Crossfire 500
Crossfire 500 X

Maintenance Manual

BX500 Motorcycle

Maintenance Manual

Foreword

With ever-developing technologies, the categories and structures of motorcycle change quickly. This manual is hereby provided to Brixton customers and the maintenance personnel and specifies the maintenance, adjustment and repair of BX500 motorcycle. We hope that this manual can provide maintenance guidance for you.

The adjustment is detailed from Chapter 1 to Chapter 3. The parts details are described from Chapter 4 to Chapter 20. The diagram of electrical system is included in Chapter 20.

The standard maintenance procedure, notes and general maintenance knowledge are excluded. Please refer to the related documents for details.

As of the printing date, the data herein, including the diagrams, forms, information and performance indexes are the latest. Brixton reserves the right of modification without prior notice. The contents herein belong to Brixton. Content copy is forbidden without the company’s consent.

Thanks for choosing BRIXTON BX500 motorcycle!

Hope you enjoy it!

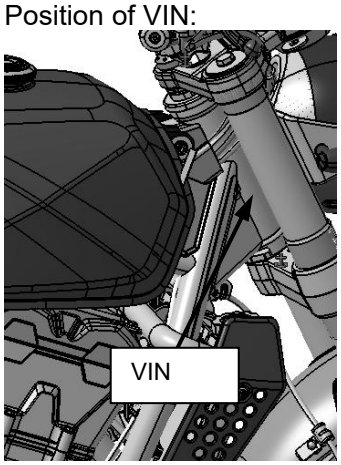
Contents

1
Summary

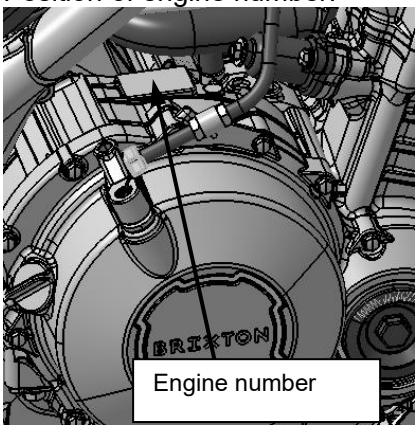
Positions of Numbers

Motorcycle:

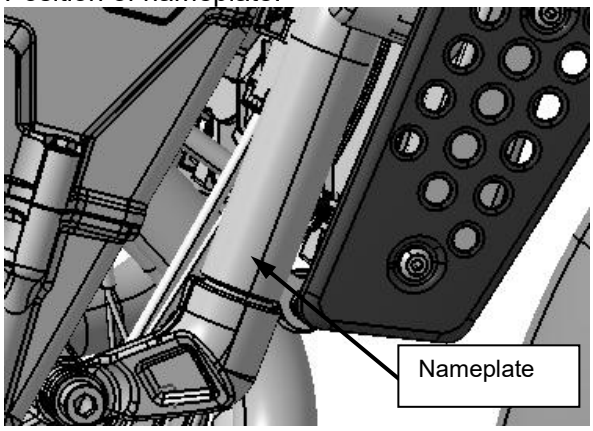
Position of VIN:



Position of engine number:



Position of nameplate:

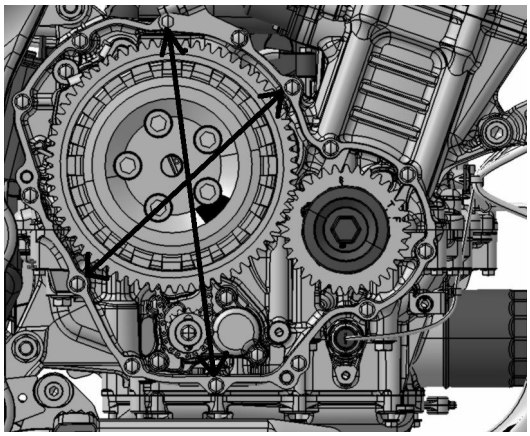


Precautions for Maintenance

1. Please use the parts, components, lubricant and other auxiliary materials produced or recommended by Brixton. The unqualified ones may damage the motorcycle.

2. The washers and split pins of sealing elements shall be replaced when re-assembling.

3. The fastening of bolts or nuts shall be carried out diagonally and gradually. Normally, fasten bolts or nuts to the required torques by two or three times.



4. Before the check and measurement of disassembled parts and components, do clean them.

Only aphlogistic cleaning agent or that with a high fire point can be used.

Smear lubricant on the sliding surface of parts as required before assembly.

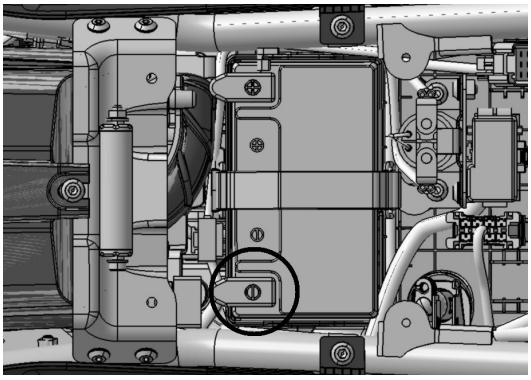
Check the installation, rotation, movement and operation status of parts after assembly.

5. Do follow the tool operation requirements when disassembling and assembling motorcycle.

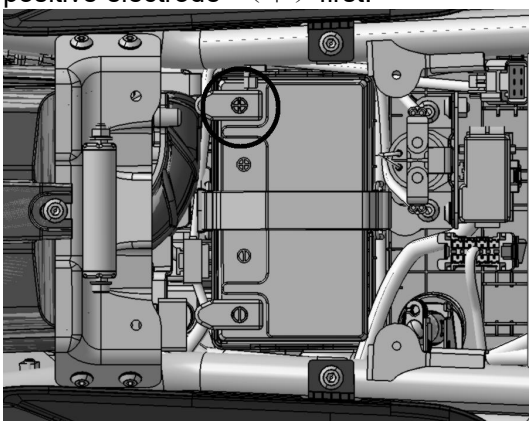
6. Do smear or inject qualified or equivalent lubricant at the required positions.

7. When two men work together, pay attention to safety and cooperate with each other.

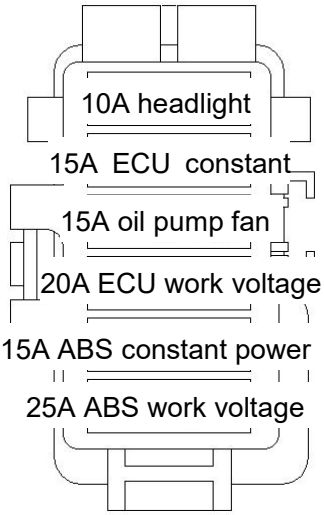
8. Disassemble the negative electrode of battery （－） before operation. Spanner and other tools cannot contact the frame.



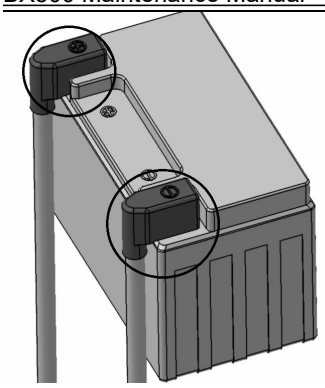
Re-check whether all parts are connected or fixed or not. If the battery is disassembled, connect the positive electrode （＋） first.



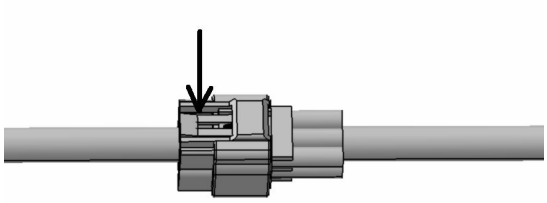
9. If the fuse is burned out, find out the cause and replaced a new one with equivalent capacity.



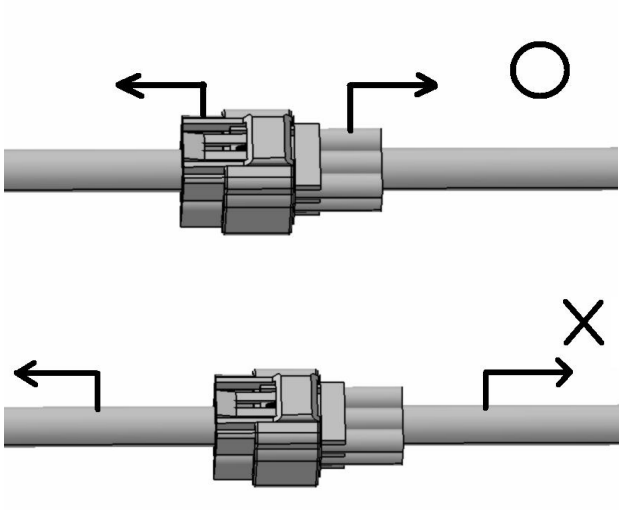
10. The covers shall be fixed on the ends after operation.



11. When disassembling connector joint with lock, do unlock it first before operation.



When disassembling the connector joint, hold the connector and do not pull the harness.



Before connect the connectors, make sure that the terminals are not broken, bent, overlength or other phenomena which affecting the insertion of connectors.

12. Fixing strap of harness shall be located at the required position on frame.
The clip shall fix the harness which shall not contact with high-temperature part, edge and sharp part.
Besides, it shall not pass the ends or front part of bolt and screw and shall not be loose. Do not pull it heavily.
If the contact with edge or sharp part cannot be avoided, protect harness with hose or adhesive tape.
The outer layer shall not be damaged.
In case of harness damage, repair it with plastic adhesive tape.
Do not press harness when installing parts and components.
It also shall not be bent.

13. When the handle is rotated to the end, the harness shall not be tightened or loose. Make sure that there is no obvious bending, pressure or interference.

14. For the application of test instrument, do understand the operating instruction first and following the guidance in maintenance manual.

15. Do not loss or throw any part or component away.

16. In case of terminal rusting, remove it with abrasive paper or other tools first, then connect it.

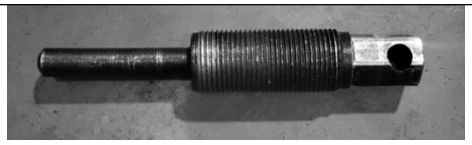
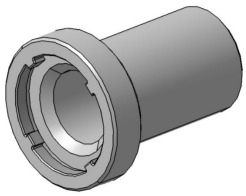
17. Do not bend cables violently. Deformed or damaged cable may cause running problem.

Main Performance and Technical Data

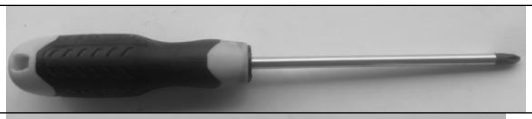
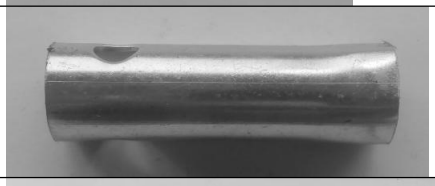
	Item	Data
Dimension and Weight	Total length	Version 0：2117mm；Version 1：2097mm
	Total width	Version 0：757mm；Version 1：851mm
	Total height	1116mm
	Wheelbase	1416mm
	Minimum ground clearance	165mm
	Total weight	Unloaded weight: 180kg, curb weight: 190kg, loaded weight: 350kg
Body	Frame Type	Steel tube
	Caster angle of front suspension	25°
	Front suspension	Hydraulic spring, composite shock absorption (adjustable inverted damper)
	Rear suspension	Hydraulic spring, composite central shock absorption (spring pre-compressor, adjustable damper)
	Front tire size	120/70 ZR 17 M/C(58W)
	Rear tire size	160/60 ZR 17 M/C(69W)；160/60 R 17 M/C 69H
	Front wheel pressure	One person: 220 kPa two persons: 250 kPa
	Rear wheel pressure	One person: 220 kPa two persons: 270 kPa
	Front brake	Disc diameter Φ320mm
	Rear brake	Disc diameter Φ240mm
	Fuel tank capacity	13.5L
	Fuel grade	92#
Engine	Type	2-cylinder, 4-stroke, water cool
	Cylinder diameter × stroke	68mm×67mm
	Cylinder displacement	486cc
	Compression ratio	10.7:1
	Maximum power	35kw/8500rpm
	Maximum torque	43N.m/6750rpm
	Valve clearance (cold state)	IN: 0.15±0.03, EX: 0.25±0.03
	Valve drive mechanism	Chain drive
	Air filter	Paper filter
	Cooling method	Water cool
	Filling capacity of cooling water	1.2L
	Crankshaft balance mode	Balance shaft
	Lubrication method	Splash and forced lubrication, replaceable oil filter
	Oil pump type	Rotor
	Engine oil grade	SAE 10W/40 (SL grade)
	Filling capacity of engine oil	3.2L
	Engine oil filter element	Paper filter element, replaceable
	Starting method	Motor
	Idle speed	1200r/min±120r/min
	Net weight of engine	55kg

	Item	Data
Driving system	Clutch	Multidisk oil-bath clutch
	Clutch operation system	Manual mechanical clutch
	Transmission	6 speed constant mesh
	Primary reduction ratio	2.03
	Gear ratio	Ⅰ 3.36 Ⅱ 2.05 Ⅲ 1.57 Ⅳ 1.29 Ⅴ 1.13 Ⅵ 1.04
	Final reduction ratio	2.733
	Shift type	Left foot operated gearshift Sequence Ⅰ—N—Ⅱ—Ⅲ—Ⅳ—Ⅴ—Ⅵ
Electrical and electric injection system	Generator	400W/5000rpm, permanent magnet AC magnetor
	Battery capacity	12V/9Ah or 12V/8Ah
	Power supply system	DC power supply; the generator only charge the battery
	Fuse protector	30A*1, 20A*2, 15A*2, 10A*2
	Spark plug	Model: NGK CPR8EA
	Spark plug clearance	0.8～ 1.0mm
	Anti-theft device type	Type 2; the ignition switch can lock the steering column and cut off the ignition circuit
	Fuel supply method	Electric injection, ECU control
	Ignition mode	Electric injection
	Headlight	2×12V19W/19W
	Turn signal light	Front: 12V1W Rear: 12V1W
	Brake light/taillight	12V3W/1W

Special tools

S/N	Description	Photo
1	Rotor fixing aids	
2	Rotor extractor	
3	E16C Piston assembly aids	
4	Alignment aids	
5	Fine filter wrench	
6	Driving chain fastening wheel aids	
7	Clutch fastening aid	
8	Primary driving gear assembly aids	
9	Steering column locking tool	

Standard tools

S/N	Description	Spec.	Photo
1	Wrench	10	
		13	
		14	
		15	
		17	
		21	
		27	
2	Screw driver	梅花	
		平口	
3	inner hexagon	4	
		5	
		6	
		8	
4	Spark plug sleeve	/	
5	Wheel wrench	/	
6	Sleeve	10	
		13	
		14	
		15	
		16	
		17	
		21	
7	Extension rod	/	
8	T-sleeve	10	

Standard Torques

Engine

Item	Qty.	Thread diameter mm	Torque N.m
Five-star switch-plate bolt	1	8	21～25
Positioning bolt of shifter arm	1	/	25～29
Bolt of magnetor rotor	1	/	138～142
Spark plug	2	/	14～18
AB bolt	6	9	46～50
Rockshaft bolt	2	12	13～17
Oil outlet screw plug	1	12	28～32
Closing bolt M8×105	1	8	15N*m tighten 120° more
Closing bolt M10	1	10	37～41
Closing bolt M8	10	8	22～26
Mounting bolt of driving sprocket	1	10	52～56
Clutch nut	5	/	126～130
Nut of connecting rod cap	4	8	33～35
Bolt of one-way clutch	6	8	27～31
Bolt of primary driving gear	1	16	103～105
Mounting bolt of oil pressure sensor	1	/	23～27
Fuel pressure sensor	1	/	10～14
Mounting bolt of gear display	2	4	2～4
Joint of fine filter tube	1	/	16～20
Fine filter	1	/	8～12
Water temperature sensor	1	12	14～16
Bolt of clutch lifting plate	5	6	11～13
Nut of positive wire of starter motor	1	6	8～12
Bolt of camshaft bracket	12	6	10～14

Body

Item	Qty.	Thread diameter mm	Torque N.m
Install the front suspension of engine	1	10	56～60
Install the left upper suspension of engine	1	10	56～60
Install the right upper suspension of engine	1	10	56～60
Install the rear upper and right suspensions of engine	1	10	56～60
Install the front shock absorber, steering column and front shock absorber	6	8	21～25
Handle tube and clip	4	8	21～25
Front wheel	1	18	80～90
Rear wheel	1	8	80～90
Upper mounting point on rear shock absorber and frame	1	10	80～90
Lower mounting point on rocker and frame	3	10	50～54

Upper connecting point on main frame and sub-frame	2	10	50～54
Lower connecting point on main frame and sub-frame	2	10	50～54
Connection between frame and rear fork	1	14	50～54
Connection between brake disc and wheel hub	10	8	34～44
Shock absorber and sprocket	6	8	28～32
Front brake calliper and front shock absorber connection	2	10	28～32
Connecting point of brake hose	8	8	24～28

Apart from the above required torques, please refer to the following torque range of other standard fasteners

Name and Size	Torque N.m
5mm bolt and nut	4 ～6
6mm bolt and nut	8 ～12
8mm bolt and nut	18 ～25
10mm bolt and nut	30 ～40
5mm screw	4 ～6
6mm screw	7 ～11
6mm disc bolt and nut	10 ～14
8mm disc bolt and nut	20 ～30
10mm disc bolt and nut	30 ～40

Maintenance plan

IMPORTANT INFORMATION

The date for the implementation of maintenance depends on whichever limit is reached first. That means either the driven kilometres or the duration.

⚠ WARNING **Only appropriate works which are intended for your vehicle to perform.**
The warranty can be granted only when the vehicle is serviced in accordance with this plan and was not exposed to extraordinary stress.

CAUTION Hydraulic lines should be replaced every 4 years.
The vehicle must continuously be checked for rust. The vehicle owner is responsible for rust prevention.

On the following pages you will find the maintenance schedule and the service record.

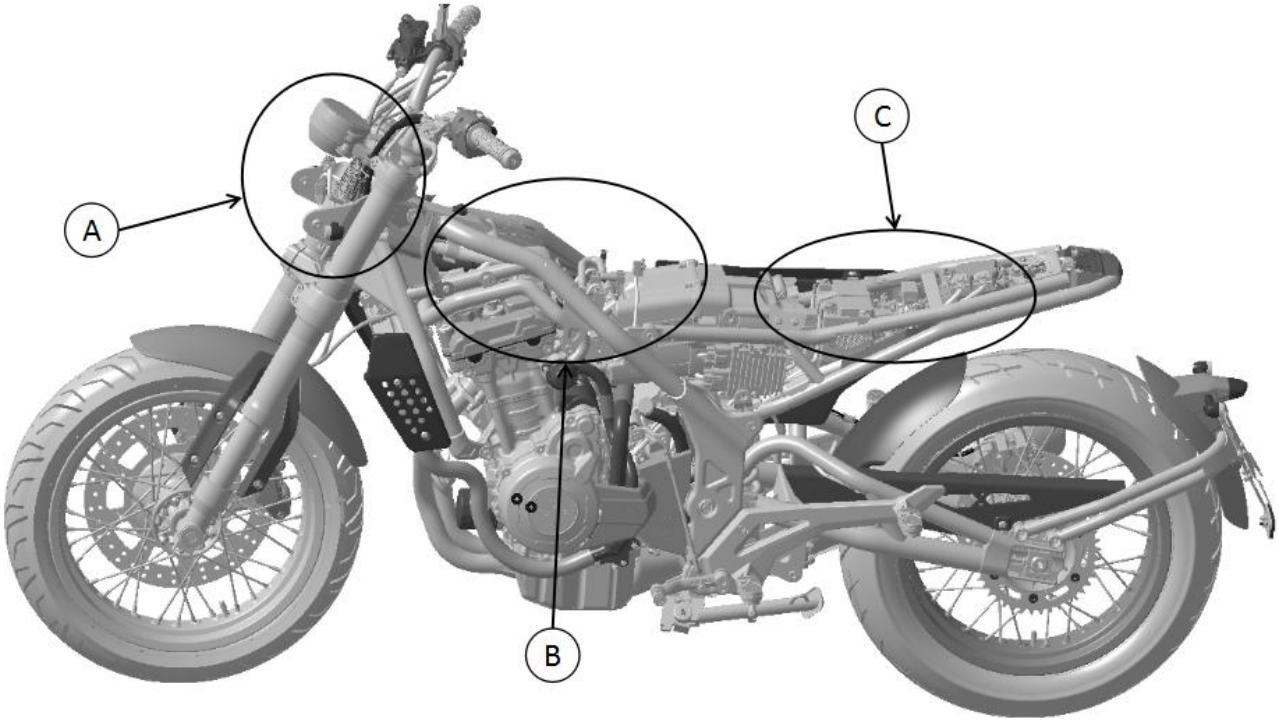
INFORMATIONS ABOUT MAINTENANCE SCHEDULE:

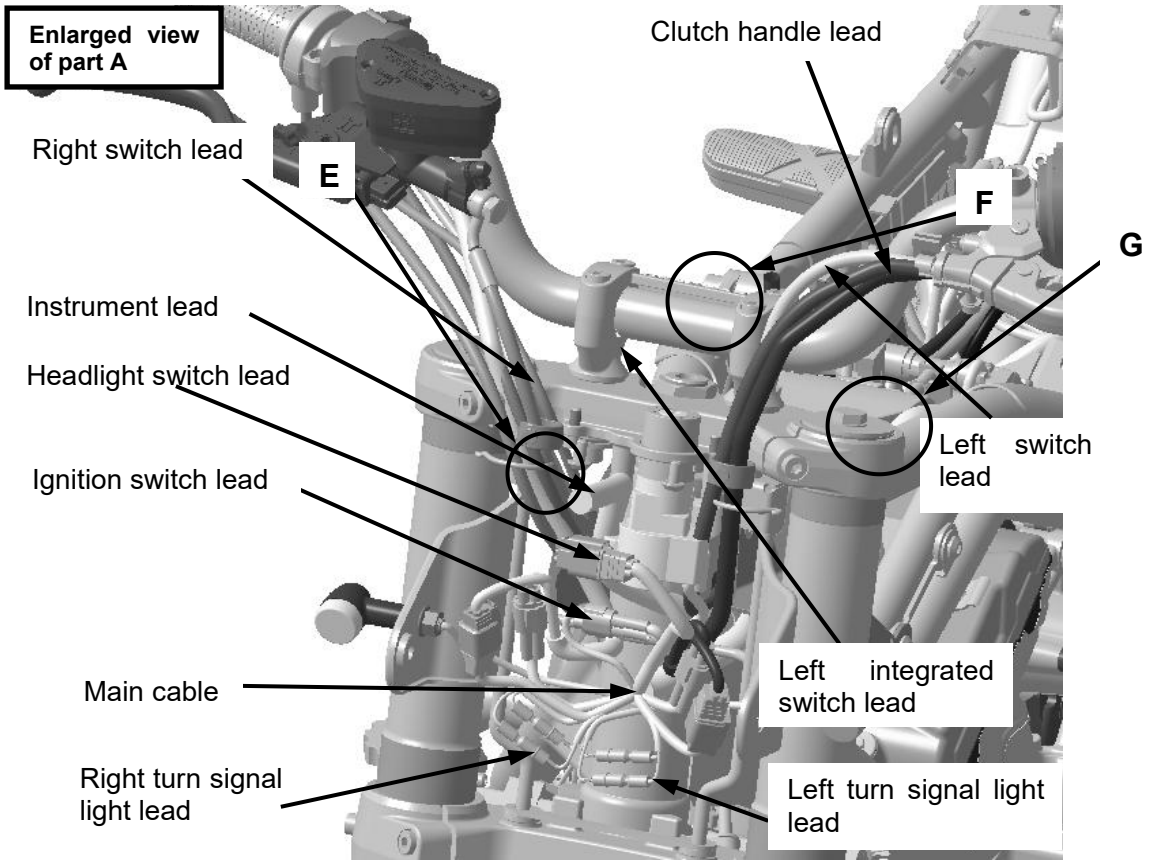
✓ ... Check for damage and correct function (for example: smooth running, excessive play, air pressure).
If errors or defects are detected, they must be repaired.
Exchange ... Replace the affected component

MAINTENANCE SCHEDULE

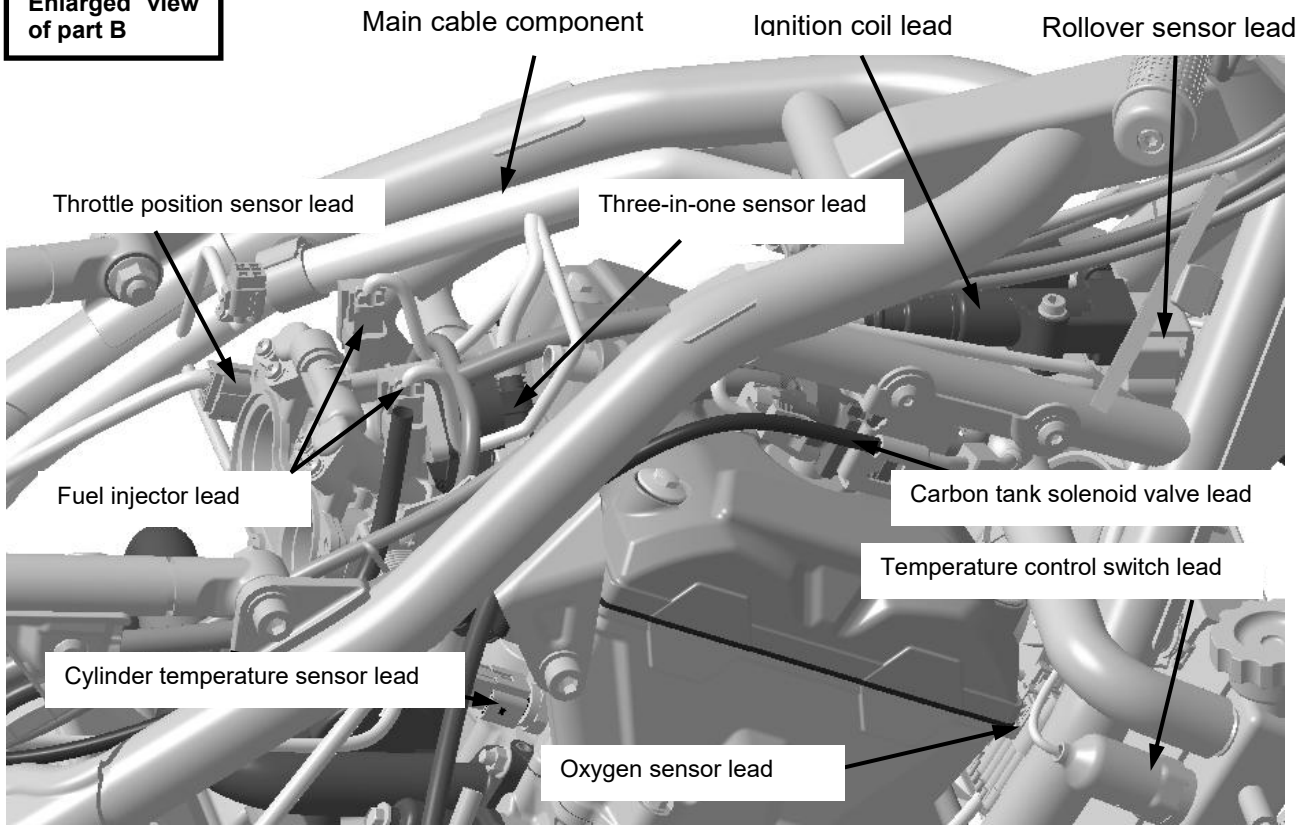
The inspection intervals are required, these will void the warranty.		After first 1.000 km	Every 5.000 km	Every 10.000 km	Every year	Every 2 years
Read out trouble code memory	Check with diagnostics tool	✓	✓	✓	✓	✓
Spark plug	Check / Exchange	✓	✓	Exchange	✓	✓
Air filter	Check / Exchange	✓	✓	Exchange	✓	✓
Tyres, rims	Check	✓	✓	✓	✓	✓
Wheel bearing	Check	✓	✓	✓	✓	✓
Steering bearing	Check / Clean / Lubricate	✓	✓	✓		✓
Tight fit of all accessible bolts and nuts	Check / Retighten	✓	✓	✓	✓	✓
Braking system	Check / Clean / Replace	✓	✓	✓	✓	✓
Brake fluid	Check / Exchange	✓	✓	✓	✓	Exchange
Battery and charging voltage	Check	✓	✓	✓	✓	✓
Side stand	Check / Clean / Lubricate	✓	✓	✓		✓
Telescopic fork	Check	✓	✓	✓	✓	✓
Rear shock absorber	Check	✓	✓	✓	✓	✓
Throttle body	Check	✓		✓		✓
Engine oil / Oil filter	Check / Exchange	Exchange	Exchange	Exchange	✓	Exchange
Valve clearance	Check	✓	✓	✓		
EVAP system	Check			✓		✓
Clutch	Check			✓		✓
Cooling system	Check		✓	✓	✓	✓
Coolant	Check / Exchange	✓	✓	✓	✓	Exchange
Clutch lever clearance	Check / Adjust	✓	✓	✓	✓	✓
Wire cables / Bowden cables	Check / Clean / Lubricate	✓	✓	✓		✓
Throttle grip clearance	Check / Adjust	✓	✓	✓		✓
Lights / Switches	Check	✓	✓	✓	✓	✓
Fuel line	Check	✓	✓	✓	✓	✓
Idling speed	Check	✓	✓	✓	✓	✓
Exhaust system	Check / Retighten	✓		✓		✓
Sprocket, chain, pinion	Check / Lubricate / Replace	✓	✓	✓	✓	✓
Swing arm bearing	Check	✓	✓	✓	✓	✓
Test ride	Check	✓	✓	✓	✓	✓
Read out trouble code memory after test ride	Check with diagnostics tool	✓	✓	✓	✓	✓
Service entry in service booklet	Make	✓	✓	✓	✓	✓

Wiring Diagram

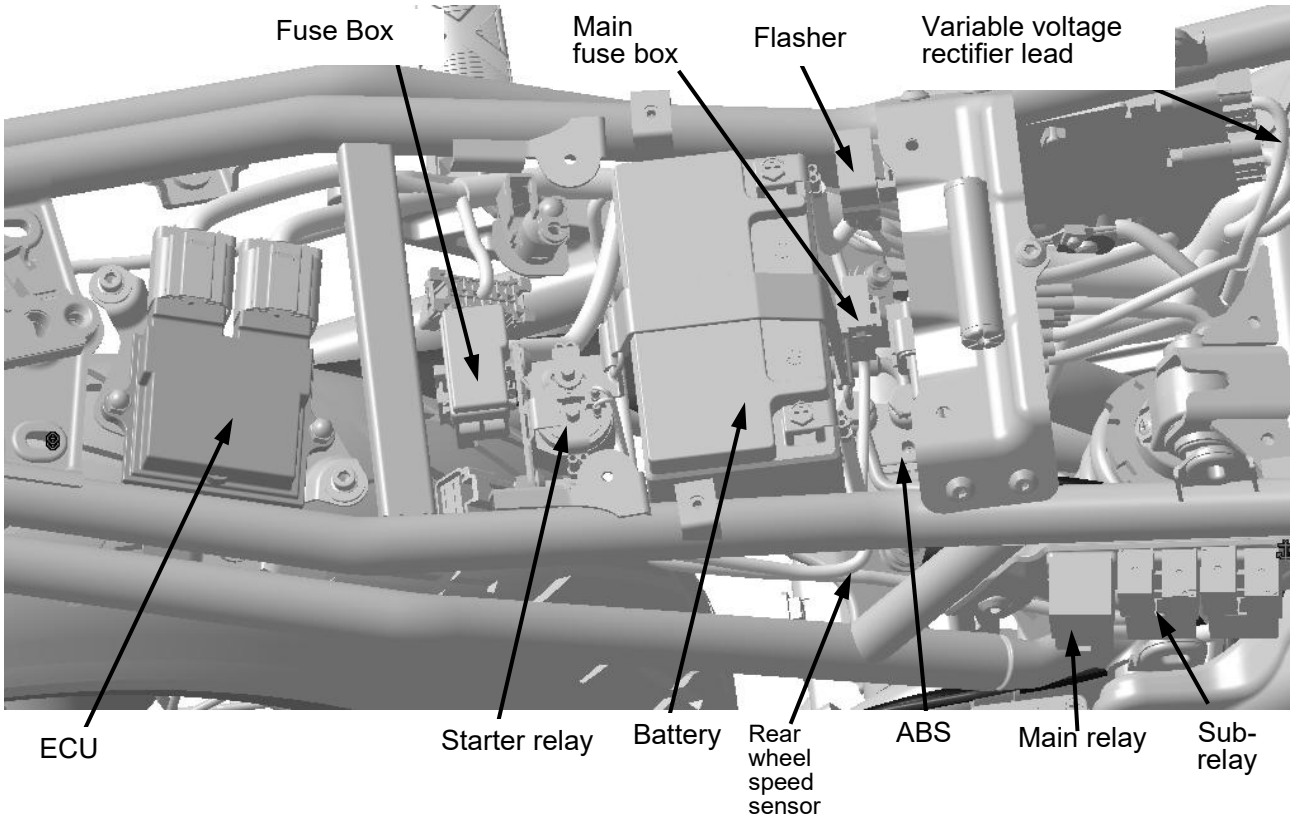




Enlarged view of part B



Enlarged view of part C



Symbols

Meanings of the symbols herein are as follows:

Note:

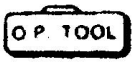
Measures that should be noted during operation, check and maintenance

Caution:

Special notes or measures to avoid motorcycle damage

Warning:

Special notes or measures to avoid major damage or personal injury

	It shall be replaced when re-assembling.
	Special tools shall be used.
	General tools can be used.
	The fastening torque is 50 N.m.
	Do use the recommended engine oil.
	Use thread-locker.
	Use lithium grease.

2
Lubrication System

Maintenance Notice

This section introduces the check and replacement of engine oil and the cleaning of primary filter mesh and filter. The parts and components are also introduced herein.

Engine oil is critical for the performance and service life of engine. Do choose it as required and do not use ordinary engine oil, gear oil, vegetable oil or others. The 10W/40SL engine oil is used for this engine. Discharge the engine oil in crankcase before oil replacement. Clean the crankcase with kerosene and refill it as required.

There is no need to disassemble the engine during check and cleaning. However, discharge the oil first.

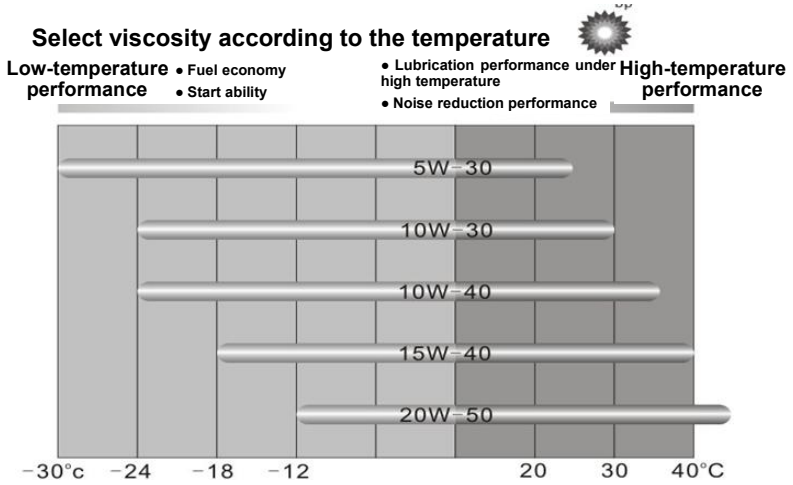
Technical specification: filling volume: 3.2L.

Oil pump capacity: 12L/min (when the engine speed is 6000rpm).

Tightening torque of drain plug: 25～30N.m.

Warning:

Frequent and long-term contact of engine oil may cause skin cancer. However, this is unlikely to happen unless you process used engine oil every day. Clean your hands with suds immediately after processing. Keep it away from children.



Troubleshooting

℘ **Engine Oil Pollution**

1. The engine oil is not replaced in line with the required maintenance period;
2. The thread at oil inlet is damaged and it is not sealed;
3. The piston ring is abraded.

℘ **Low engine oil pressure**

1. The oil level is low;
2. The oil pipe, orifice or oil filter mesh is blocked;
3. The oil pump is faulted.

℘ **High engine oil consumption**

1. The engine is leaky;
2. The piston ring is abraded;
3. The guide rods of intake valve and exhaust valve are abraded;
4. The oil drip pan is abraded or damaged.

Lubrication Positions

Apart from the driving chain which uses special oil, lithium grease can be used for all other positions above.

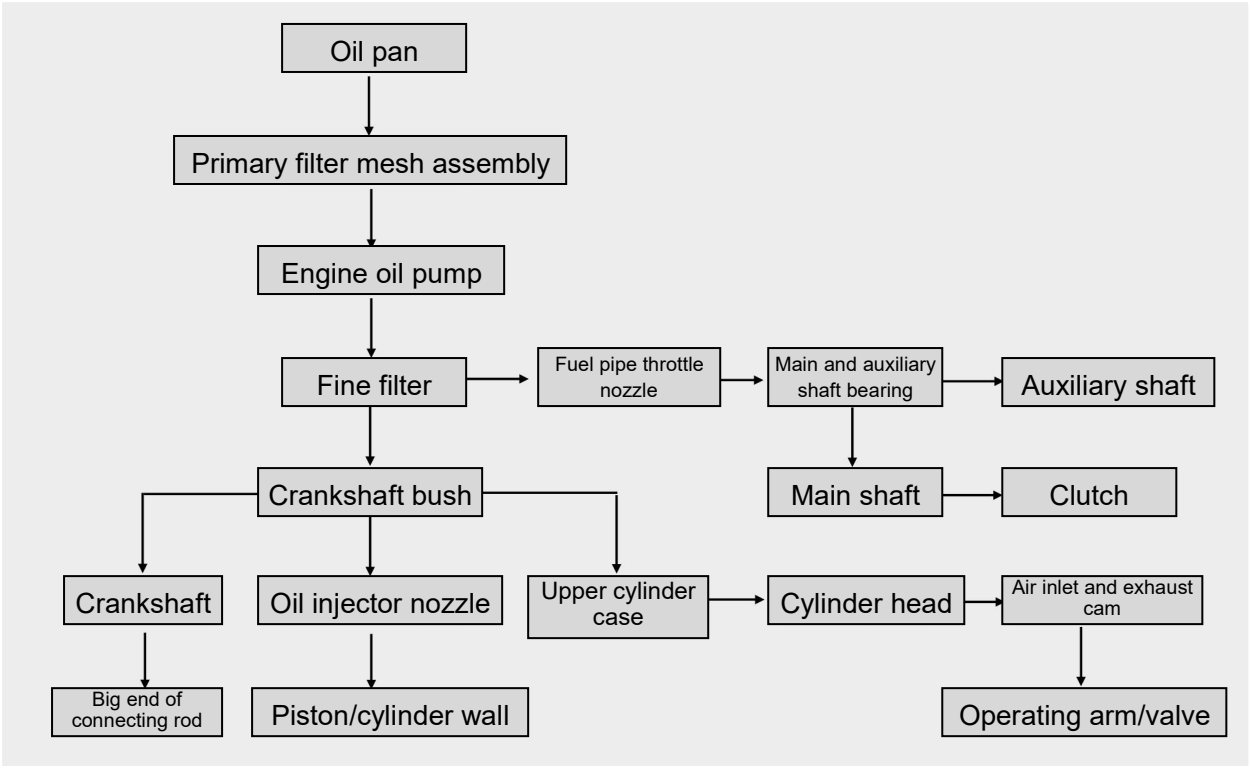
Unless otherwise specified, ordinary oil can be used.

Smear oil or grease on all sliding surfaces and cables which are not shown in the above figure.

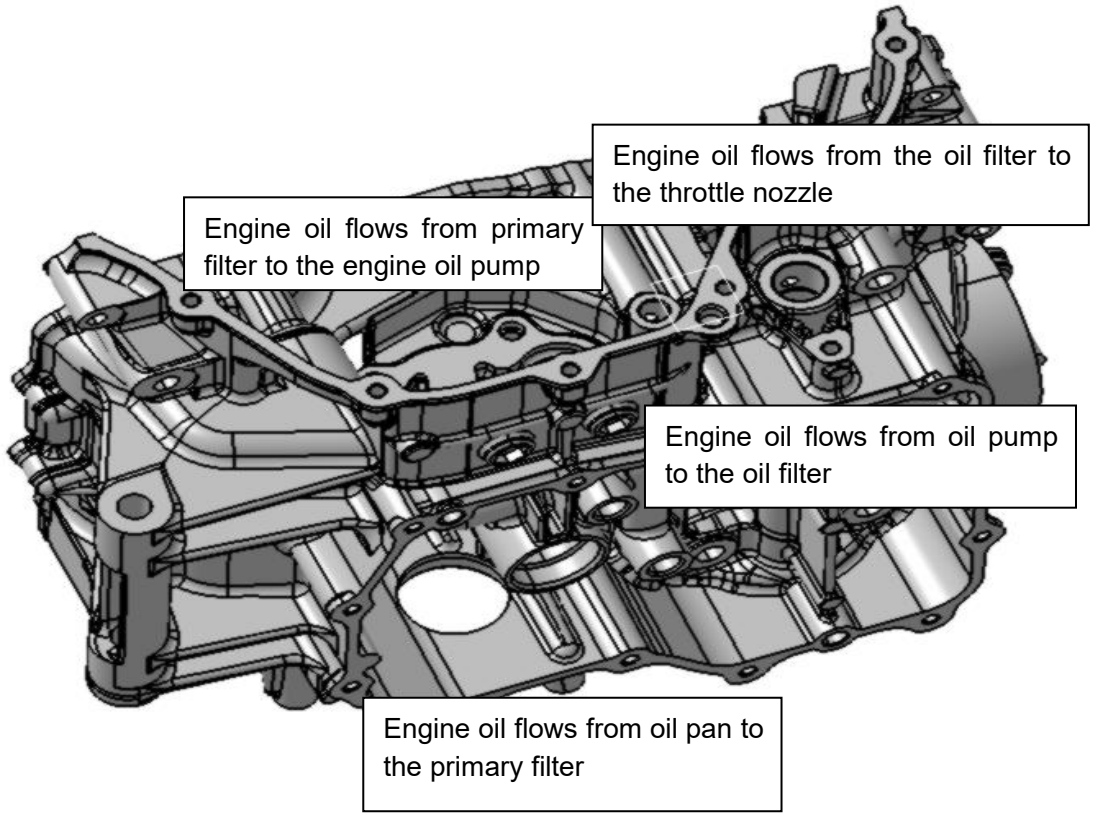
Lubrication of Control Cables

Lubricate the control cables of clutch and accelerator regularly. Take down the upper end of each control cable and lubricate and maintain the steel wirerope and supporting points with lithium grease.

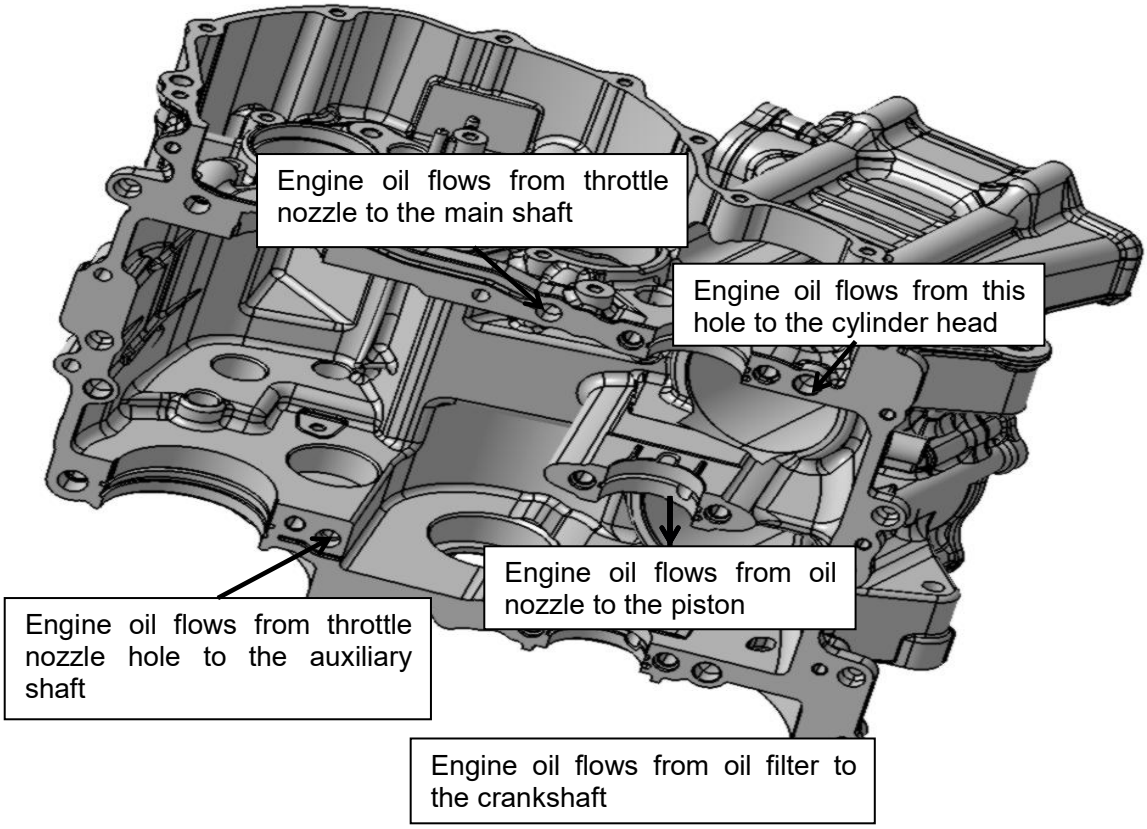
Chart of Lubrication System



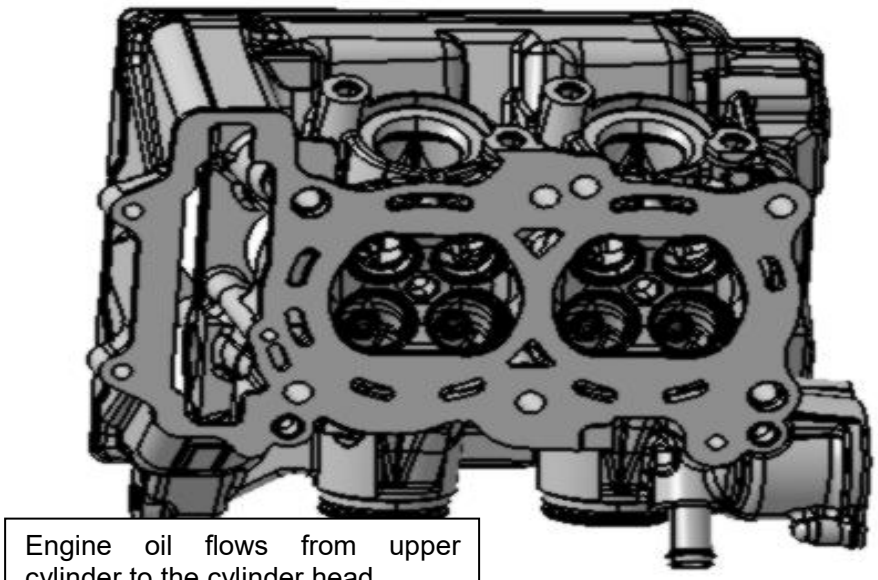
Oil pipe of lower crankcase



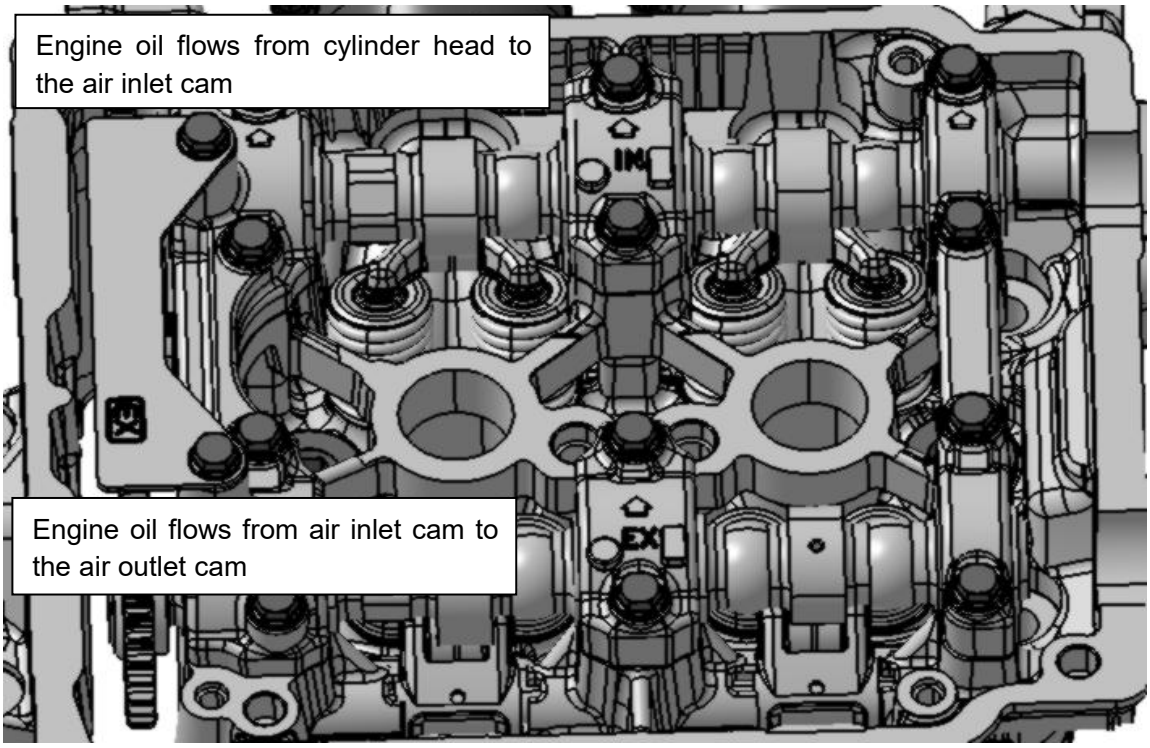
Oil pipe of upper crankcase



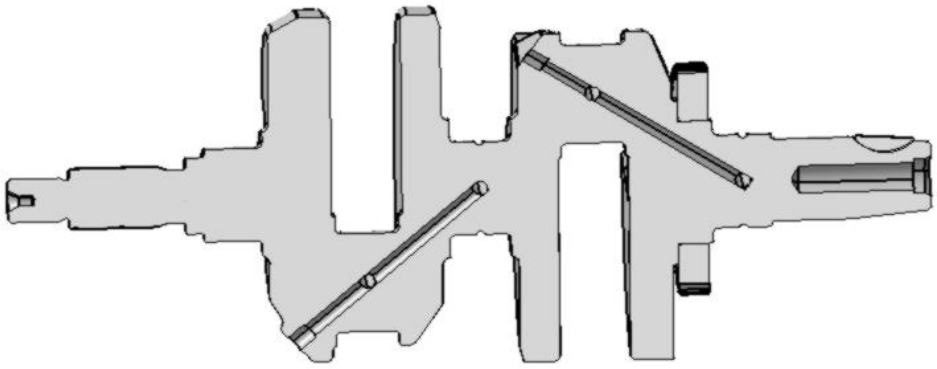
Oil pipe of cylinder head



Lubrication of camshaft journal



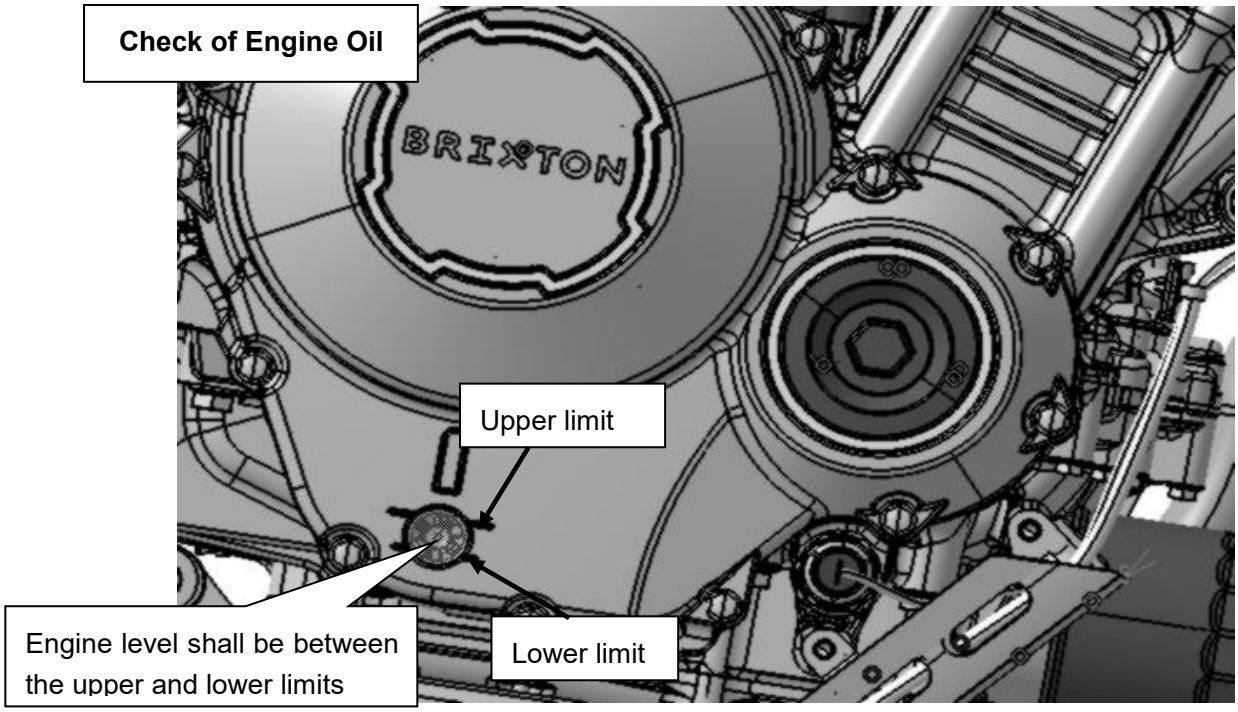
Lubrication of Crankshaft

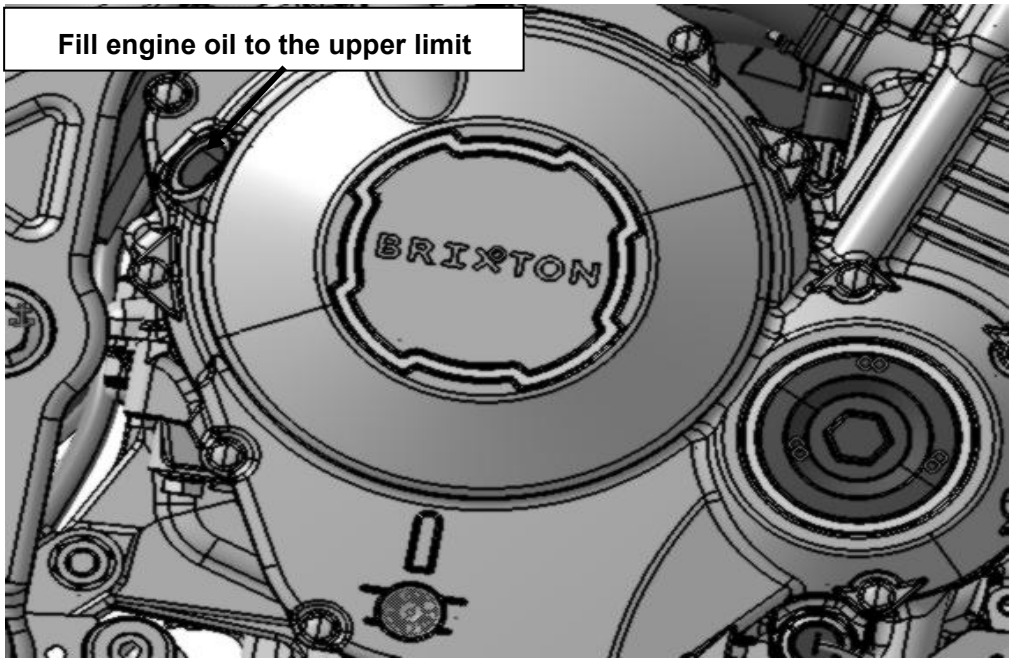


Check of Engine Oil

Place the motorcycle on a flat ground with special fixture. Check the oil viewer at the right crankcase cover. If the oil level is under the lower limit, fill the recommended oil to the required volume.

Filling method: take down the filler plug and fill oil slowly with a funnel until the oil reaches the requirement. Then install the filler plug and tighten it.

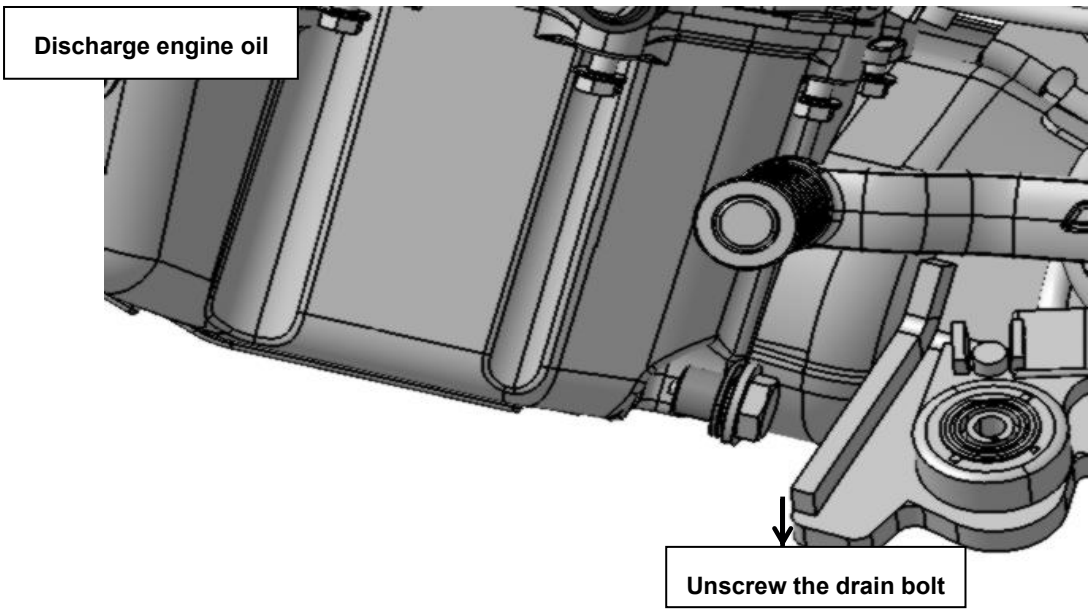


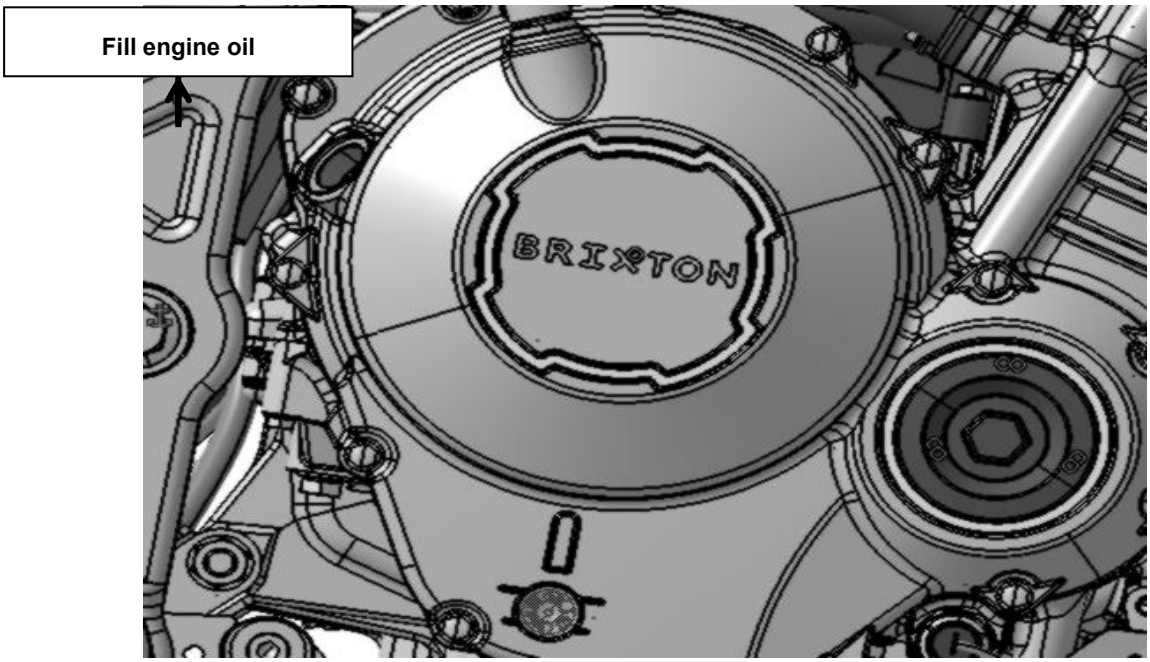


Replacement of engine oil

Replace the engine oil when the engine is uncooled. This is to ensure that engine oil in the crankcase can be discharged completely.

To replace, unscrew the drain bolt first, discharge the used engine oil and clean the drain bolt. Replace the gasket and install the drain bolt. Unscrew the filler plug, fill 3.2L engine oil in the crankcase with a funnel as required. Then, install the filler plug.

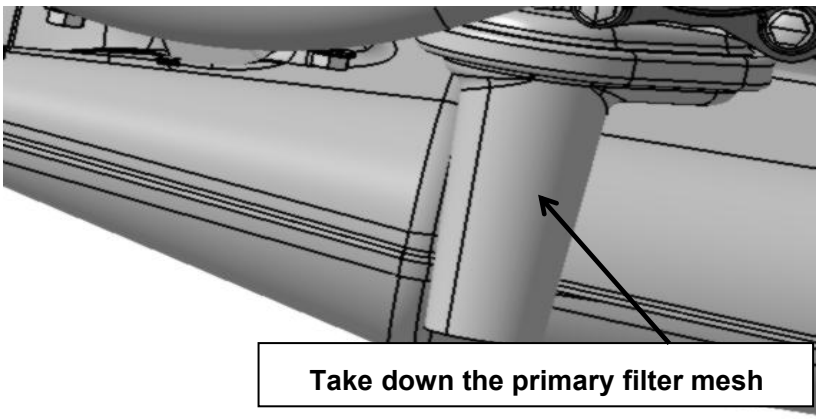




Cleaning of Primary Filter Mesh

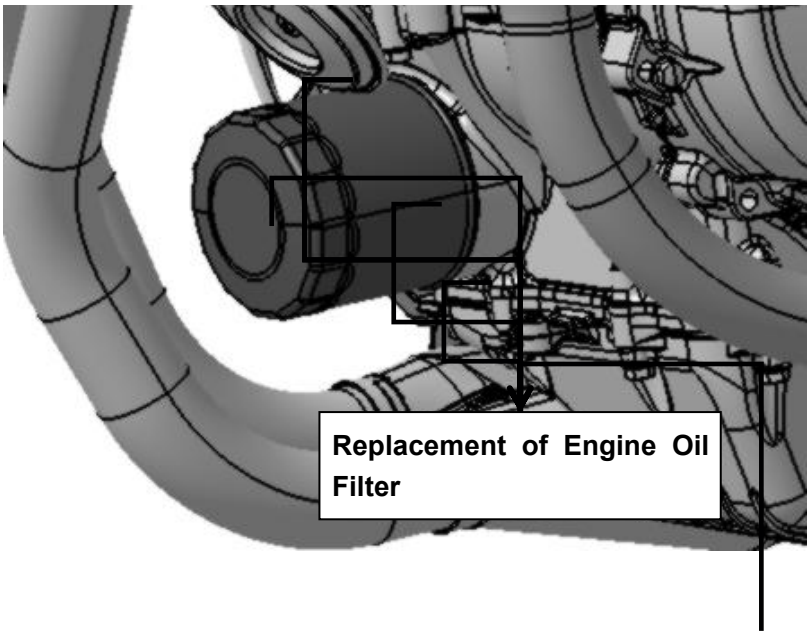
It shall be done during engine oil replacement.

The primary oil filter mesh is in the oil pan. Unscrew the drain plug, discharge the engine oil and place the motorcycle sideways. Loosen the bolts of oil pan and take it down. Take out the primary filter mesh with cleaning agent, then dry it with compressed air. Install the mesh, drain plug and carry out other steps in line with the “Replacement of Engine Oil”.



Replacement of Engine Oil Filter

Take down the engine oil filter with tools and replace a new one.



Oil pump

If the oil pump is faulted, take it down for repair or replacement. In this case, there is no need to disassemble engine from the frame.

The following contents are included:

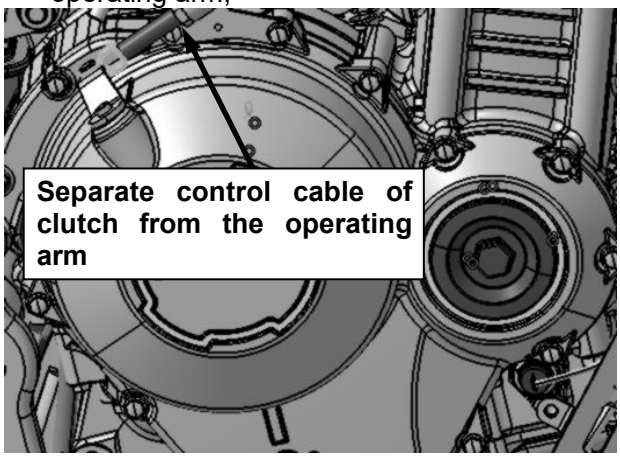
Disassembling steps and diagram of oil pump;

Installation steps of oil pump;

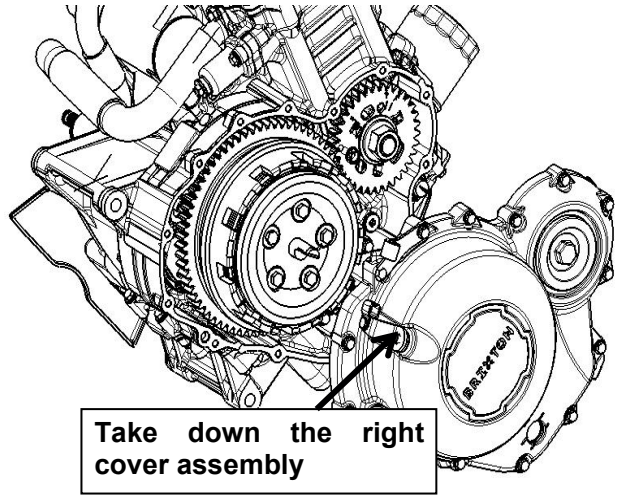
Disassembly and assembly of oil pump, and so on.

Disassembling steps and diagram of oil pump:

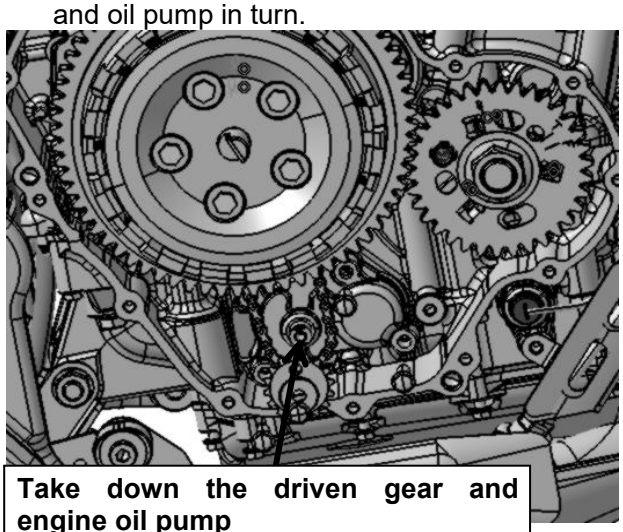
1. Separate control cable of clutch from the operating arm;



2. Take down the right crankcase cover;



3. Take down the oil pump bolts, driven gear and oil pump in turn.

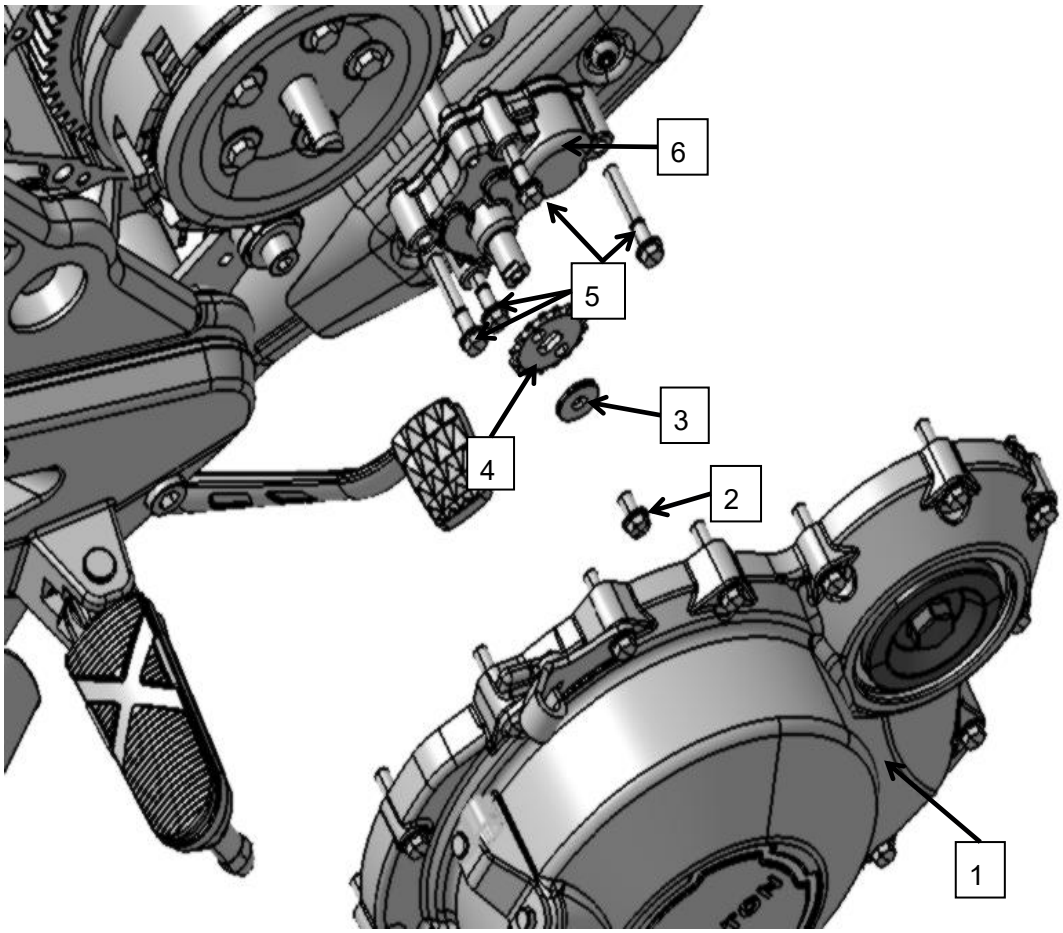


Installation steps of oil pump:

The installation and disassembly sequences are reverse. Pay attention to the following items during installation:

1. The parts shall be clean and undamaged;
2. The angle of clutch's operating arm may change after installation of right crankcase cover. Adjust it according to the cases;
3. Fill coolant and engine oil at last.

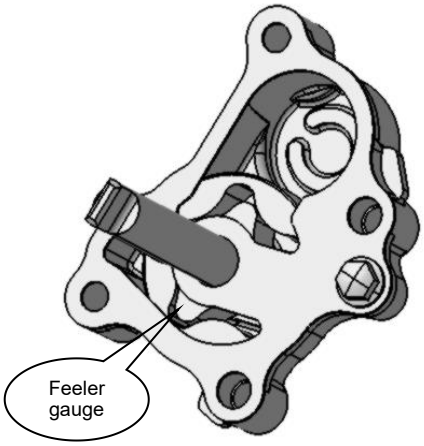
Disassembly/Installation of Engine Oil Pump



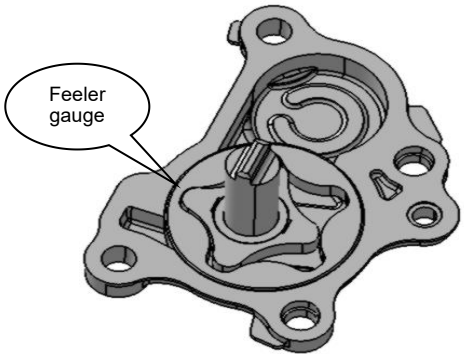
Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Right crankcase cover	**1**	
2	Connecting bolts of engine oil pump	**1**	Use thread adhesive during assembly
3	Gasket	**1**	
4	Driven gear of engine oil pump	**1**	
5	Fastening bolt of engine oil pump	**4**	
6	Engine oil pump	**1**	

Check of Engine Oil Pump

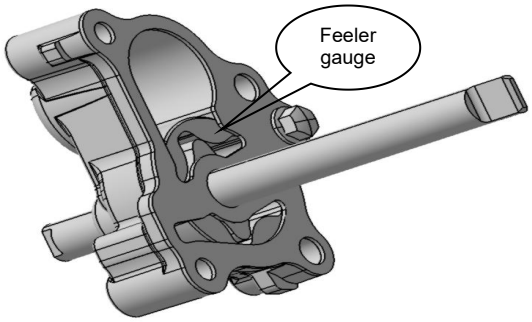
Check of Radial Clearance
Maintenance limit: 0.20mm



Check of Engine Oil Pump Clearance
Maintenance limit: 0.25mm



Check of End Gap
Maintenance limit: 0.12mm



3
Check and Adjustment

Maintenance Notice

This section introduces the check and adjustment of GK500 motorcycle, and the related technical requirements.

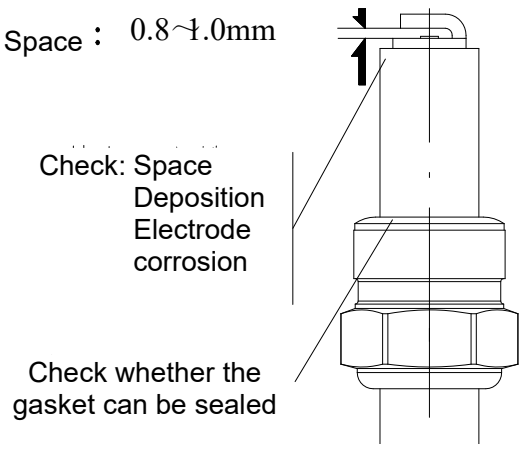
Note:

Unless otherwise specified or it is indicated in the maintenance plan, please check and adjust the GK500 motorcycle before each operation.

Technical Specification	
Engine	
Spark plug	**NGK CPR8EA**
Spark plug clearance	**0.8 ～ 1.0mm**
Valve clearance (cold state)	**IN: 0.15±0.03mm**
	EX: 0.25±0.03 mm
Idle speed	**1200 r/min±120r/min**
Cylinder pressure	**≥0.6MPa/300rpm**
Body	
Free stroke of accelerator handle	**2～ 6 mm**
Free stroke of clutch handle	**10～ 20 mm**
Free stroke of front brake handle	**12～ 18 mm**
Free stroke of rear brake pedal	**10～ 15mm**
Relaxation of driving chain	**40 mm**
Tire pressure front wheel	**one person: 220kPa, two persons: 250 kPa**
Rear wheel	**one person: 220kPa, two persons: 270 kPa**
Tire size front wheel	**120/70 ZR 17 M/C(58W)**
Rear wheel	**160/60 ZR 17 M/C(69W) 160/60 R 17 M/C 69H**

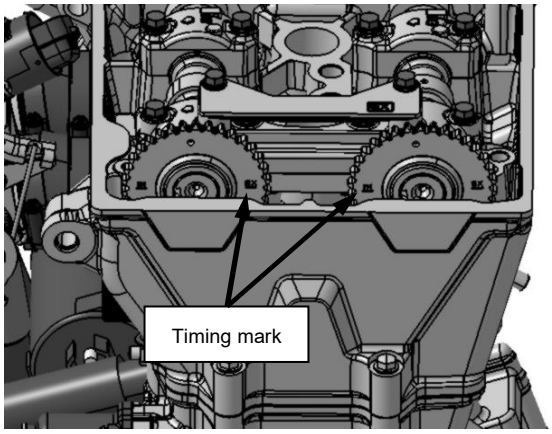
Spark plug

Take down the spark plug. Then take down the spark plug with a sleeve spanner. Visually check the spark plug insulator for damage and the electrode for ablation, In case of this, replace it.
Check the electrode clearance with a plug gauge. The electrode clearance of spark plug is 0.8～1.0mm. Adjust the clearance prudently. Clean the carbon deposit and dirty with a cleaner or steel wire.
Check the status of spark plug sealing gasket.
To install the spark plug, manually screw the spark plug firstly,
then tighten it with a sleeve spanner. Install the cap finally.



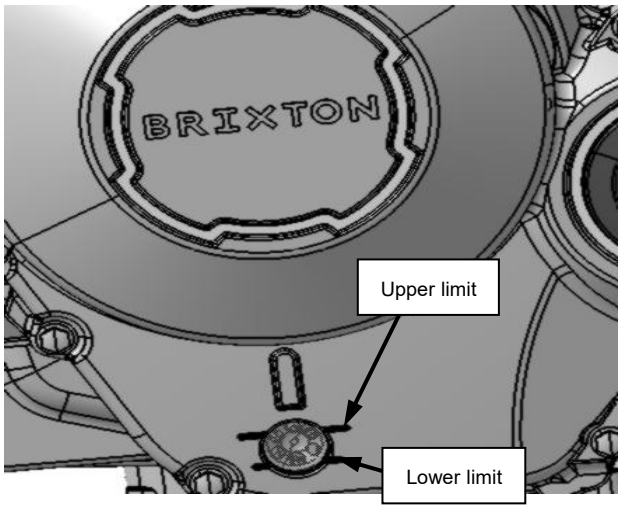
Timing phase

This shall be carried out for a new motorcycle or when the timing phase has suspected fault.
Take down the front left cover, rotate the fastening bolt of rotor clockwise and keep the “I” mark on rotor at right and aligned with the contacting surface. Take down the cylinder head cover and check whether it is at the required position (as shown in the figure).



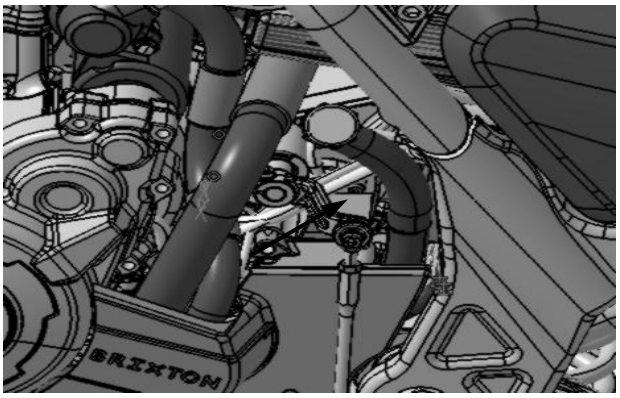
Lubricant

Fix the motorcycle on a flat ground with special fixture and keep the engine horizontal and stable. Visually check the oil level from the window on the right crankcase cover.
In case of shortage, fill timely.

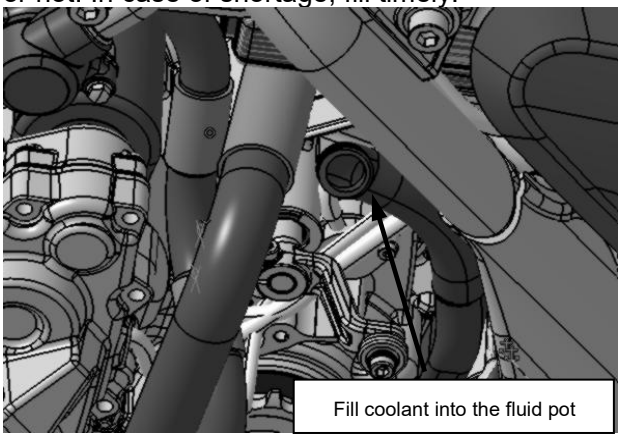


Coolant

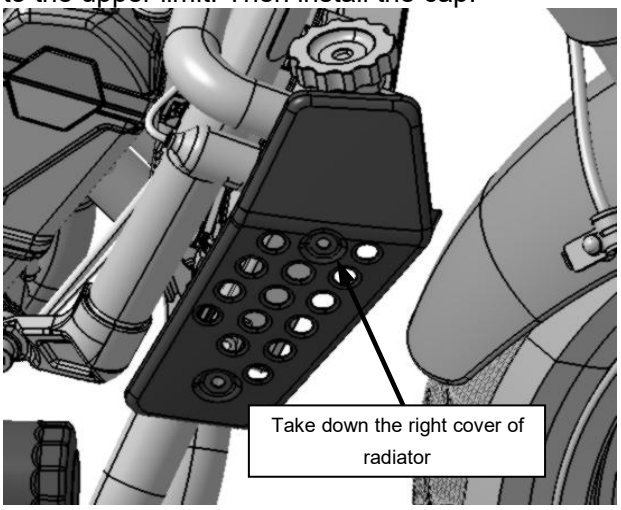
Fix the motorcycle on a flat ground with special fixture. Loosen the bolt under water pump and check is there any coolant flow out. Tighten the bolt after check.

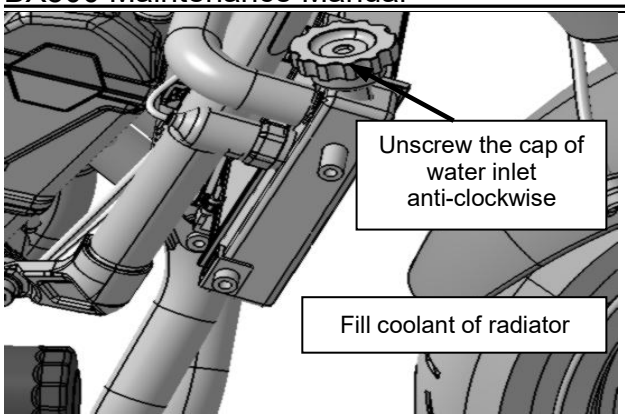


Check is the coolant volume within the limit lines or not. In case of shortage, fill timely.



Filling method: take down the pot cap and fill coolant slowly with a funnel until the level is near to the upper limit. Then install the cap.





The ratio of anti-freezing agent and water in the coolant shall be 50%:50%. Do not add only one of them.

Do use a funnel when filling, or the coolant may flow out. Check is the water pipe of fluid pot is leaky or damaged. In case of this, replace it.

If the fluid pot is empty, check the coolant level of radiator. Unscrew the radiator cap anti-clockwise and check whether the coolant level has reached the bottom of filler opening neck or not. In case of shortage, fill coolant timely.

Warning:

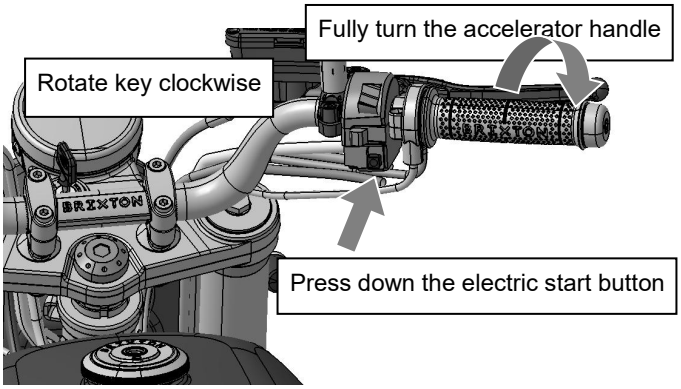
Make sure that the engine and radiator are cooled before opening radiator cap, otherwise, the injected coolant may cause serious scald.

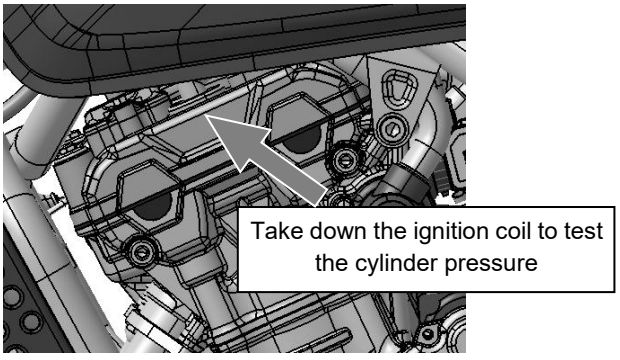
Cylinder pressure

When the engine cannot be started or it is hard to be started and there are no other faults, check the cylinder pressure.

Cylinder pressure: ≥0.6MPa/300rpm.

When testing the cylinder pressure, take down the spark plug and install a pressure gauge. Fully turn the accelerator handle and start the engine. Check the airtightness of pressure gauge connection parts. Reset the pressure gauge and re-started the engine; stop when the pressure gauge reading is stable. The maximum reading normally reaches after one or two cycles. The maximum reading is the cylinder pressure. Install the spark plug after test.





Low cylinder pressure is normally caused by the following reasons:

- The adjustment of valve clearance is improper
- The valve airtightness is poor
- The sealing pad of cylinder head is burnt
- The piston ring or cylinder is abraded
- The piston is abraded

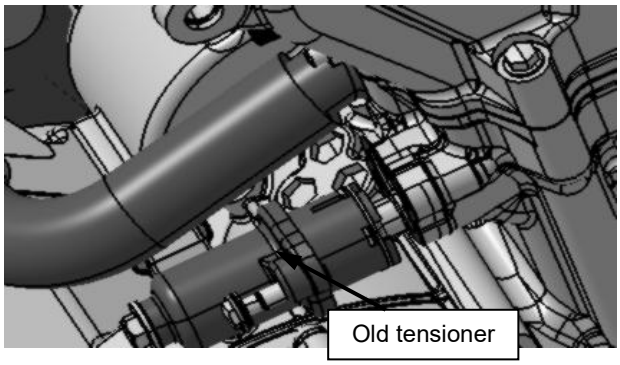
High compressing force is normally caused by the following reason:

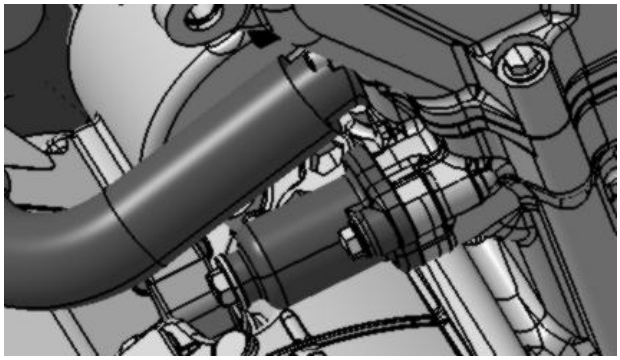
- There is carbon deposit in the combustor or piston head

Tension of timing chain

Start the engine and keep it running at idle speed. Listen to the voice of engine carefully. If there is “tap-tap” sound from the timing chain, it means that the tension is insufficient and the chain tensioner shall be replaced.
Replacement method:
Unscrew the inner hexangular screw 2-M6×25 and take down the sealing washer and chain tensioner. Please note that the sealing washer may drop into the crankcase. Do hold it. Insert the key into the end of new chain tensioner and rotate it to draw the front part of tensioner back and lock it. Then install a new sealing washer and chain tensioner, at last, tighten the tensioner.
Take down the key and make the timing chain tensioned.
The sealing washer shall be replaced. Install the screw at the end of tensioner chain.

Caution:
When the timing chain is loose, do not rotate the crankshaft, or the timing gear may mismatch.





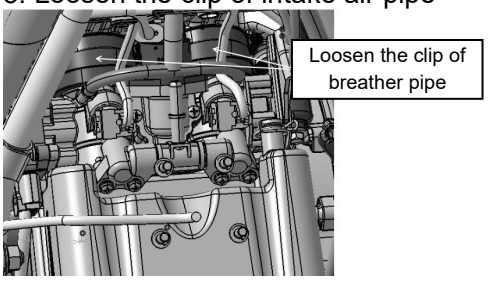
Air filter and oil collector

Cleaning and replacement of air filter element

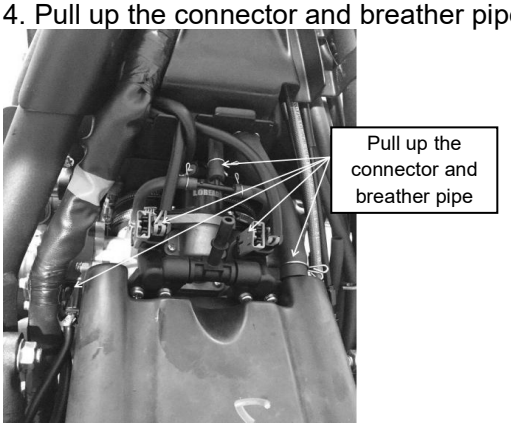
1. Open and take down the seat cushion

2. Disassemble the fuel tank (refer to the disassembly and installation of fuel tank)

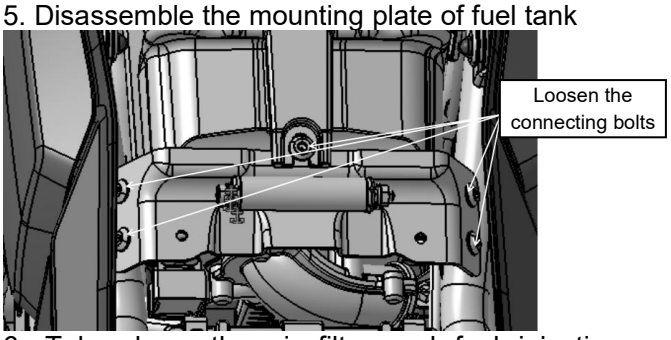
3. Loosen the clip of intake air pipe



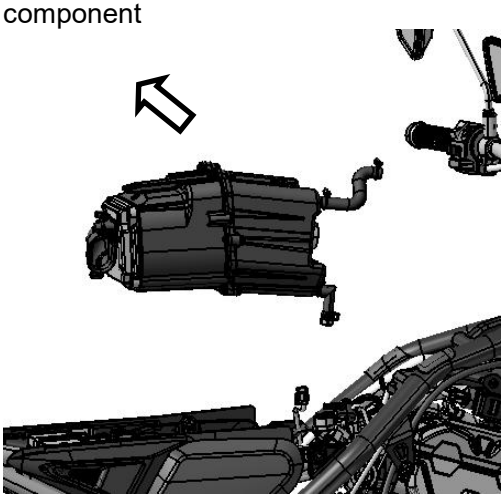
4. Pull up the connector and breather pipe



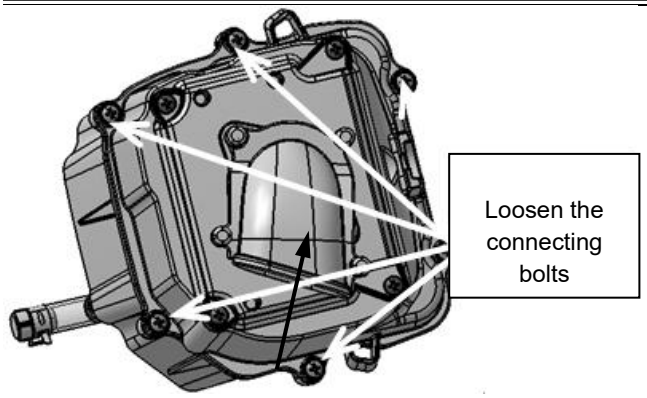
5. Disassemble the mounting plate of fuel tank



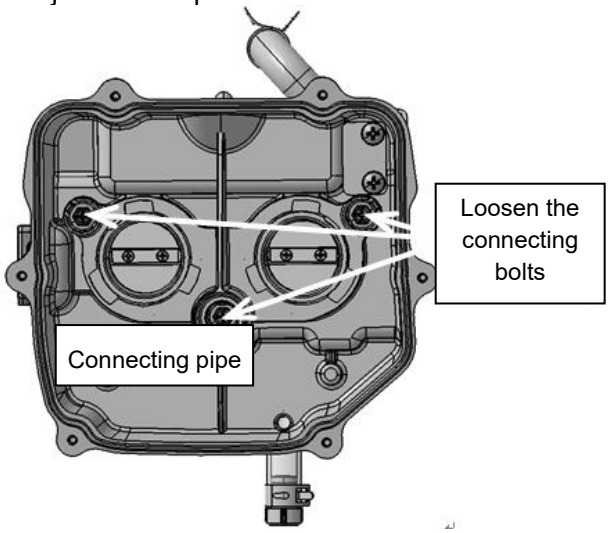
6. Take down the air filter and fuel injection component



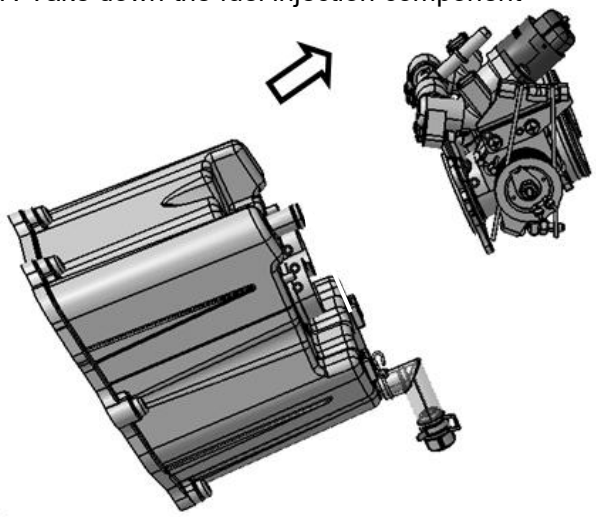
7. Take down the case of air filter



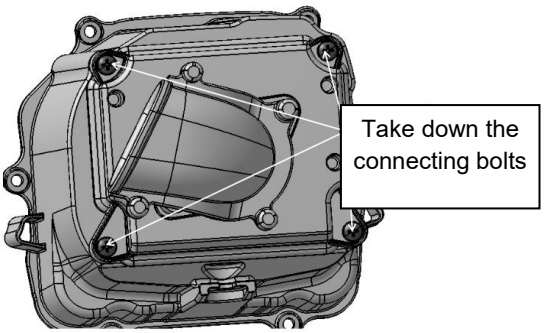
8. Take down the mounting bolts of fuel injection component



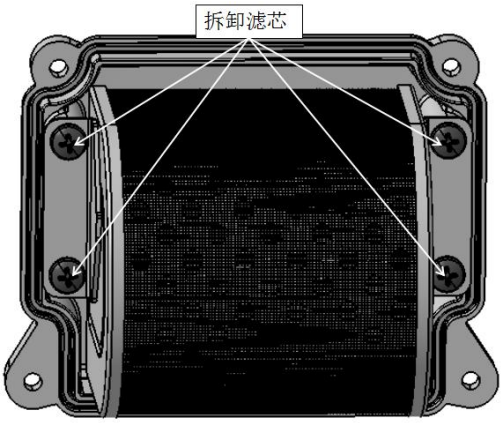
7. Take down the fuel injection component



8. Take down the air filter cover



9、Take down the filter element



Notes:

1. Take down and check the filter element. If it is a paper one, blow it with compressed air. If it is too dirty, cracked or damaged, replace it;

2. The cleaning and replacement period shall be shortened when driving at dusty areas;

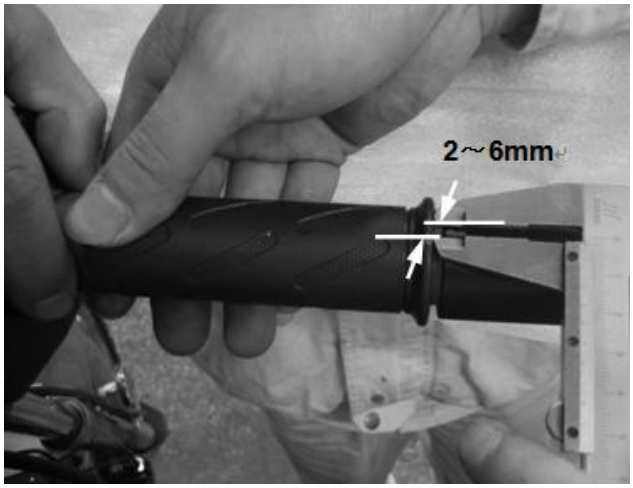
3. Keeping the air filter clean can improve the engine efficiency and prolong the service life.

After the filter element is cleaned or replaced, assemble the motorcycle in the reverse sequence.

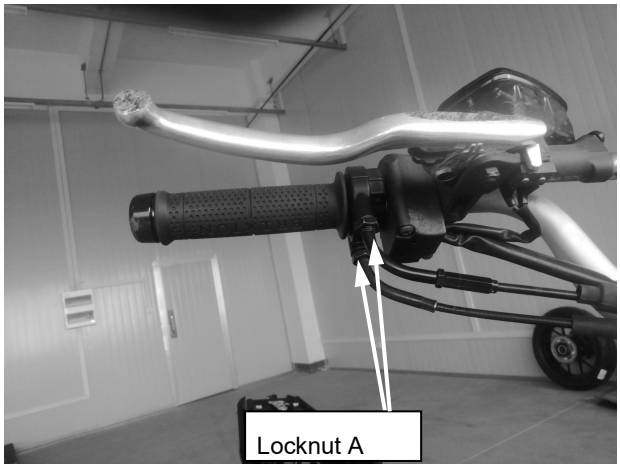
Accelerator control

First, check the accelerator cable for deformation, twist or damage.
Then, measure the free stroke of accelerator handle. Rotate the handle to the side of free stroker, mark a straight line between handle and counter weight with a marking pen; then rotate the handle to the other side, measure the displacement of straight line, which is the free stroke of accelerator handle.

Free stroke 2～6mm.

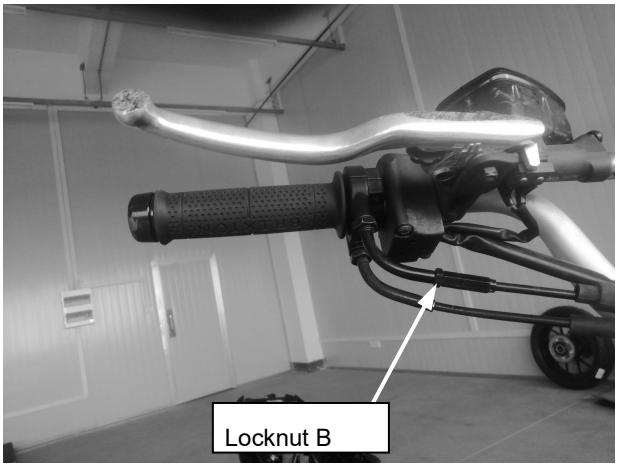


If the free stroke is too short or too large, adjust it.
Adjustment method:
Minor adjustment: open the protective cover, loosen the lock nut A and rotate the screw tube to get the required free stroke. Then tighten the lock nut A and install the protective cover.



Major adjustment: if minor adjustment cannot meet the requirement, separate accelerator cable and throttle, unscrew lock nut B to perform large range stroke adjustment. After it is adjusted, screw lock nut B.

Check the accelerator and make sure that it rotates smoothly from fully-open to filly-closed from any position. In case of jam, adjust or replace it.



Idle speed

Caution:

Check and adjust the idle speed after other items of engine are qualified.

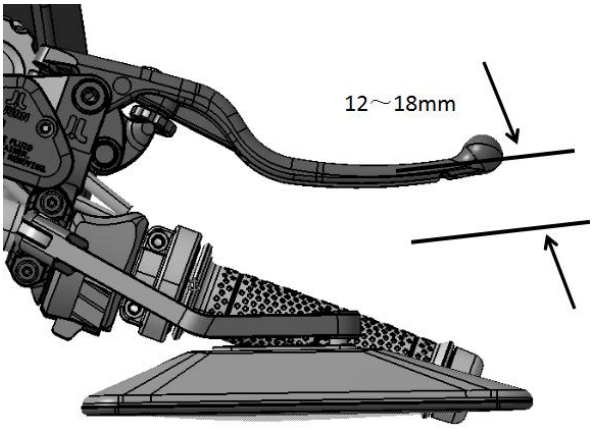
The idle speed is controlled by ECU. The air intake flow of throttle under idle speed has been adjusted when delivering. Do not adjust the adjusting screw. When the idle speed is unstable, there is no idle speed or the idle speed is high, find out the cause in line with the EMS troubleshooting.

Idle speed 1200r/min ±120r/min

Brake system

Check the free stroke of front brake handle.

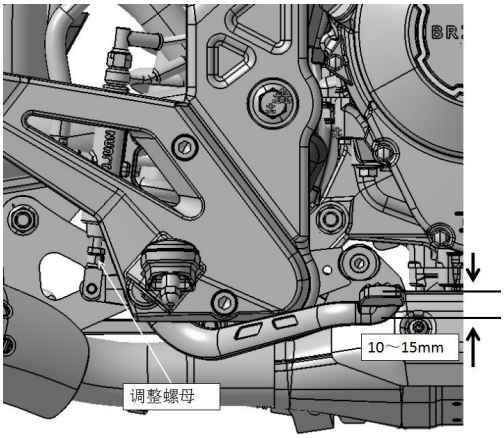
Free stroke of brake handle: 5～10mm.



Check the free stroke of rear brake handle.

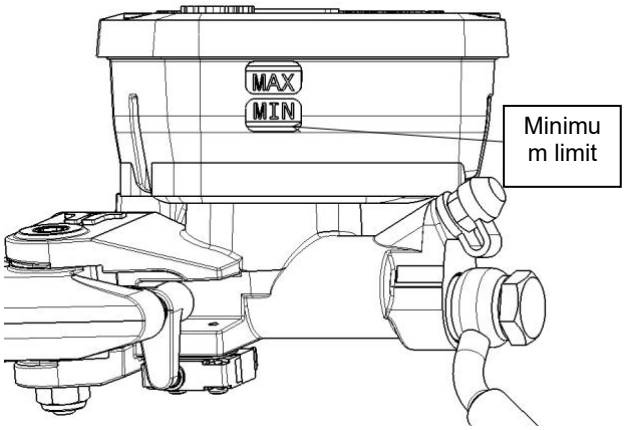
Free stroke of rear brake pedal: 10～ 15mm.

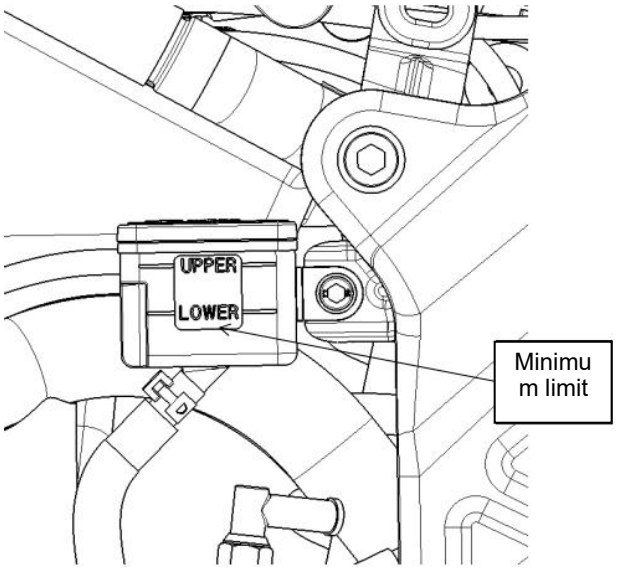
To adjust it, rotate the adjusting nut to get the required free stroke.



Check the level of brake liquid:

Check the level of brake liquid in the front brake cylinder. If it is under the lower limit, fill **DOT 4**.





If the brake liquid is feculent or there is impurity or smelly, discharge the liquid completely to refill it. Please refer to the vacuum filling method below.

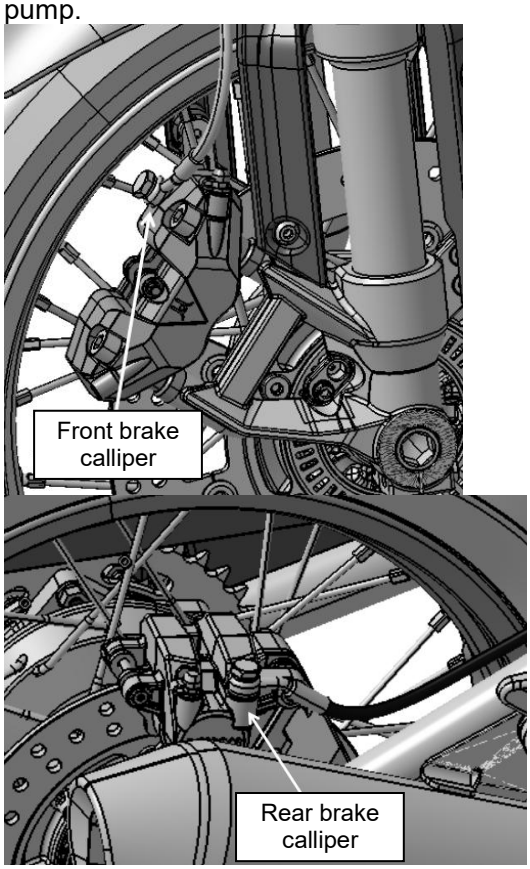
If the brake liquid pot in front and rear brake cylinders are empty, exhaust air at brake calliper with a vacuum pump and fill liquid then.

Please refer to the vacuum filling method below.

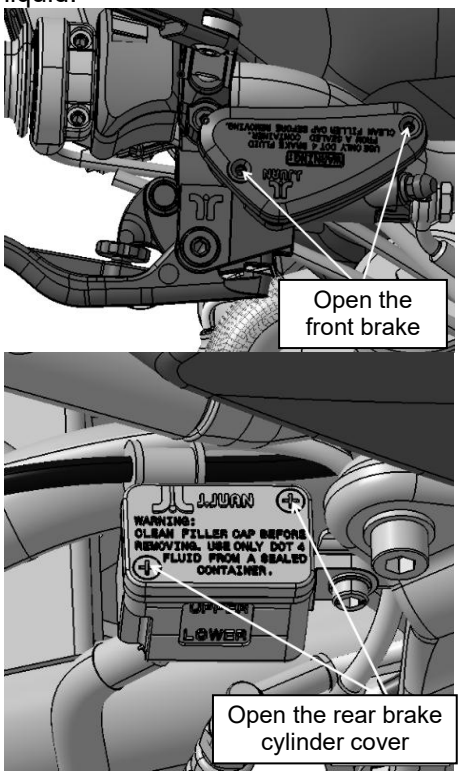
Vacuum filling method:

This method is applicable to a new motorcycle or when the brake liquid pot is empty.

1. Exhaust air at brake calliper with a vacuum pump.



2. Open the brake cylinder cover and fill brake liquid.



3. Operate the brake handle or pedal to discharge air in the brake calliper.

4. When the air is discharged completely, pump out the brake liquid and pinch the handle tightly or step the pedal to the end, then screw the exhaust bolt quickly with a torque of **7～9N.m**.

5. Install the brake cylinder cover. The sealing washer shall be flat. Replace it if necessary.

6. Check the oil cup, hydraulic brake hose and the connecting parts for oil leakage.

Caution:

1. Use DOT4 non-petroleum brake fluid.

2. Prevent impurity, or the chemical changes will degrade the brake performance.

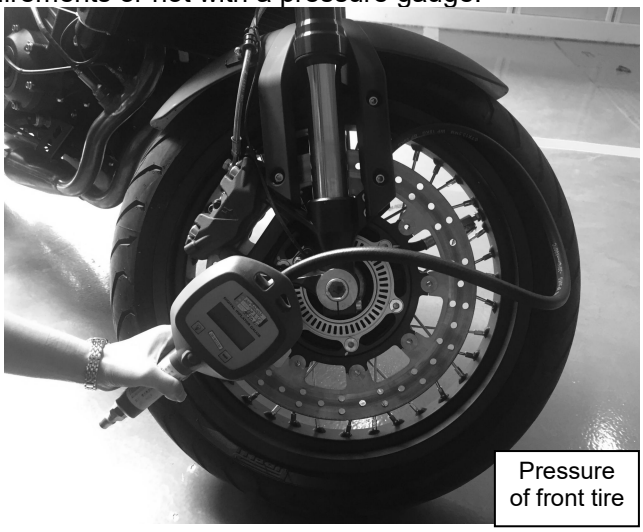
Warning:

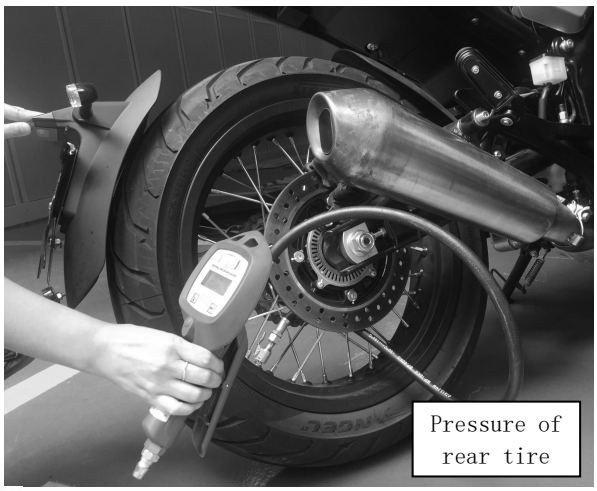
Brake liquid is with strong causticity. Do not contact painted or plastic parts. In case of contact with eyes or skin, wash with water immediately and go for a doctor.

Running system

Tire specification and pressure

Check whether the tire pressure meets the requirements or not with a pressure gauge.





Caution:

Check the pressure when tires are cool so as to get correct results.

Tire specification and suggested pressure:

Tire specification	Front tire		Rear tire	
	120/70ZR 17 M/C(58W)		**160/60ZR 17 M/C(69W) 160/60 R 17 M/C 69H**	
Pressure of cold tire	One person		Two persons	
	Front tire	Rear tire	Front tire	Rear tire
	220kPa	**220kPa**	**250kPa**	**270kPa**

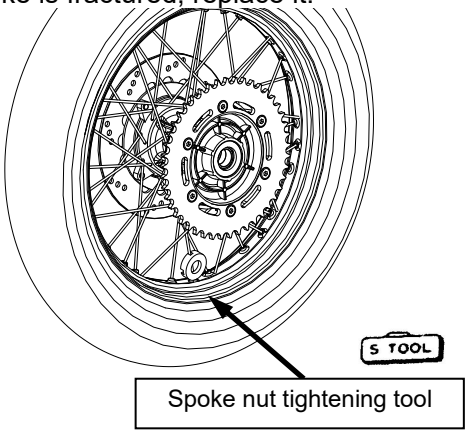
In case of under-pressure, check the tire for cut, iron nail or other sharp articles.

Spoke

Check whether the wheel spoke is loose or fractured.

Tighten the loose spoke to the required torque with spoke nut tightening tool. S TOOL Torque of spoke nut is **2.45～4.9N.m**.

If the spoke is fractured, replace it.



Clutch control cable

Check the free stroke of clutch handle.
Free stroke of clutch handle: 10～ 20mm

Adjustment method:
Minor adjustment: open the protective cover, loosen the locknut and rotate the adjusting nut to get the required free stroke. Then tighten the locknut and install the protective cover.

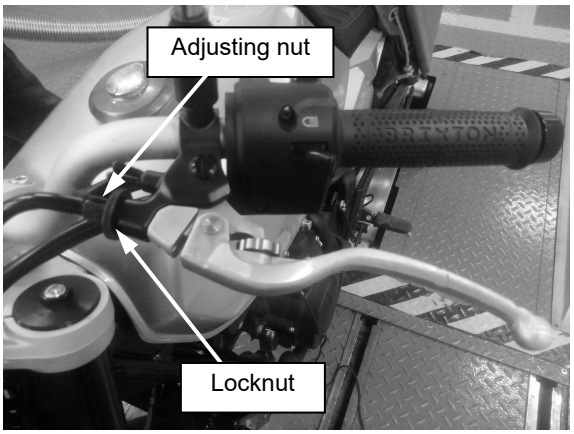
If the free stroke is still unsatisfied, take down the clutch cable to adjust the end connecting engine.

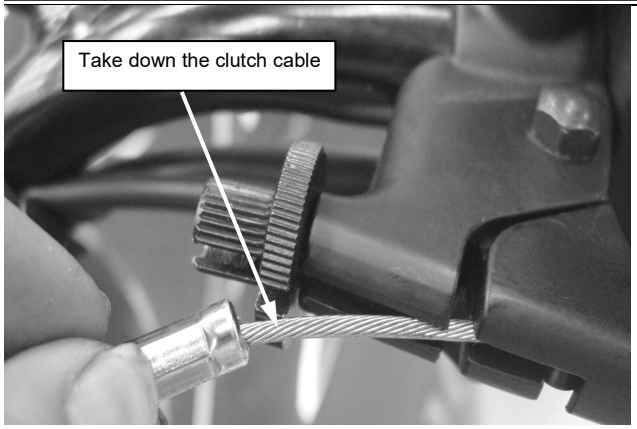
Major adjustment: take down the control cable, then the clutch lever connecting engine. Rotate the lever to an appropriate angle and install it. Then install the control cable and perform minor adjustment.

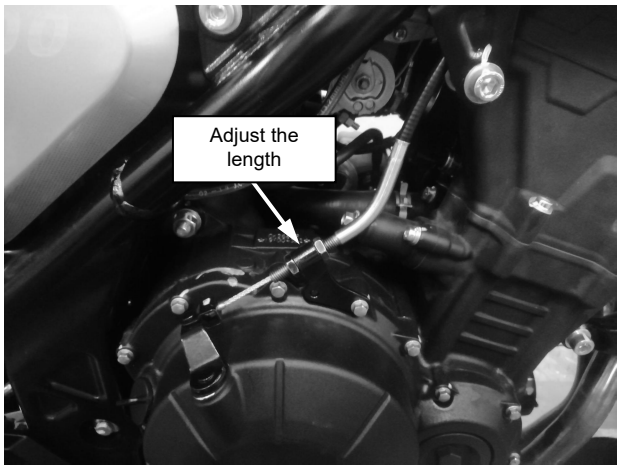
Caution:

Make sure that the free stroke of clutch handle is appropriate! If it is too loose, the clutch discs cannot be separated; if it is too tensive, the clutch mesh is poor and the clutch may be damaged.

10-20mm







Driving chain

Check of driving chain relaxation

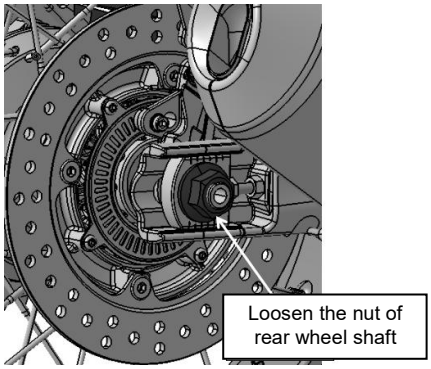
Place the motorcycle on a flat ground and put down the bracket. Keep the transmission at N gear. Check the relaxation of driving chain by pressing the chain up and down and observing the up and down movement of lower chain.

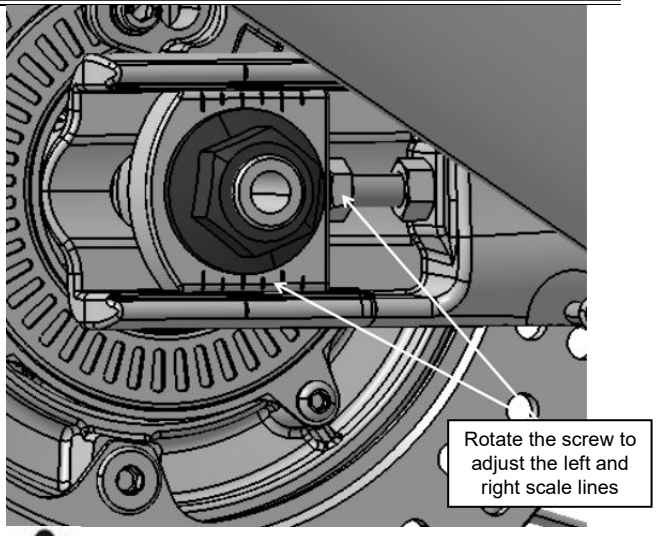
Vertical movement of driving chain: **40 mm.**

If the chain is too loose or tight, adjust it.

Adjustment method:

Loosen the nut of rear wheel shaft and rotate the adjustable bolt on the chain regulator. After reaching the required relaxation, tighten the nut of rear wheel shaft and check the rear wheel rotation and the uniformity of front and rear wheels.





Caution:

The marks on two chain regulators shall be aligned.

Warning:

Nut of the rear wheel shaft shall be tightened. The tightening torque is 80-90 N.m.

Cleaning and check of chain

Clean the driving chain with cleaning agent, remove dust and soil, dry it and check it for abrasion or fracture. In case of damage, replace the chain. Install the chain and smear special lubricant;

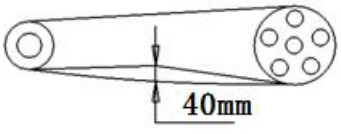
Check the abrasion of big and small sprocket. If the gear is abraded seriously, or there is loss or fracture, replace it.

Caution:

The motorcycle adopts oil-sealed chain. The cleaning agent shall not corrode the oil seal. When assembling chain, smear special lubricant on the connecting shaft of locking plate.

Caution:

The locking plates are not directly connected. They are riveted when assembling. The chain shall be replaced at repair shop.



Vertical movement

Battery

Disassembly of battery

Take down the seat cushion first and disassemble the negative and positive electrodes. Unscrew the fastening bolts of battery bracket and take down the battery.

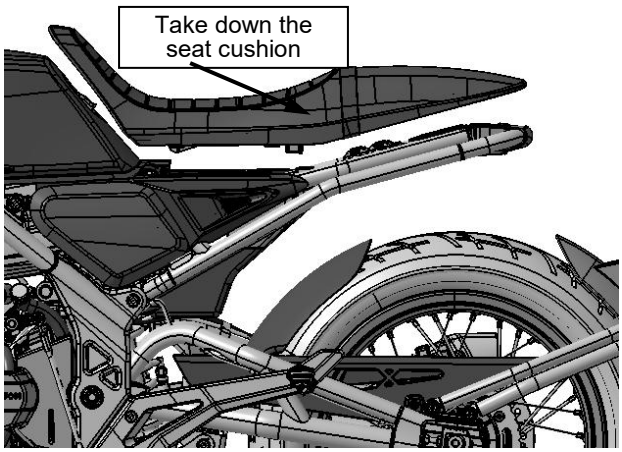
Clean the electrode connections and outer surface.

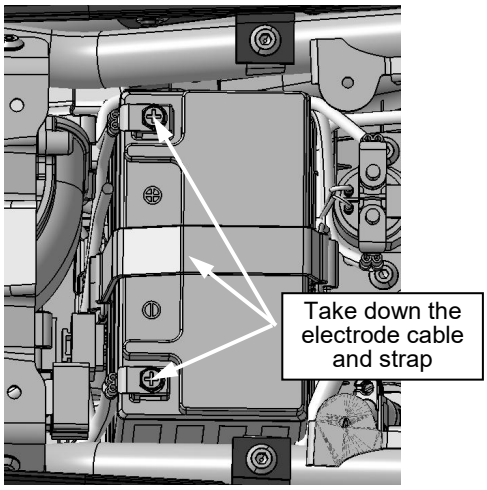
Installation of battery

Install the battery in the reverse sequence. Do connect the positive electrode first.

Caution:

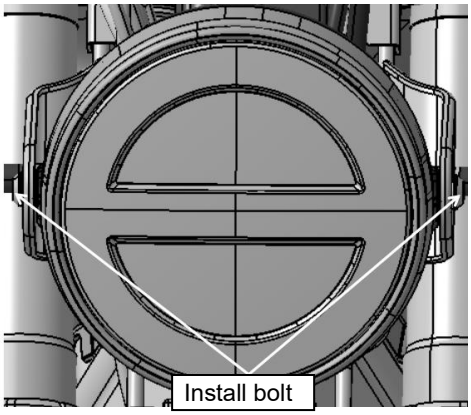
1. The starter and EMS are powered by battery, therefore, it is important to keep the battery capacity sufficient. Otherwise, the motorcycle cannot be started.





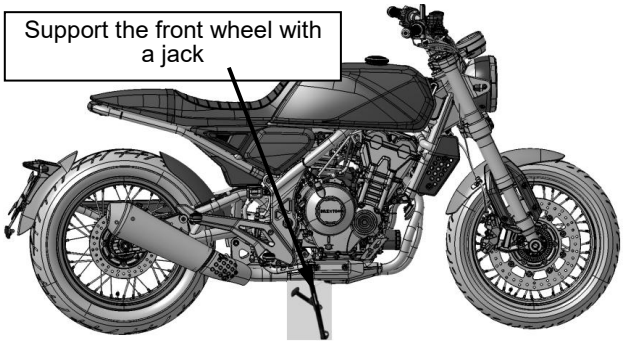
Headlight dimming

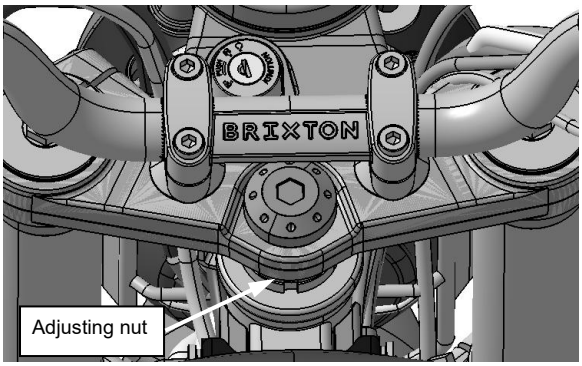
Check the headlight direction before driving.
It can be adjusted vertically.
Adjustment method:
Use an inner hex spanner to loosen the mounting bolts of headlight; rotate the headlight up and down to bypass the limit slot. Adjust the bolts to required height and then tighten them.



Steering bearing of stem

Support the motorcycle with a jack or others and make the front wheel off ground. Check the rotation of steering handle. If it cannot rotate balanced, or there is axial displacement or jam, adjust the nut of front fork stem.





Suspension system

Front suspension

Activate the front brake and press down the front fork several times to check the work of front suspension.

If there is abnormal noise or click, check all fasteners and tighten them to the required torques.

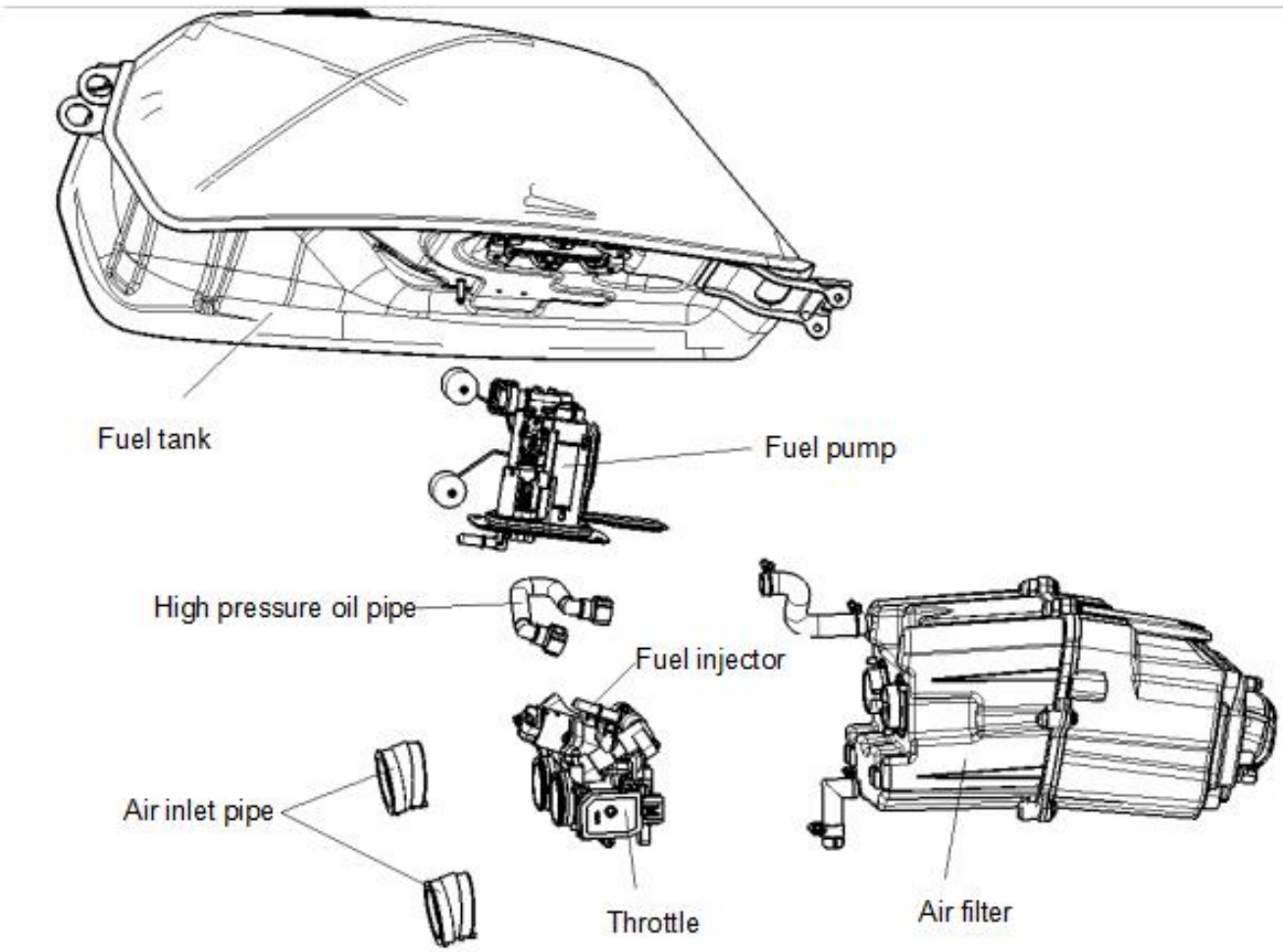
Rear suspension

Press down the rear part of seat strongly and check the rear fork shaft sleeve for abrasion or damage. In case of damage, replace it. Check the whole suspension assembly for fixture, damage and deformation.

Bolt, nut and fastener

All bolts, nuts and fasteners shall be tightened in line with the maintenance plan. All split pins, clamps, locks and others shall be checked.

Fuel System


Fuel tank
Fuel pump
High pressure oil pipe
Fuel injector
Air inlet pipe
Throttle
Air filter

4
Fuel System

Maintenance Notice

This section introduces the fuel system.

Warning:
Do avoid fire during gasoline processing!

Pay attention to the installation positions of sealing elements when disassembling the components and parts of fuel system. New sealing elements shall be used during assembly.
Do not disassemble the throttle (only the fuel injector can be disassembled).

Technical Specification

Opening diameter	**Φ34mm**
Idle speed	**1200r/min±120 r/min**
Free stroke of accelerator handle	**2～6mm**

Troubleshooting

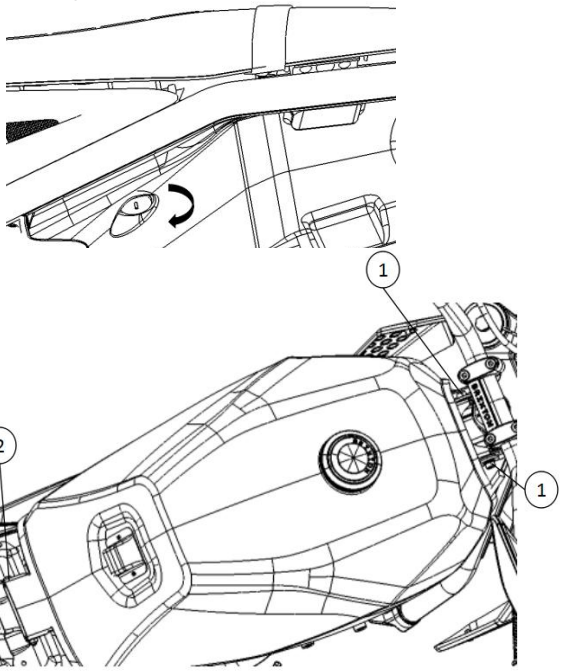
℘ **The engine can be ignited but cannot be started.**

1. There is no fuel or the fuel is insufficient;
2. Fuel in the cylinder is too much;
3. The air filter is blocked;
4. The ignition of spark plug is discontinuous;
5. Fuel in the pipe is blocked;
6. Fuel quality (there is water);
7. The fuel has been stored for a long period;
8. The fuel pump is faulted;
9. The fuel injector is faulted (blocked).

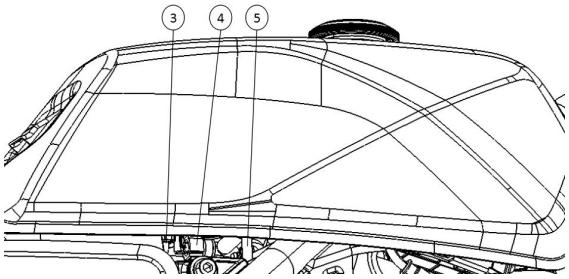
Disassembly and Installation of Fuel Tank

Disassembling steps:

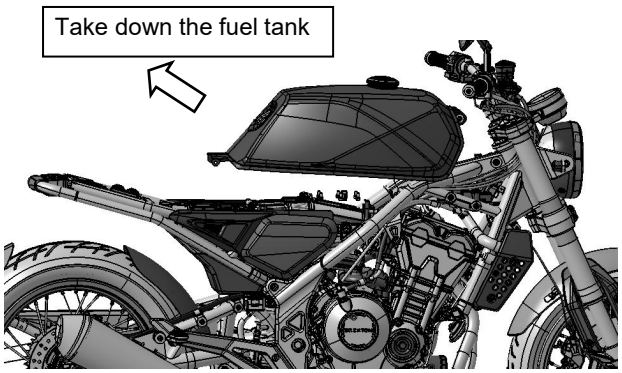
1. Disassemble the seat (unlock it with a key and take it down).



3. Take down connector ③ of fuel pump. Loosen the holder and disassemble the fuel pipe ④. Take down the breather pipe ⑤ and dump valve.



4. Take down the fuel tank.



To avoid pollution of fuel supply pipe, seal the joint with adhesive tape after it is pulled up.

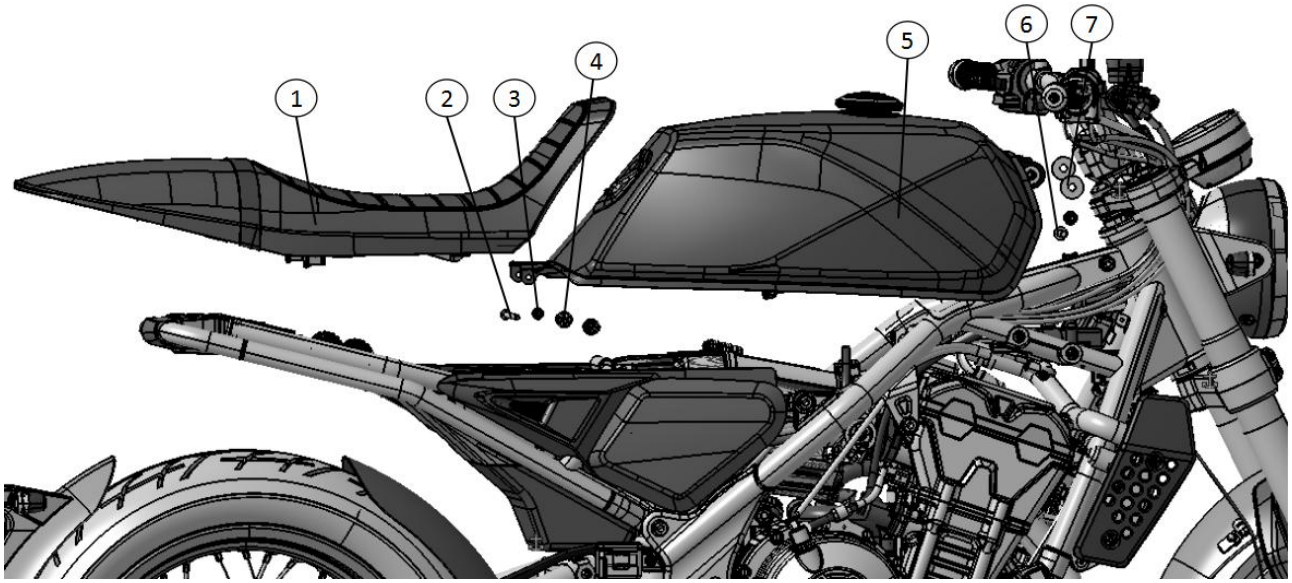
The fuel tank is not fixed. It is suggested that two persons shall work together when disassembling the fuel tank.

Installation steps:

Install the fuel tank in the reverse sequence.

Do follow the layout during installation. Avoid pollution of fuel supply pipe.

Disassembly/Installation of Fuel Tank



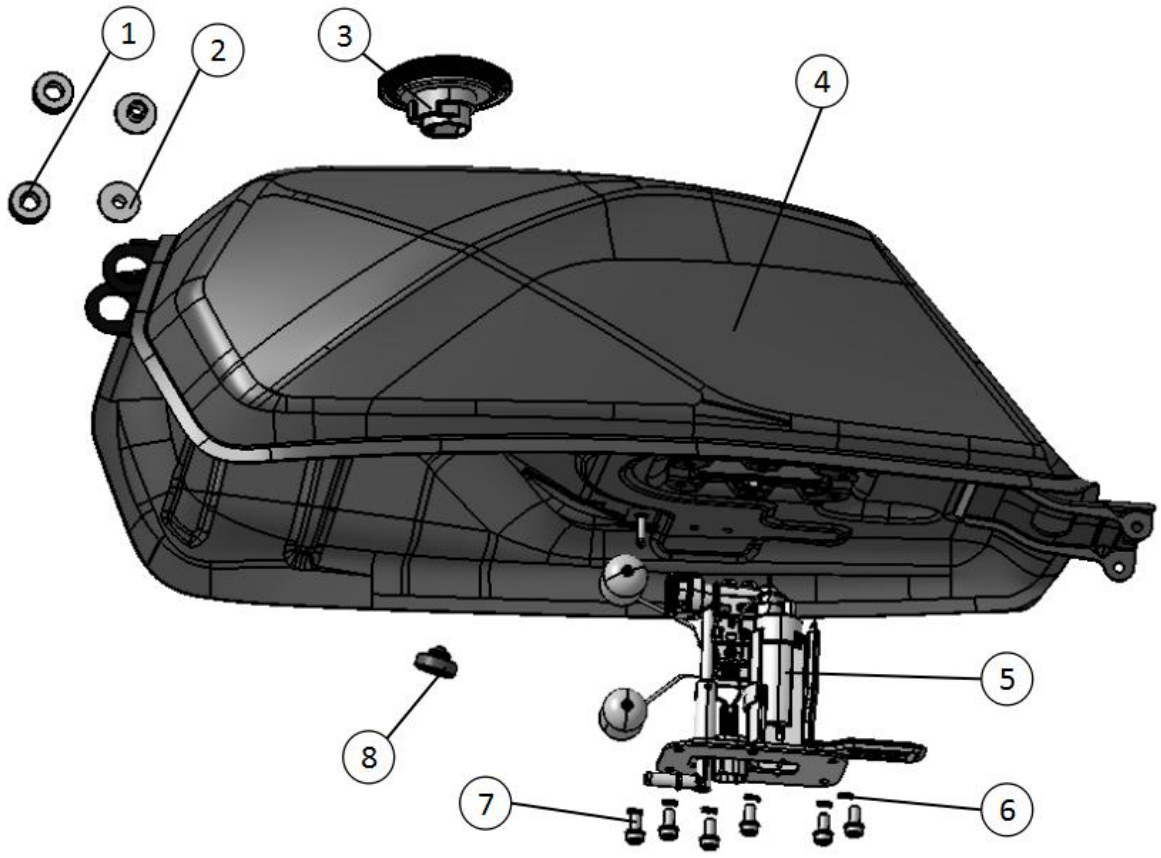
Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Seat	**1**	
2	Bolt M6X90	**1**	
3	Nut M6	**1**	
4	Mounting sleeve of fuel tank	**2**	
5	Fuel tank assembly	**1**	
6	Bolt M8X25	**2**	
7	Extra large washer 8	**2**	

Disassembly and Assembly of Fuel Tank

Please refer to the following figure for the disassembly and assembly of fuel tank.

The assembly and installation sequences are reverse during assembly.

Keep the fuel output at the front of fuel tank during assembly.



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Rubber sleeve (IV)	**2**	
2	Liner assembly (IV)	**2**	
3	Fuel cover assembly	**1**	
4	Fuel tank welding assembly	**1**	
5	Fuel pump assembly	**1**	
6	spring washer 6	**6**	
7	Inner hex disc bolt M6X12	**6**	
8	Crash pad	**1**	

Replacement of fuel filter

Replacement period: a mileage of 15000km.

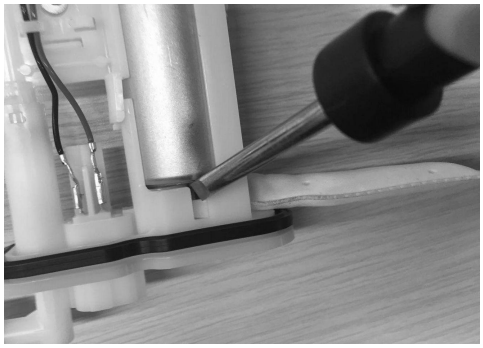
Tool: straight screwdriver.

Caution:

Do not pull the level sensor and float rod assembly up hard.

Disassembling steps of filter:

Press the filter clip and take out the filter.

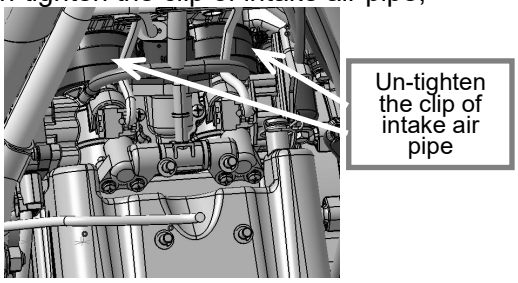


Disassembly and Installation of Air Filter

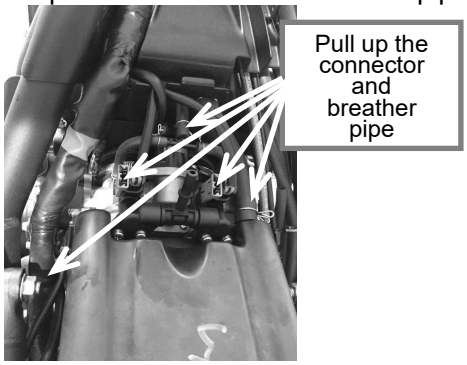
After taking out the air filter, the upper and lower parts can be disassembled. Then take out the filter element to clean or replace it.

Disassembling steps:

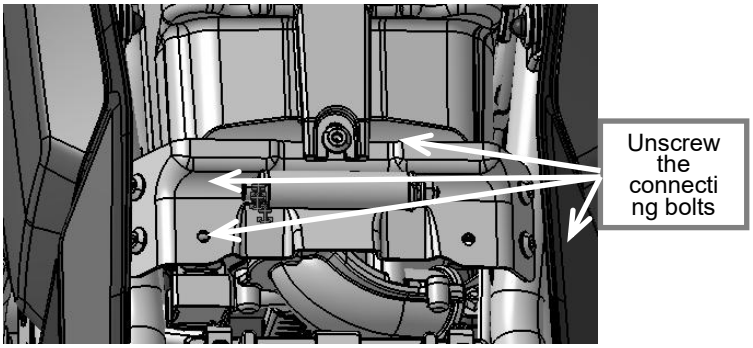
1. Disassemble the fuel tank (please refer to the Disassembly and Installation of Fuel Tank);
2. Un-tighten the clip of intake air pipe;



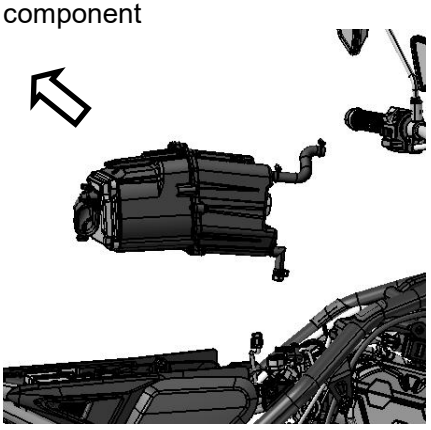
3. Pull up the connector and breather pipe



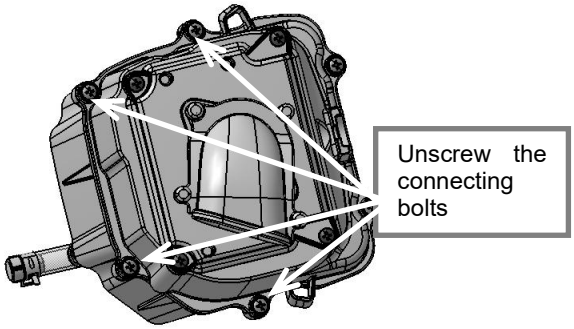
4. Disassemble the mounting plate of fuel tank



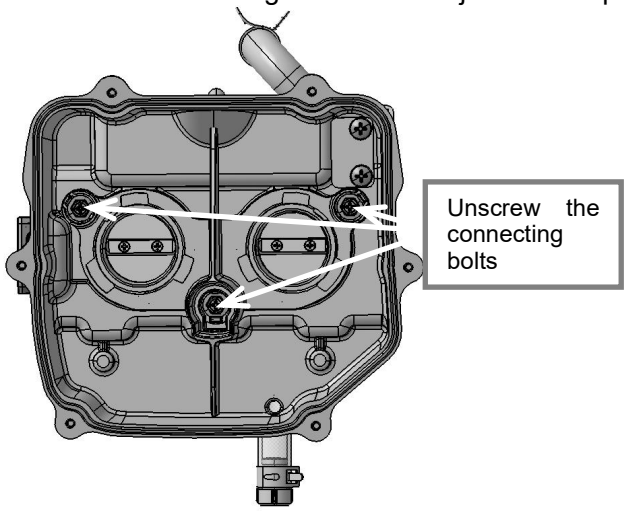
5. Take down the air filter and fuel injection component



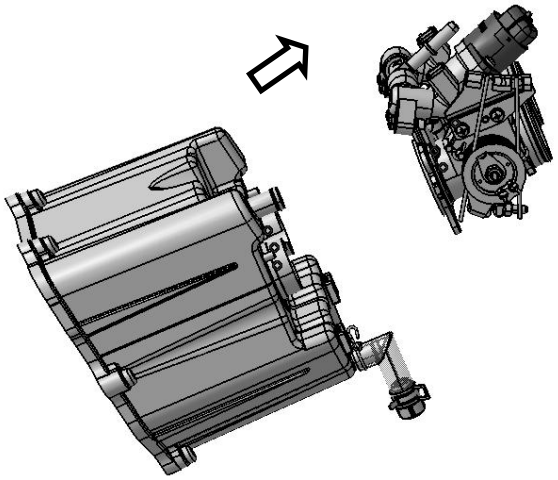
6. Take down the case of air filter



7. Take down the mounting bolts of fuel injection component.



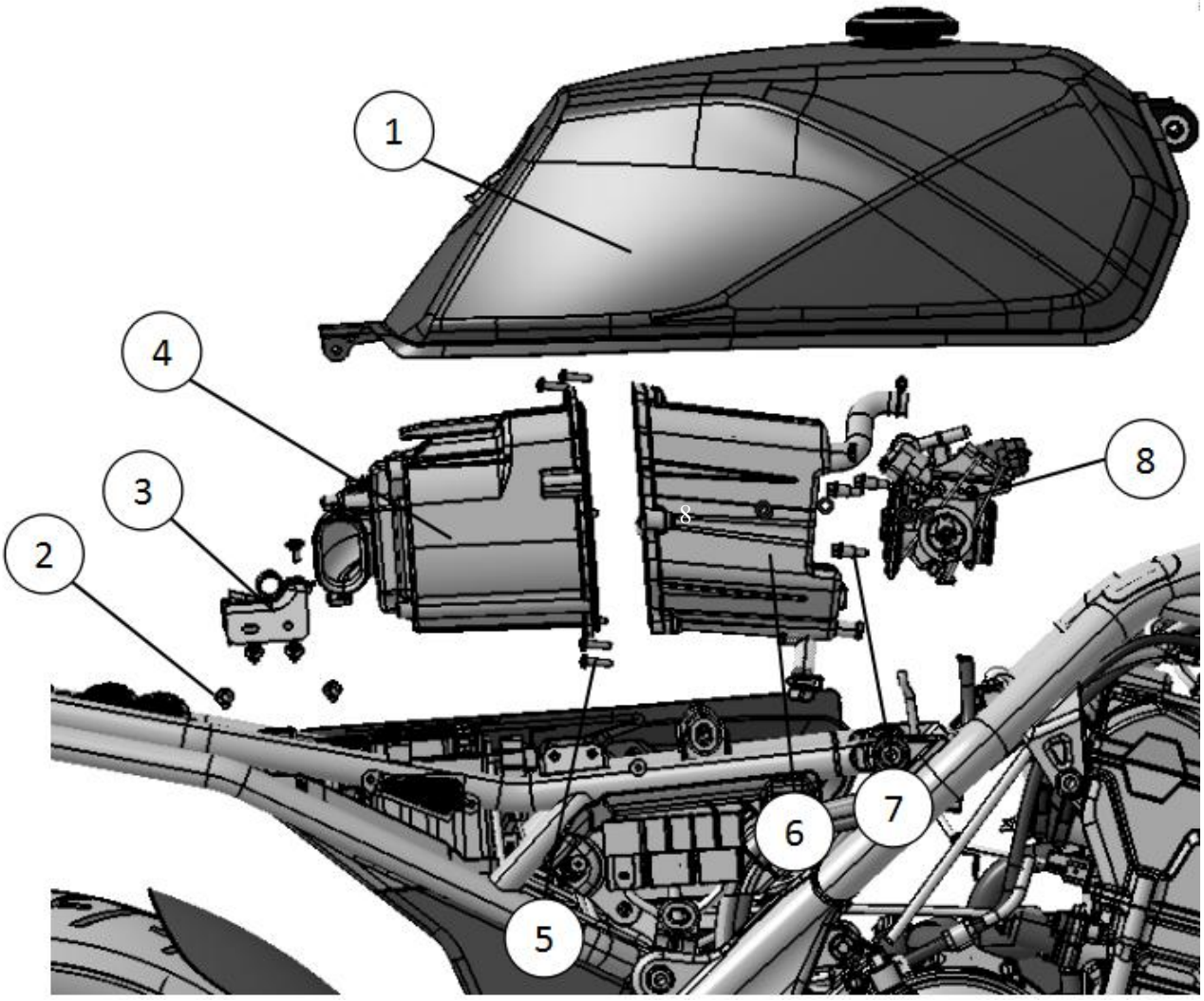
8. Take down the fuel injection component (including the fuel injector)



Disassembly/Installation of Air Filter

The installation and disassembly sequences are reverse.

Align the locating slot of intake air pipe with the throttle during installation.



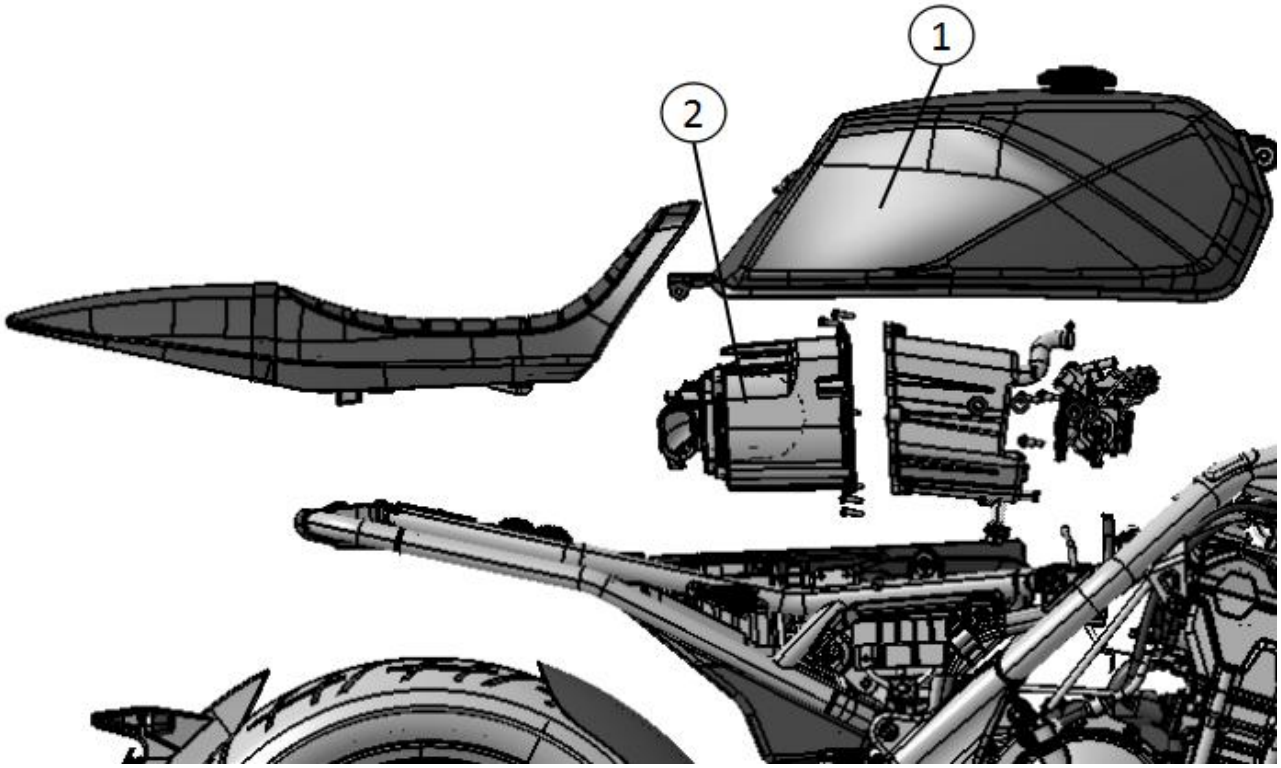
Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Disassembly of Fuel Tank	**1**	Refer to the Disassembly/Installation of Fuel Tank
2	Bolt M6X12	5	
3	Mounting plate of fuel tank	1	
4	Air filter component	1	
5	Self-tapping screw ST 4.8X19	6	
6	Front component of air filter	1	
7	Step bolt	3	
8	Fuel injection component	1	

Disassembly and Installation of Throttle

Installation steps:

The installation and disassembly sequences are reverse.

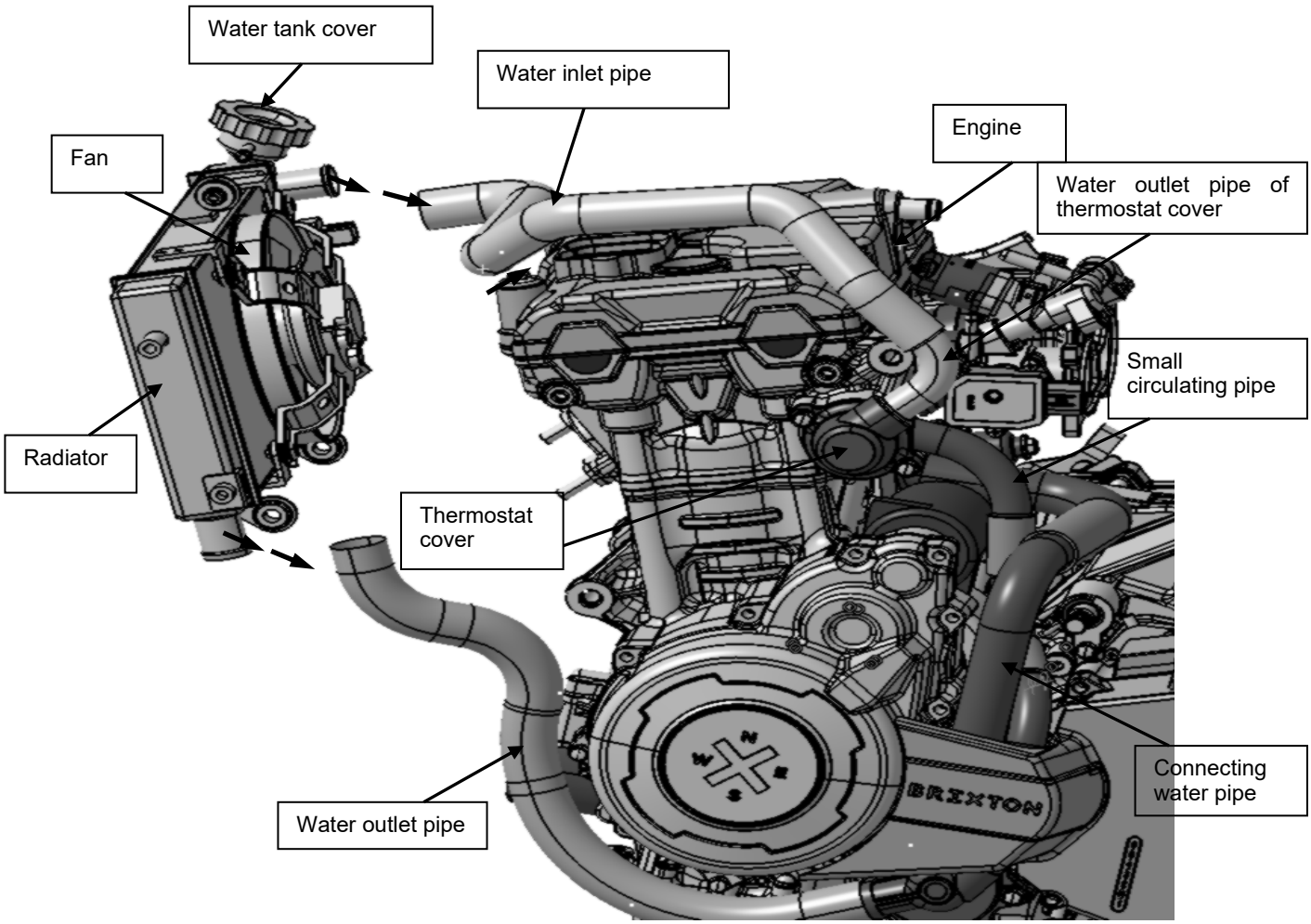
Align the locating slot of intake air pipe with the throttle during installation.



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Disassembly of Fuel Tank	**1**	Refer to the Disassembly/Installation of Fuel Tank
2	Disassembly of Air Filter	**1**	Refer to the Disassembly/Installation of Air Filter

Do not disassemble the throttle. If the sensors shall be replaced, please follow the guidance of EMS system experts.

Cooling System



5
Cooling System

Maintenance Notice

The maintenance shall be carried out at an environment with low temperature.
The maintenance shall be carried out on the motorcycle.
Coolant is refilled through the fluid pot. The radiator cover can only be disassembled when refilling coolant after the cooling system is disassembled or the radiator is taken out.
After inspection and maintenance, check all joints and sealing parts with a radiator detector for water leakage.

Warning:
When the coolant temperature is above 100℃, if the radiator cover is open, pressure decrease will cause boiling. Do not open the cover in this case.

Caution:
Coolant on the paint surface may cause damage. In this case, wash it with water rapidly.

Maintenance criteria

Item		Standard value	Limit
Buffering pressure of radiator cover		88.2kPa	73.5kPa～102.9 kPa
Open temperature of thermostat	Start open	71℃	/
	Full open	85℃	/
	Full open degree (85℃)	3.5mm	/
Boiling temperature of coolant (Mixing ratio 50%)	Atmospheric pressure	107.7℃	/
	88.2kPa pressed	125.6℃	/
Coolant capacity		1.2L	/

Mixing ratio of coolant

The lowest temperature	Mixing ratio	Antifreeze (ml)	Pure water (ml)
-9℃	20%	240	960
-16℃	30%	360	840
-25℃	40%	480	720
-37℃	50%	600	600
-44.5℃	55%	660	540

The words in black is the mixing ratio of coolant when delivery.

Please fill coolant as required by Brixton.
Do not mix with other coolants.
The coolant is toxic and cannot drink.
In addition to considering the lowest temperature, a mixing ratio applicable to a temperature with a leeway of -5℃ shall be chosen.

Troubleshooting

℘ **Water temperature rise is too high**

1. The switch of fan is in poor contact;
2. The radiator cover is faulted;
3. The thermostat is faulted;
4. The coolant volume is insufficient;
5. The water pipe or sleeve is blocked;
6. The radiator blades are blocked;
7. The radiator is blocked;
8. The water pump is faulted;
9. The cable circuit is short.

℘ **No or little water temperature rise**

1. The switch of fan is in poor contact;
2. The thermostat is faulted;
3. The cable circuit is short.

℘ **There is water leakage**

1. Mechanical sealing is not good;
2. The O ring is degraded or in poor contact;
3. The water pipe is damaged or degraded.

Performance inspection

Check of radiator cover

Warning:

Open the cover after the coolant is completely cooled.

Install the radiator cover on the detector to raise the pump pressure. If the pressure can be maintained within the required scope for 6 seconds, you can open the cover.

Caution:

Apply water on the sealing surface when installing cover on the detector.

Open pressure of radiator cover valve: 73.5～103kPa.

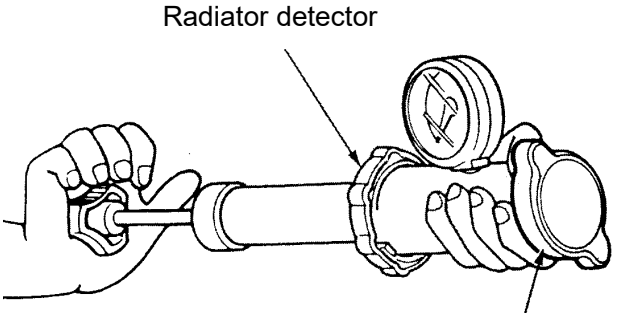
Check of radiator pressurization

Install the radiator detector on the radiator to raise the pump pressure. Check that whether the pressure can be maintained with the required scope for 6 seconds or not.

Required pressure: 73.5～103kPa.

Check is there any leakage on the water pipe and joints.

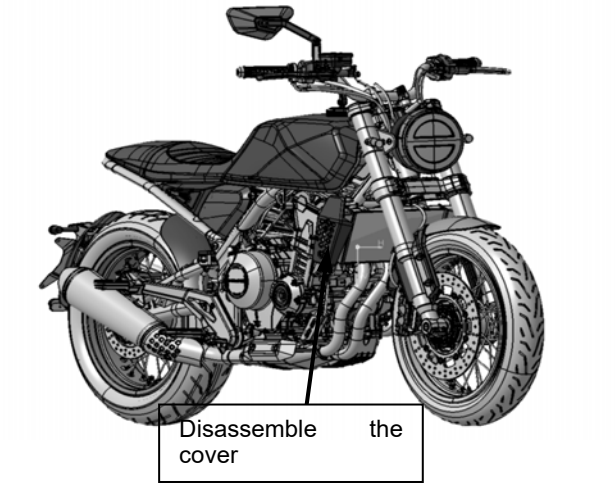
Do not over-pressurize or the radiator and the joints may be damaged.



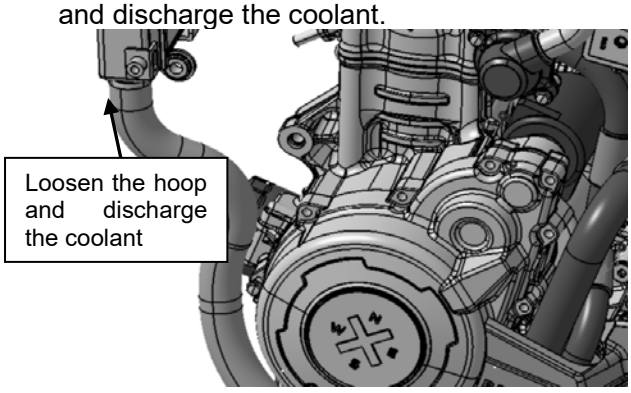
Radiator

Disassembly of radiator

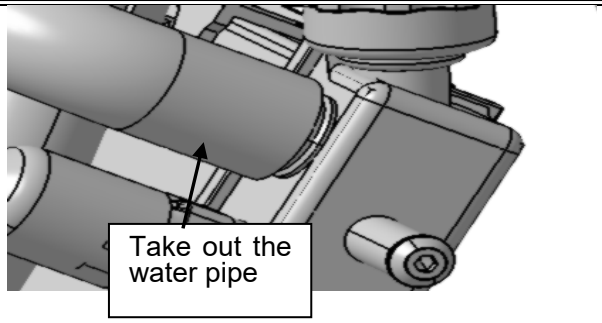
1. Place the motorcycle on a flat ground and disassemble the radiator cover.



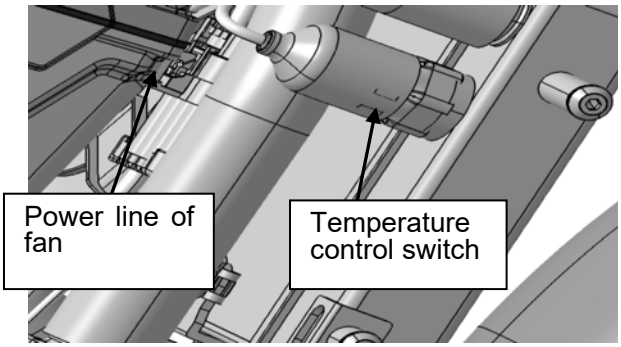
2. Take the water outlet pipe of radiator out and discharge the coolant.



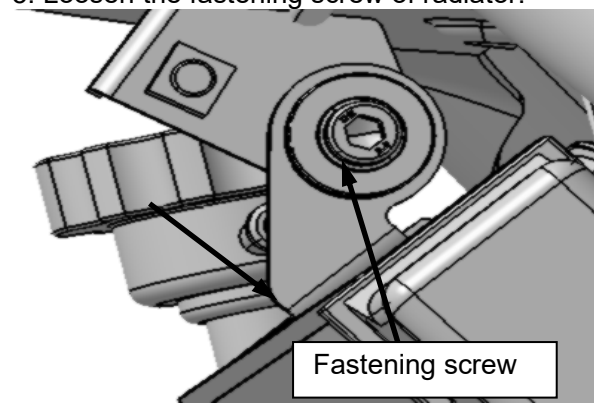
3. Loosen the hoop and take out the water pipe.



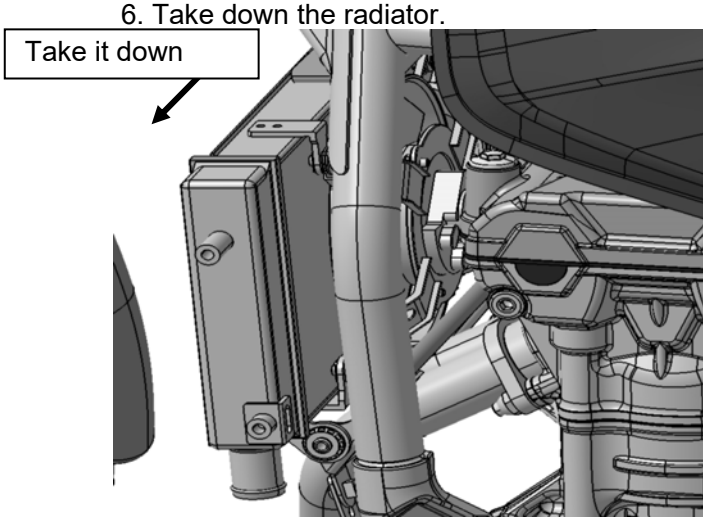
4. Remove the switch connector and power line of fan.



5. Loosen the fastening screw of radiator.



6. Take down the radiator.



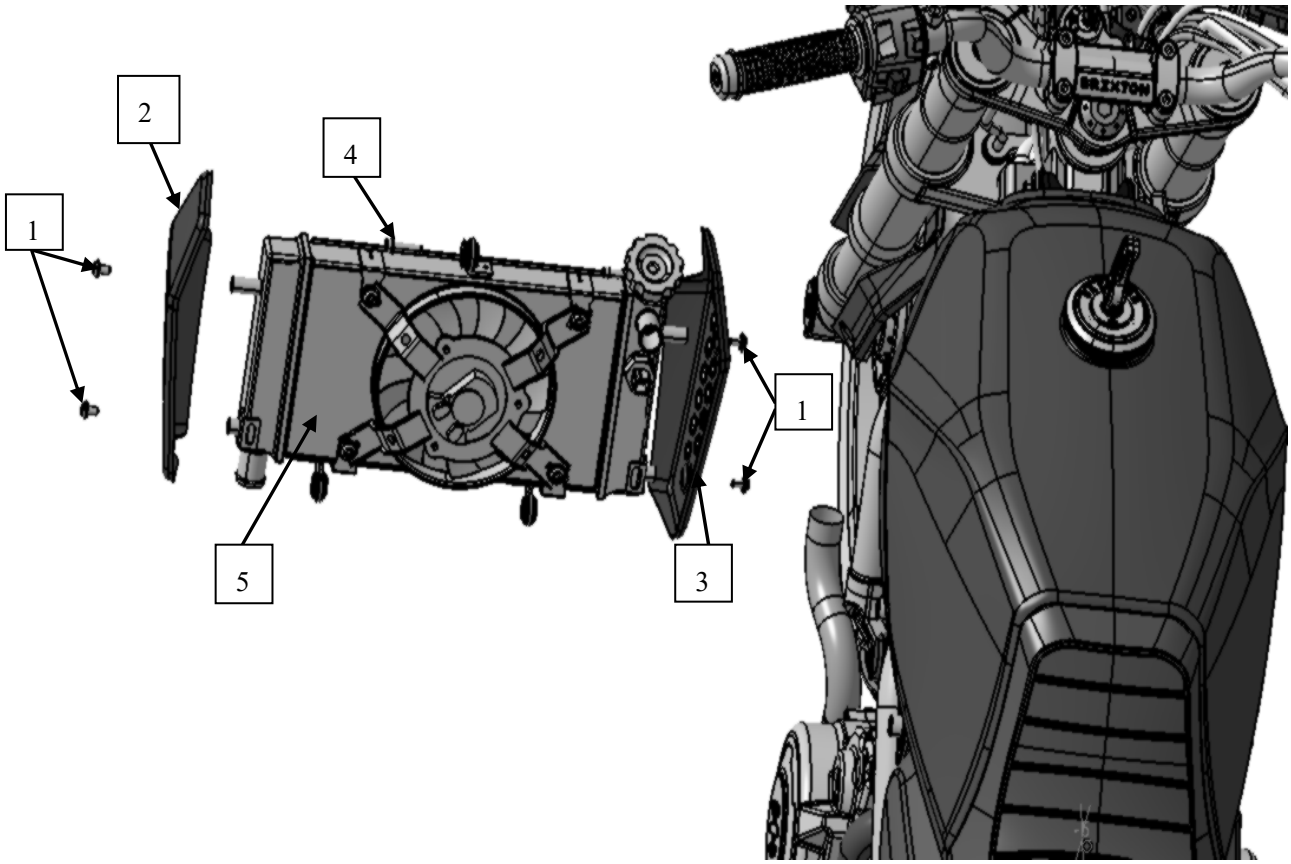
Installation of radiator

The installation is reverse to the disassembly sequence.

Do not damage the blade.

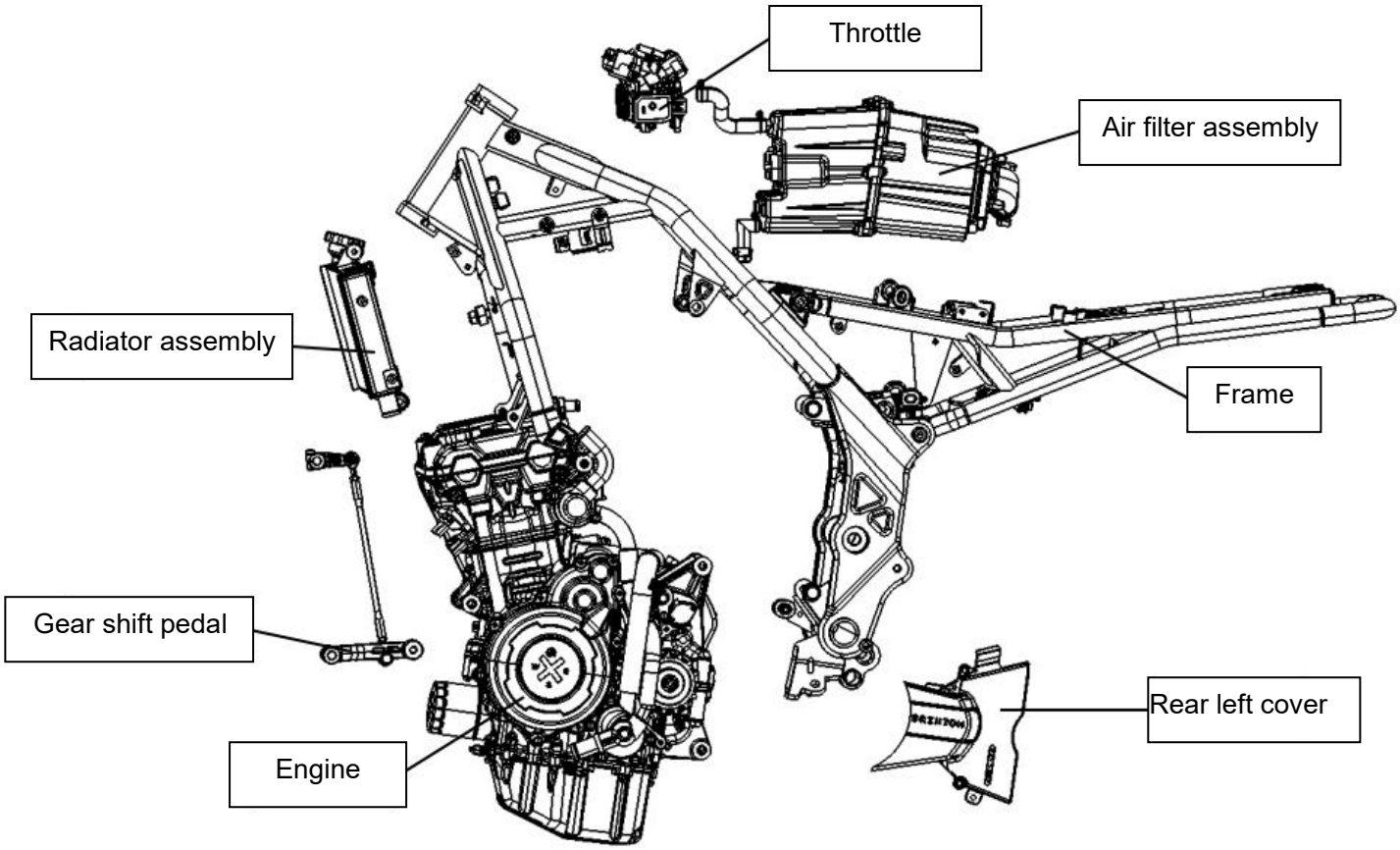
Fill coolant after installation and check the joints for leakage.

Disassembly/installation of radiator



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Bolt M6X10	**4**	
2	Left cover of radiator	**1**	
3	Right cover of radiator	**1**	
4	Bolt M6X25	**1**	
5	Radiator component	**1**	

6
Engine Disassembly and Installation



Engine Disassembly and Installation

Maintenance Notice

Only disassemble engine when maintaining its crankshaft, balance shaft and transmission part. In other cases, there is no need to disassemble engine.
Before disassembly, place the motorcycle on a flat ground with the side bracket supported. Drain the water coolant and engine lubricant completely.
To maintain the cylinder head, cylinder block, piston and other parts of heat engine, the cover, fuel tank, radiator, throttle and air filter assembly shall be disassembled.
During maintenance, when the front left cover is to be disassembled, the gear shift pedal, rear left cover and other component shall be disassembled.
The installation and disassembly are in a reverse sequence.
After maintenance, all wires shall be arranged in line with the wiring diagram and the straps shall be replaced.

Specification

Net weight of engine	**55kg**
Fuel capacity of engine	**3.2L**
Capacity of water coolant	**2.9L**

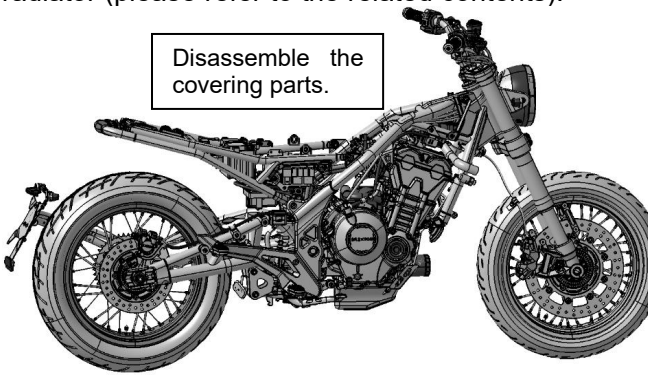
Important torque value

Suspension Bolt of Engine	**M10: 55～60N.m**

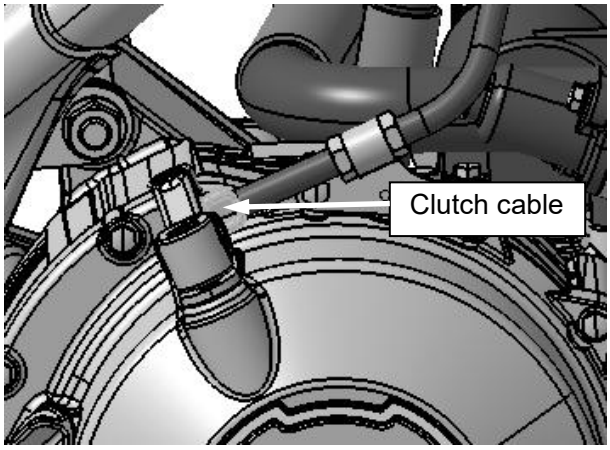
Engine Disassembly

Place the motorcycle on a flat ground. Discharge the water coolant and engine lubricant completely.

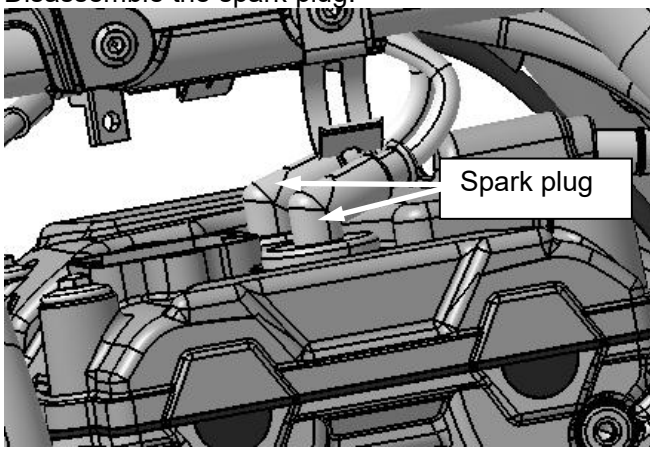
Disassemble the cover, fuel tank, silencer and radiator (please refer to the related contents).



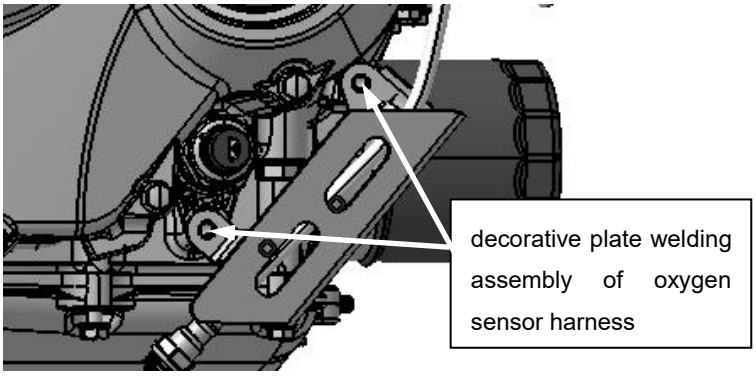
Disassemble the clutch cable.



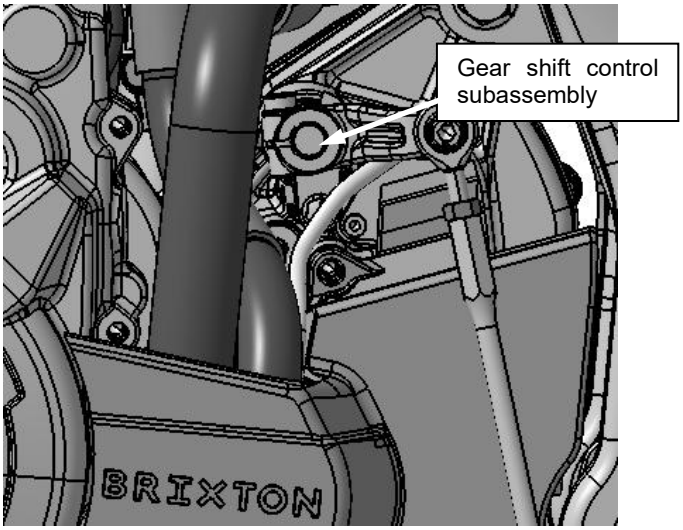
Disassemble the spark plug.



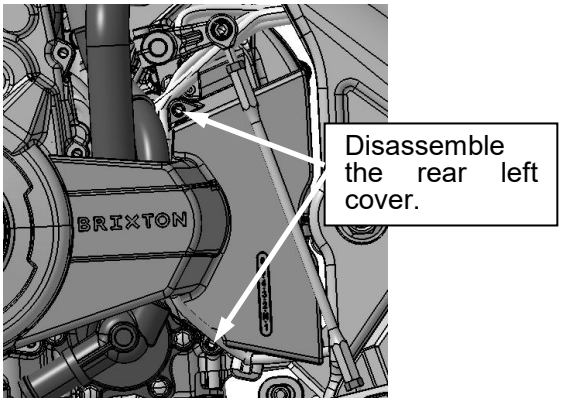
Disassemble the decorative plate welding assembly of oxygen sensor harness.



Disassemble the control unit of transmission.

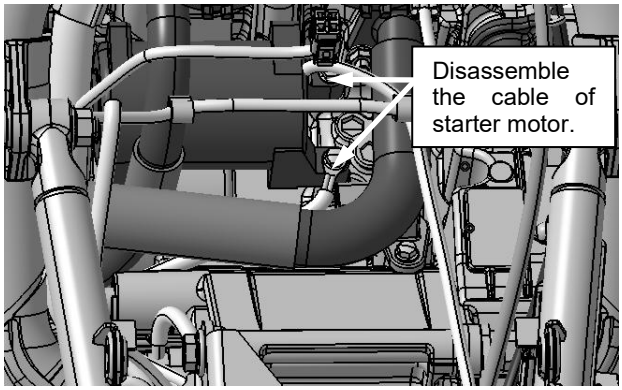


Disassemble the rear left cover.

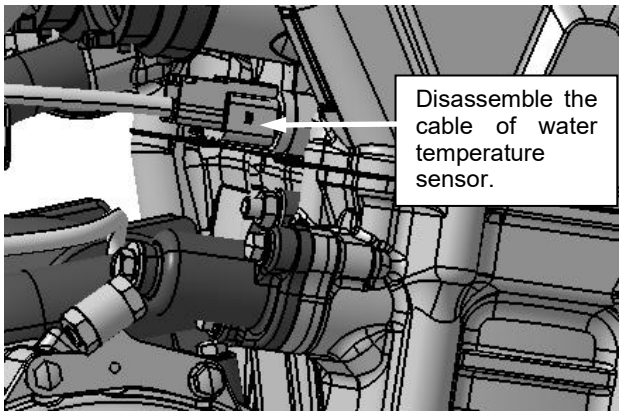


Disassemble the driving chain.

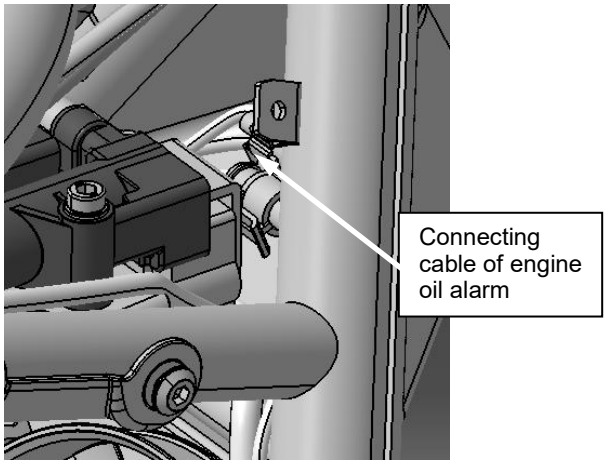
Disassemble the cable of starter motor.



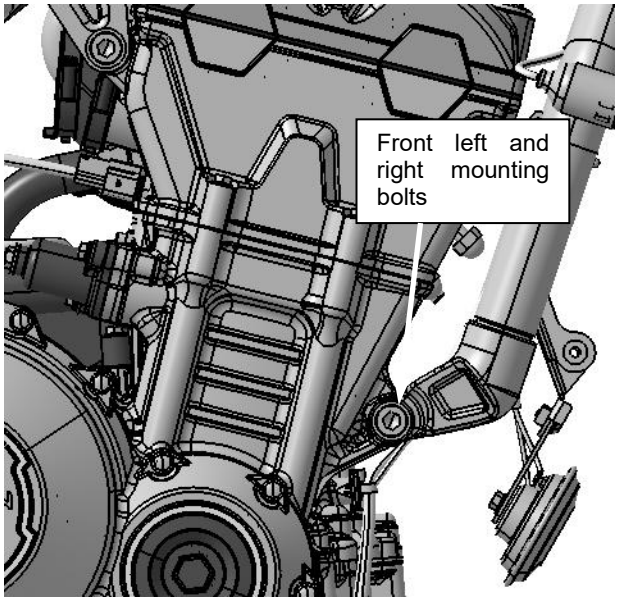
Disassemble the cable of water temperature sensor.



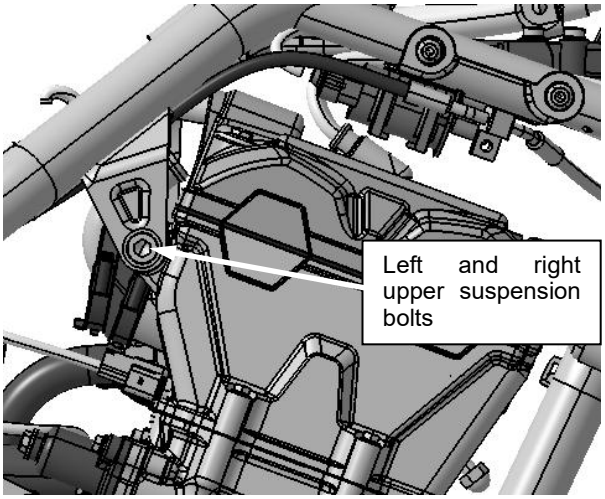
Disassemble the connecting cable of engine oil alarm.



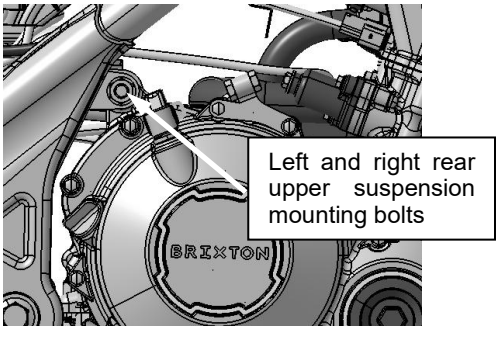
Disassemble the front left and right mounting bolts of engine.



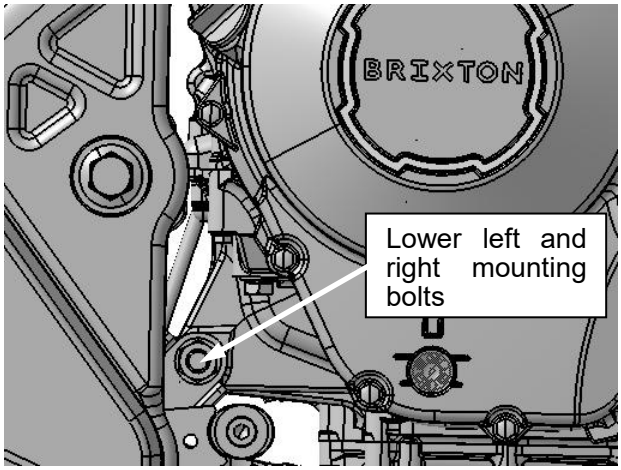
Disassemble the left and right upper suspension bolts of engine.



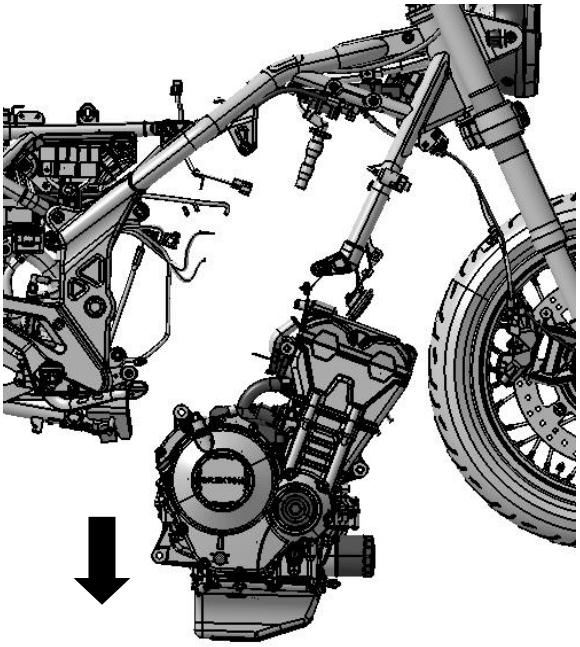
Disassemble the left and right rear upper suspension mounting bolts of engine.



Disassemble the lower left and right mounting bolts of engine.



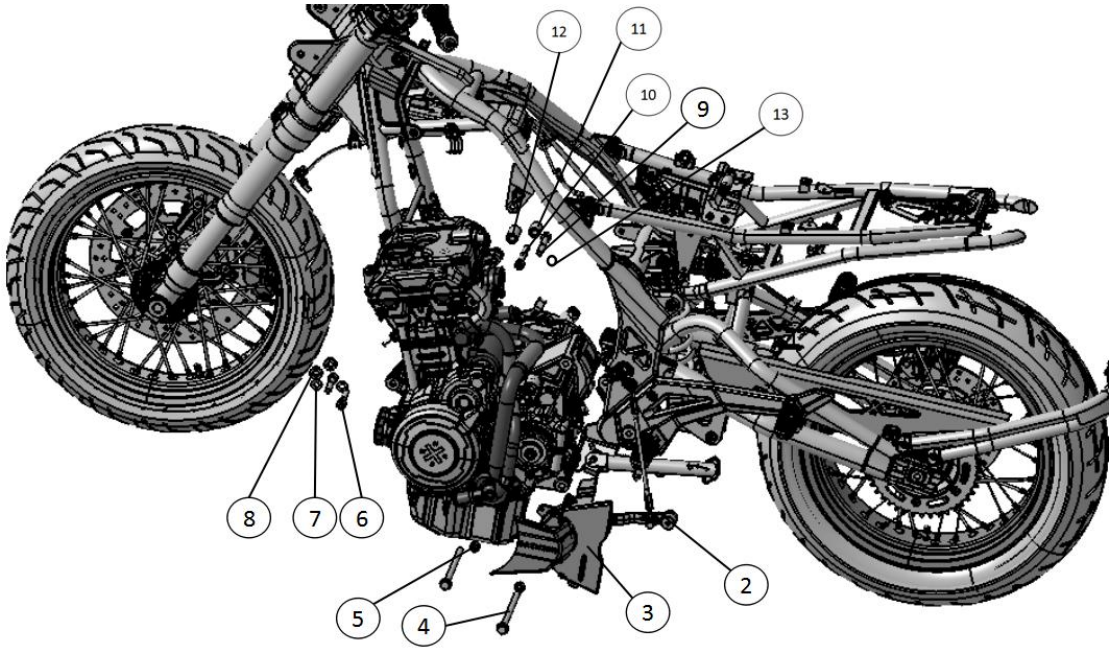
Disassemble the engine.



Engine Installation

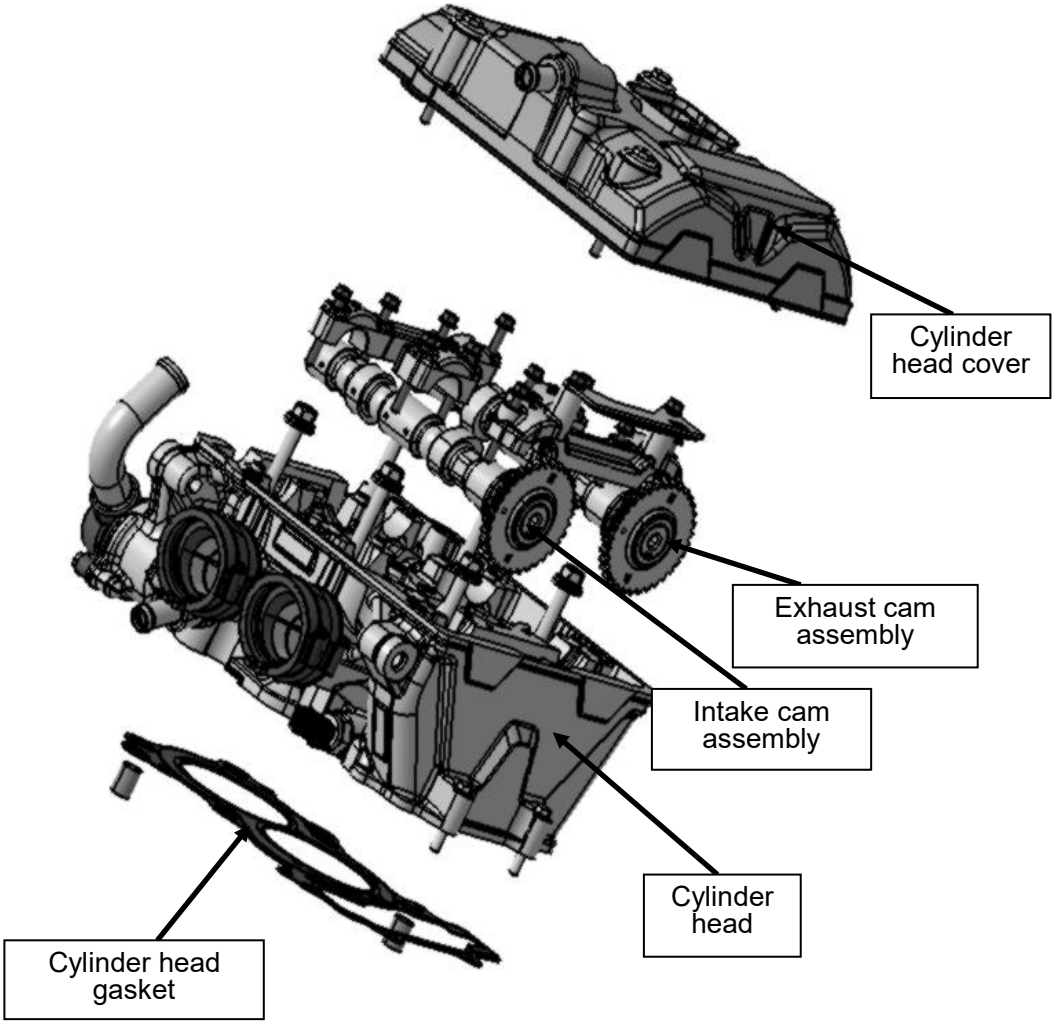
Install the engine in the reverse sequence.
During installation, pay attention to the cables. Cables shall be arranged in line with the wiring diagram.

Engine Disassembly/Installation



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Covering parts, fuel tank, radiator, silencer, air filter and so on		Refer to the related contents.
2	Transmission control unit	**1**	
3	Rear left cover	**1**	
4	Bolt M10X1.25X150	**2**	Required tightening torque: 55～60N.m
5	Nut M10×1.25	**2**	Required tightening torque: 55～60N.m
6	Bolt M10X1.25X50	**2**	Required tightening torque: 55～60N.m
7	Flat washer 10	**6**	
8	Front junction bush of engine	**2**	
9	Bolt M10X1.25X70	**1**	Required tightening torque: 55～60N.m
10	Bolt M10X1.25X65	**1**	Required tightening torque: 55～60N.m
11	Upper left junction bush of engine	**1**	
12	Upper right junction bush of engine	**1**	
13	Spring washer 10	**2**	

Cylinder Head Cover and Cylinder Head



7
Cylinder Head Cover and Cylinder Head

Maintenance Notice

During this part of the maintenance, the engine needs to be taken down from the frame.
The lubrication oil of camshaft and rocker is oil pumped into the pipe of cylinder head and cylinder head cover. Please check the oil pipe before assembly. If it is blocked, clean it.
Clean all components and parts with cleaning agent and dry them with compressed air before assembly.
Smear engine oil on the camshaft convex when assembling for primary lubrication.

Technical Specification and Maintenance Criteria

Item		Standard Value	Maintenance Limit
Camshaft	Left journal	24.967～24.98	24.954
	Fit clearance	0.02～0.033	0.074
	Middle journal	24.967～24.98	24.954
	Right journal	24.967～24.98	24.954
	Fit clearance	0.02～0.033	0.074
Rocker Rockshaft	Shaft diameter	9.972～9.987	9.949
	Hole diameter	10.00～10.022	10.05
	Fit clearance	0.013～0.04	0.097
Cylinder head	Planeness	/	0.05

Technical Specification and Maintenance Criteria (Contd)

Item		Standard Value	Maintenance Limit
Valve spring	Free length of internal spring	29.5	28.66
	Free length of external spring	39.7	38.65
Valve	External diameter of IN valve rod	4.47～4.485	4.44
	Internal diameter of conduit	4.5～4.512	4.53
	Fit clearance	0.015～0.042	0.09
	External diameter of EX valve rod	4.455～4.47	4.425
	Internal diameter of conduit	4.5～4.512	4.53
	Fit clearance	0.025～0.052	0.10
Valve clearance	IN	0.12～0.18	/
	EX	0.22～0.28	/
Piston, piston pin	External diameter of piston	67.978～67.992	67.878
	Fit clearance to the cylinder bore	0.01～0.045	0.10
	External diameter of piston pin	16.015～16.02	15.999
	Internal diameter of piston pin hole	16.026～16.032	16.071
	Fit clearance	0.006～0.017	0.04
Small end of connecting rod	Inner diameter	16.03～16.044	16.065
	Clearance to piston pin	0.015～0.024	0.06
Piston ring	Gap clearance of the first ring	0.1～0.25	0.75
	Gap clearance of the second ring	0.15～0.3	0.75
	Side clearance of the first ring	0.03～0.062	0.12
	Side clearance of the second ring	0.04～0.072	0.12
	Side clearance of oil ring	0.04～0.16	0.40

Important torque value

Connecting bolts of cylinder head cover	**8～10N.m**
Bolts of cylinder head	**48～52N.m**
Bolts of rockshaft	**10～12N.m**
Spark plug	**14～18N.m**
Clamp bolt of tension plate	**10～12N.m**

Troubleshooting

℘ Low cylinder pressure

1. Valve:
-- The adjustment of valve clearance is improper;
-- The valve is burnt or bent;
-- The valve airtightness is poor;
-- The valve timing is improper;
-- The valve spring is damaged.

2. Cylinder head:
-- The spark plug airtightness is poor;
-- The cylinder head gasket is leaky or damaged;
-- The cylinder head is cracked or has air hole.

3. Piston:
-- The clearance of piston ring is too large or the piston ring is cracked;
-- The piston is cracked or damaged;
-- The piston ring is abraded.

℘ The exhaust is black

1. The valve guide is abraded;
2. The oil drip pan is leaky or damaged;
3. The piston or piston ring is abraded;
4. The clearance of piston ring is too large;
5. The piston ring is installed improperly;
6. The piston or cylinder bore is with scratch.

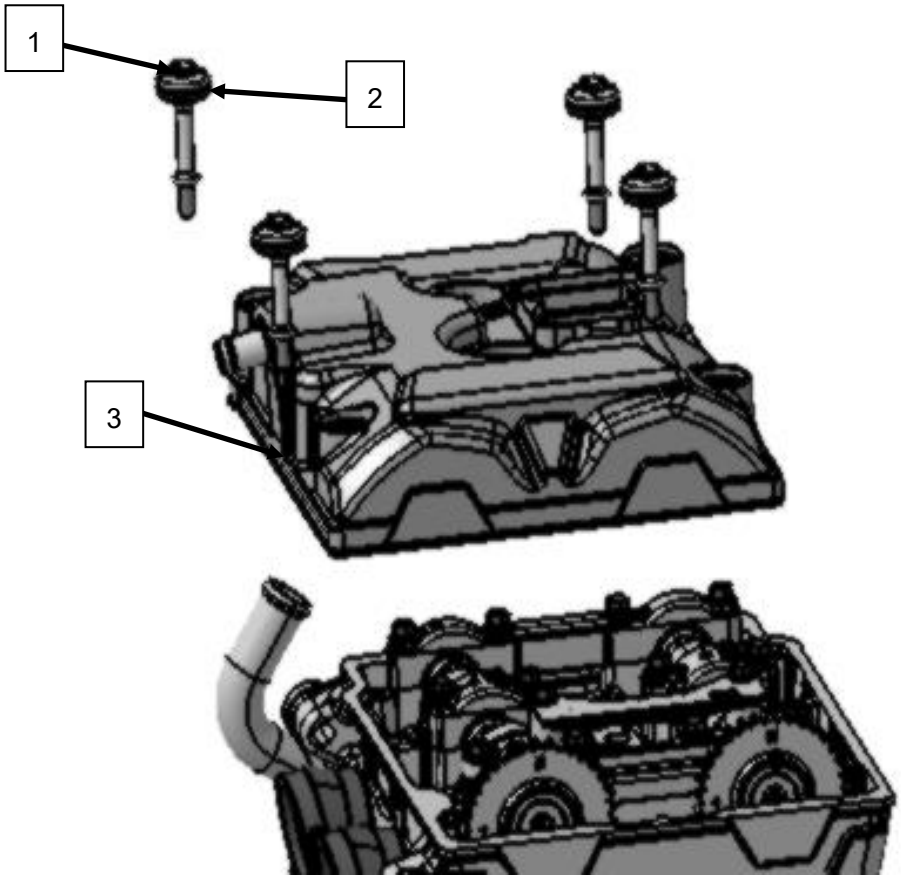
℘ There is large noise

1. The valve adjustment is improper;
2. The valve is stuck or the valve spring is fractured;
3. The camshaft is abraded or damaged;
4. The timing chain is too long, abraded or damaged;
5. The tensioner of timing chain is faulted;
6. The timing driven sprocket is abraded;
7. The cylinder and piston are abraded;
8. The rocker or rockshaft is abraded;
9. The piston pin hole and piston pin are abraded.

℘ Overheating, knocking (high cylinder pressure)

1. Carbon deposition in the combustor is heavy.

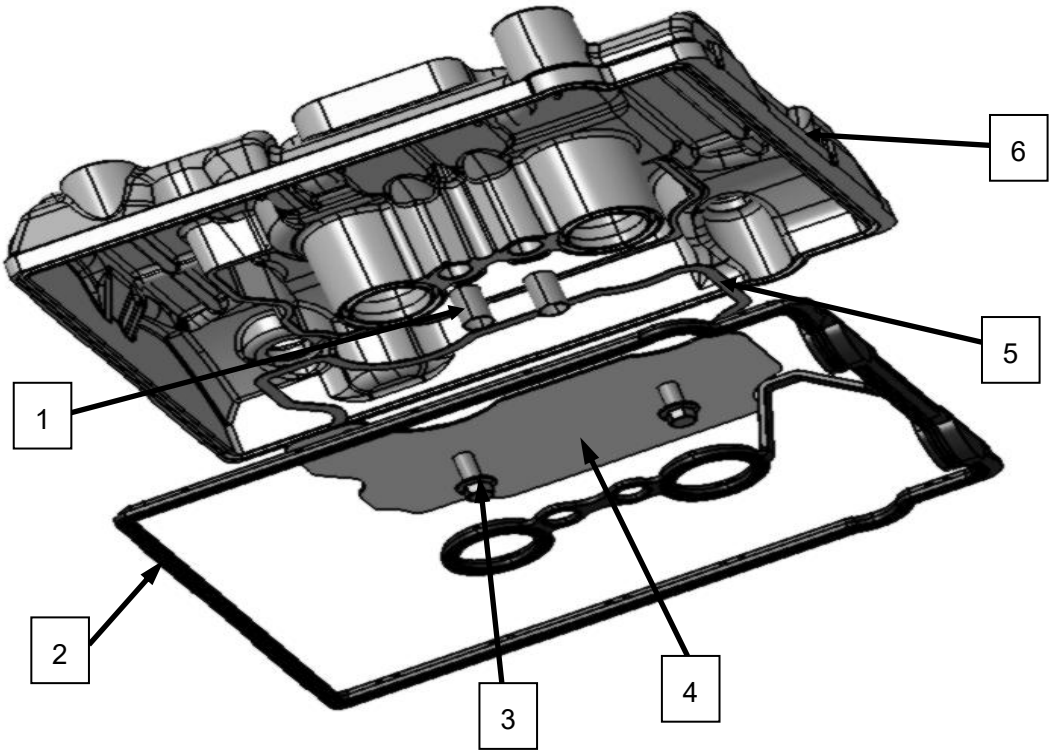
Disassembly/installation of cylinder head cover



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Connecting bolts of cylinder head cover	**4**	Fastening torque 8-10N.m
2	Sealing washer	**4**	Replace the gasket with a new one
3	Cylinder head cover	**1**	

Disassembly/assembly of cylinder head cover

Please refer to the following figure for the disassembly and assembly of cylinder head cover.

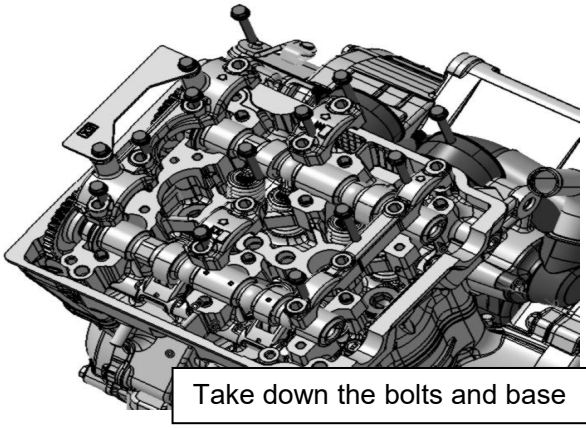


Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Locating pin 10X16	**2**	
2	Sealing pad of cylinder head cover	**1**	
3	Bolt M6X12	**2**	Smear thread adhesive
4	Vent baffle	**1**	
5	Paper washer of vent baffle	**1**	
6	Cylinder head cover	**1**	

Camshaft

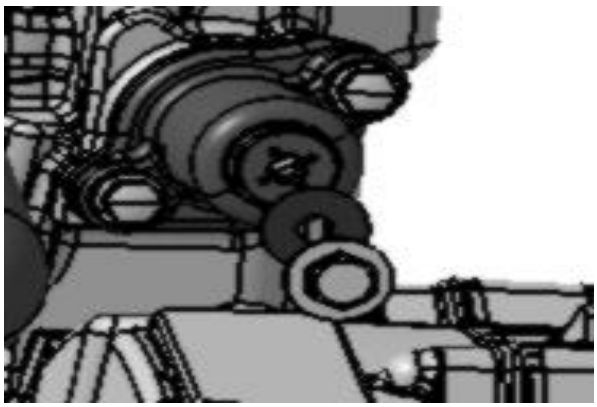
Disassembling steps of camshaft:

1. Take down the cylinder head cover (refer to the disassembly of cylinder head cover); take down the bolts of camshaft base; take down the intake/exhaust camshaft base.

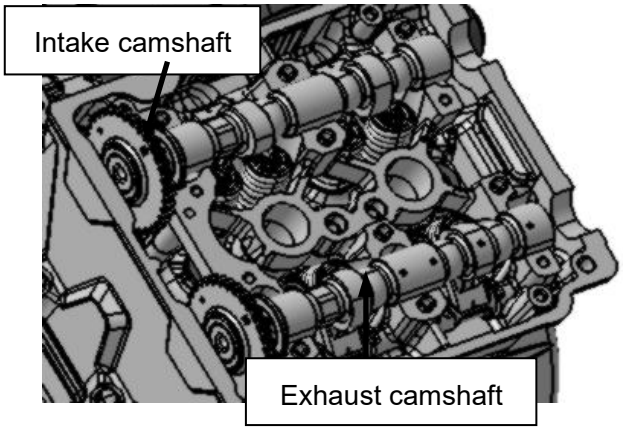


Take down the bolts and base

2. Loosen the bolts and washer at the end of tensioner; turn the tensioner key clockwise to rotate the screw; then lock the tensioner.

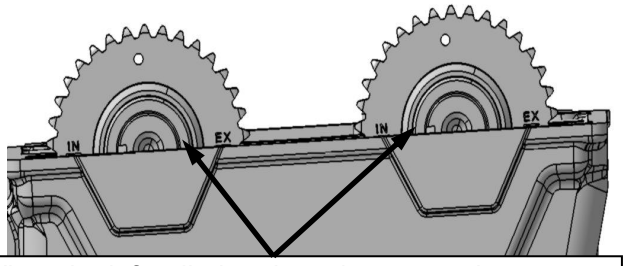


3. Separate timing chain from the timing driven chain and take down the intake and exhaust camshafts.



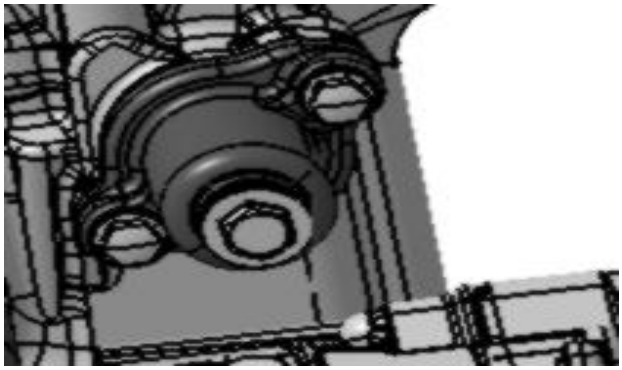
Installation steps of camshaft:

1. Rotate the crankshaft until the piston reaches the upper limit of compression stroke. Align the "|" mark on the rotor with contacting dividing line at the right of left cover.
2. Clean all parts and components and smear oil on the camshaft boss surface and journal.
3. During alignment, when the left cylinder piston locates at the upper limit, keep the marks of intake/exhaust camshaft and cylinder head surface aligned, as shown in the figure.



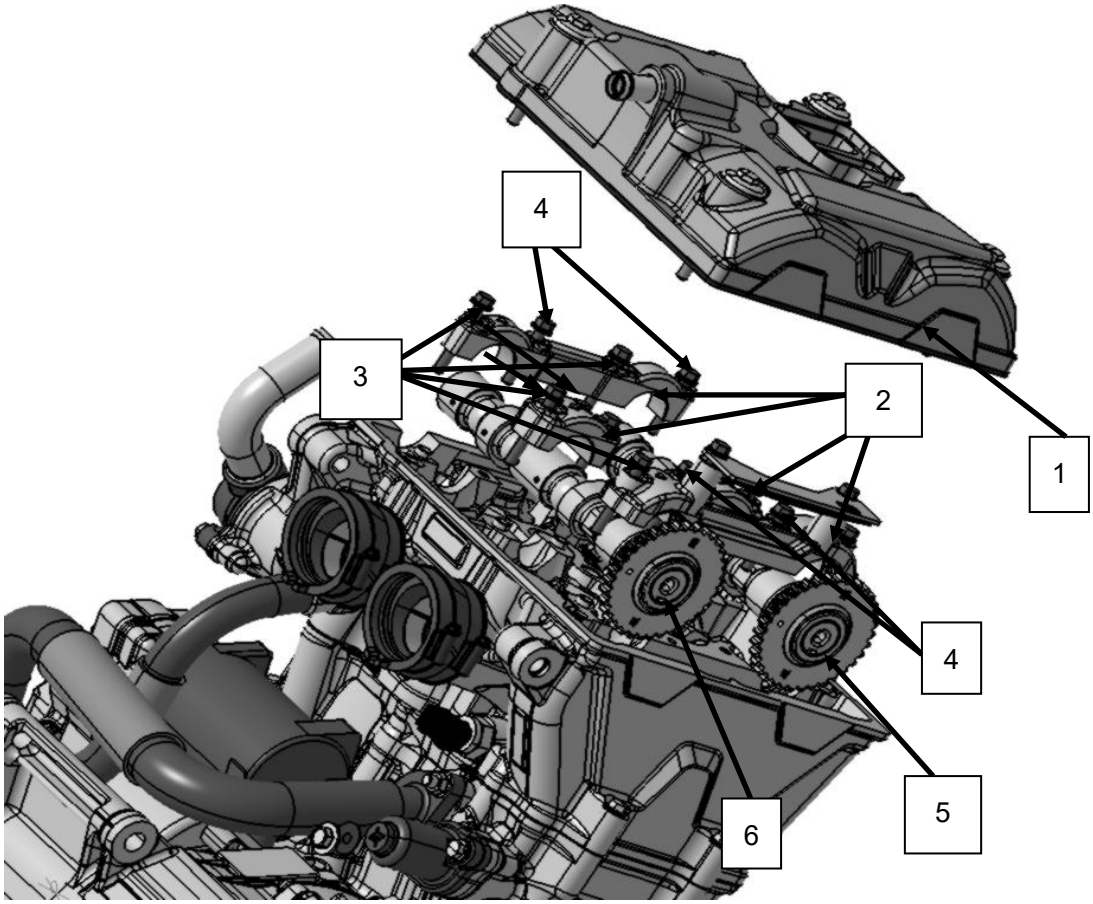
When the left cylinder piston locates at the upper limit, keep the mark of camshaft and cylinder head surface aligned

4. When the timing chain is aligned, take out the tensioner key and make it tense; install washer and bolt.



5. Install camshaft base, bolts and cylinder head cover (refer to the installation of cylinder head cover).

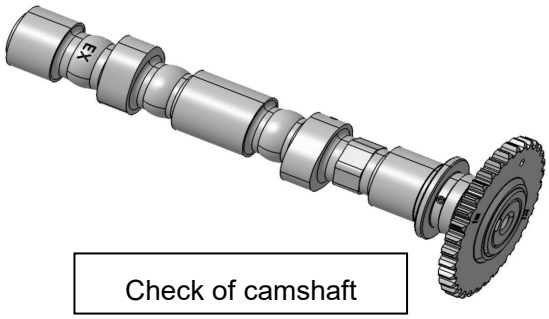
Disassembling/installation of camshaft:



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Cylinder head cover	**1**	Please refer to the disassembly/installation of cylinder head cover
2	Camshaft base	**4**	
3	Base bolt M6X39.5	**8**	
4	Base bolt M6X32	**4**	
5	Exhaust cam assembly	**1**	Smear oil on the camshaft boss surface and journal during assembly
6	Intake cam assembly	**1**	Smear oil on the camshaft boss surface and journal during assembly

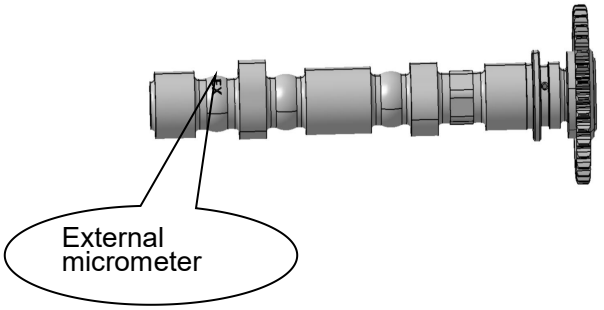
Check of Camshaft

Check the camshaft for abrasion, damage and the hole for blocking.

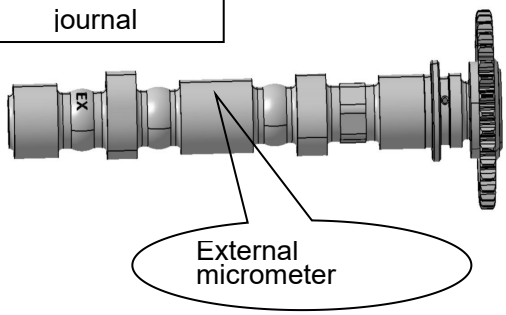


Check of camshaft

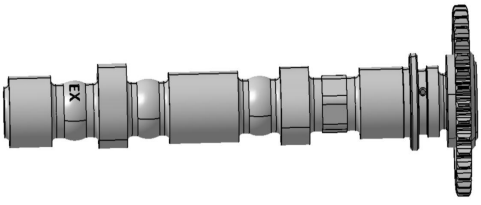
Measure the diameters of left, middle and right journals of camshaft.



Measure the left journal

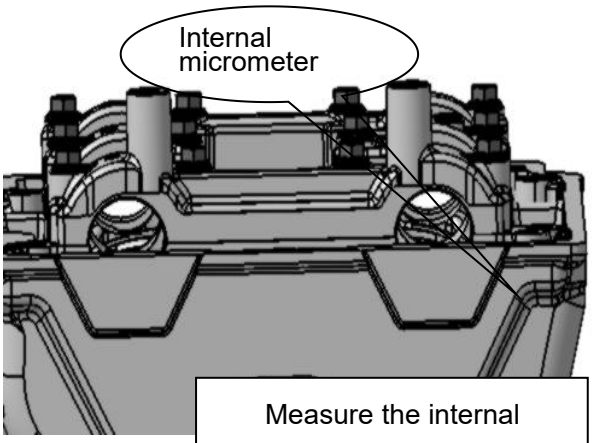


Measure the middle journal



Measure the right journal

Measure the internal diameter of camshaft hole of cylinder head.

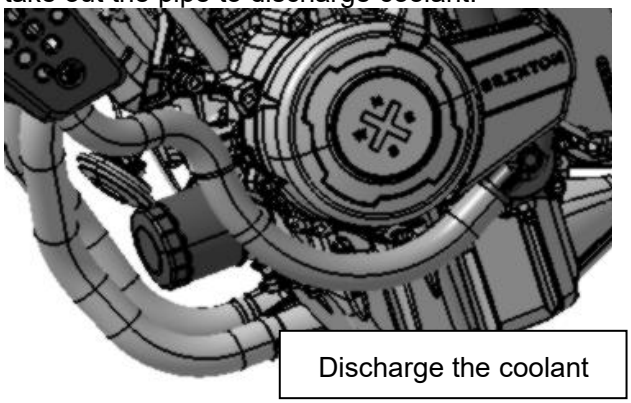


Measure the internal diameter of camshaft hole

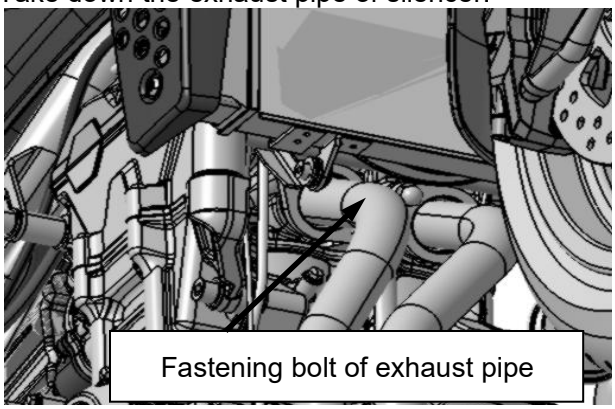
Cylinder head

Disassembly step of cylinder head:

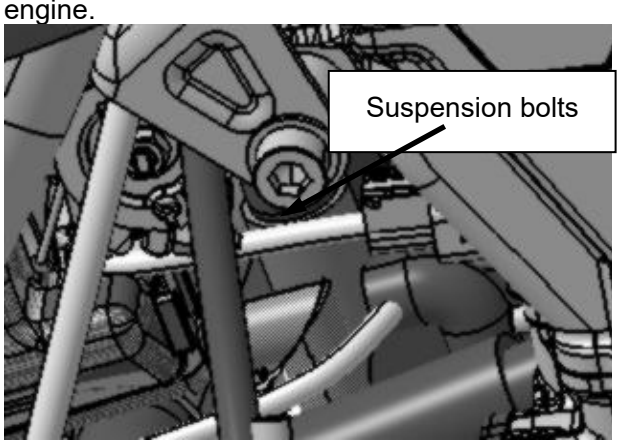
1. Take down the hoop of discharge pipe, then take out the pipe to discharge coolant.



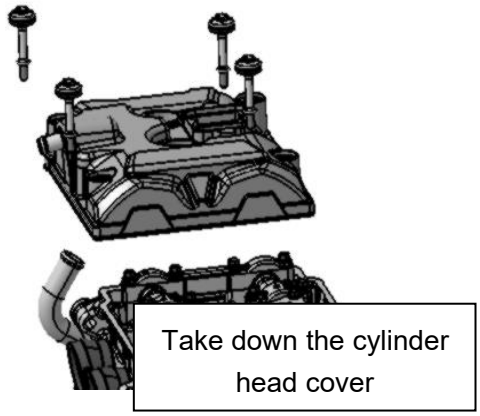
2. Take down the exhaust pipe of silencer.



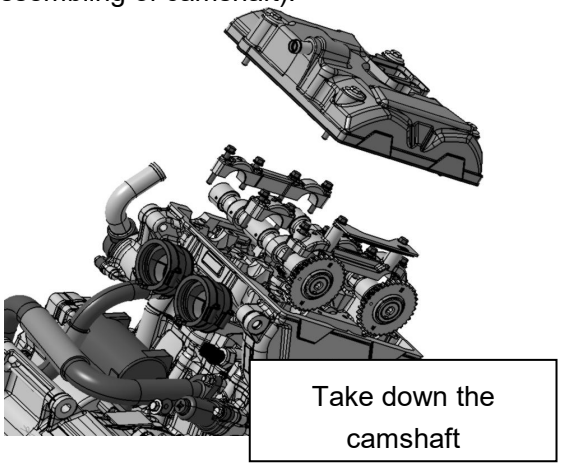
3. Take down the suspension bolts and then the engine.



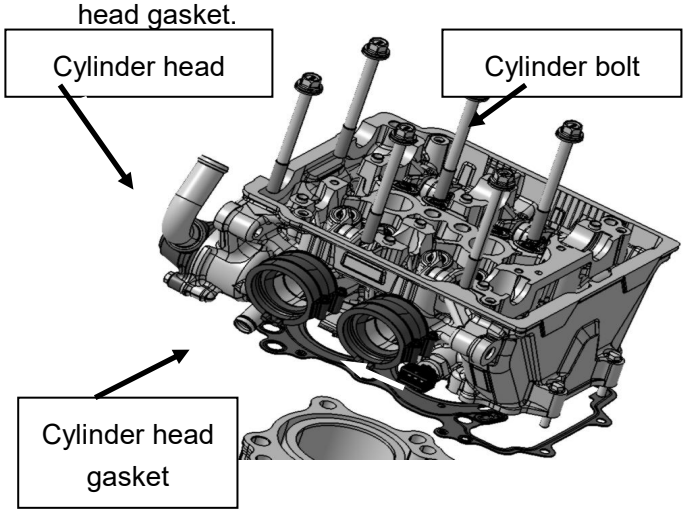
4. Take down the cylinder head cover (refer to the disassembly of cylinder head cover).



5. Take down the camshaft (refer to the disassembling of camshaft).



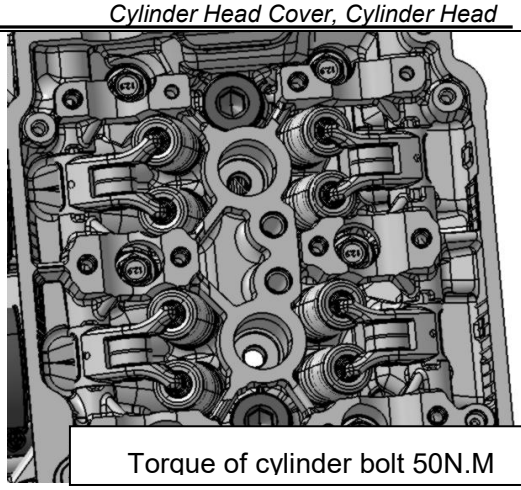
6. Take down the cylinder bolts.
7. Take down the cylinder head and cylinder head gasket.



Installation steps of cylinder head:

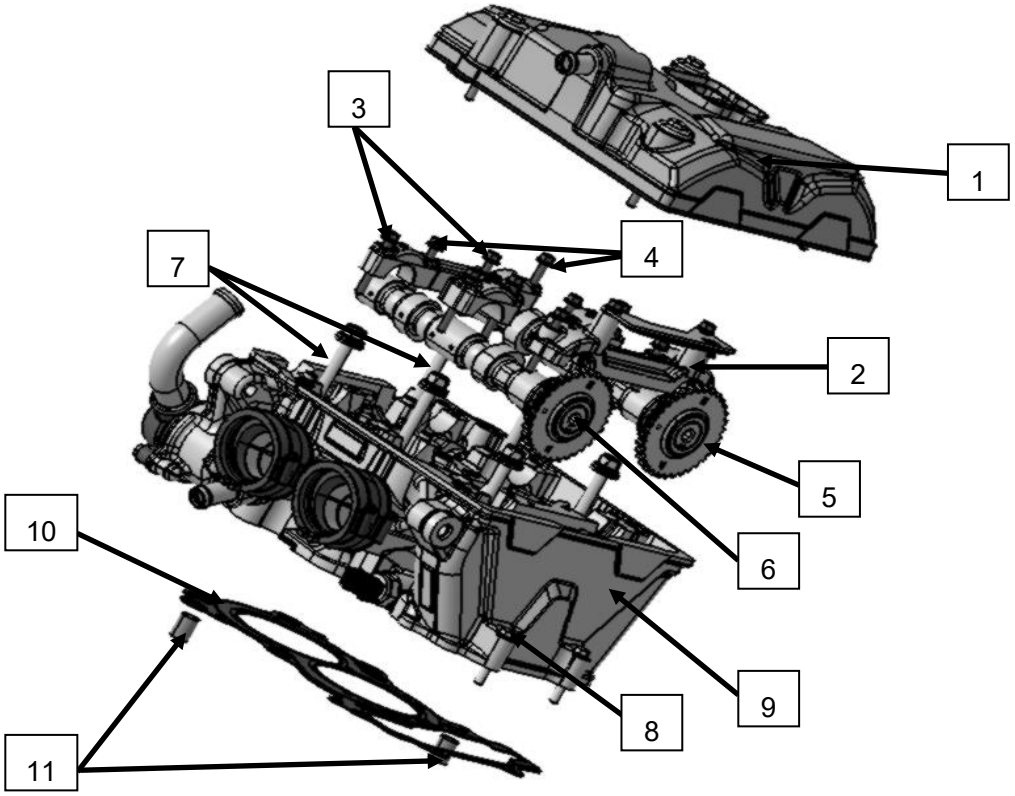
The installation is reverse to the disassembly sequence. Pay attention to the following items during installation:

1. Make sure the position of locating pin is right; clean the parts and components; check the smoothness, cleaning and leakiness of cylinder head pipe.
2. Replace the cylinder head gasket.
3. Fastening torque of cylinder bolt 50N.m.



Torque of cylinder bolt 50N.M

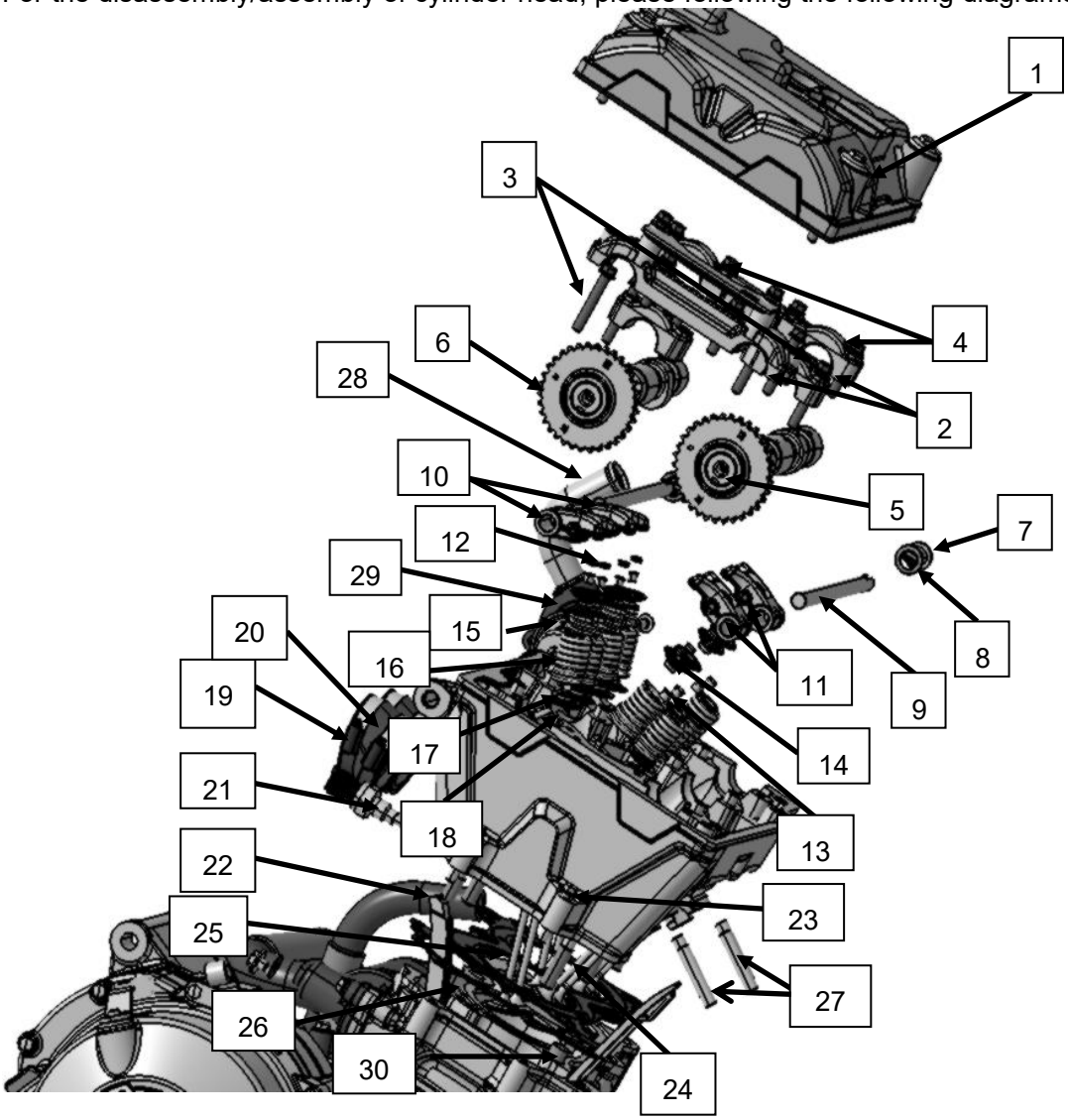
Disassembly/installation of cylinder head



Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Cylinder head cover assembly	**1**	
2	Camshaft base	**4**	
3	Base bolt M6X39.5	**8**	
4	Base bolt M6X32	**4**	
5	Exhaust cam assembly	**1**	Smear oil on the camshaft boss surface and journal during assembly
6	Intake cam assembly	**1**	Smear oil on the camshaft boss surface and journal during assembly
7	Cylinder bolt	**6**	
8	Bolt 6 X 40	**2**	
9	Cylinder head	**1**	
10	Cylinder head gasket	**1**	Replace it with a new one during assembly
11	Locating pin	**2**	

Disassembly/assembly of cylinder head

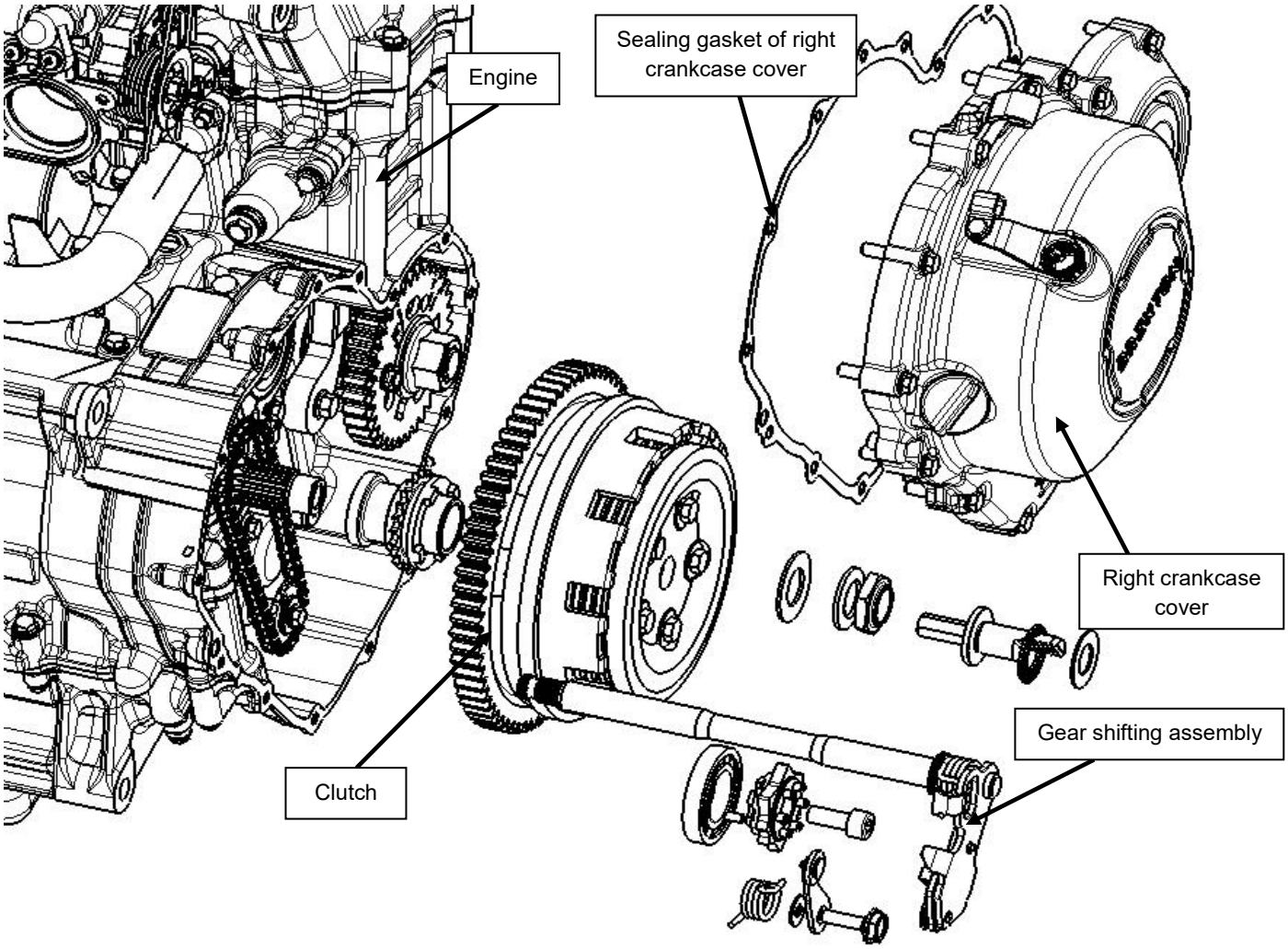
For the disassembly/assembly of cylinder head, please following the following diagrams.



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Cylinder head cover	**1**	
2	Camshaft base	**4**	
3	Base bolt M6X39.5	**8**	
4	Base bolt M6X32	**4**	
5	Exhaust cam assembly	**1**	Smear oil on the camshaft boss surface and journal during assembly
6	Intake cam assembly	**1**	Smear oil on the camshaft boss surface and journal during assembly
7	Rockshaft bolt	**2**	
8	Washer 12	**2**	
9	Rockshaft	**2**	

10	Intake rocker	**2**	
11	Exhaust rocker	**2**	
12	Valve adjusting gasket	**8**	Re-adjust the valve clearance during assembly
13	Valve key	**16**	
14	Upper spring base	**8**	
15	Internal valve spring	**8**	
16	External valve spring	**8**	
17	Oil drip pan	**8**	
18	Lower spring base	**8**	
19	Hoop	**4**	
20	Intake air pipe	**2**	
21	Water temperature sensor	**1**	
22	Cylinder head and bolt assembly	**6**	
23	Bolt 6 X40	**2**	
24	Exhaust valve	**4**	
25	Intake valve	**4**	
26	Cylinder head gasket	**1**	
27	Stud	**4**	
28	Thermostat cover assembly	**1**	
29	Thermostat	**1**	
30	Locating pin	**2**	

Clutch and Gear Shift Mechanism



8
Clutch and Gear Shift Mechanism

Maintenance Notice

There is no need to disassemble engine from the frame during maintenance. Remove the clutch cable first, then loosen the bolt and take down the right cover; disassemble clutch and gearshift from the engine. Cover the right cover hole connecting case with a piece of clean nonwovens during disassembly, or part may fall into it.

Clean all components and parts with cleaning agent and dry them with compressed air before assembly.

To assemble clutch, release clutch spring and smear oil on the friction plate. If a new clutch is used, the friction plate shall be inserted in oil for more than 24h before assembly.

Technical Specification and Maintenance Criteria

Item		Standard Value	Maintenance Limit
Clutch	Free stroke of handle	10～20	/
	Free length of spring	39.74	38.70
	Thickness of friction plate	3.0	2.7
	Planeness of friction plate	/	/
	Thickness of clutch plate	2.0	/
	Planeness of clutch plate	0.10	0.20

Important Torques Values

Clamp nut of Clutch	**126～130N.m**
Clamp nut of primary driving gear	**103～ 105N.m**
Clamp bolt of clutch lifting plate	**12N.m**
Connecting bolt of transmission hub switch-plate	**10～14N.m**

Troubleshooting

℘ Clutch

For clutch operation, in case of any fault, adjust the free stroke of clutch handle to correct the fault.

℘ The clutch slips when speeding up

1. The free stroke is insufficient;
2. The clutch friction plate is abraded;
3. The clutch plate is deformed and bended;
4. The clutch spring is invalid.

℘ The handle pressure is too large

1. The clutch cable is bonded, damaged or unclean;
2. The pull rod of clutch is damaged or stuck.

℘ The clutch is hard to be operated

The run channel of external clutch cover has burrs.

℘ The shifter arm cannot be reset

1. The reset spring is fractured or slipped;
2. There is mutual interference between transmission shaft switch-plate assembly and crankcase or crankcase cover.

℘ The motorcycle moves slowly although the handle is fully pulled.

1. The free stroke of handle is too large;
2. The clutch plate is bended and deformed.

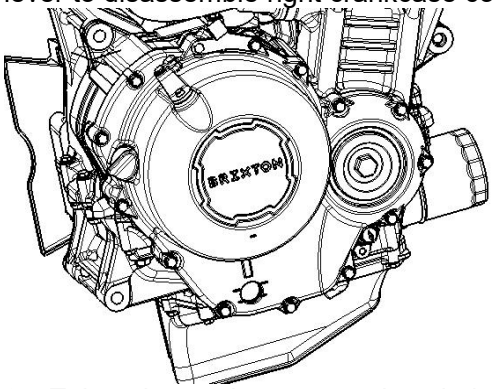
℘ Gear shift is difficult or impossible

1. The locating plate is bended or abraded;
2. The five-star switch-plate assembly is damaged or cracked;
3. The fork pin is fractured or slipped;
4. The clutch adjustment is improper.

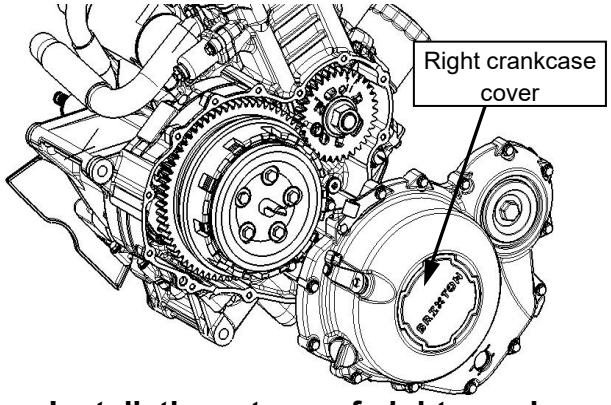
Right crankcase cover

Disassembling steps of right crankcase cover:

1. Take down the clutch cable and connecting bolts of right crankcase cover; rotate the clutch lever to disassemble right crankcase cover.

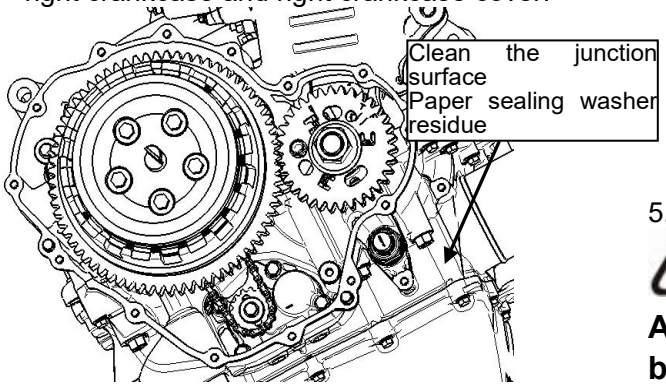


2. Take down the connecting bolts of right crankcase cover;
3. Take down the components of right crankcase cover;
Take down the paper sealing washer of right crankcase cover.

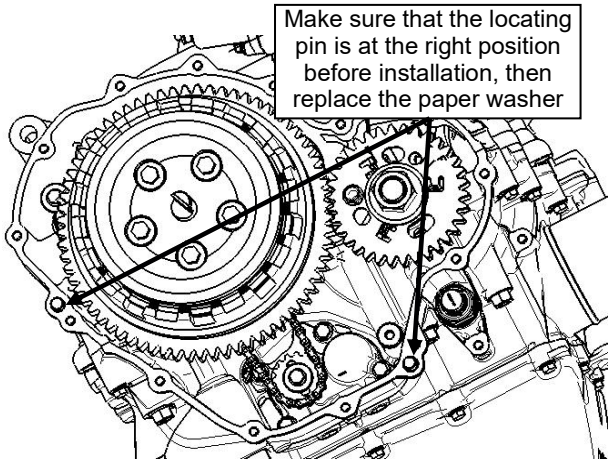


Installation steps of right crankcase cover:

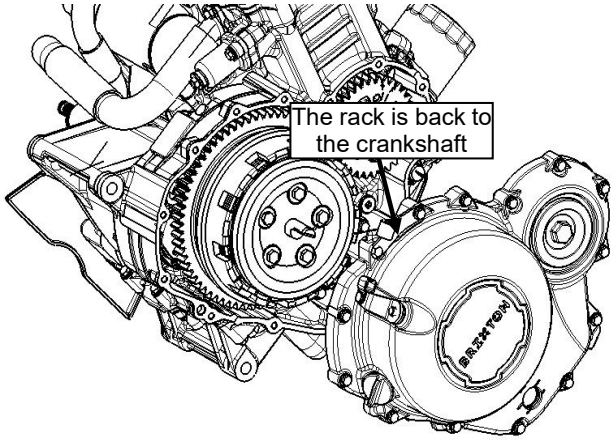
1. Make sure the position of locating pin; clean the paper sealing washer residue on right crankcase and right crankcase cover.



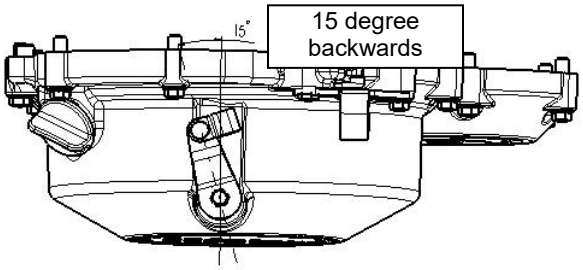
2. Replace new paper sealing gasket.



3. Adjust the direction of rack and install the right crankcase cover.



4. Adjust the direction of clutch controller as required, as shown in the figure. Then install the clutch cable.



5. Fill oil to the upper limit.

Caution:

Adjust the push rod rack and keep it back to the crankshaft.

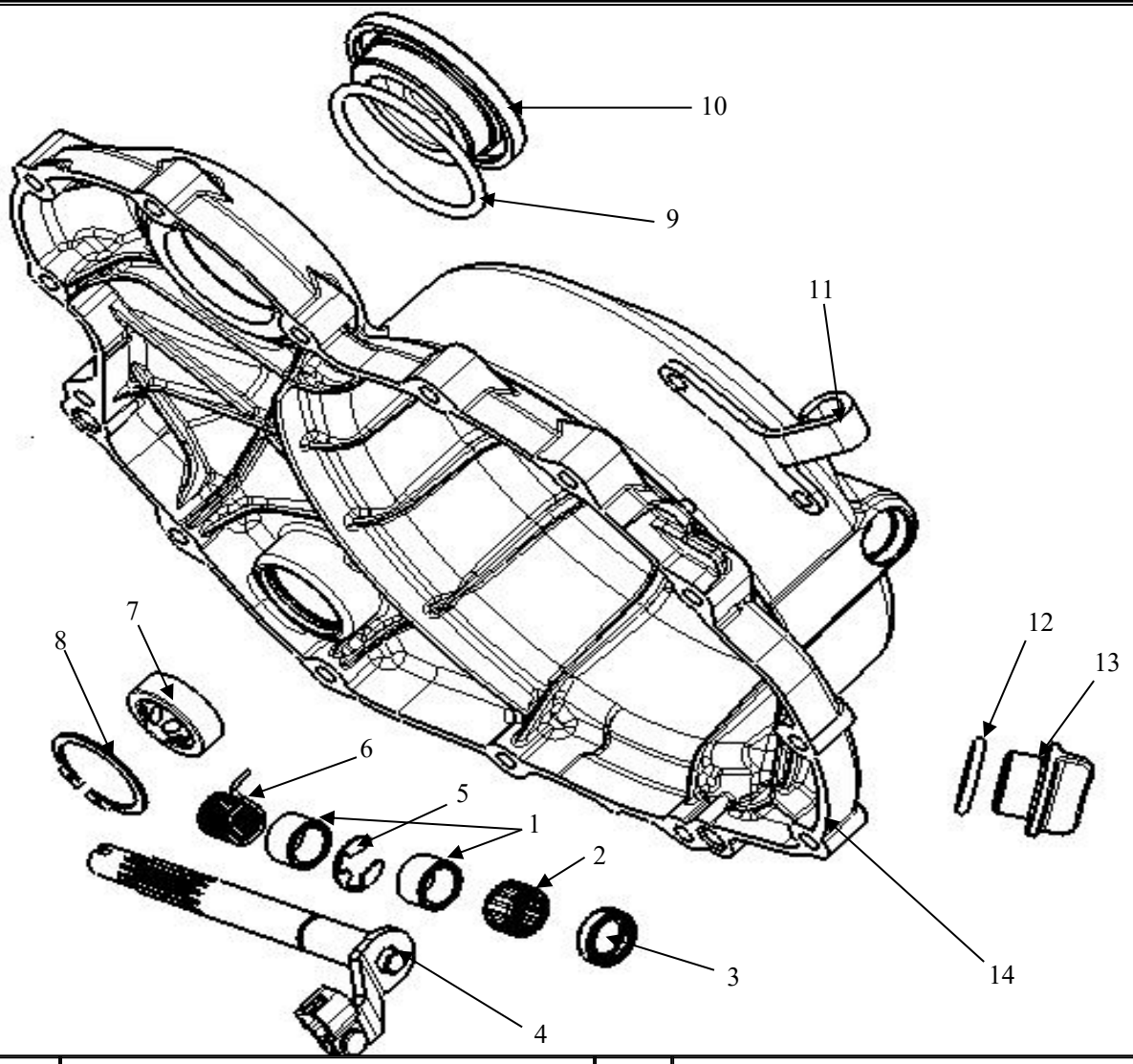
Disassembly/installation cover of right crankcase cover

Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Connecting bolt 6X30 of right crankcase cover	**13**	
2	Right crankcase cover	**1**	
3	Paper sealing washer of right crankcase cover	**1**	Replace the gasket with a new one

Disassembly/assembly of right crankcase cover

Please refer to the following figure for the disassembly and assembly of right crankcase cover.
Normally, the following parts in the figure shall not be disassembled: 2 oil seal, 3 needle bearing, 4 shaft sleeve, 5 open retainer, 7 oil level window, 8 hole retainer, 9 O ring and 10 crankshaft end cover.
If the oil seal is disassembled, it shall be replaced when assembling. Use oil seal guide rail of clutch lever to protect the oil seal and install it.
Press the needle bearing in with special tool and keep the surface with words upwards.
After assembly, the clutch lever shall rotate flexibly.

Caution:
Do not scratch the sealing surface.

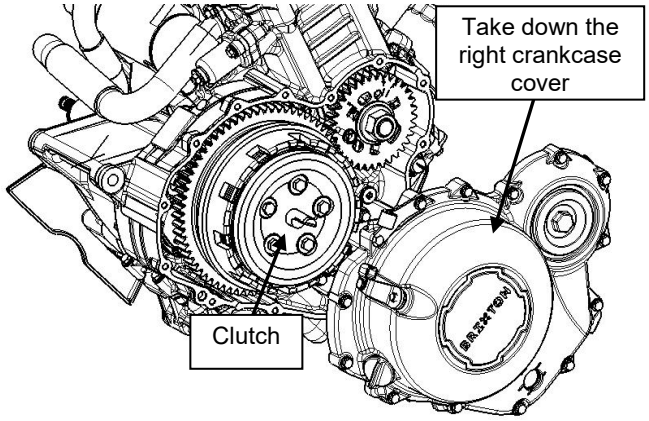


Sequence	Step	Qty.	Remark
	Assembly sequence		**The assembly and disassembly sequences are reverse.**
1	Shaft sleeve 12X16X10	**2**	Press it in with tools
2	Needle bearing HK1210	**1**	Press it in with tools and keep the surface with words outwards
3	Oil seal 12X18X5	**1**	Do not disassemble it. If it has to be disassembled, replace it with a new one when assembling
4	Clutch lever	**1**	
5	Open retainer 9	**1**	Do not disassemble it. If it has to be disassembled, replace it with a new one when assembling
6	Return spring of clutch lever	**1**	
7	Oil level window	**1**	
8	Hole retainer 32	**1**	Do not disassemble it. If it has to be disassembled, replace it with a new one when assembling
9	O ring 48.7X3.55	**1**	
10	Crankshaft end cover	**1**	
11	Clutch pull hook bracket	**1**	
12	O ring 17X3	**1**	
13	Oil filler plug	**1**	
14	Right crankcase cover	**1**	

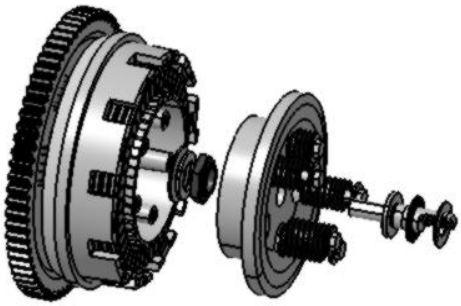
Clutch

Disassembling steps of clutch:

1. Take down the right crankcase cover (refer to the disassembly of right crankcase cover).



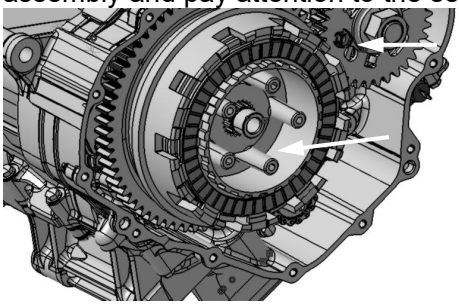
2. Take down the bolts of pressing plate with a sleeve, then remove the spring, declutch shaft and wearable gasket assembly, and plane bearing and clutch pressing plate assembly.



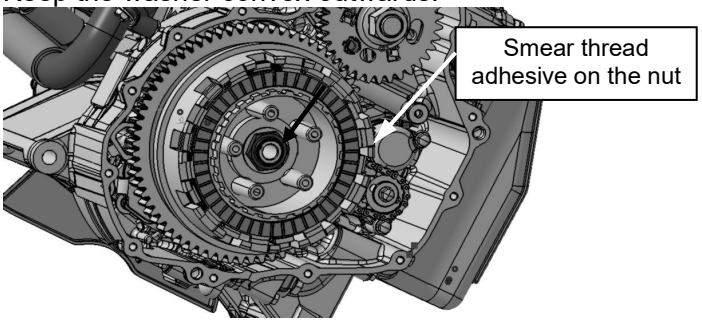
3. Hold the primary driving and driven gears with fixture, take down the hex locknut M18, belleville washer and flat washer.
4. Take down the clutch.

Installation steps of clutch:

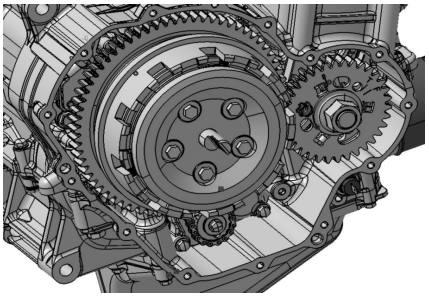
1. Adjust the position of pawl of oil pump driving sprocket to make clutch installation easy.
2. Install the clutch cover, gasket and friction plate assembly and pay attention to the sequence.



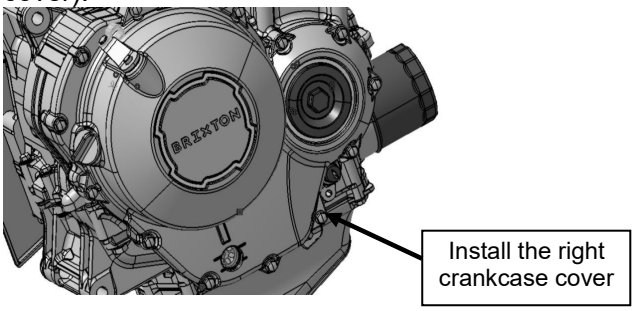
3. Install the belleville washer and locknut M18. Keep the washer convex outwards.



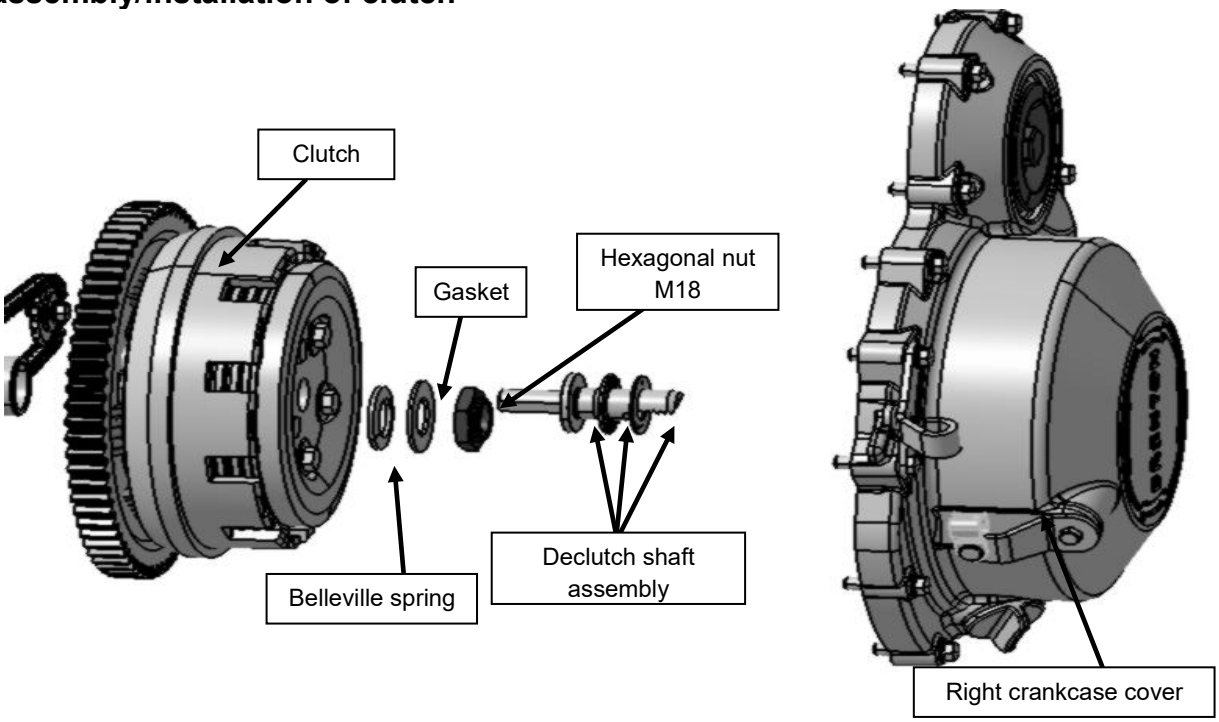
4. Hold the primary driving and driven gears with fixture, tighten locknut M18 with a torque of 126~130N.m.



5. Rotate the declutch shaft and keep the rack back to the crankshaft. Install the right crankcase cover (refer to the installation of right crankcase cover).



Disassembly/installation of clutch



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Right crankcase cover	**1**	Refer to the disassembly/installation of right crankcase cover
2	Declutch shaft assembly	**1**	
2-1	Thrust washer AS1528	**1**	
2-2	Thrust needle and holder assembly AXK1528	**1**	
2-3	Declutch shaft	**1**	
3	Hexagonal nut M18*1.5	**1**	Fixture shall be used when disassembling; use thread adhesive LOCTITE 243 when assembling. The tightening torque is 126~130N.m.
4	Gasket		
5	Belleville washer	**1**	Keep the convex surface outwards
6	Clutch	**1**	

Disassembly/assembly of clutch

Please refer to the following figure for the disassembly and assembly of clutch.

When disassembling the lifting plate of clutch, the five connecting bolts shall be loosened alternately and gradually so as to avoid damage or fracture of clutch spring due to uneven forces.

When installing the lifting plate, the five bolts shall be tightened to the required torques alternately and gradually.

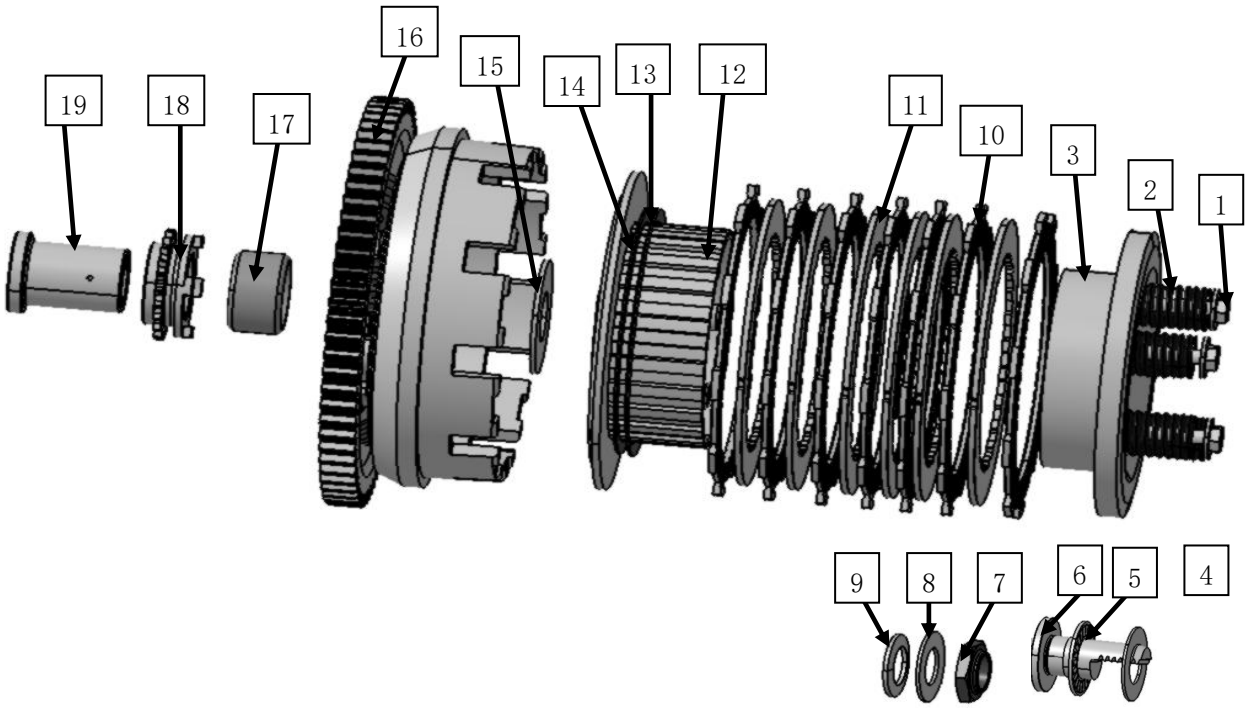
Keep the convex of belleville washer toward the flat washer.

When assembling, smear lubricant on the friction plate. If a new friction plate is used, it shall be inserted in oil for more than 24h before assembling.

Do not further disassemble the clutch cover, or it will be damaged.

Note:

Loosen bolts alternately and gradually, normally two or three times. The fastening shall also follow this principle.



Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Bolt	**5**	Fastening torque 12N.m
2	Clutch spring	**5**	
3	Clutch pressing plate	**1**	
4	Thrust washer AS1528	**1**	
5	Thrust needle and holder assembly AXK1528	**1**	
6	Declutch shaft	**1**	
7	Hexagonal nut M18	**1**	Use thread adhesive LOCTITE243 when installing. The tightening torque is 130N.m.
8	Gasket	**1**	
9	Belleville spring	**1**	
10	Friction plate	**7**	Adhesive base; insert it in oil when assembling
11	Clutch plate	**6**	
12	Clutch center bush	**1**	
13	Belleville washer	**1**	Keep the convex toward the flat washer
14	Flat washer	**1**	Install it between the cover and center bush
15	Gasket	**1**	
16	Clutch cover	**1**	Do not further disassemble it
17	Needle bearing	**1**	Press the needle bearing in the clutch cover before clutch assembling
18	Driving sprocket of oil pump	**1**	Adjust the position of pawl to make clutch installation easy
19	Clutch bush	**1**	

Check of Clutch

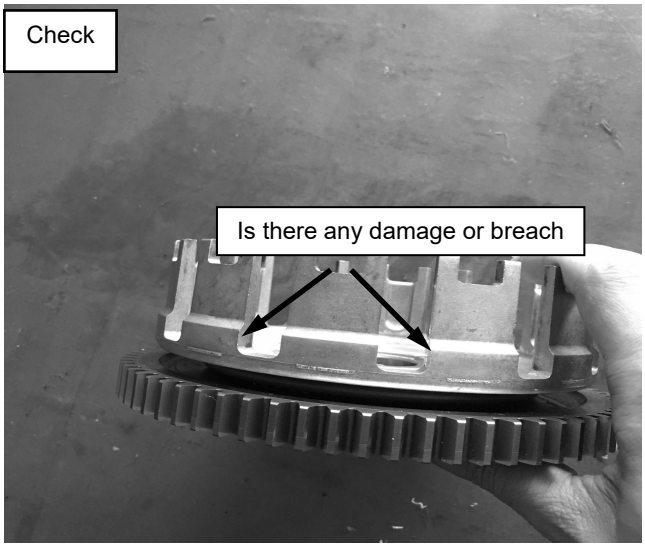
Check tooth socket of cover for any damage or breach due to the impact of friction plate.

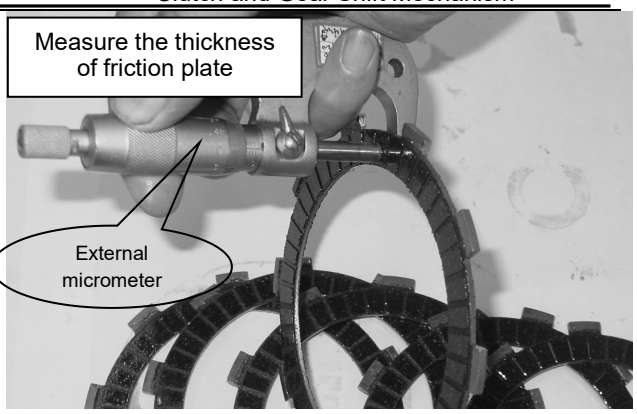
Check the friction plate. In case of abrasion, color fading or smell of burning, replace it. Measure the thickness of each friction plate.
Maintenance limit: ≥2.7mm.

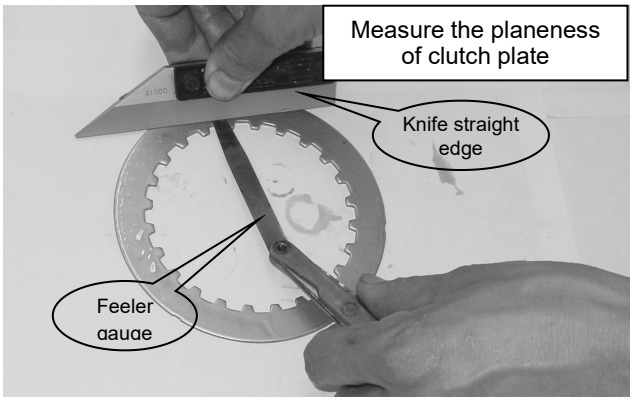
Check the clutch plate for bending and check the planeness with a feeler gauge.
Maintenance limit: ≤0.20mm.

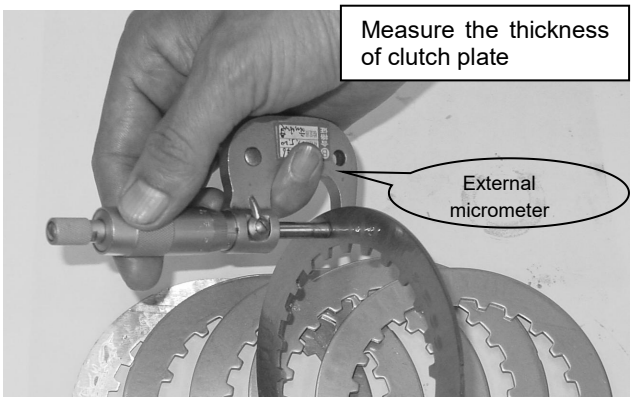
Measure the thickness of each clutch plate. The thickness is 2.0mm.

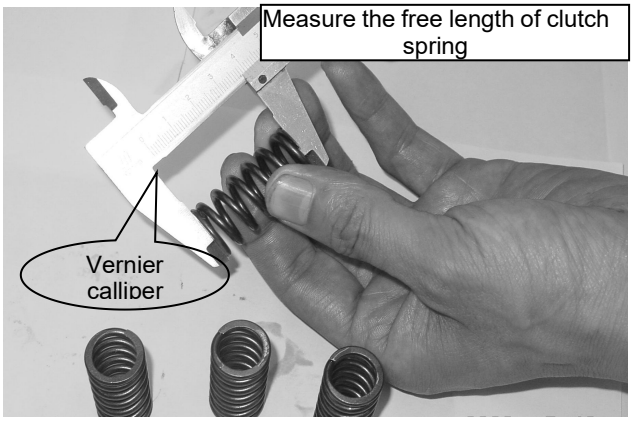
Measure the free length of clutch spring.
Maintenance limit: ≥38.70mm.







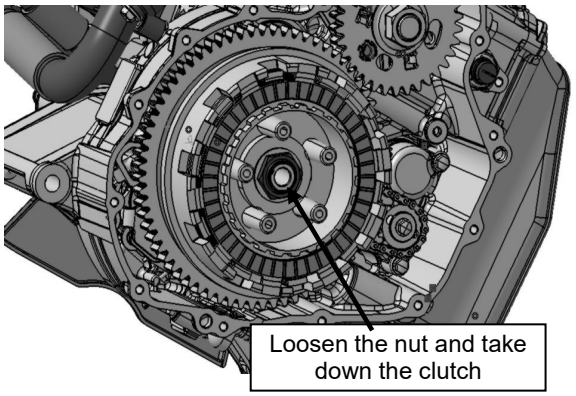




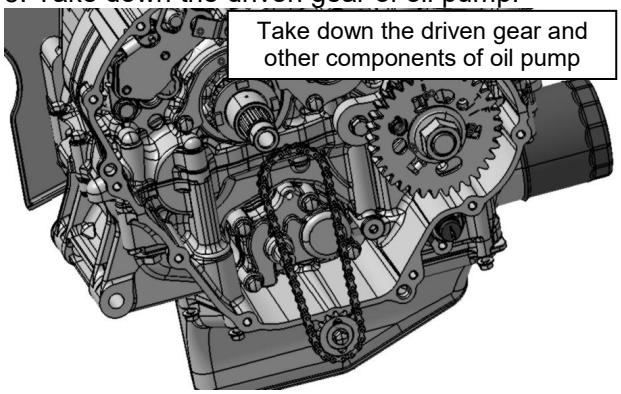
Gear shift mechanism

Disassembling steps of gear shift mechanism:

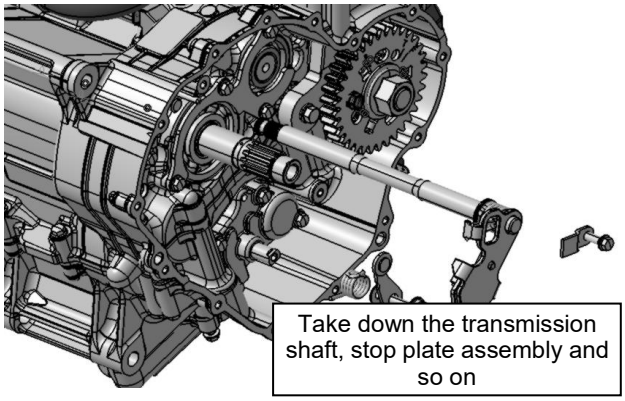
1. Take down the right crankcase cover (refer to the disassembly of right crankcase cover).
2. Take down the clutch (refer to the disassembly of clutch).
3. Before disassembling the clutch, hold the primary driving and driven gears with fixture, then loosen locknut M18 and washer.
4. Take down the clutch.



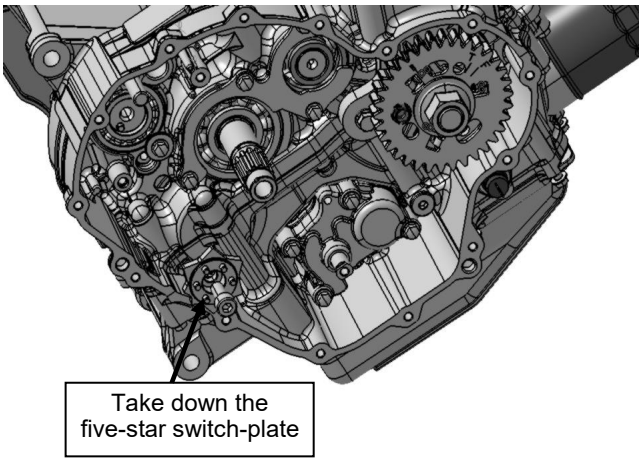
5. Take down the driven gear of oil pump.



6. Disassemble the transmission shaft pressing plate, take down the transmission shaft, stop plate bolt and return spring, stop plate assembly (9, 10 and 11 in the figure) and so on.

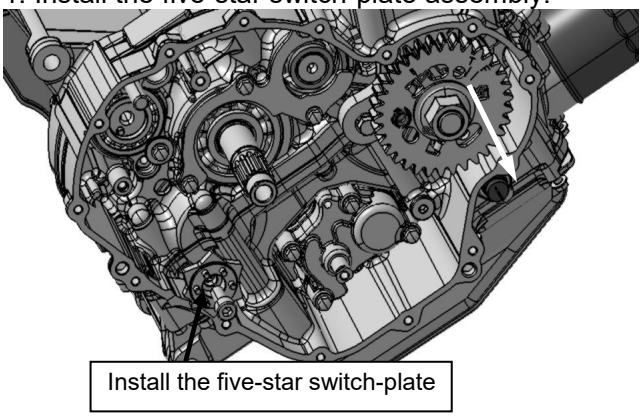


7. Take down the five-star switch-plate.

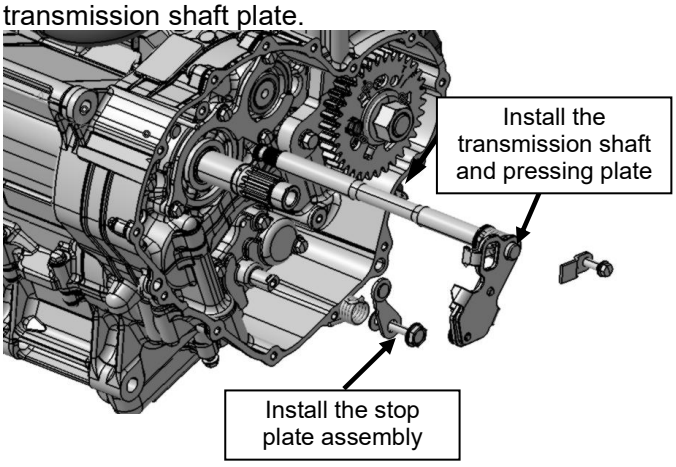


Installation steps of gear shift mechanism:

1. Install the five-star switch-plate assembly.



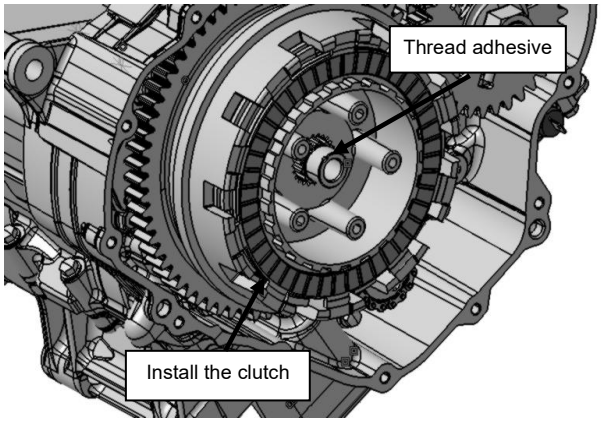
2. Install the stop plate assembly; hook the case with one end of the return spring of stop plate. Install a gasket at the upper end and hook the stop plate with the other end, assemble these four parts with a screwdriver.
3. Install the transmission shaft and pressing transmission shaft plate.



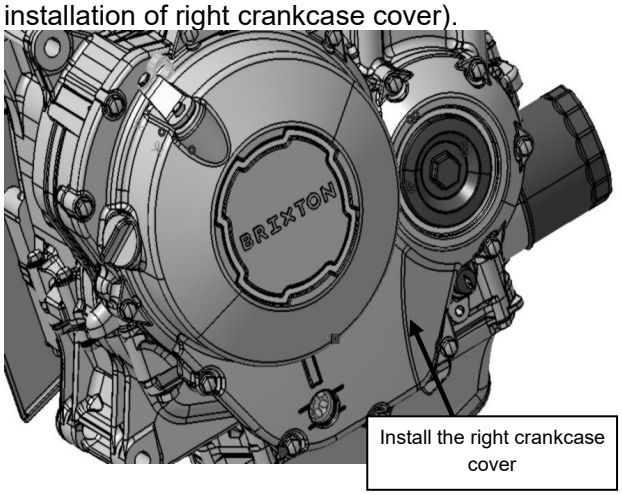
4. Install the driving sprocket, chain and driving

sprocket of oil pump.

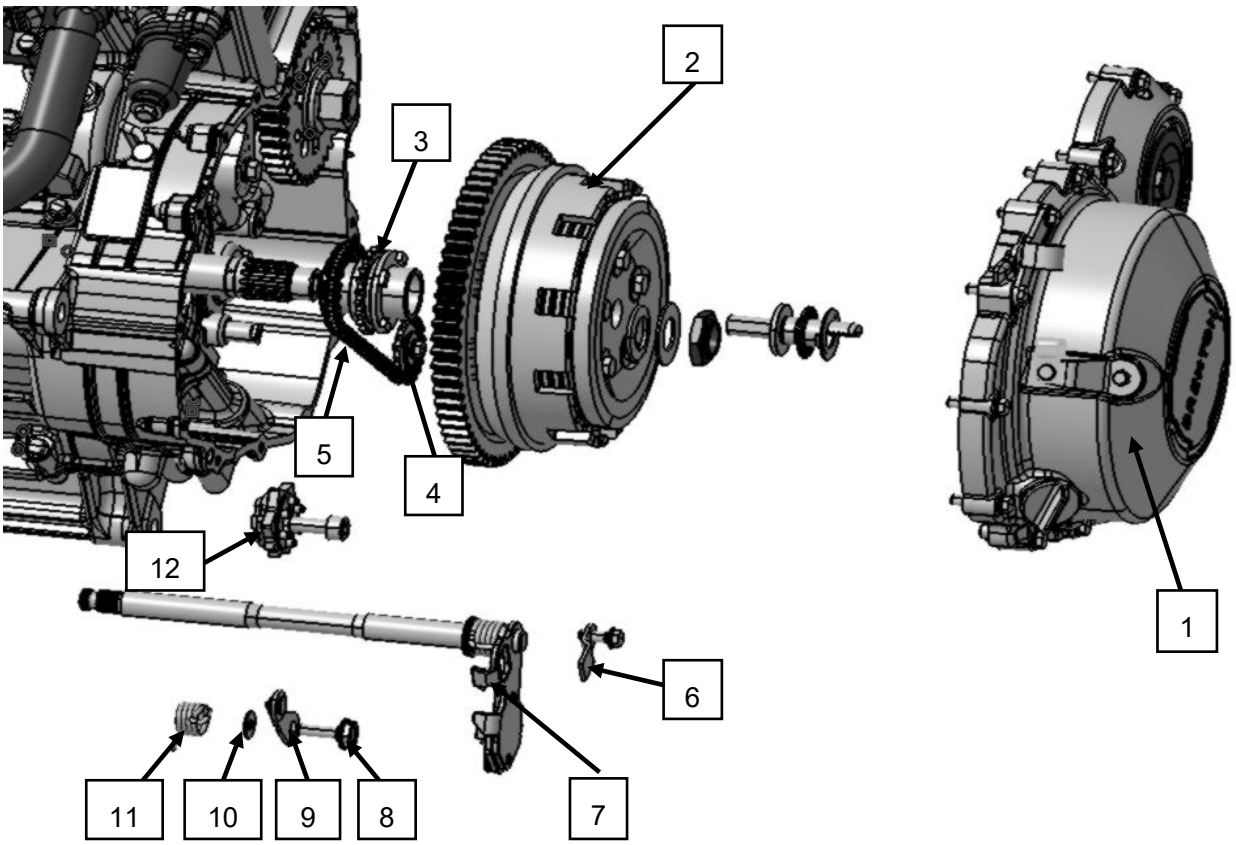
5. When installing the clutch, hold the primary driving and driven gears with fixture, install and tighten locknut M18 with a torque of 130N.m (refer to the installation of clutch).



Install the right crankcase cover (refer to the installation of right crankcase cover).

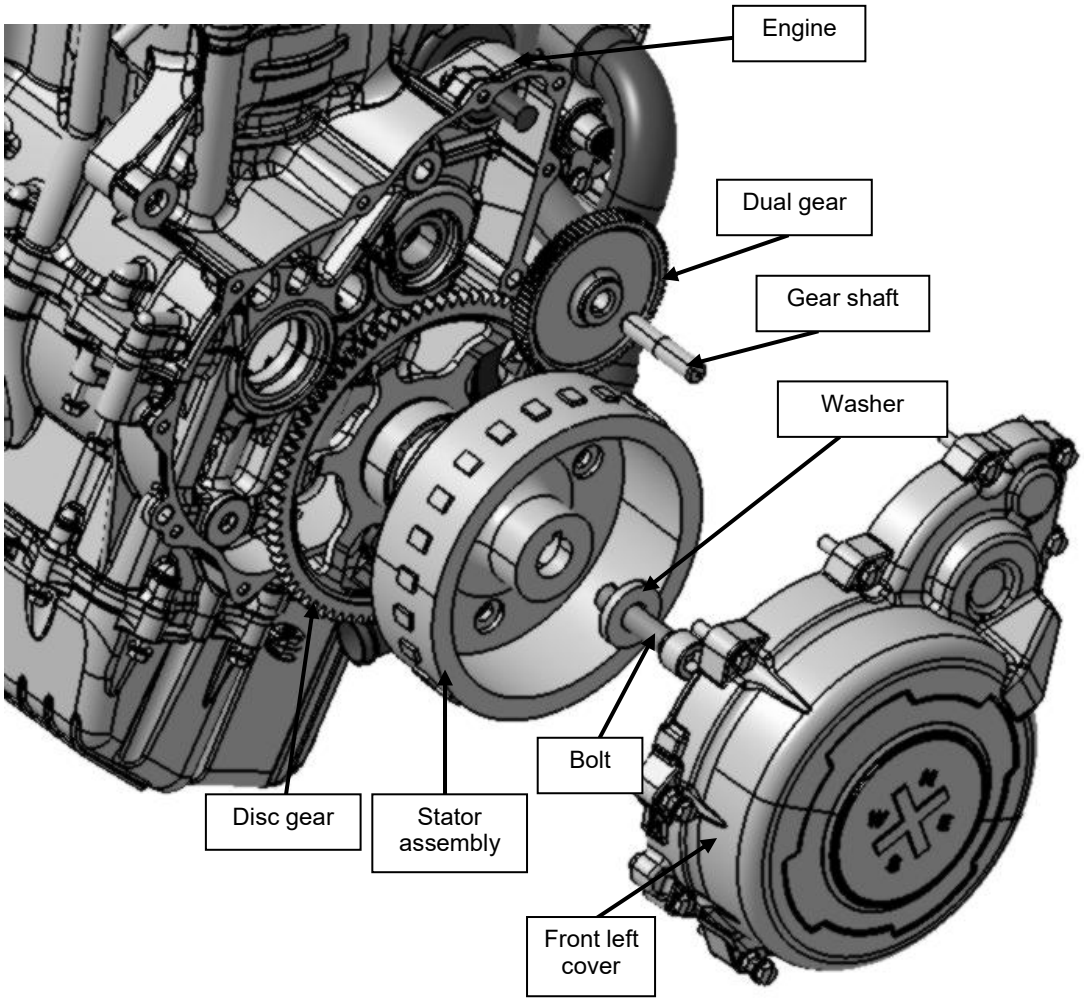


Disassembly/installation of gear shift mechanism



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Right crankcase cover	**1**	Refer to the disassembly/installation of right crankcase cover
2	Clutch	**1**	Refer to the disassembly/installation of clutch
3	Driving sprocket of oil pump	**1**	
4	Driven gear of engine oil pump	**1**	
5	Oil pump chain	**1**	
6	Pressing plate of transmission shaft	**1**	
7	Transmission shaft	**1**	
8	Bolt of stop plate	**1**	
9	Stop plate	**1**	
10	Gasket	**1**	Replace it with a new one if necessary
11	Return spring of stop plate	**1**	
12	Five-star switch-plate	**1**	

Magnetor and Starting System



9
Magnetor and Starting System

Maintenance Notice	Stator assembly
Front left cover	Starter Motor and Driving System

Maintenance Notice

There is no need to disassemble engine from the frame during maintenance. Just remove the front left cover and discharge the engine oil.
Clean all components and parts with cleaning agent and dry them with compressed air before assembly.

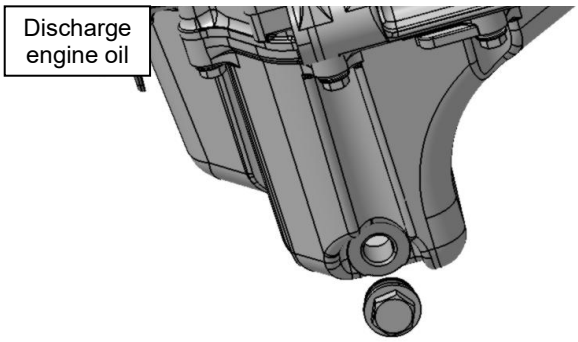
Torques

Clamp nut of rotor	**138～142N.m**
Clamp nut of stator	**10～12N.m**
Clamp Bolt of pressing plate	**10～12N.m**
Connecting screw of starting clutch	**23～27N.m**

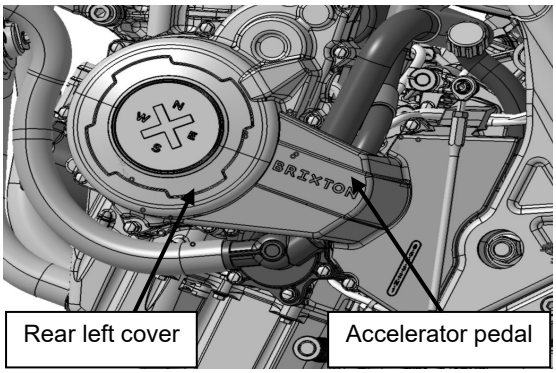
Front left cover

Disassembling steps of front left cover:

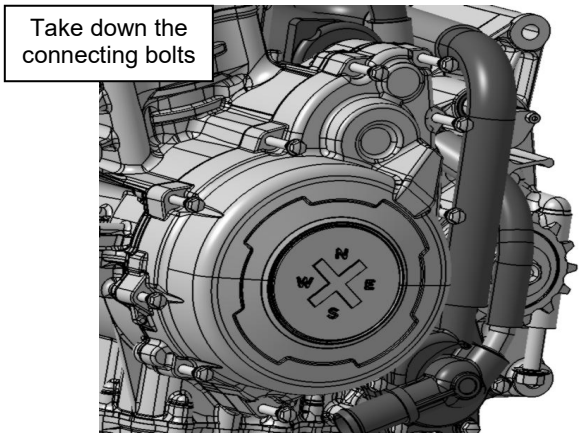
1. Unscrew the drain plug and discharge the engine oil completely.



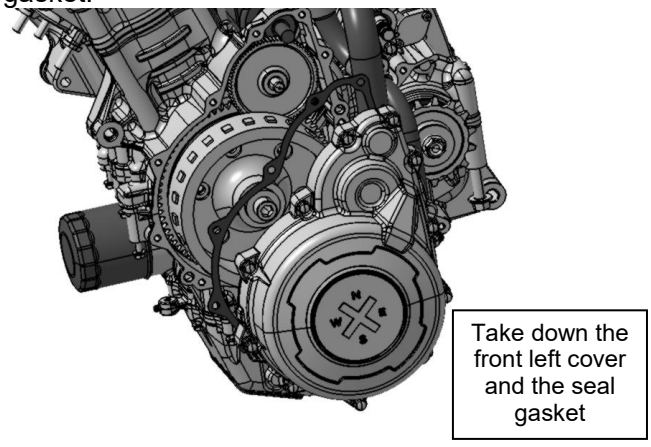
2. Take down the rear left cover and separate the lead joint of magnetor from the main cable.



3. Take down the connecting bolt of front left cover.

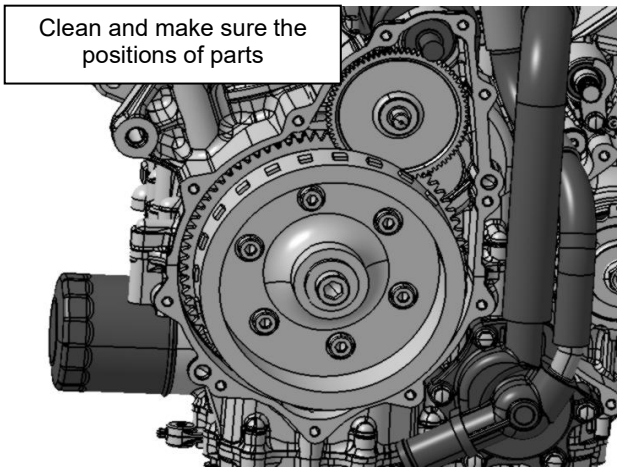


4. Take down the front left cover and the seal gasket.

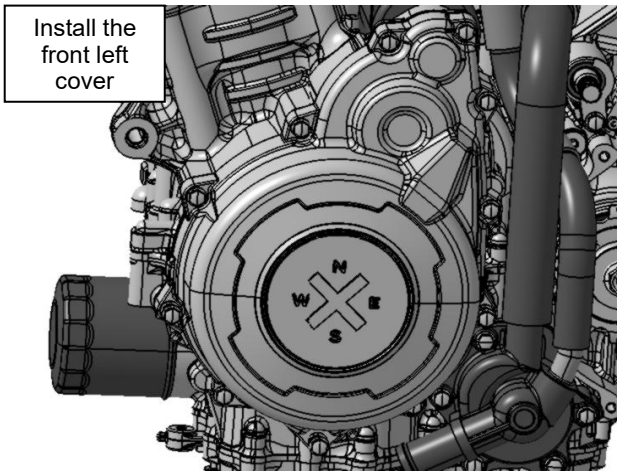


Installation steps of front left cover:

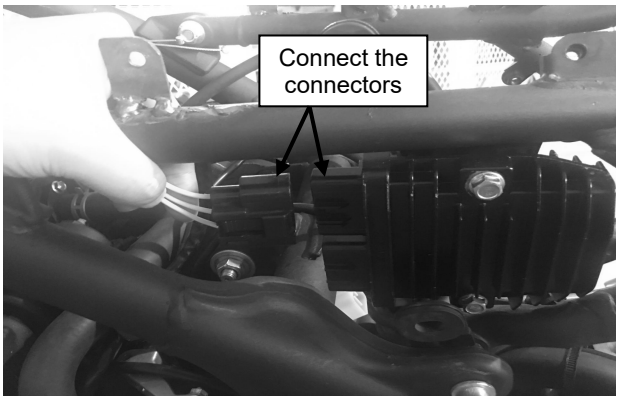
1. Clean the seal gasket remnant on the left crankcase and front left cover. Replace seal gasket of front left cover and make sure that the positions of locating pin, gear shaft and dual gear are right.



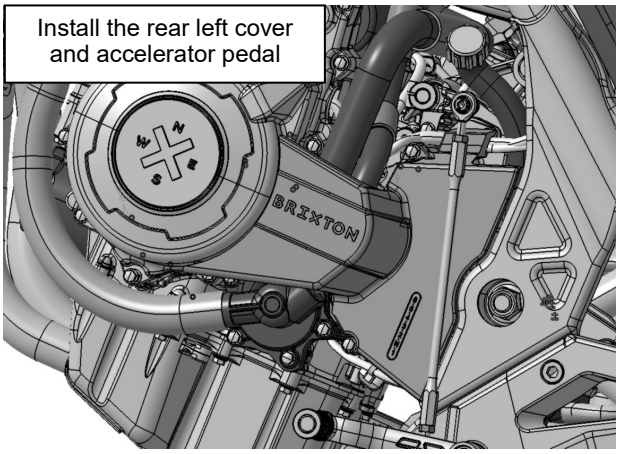
2. Install the front left cover.
3. Install the connecting bolts of front left cover and tighten them.



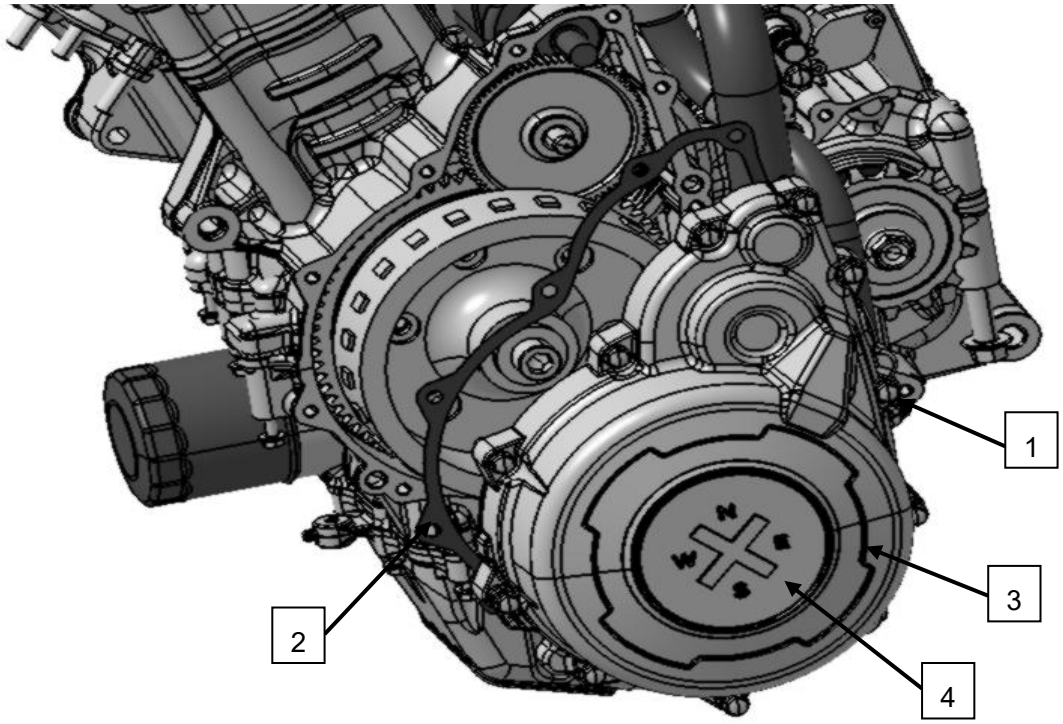
4. Connect the lead of magnetor.



5. Install the drain plug and fill engine oil.



Disassembly/installation of front left cover

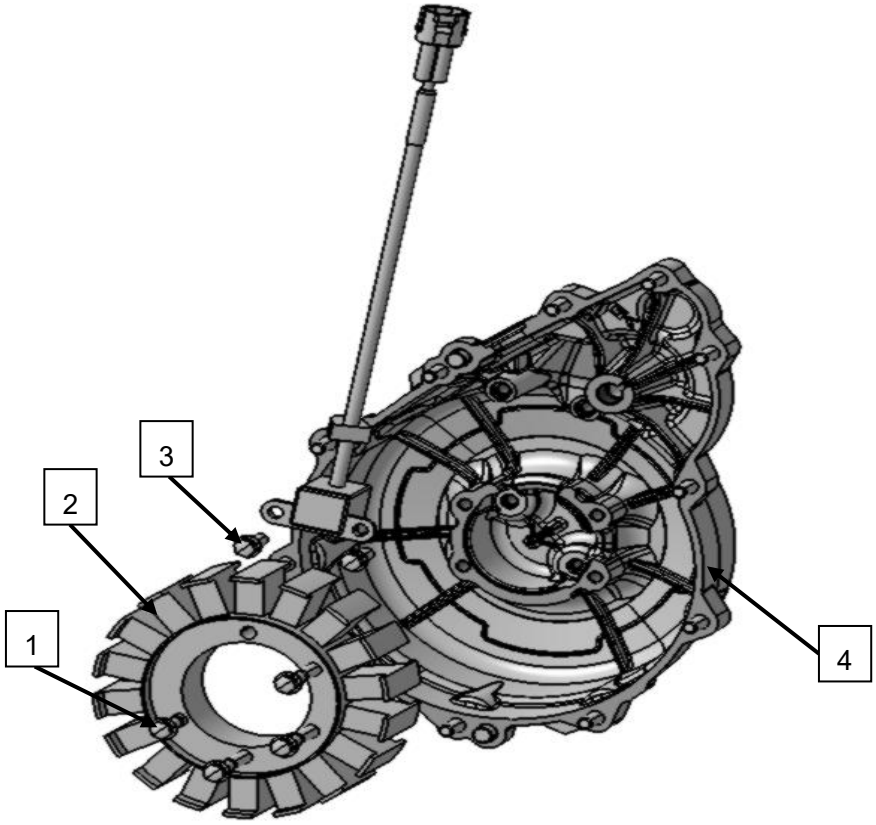


Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Connecting bolt of front left cover	**11**	
2	Seal gasket of front left cover	**1**	Replace the gasket with a new one
3	Front left cover	**1**	
4	Front left decorative cover	**1**	

Disassembly/assembly of front left cover

Please refer to the following figure for the disassembly and assembly of front left cover.
Use thread adhesive LOCTITE 648 during pressing plate assembly.
Use thread adhesive LOCTITE 648 when installing the connecting bolt of magnetor stator.

Caution:
Do not scratch the sealing surface and do not damage the stator coil.

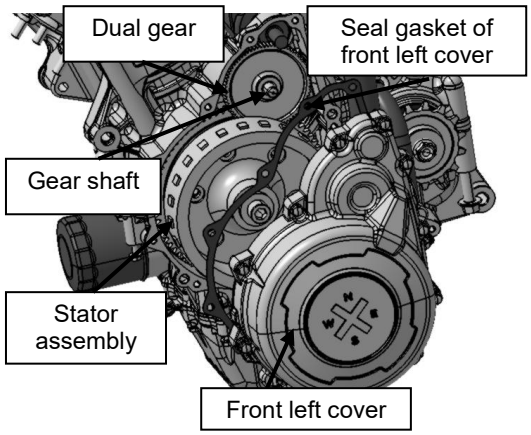


Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Bolt M6×40 (small head)	**4**	Use thread adhesive LOCTITE 648 during assembly
2	Magneto stator assembly	**1**	
3	Bolt M6×16 (small head)	**2**	Use thread adhesive LOCTITE 648 during assembly
4	Front left cover	**1**	
5			
6			

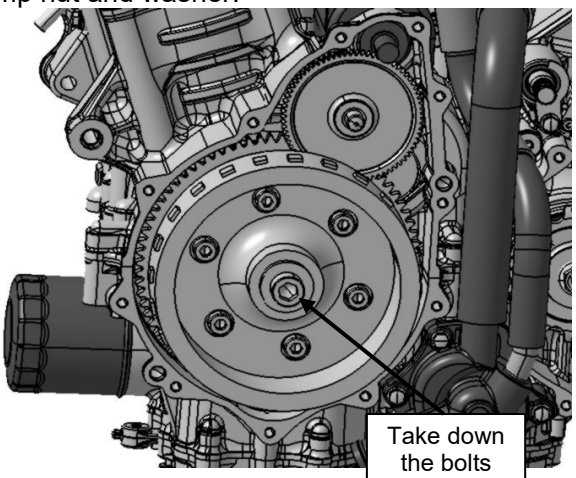
Stator assembly

Disassembling steps of stator assembly:

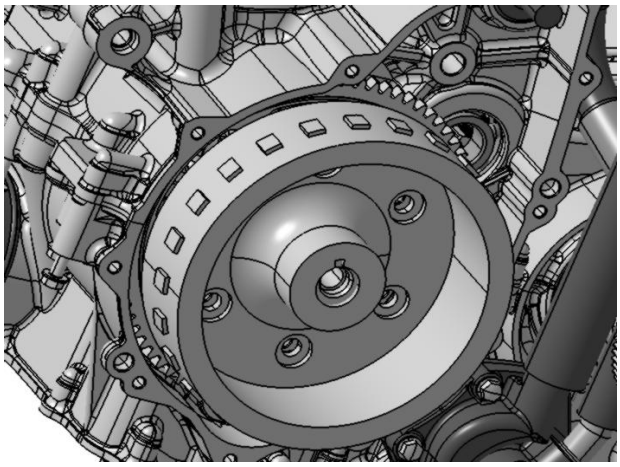
1. Take down the front left cover (please refer to the disassembly of front left cover).
2. Take down the gear shaft and dual gear.



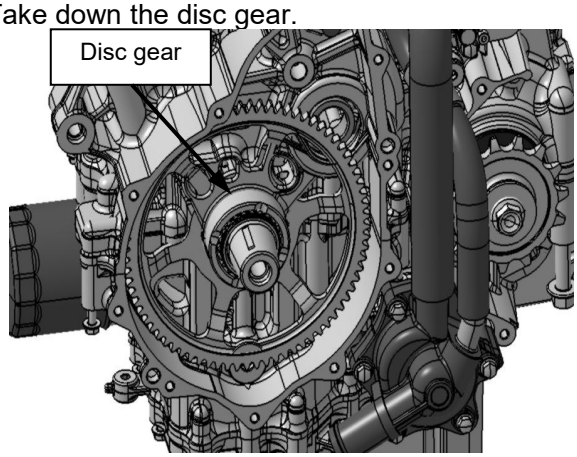
3. Fix the rotor with tools and take down the clamp nut and washer.



4. Pull the rotor out with tools.

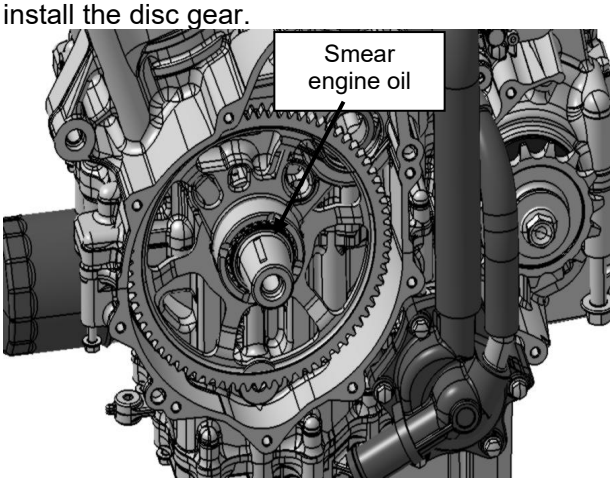


5. Take down the disc gear.

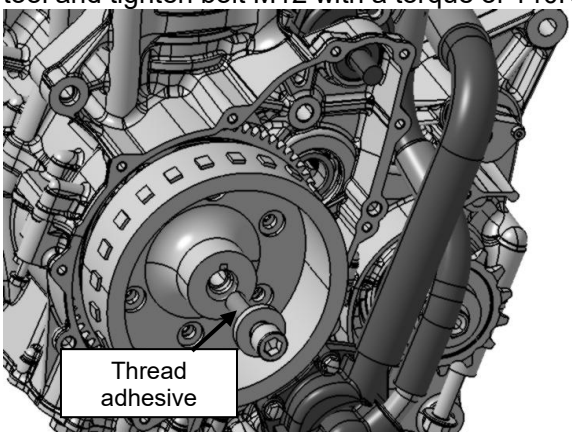


Installation steps of rotor assembly:

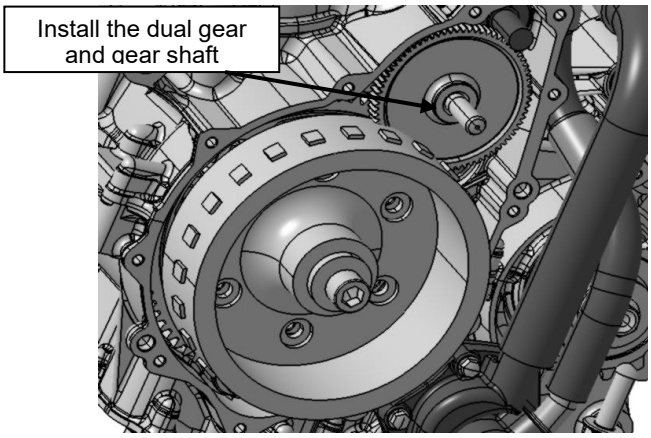
1. Smear engine oil on the left crank journal and install the disc gear.



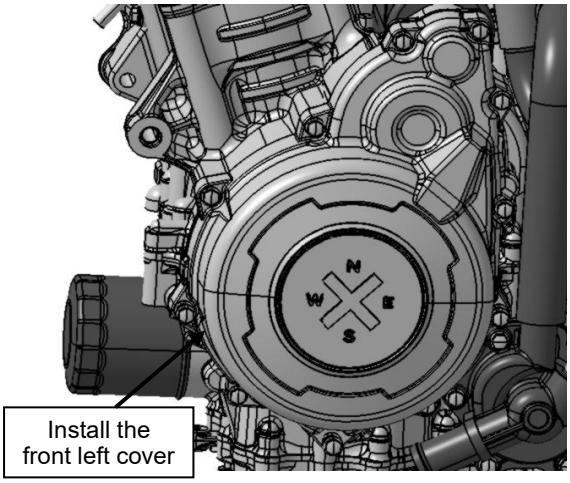
2. Install the stator assembly.
3.
3. Install the gasket. Smear thread adhesive LOCTITE 648 on the clamp nut. Fix the rotor with tool and tighten bolt M12 with a torque of 140N.m.



4. Install the dual gear, gear shaft and so on.



5. Install the front left cover (please refer to the installation of front left cover).



Caution:

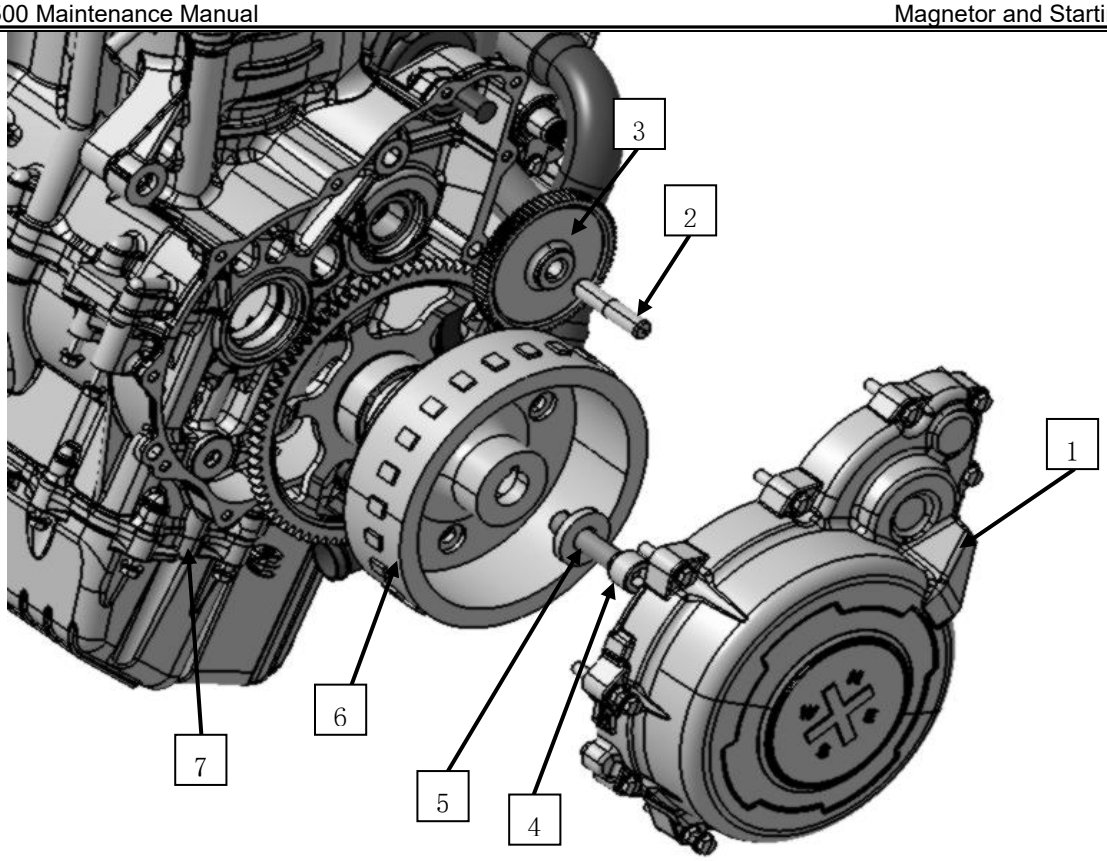
1. No foreign materials can be left on the left crank cone surface and rotor cone surface.

2. The disc gear shall rotate smoothly at the clockwise direction (to the rotor).

Warning:

Use thread adhesive LOCTITE648 when installing clamp nut of rotor. The tightening torque is 140N.m.

Disassembly/installation of stator assembly



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Front left cover	**1**	Refer to the disassembly/installation of front left cover
2	Gear shaft	**1**	Smear engine oil during assembly
3	Dual gear	**1**	
4	Bolt M12	**1**	Use thread adhesive LOCTITE 648 during assembly. The tightening torque is 140N.m.
5	Gasket	**1**	
6	Stator assembly	**1**	The rotor fixture shall be used for assembly and disassembly. Rotor extractor is used for extraction.
7	Disc gear	**1**	Smear engine oil on the external diameter during assembly

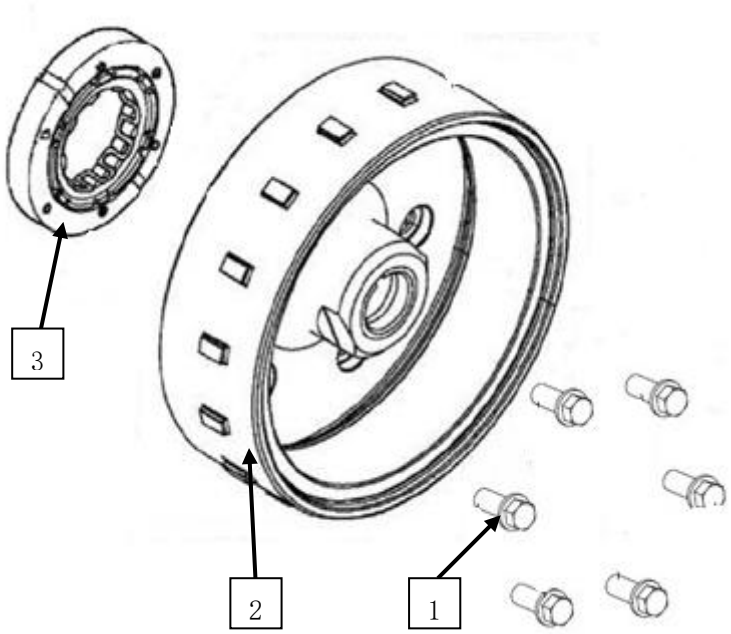
Disassembly/assembly of rotor assembly

Please refer to the following figure for the disassembly and assembly of rotor assembly.

Use thread adhesive LOCTITE 648 during assembly. The tightening torque is 25N.m.

Caution:

Pay attention to the installation direction of one-way clutch.

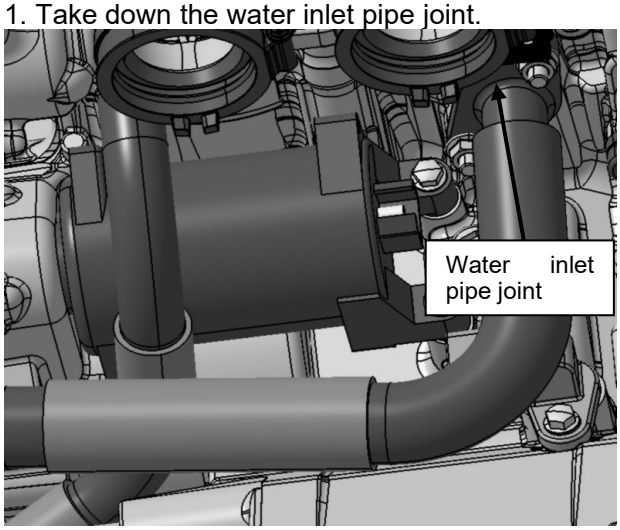


Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Bolt M8×20	**6**	Use thread adhesive LOCTITE 648 during assembly. The tightening torque is 25N.m.
2	Rotor	**1**	
3	One-way clutch	**1**	Pay attention to the installation direction

Starter Motor and Driving System

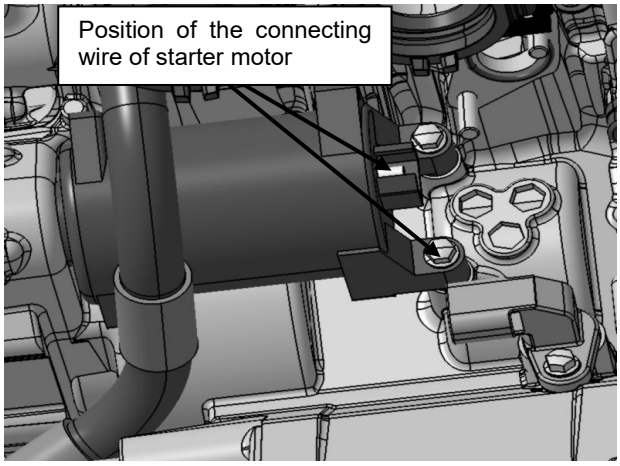
Disassembly of starter motor:

1. Take down the water inlet pipe joint.

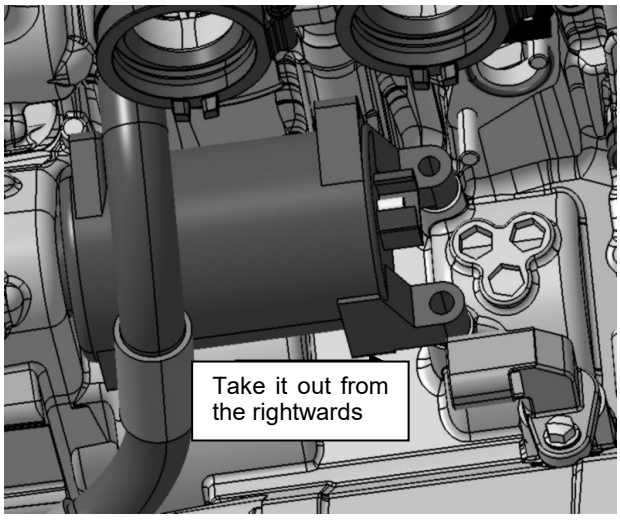


2. Take down the ground wire and power line of starter motor.

3. Take down the connecting bolts of starter motor.



4. Push the starter motor rightwards and pull it up, then take it out.

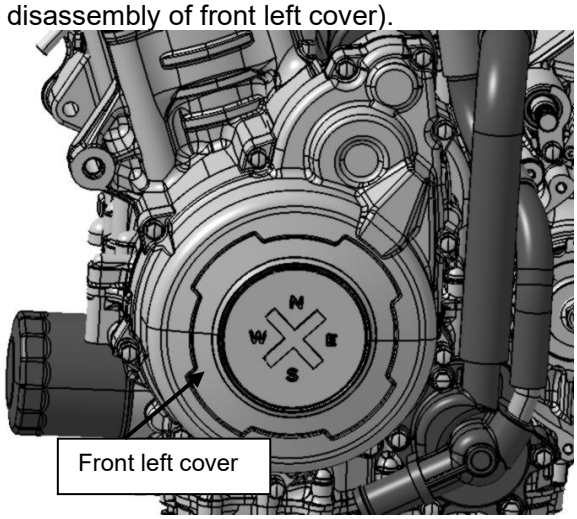


Installation of starter motor:

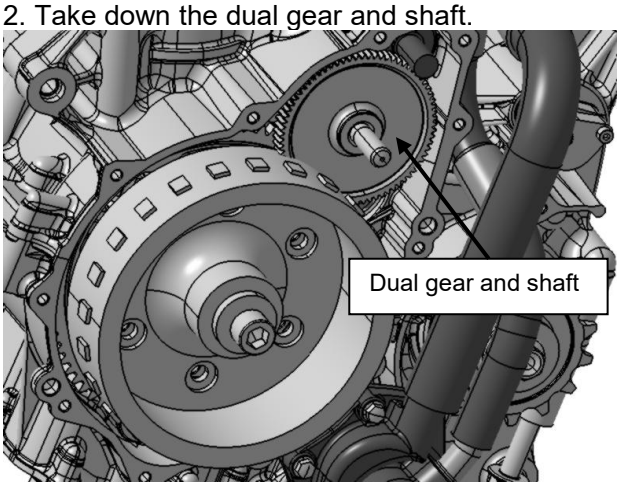
The sequence is reverse to disassembly.

Disassembly of starter driving system:

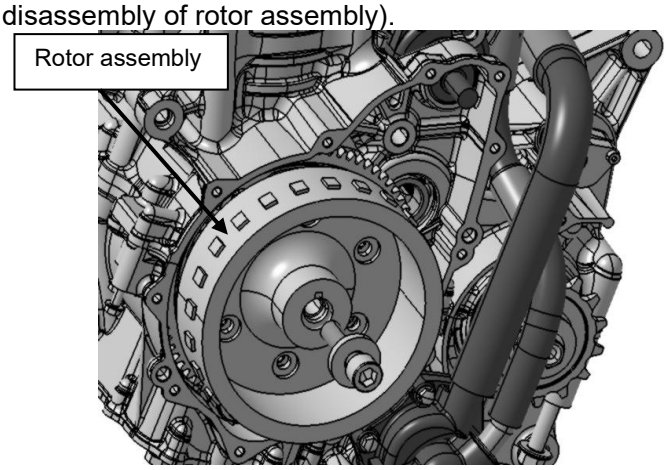
1. Take down the front left cover (please refer to the disassembly of front left cover).



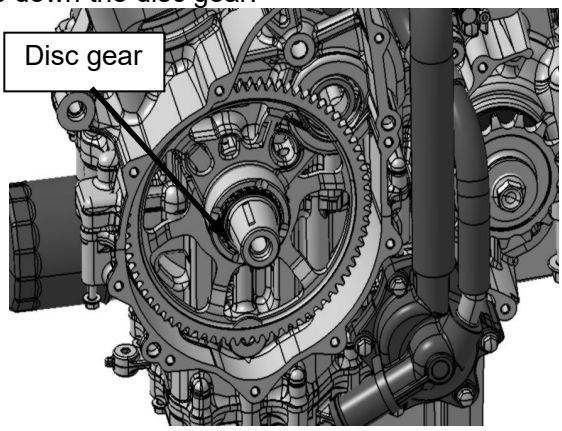
2. Take down the dual gear and shaft.



3. Take down the rotor assembly (refer to the disassembly of rotor assembly).



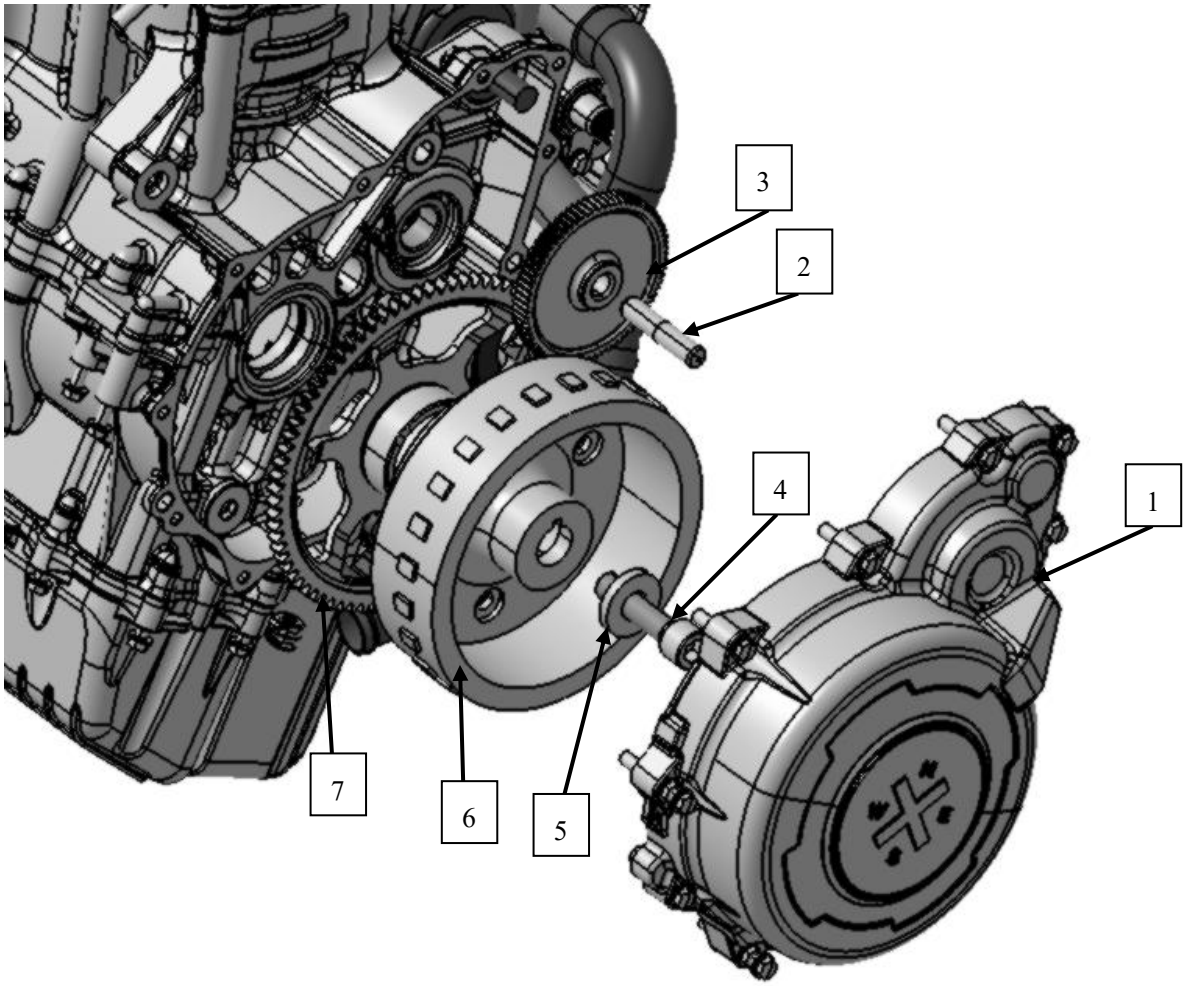
4. Take down the disc gear.



Installation of starter driving system:

The sequence is reverse to disassembly.

Disassembly/installation of starter driving system

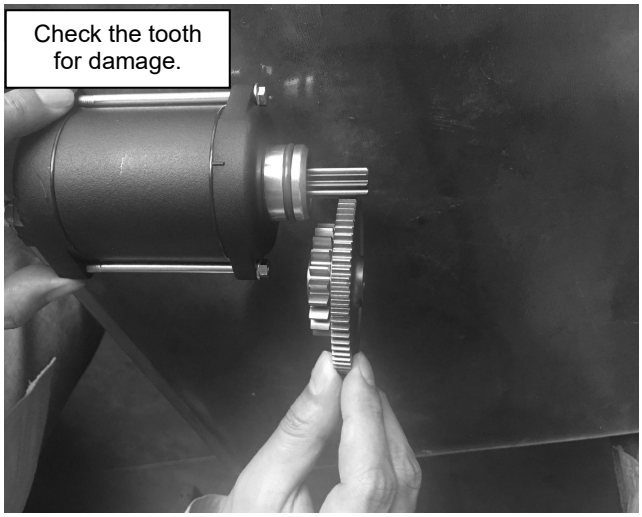


Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Front left cover	**1**	Refer to the disassembly/installation of front left cover
2	Bolt M12	**1**	Use thread adhesive LOCTITE 648 during assembly. The tightening torque is 140N.m.
3	Gasket	**1**	
4	Stator assembly	**1**	Refer to the disassembly/installation of rotor assembly
5	Gear shaft	**1**	Smear engine oil during assembly
6	Dual gear	**1**	
7	Disc gear	**1**	Smear engine oil on the external diameter during assembly

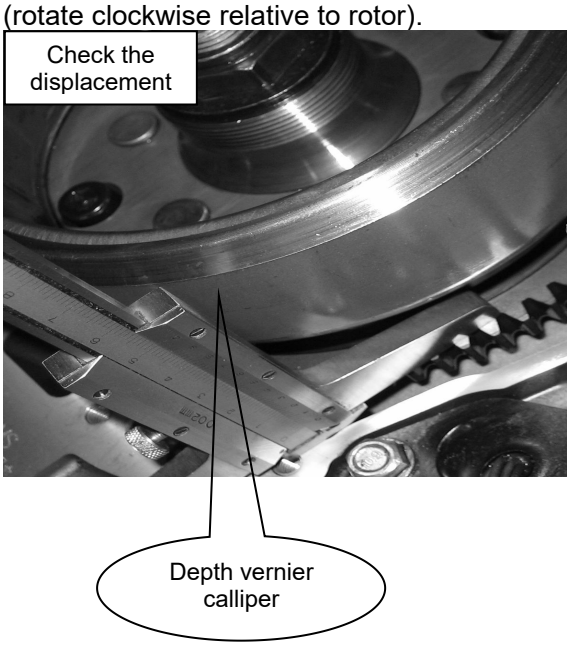
Check

Check the spline tooth of starter motor output shaft for damage, deformation and other faults.

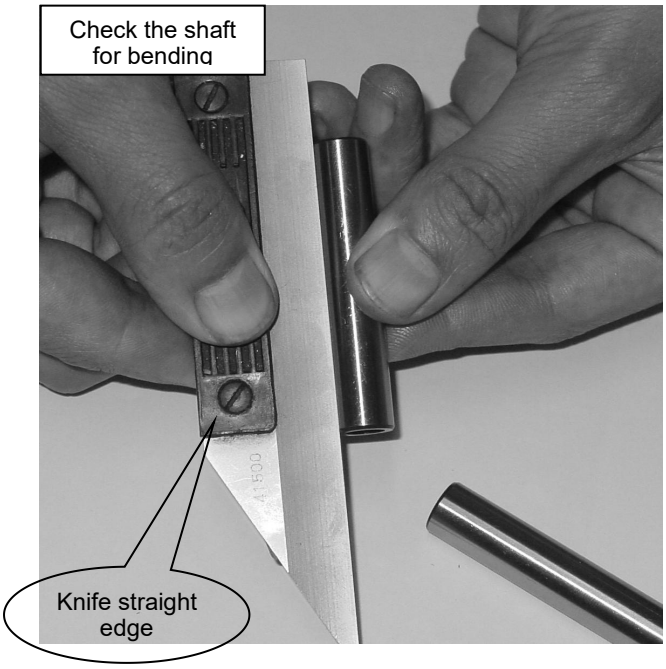
Check the dual gear for tooth integrality.



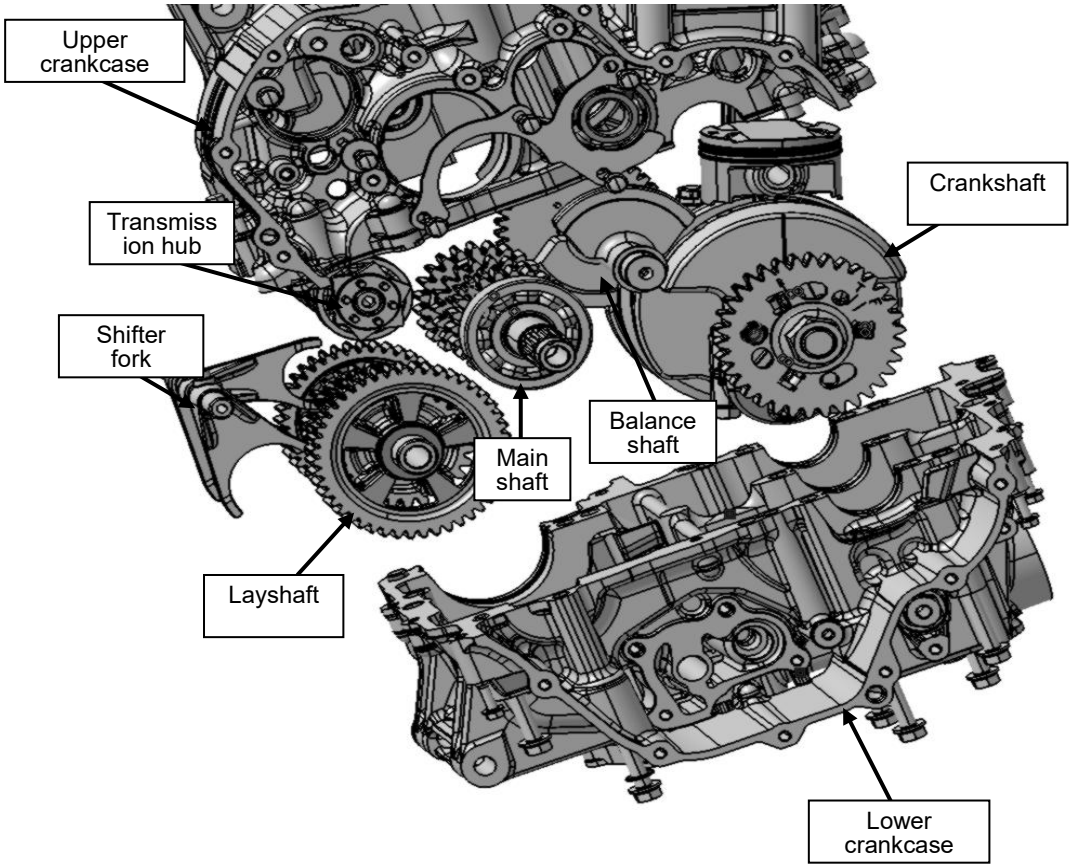
Check the rotation and directionality of disc gear (rotate clockwise relative to rotor).



Check the gear shaft for bending.



Crankcase、Crankshaft and Shift Mechanism



10
Crankcase、Crankshaft and Shift Mechanism

Maintenance Notice

Take down the engine from frame during maintenance.

To repair crankshaft, balance shaft or shift mechanism, the upper and lower crankcases shall be separated, which is called crankcase separation. Before crankcase separation, the following parts and components of engine shall be removed:

1. Right crankcase cover, clutch, gearshift [refer to the “Clutch and Gearshift”];
2. Cylinder head cover, camshaft and cylinder head;
3. Front left cover, rotor assembly, electric starting system [refer to the “Magnetor and Electric Starting System”];
4. Oil pan and primary filter assembly;
5. Gear switch assembly, driving sprocket.

Clean all components and parts with cleaning agent and dry them with compressed air before assembly.

Technical Specification and Maintenance Criteria

Item		Standard Value	Maintenance Limit
Transmission shifter fork	**Thickness of shifter fork claw**	**5.9～6.0**	**5.8**
Crankshaft	Diameter of small end of connecting rod	**16.03～16.044**	**16.06**
	Radial runout	**0.03**	**0.10**
	Left and right crank journal	**33.988～34.006**	**33.90**

Troubleshooting

Engine noise

1. The crankshaft bearing is abraded;
2. Bearing at the big end of connecting rod is abraded;
3. The mainshaft and layshaft bearings are abraded;
4. The pinion spring of balance shaft is invalid.

Engagement of mainshaft and layshaft gears is poor

1. The shifter fork is bent or damaged;
2. The shifter fork shaft is bent;
3. The transmission hub is poor or the bearing position changes;
4. The positions of mainshaft and layshaft bearings changed.

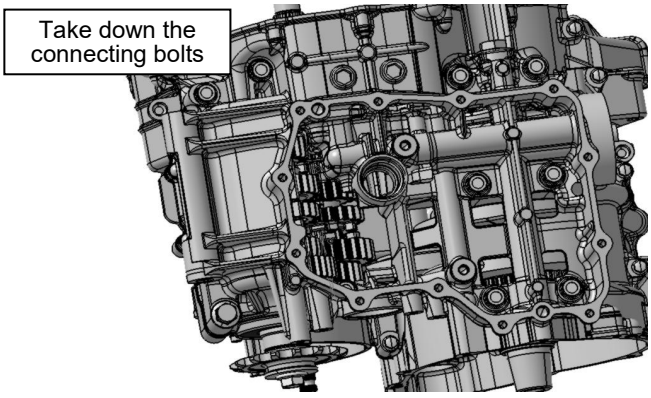
Gear shift is difficult

1. The shifter fork is bent or damaged;
2. The shifter fork shaft is bent;
3. The guide slot of transmission hub is abraded or damaged;
4. The clutch adjustment is improper.

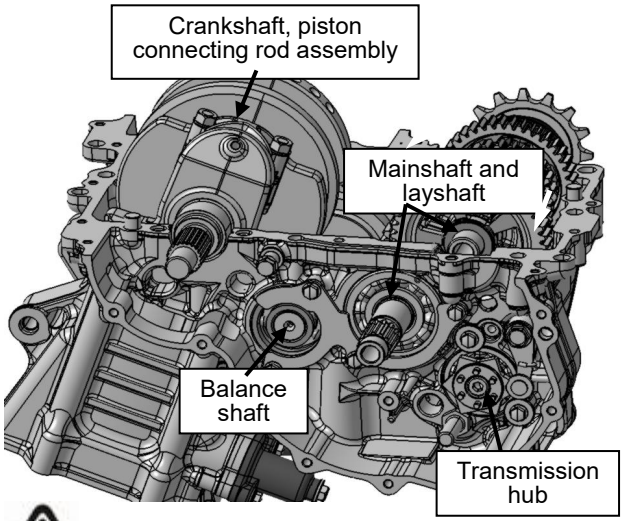
Crankcase

Disassembling steps of crankcase:

1. Take down the engine from frame (discharge cooling water and engine oil completely) and place it on the assembly workbench.
2. Take down the parts and components, including the right crankcase cover, clutch, gearshift, cylinder head cover, camshaft, cylinder head, front left cover, rotor assembly, electric starting system, oil pan, primary filter assembly, gear switch assembly and driving sprocket (please refer to the related contents).
3. Take down the connecting bolts of upper and lower crankcases.



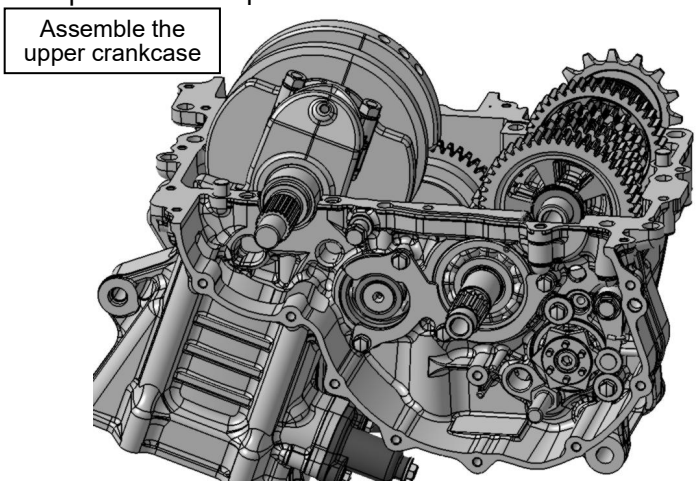
4. Separate the crankcases with a piece of formica or a nylon hammer gently.
5. Take down the mainshaft, layshaft, transmission hub, shifter fork and so on.
6. Take down the piston connecting rod assembly, crankshaft and balance shaft.



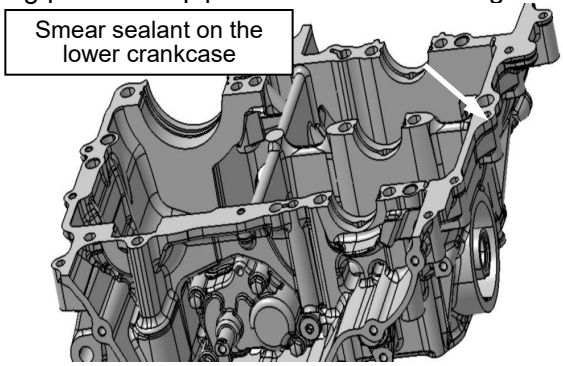
Caution:
Do not use screwdriver or similar tools to separate the cases, or the sealing surface will be damaged.

Installation steps of crankcase:

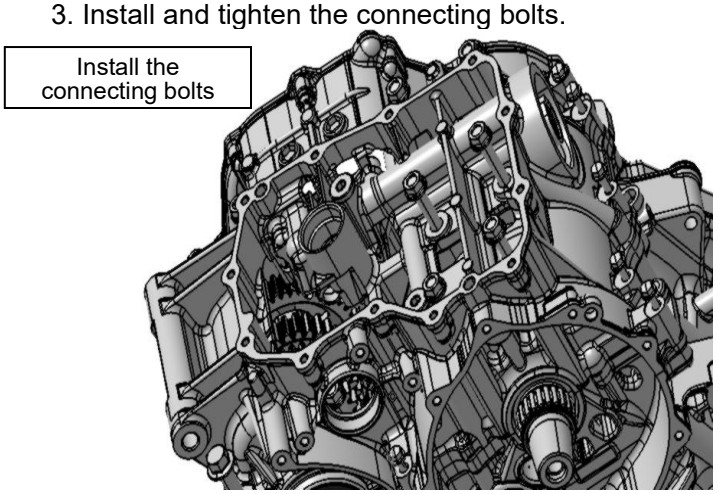
1. Place the upper crankcase on the workbench, install the engine oil nozzle assembly, case sliding bearing, connecting rod bush, piston connecting rod assembly, crankshaft, balance shaft assembly, transmission hub assembly, shifter fork assembly, mainshaft and layshaft and other parts and components.



2. Smear a layer of sealant ThreeBond 1215 on the contacting surface of lower crankcase and make sure that the positions and quantity of locating pin and oil pipe throttle nozzle are right.



3. Install and tighten the connecting bolts.



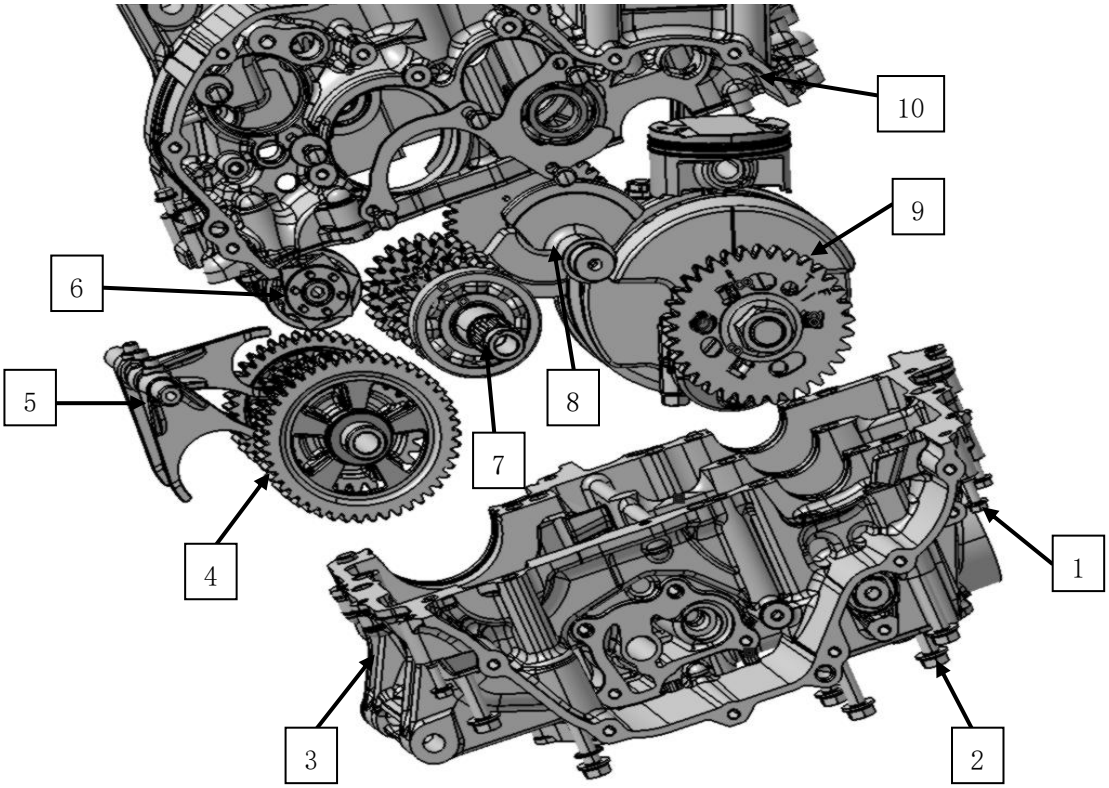
4. Install other parts and components of engine, mainly including: right crankcase cover, clutch, gearshift, cylinder head cover, camshaft, cylinder head, cylinder, piston, front left cover, rotor assembly, electric starting system, primary filter assembly, oil pan, gear switch assembly and driving sprocket (please refer to the related contents).

5. Install the assembled engine on the frame, fill cooling water and engine oil and complete motorcycle assembly.

 **Caution:**

Press or use formica hammer to connect the crankcases. Do not beat them heavily.

Disassembly/installation of crankcase



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Connecting bolts (small head)	**10**	Pre-tighten them diagonally, then tighten to the required torque
2	Connecting bolts (big head)	**10**	Tighten the connecting bolts of layshaft diagonally, then tighten them to the required torques
3	Lower crankcase	**1**	
4	Layshaft assembly	**1**	
5	Shifter fork assembly	**1**	
6	Transmission hub	**1**	
7	Mainshaft assembly	**1**	
8	Balance shaft	**1**	
9	Crankshaft	**1**	
10	Upper crankcase	**1**	

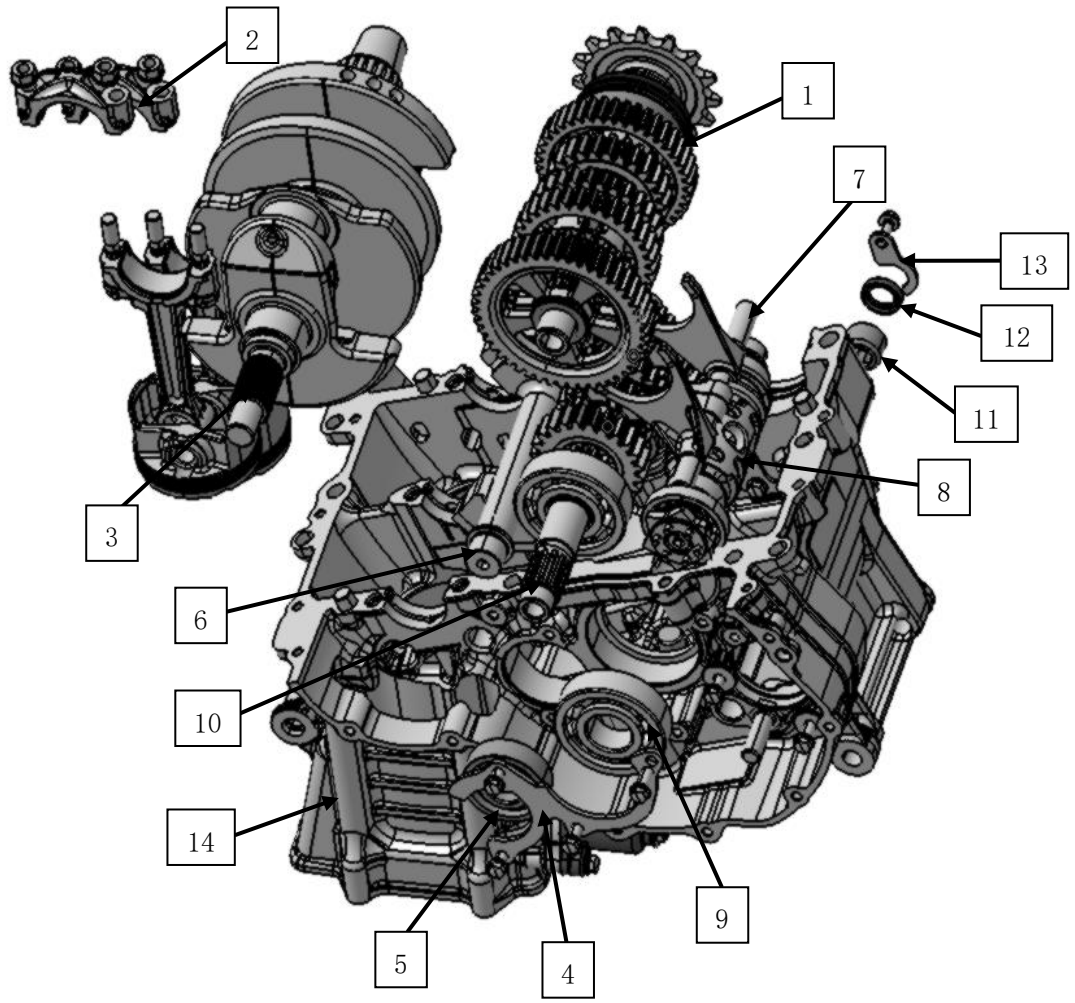
Disassembly/assembly of upper crankcase

Please refer to the following figure for the disassembly and assembly of upper crankcase.

The needle bearing may be damaged during disassembly. In this case, replace it with a new one. The disassembled oil seal shall be replaced.

Caution:

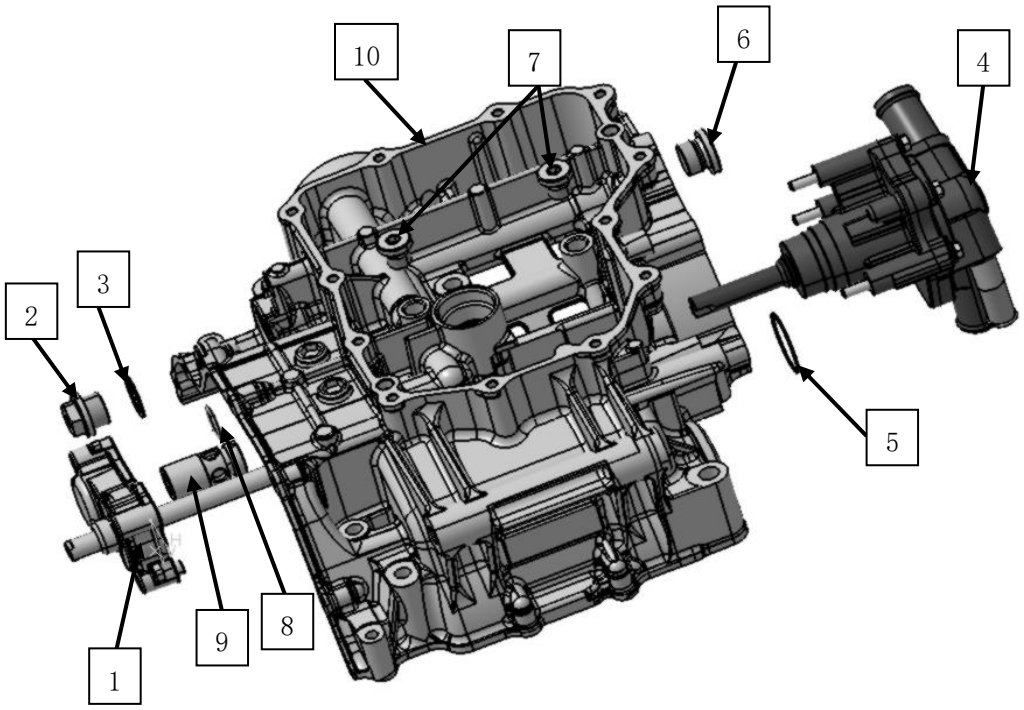
Do not scratch the sealing surface. For the mainshaft bearing, keep the surface with oil seal inwards.



Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Layshaft	**1**	Smear engine oil during assembly
2	Piston connecting rod assembly	**2**	Smear engine oil during assembly
3	Crankshaft	**1**	Smear engine oil during assembly and mark on the balance shaft
4	Ball bearing pressure plate of mainshaft	**1**	
5	Bearing 6204	**1**	Smear engine oil during assembly and keep the surface with words outwards
6	Balance shaft	**1**	Smear engine oil during assembly
7	Shifter fork	**1**	Smear engine oil during assembly
8	Transmission hub	**1**	Smear engine oil during assembly
9	Bearing 6305	**1**	Smear engine oil during assembly and keep the surface with words outwards
10	Mainshaft	**1**	Smear engine oil during assembly
11	Needle bearing	**1**	Smear engine oil during assembly
12	Oil seal	**1**	Smear engine oil during assembly
13	Oil seal pressure plate of shifter shaft	**1**	
14	Upper crankcase	**1**	

Disassembly/assembly of lower crankcase

Do not take down the plug after it is installed. If it has to be taken down, smear thread adhesive LOCTITE 648 again. If the O ring of oil pump and water pump is cut, replace them.

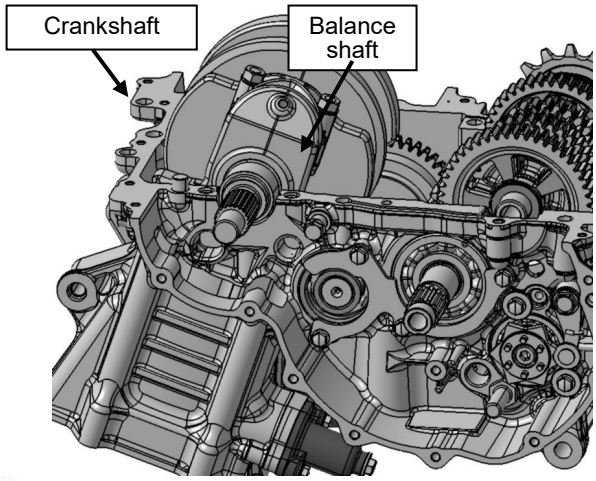


Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Oil pump assembly	**1**	Smear engine oil during assembly
2	Joint of oil pressure alarm switch	**1**	Use thread adhesive LOCTITE 648 during assembly
3	Gasket	**1**	
4	Water pump assembly	**1**	
5	O ring	**1**	Smear engine oil during assembly
6	Plug 18	**1**	Use thread adhesive LOCTITE 648 during assembly
7	Plug 12	**2**	Use thread adhesive LOCTITE 648 during assembly
8	Pressure relief valve	**1**	Smear engine oil during assembly
9	O ring	**1**	Smear engine oil during assembly
10	Lower crankcase		

Crankshaft and balance shaft

Disassembling steps of crankshaft and balance shaft:

1. Take down the lower crankcase.
2. Take down the lower crankshaft.
3. Take down the balance shaft.



Caution:

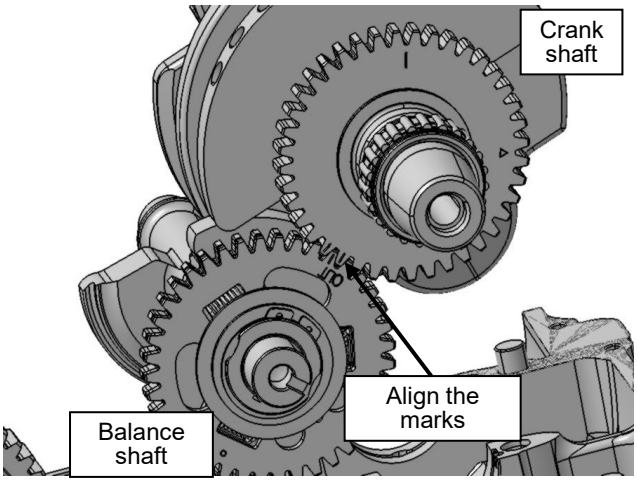
Knock the balance shaft and crankshaft gently during disassembly. Do not damage them.

Installation steps of crankshaft and balance shaft:

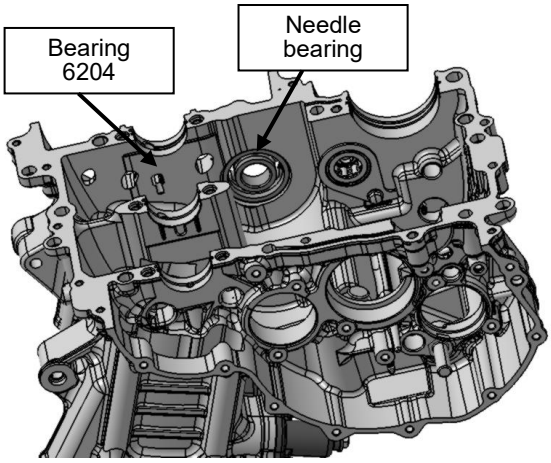
1. Place the upper crankcase with needle bearing and bearing 6204 on the workbench.
2. Install the balance shaft and align the marks on driven gear I and II.
3. Install the crankshaft and align with the mark on balance shaft.

Caution:

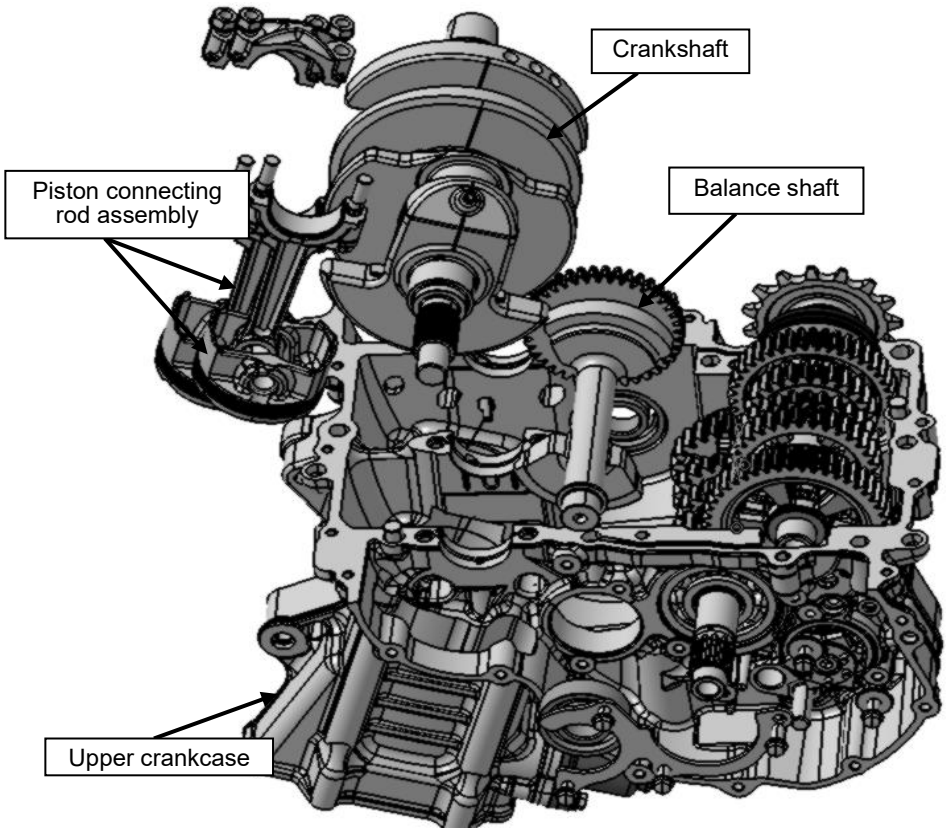
1. The marks on driving gear and driven gear of balance shaft shall be aligned.



4. Install the transmission hub, shifter fork, mainshaft and layshaft.
5. Install the lower crankcase.



Disassembling/installation of crankshaft and balance shaft



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Lower crankcase	**1**	
2	Piston connecting rod assembly	**2**	
3	Crankshaft	**1**	
4	Balance shaft	**1**	
5	Upper crankcase	**1**	

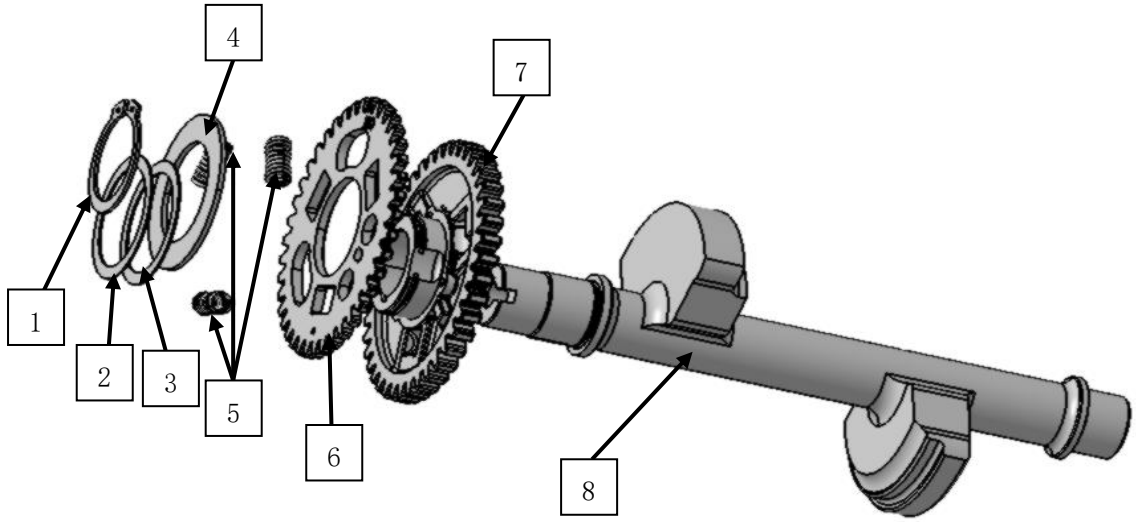
Disassembly/assembly of crankshaft and balance shaft

The crankshaft shall not be further disassembled, or the parts will be damaged!

Please refer to the following figure for the disassembly and assembly of balance shaft.

Caution:

Do align the marks when assembling the balance shaft.

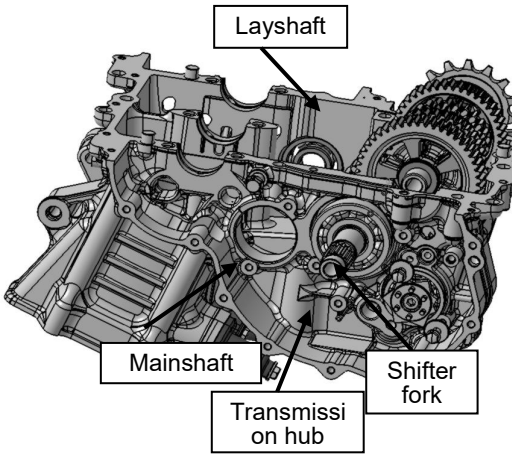


Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Retainer 32	**1**	
2	Washer 32*40*1	**1**	
3	Belleville spring 46*32*0.5*2-C1	**1**	
4	Washer 32*50*1.5	**1**	
5	Driven gear II	**1**	
6	Press spring	**3**	
7	Driven gear I	**1**	
8	Balance shaft	**1**	

Shift mechanism

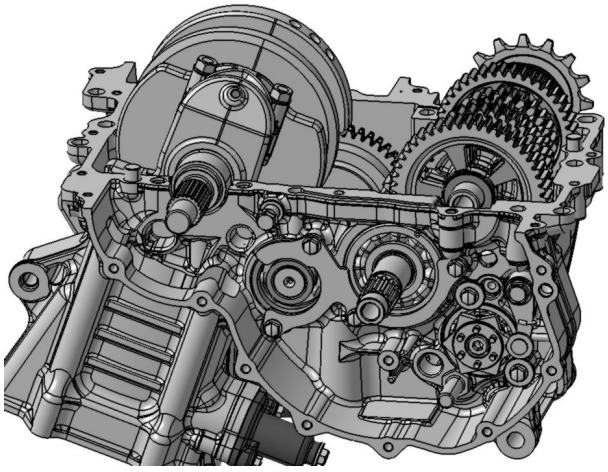
Disassembling steps of transmission shift mechanism:

1. Take down the lower crankcase.
2. Take down the layshaft.
3. Take down the shifter fork shaft
4. Take down the transmission hub.
5. Take down the shifter fork.
6. Take down the mainshaft.

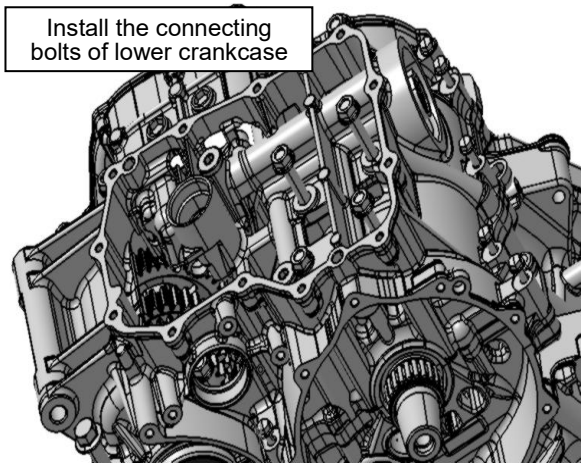


Installation steps of transmission shift mechanism:

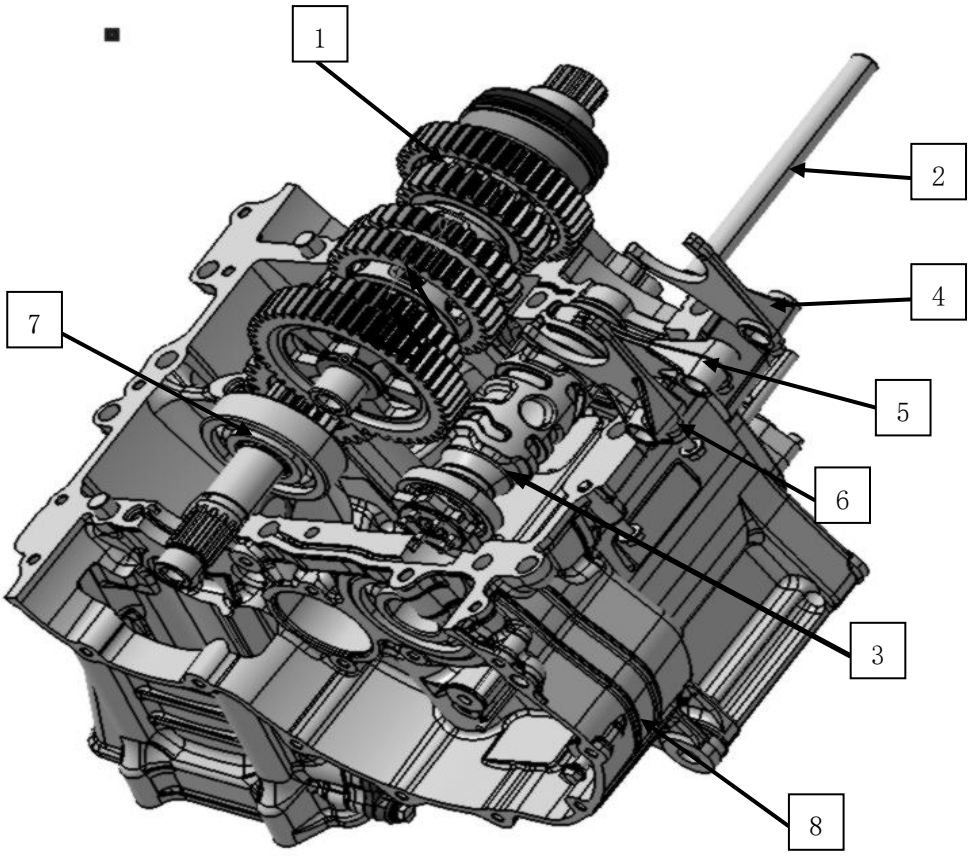
1. Place the upper crankcase with crankshaft and balance shaft on the workbench.
2. Install the transmission hub.
3. Install the mainshaft, shifter fork shaft, shifter fork I, shifter fork II and shifter fork III. Keep the surface with words outwards.
4. Install the layshaft and check the rotation of mainshaft and layshaft.



5. Install the lower crankcase.



Disassembly/installation of transmission driving system



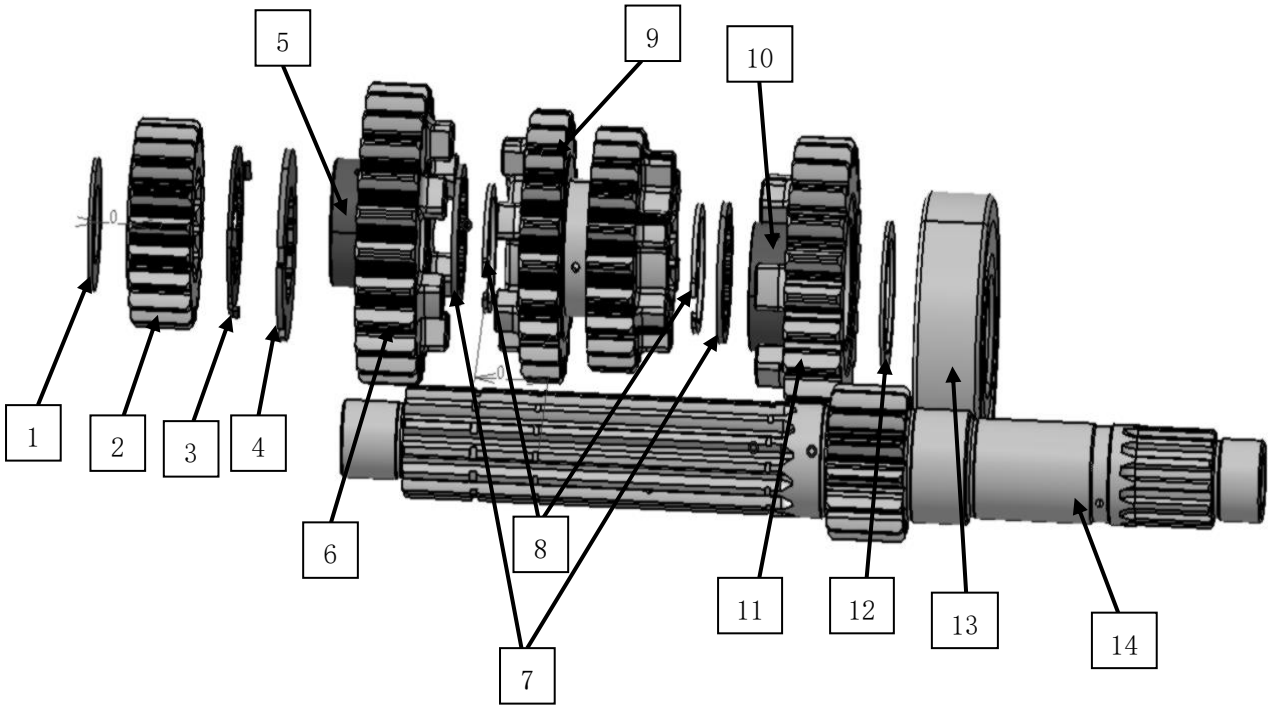
Sequence	Step	Qty.	Remark
	Disassembly Sequence		**Install the engine in the reverse sequence.**
1	Layshaft assembly	**1**	Smear engine oil during assembly
2	Shifter fork shaft	**1**	Replace the gasket with a new one
3	Transmission hub	**1**	Smear engine oil during assembly
4	Shifter fork I	**1**	Smear engine oil during assembly
5	Shifter fork Ⅱ	**1**	Smear engine oil during assembly
6	Shifter fork Ⅲ	**1**	Smear engine oil during assembly
7	Mainshaft	**1**	Smear engine oil during assembly
8	Upper crankcase	**1**	

Disassembly/assembly of mainshaft

Please refer to the following figure for the disassembly and assembly of mainshaft.
Pay attention to the installation sequence and positions of washer and retainer.
Smear lubricant when assembling shaft sleeve. Align the oil holes of spline shaft sleeve and spline shaft.

Caution:

Make sure that the oil holes are unblocked. Do align the oil holes of spline shaft sleeve with that of mainshaft.



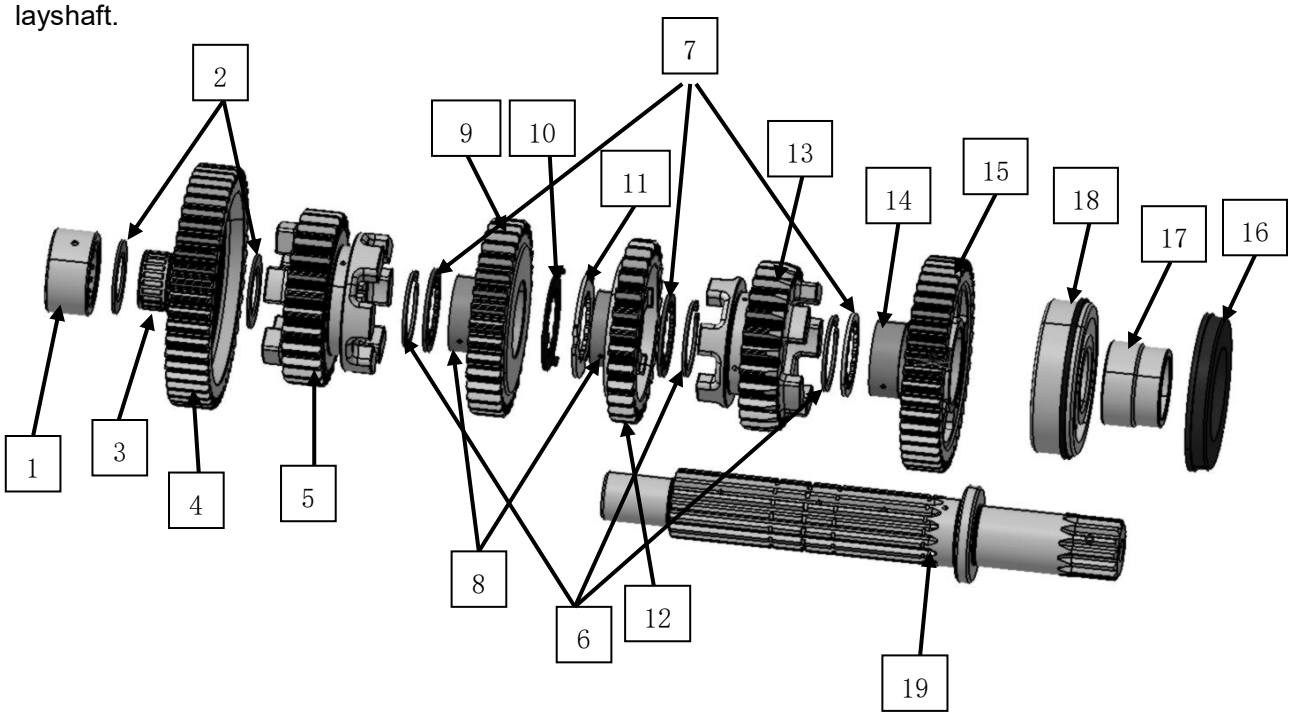
Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Gasket 17.2*29*1	**1**	
2	Second driving gear	**1**	
3	Spline retainer of mainshaft key	**1**	
4	Spline retainer of mainshaft opening	**1**	
5	Spline shaft sleeve 25*28*13	**1**	Smear lubricant during assembly
6	Sixth driving gear	**1**	
7	Spline anti-friction pad 25*30.8*1.5	**2**	
8	Shaft retainer 25	**2**	
9	Third and fourth driving gear	**1**	
10	Shaft sleeve 25×28*12	**1**	Smear lubricant during assembly
11	Fifth driving gear	**1**	
12	Gasket 25.2*32.8*1	**1**	
13	Deep groove ball bearing 6305/P6	**1**	
14	Transmission mainshaft	**1**	

Disassembly/assembly of layshaft

Please refer to the following figure for the disassembly and assembly of layshaft.
Normally, part 17 and part 18 in the figure cannot be disassembled. If they have to be taken down, replace them during assembly.
Pay attention to the installation sequence and positions of washer and retainer.
Smear lubricant when assembling shaft sleeve. Align the oil holes of spline shaft sleeve and spline shaft.

Caution:

Make sure that the oil holes are unblocked. Do align the oil holes of spline shaft sleeve with that of layshaft.



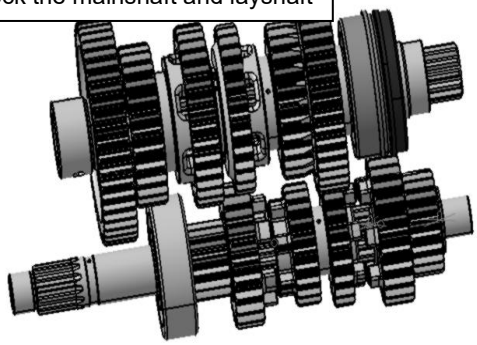
Sequence	Step	Qty.	Remark
	Disassembly sequence		**The assembly and disassembly sequences are reverse.**
1	Needle bearing 20*34*16.7	**1**	
2	Gasket 20.2*30*1	**2**	
3	Needle bearing 20*24*11	**1**	
4	First driven gear	**1**	
5	Fifth driven gear	**1**	
6	Shaft retainer 28	**3**	
7	Spline anti-friction pad 28.5*33.8*1.5	**3**	
8	Spline shaft sleeve 28.3*31*9	**2**	Smear lubricant during assembly
9	Third driven gear	**1**	
10	Spline retainer of layshaft key	**1**	
11	Spline retainer of layshaft opening	**1**	
12	Fourth driven gear	**1**	
13	Sixth driven gear	**1**	
14	Shaft sleeve 28×31*11.5	**1**	Smear lubricant during assembly
15	Second driven gear	**1**	
16	Oil seal 34*62*8	**1**	
17	Bearing fixing sleeve	**1**	The disassembled shall be replaced

18	Deep groove ball bearing TAB6305NR	**1**	The disassembled shall be replaced
19	Transmission layshaft	**1**	

Check

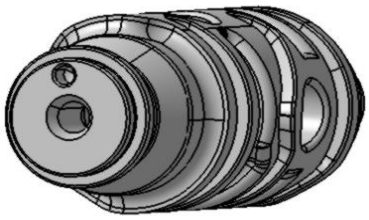
Check the gears of mainshaft and layshaft for abrasion and corrosive pitting, the shifter fork shaft for bending and the guide slot of transmission hub for damage.

Check the mainshaft and layshaft



Check the shifter fork shaft

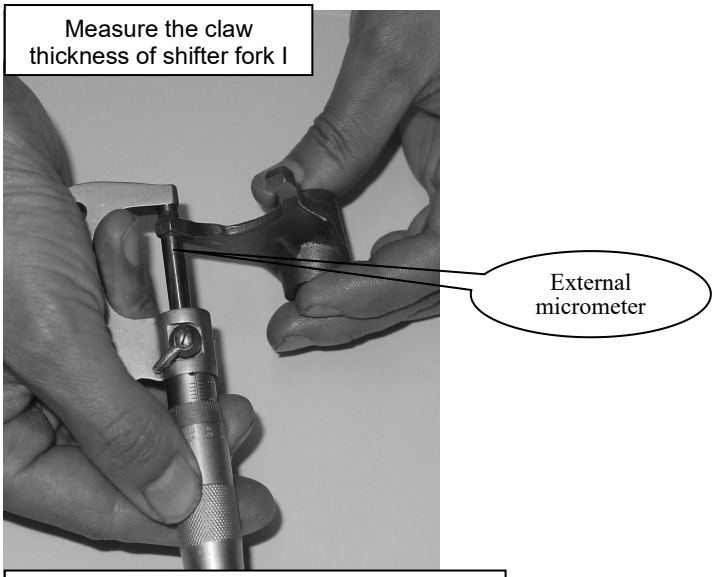
Check the transmission hub



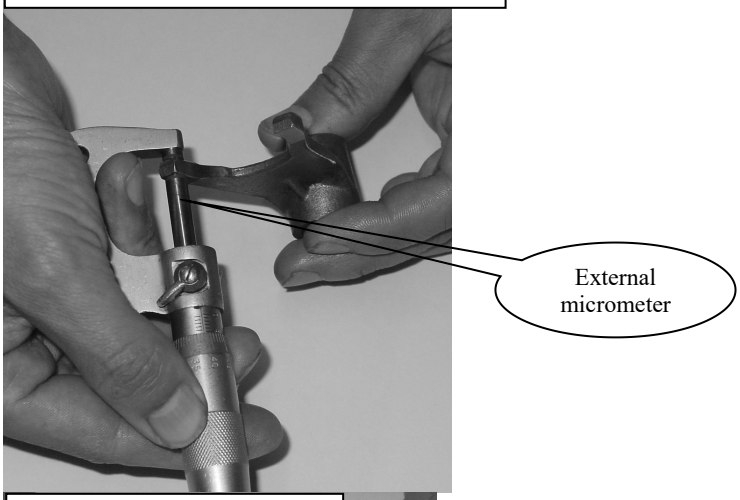
Measure the thickness of shifter fork claw.

Maintenance limit: ≥5.8mm.

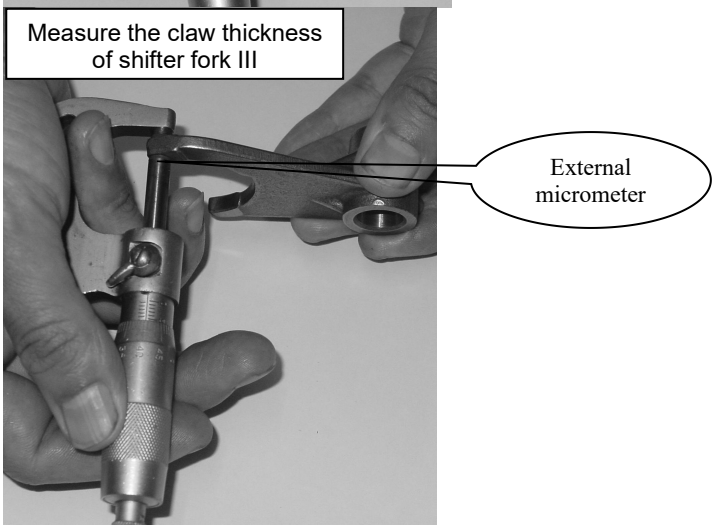
Measure the claw thickness of shifter fork I



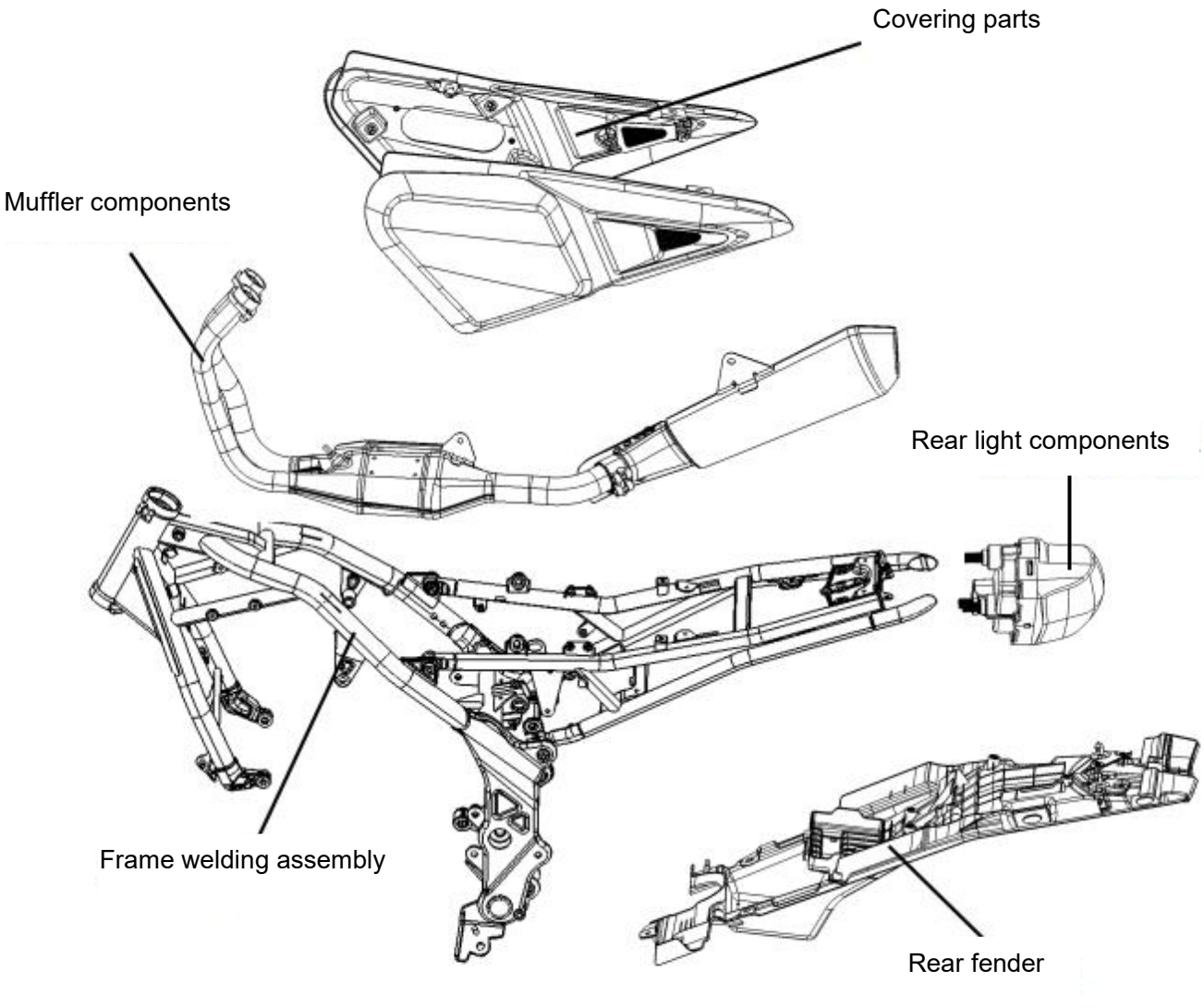
Measure the claw thickness of shifter fork II



Measure the claw thickness of shifter fork III



Frame and Exhaust System



11
Frame and Exhaust System

Maintenance Notice

When maintaining this part, be careful not to scratch and damage the covering parts, instrument and lights.
Removing or maintaining parts before the exhaust system cools may cause severe burns.
This part mainly includes the disassembly and installation of covering parts, rear fender, exhaust muffler, radiator and lights.

Key Torque Values

Fastening screw of handhold	**18-25N.m**

Troubleshooting

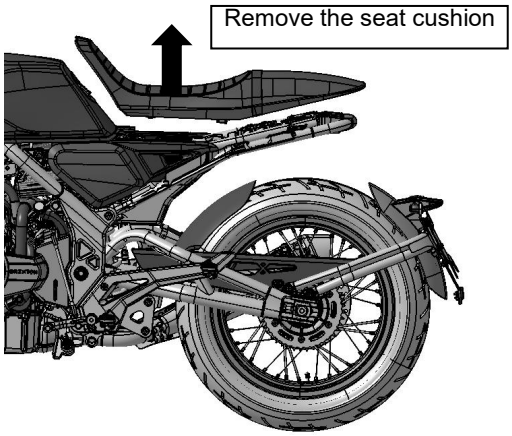
℘ **Excessive emission noise**
1. Damage of exhaust system;
2. Exhaust leakage;

℘ **Abnormal operation**
1. Deformation of exhaust system;
2. Exhaust leakage;
3. Blocking of muffler.

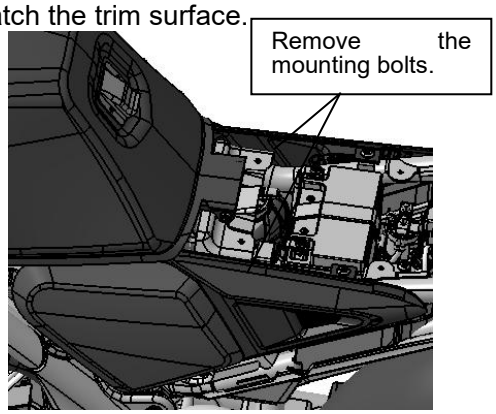
Covering Parts, Headlight and Instrument

Disassembly Steps of Covering Parts, Headlight and Instrument:

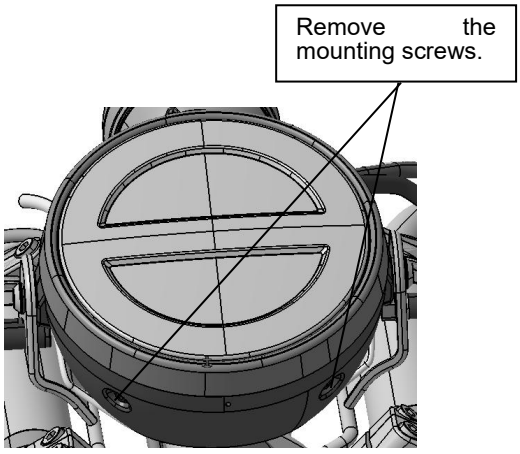
1. Place the motorcycle on a side stand and remove the seat cushion.



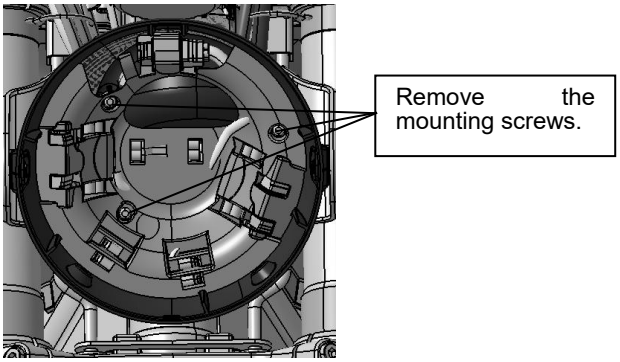
2. Remove one mounting bolt on the left and right side cover respectively. Remove the left and right side cover assembly. Be careful not to scratch the trim surface.



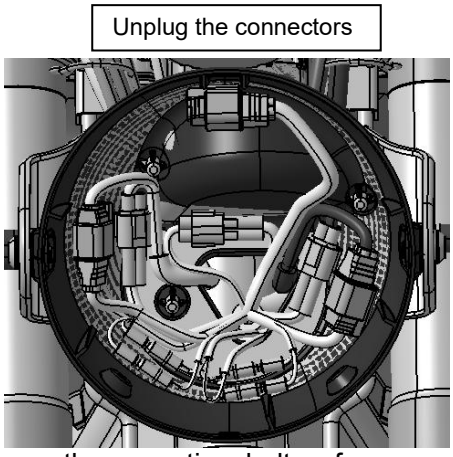
3. Remove the 2 connecting screws of mounting bolts of headlight.



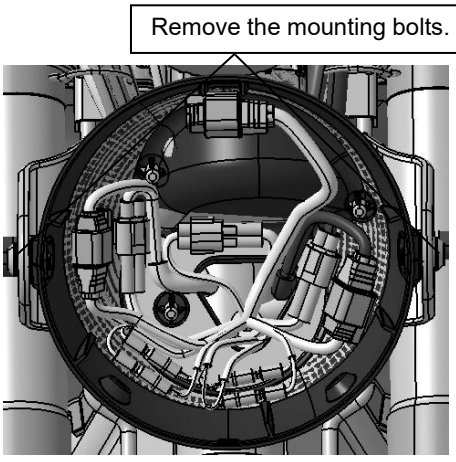
4. Remove the mounting screws of headlight lining plate. Unplug the connectors of headlight and remove the headlight.



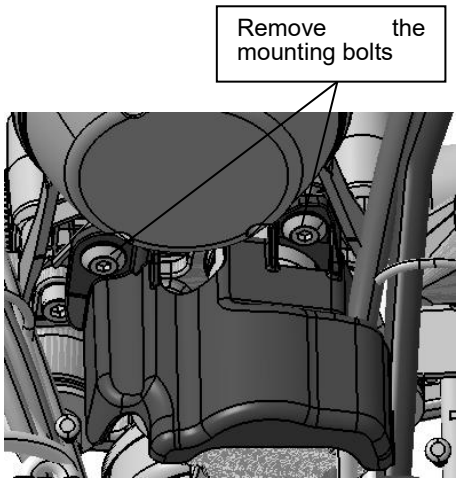
5. Unplug all connectors.



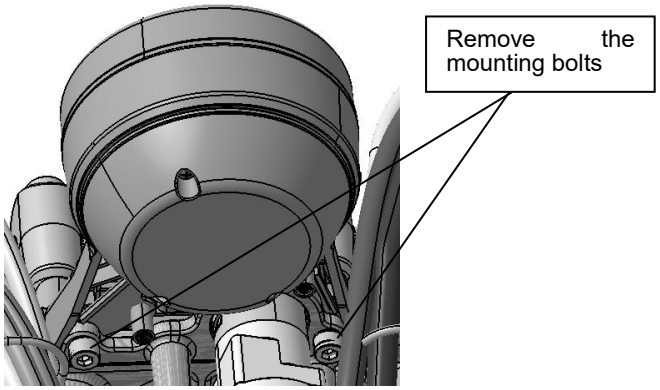
6. Remove the mounting bolts of rear cover of headlight and take down the rear cover.



7. Remove the mounting bolts of ignition switch cover and take down the ignition switch cover.



8. Remove the mounting bolts of instrument and take down the instrument.



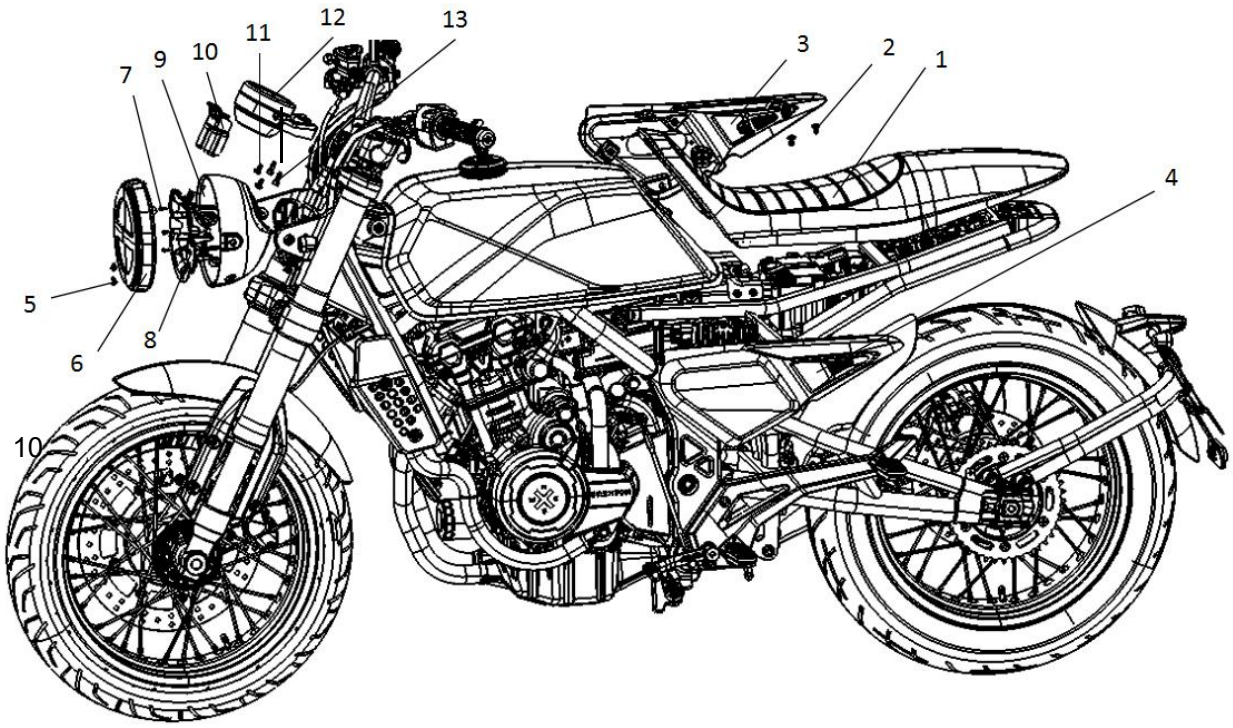
Installation Steps of Covering Parts, Headlight and Instrument:

Install the covering parts, headlight and instrument in the reverse sequence of disassembly. Be careful not to scratch the covering parts or damage the bulb during installation.

Caution:

Do not scratch the surface of covering parts and break the buckle during disassembly and installation.

Disassembly/Installation of Covering Parts, Headlight and Instrument

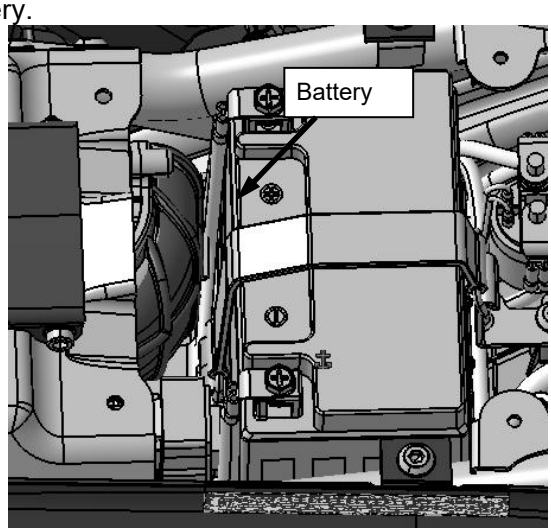


Sequence	Step	Qty.	Remark
	Disassembly Sequence		**The installation and disassembly are in a reverse sequence.**
1	Two-seat cushion component	**1**	
2	Convex bolt M6X12	**2**	
3	Right cover assembly	**1**	
4	Left cover assembly	**1**	
5	M4 hexagon socket convex bolt	**2**	
6	Headlight assembly	**1**	
7	Self-tapping screw ST4.2×10	**3**	
8	Lining plate	**1**	
9	Rear cover assembly	**1**	
10	Trim cover of ignition switch	**1**	
11	Bolt M6X12	**2**	
12	Inner hex disc bolt M6×16	**2**	
13	Integrated instrument component	**1**	

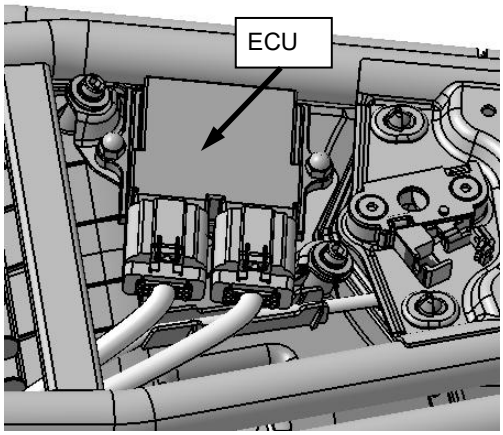
Disassembly/Installation of Rear Fender

Disassembly Steps of Rear Fender:

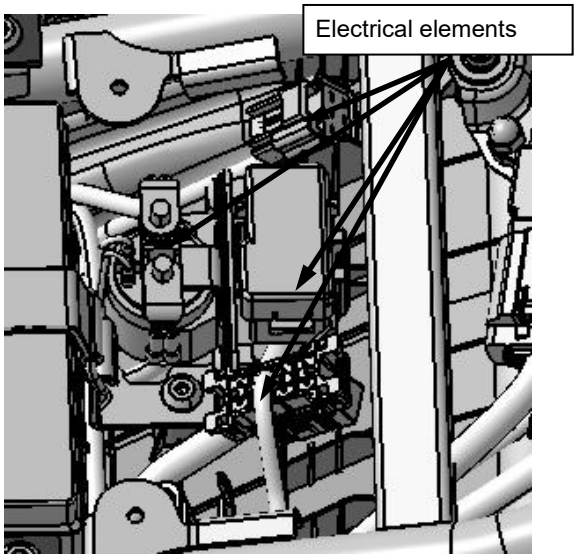
1. Park the motorcycle on the ground, remove the seat cushion with the key and remove the battery.



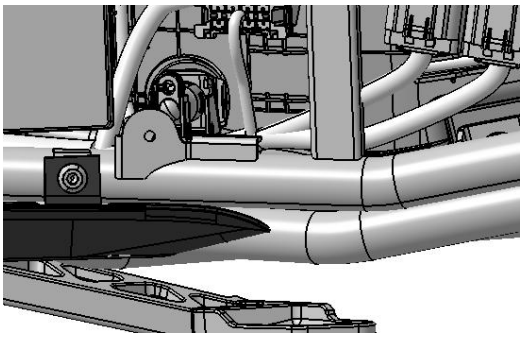
2. Remove the ECU controller.



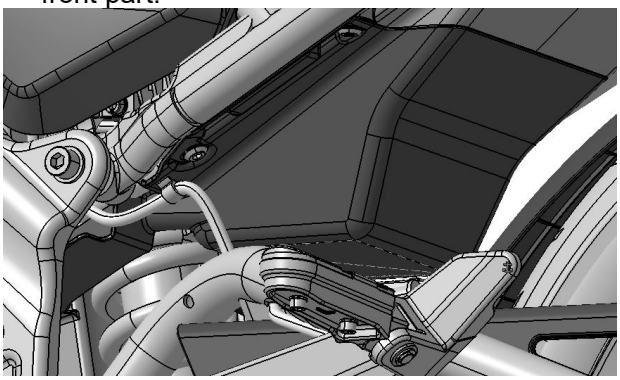
3. Remove all electrical elements



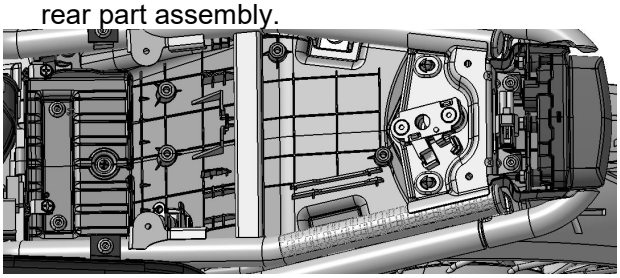
4. Remove the seat cushion fastener



5. Remove the mounting bolts and wire clamps of front part of rear fender and take down the front part.



6. Remove the mounting bolts of rear part assembly of rear fender and take down the rear part assembly.



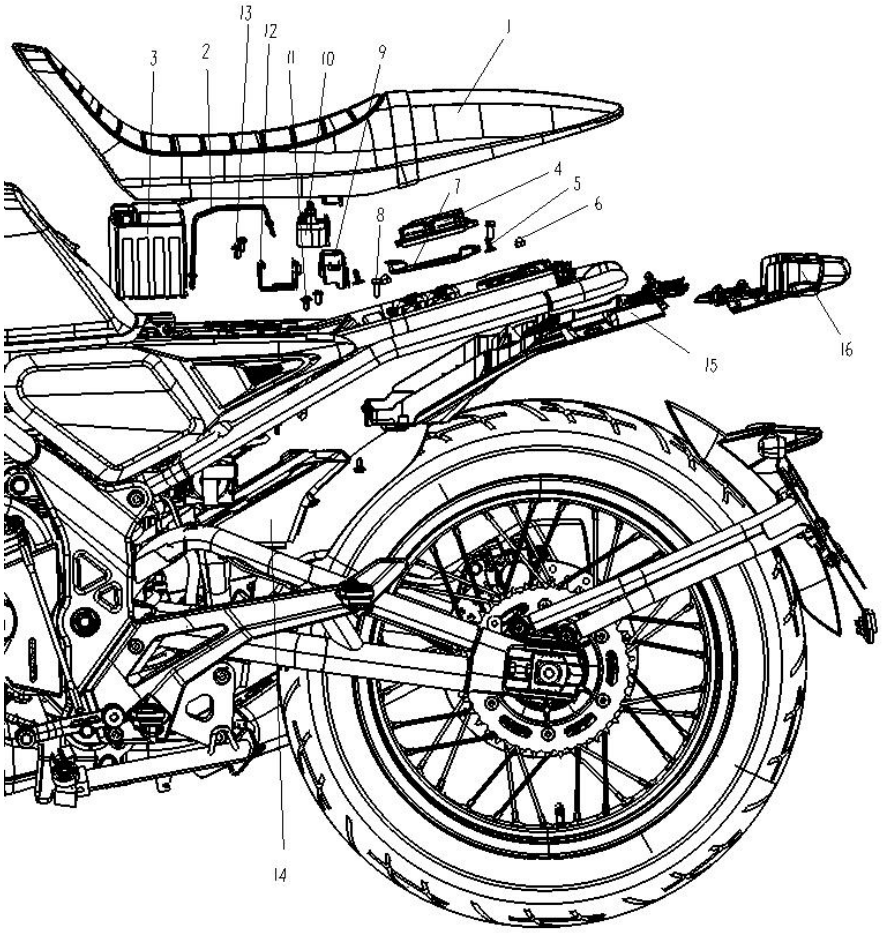
Caution:

The ECU can only be unplugged when the main power is off.

Installation Steps of Rear Fender:

Install the rear fender in the reverse sequence of disassembly.

Disassembly/Installation of Rear Fender

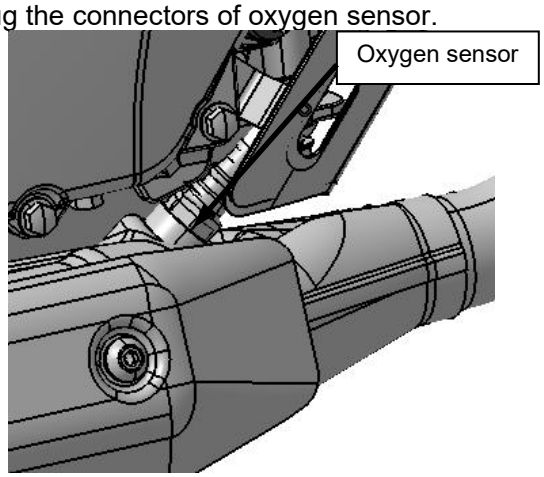


Sequence	Step	Qty.	Remark
	Disassembly Sequence		
1	Two-seat cushion component	**1**	
2	Battery fixing strap	**1**	
3	Battery	**1**	
4	ECU control unit	**4**	
5	ECU mounting screw	**2**	
6	Cap nut	**3**	
7	ECU mounting bracket	**1**	
8	Bolt M6X16	**2**	
9	Fuse box	**1**	
10	Starter relay	**1**	
11	Bolt M6X12	**2**	
12	Mounting bracket of starter relay	**1**	
13	Convex bolt M6X12	**6**	
14	Front part of rear fender	**1**	
15	Rear part of rear fender	**1**	
16	Taillight fender	**1**	

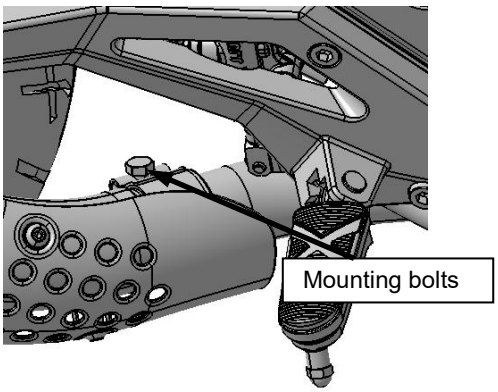
Disassembly/Installation of Exhaust Muffler

Disassembly Steps of Exhaust Muffler

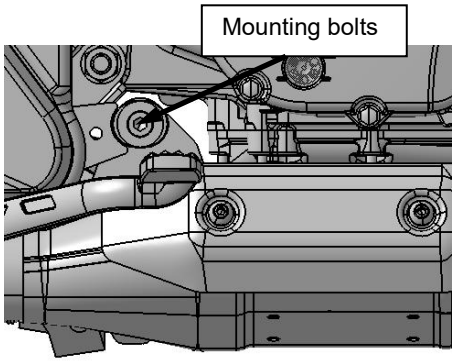
1. Place the motorcycle on a side stand and unplug the connectors of oxygen sensor.



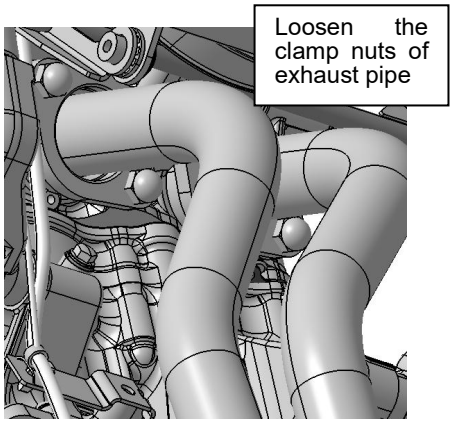
2. Loosen the bolts of connector hoop.



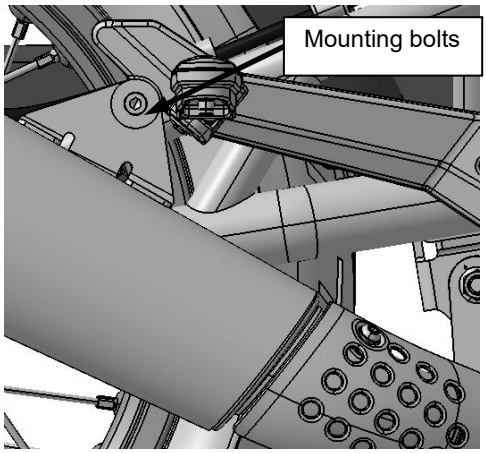
3. Loosen the bolts connecting muffler and frame and take down the muffler.



4. Loosen the clamp nuts of exhaust pipe.



5. Remove the mounting bolts of exhaust pipe and take down the exhaust pipe.



Installation Steps of Exhaust Muffler:

Install the exhaust muffler in the reverse sequence of disassembly.

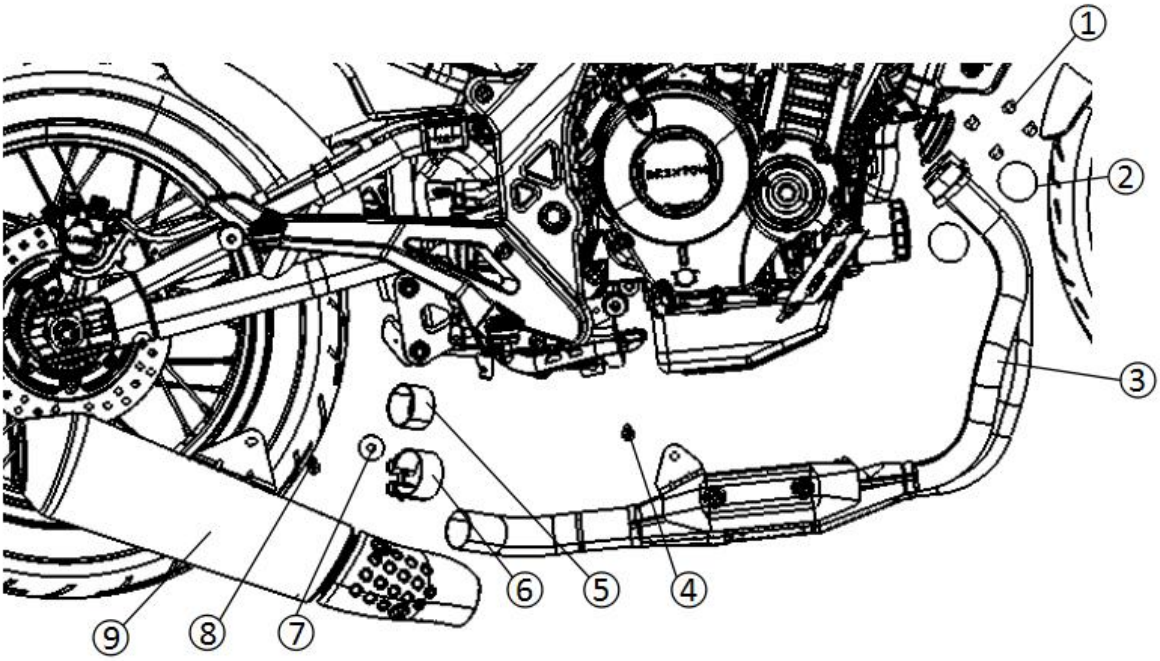
The muffler gasket at the engine exhaust port shall be replaced.

During installation, apply sealant to the joint between the exhaust pipe and the muffler. Fasten the bolts of connector hoop first, and then fasten the bolts of the support of exhaust port and muffler, otherwise it will cause air leakage.

Caution:

Make sure the muffler is completely cooled before installation, otherwise it could cause burns.

Disassembly/Installation of Exhaust Muffler

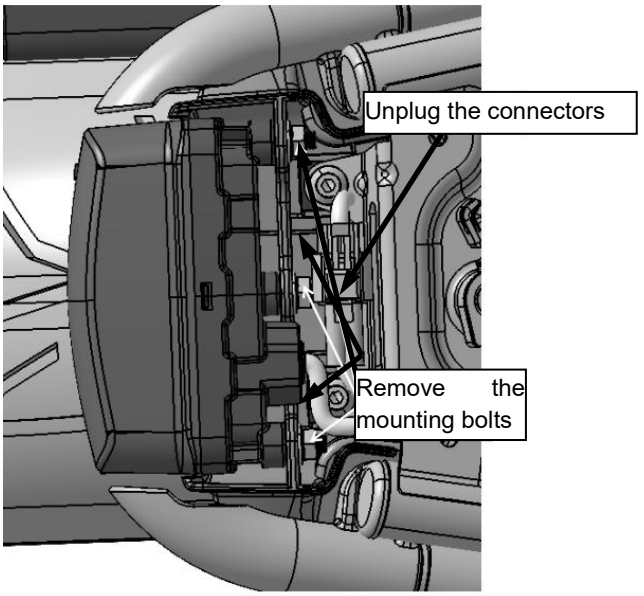


Sequence	Step	Qty.	Remark
	Disassembly Sequence		**The installation and disassembly are in a reverse sequence.**
1	Cap nut M8	**4**	
2	Sealing gasket of exhaust port	**2**	
3	Exhaust pipe assembly	**1**	
4	Inner hexangular core screw M8X45	**1**	
5	Graphite sealing gasket	**1**	Special sealant for installation
6	Hoop assembly	**1**	
7	Gasket 8	**1**	
8	Inner hexangular core screw M8X55	**1**	
9	Muffler assembly	**1**	

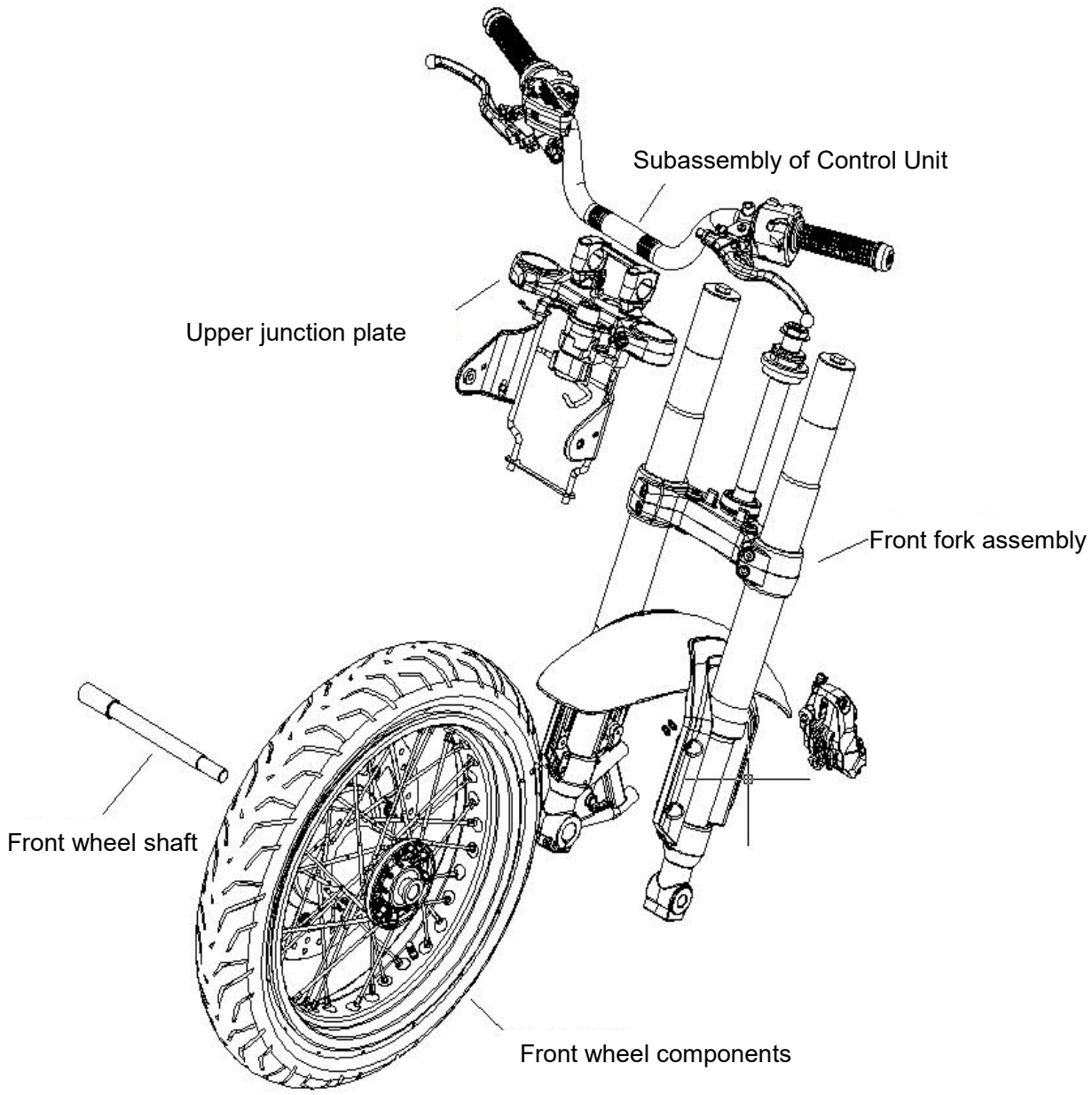
Taillight Assembly

Disassembly Steps of Taillight:

1. Open the seat cushion lock with key and take down the seat cushion.
2. Unplug the connectors, remove the mounting bolts and take down the taillight assembly.



Front Wheel, Front Suspension, Steering Column and Front Brake



12
Front Wheel, Front Suspension, Steering Column and Front Brake

Maintenance Notice

- When repairing the front wheel, the motorcycle shall be reliably held up by putting a jack or other support under the engine to keep the front wheel off the ground.
- Only tires marked "TUBELESS" can be used.
- Since inhaling friction piece dust will cause respiratory irritation, please do not use air duct or dry brush to clean brake assembly, but go to a professional service shop for repair and maintenance.

Key Torque Values

Front wheel shaft	80-90 N.m	Fastening bolt of front shock absorber plate	20-25 N.m
Fastening bolt of handle	20-25 N.m	Bolt of front fork stem	60-90 N.m
Fastening bolt of upper and lower junction plate	20-25 N.m	Fastening screw of brake disc	20-30 N.m

Troubleshooting

Unstable direction
1. The stem bearing is damaged;
2. The tire pressure is insufficient;
3. The tire is damaged;
4. The wheel bearing is damaged;
5. The regulating nut of stem is too tight.

Motorcycle running to one side or not in a straight line
1. The left and right shock absorbers are not evenly adjusted;
2. The front fork is bended;
3. The front wheel shaft is bended and the wheel is installed incorrectly;
4. The wheel bearing is damaged.

Run-out of front wheel
1. The rim is bended and deformed;
2. The wheel bearing is abraded;
3. The wheel spoke is deformed or loose;
4. The front wheel shaft is loose;
5. The tire is damaged.

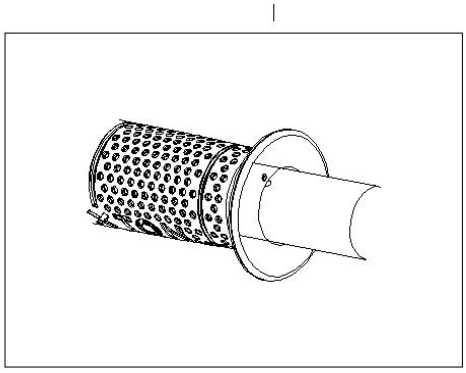
Wheel rotation difficulty
1. The wheel bearing and bearing sleeve are damaged;
2. The tire pressure is insufficient;
3. The friction plate of brake fails to return.

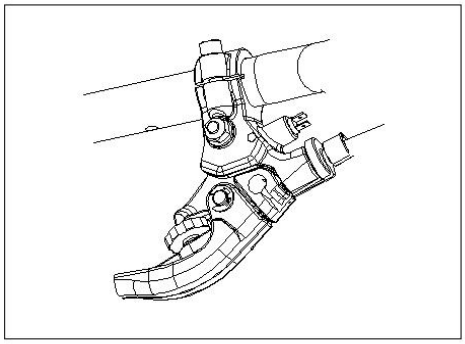
Over-soft of front suspension
1. The elastic force of front fork spring is not enough;
2. The hydraulic oil level is too low or the liquid model is wrong.

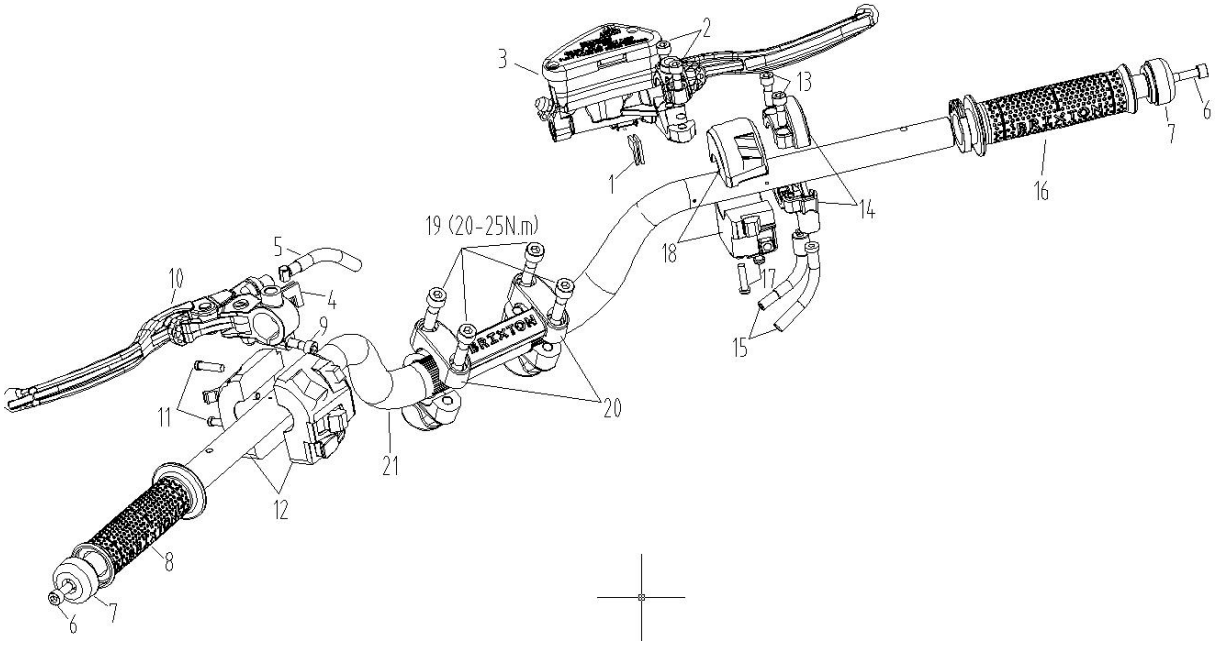
Over-hard of front suspension
1. The hydraulic oil level is too high or the liquid model is wrong.
2. The fork stem of front shock absorber is bended;
3. The damper of front shock absorber is blocked.

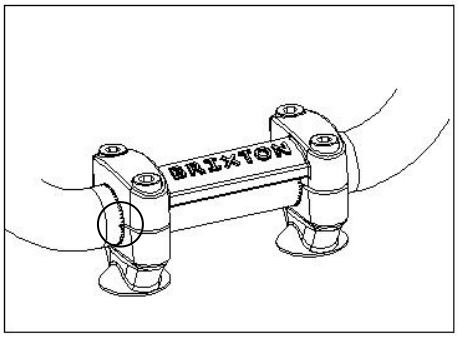
Bad performance of brake
1. There is air in the brake pipe;
2. The brake shoe is abraded;
3. There is water or greasy dirt on the brake shoe.

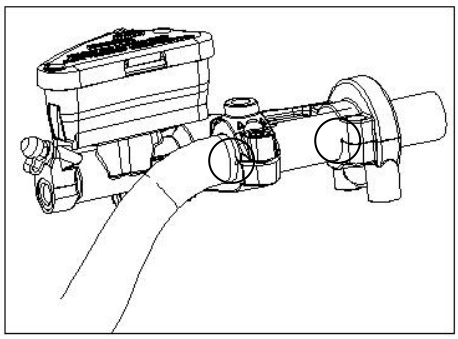
Disassembly/Installation of Control Unit Subassembly











Notes

The master cylinder of front brake shall be lifted up with steel wire rope to the height at least the same as the height of the original installation position, so as to avoid air intrusion into the master cylinder and affecting the braking performance. Do not twist the brake hose.

The opening of clutch handle and front brake cylinder block shall be aligned with the mark of handle tube during installation.

The opening at the back end of the clip shall be aligned with the mark of the handle. The bolts in the front of the clip shall be tightened first, and then the bolts at the back.

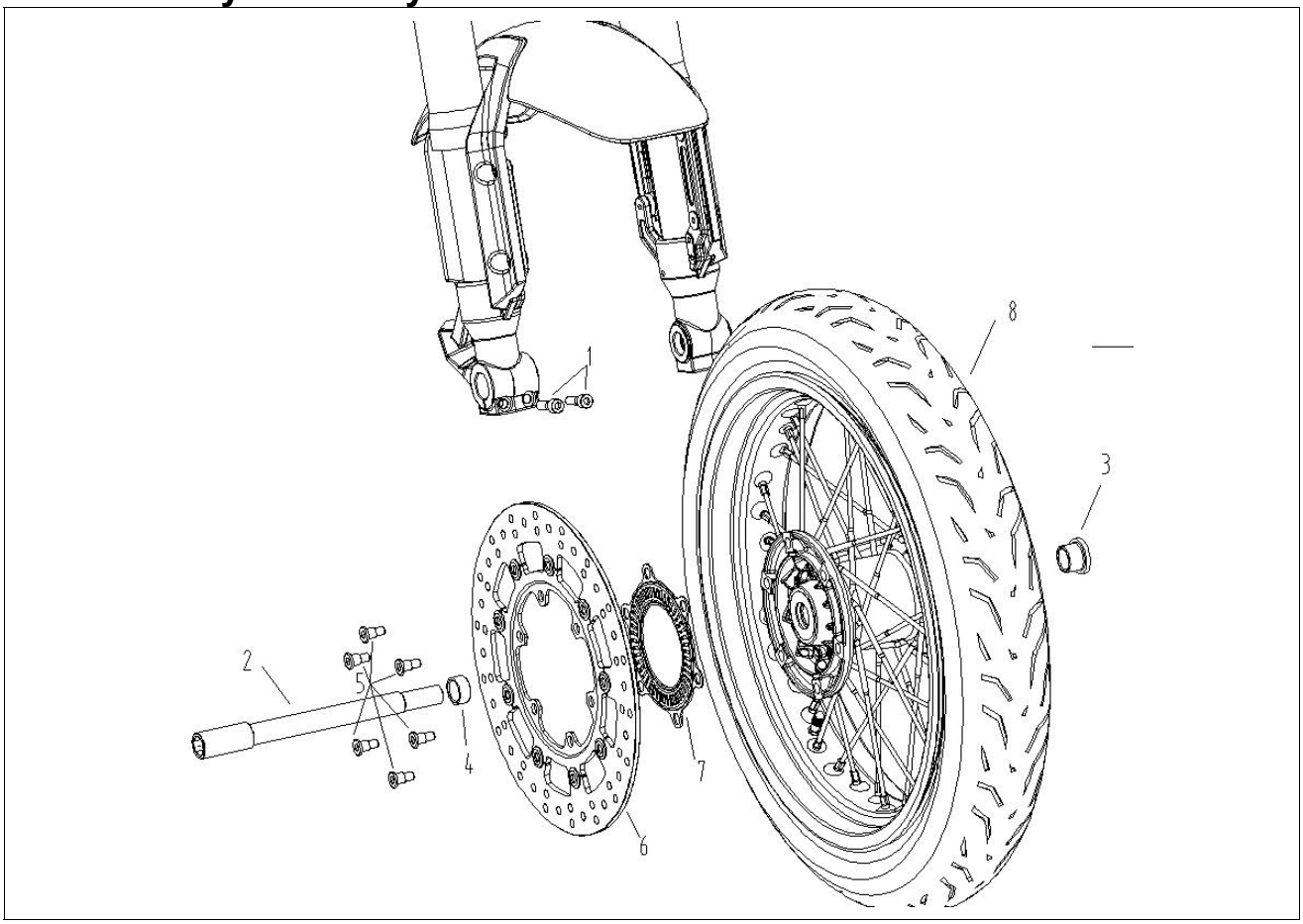
After installation, the throttle control line shall be adjusted.

The cables and wiring shall be consistent with the wiring diagram.

Maintenance Requirements

Sequence	Step	Qty.	Remark
Disassembly Sequence		The installation and disassembly are in a reverse sequence.	
1	Plug of brake switch	2	
2	Bolt of clip of front brake master cylinder	2	Notes: 1. Tighten a bolt in the front, then a bolt in the rear; 2. The two raised triangle marks on the clip shall face backward.
3	Front brake cylinder block component	1	
4	Plug of clutch switch	2	
5	Clutch cable	1	
6	Bolt of counter weight	2	
7	Counter weight	2	
8	Left handle	1	Align the handle mark with the mark on handle tube
9	Bolt of clutch handle	1	Align the handle opening with the mark on handle tube
10	Clutch handle	1	
11	Screw of left integrated switch	2	Note: First tighten the upper bolt, then the lower bolt.
12	Left integrated switch	1	
13	Screw of oil filler base	2	Note: First tighten the front bolt, then the rear bolt.
14	Oil filler base	1	
15	Throttle cable	2	Note: Do not bend or twist the throttle cable.
16	Oil filler	1	
17	Screw of right integrated switch	2	Note: First tighten the front bolt, then the rear bolt.
18	Right integrated switch	1	
19	Bolt of clip	4	Note: First tighten the front bolt, then the rear bolt.
20	Clip	1	
21	Handle tube	2	Note the mark position during installation.

Disassembly/Assembly of Front Wheel



Notes

Contaminated brake disc and friction disc will degrade the brake performance, So, the friction disc shall be replaced and the contaminated brake disc shall be cleaned.

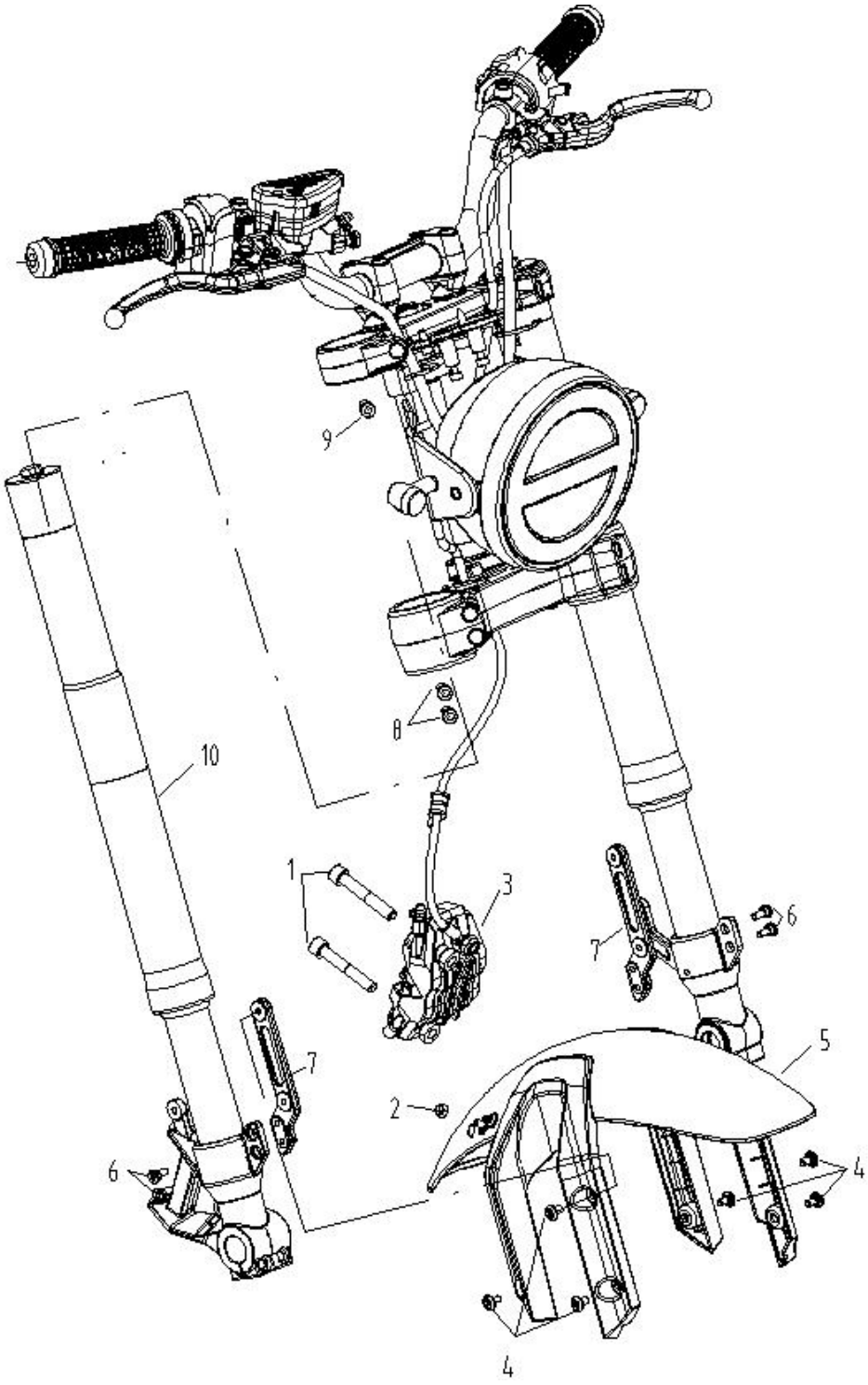
After removing the brake caliper, do not pull the brake handle, otherwise it will be difficult to assemble the front wheel.

The vehicle bearings shall be replaced in a complete set.

Maintenance Requirements

Sequence	Step	Qty.	Remark
Disassembly Sequence		The installation and disassembly are in a reverse sequence.	
1	Bolt	2	Tightening torque: 20-25N.m
2	Front wheel shaft	1	Tightening torque: 80-90N.m, apply lithium grease
3	Left shaft sleeve of front wheel	1	Apply lithium grease during assembly.
4	Right shaft sleeve of front wheel	1	Apply lithium grease during assembly.
5	Bolt of front brake disc	6	Tightening torque: 20-30N.m
6	Front brake disc assembly	1	
7	Front speed signal disc	1	

Disassembly/Assembly of Front Suspension



Notes

The master cylinder of front brake shall be lifted up with steel wire rope to the height at least the same as the height of the original installation position. Do not twist the brake hose.

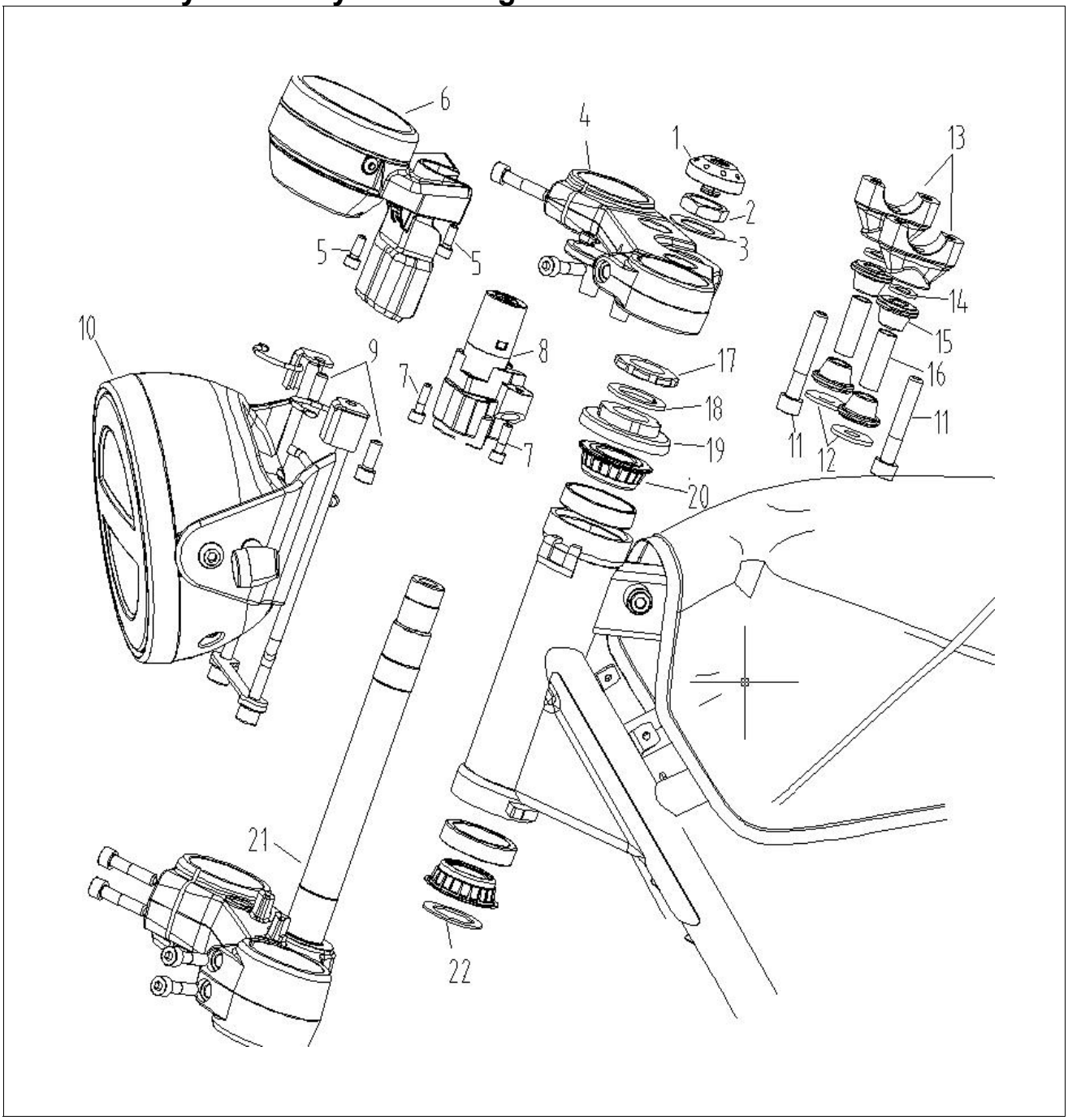
After removing the brake caliper, do not pull the brake handle, otherwise it will be difficult to assemble the front wheel.

Before removing the shock absorber, loosen the lock nut of steering column, but not remove it.

Maintenance Requirements

Sequence	Step	Qty.	Remark
Disassembly Sequence		The installation and disassembly are in a reverse sequence.	
1	Bolt of brake caliper	2	Tightening torque: 45-50N.m
2	Nut of fixing clamp of front brake oil pipe	1	
3	Front brake caliper component	1	Note: The master cylinder of front brake shall be lifted up with steel wire rope and do not twist the brake hose.
4	Bolt of front fender	6	Convex bolt M6X12
5	Front fender	1	
6	Screw of fender bracket	4	Inner hex convex bolt M6X16
7	Fender bracket	2	
8	Mounting bolt of lower junction plate	4	Inner hex bolt M8X35, loose it only
9	Mounting bolt of upper junction plate	2	Inner hex bolt M8X35, loose it only and note the falling of shock absorber.
10	Front shock absorber	2	

Disassembly/Assembly of Steering Column



Maintenance Requirements

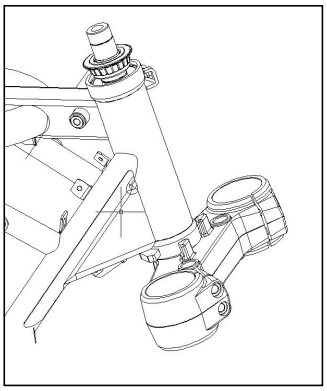
Sequence	Step	Qty.	Remark
Disassembly Sequence		The installation and disassembly are in a reverse sequence.	
1	Trim cover	1	
2	Steering column nut	1	Assembling torque: 60-90N.m
3	Steering column gasket	1	
4	Upper junction plate	1	
5	Mounting screw of instrument	2	Inner hexangular screw M5X12
6	Mounting bracket of integrated instrument and ignition switch cover	1	
7	Locking screw of ignition switch	2	Inner hexangular screw M6X20
8	Integrated ignition switch component	1	
9	Mounting bolt of headlight bracket	2	Inner hexangular screw M8X16
10	Headlight component and bracket	1	
11	Clip base mounting bolt M10X1.25X60	2	Bolt M10X1.25X60, Note: Apply thread sealant during assembly
12	Big washer 10	2	
13	Clip base	2	Note: Apply thread sealant during assembly
14	Flat washer 10	2	
15	Rubber pad of clip base	4	Note: The rubber pad shall be replaced if aged or cracked.
16	Clip base liner	2	
17	Regulating nut B	1	Assembling torque: 5-8N.m
18	Regulating nut gasket	1	
19	Regulating nut A	1	Assembling torque: 5-8N.m, rotate the steering column repeatedly during assembly
20	Conical roller bearing	2	
21	Steering column assembly	1	Rotate the steering column repeatedly during assembly
22	Steering column bearing washer	1	

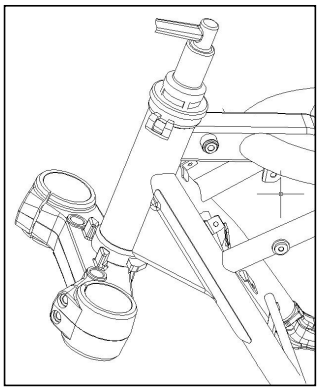
Assembly of Steering Column

Apply sufficient lithium grease to the surface of bearing roller.

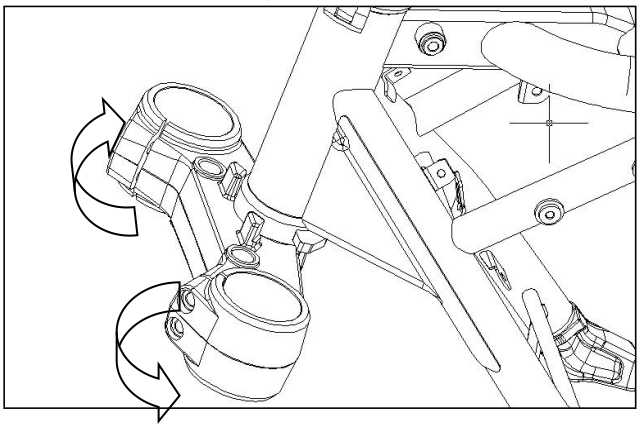
Put the steering column into the frame stem.

Put the bearing and regulating nut A in turn and temporarily tighten the regulating nut A to the torque of 25N.m.



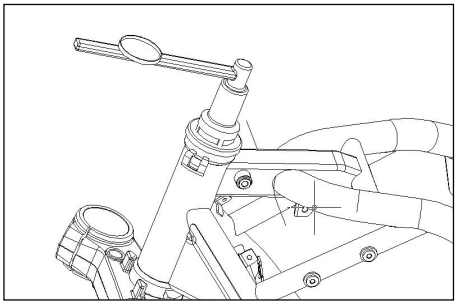


Tighten the regulating nut A and rotate the steering column repeatedly to match the bearing roller with the seat ring.

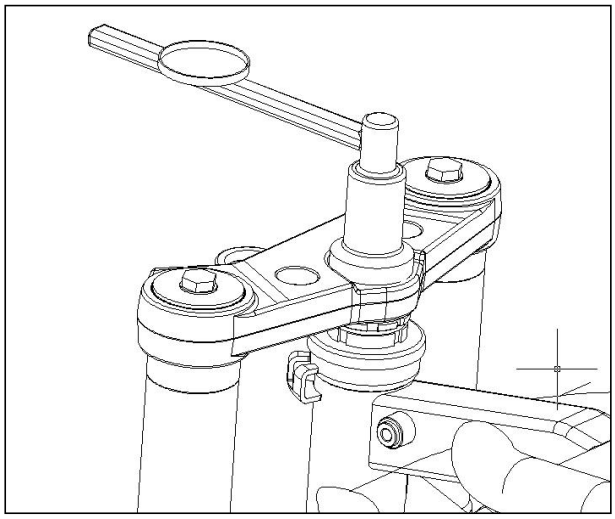


Loosen regulating nut A to the zero torque. Then tighten the regulating nut A again to the torque of 5-8N.m.

Put the bearing and regulating nut B in turn and temporarily tighten the regulating nut B to the torque of 5-8N.m.



Put the upper junction plate and the steering column gasket and then tighten the steering column nut to the specified torque of 60-90N.m. Rotate the column again to make sure that it can turn reliably and smoothly without any external force, without any jamming.



Front brake

Maintenance Notice

- Contaminated brake disc and friction disc will degrade the brake performance, So, the friction disc shall be replaced and the contaminated brake disc shall be cleaned.
- Since inhaling friction piece dust will cause discomfort of respiratory, please do not use air duct or dry brush to clean brake assembly, but go to a professional service shop for repair and maintenance.
- Spilled brake fluid will seriously damage the surface of instrument glass and oil and gas components, and is harmful to some rubber. So, be careful when removing the main cylinder and first make sure that the master cylinder is placed horizontally.
- Do not let contaminants (dust, dirt, water, etc.) enter the master cylinder.
- Once the hydraulic system is opened, or the brake is loose, the air must be removed from the brake system.
- DOT4 brake fluid shall be used for system maintenance. Do not mix it with brake fluid of other models.
- Before driving a motorcycle, check the braking status.

Troubleshooting

Loose brake

1. There is air in pipeline;
2. The pipeline has leakage;
3. The brake liquid level is too low;
4. The brake friction disc is smudgy;
5. The piston seal of brake minor cylinder is abraded or aged;
6. The piston seal of brake master cylinder is abraded or aged;
7. The piston of brake minor cylinder is stuck or aged;
8. The piston of brake master cylinder is stuck or aged;
9. The brake shoe is abraded;
10. The brake shoe slips difficultly;
11. The pipeline is blocked
12. The brake disc is warped or deformed;
13. The pipeline is contaminated.

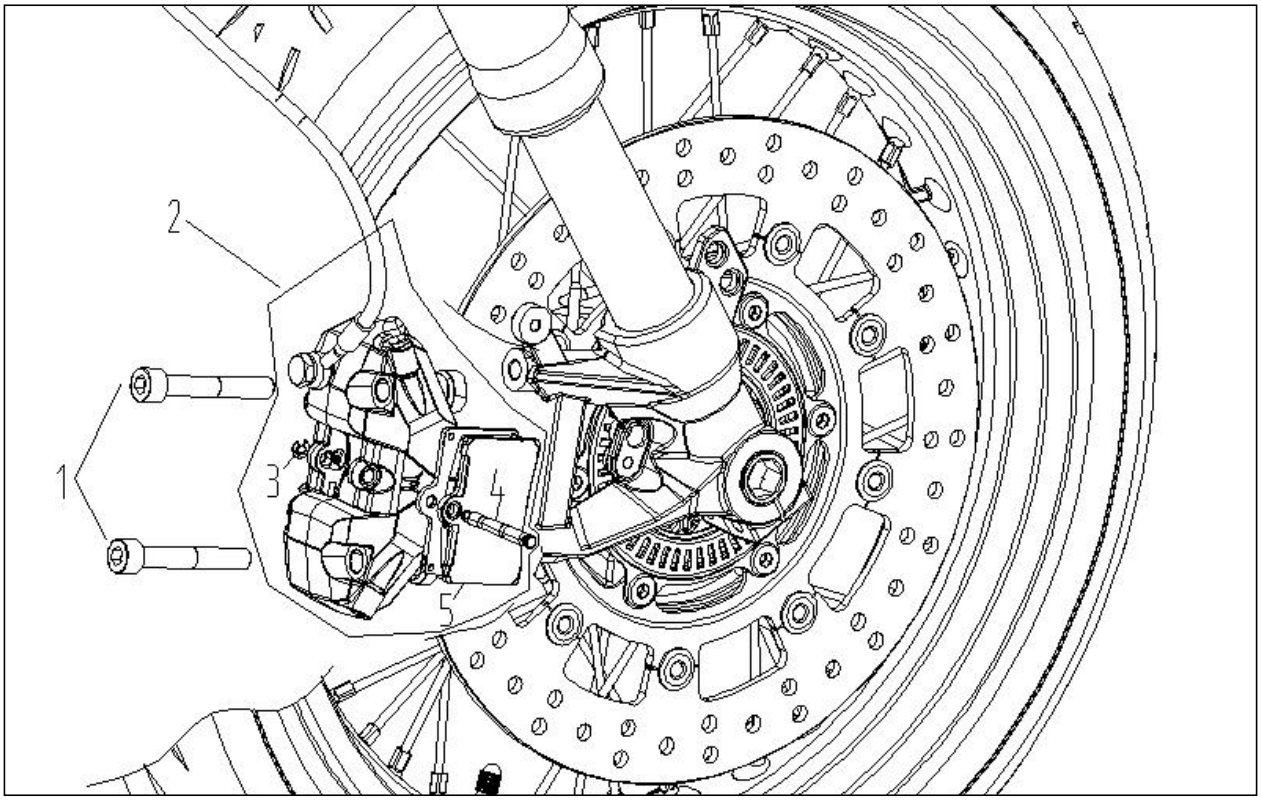
Inflexible brake handle

1. The brake system is blocked;
2. The brake caliper piston is stuck or abraded.
3. The brake shoe slips difficultly;
4. The pipeline is blocked;
5. The master pump piston of brake is stuck or abraded.
6. The brake handle is bended.

Brake running sideways

1. The brake disc/friction disc is smudgy;
2. The wheel has not been adjusted correctly;
3. The brake disc is warped or deformed;
4. The brake shoe slips difficultly;

Disassembly/Assembly of Front Brake Caliper



Notes

Contaminated brake disc and friction disc will degrade the brake performance, So, the friction disc shall be replaced and the contaminated brake disc shall be cleaned.

The master cylinder of front brake shall be lifted up with steel wire rope to the height at least the same as the height of the original installation position. Do not twist the brake hose.

After removing the brake caliper, do not pull the brake handle, otherwise it will be difficult to assemble the front wheel.

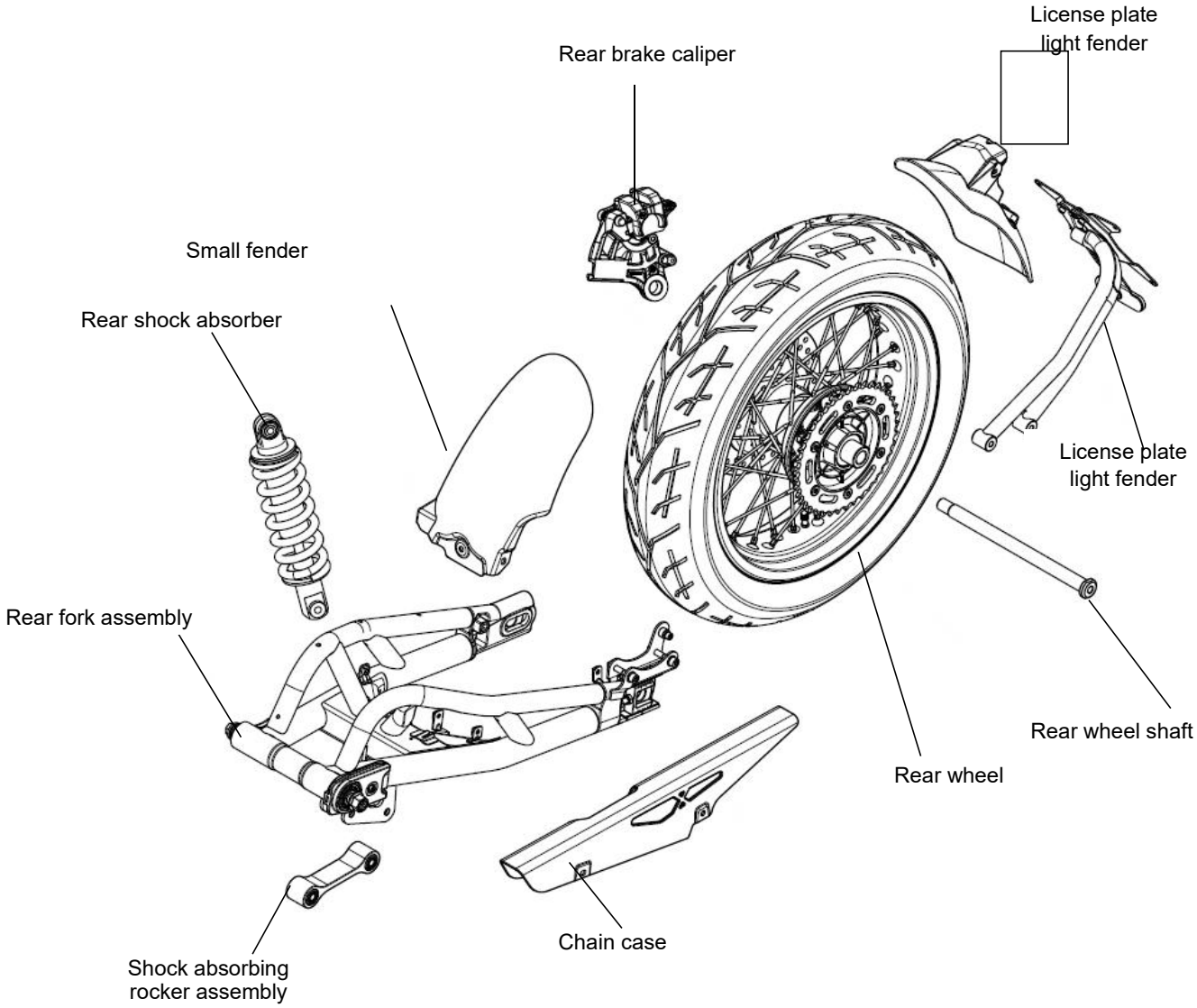
Since inhaling friction piece dust will cause discomfort of respiratory, please do not use air duct or dry brush to clean brake assembly, but go to a professional service shop for repair and maintenance.

After replacing the friction plate, repeatedly operate the brake handle to reset the caliper and cylinder piston against the friction plate.

Maintenance Requirements

Sequence	Step	Qty.	Remark
Disassembly Sequence		The installation and disassembly are in a reverse sequence.	
1	Bolt of brake caliper	2	Tightening torque: 45-50N.m
2	Front brake caliper component	1	The master cylinder of front brake shall be lifted up with steel wire rope and do not twist the brake hose.
3	Spring clip	1	
4	Locating pin of friction plate	1	
5	Friction plate	2	

Rear Wheel, Rear Brake and Rear Suspension



13
Rear Wheel, Rear Brake and Rear Suspension

Maintenance Notice

This part introduces the disassembly, installation and maintenance of rear wheel, rear brake, rear fork, rear shock absorber and rocker link. When repairing the rear wheel, rear shock absorber and rocker link, the motorcycle shall be reliably held up by putting a jack or other support under the engine.

Key Torque Values

Rear wheel shaft clamp nut	**80-100 N.m**
Rear fork shaft nut	**90-100 N.m**
Bolt and nut of shock absorbing rocker	**34-44 N.m**
Fastening screw of brake disc	**20-30N.m**

Troubleshooting

℘ Swing of rear wheel

1. The rim is bended;
2. The rear wheel bearing is abraded;;
3. The tire pressure is too low;
4. The left and right regulator are inconsistent;
5. The wheel bearing sleeve is damaged.

℘ Wheel rotation difficulty

1. The wheel bearing and bearing sleeve are damaged;
2. The wheel is installed incorrectly;
3. The rear wheel shaft is bended;
4. The friction plate of rear brake fails to return.

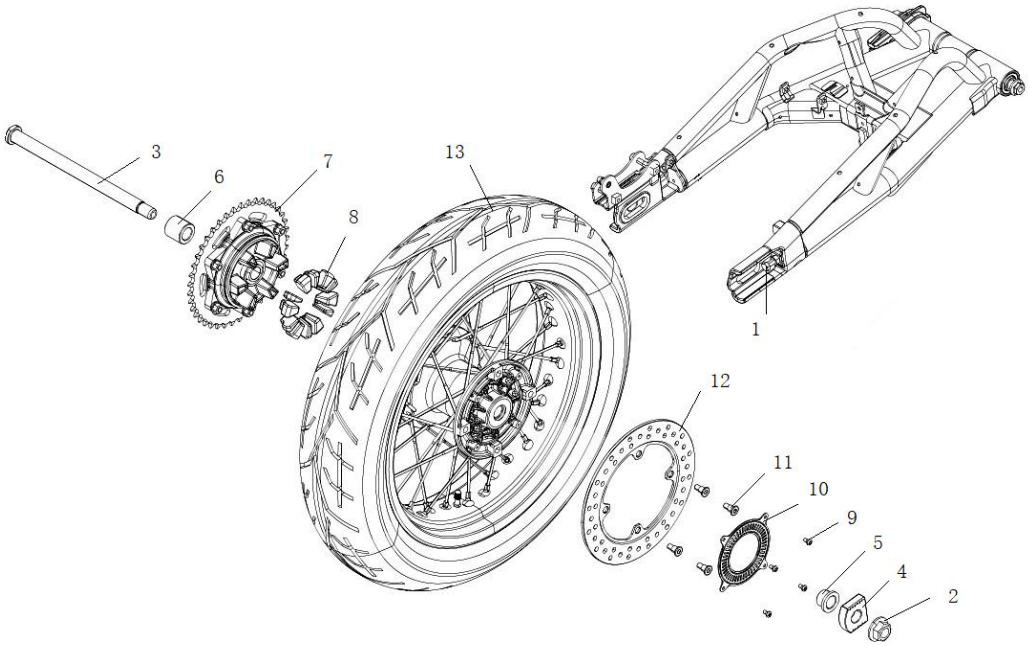
℘ Abnormality of suspension

1. The damping spring is over hard or soft;
2. The rear fork bearing is damaged;
3. The shock absorber is bended.

℘ Abnormal noise

The fastener is loose.

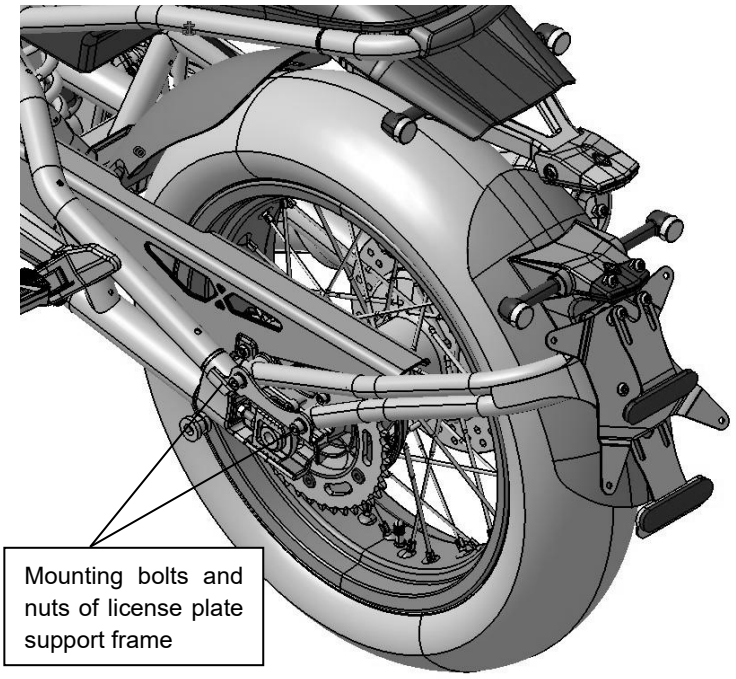
Rear wheel



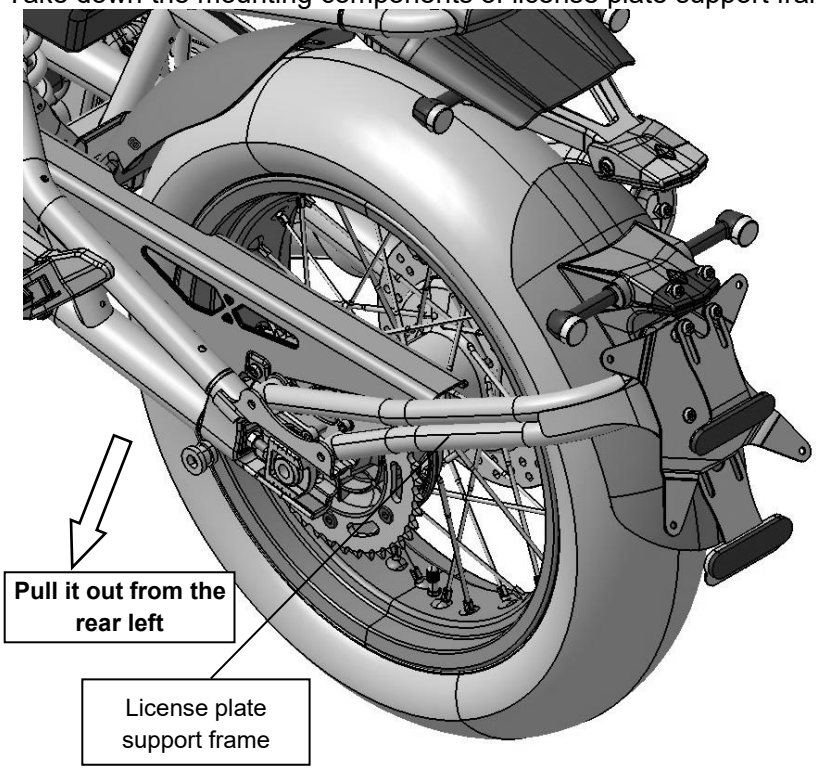
1. Chain regulating bolt, lock bolt and nut; 2. Clamp nut of rear wheel shaft; 3. Rear wheel shaft; 4. Locating plate; 5. Right bush of rear wheel; 6. Left bush of rear wheel; 7. Shock absorber assembly; 8. Crash pad; 9. Fastening screw of speed signal panel; 10. Rear speed signal panel; 11. Fastening screw of rear brake disc; 12. Rear brake disc; 13. Rear wheel assembly

Disassembly Steps of Rear Wheel

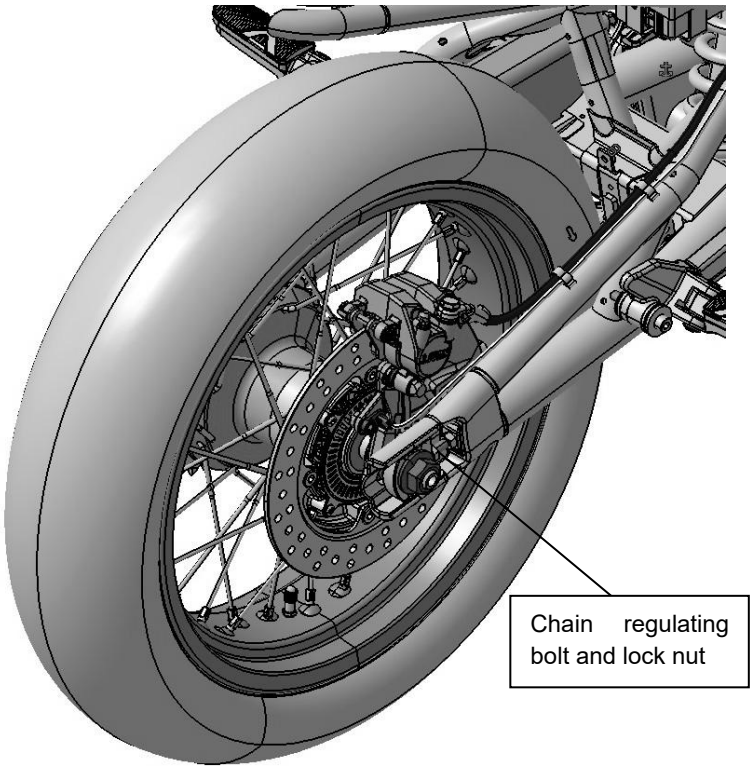
1. Unscrew 2 pairs of mounting bolts and nuts of license plate support frame



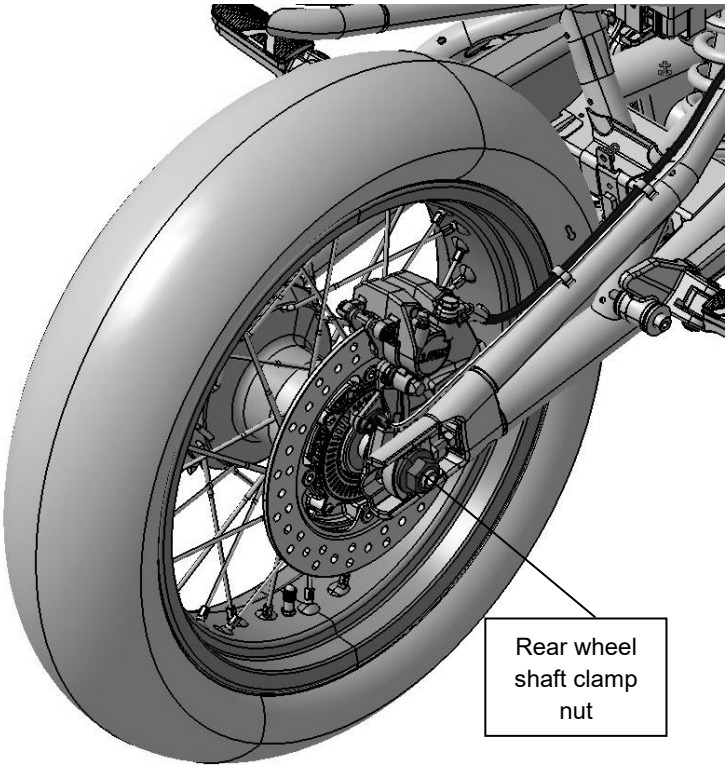
2. Take down the mounting components of license plate support frame



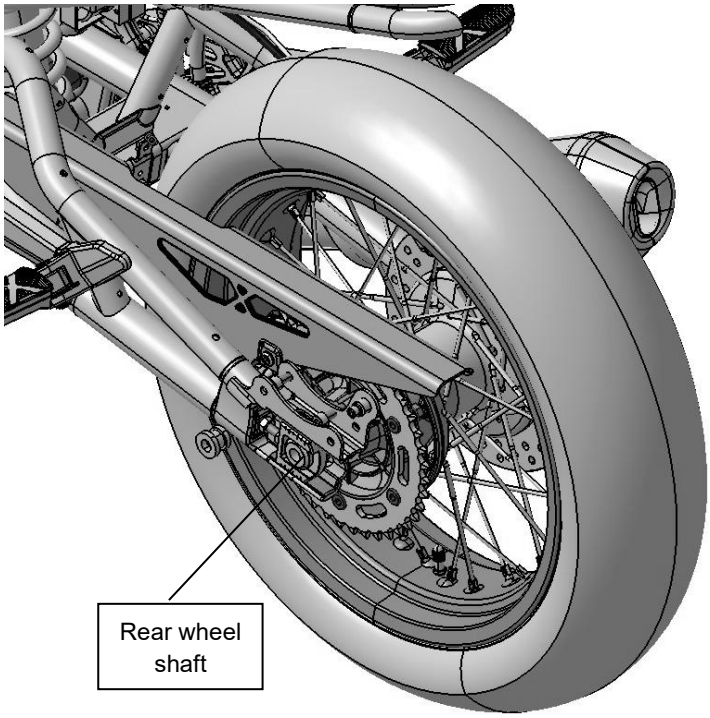
3. Loosen the chain regulating bolt and lock nut to remove them from the locating plate



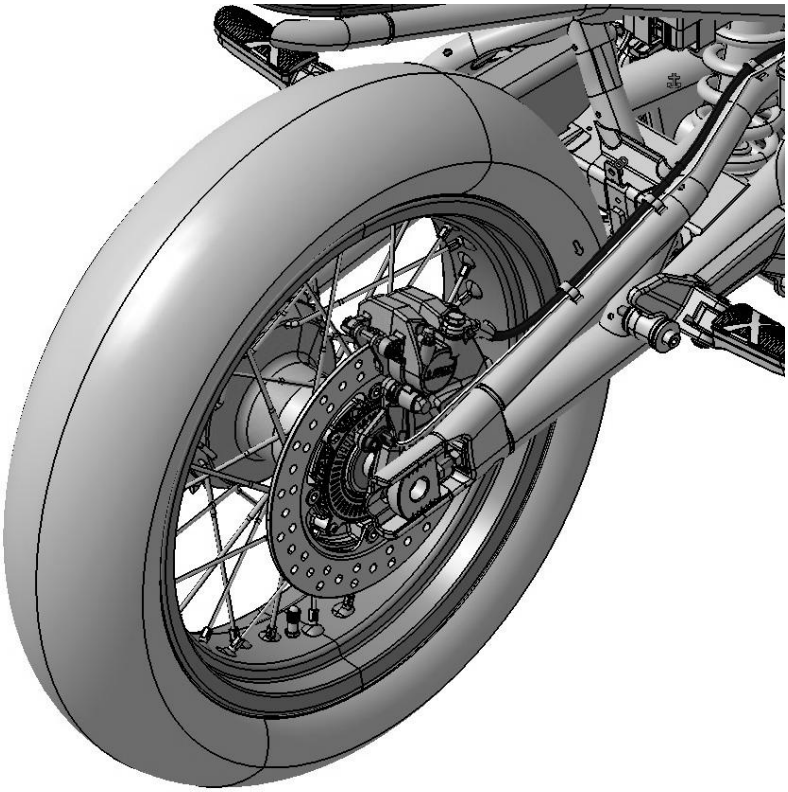
4. Unscrew the rear wheel shaft clamp nut



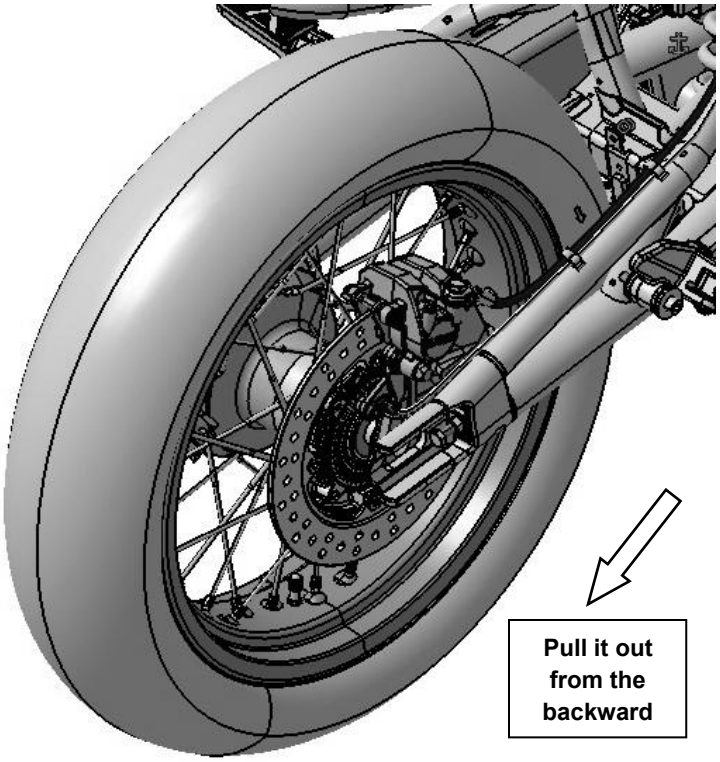
5. Take out the rear wheel shaft



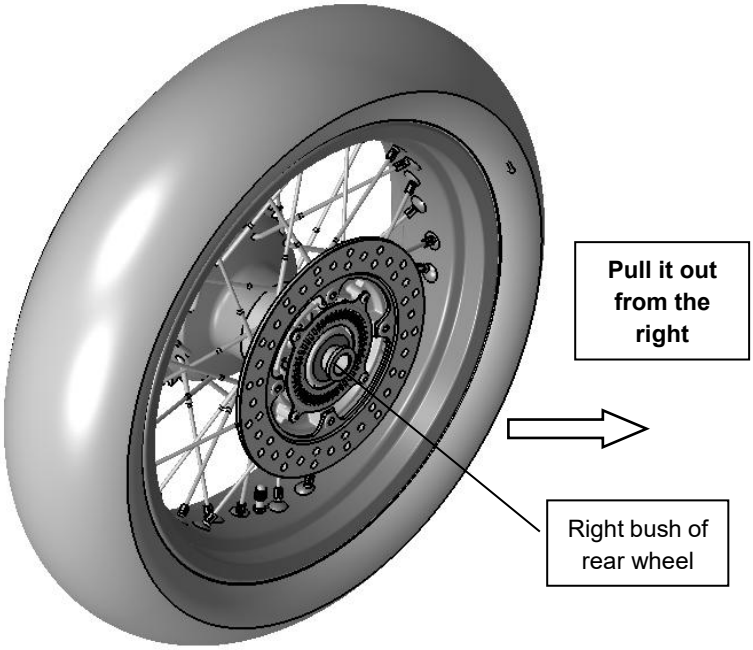
6. Take out the locating plate



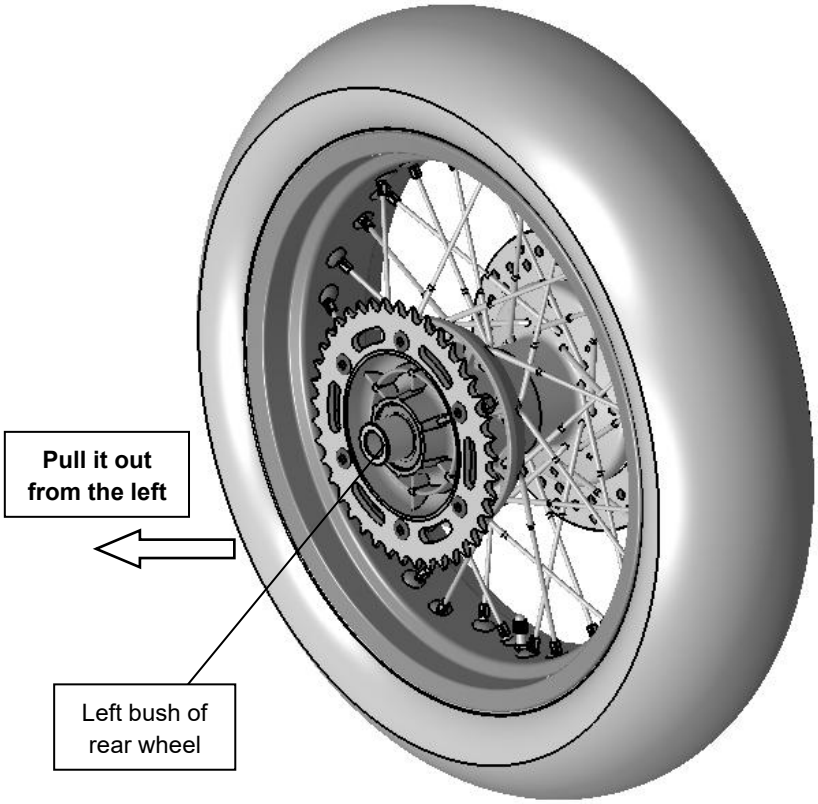
7. Take out the rear wheel assembly



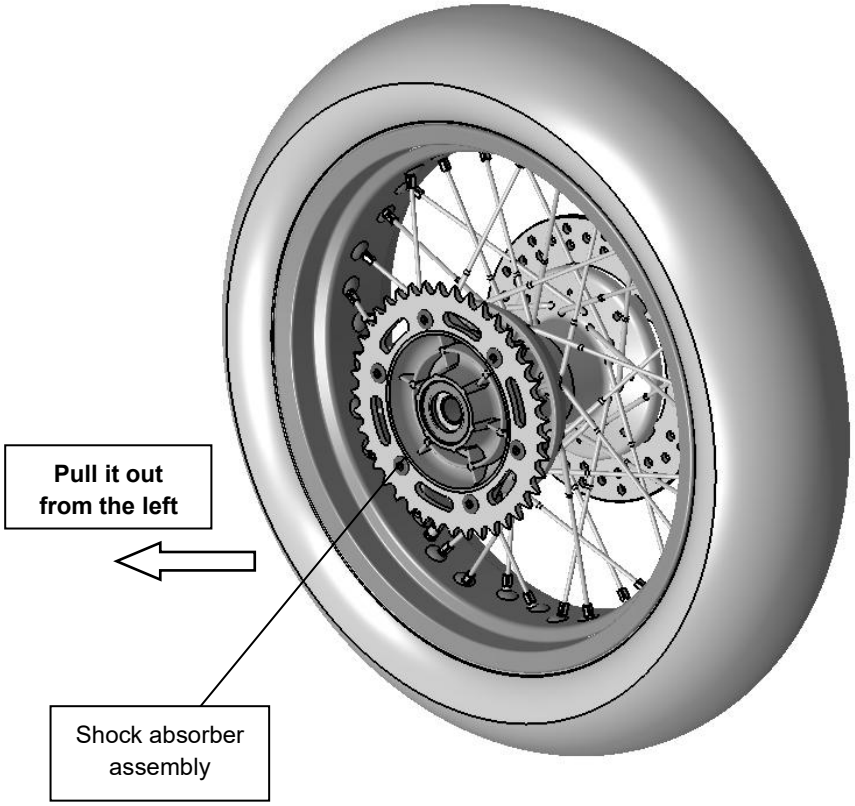
8. Take out the right bush of rear wheel



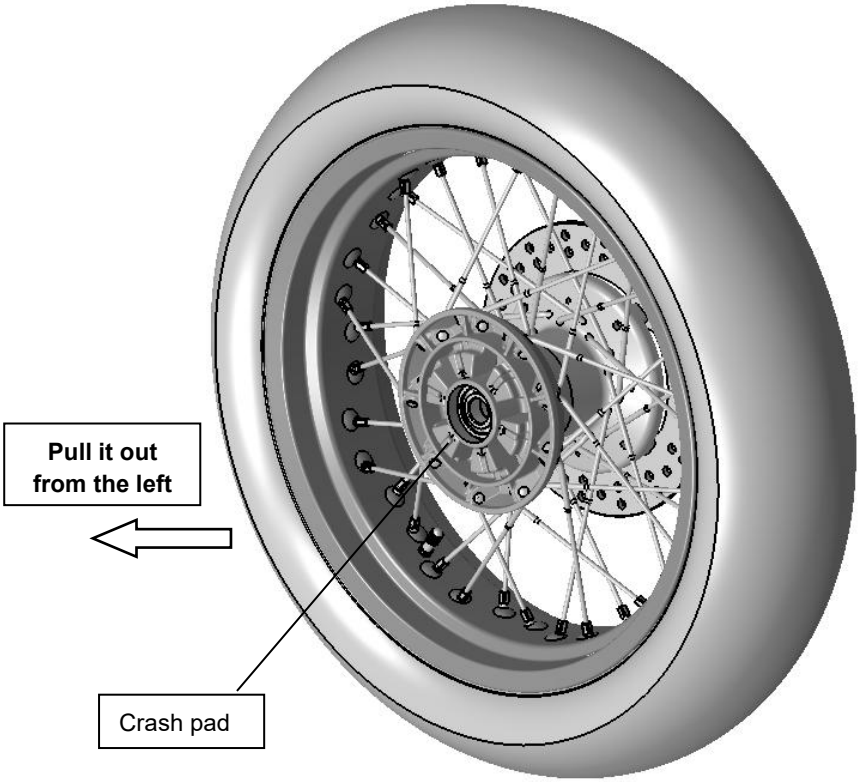
9. Take out the left bush of rear wheel



10. Take out the shock absorber assembly



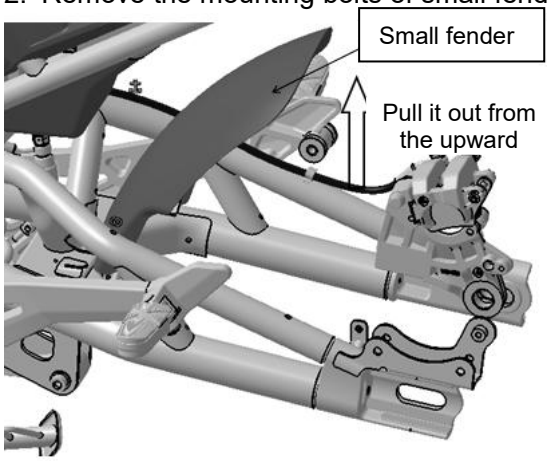
11. Take out the crash pad and get the rear wheel



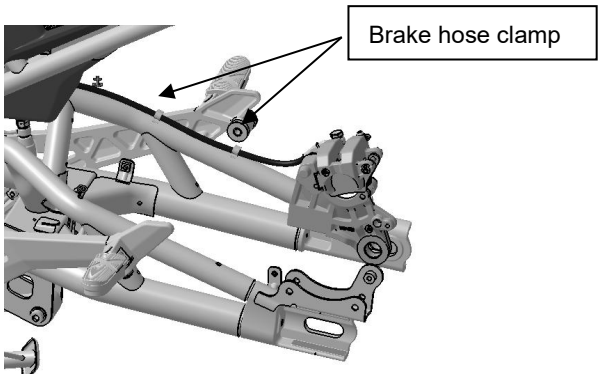
Rear Fork

Disassembly Steps of Rear Fork

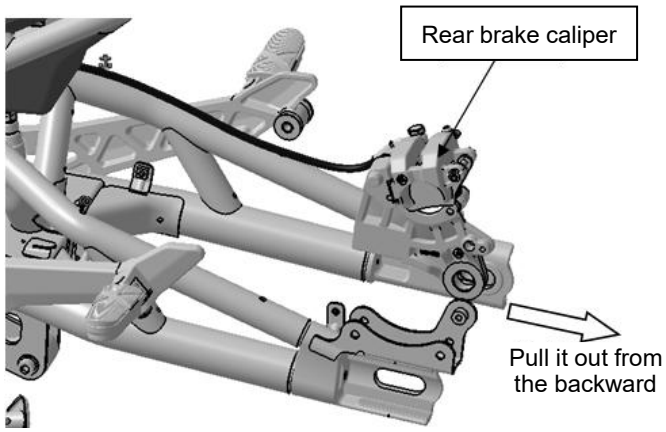
1. Remove the rear wheel assembly first (see the disassembly of rear wheel).
2. Remove the mounting bolts of small fender and take down the small fender.



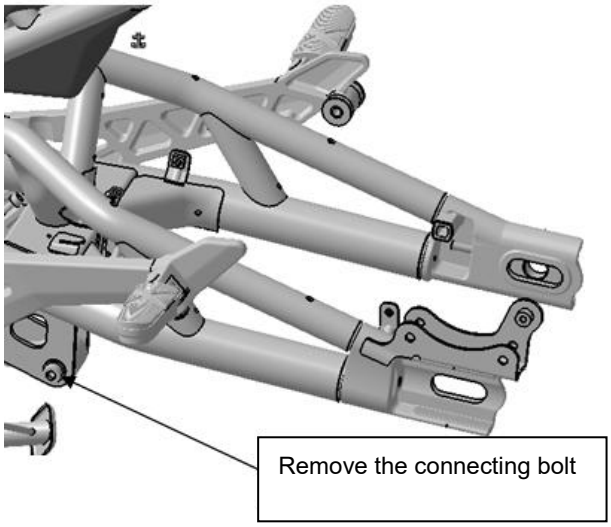
3. Remove the brake hose clamp.



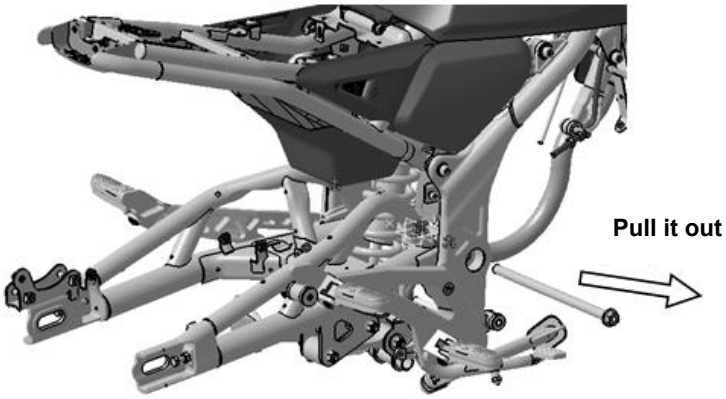
4. Pull the rear brake caliper out of the suspension from the back.



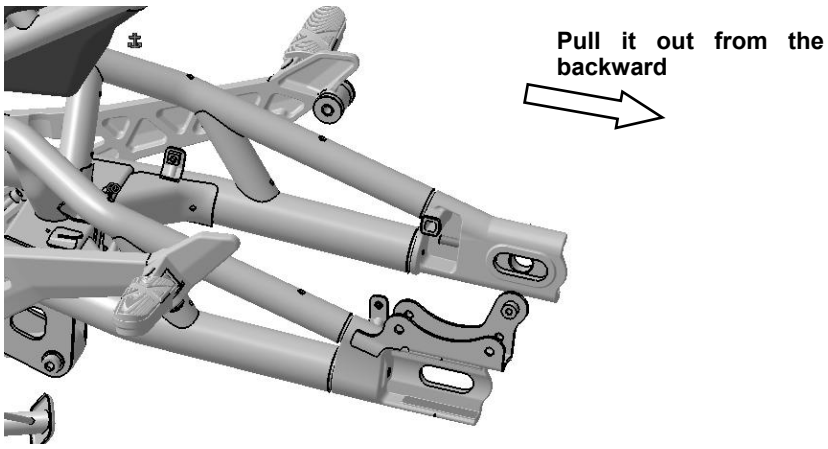
5. Remove the connecting bolt of rocker junction plate and rear fork.



6. Loosen the rear fork shaft nut and pull the rear fork from the right side.



7. Pull the rear fork out from the backward.



Installation Steps of Rear Fork

Install the rear fork in the reverse sequence of disassembly.
The tightening torque of rear fork shaft nut is 60-70 N.m.

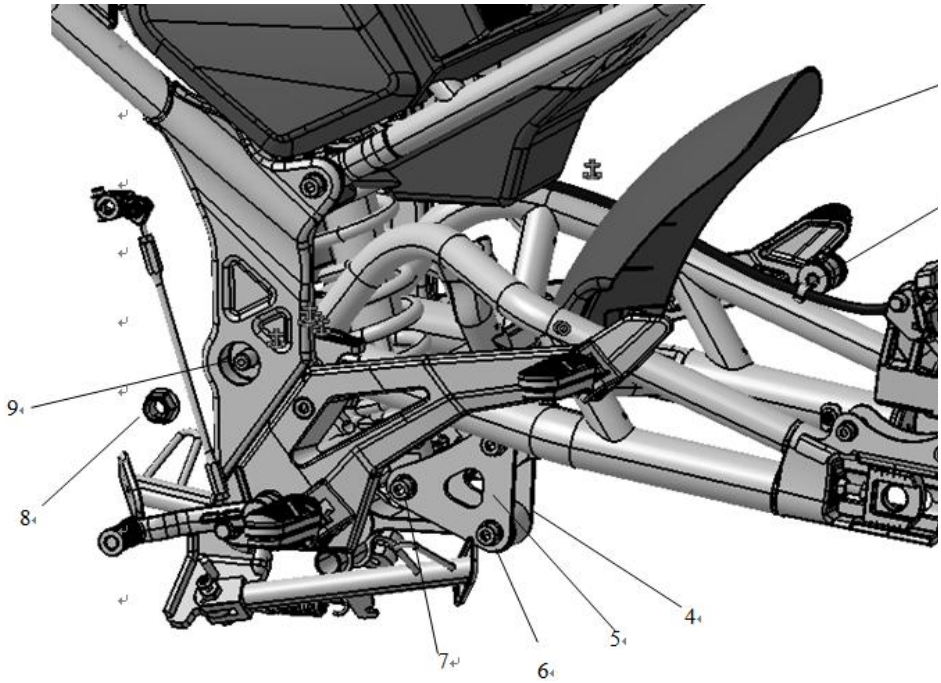
Caution:

Before removing the brake caliper, make sure that the rear brake caliper is lower than the rear brake cylinder to avoid air entering the cylinder and degrading the braking performance. After removing the rear brake caliper and if there is no need to replace it, do not step on the rear brake pedal.

Warning:

The clamp nut of rear fork shaft shall be tightened to a torque of 60-70 N.m.

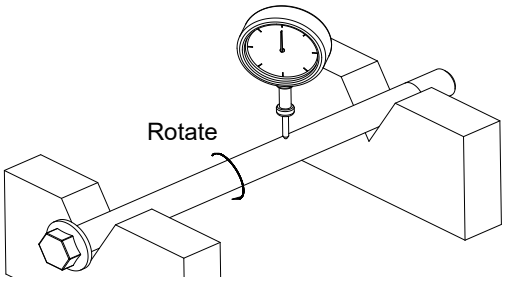
Disassembly/Installation of Rear Fork



Sequence	Step	Quantity	Remark
	Disassembly Sequence		**The installation and disassembly are in a reverse sequence.**
1	Small fender	1	
2	Brake hose clamp	2	
3	Rear brake caliper	1	Ensure that the caliper is lower than the main pump cylinder
4	Connecting bolt	1	
5	Gasket	1	
6	Nut	1	
7	Junction plate	2	
8	Nut M14x1.5	2	Required tightening torque: 90-100N.m
9	Rear fork shaft	1	

Check of Rear Fork Shaft

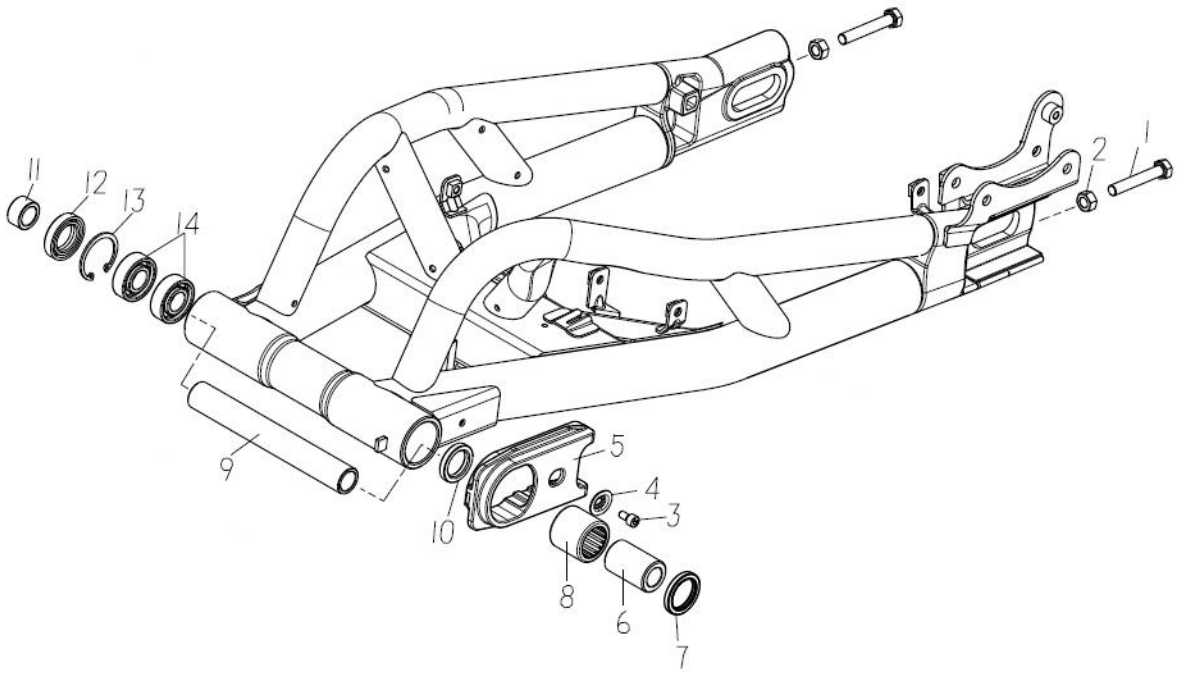
Put the rear fork shaft on the v-shaped seat and measure its deflection of with a dial gauge. If the reading is ≥0.2mm, replace the rear fork shaft with a new one.



Disassembly/Assembly of Rear Fork

Please refer to the following figure for the disassembly/assembly of rear fork.

The seal ring and needle bearing shall be replaced after removed. The installed needle bearing shall be 3mm away from the end face, and lithium grease shall be applied to the needle. Check whether the needle bearing rotates flexibly after installation.



Sequence	Step	Qty.	Remark
	Disassembly Sequence		**The installation and disassembly are in a reverse sequence.**
1	Bolt M8X50	**2**	
2	Nut M8	**2**	

3	Bolt M5x10	**1**	
4	Flanging washer	**1**	
5	Chain clamp	**1**	
6	Left shaft sleeve of rear fork	**1**	Make sure the shaft sleeve rotates flexibly during assembly.
7	Oil seal 22X33X4	**1**	
8	Needle bearing	**1**	Apply lithium grease on the needle during installation.
9	Rear fork liner	**1**	
10	Bearing liner holder	**1**	
11	Right shaft sleeve of rear fork	**1**	Make sure the shaft sleeve rotates flexibly during assembly.
12	Oil seal 22X35X7	**1**	
13	Retainer 35	**1**	
14	Deep groove ball bearing 6202	**2**	Apply lithium grease on the needle during installation.

14
Overview of Electrical System

Notes for Circuit Inspection

1. When disconnecting and connecting the connector, turn OFF the ignition switch, otherwise the electrical components may be damaged.
2. The circuit shall be inspected with a probe that can be inserted from the front and back ends of connector and contact reliably with the terminals.
3. Power supply and related electrical components shall be disconnected during the circuit on-off inspection.
4. When conduct the inspection with voltage, the battery voltage shall be checked first.
5. In case of electrical system failure, the following steps are generally followed for diagnosis:
A. Observe the fault phenomenon to determine which subsystem is out of order;
B. Minimize the fault scope by exclusive method according to the schematic circuit diagram;
C. Check whether the subsystem line is open-circuited, short-circuited or connected incorrectly;
D. Check whether relevant components are failed or damaged.
6. When looking for circuit fault, check the part that can be easily removed first. The parameter detection method and part replacement method can be used, but when adopting the part replacement method, make sure that there is no overload in the circuit to avoid damaging new parts.
7. Multimeter and clamp meter shall be always available for circuit inspection.
8. Most instantaneous electrical failures are caused by fault of wire terminal or wire.

System Principle and Composition

The electrical system is essential for a motorcycle to run safely, reliably and efficiently. It covers a wide range of subjects including the motor, electrical & electronic technology, computer, electrochemistry, acoustics, optical materials and so on. With the development of electronic technology, the motorcycle electrical system will also have significant changes. The BX500 electrical system adopts many advanced automotive electronics technologies, which is much more complicated than traditional ones. It composes of the following sub-systems:

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

They will be introduced in the following chapters. Since the cooling system is introduced in Chapter 5 and will not be repeated.

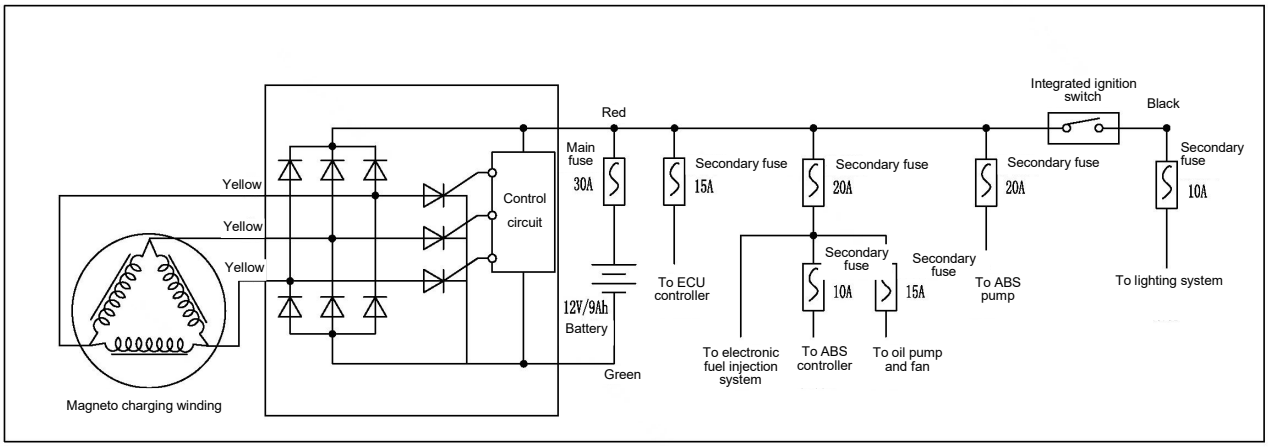
15
Battery and Power Supply System

Overview

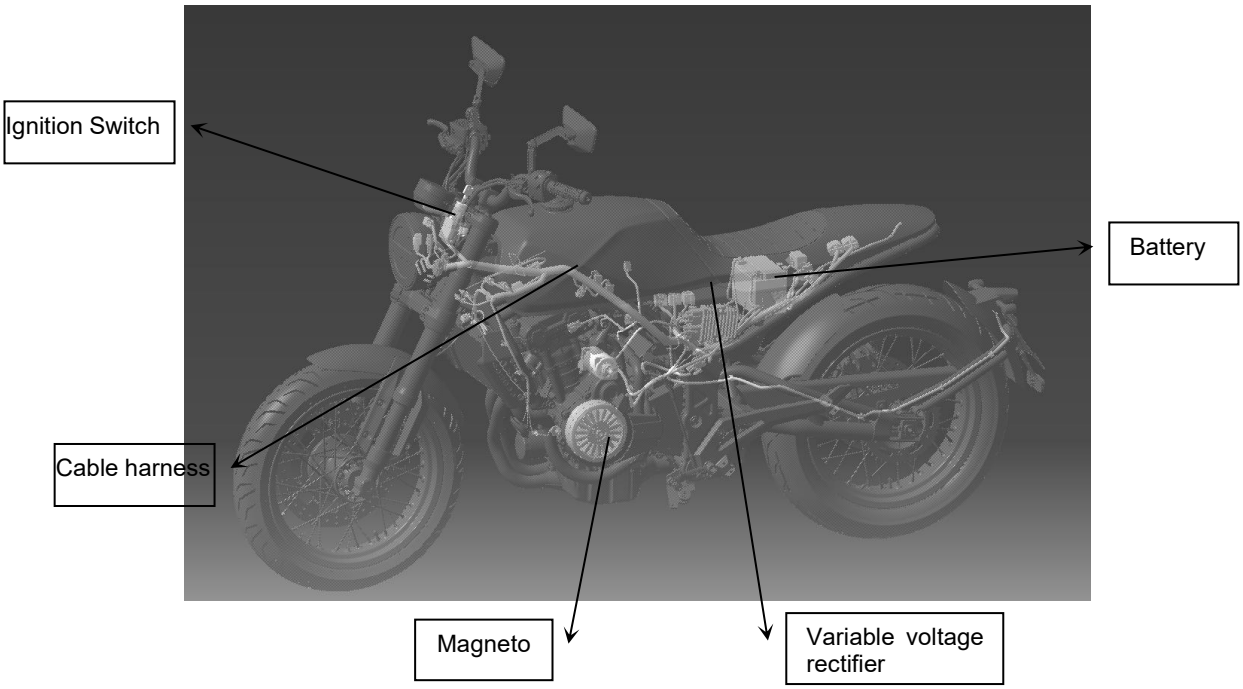
The power supply system is the premise of the running of the whole electrical system, which can provide sufficient electric energy for other electrical sub-systems. Its functions include charging, saving and discharging electricity. The BX500 power supply system is featured by large power supply capacity, which can reach 400W and above. It consists of the following parts:

- Magneto
- Variable voltage rectifier
- Battery
- Integrated ignition switch
- Fuses

Schematic Circuit Diagram



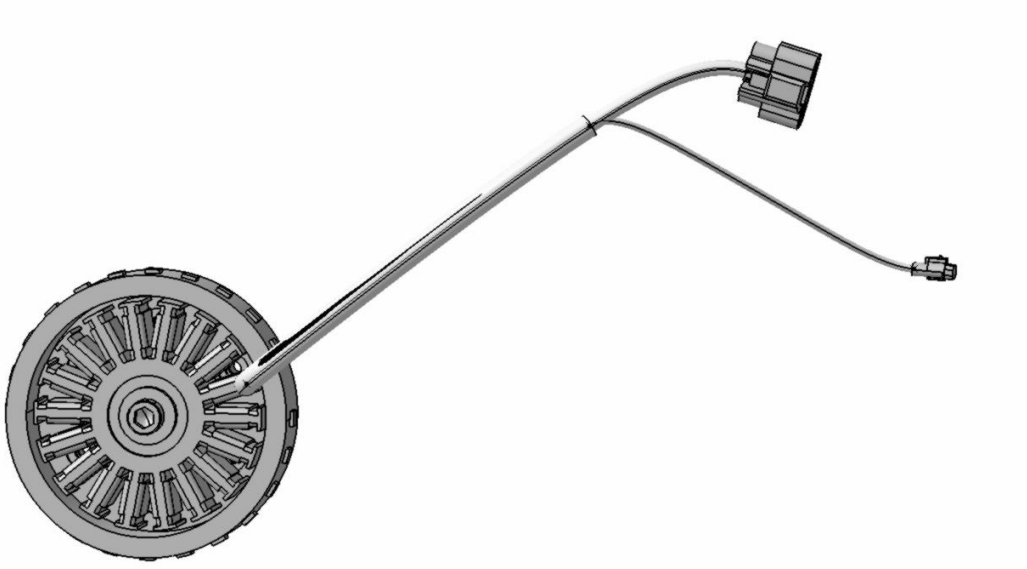
Parts Arrangement Diagram



Introduction to Main Components and Parts

○ Magneto

1. Outside view



2. Working principle

The crankshaft drives the rotor to rotate, and the stator winding coils cut the magnetic line of force to generate induced electromotive force and output alternating current, and the formula is E=Blv. The magneto of motorcycle is a permanent magnet alternator, with taking the permanent magnet steel as the rotor and the coil winding as the stator. Magneto is the main power supplier of electrical system.

3. Basic parameters

The six pieces of magnet steels of rotor have 12 poles;

The stator windings have 18 poles which are connected in three-phase (△) and the resistance of each phase is 0.3-0.5Ω;

Rated power: 400W/5000r/min (cold state) (maximum attenuation of 8% for heat engine).

4. Fault mode

The rotor magnet steel is broken;

The magnetism of magnet steel has faded;

The stator winding is short-circuited to ground;

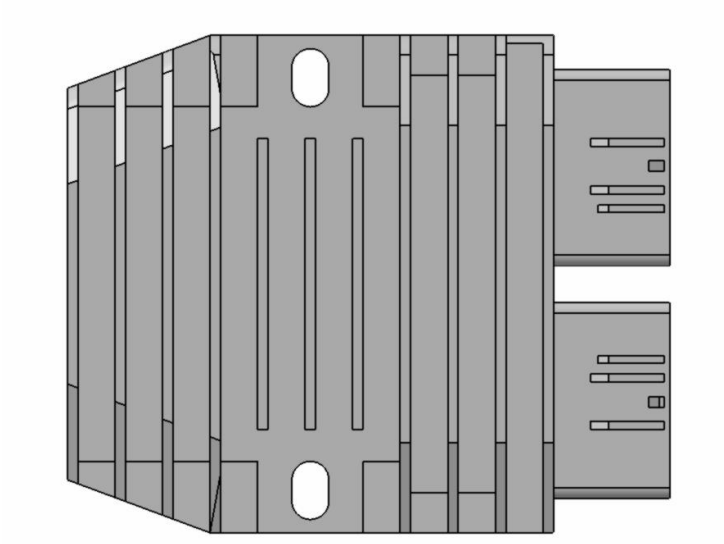
The stator winding suffers turn-to-turn short circuit;

The stator winding welding point has fell off or suffers short-circuit;

The rotor and stator suffer friction damage (by foreign matters).

○ Variable voltage rectifier

1. Outside view



2. Working principle

The three-phase sinusoidal alternating current output by magneto, which fluctuates with the speed, is converted into stable direct current through the full-wave rectification and controllable stable-voltage charging circuit. The power will be provided to the load line and charge the battery.

3. Basic parameters

Structural style: three-phase full-wave rectification, short circuit mode (MOS tube);

Regulation voltage: 14.5V±0.3V;

Maximum operating current: 30A.

4. Fault mode

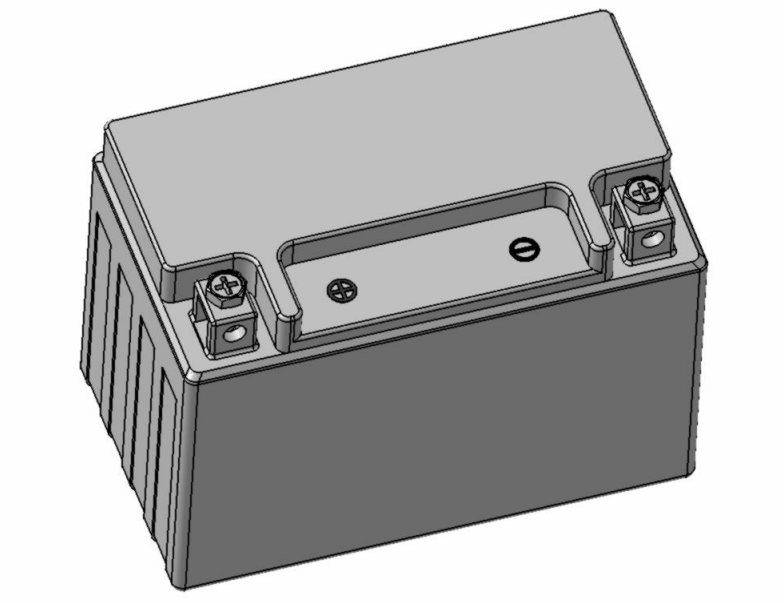
The voltage regulator circuit is out of control and the battery is overcharged;

The rectifier circuit is open-circuited or short-circuited and the battery cannot be charged or charged fully;

The outgoing line is open-circuited or short-circuited.

○ Battery

1. Outside view



2. Working principle

Two kinds of lead (negative electrode) and lead dioxide (positive electrode) immersed in the electrolyte (sulfuric acid solution) can generate a voltage of 2V, and the voltage can reach 12-13V when six single cells are connected in series. It is the auxiliary power supply of electrical system and can absorb the overvoltage in the circuit.

3. Basic parameters

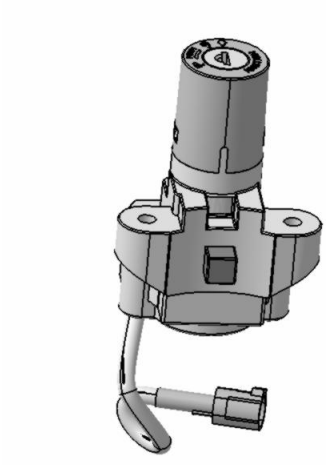
Battery type: valve-controlled charged lead-acid battery, model: 12V/9Ah or 12V/8Ah;
Rated capacity of 10HR: 8Ah (25℃±2℃);
High rate discharge performance (-10℃) 90A: duration time longer than 90s; and voltage greater than 8.5v after 5s.

4. Fault mode

The pole-plate is polarized and the capacity is reduced, which is unable to provide power for starting, and the charging performance is degraded;
The liquid leakage leads to corrosion of electrode;
There is excessive internal resistance and serious self-discharge phenomena, and the voltage is lower than 5V.

○ Integrated ignition switch

1. Outside view



2. Working principle

The key with double grooves, 8 tooth profiles and an ignition lock cylinder is the master switch of the whole vehicle power supply and combines the locking function of head steering.

3. Basic parameters

Switch function list:

Wire color / Gear	Red	Black	Can the key be pulled out	Latch bolt status
			No	Not stretch out
	○	○	Yes	Not stretch out
			Yes	Stretch out

Mutual opening rate of switch key shall not be greater than 0.1%;

Rated operational current of switch: 20A.

4. Fault mode

The lock cylinder is failed and the switch cannot be turned on flexible or the key cannot turn on the switch;

The switch cannot be connected due to the failure of switch contact;

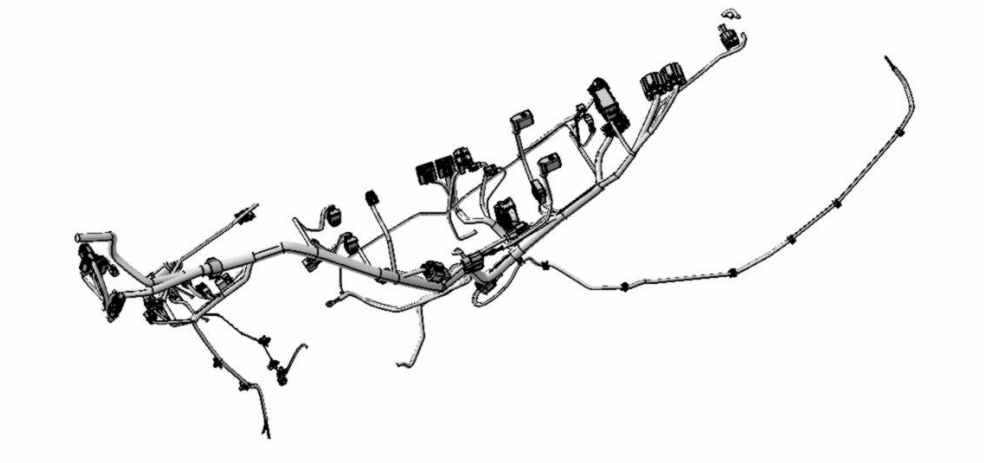
The switch contact in contact with the shell is short-circuited which leads to burn of the main fuse and the power failure of motorcycle;

The outgoing line is open-circuited or short-circuited to ground;

The latch bolt fails to stretch out and the head can't be locked.

○ Cable harness

1. Outside view



2. Working principle

The cable harness integrated wires in various specifications, connector sheath, terminals, conduits, tapes, safety pieces and other parts by bifurcating, riveting, binding and assembling. The electrical and electronic equipment can only work normally with the connection of harness.

3. Basic parameters

The on-off state of line in each color shall conform to the electrical wiring diagram;

The riveting of each bifurcation and terminal shall be firm;

The duct and tape shall be tied tightly;

Each connector and corresponding electrical and electronic equipment shall be reliably connected.

4. Fault mode

The terminal and connector have not been assembled firmly;

The damaged wire sheath is short-circuited to ground or adjacent wire;

The connection at the bifurcation is corrosive and is unreliable or open-circuited;

There is instantaneous fault and poor contact of wire terminals or wires (most instantaneous electrical faults are caused by this);

There is poor contact or burning in the safety pieces;

The wire harness is not tied firmly to the motorcycle, which leads to wire vibration, abrasion, failure or poor contact.

Main Faults Diagnosis

Fault Phenomenon	Possible Cause	Solution
Power failure of whole motorcycle: The instrument displays nothing and other electrical functions cannot be performed when turning the key.	The main fuse is burnt out; The main fuse circuit is in bad contact; The battery positive and negative circuits of battery are in bad contact; The battery has no power; The ignition switch is failed; The outgoing line of ignition switch is not connected well with the main cable; The circuits of main cable are open-circuited or short-circuited.	Replace the main fuse. Reconnect; Reconnect; Charge the battery or replace it; Repair or replace; Reconnect it; Repair or replace.
Undervoltage of battery: After turning on the power, the alarm light of instrument voltage flashes; or the terminal voltage of the battery is lower than 12V.	The motorcycle has been stored for a long time; The charging line is faulted or the quiescent current of motorcycle is excessive; The battery capacity attenuates and fails to store energy, and the battery discharges itself.	Charge with DC regulator charger; Check the charging line and the quiescent current; Replace the battery.
Battery undercharged: After starting the engine, the alarm of instrument voltage flashes; or the terminal voltage of the battery is lower than 13V.	The outgoing line of variable voltage rectifier is not connected well with the main cable or magneto; The circuits of main cable are open-circuited or short-circuited; The magneto is failed; The variable voltage rectifier is failed; The battery stores no energy;	Reconnect; Repair or replace; Replace the magneto; Replace the variable voltage rectifier; Replace the battery.
Battery overcharged: The battery releases gas or is deformed.	The variable voltage rectifier is failed.	Replace.

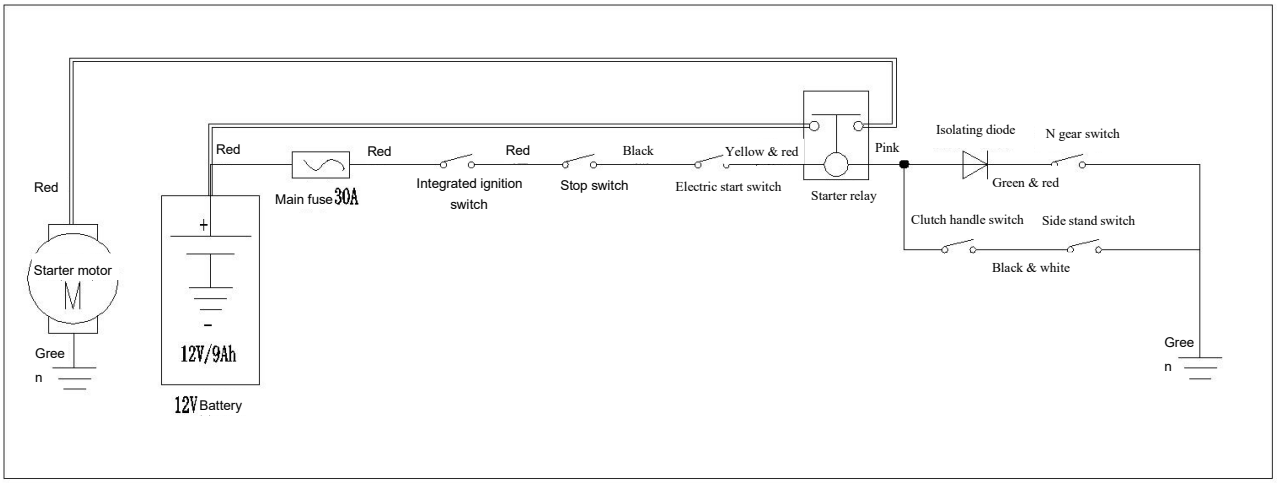
16
Starting system

Overview

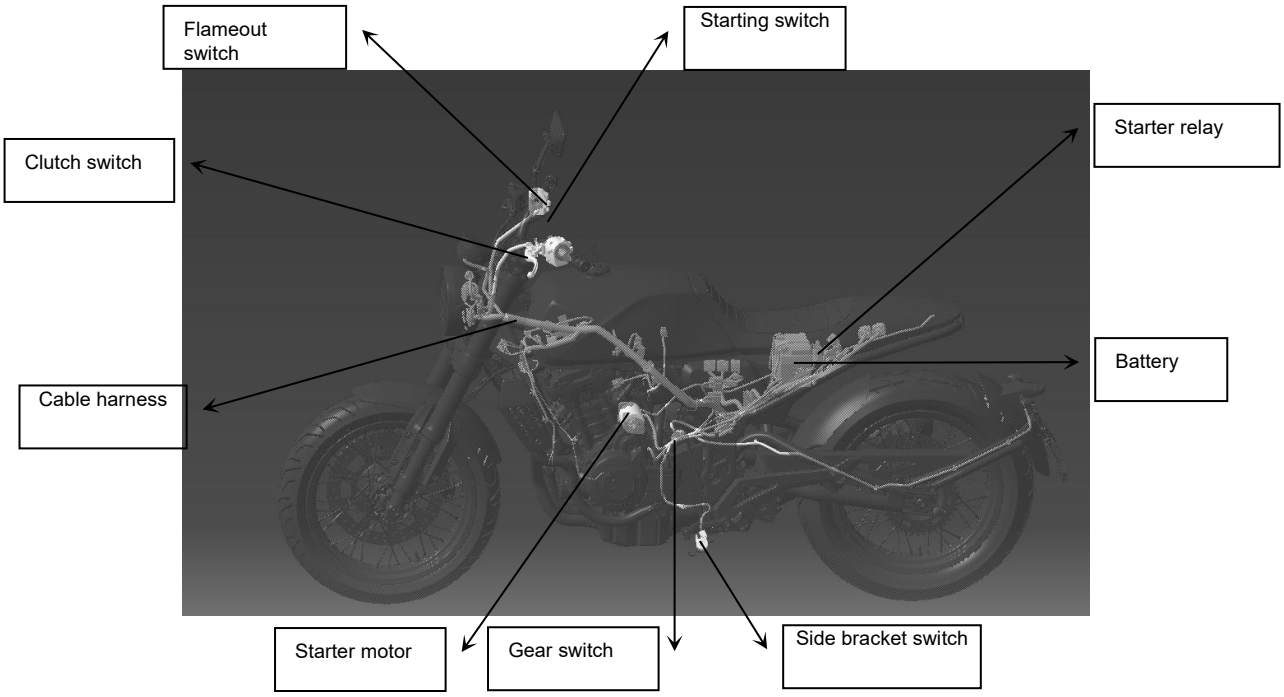
The engine can only be started with the help of external force at the initial and then enter the ignition and fuel supply process, and thus the internal combustion engine can combust and run stably. The BX500 motorcycle is only equipped with an electronic starting system. First, it will remove the protection on the gear switch, side stand switch and clutch switch protection, then press the start button to switch on the start relay and starter motor to drive the middle gear and one-way clutch to make the engine work for ignition and combustion with fuel injection. The system consists of the following parts:

- Starter motor;
- Starter relay;
- Battery;
- Starting switch and stop switch;
- Neutral position switch, side stand switch and clutch switch.

Schematic Circuit Diagram



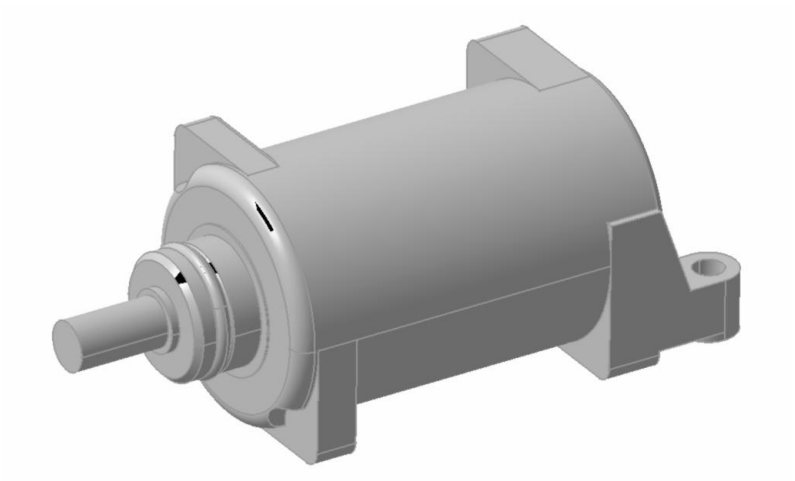
Parts Arrangement Diagram



Introduction to Main Components and Parts

○ Starter motor

1. Outside view



2. Working principle

A current-carrying conductor is subjected to the electromagnetic force in a magnetic field, F=Bli. When supplying power to the positive and negative poles of starter motor (negative pole connected to motorcycle), the motor shaft will rotate to drive the initial running of the engine through reduction gear, one-way clutch and crank.

3. Basic parameters

4 poles for four pieces of magnet steels, four carbon brushes;

Specification: 12V650W；

Rotation direction of output shaft: clockwise seen from the tooth;

Output characteristics:

	State	Voltage V	Current A	Rev speed r/min	Torque N.m
Motor Characteristics	No-load	11.5	≤30	≥10000	
	With load	9.5	≤120	≥6000	1.0
	Brake	6	≤300		≥2.5

4. Fault mode

The motor is open-circuited and failed;

The carbon brush is over abraded;

The stator magnet steel is broken;

The magnetism of magnet steel has faded;

The friction between enameled wire of rotor winding and stator causes short-circuit;

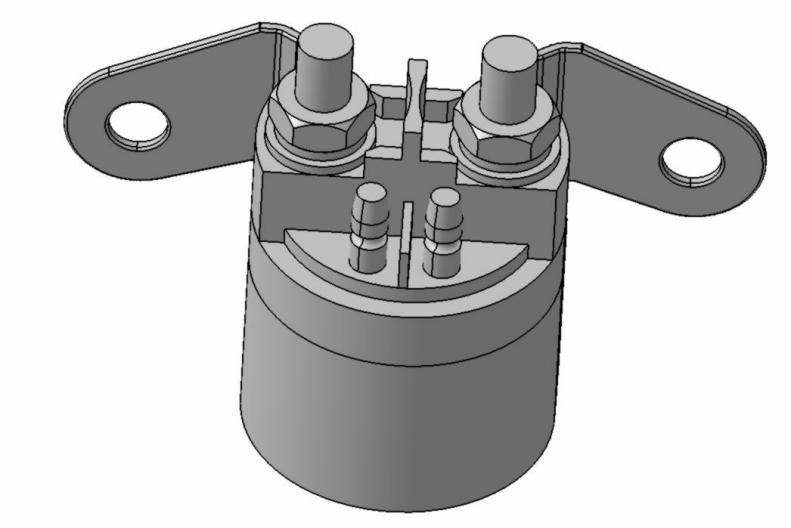
The bearing is failed and the motor generates abnormal noise;

The poor oil seal leads to oil entering in motor and short-circuit;

The poor waterproof leads to water entering in motor water and performance decline.

○ Starter relay

1. Outside view



2. Working principle

The two ends of relay coil supplied with voltage will generate an electromagnetic force to connect the movable contact and stationary contact. The large current passing the starter motor and relay contacts are controlled with the small current passing the operating switch and relay coil. The BX500 starter relay also contains a power circuit (power pole B, coil terminal).

3. Basic parameters

Nominal voltage: 12V;

Rated current: DC100A (30s);

Closing voltage: ≥DC7V;

Release voltage: ≤ DC4.5V;

Contact voltage drop: below 0.2V (at 100A);

Coil current: below 5A (at 12V);

4. Fault mode

The coil or lug plate is open-circuited and the contacts cannot be jointed;

The coil is short-circuited and the contacts cannot be jointed;

The contact is corrosive or ablative, and cannot be connected even if jointed;

The contacts are stuck together and fail to be disconnected due to overcurrent;

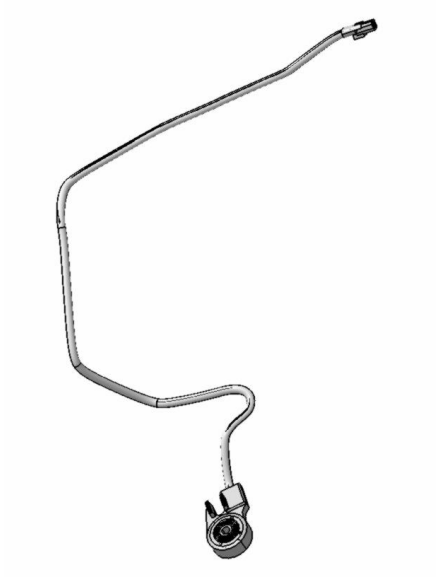
The power circuit (power pole B, coil terminal) is open-circuited, which leads to starting failure of motorcycle.

○ Control switch (left and right integrated switch, gear switch)

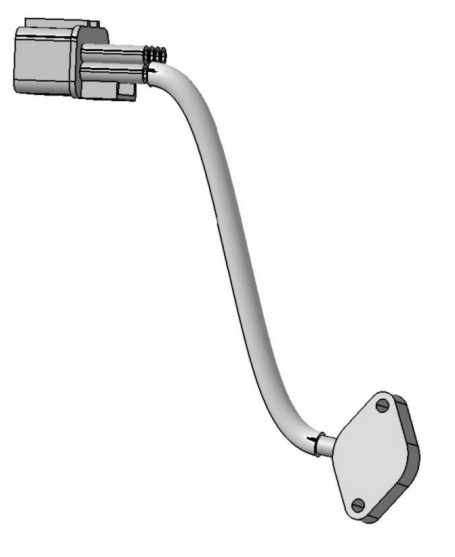
1. Outside view

Left integrated switch

Right integrated switch



Side stand switch



Gear switch

2. Switch function

Left switch function table

							Orange	Green	Light blue										
						Emergency light													
		White	Blue & yellow	Blue		Turn left													
	Low											Light green	Black				Black	Blue	
	High beam					Turn right					Horn					Passing light			

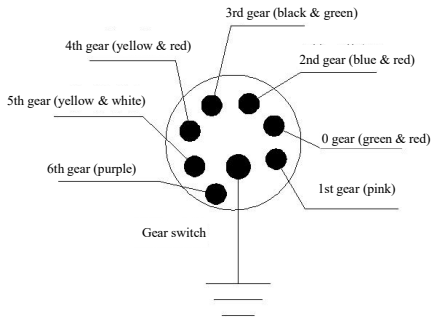
Right switch function table

		Blue & yellow	Yellow			Red & black	Black & white			Black & white	Yellow & red
	Headlight				Stop						
	Position light				On				Start		

Side stand switch function table

Up			Engine can be started
Down			Engine cannot be started

Gear switch function table



3. Fault mode

The switch locating pin is broken and it rotates on the handle tube when used;
The switch cannot be put on or be fully put on;
The button cannot be reset;
The failure of switch or open-circuit of outgoing line leads to connection failure of switch;
The outgoing line is short-circuited and the switch is dysfunctional;
The switch of the side stand is loose and the contacts is in poorly contact;
The outgoing line of side stand switch is abraded, open-circuited or short-circuited;
The switch suffers abrasion, vibration, water filling, corrosion or fault.

Main Faults Diagnosis

Fault Phenomenon	Possible Cause	Diagnostic Approach	Solution
Closing failure of starter motor: After pressing the start button, there is no closing sound of relay and the starter motor fails to run.	The battery is undervoltage; The corresponding fuse is not connected or burnt out; The neutral wire of gear switch is open-circuited; The side stand switch is open-circuited and failed; The clutch switch is open-circuited and failed; The start button is open-circuited and failed; The flameout switch is open-circuited and failed; The starter relay is open-circuited and failed; The circuits of main cable are open-circuited.	Check the wires connected to starting relay. If there is no voltage in the yellow/red wire, check the start button and the circuit of flame-out switch. If the voltage is normal, check the on-off condition of pink wire to ground and if it is off to ground, check the neutral wire, side stand switch and clutch switch circuit and if it is on, the starter relay is failed.	Charge the battery; Connect or replace the fuse; Connect or replace the gear switch; Connect or replace the side stand switch; Connect or replace the clutch switch; Connect the circuit or replace the left switch; Connect the circuit or replace the left switch; Replace the starter relay; Repair or replace the main cable;
Running failure of starter motor: The is a closing sound of motor, but the starter motor fails to run.	The battery is undervoltage; The connector of thickwire is loose; The motor is open-circuited and failed; There is open-circuit between the pole contacts of starter relay; The motor is short-circuited and failed; The engine is stuck and the motor is stalled;	Check the battery voltage drop. If there is no drop, first check whether the connector is loose, then check whether there is open circuit in relay or motor; if there is a serious drop (less than 5V), it is determined that the motor is short-circuited or stalled;	Charge the battery; Fasten the connector; Replace the motor; Replace the starter relay; Replace the motor; Check the engine.
Excessive low motor speed	The voltage or capacity of battery is low; The connector is poorly connected; The starter motor output torque is insufficient; The engine resistance is too high;		Charge or replace the battery; Fasten the connector; Replace the motor; Check the engine.

17
Lighting Signal System

Overview

The lighting signal system is essential for a motorcycle to run safely and includes headlights system, signal lights control system and horn system.

Headlights system:

The headlights are used for illuminating the road during night driving, letting surrounding vehicles and people to aware the motorcycle. The high beam will be adopted during high speed driving and the anti-dazzle low beam will be used when passing other vehicles. In addition, the dual-light lighting system also requires that when one high beam fails, the other one shall not be on, which needs to be controlled by the headlight controller.

Signal lights control system:

When the motorcycle is to turn, the turn light will flash to draw surrounding vehicles and people's attention to give way. When driving at night, the taillight is needed to indicate the presence of the motorcycle and to illuminate the license plate. A brake light aims to tell the vehicle behind that the motorcycle is braking to slow down. The flicker of the turn light is controlled by the switch and the flasher. Other lights are controlled only by the switch.

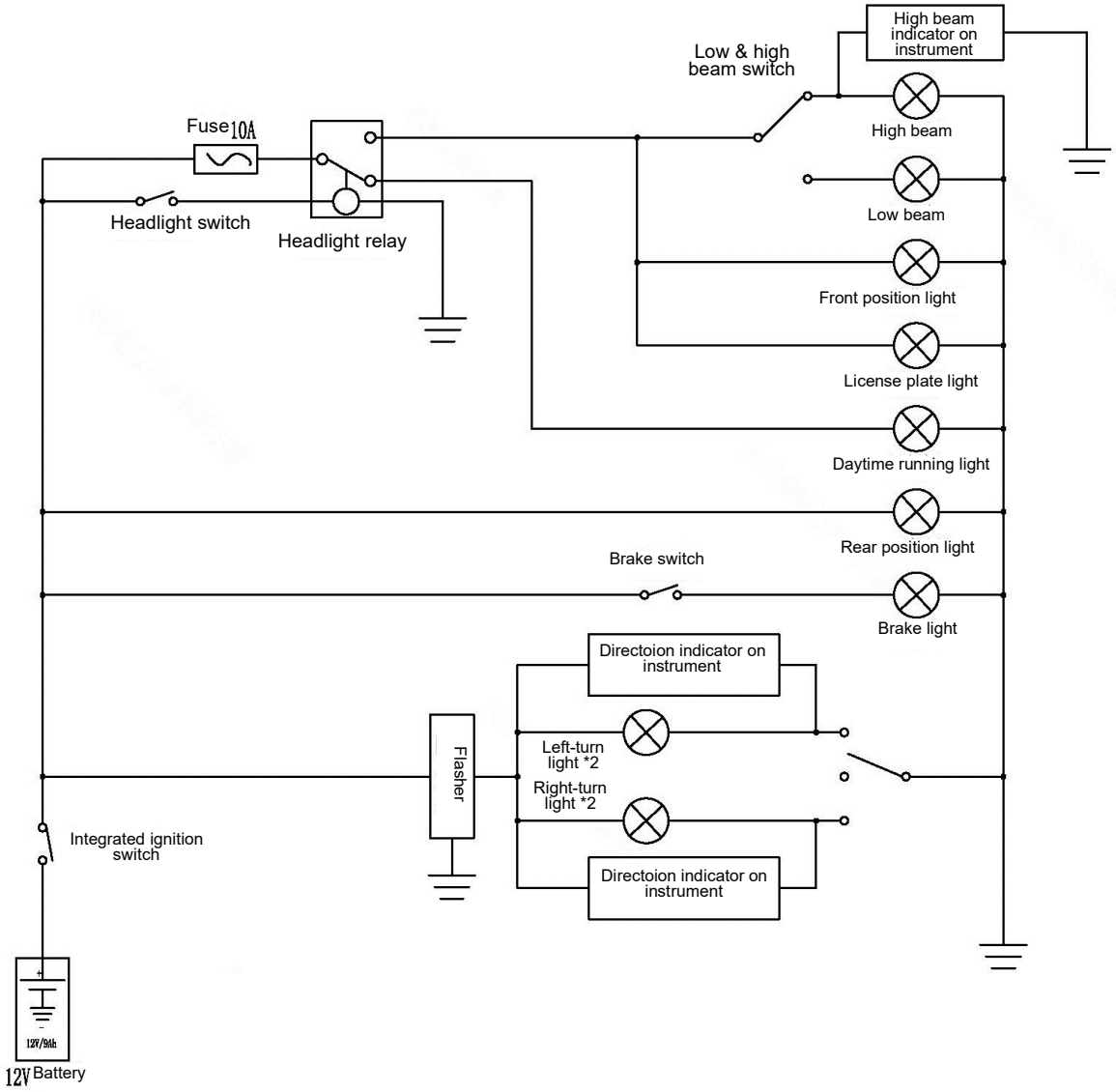
Horn system:

If there are other vehicles or people around that are obstructing or may obstruct the motorcycle, the horn can be used to ensure the safety of driving. The horn is controlled by the horn button.

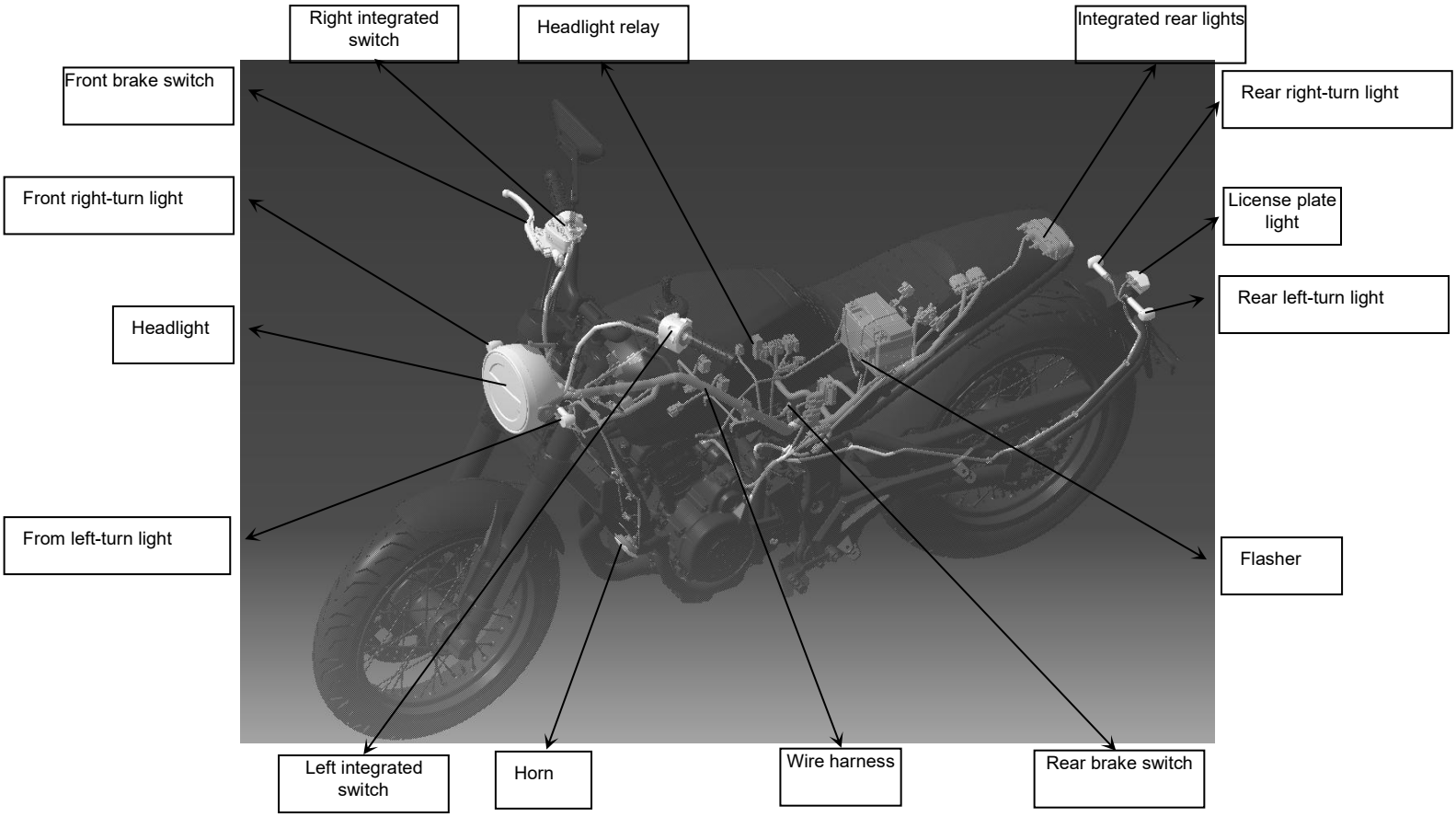
Components:

- Headlights (including daytime running light)
- Integrated rear lights
- Turn light
- Horn
- Headlight relay
- Flasher
- Front brake light switch
- Rear brake light switch
- Integrated left and right switches

Schematic Circuit Diagram



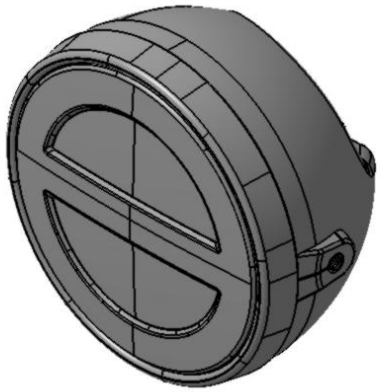
Parts Arrangement Diagram



Introduction to Main Components and Parts

○ Headlight

1. Outside view



2. Working principle

The headlight beads generally have high beam filament and low beam filament. The high beam filament is located at the focal point of paraboloid of the headlight reflector and the ray will become a parallel beam after being reflected by the reflector and scattered through the light glass, which can evenly illuminate the road within 100m ahead. The low beam filament is located above the focal point, and the ray can illuminate the road within 30m in front after reflection. Sine there is a visor below the bead, the ray is dazzle-free.

3. Basic parameters

Headlight bead specification: LED, 20W;
Daytime running light specification: LED, 5W;
Position light specification: LED, 1W;

4. Fault mode

The light bead is failed;
There is water or dust in the light;
The welding of circuit board is loose;
The light housing glass is scratched;
The light wire is open-circuited or short-circuited;
The reflector is overheated and deformed;
The visor is broken or loose;
The ray is deflected.

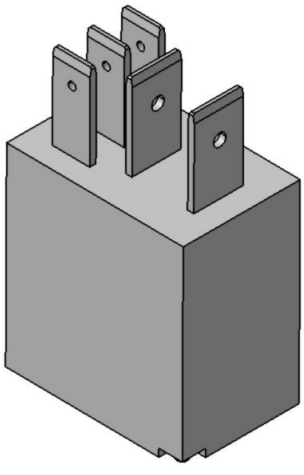
5. Beam adjustment

Up and down adjustment: adjust the adjusting screws on the left and right sides of headlight, turn the adjusting screws clockwise to adjust the beam to move down, and vice versa.

Left and right adjustment: it is not available for this motorcycle.

○ Headlight relay

1. Outside view



2. Working principle

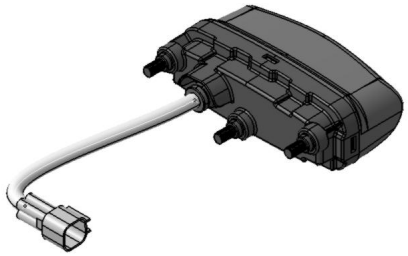
The headlight relay is set for two purposes: the headlight is off when the engine is not started, and the headlight will be turned on by the headlight switch after the engine is started. 1) When the headlight switch is turned on during night driving and not turned off during day driving, the headlight will not be lit on when the engine is not started; 2) It can prolong the service life of battery.

3. Fault mode

The high beam fails to be lit;
The low beam fails to be lit;
The headlight is lit by mistake;
The headlight is not lit after starting;
The outgoing line is open-circuited or short-circuited.

○ Integrated rear lights

1. Outside view



2. Working principle

The integrated rear lights contain taillight and brake light. The ray of taillight and brake light is red, and taillight/brake light beads are equipped with double-filament. The light bead with low power is used for taillight, while the one with high power is used for brake light.

3. Basic parameters

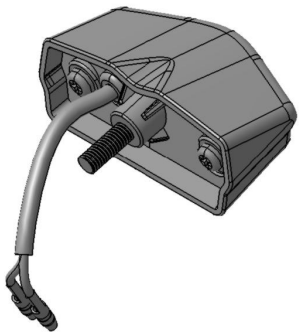
Taillight bead specification: LED, 1W;
Break light bead specification: LED, 3W;

4. Fault mode

The light bead is failed;
The light holder is loose;
The light wire is open-circuited or short-circuited;
There is water or dust in the light;
The light glass is scratched or damaged;
The reflection block falls off.

○ License plate light

1. Outside view



2. Working principle

The ray of the license plate light is white, which is reflected by the reflection block through the transparent polymethyl methacrylate below.

3. Basic parameters

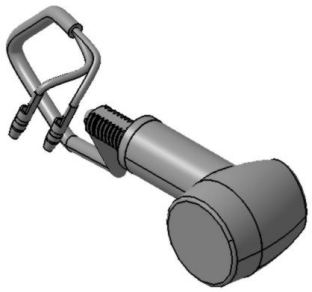
License plate light bead specification: LED, 1W;

4. Fault mode

The light bead is failed;
The circuit board is loose;
The light wire is open-circuited or short-circuited;
There is water or dust in the light;
The light glass is scratched or damaged;
The reflection block falls off.

○ Front turn signal light

1. Outside view



Front left-turn light

Front right-turn light

2. Working principle

The front turn signal light is composed of glass, housing, reflector, holder, handle and light bead. The rays generated by bead and reflected by reflector are concentrated and then they will be scattered by light glass again to become uniform and soft orange rays.

3. Basic parameters

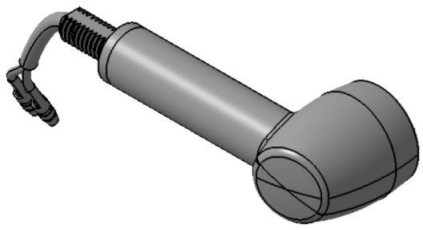
Front turn light bead specification: LED, 1W;

4. Fault mode

The light bead is failed;
The light holder is loose;
The light wire is open-circuited or short-circuited;
There is water or dust in the light;
The light glass is scratched or damaged;
The handle is loose or fractured;

○ Rear turn signal light

1. Outside view



Rear left-turn light

Rear right-turn light

2. Working principle

The rear turn signal light is composed of glass, housing, reflector, holder, handle and light bead. The rays generated by bead and reflected by reflector are concentrated and then they will be scattered by light glass again to become uniform and soft orange rays.

3. Basic parameters

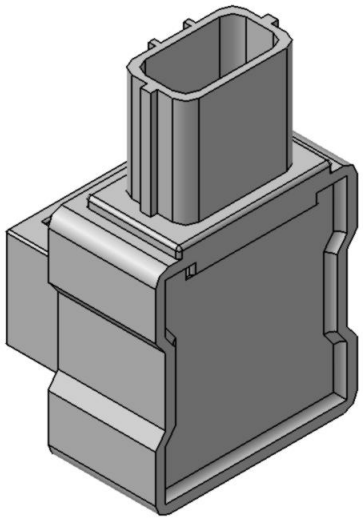
Turn light bead specification: LED, 1W;

4. Fault mode

The light bead is failed;
The light holder is loose;
The light wire is open-circuited or short-circuited;
There is water or dust in the light;
The light glass is scratched or damaged;
The handle is loose or fractured;

○ Flasher

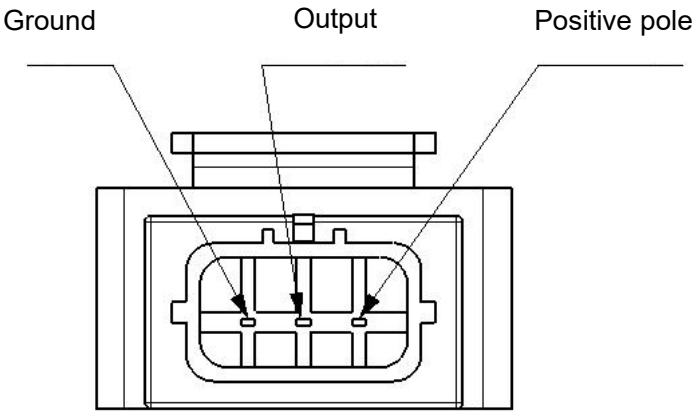
1. Outside view



2. Working principle

The electronic flasher controls the on-off of the high-power field effect tube through an IC chip, and outputs the voltage of a certain frequency to make the turn signal flicker. At the same time, the relay knocks on the housing to send out a warning sound. If the wire of a turn light is disconnected, the flash frequency will increase significantly. The flasher also has the self-protection function against short-circuit and it will buzz under protection status.

3. Pin Function

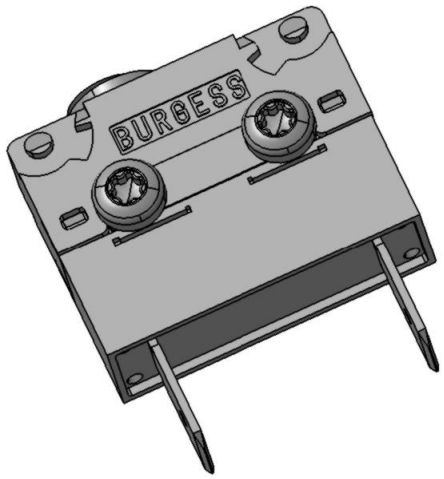


4. Basic parameters
Flash frequency: (85±10) times/min.

5. Fault mode
The turn light fails to be lit;
The relay knocks due to interference or spurious triggering;
The turn light fails to flash;
The short circuit protection is triggered due to interference;
The relay is failed and cannot make a sound of knock;
If the wire of a turn signal disconnected, the flash frequency will have no significant change;
The pin is rusty and cannot be connected.

○ Front brake light switch

1. Outside view



2. Working principle
When holding the brake handle tightly to brake, the contact will be in contact with the conductive spring strip under the action of spring force. Thus, the circuit will be connected and the brake light will be on. When releasing the brake handle, the brake handle against the switch guide rod will compress the spring to make the contact leave the conductive spring strip, and then the circuit will be disconnected and the brake light will go out.

3. Basic parameters

Switch disconnection stroke: 2mm; total stroke: 4mm.

4. Fault mode

The contacts and spring strip are rusted and in poor contact;

The switch is stuck and guide rod cannot act;

The outgoing insert is fractured or rusted.

○ Rear brake light switch

1. Outside view

2. Working principle

The rear brake light switch lever is connected with the brake pedal by a spring. When stepping on the brake pedal, the brake lever will move down, and the contacts will move down with it to touch the two contact spring strips and the circuit will be connected and the brake light will be on. When the brake pedal is released, the brake lever moves upward under the force of return spring, so that the contacts will leave the two contact spring strips, and the circuit will be disconnected and the brake light will be off.

3. Basic parameters

Switch connection stroke: 2.5mm; total stroke: 6mm.

4. Fault mode

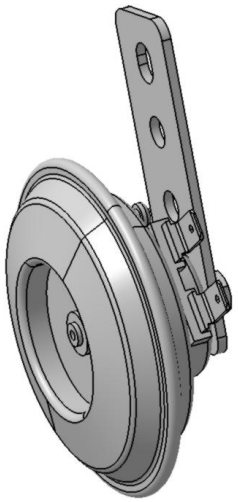
The contacts and spring strip are rusted and in poor contact;

The switch is stuck and the lever cannot act;

The outgoing line is open-circuited or short-circuited.

○ Horn

1. Outside view



2. Working principle

Horn working current loop: positive-pole lug plate → horn coil → contact → negative-pole lug plate. The magnetic field generated by current passing the horn coil will generate magnetism to move the bass diaphragm and treble diaphragm to disconnect the contracts, and then the current will be interrupted and the electromagnetic force will disappear. As a result, the diaphragm will spring back by itself and the contacts will be connected again, and the circuit will be closed again. By repeating the above actions, the diaphragm will vibrate continuously and make sounds. The contacts clearance can be adjusted by screws to change the vibration frequency of diaphragm, thus changing the pitch of sound.

3. Basic parameters

Fundamental frequency: (430±30) Hz, sound pressure level: (110±5) dB(A).

4. Fault mode

The contracts are burnt out;
The clearance between contacts is too large or too small (which can be adjusted and repaired);
The coil is open-circuited or short-circuited;
The outgoing insert is fractured or rusty.

5. Horn adjustment

The contact arm may deform after a long-time use, which may cause excessive large or small clearance and lead to excessive low sound volume or no sound. The problem can be fixed by adjusting the screw. Loosen the lock nut first, and then turn the screw clockwise or counterclockwise and switch on the horn power supply at the same time to adjust it to the loudest sound, and at last tighten the nut.

Main Faults Diagnosis

Fault Phenomenon	Possible Cause	Solution
The headlight fails to be lit; The high beam fails to be lit; The low beam fails to be lit; All lights cannot be lit.	The engine is not started; The voltage regulator is failed; The corresponding fuse is not connected or burnt out; The corresponding switch is failed;	Start the engine; Replace the voltage regulator; Connect or replace the fuse; Repair or replace the switch;

	The headlight relay is failed; The light bead is failed; There is poor connection on circuit; The circuits of main cable are open-circuited.	Replace the headlight relay; Replace the light bead; Reconnect; Repair or replace the main cable;
The headlight cannot be lit;	The main fuse, light bead or circuit is in poor contact; The headlight relay is failed.	Reconnect; Replace the headlight relay.
The position light cannot be lit; The front position light cannot be lit; The taillight cannot be lit; All lights cannot be lit.	The corresponding fuse is not connected or burnt out; The corresponding position switch is failed; The light bead is failed; There is poor connection on circuit; The circuits of main cable are open-circuited.	Connect or replace the fuse; Repair or replace the left switch; Replace the light bead; Reconnect; Repair or replace the main cable;
The turn signal light fails to be lit; The front turn light fails to be lit; The rear turn light fails to be lit; All lights cannot be lit.	The battery is undervoltage; The corresponding fuse is not connected or burnt out; The switch of left turn light is failed; The switch of right turn light is failed; The flasher is failed; The light bead is failed; There is poor connection on circuit; The circuits of main cable are open-circuited.	Charge the battery; Connect or replace the fuse; Repair or replace the left switch; Repair or replace the right switch; Replace the flasher; Replace the light bead; Reconnect; Repair or replace the main cable;
The brake light fails to be lit;	The corresponding fuse is not connected or burnt out; The front brake light switch is failed; The rear brake light switch is failed; The light bead is failed; The circuit is faulted.	Connect or replace the fuse; Replace the front brake light switch; Adjust or replace the rear brake light switch; Replace the light bead; Check and repair.
The horn fails to make sound;	The corresponding fuse is not connected or burnt out; The horn button is failed; The horn is failed; There is poor connection on circuit; The circuits of main cable are open-circuited.	Connect or replace the fuse; Repair or replace the left switch; Adjust or replace the horn; Reconnect; Repair or replace the main cable;

18
Information Display System

Overview

The information display system displays the static and dynamic information of the motorcycle through the instrument panel and provides it to the driver for safe operation.

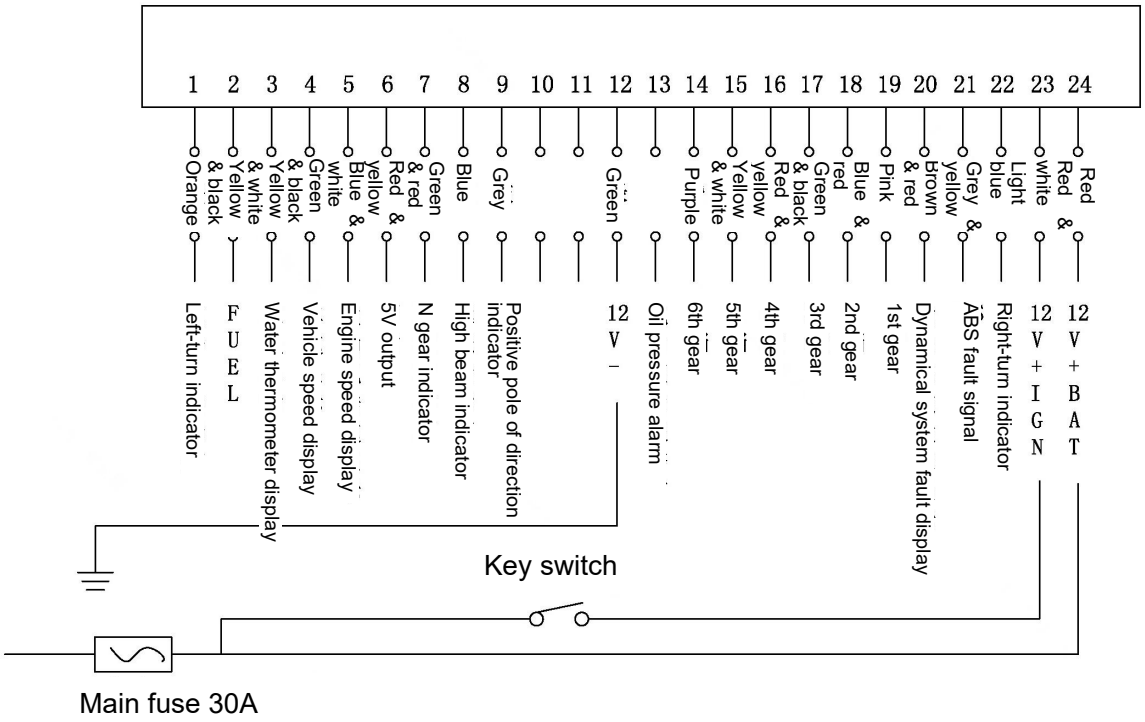
The information display system of BX500 displays: vehicle speed, engine speed, fuel level, gear, voltage alarm, water temperature alarm, direction indication, high beam indication, total/subtotal running mileage/time, time, and EMS fault code.

The signals of BX500 display system are all electronic signals, and the instrument is an all-electronic instrument.

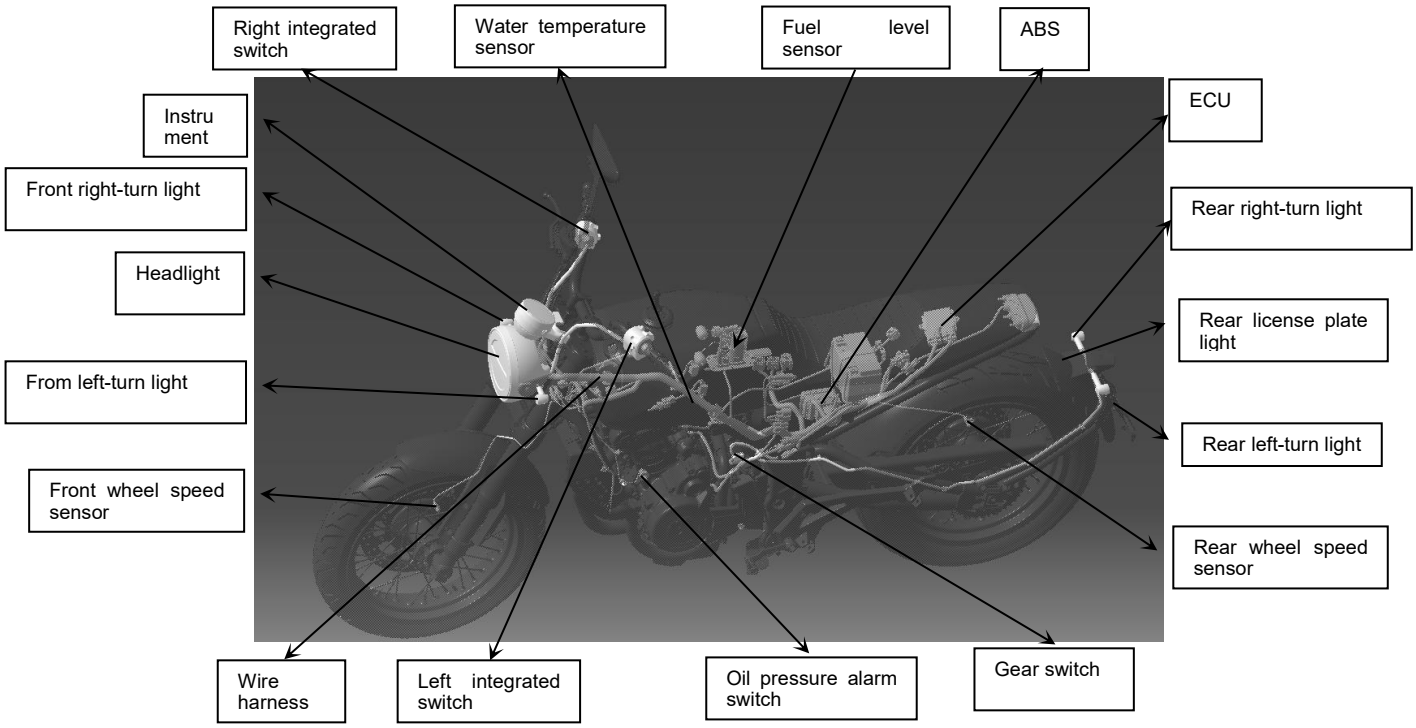
Parts of the system:

- Integrated instrument
- Running speed sensor
- Fuel level sensor
- Gear switch
- Signal switch
- ABS
- ECU

Schematic Circuit Diagram



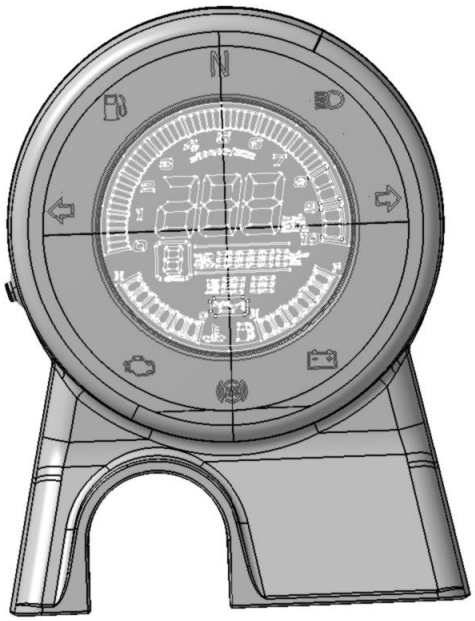
Parts Arrangement Diagram



Introduction to Main Components and Parts

○Integrated instrument

1. Outside view



2. Working principle

The all-electronic instrument is also known as digital instrument. The electronic signals (including digital signals and analog signals) input will be converted to digital signals after been processed in circuit and then be output through CPU to drive the stepper motor pointer, LCD and LED to display information.

3. Pin function table

Pin No.	Function	Signal	Pin No.	Function	Signal
1	L	Turn left	13	OIL	Engine oil
2	FUEL	FUEL	14	6	6th gear
3	TEMP	Fuel	15	5	5th gear
4	SP	Speed	16	4	4th gear
5	REV	Rev speed	17	3	3rd gear
6	5V-OUT	5V output	18	2	2nd gear
7	N	N gear	19	1	1st gear
8	YG	High beam	20	DP	Electronic fuel injection
9			21	ABS	ABS
10			22	R	Turn right
11			23	IGN	+12V
12	GND	Ground	24	BAT	＋12V

4. Basic function

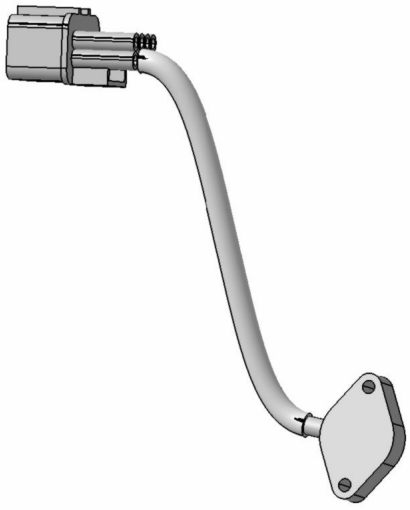
The instrument displays: vehicle speed, motor speed, direction indication, high beam indication, N gear indication, fuel level alarm, undervoltage alarm, engine temperature alarm, gear position, time, fuel level, total mileage, subtotal mileage, total running time, subtotal running time, EMS fault code and green backlight.

5. Fault mode

Part of functions cannot be displayed correctly;
The time and mode cannot be changed via operating button;
There is water in the instrument;
The housing is broken due to mechanical vibration;
The surface is discolored or scratched.

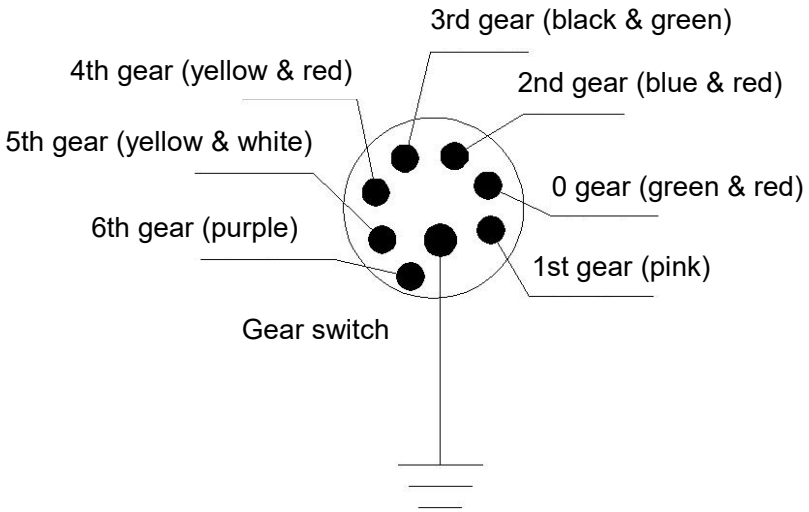
○Gear switch

1. Outside view



2. Working principle

The rotation of transmission drum drives the moving contact to rotate and the moving contact will be pressed to touch with the end contact of gear switch by the action of spring force. There are 7 contacts arranged on the end face of gear switch according to the gear of transmission drum: 1st gear － N gear －2nd gear－3rd gear－4th gear－5th gear－6th gear, with wires in 7 colors. When the transmission drum rotates to a gear, the corresponding color wire will be grounded and conductive.**3. Location of gear color wire**

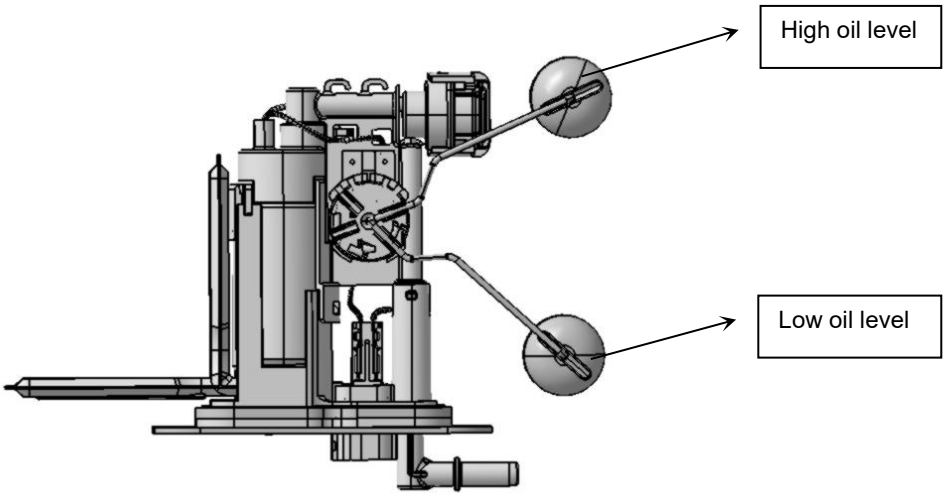


4. Fault mode

The contacts are abraded and in poor contact;
The gear switch is broken by vibration or pressing;
The gear switch is loose;
The connector cannot be fully connected;
The outgoing line is open-circuited or short-circuited.

○Oil level sensor

1. Outside view



2. Working principle

The oil level sensor and oil pump are assembled on the fuel pump assembly, including float, float rod, contact chip, thick film circuit board, outgoing line and so on. The contact chip and the thick film circuit board constitute a variable resistance and the float level changes with the oil level, driving the floating rod to rotate, and the position of variable resistance tap will change with it, and the corresponding resistance value will be output.

3. Corresponding relation of instrument display scale and oil level sensor

Warning Light Flashing	≥97Ω
Display 1 bar	82Ω - 97Ω
Display 2 bars	67Ω - 82Ω
Display 3 bars	52Ω - 67Ω
Display 4 bars	37Ω - 52Ω
Display 5 bars	22Ω - 37Ω
Display 6 bars	7Ω - 22Ω
Note: When displaying one bar, one bar flashes; when the resistance≥97Ω, the 6 bars and icon will flash together.	

4. Fault mode

The float fell off;

The contact chip and thick film circuit board are poorly contacted;

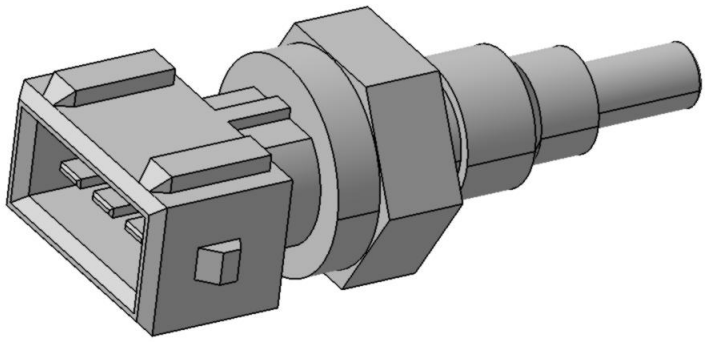
The bracket is fractured;

The circuit board is damaged;

The outgoing line fell off;

○Water temperature sensor

1. Outside view



2. Working principle

Water temperature sensor: After the engine is started, the temperature in the water tank will increase, and the resistance of the water temperature sensor will reach the set value. Then, the LCE will receive

this signal and pass it to the instrument which will display the water temperature scale to remind the driver.

3. Corresponding relation of instrument display scale and water level sensor

Temperature ℃	Standard resistance (Ω)
45	265.0~323.0
50	216.0~264.0
54	185.0~229.0
60	148.5~180.5
80*	74.6~90.6
90	53.5~66.5
100	40.6~48.6
108	34.0~38.0
110	32.0~36.0
113	30.0~34.0
115*	25.7~31.7
120	23.0~27.0
125	2.05~24.5

Main Faults Diagnosis

Fault Phenomenon	Possible Cause	Solution
Vehicle speed indicator fault： The vehicle speed is not displayed; The indicated vehicle speed is far from the real one;	The space between the speed sensor and the signal panel is too large; The vehicle speed sensor is failed; The signal panel is failed; The instrument is failed; The circuit is not connected well or is open-circuited or short-circuited.	Reduce the space to smaller than 2mm; Replace the vehicle speed sensor; Replace the signal panel; Replace the instrument; Reconnect or repair;
No mileage increase indication for running speed	The instrument is failed.	Replace the instrument.
Engine speed indication fault	The circuit is not connected well or is open-circuited; The instrument is failed; The ECU is failed.	Reconnect or repair; Replace the instrument; Replace the ECU.
ABS fault: The ABS fault light is always on; When the vehicle is powered on, the instrument self-check ABS fault light fails to be lit. The ABS fault light is always out;	The ABS is failed. The circuit is not connected well or is open-circuited or short-circuited.	Reconnect or repair; Replace the ABS; Replace the instrument.
Oil level indication fault: There is oil but no oil level indication;	The fuel sensor is failed or the float is stuck; The instrument is failed;	Replace the fuel sensor; Replace the instrument;

There oil level indication but no oil;	The circuit is not connected well or is open-circuited or short-circuited.	Reconnect or repair;
Gear indication fault: There is no gear indication; The gear indication is wrong.	The spring of moving contact is failed; The moving contact or gear switch contract is abraded; The gear switch is failed; The instrument is failed; The circuit is not connected well or is open-circuited or short-circuited.	Replace the spring; Replace the moving contact or gear switch; Replace the gear switch; Replace the instrument; Reconnect or repair;
Normally-on of water temperature alarm light	The circuit is not connected well or is open-circuited; The instrument is failed; The ECU is failed.	Reconnect or repair; Replace the instrument; Replace the ECU.
False alarm of voltage alarm light Alarm failure of voltage alarm light	The circuit is not connected well or is open-circuited; The instrument is failed.	Reconnect or repair; The instrument is failed.
Lighting failure of backlight of instrument	The circuit is not connected well or is open-circuited; The instrument is failed;	Reconnect or repair; Replace the instrument;
Failure of instrument displaying ECU information	The circuit is not connected well or is open-circuited; The instrument is failed; The ECU is failed.	Reconnect or repair; Replace the instrument; Replace the ECU.
Lighting failure of director indicator Lighting failure of low beam indicator	The circuit is not connected well or is open-circuited; The instrument is failed.	Reconnect or repair; Replace the instrument.
Time display fault: There is no time displayed or it cannot be adjusted or there is a serious time error;	The instrument is failed.	Replace the instrument.
Mode change failure of LCD	The instrument is failed.	Replace the instrument.
Function regulating failure of instrument	The instrument is failed.	Replace the instrument.

Engine Management System

Overview

The BX500 engine management system adopts the closed-loop electronic injection system which can effectively control the mixture air-fuel ratio by controlling the fuel injection volume, so as to reach the best air-fuel ratio of engine under various working conditions, and to improve power, reduce fuel consumption, reduce exhaust pollution, improve driving performance, low-temperature starting performance and idle performance.
The controls of closed-loop electronic injection system include: fuel quantity control, ignition timing control and ignition closed angle control, etc. The fuel quantity control is the most important function of the system, which includes: λ closed-loop control, start control, post-start control, warm-up control, idle control, partial load control, full load control, acceleration and deceleration control, overspeed fuel cut-off control and deceleration fuel cut-off control.
The system mainly consists of:

1. Sensor:
• Three-in-one sensor (air density, load, load range, acceleration and deceleration)
• Start temperature sensor (engine temperature)
• Muffler oxygen sensor (excess air coefficient greater than or less than 1)
• Engine speed sensor (RPM, crankshaft position)

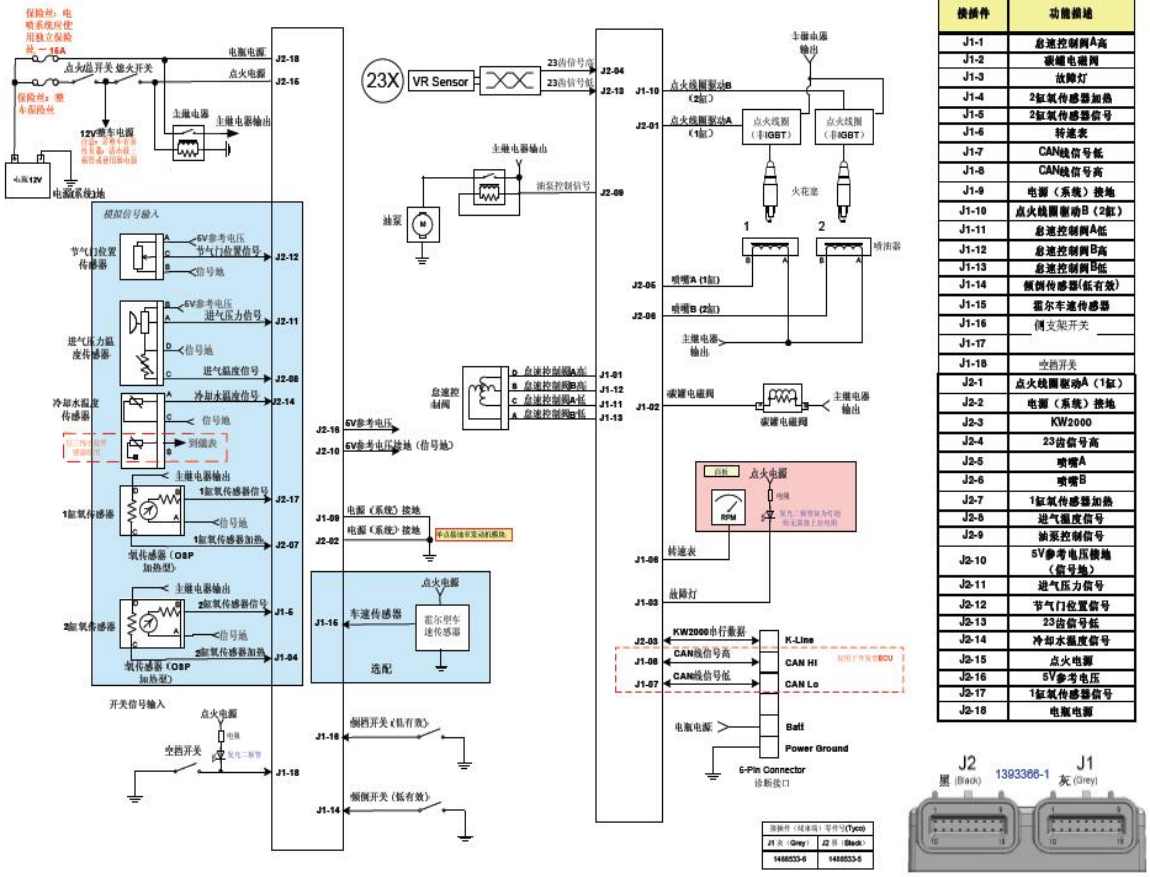
2. Actuator:
• Fuel pump
• Fuel injector (fuel supply)
• Ignition system coil
• High-voltage connecting wire
• Spark plug (ignition)
• Throttle, Idle speeding motor (air intake)

3. Electronic control unit:
• ECU

Notes for Maintenance

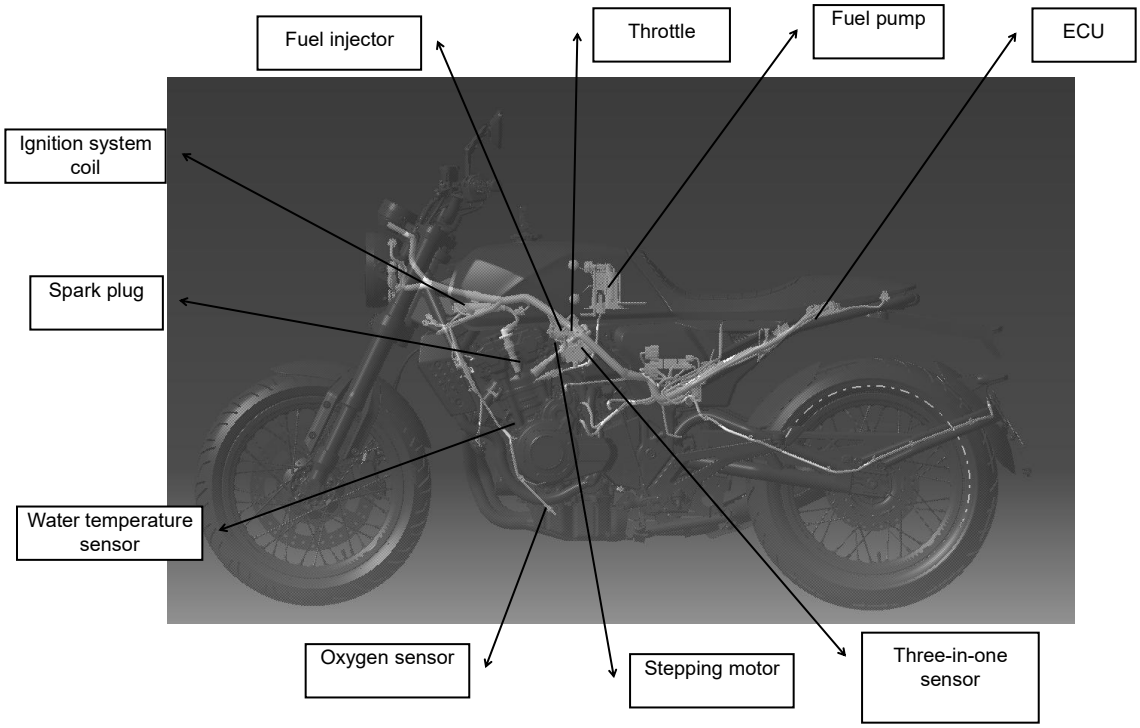
1. The fault of electronic fuel injection system can be diagnosed by the fault indicator on instrument and also by communicating the special diagnostic device with the ECU and reading the fault code.
2. When diagnosing fault, it only needs to turn on the key switch.
3. If the throttle position is adjusted, it is necessary to turn off the key switch and restart for the self-learning of idle position of engine.
4. If any sensor fails, the ECU will continue to run in limping with default value. Please drive the motorcycle to the special maintenance shop for repairing. If the actuator fails, the ECU will not be able to control the normal running of the vehicle. Please contact the special maintenance shop immediately repairing.

System Schematic Diagram



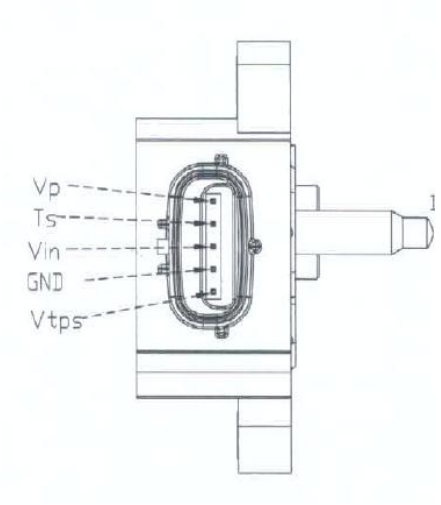
Details please refer to Attachment 1

Parts Arrangement Diagram



Introduction to Main Components and Parts

○ **Three-in-one sensor**



2. Working principle

The three-in-one sensor integrates the function of absolute pressure sensor of intake manifold, absolute temperature sensor of intake pipe and sensor of throttle opening.

The absolute pressure sensor of intake manifold consists of the pressure conversion element (elastic diaphragm + strain resistance) and the signal processing circuit that amplifies the output signal of conversion units. Since the vacuum chamber is at one side of the pressure conversion element and the intake manifold pressure is introduced from the other side, the higher of absolute pressure in the intake manifold, the greater the deformation of diaphragm, that is, the deformation is proportional to the pressure. The resistance value of the strain resistance attached to the elastic diaphragm changes in proportion to its deformation. With this, the changes of pressure in intake manifold can be converted to electrical signal.

The core temperature sensing element of the engine intake temperature sensor is composed of a semiconductor thermistor with negative temperature coefficient (NTC). Generally, the temperature sensor requires a special measuring circuit to test its resistance characteristics. The output characteristics of the semiconductor thermistor with NTC is that the resistance value of thermistor is inversely proportional to the change of temperature: that is, the higher temperature, the lower output resistance of thermistor; and the lower temperature, the higher output resistance of thermistor.

The throttle sensor is an angle sensor with linear output, which is essentially an angular displacement sliding rheostat, and it consists of two arc-shaped sliding resistors and two sliding arms. The rotating shaft of sliding arm is connected with the throttle shaft on the same axis. And 5V power supply voltage US is applied on both ends of the sliding rheostat. When the throttle rotates, the sliding arm will rotate along with it and move on the sliding resistor and extract the potential UP of contact as the output voltage, so that the throttle opening angle signal can be converted into a voltage signal.

3. Basic parameters

Pressure test range: 10-115kPa;

Limiting pressure: 655KPa (pressure greater than this value will cause permanent damage);

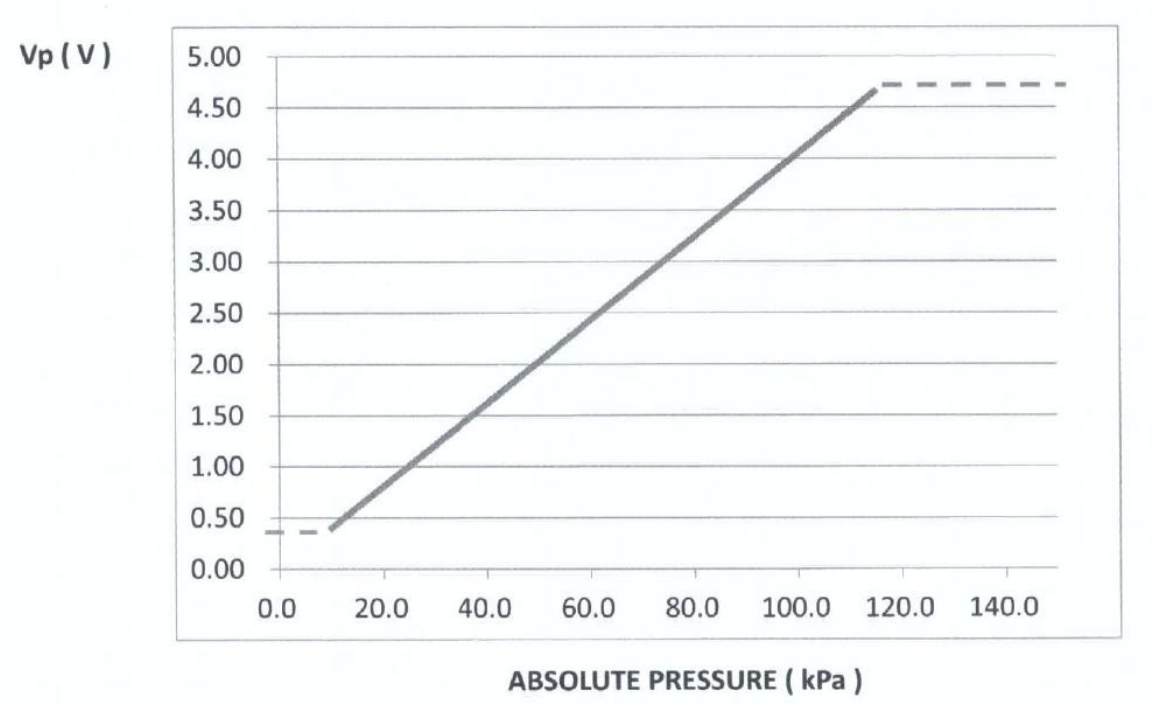
Operating temperature range: －40℃ - 125℃;

Storage temperature range: －40℃ - 150℃;

Operating voltage: 5V±0.25VDC;

Maximum operating current:＜10mA DC;

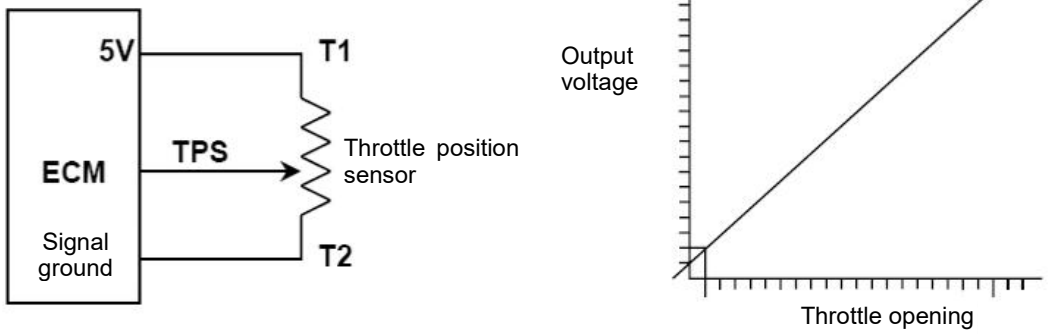
Diagram of relation of intake pressure and output voltage:



See the characteristic parameters of thermistor when the intake temperature sensor is not loaded in the following table:

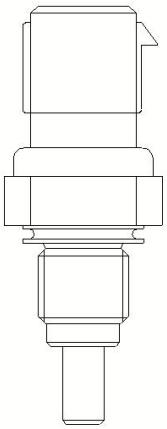
Temp.(℃)	Resistance(Ω)			Temp. Coef.(%/℃)	Temp. Tolerance(℃)		Audit tolerance @T± 1K Resistance(Ω)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
-40	37610	41690	45770	-5.61	-1.74	1.74	34220	46540
-35	28730	31620	34500	-5.45	-1.67	1.67	26160	34900
-30	22120	24170	26220	-5.30	-1.61	1.61	20240	26440
-25	17150	18620	20090	-5.14	-1.54	1.54	15800	20280
-20	13390	14450	15510	-5.00	-1.47	1.47	12380	15620
-15	10530	11300	12060	-4.85	-1.40	1.40	9760	12120
-10	8341	8896	9451	-4.71	-1.32	1.32	7832	9552
-5	6649	7053	7456	-4.58	-1.25	1.25	6298	7562
0	5335	5629	5923	-4.44	-1.18	1.18	5090	6026
5	4307	4522	4736	-4.32	-1.10	1.10	4124	4802
10	3498	3655	3812	-4.19	-1.02	1.02	3356	3864
15	2858	2972	3087	-4.08	-0.94	0.94	2766	3134
20	2348	2431	2514	-3.96	-0.86	0.86	2286	2558
25	1940	2000	2060	-3.85	-0.78	0.78	1900	2100
30	1598	1654	1711	-3.74	-0.91	0.91	1566	1752
35	1323	1375	1428	-3.64	-1.05	1.05	1296	1456
40	1100	1149	1198	-3.55	-1.19	1.19	1070	1226
45	920	965	1009	-3.45	-1.34	1.34	889	1028
50	773	813	854	-3.36	-1.49	1.49	742	867
55	652	689	726	-3.28	-1.64	1.64	621	735
60	552	586	620	-3.19	-1.79	1.79	527	631
65	470	500	531	-3.11	-1.95	1.95	451	543
70	401	429	457	-3.04	-2.12	2.12	386	470
75	344	369	394	-2.96	-2.28	2.28	329	404
80	297	319	342	-2.89	-2.45	2.45	283	350
85	257	277	297	-2.82	-2.62	2.62	245	303
90	222	241	259	-2.75	-2.80	2.80	212	267
95	193	210	227	-2.68	-2.98	2.98	187	237
100	169	184	199	-2.62	-3.17	3.17	166	210

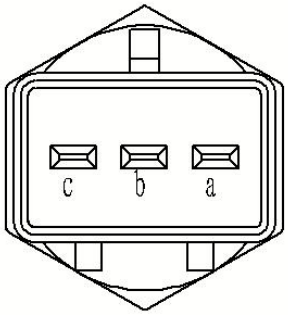
Throttle position & opening
Measure range: 7%-93% (from idle speed to full open)
Throttle position sensor reference voltage: 5V± 0.1V
When the throttle is fully closed, the output voltage is 12%±5% of the reference voltage.
When the throttle is fully opened, the output voltage is 83%-93% of the reference voltage.
The performance curve of throttle position sensor is as follows:

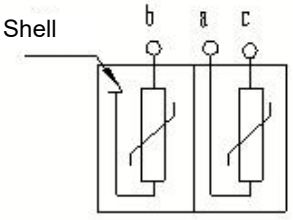


4. Fault mode
The sensor probe is blocked by a foreign matter;
The joint of sensor leaks air;
The sensor is short-circuited or open-circuited;
There is water in sensor;
The sensor suffers mechanical failure;

○ **Engine temperature sensor**







2. Working principle

The engine temperature sensor is a thermistor with negative temperature coefficient (NTC), which utilizes the thermistor's temperature sensitivity to convert the change of ambient temperature into the change of thermistor resistance value, and then convert it into a voltage signal through a bleeder circuit and output it to the ECU. The thermistor resistance decreases as the temperature of the coolant increases, but not linearly.

3. Basic parameters

The temperature curve R-T of engine temperature sensor is as follows:

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	标准电阻 Standard resistance	电阻精度 Resistance precision	温度精度 Temperature precision	温度 Temperature	标准电阻 Standard resistance
(℃)	(Ω)	(±%)	(±?)	(℃)	(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		

Details please refer to Attachment 2

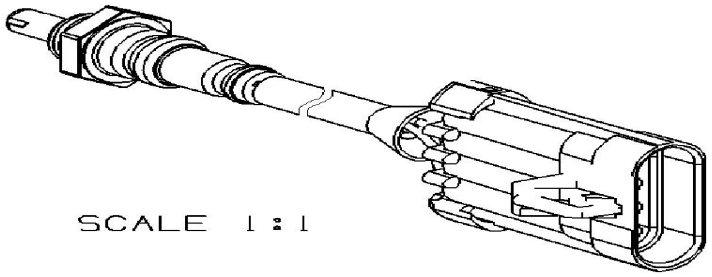
4. Fault mode

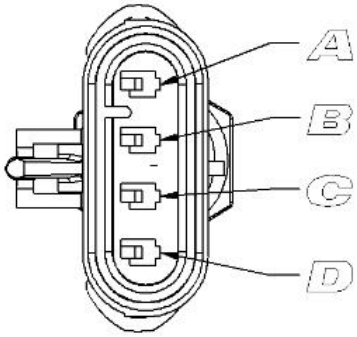
The resistance is inaccurate;

The sensor is open-circuited or short-circuited.

○ **Oxygen sensor**

1. Outside view and definition of pin





CONNECTOR PIN	WIRE COLOR	PIN AND WIRE CONNECTION
A	GRAY	SENSOR (GROUND)
B	BLACK	SENSOR (OUTPUT)
C	WHITE	HEATER -
D	PURPLE	HEATER +

2. Working principle

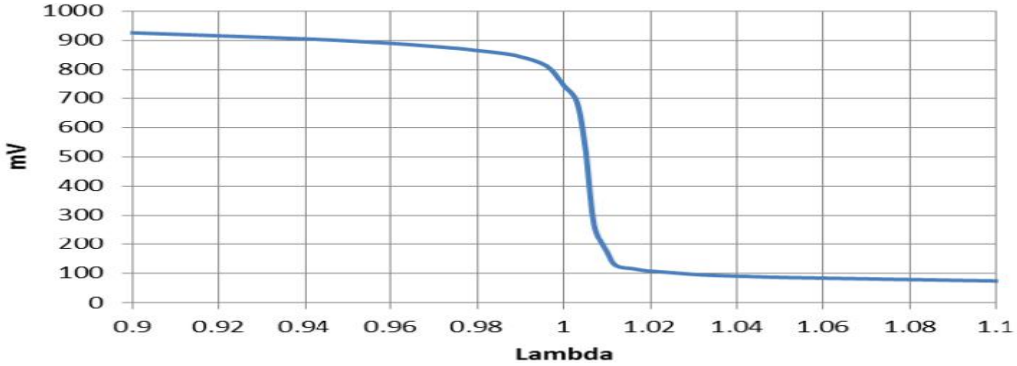
The OSMa oxygen sensor takes the flat-structured multilayer ceramic element as its basic element and the zirconia layer as the core element. The zirconia element works as a simple solid galvanic cell. According to the principle of electrochemistry, the electrode at its two ends will have electrical potential difference due to the difference of concentration of oxygen ion. Since the external electrode is exposed to exhaust gas, the oxygen ion concentration will vary according to the actual working conditions, while air at the internal electrode side is reference air and the oxygen ion concentration is constant. When the air-fuel ratio result of the engine is lean, the oxygen ion concentration in the exhaust gas is relatively high, and the oxygen ion concentration difference between the internal and external electrodes is small, that is, the potential difference is small, and the output voltage signal of the oxygen sensor is close to 0V. On the contrary, when the air-fuel ratio result is dense, the oxygen ion concentration in the exhaust gas is also relatively low, and the oxygen ion concentration difference between the internal and external electrodes is large, that is, the potential difference is large, and the output voltage of the sensor is close to 1V.

3. Basic parameters

Characteristic parameter of oxygen sensor with exhaust temperature at 450℃:
Rich mixture (λ＜1), output voltage of oxygen sensor: ≥750 mV;
Lean mixture (λ＞1), output voltage of oxygen sensor: ≤120 mV;
Rich-lean response time ≤80 mS;

Lean-rich response time ≤65 mS;
Heater power when exhausting at 13.5V & 450℃: 7.0
Heater current when exhausting at 13.5V & 450℃: 0.52A±0.10A
Nominal voltage of oxygen sensor: 13.5 V
Maximum operating voltage of oxygen sensor: 18V
Minimum operating voltage of oxygen sensor: 10V
Limit voltage of oxygen sensor (at 21℃,＜60s) : 21V

The transition characteristic of oxygen sensor with exhaust temperature at 450 ℃ is as follows:

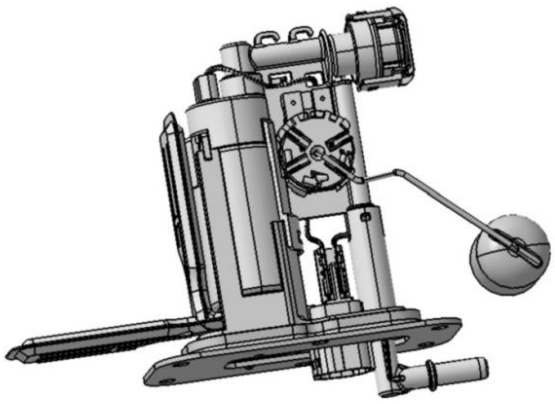


4. Fault mode

The heating element is failed;
The sensing element is failed;
The ceramic tube is broken;
The heating circuit is short-circuited or open-circuited;
The sensing circuit is short-circuited or open-circuited.

○ **Fuel pump**

1. Outside view



2. Working principle

The fuel pump integrates the fuel pump core, fuel pump support, primary filter, oil pressure regulator and so on and is installed in the fuel tank. The fuel will be sent to the secondary filter with the action of fuel pump core for filtration and then be output to the external tube after being adjusted to a certain pressure by the oil pressure regulator and finally to the injector. The constant fuel pressure is set as 350kPa. (Including oil level sensor）

3. Basic parameters

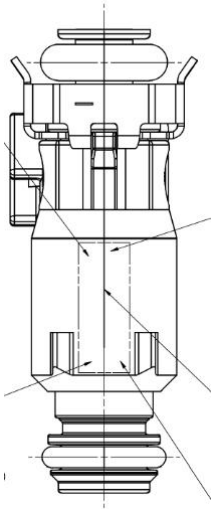
Storage temperature: -40°C-80°C;
Operating temperature: -30°C - 80°C;;
Fuel temperature: -30°C-70°C;
Insulation resistance of conductive parts and insulation parts: >500 M Ω;
Fuel level sensor resistance: 8Ω-97Ω.

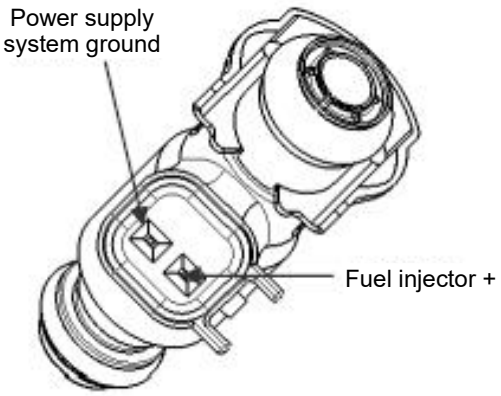
4. Fault mode

The fuel pump fails to rotate;
The fuel pressure regulator is failed;
The support fails to vibrate;
The fuel pump is short-circuited or open-circuited;
The fuel leaks from the seal ring;
The fuel level sensor resistance is open-circuited or short-circuited.

○ **Fuel injector**

1. Outside view and definition of pin





2. Working principle

The fuel injector is actually an element controlled by an electromagnetic switch. The fuel is supplied from the top.

There is an electromagnetic coil winding round an iron core and the two electrodes from the electromagnetic coil are the input control interface of the injector. The injector is directly connected to the control circuit of engine electronic control module (ECM) and system power through the engine cable harness. The electromagnetic coil of the injector directly receives the output control voltage signal of the engine ECM, that is, the ECM directly drives the electromagnetic coil to control the opening and closing time of the lower ball valve of the injector. When the electromagnetic coil is energized, the electromagnetic force generated will overcome the spring force of ball valve and fuel pressure to raise the ball valve, and the high-pressure fuel (250-400kPa) in the fuel line can pass through the valve seat hole of injector, flow through the injection orifice plate and form a cone spray which will be sprayed onto the intake valve. When the fuel injector is deenergized, the magnetic force of electromagnetic coil will disappear, and the ball valve of fuel injector will be closed under the action of the return spring, so that the fuel injection will stop. The injector orifice plate is a thin plate located at the injector head for precise control of fuel injection volume and uniform atomization.

3. Basic parameters

Operating temperature range: -30℃-125 ℃
System fuel pressure: 350kPa
Static coil resistance: 12.0 Ω±0.6 Ω
Maximum end fuel leakage rate: 0.6 cc/min
Normal operating voltage: 9-15V
Storage temperature: -40 -60°C

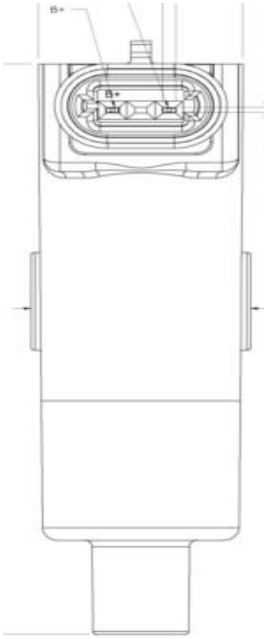
4. Fault mode

The fuel injector is blocked;
The electromagnetic coil is open-circuited or short-circuited;

The fuel injector fails to vibrate;
The fuel leaks from the seal ring.

○ **Ignition system coil**

1. Outside view and definition of pin



2. Working principle
The ignition coil consists of primary winding, secondary winding, iron core, shell and so on. When the voltage of battery is applied to the primary winding, the primary winding is charged. Once the ECU cuts off the primary resistance circuit, the charging stops. Meanwhile, the high voltage electricity will be detected in the secondary winding, and sparks will be generated through the electro-discharge of the high-voltage connecting wire and spark plug so as to ignite the mixture of fuel and air in the cylinder.

3. Basic parameters
Operating voltage: 6-16V；
Primary coil resistance: 0.53 Ω±0.08 Ω;
Secondary coil resistance: 8 kΩ±1.2 kΩ;
Primary coil inductance: 1mH±0.2mH;
Secondary coil inductance: 9.5H±1.9H;
Insulation resistance: under normal temperature condition, the insulation resistance between ignition coil shell and copper sheath of spark plug cap shall be greater than 1000M Ω;

4. Fault mode
The primary winding is open-circuited;
The secondary winding is broken down and short-circuited;

The surface discharges.

○ **High-voltage connecting wire**

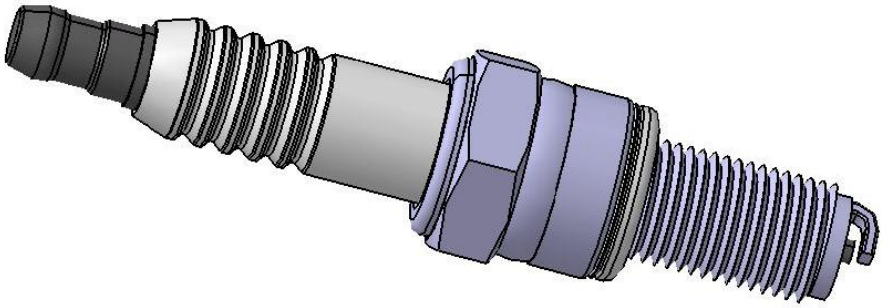
1. Outside view

2. Working principle
The high voltage connecting wire connects the ignition coil to the spark plug. It consists of spark plug cap, high voltage wire and ignition coil connector cap.

3. Fault mode
The connection between voltage wire, spark plug cap or ignition coil connector cap is loose;
The insulation rubber sleeves of spark plug cap or ignition coil connector cap is aged or leaks electricity;
The circlip of spark plug cap or ignition coil connector cap is failed or in poor contact.

○ **Spark plug**

1. Outside view



2. Working principle

The spark plug is to introduce the high voltage generated by the ignition coil into the combustor and spark the mixture between its two electrodes. The spark plug mainly consists of center electrode, side electrode, connecting screw, insulator, sealing washer and shell. The damping resistance powder is applied between the connecting screw and center electrode to better suppress the interference caused by ignition. The spark plug has different calorific value which is determined by the length of insulator skirt section. The longer the insulator skirt section is, the lower degree of heat dissipation and the lower calorific value, and vice versa.

3. Basic parameters

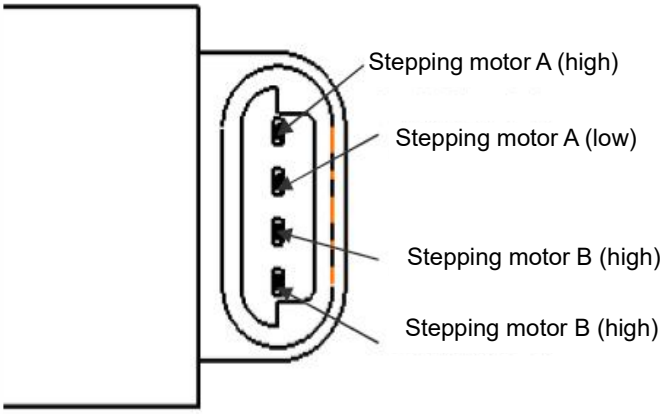
Spark plug model: CPR8EA (NGK);
3-6kΩ resistance in spark plug.

4. Fault mode

There is serious carbon accumulation in spark plug;
The spark plug electrode is burnt;
The spark plug insulator is broken;
The spark plug is overheated;
The spark plug leaks air.

○ **Idle stepping motor**

1、Outside view and definition of pin



2. Working principle

The principle of idle bypass air volume control valve is derived from the one of stepper motor. It consists of a rotor which composes of two special-shape permanent magnets, a stator which composes of two sets of two phase electromagnetic coils, a threaded rotor drive mechanism which changes rotational motion to straight motion, a cone control valve, an input circuit signal connector, a spring, a metal fixing shell for assembly, a rubber seal ring and other elements. When a specific electric pulse input signal acts on the two sets of electromagnetic coils, the polarity of the electromagnetic field formed by the coils will be changed in a certain order. According to the principle of like charges repelling each other while opposite charges attracting, the rotor mechanism will be driven to rotate in a certain direction. Therefore, the stepper motor can convert the electrical pulse input signal into the discontinuous mechanical rotational motion, and then transform the rotational motion of the rotor into the linear motion of regulating head.

3. Basic parameters

Rated operating voltage: 12V;
Allowable operating voltage: 7.5 V-14.2V;
Allowable operating temperature: -40℃-150℃;
Specification of DC resistance of each coil: 53±5.3Ω (tested under 27℃);
Inductance of each coil winding: 33±5Mh (tested under 25℃ with 1000Hz sinusoidal input signal).

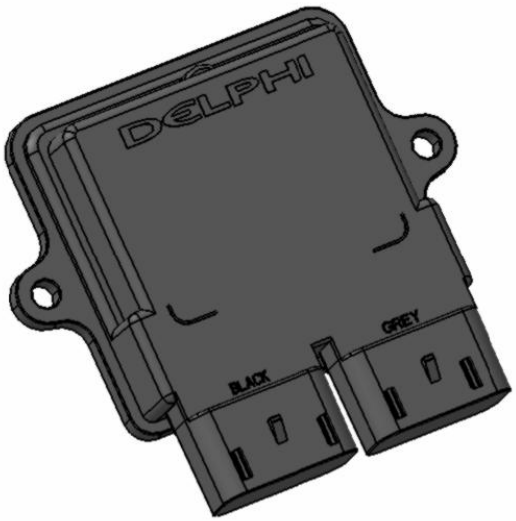
4. Fault mode

The pipeline is blocked or leaks air;
The idle actuator is blocked;
The electromagnetic coil is open-circuited or short-circuited;

The idle actuator fails to vibrate.

○ **ECU**

1. Outside view



2. Working principle

ECU obtains various information about the actual working status of the engine or vehicle through a number of sensors allocated to the engine management system. ECU drives the actuator of the system with pre-set and pre-stored data to optimize and control the engine operating condition.

The main input signal sensors of electronic fuel injection system include: engine intake manifold pressure (MAP) sensor and engine intake manifold air temperature (MAT) sensor, cylinder cover temperature/coolant temperature (CLT) sensor, oxygen sensor (O2), crankshaft position sensor (CPS) and so on. The ECU controls the engine through the system-equipped actuators. The actuators of the system mainly include the fuel injectors (INJ), ignition system coil (ING), electric fuel pump and idle air control valve (IACV) and other elements.

3. Basic parameters

Normal operating voltage: 9V-16V;

The ECU system has the short-time anti-26V voltage protection function and short-time anti-13V reversed polarity voltage protection function. If the ECU is subjected to overvoltage or reverse polarity voltage for a long time, its hardware will be permanently damaged.

Storage temperature:-40℃～ 105℃;

Operating temperature: -20℃85 ℃;

4. Fault mode

The connector is failed;

The element is damaged;

Water enters in and causes short-circuit;
The element is failed after vibration.

EMS Faults Diagnosis Process

1. Analyze feedback by user
Keep a detailed record of the problem (fault, other information reported by the user) and the occurrence process stated by the user.
2. Check, record and sort out fault diagnosis codes
The fault can be determined by the instrument indicator or using fault diagnosis tester and reading the fault code.
Fault diagnosis code confirmation procedure:
Turn on the power ⟹ Connect the fault diagnosis instrument ⟹ Read the history fault and clear the history fault ⟹ Turn off the power and then turn it on ⟹ Start the engine and running it at idle for 2min (press the start button for 5s if it cannot be started) and accelerate and decelerate it for 2-3 times ⟹ Read the current fault with PCHUD software.
3. Check appearance
Check whether the wiring connector, fuse, high voltage connecting wire, throttle and their parts are abnormal.
4. Check basic function
Check the battery voltage
Check the starting, idle running and acceleration condition
Check whether the fuel pump is running
Check the ignition spark and spark plug
Check whether there is scrap iron in the engine speed sensor
Check whether the rubber hose of pressure sensor is broken
Check whether the fuel injector is blocked
Check other items
5. Handle the fault according to the confirmed fault code, appearance check and basic function check results.
6. Use a fault diagnosis tester to check whether the data of heat engine at idle is in the specified range.
7. Analyze and handle the fault according to the methods in the Fault Diagnosis Table.
8. Clear the fault code.

EMS Fault Diagnosis Table

Fault Phenomenon	Possible Cause	Solution
Starting difficulty	The starting system is faulted;	Repair the starting system as described in the previous chapter;
	The engine starting resistance is too high or the cylinder pressure is insufficient;	Check the mechanical parts of engine;
	The air filter is blocked or the throttle or intake air pipe leaks air;	Repair the air filter, throttle or intake manifold;
	No spark or abnormal spark:	
	The fuse is blown;	Replace the fuse;
	The starting rev speed is lower than 300r/min;	Check the starting system;
	The high-voltage connecting wire is poorly connected;	Reconnect;
	The spark plug cap is aged, filled with water or in defective insulation;	Replace the spark plug cap;
	The main cable line is faulted or is poorly grounded;	Repair the circuit;
	The spark plug is faulted;	Remove the deposited carbon or replace the spark plug;
	The ignition system is faulted;	Replace the ignition coil;
	The emergency stop switch if faulted;	Replace the emergency stop switch.
	The ECU is faulted;	Reconnect or repair the ECU:
	The engine speed sensor or signal wheel is faulted.	Remove the iron filings and adjust the clearance;
	No fuel pressure or insufficient fuel pressure:	
	The oil pump relay is faulted;	Reconnect or repair the oil pump relay;
	The secondary filter is blocked or the oil pump is faulted;	Replace the secondary filter or oil pump;
	The fuel pipeline is blocked and leaks oil;	Replace;
	The fuel injector is faulted.	Replace.
	The intake pressure sensor is faulted or the hose is fractured;	Replace the intake pressure sensor or hose;
	The ignition timing is incorrect;	Adjust the ignition timing;
	The fuel is deteriorated or contains water.	Replace the fuel with qualified one.
Unstable idle speed, no idle speed or flameout upon throttling back of engine	The cylinder pressure of engine is insufficient;	Check the mechanical parts of engine;
	The air filter is blocked or the throttle or intake air pipe leaks air;	Repair the air filter, throttle or intake manifold;
	The exhaust system is blocked;	Replace or clean;
	Check the ignition system:	
	The high-voltage connecting wire is poorly connected;	Reconnect;
	The spark plug cap is aged, filled with water or in defective insulation;	Replace the spark plug cap;
	The spark plug has carbon deposits or is faulted;	Remove the deposited carbon or replace the spark plug;
	The engine speed sensor or signal wheel is faulted;	Remove the iron filings and adjust the clearance;
	The ignition timing is incorrect;	Adjust the ignition timing;
	Check the oil supply system:	
	The secondary filter is blocked or the oil pump is faulted;	Replace the secondary filter or oil pump;
	The fuel pipeline is blocked;	Replace;
	The fuel injector is faulted;	Replace;
	Check the idle speed control system:	

	The idle screw is loose; The throttle position sensor is faulted;	Adjust and tighten the idle screw; Replace the throttle position sensor;

EMS Fault Diagnosis Table (continued)

Fault Phenomenon	Possible Cause	Solution
Unstable idle speed, no idle speed or flameout upon throttling back of engine	The intake pressure sensor and hose are faulted; The water temperature sensor is faulted; The idle stepping motor is faulted; The circuit is connected or grounded poorly; The ECU is faulted. The fuel grade is incorrect, or the fuel is deteriorated or contains water.	Replace intake pressure sensor or connecting hose; replace the water temperature sensor; Replace idle stepping motor and its pipeline; Check and connect the circuit; Reconnect or repair the ECU; Replace the fuel with qualified one.
Overhigh engine idle speed	The throttle cable fails to return; The oil pump pressure regulator is faulted; The intake temperature sensor is faulted; The idle stepping motor and connecting pipe are faulted;	Adjust throttle cable and idle screw; Replace the pressure regulator; Replace intake temperature sensor; Replace idle stepping motor.
Underpowered engine Rev speed failing to increase or flameout occurrence when accelerating; slow reaction during accelerating Poor performance or powerlessness during accelerating The engine shakes or the vehicle speed is unstable;	The engine has mechanical fault; The air filter is blocked or the throttle or intake air pipe leaks air; The exhaust system and three-way catalytic converter are blocked; The ignition coil, high-voltage wire or spark plug is faulted; The oil pump or oil supply pipe is faulted; The fuel injector is blocked or faulted; The signal of sensor is abnormal; The circuit is connected or grounded poorly; The ECU is faulted.	Repair the mechanical parts of engine; Repair the air filter, throttle or intake manifold; Replace or clean; Repair or replace; Repair or replace; Clean or replace; Replace the failed sensor; Check and connect the circuit; Reconnect or repair the ECU.
Over consumption of oil	The cylinder pressure of engine is insufficient; The ignition coil, high-voltage wire or spark plug is faulted; The phase sensor and circuit are faulted; The oil pump or oil supply pipe is faulted; The fuel injector is blocked or faulted; The ECU is faulted.	Repair the mechanical parts of engine; Repair or replace; Repair or replace; Repair or replace; Clean or replace; Reconnect or repair the ECU.
Poor idling or flameout with another electrical load	Other electrical load is excessive or the intermittent short circuit causes the instability of battery voltage; The short circuit between system circuit and other load circuit makes the system signal voltage unstable.	Replace the electrical load; Check and connect the circuit.

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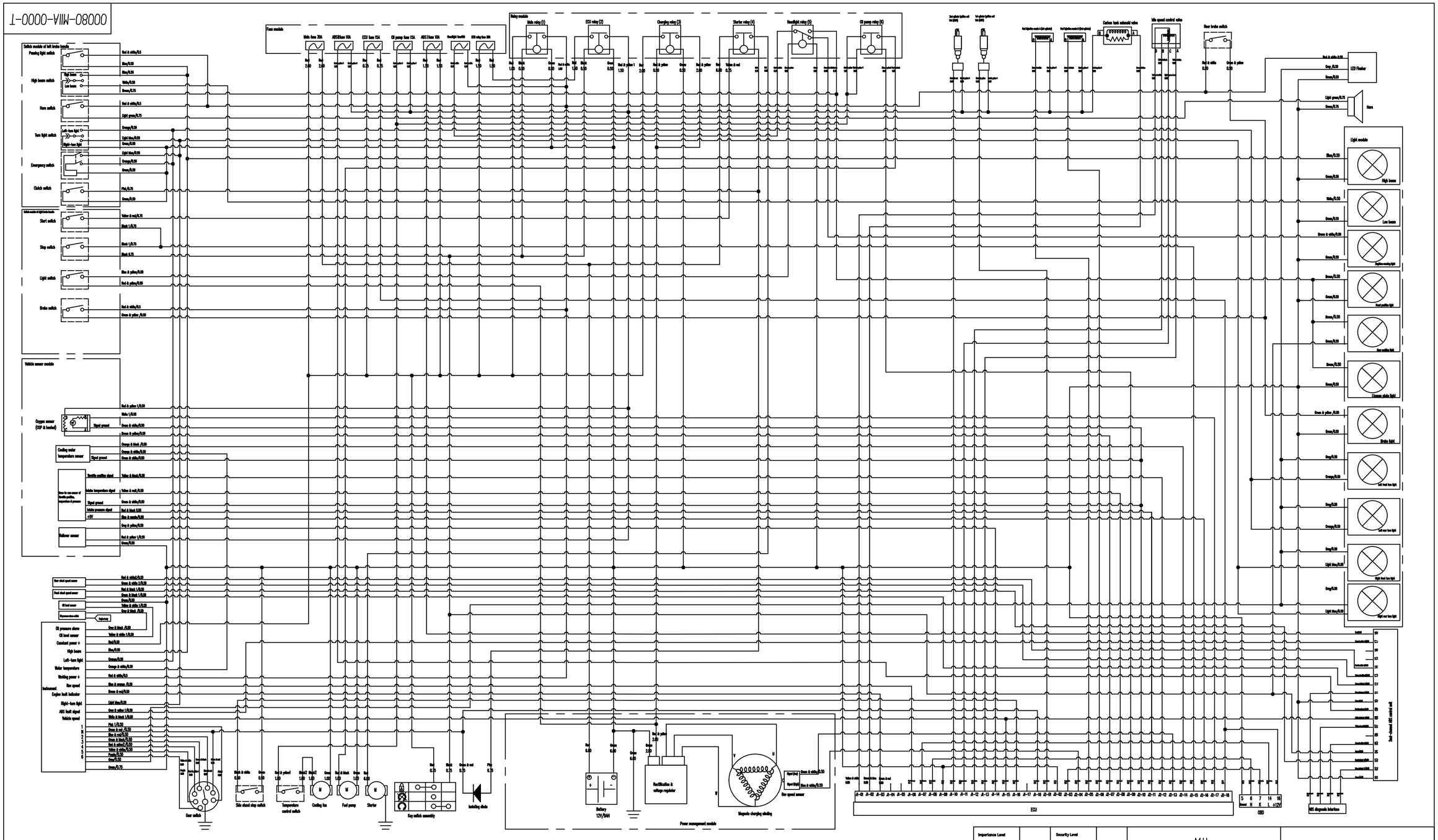

Special symbol:

⏚ Ground wire

Importance Level			Security Level		MII	Chongqing Gaokin Industry Co., Ltd.	
Compliance Level			Q				
					Electrical Diagram	Designed by	
						Verified by	
						Reviewed by	
						Process Reviewed by	
						Standard	
						Approved by	
					Quality		
S/N	Quantity	Design Change No.	Signature	Date	Scale 1 : 1	00080-MIIA-0000-T	
					Page 1 of 1		

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Signature

Date

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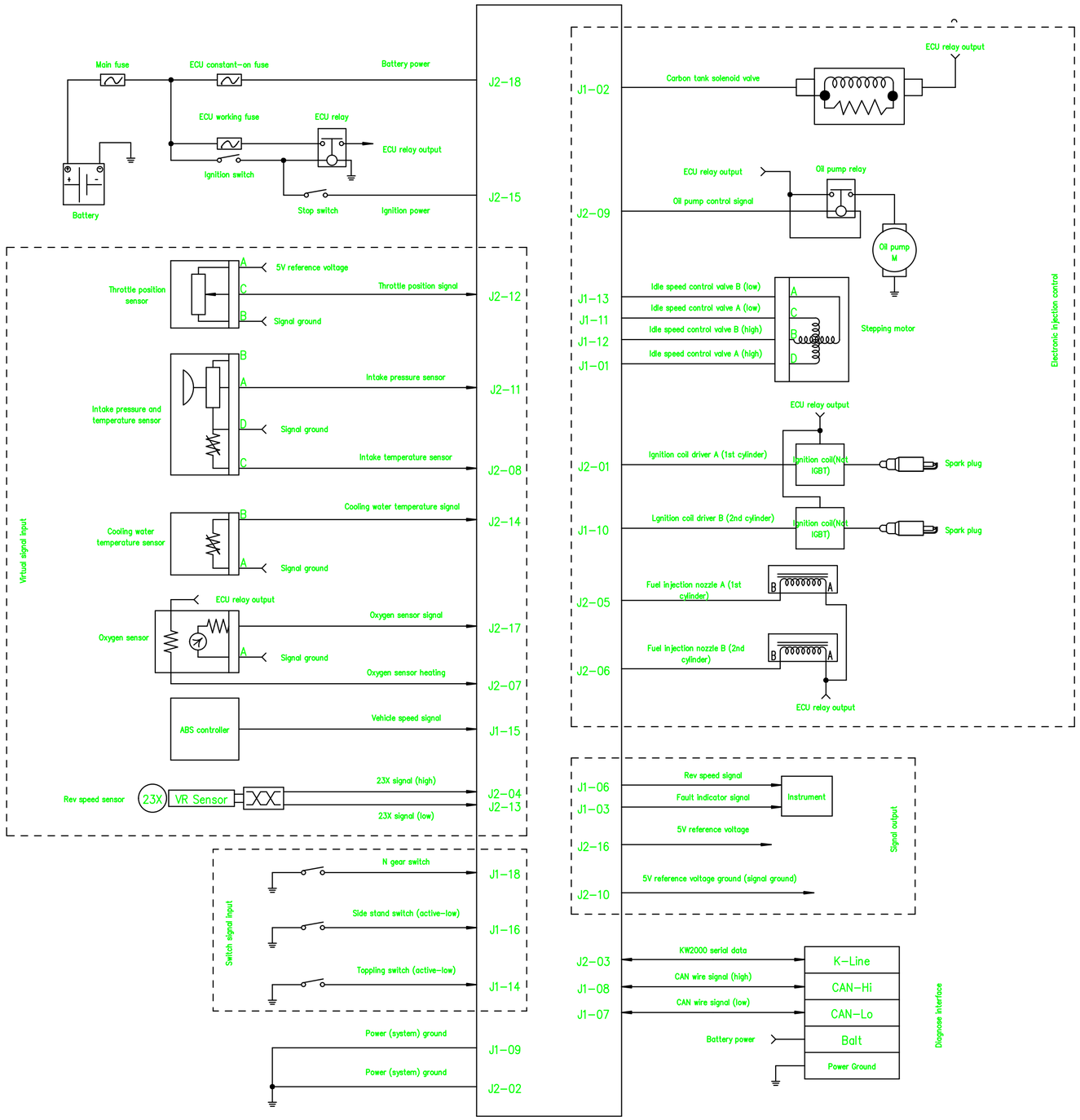
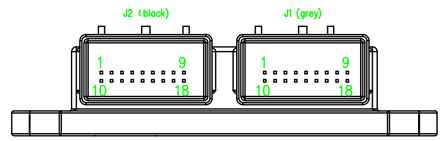


J1-18	N gear switch	J2-18	Battery power
J1-17		J2-17	Oxygen sensor signal
J1-16	Side stand switch	J2-16	5V reference voltage
J1-15	Vehicle speed signal	J2-15	Ignition power
J1-14	Toppling switch	J2-14	Cooling water temperature signal
J1-13	Idle stepping motor B (low)	J2-13	23-tooth signal (low)
J1-12	Idle stepping motor B (high)	J2-12	Throttle position signal
J1-11	Idle stepping motor A(low)	J2-11	Signal of intake pressure
J1-10	Ignition coil driver B (2nd cylinder)	J2-10	5V reference voltage ground
J1-9	Power (system) ground	J2-9	Oil pump control signal
J1-8	CAN signal (high)	J2-8	Intake temperature sensor
J1-7	CAN signal (low)	J2-7	Oxygen sensor heating
J1-6	Rev speed signal	J2-6	Nozzle B
J1-5		J2-5	Nozzle A
J1-4		J2-4	23-tooth signal (high)
J1-3	Fault indicator signal	J2-3	KW2000
J1-2	Carbon tank control	J2-2	Power (system) ground
J1-1	Idle stepping motor A(high)	J2-1	Ignition coil driver A (1st cylinder)
Pin	Function Description	Pin	Function Description



Importance Level		Security Level		MII	Chongqing Gaokin Industry Co., Ltd.
Compliance Level		Q			
				ECU Control Schematic Diagram	Designed by
					Verified by
					Reviewed by
					Process Reviewed by
					Standard
				Quality	
				Scale 1 : 1	
S/N	Quantity	Design Change No.	Signature	Date	Page of

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Former Based Drawing No.

Based Drawing No.

Signature

Date

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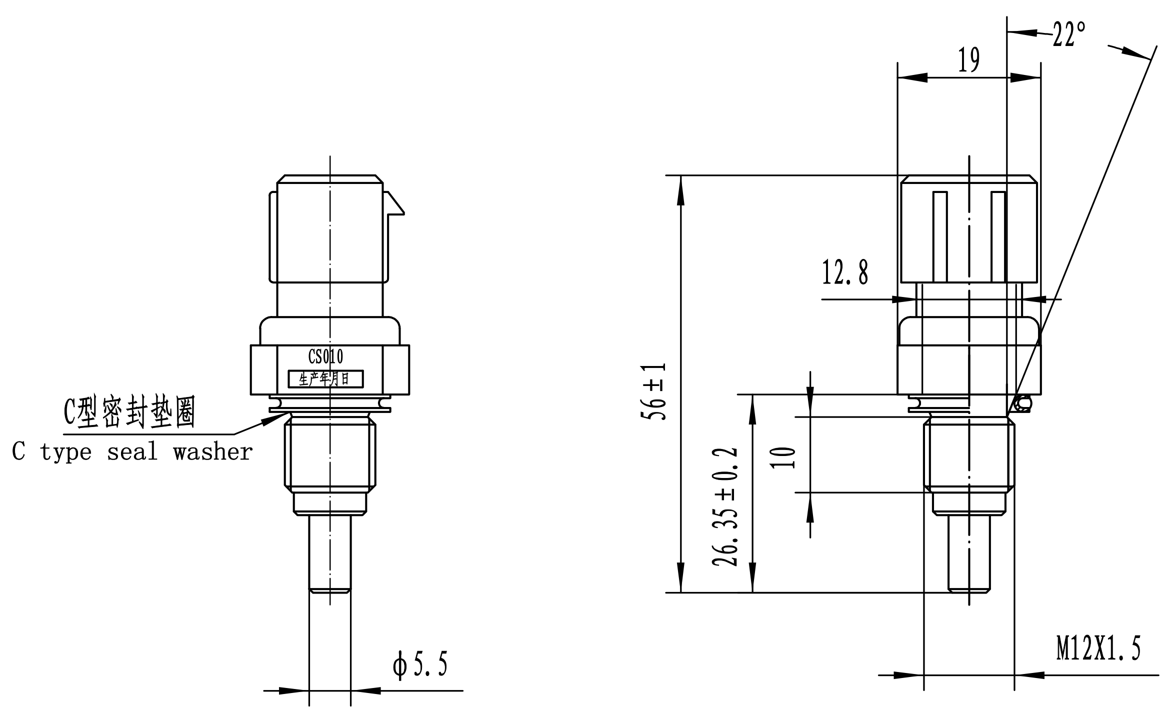
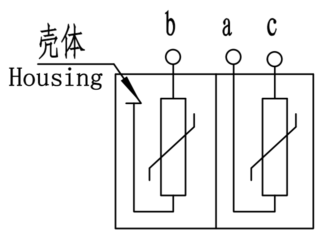
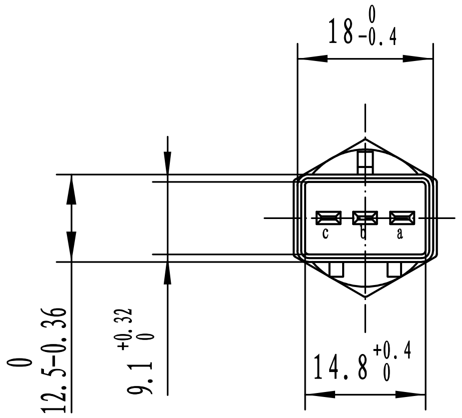
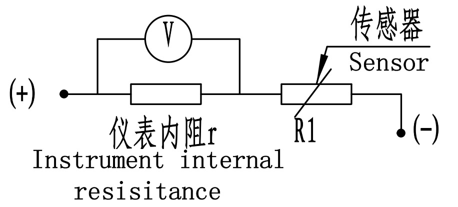


ECU通道电阻（a～c） ECU passageway resistance				仪表通道电阻（b～壳体） Instrument passageway resisitance (b~housing)	
温度 Temperature	标准电阻 Standard resistance	电阻精度 Resistance precision	温度精度 Temperature precision	温度 Temperature	标准电阻 Standard resistance
(℃)	(Ω)	(±%)	(±?)	(℃)	(Ω)
-40	100, 865	4.87	0.7	45	265.0－323.0
-35	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		







仪表动态监测线路

The dynamic detecting circuit of the instrument

技术要求

1. 温度传感器工作温度范围.：-40～135℃。
2. 热响应时间不大于30s。
3. 温度电阻特性见右表ECU及仪表通道电阻值。
4. 安装力矩：13～17N.m。
5. 相配接插件标准为KPB016-0.3427或等效替换件。
6. 表中带“*"为关重特性点。
7. 产品型号：BDW-CS-010

Technical Requirements

1. The temperature sensor working temperature range:-40~ 35℃.
2. The thermal response time is not greater than 30 s.
3. The resistance temperature characteristic see right chart ECU and instrument channel resistance.
4. Install torque:13~17N.m.
5. Matching connector standard for KPB016-0.3427 or equivalent replacement parts.
6. Marking "*" in the table is the key-important point..
7. Product model: BDW-CS-010

产品重要度等级 Productimportance Level

保安性等级 Security Level

法规性等级 Regulatory Level

E05

水温传感器

Water temperature sensor

重庆高金实业有限公司

Chongqing Gaokin Industry Co.,Ltd

设计 Design

审核 Audit

工艺Process

标准化 Standardization

批准 Approve

阶段标记 Stage mark | 质量Quality | 比例Scale 1:1

序号 S/N | 处数No. | 设计变更号 Design chang No. | 签字Sign | 日期Date

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旧底图总号 Old traced drawing No.

底图总号 Traced drawing No.

签 字 Sign

日 期 Date