, 371	3.8	0.7	90	53.5 - 66.5
-10	16, 120	3.60	0.6	100	40.6 - 48.6
-5	12, 261	3.40	0.6	108	34.0 - 38.0
0	9, 399	3.21	0.6	110	32.0 - 36.0
5	7, 263	3.06	0.6	113	30.0 - 34.0
10	5, 658	2.92	0.6	115 (*)	25.7 - 31.7
15	4, 441	2.78	0.6	120	23.0 - 27.0
20	3, 511	2.64	0.6	125	20.5 - 24.5
25 (*)	2, 795	2.50	0.6		
30	2, 240	2.45	0.6		
35	1, 806	2.40	0.6		
40	1, 465	2.36	0.6		
45	1, 195	2.31	0.6		
50	980	2.27	0.6		
55	809	2.23	0.6		
60	671	2.19	0.6		
65	559	2.15	0.6		
70	469	2.11	0.6		
75	395	2.07	0.6		
80	334	2.04	0.6		
85 (*)	283	2.00	0.6		
90	241.8	2.10	0.7		
95	207.1	2.21	0.7		
100	178.0	2.31	0.8		
105	153.6	2.42	0.8		
110	133.1	2.52	0.9		
115	115.7	2.61	0.9		
120	100.9	2.68	1.0		
125	88.3	2.75	1.1		
130	77.5	2.80	1.1		
135	68.3	2.84	1.2		
140	60.3	2.87	1.2		
145	53.4	2.89	1.2		
150	47.5	2.90	1.2		

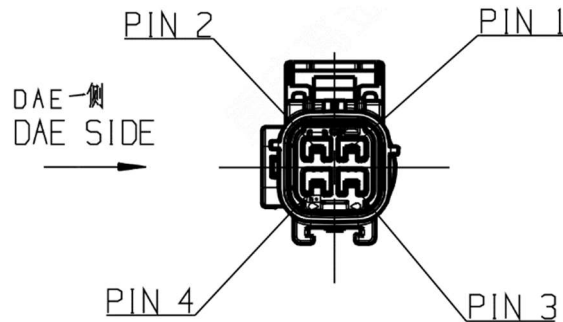
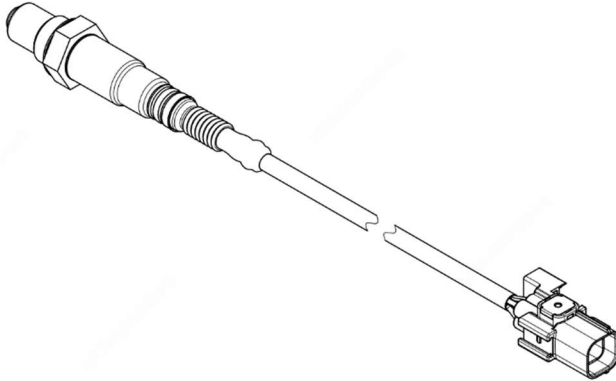
3. Fault mode

Inaccurate resistance;

The sensor is open or short circuited.

★ Oxygen sensor

1. Outline drawing and pin definition



Definition of connector flat tabs

PIN1: Heating	+	(White) Tin plating
PIN2: Sensor ground	-	(Grey) Tin plating
PIN3: Heating	-	(White) Tin plating
PIN4: Sensor signal	+	(Black) Tin plating

2. Working principle

The heated planar oxygen sensor uses the planar multilayer ceramic element as the basic element, and the zirconia layer is the core element. The working principle of the zirconia element is equivalent to a simple solid primary battery. According to the electrochemical principle, there will be potential difference between the electrodes due to the difference of oxygen ion concentration. The oxygen ion concentration of the outer electrode will vary according to the actual operating conditions due to exposure to exhaust gas, while the inner electrode is reference air, and the oxygen ion concentration is unchanged. When the air-fuel ratio of the engine is rare, the oxygen ion concentration in the exhaust gas is relatively high, and the oxygen ion concentration difference between the inner and outer electrodes is small, i. e. the potential difference is small. The output voltage signal of the oxygen sensor is close to 0V; on the contrary, when the air-fuel ratio is rich, the oxygen ion concentration in the exhaust gas is relatively low, and the oxygen ion concentration difference between the inner and outer electrodes is large, that is, the potential difference is large. The output voltage of the sensor is close to 1V.

3. Basic parameters

Characteristic parameters of oxygen sensor at exhaust gas temperature 450°C:

When rich gas mixture is ($\lambda < 1$), the output voltage of oxygen sensor is $\geq 600\text{mV}$;

When rare gas mixture is ($\lambda > 1$), the output voltage of oxygen sensor is $\leq 100\text{mV}$;

Rich-rare response time $\leq 250\text{ms}$;

Rich-rare response time $\leq 100\text{ms}$.

Heater power when exhaust gas at 13.5V, 450°C: 7.0W

Heater current when exhaust gas at 13.5V, 450°C: 0.48A \pm 0.10A

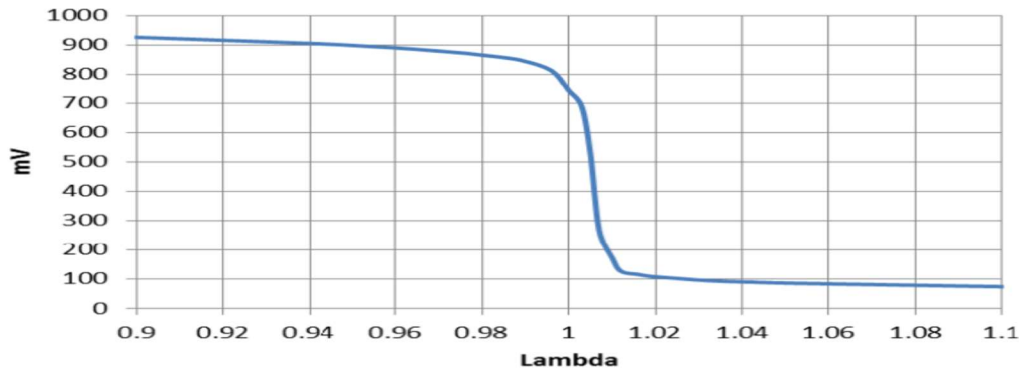
Oxygen sensor nominal voltage: 13.5 V

Maximum operating voltage of oxygen sensor: 16.5V

Minimum operating voltage of oxygen sensor: 10V

Oxygen sensor limit voltage (<60s at 21°C): 28V

At an exhaust gas temperature of 450°C, the oxygen sensor transition characteristics are as follows:

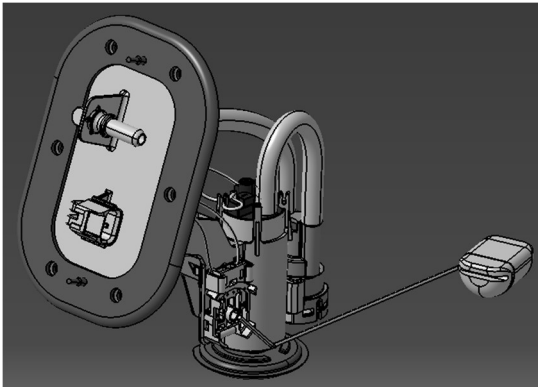


4. Failure mode

- Failure of heating element;
- Failure of sensor element;
- Cracking of ceramic tube;
- Short circuit or open circuit of heating circuit;
- Short circuit or open circuit of sensor circuit.

★ Fuel pump

1. Outline drawing



2. Working principle

The fuel pump integrates fuel pump core, oil pump bracket, strainer, oil pressure regulator, etc. and is installed in the fuel tank. The fuel pump core works, and the fuel is filtered through the pump core to the fine filter, and then adjusted to a certain pressure by the oil pressure regulator and then outputted to the external oil pipe, and finally to the injector. The fuel pressure is constant set to 350kPa. (Including oil level sensor)

3. Basic parameters

- Storage temperature: $-40^{\circ}\text{C}\sim 80^{\circ}\text{C}$;
- Operating temperature: $-30^{\circ}\text{C}\sim 70^{\circ}\text{C}$;
- Insulation strength: medium: air;
- Oil level sensor: resistance value: $20\pm 2\Omega\sim 170\pm 2\Omega$

4. Failure mode

- The oil pump cannot rotate;
- Failure of oil pressure regulator;
- Failure of bracket vibration;
- Short circuit or open circuit of fuel pump;
- Poor oil sealing of sealing ring.
- The resistance of the oil level sensor is open or short circuited.

★ Injector

1. Outline drawing and pin definition



2. Working principle

The injector is actually a solenoid switch control element device. The fuel supply mode adopts the top oil supply structure. The injector is designed with solenoid coil around the core. The two electrodes led out by the solenoid coil are the input control interface of the injector. The injectors are connected directly to the engine electronic control module (ECM) control circuit and to the system power supply via the engine harness.

The solenoid coil of the injector directly receives the output control voltage signal from the engine electronic control module (ECM), i. e. the solenoid coil is driven directly by the engine electronic control module (ECM) to control the opening and closing timing of the ball valve at the lower end of the injector. When the solenoid coil is energized, the electromagnetic attraction generated overcomes the spring force and fuel pressure of the ball valve to raise the ball valve. The high-pressure fuel (250-400kPa) in the fuel pipe can flow through the valve seat hole of the injector and flow through the orifice plate and form conical spray to spray onto the valve body of the intake valve. When the injector is powered off, the magnetic force of the solenoid coil disappears automatically, and the ball valve of the injector is automatically closed under the action of return spring to stop the fuel injection action of the injector. The injector orifice plate is a thin plate located at the head of the injector for accurate control of fuel injection and uniform atomization.

3. Basic parameters

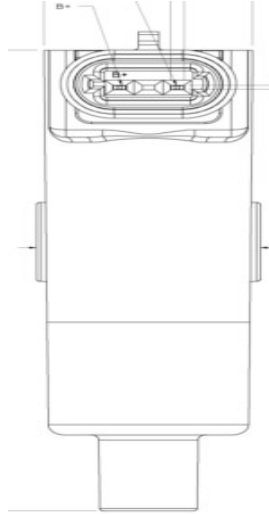
- Operating temperature range: $-30^{\circ}\text{C}\sim 125^{\circ}\text{C}$
- Storage temperature: $-40\sim 60^{\circ}\text{C}$
- System fuel pressure: 350kPa
- Static coil resistance: $12.0\Omega\pm 0.6\Omega$
- Maximum end fuel leakage rate: 3 cc/min
- Normal operational voltage: 9~15V

4. Failure mode

The injector is blocked;
Open circuit or short circuit of solenoid coil;
Failure of injector vibration;
Poor oil sealing of sealing ring.

★ Ignition coil

1. Outline drawing and pin definition



2. Working principle

The ignition coil consists of primary winding, secondary winding and iron core, shell, etc. When the battery voltage is applied to the primary winding, the primary winding is charged. Once the ECU cuts off the primary winding circuit, the charging stops, and the high-voltage power is induced in the secondary winding. Sparks are generated through the high-voltage connecting line and spark plug, and the fuel-air mixture in the cylinder is ignited.

3. Basic parameters

Operational voltage: 6~16V;
Primary coil resistance: $0.6\Omega \pm 10\%$;
Secondary coil resistance: $7k\Omega \pm 10\%$;
Primary coil inductance: $1mH \pm 0.2mH$;
Secondary coil inductance: $9.5H \pm 1.9H$;

Insulation resistance: insulation resistance between ignition coil shell and spark plug cap copper sleeve is greater than $1000M\Omega$ under normal temperature;

4. Failure mode

Open circuit of primary winding;
Breakdown and short circuit of secondary winding;
Surface discharge.

★ HV connection line

1. Outline drawing



2. Working principle

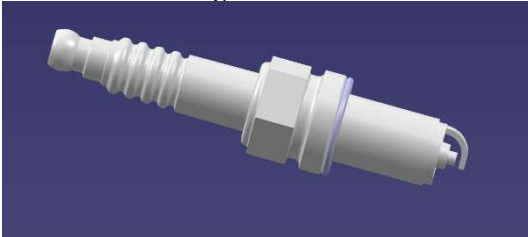
The high voltage connecting line is a device that connects the ignition coil to the spark plug. It consists of spark plug cap, high voltage line, and ignition coil connector cap.

3. Fault mode

The connection between high voltage line with spark plug cap and ignition coil connector cap is loose;
Spark plug cap and ignition coil connector cap insulation rubber sleeve aging and leakage;
Spark plug cap and ignition coil connector cap circlip fails and the contact is poor.

★ Spark plug

1. Outline drawing



2. Working principle

The function of the spark plug is to introduce the high voltage generated by the ignition coil into the combustion chamber and ignite the mixture between the two electrodes. The spark plug is mainly composed of center electrode, side electrode, connection screw, insulator, sealing grommet and housing. In order to prevent the external interference caused by ignition better, damping resistance powder is added between the connection screw and the center electrode. The spark plug can be divided into different heat quality according to the length of insulator skirt. The longer the insulator skirt is, the lower heat dissipation degree is, and the lower calorific value is, and vice versa.

3. Basic parameters

Spark plug model: DCPR7E (NGK);

There is a resistance of 3-6k Ω inside the spark plug.

4. Failure mode

Heavy carbon deposit of spark plug;

Ablation of spark plug electrode;

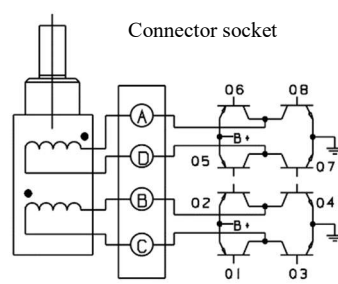
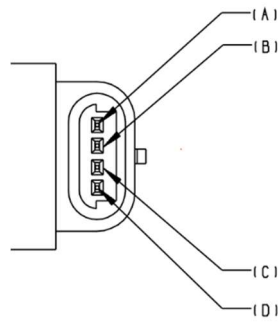
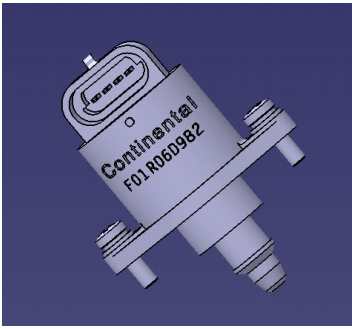
Cracked spark plug insulator;

Overheating of spark plug;

The spark plug is leaking.

★ Idle stepping motor

1. Outline drawing and pin definition



Circuit diagram of coil initial state

2. Working principle

The basic operating principle of the idle bypass air volume regulation control valve is derived from the principle of the stepping motor. It is composed of rotor made of two special permanent magnet modules, stator element composed of two sets of two-phase electromagnetic coils, screw rotor transmission mechanism that converts rotating motion into straight line, taper control valve, input circuit signal connector, spring, metal forming assembly fixed shell, and rubber seal ring. When there are specific electric pulse input signals acting on two groups of electromagnetic coils respectively, the polarities of electromagnetic fields formed by two groups of coils will be changed in a certain order, and the rotor mechanism is driven to rotate in a certain rotation direction according to the principle of magnetic field. Therefore, the stepping motor can transform the electric pulse input signal into discontinuous mechanical rotary motion, and then transform the rotary motion of the rotor into the linear motion of adjusting head through the screw rotor transmission mechanism.

3. Basic parameters

Rated operational voltage: 12V;

Allowable operational voltage: 7.5V~14.2V;

Allowable operating temperature: -40°C~150°C;

Specification of DC resistance of each coil: $53 \pm 5.3 \Omega$ (tested at 27°C);

Inductance characteristics of coil windings of each group: $33 \pm 5 \text{Mh}$ (tested at 25°C with 1000Hz sinusoidal wave input signal);

4. Failure mode

The pipeline is blocked or leaked;

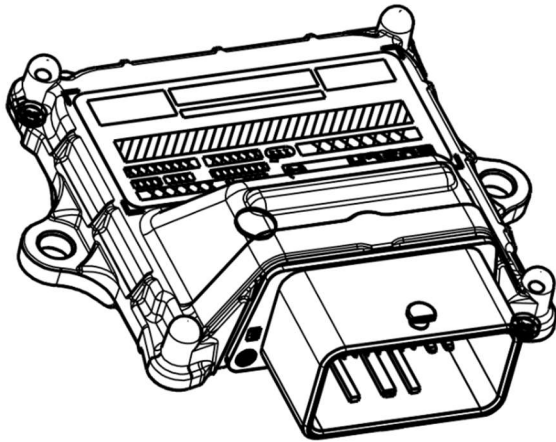
The idle actuator is blocked;

Open circuit or short circuit of solenoid coil;

Failure of idle actuator vibration.

★ ECU

1. Outline drawing



2. Working principle

The ECU acquires all kinds of information about the actual working status of the engine or the vehicle through several sensors configured by the engine management system. The ECU drives the actuator configured by the system according to the data calibrated and stored in advance.

The main input signal sensors of the EFI system include: engine manifold absolute pressure sensor (MAP), engine manifold absolute temperature sensor (MAT), cylinder temperature/coolant temperature sensor (CLT), oxygen sensor (O₂), and crankshaft position sensor (CPS).

The ECU controls the engine through the actuator equipped with the system. The actuators provided in the system mainly include injector (INJ), ignition coil (IGN), electric fuel pump, and idle air control valve (IACV).

3. Basic parameters

Rated operational voltage: 13.5V

Full-function operational voltage range: 9V~16V;

The ECU system includes short-time anti-24V voltage protection and short-time protection against 14V reverse polarity voltage. If the ECU withstands overvoltage or reverse polarity voltage for a long time, it will cause permanent damage to the ECU hardware.

Storage temperature: -40°C~85°C

Operating temperature: -30°C~70°C

4. Failure mode

Connector failure;

Damage of components;

Short circuit of water inlet;

Looseness and failure of components after vibration.

EMS Fault Diagnosis Procedure

1. Analyze the situation reflected by the user

Make a detailed record of the problem (fault, other information reflected by the user) and the occurrence process stated by the user.

2. Inspect, record, and sort out DTCs

The fault content can be read out through the instrument fault indicator scan tool and inspecting the fault code table

DTC Validation Procedure:

Turn on the power supply \Rightarrow and connect the scan tool \Rightarrow read the historical fault and clear the historical fault \Rightarrow
turn off the power supply and turn it on again \Rightarrow start the engine at idle speed for 2min (if it cannot be started, press the start button for 5s) and perform 2~3 acceleration and deceleration operations \Rightarrow and read the current fault with PCHUD software.

3. Visual inspection

Inspect wire connectors, fuses, high voltage connections, throttle valves, and their parts for abnormalities.

4. Basic Function Inspection

Inspect battery voltage

Inspect whether the engine can start, idle, and accelerate

Inspect whether the fuel pump is running

Inspect ignition sparks and spark plugs

Inspect engine speed sensor for iron chips

Inspect pressure sensor hose for damage

Inspect the injector for blockage

Other inspections.

5. Troubleshoot according to the confirmed fault code, appearance inspection, and basic function inspection results.

6. Use the scan tool to inspect whether the system thermal engine idle speed data is within the specified value range.

7. The methods in the fault diagnosis table shall be used for fault analysis and handling.

8. Clear the fault record.

EMS Fault Diagnosis Table

Name of components	Fault Code	Fault determination
Oxygen sensor heating	P0030	Open circuit of upstream 1 in oxygen sensor heating control circuit
	P0031	Too Low Voltage of upstream 1 in oxygen sensor heating control circuit
	P0032	Too High Voltage of upstream 1 in oxygen sensor heating control circuit
Oxygen sensor	P0130	Signal of upstream cylinder 1 in oxygen sensor is unreasonable
	P0131	Signal of upstream cylinder 1 in oxygen sensor is too low
	P0132	Too High Voltage of Signal Circuit of Upstream Cylinder 1 in oxygen sensor
	P0134	Signal circuit fault of upstream cylinder 1 in oxygen sensor
Manifold absolute pressure sensor	P0107	Manifold absolute pressure sensor short to ground
	P0108	Manifold absolute pressure sensor short to power supply
Manifold absolute temperature sensor	P0112	Manifold absolute temperature sensor signal voltage is too low
	P0113	Manifold absolute temperature sensor signal voltage is too high
Engine Coolant Temperature Sensor	P0117	Engine coolant temperature sensor circuit voltage is too low
	P0118	Engine coolant temperature sensor circuit voltage is too high
Throttle Position Sensor	P0122	Throttle position sensor circuit exceeds the low limit value
	P0123	Throttle position sensor circuit exceeds the high limit value
Injector	P0201	Open circuit of control circuit in cylinder 1 injector
	P0261	Short circuit to ground in the control circuit in cylinder 1 injector
	P0262	Short circuit to power supply in control circuit in cylinder 1 injector
Speed sensor	P0322	No-speed sensor pulse signal (open or short circuit)
Idle actuator	P0511	Idle Actuator Control Circuit Fault
System Battery	P0562	System battery voltage is too low
	P0563	System battery voltage is too high

20 Electrical system drawing

