

Maintenance and Repair Manual

V250



GENERAL INFORMATION

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SAFETY INSTRUCTIONS

For your personal and vehicle safety, please abide by the following six regulations:

①、Wear all kinds of protective equipment correctly.

Riding protective equipment includes safety helmets, goggles, knee pads, elbow pads and gloves. Wearing protective equipment can greatly reduce the injury to your body during an accidental crash and protect your personal safety to the utmost extent.

②、Familiar with vehicle structure.

The driver's driving skills and understanding of the vehicle are the basis for safe driving. Before officially riding on the road, you need to practice in an open field where there are no other vehicles and be fully familiar with the vehicle and the method of manipulating it.

③、Understand the limit of your own safe speed.

The driving speed depends on the ground conditions, your own skills and the weather. Drive at a safe speed and within your skill range at all times. Knowing this limit will prevent accidents.

④、Wear appropriate clothing.

Loose, bizarre clothing can make you uncomfortable and unsafe when driving. When you are on the saddle, wearing well-fitting clothing will make your hands, feet, and whole body move freely. So try to choose high-quality tight clothing.

⑤、Check before driving.

Please carefully read the instructions in the section "Inspection before driving" in this manual, driving in accordance with the rules can ensure the safety of you and the passengers.

⑥、Pay extra attention to safety when driving on cloudy and rainy days.

Pay special attention to rainy days. Keep in mind that the braking distance is twice that in sunny days. When driving, keep clear of the hole caps, marking paints, and oily roads to avoid slipping.

GENERAL PRECAUTIONS

WARNING

- ❖ Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the vehicle.
- ❖ When 2 or more persons work together, pay attention to the safety of each other.
- ❖ When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors.
- ❖ When working with toxic or flammable materials, make sure that the area you work in is well-ventilated and that you follow all of the material manufacturer's instructions.
- ❖ Never use gasoline as a cleaning solvent.
- ❖ To avoid getting burned, do not touch the engine, engine oil or exhaust system during or for a while after engine operation.
- ❖ After servicing fuel, oil, exhaust or brake systems, check all lines and fittings related to the system for leaks.

CAUTION

- ❖ If parts replacement is necessary, replace the parts with Genuine Parts or their equivalent.
- ❖ When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.
- ❖ Be sure to use special tools when instructed.
- ❖ Make sure that all parts used in reassembly are clean, and also lubricated when specified.
- ❖ When use of a certain type of lubricant, bond, or sealant is specified, be sure to use the specified type.
- ❖ When removing the battery, disconnect the negative cable first and then positive cable. When reconnecting the battery, connect the positive cable first and then negative cable, and replace the terminal cover on the positive terminal.
- ❖ When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative cable at the battery.
- ❖ Tighten cylinder head and case bolts and nuts, beginning with larger diameter and ending with smaller diameter, from inside to outside diagonally, to the specified tightening torque.
- ❖ Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, cotter pins, circlips, and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any leftover material from the mating surfaces.
- ❖ Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.
- ❖ Do not use self-locking nuts a few times over.
- ❖ Use a torque wrench to tighten fasteners to the torque values when specified. Wipe off grease or oil if a thread is smeared with them.
- ❖ After reassembly, check parts for tightness and operation.
- ❖ To protect environment, do not unlawfully dispose of used motor oil and other fluids: batteries, and tires.
- ❖ To protect Earth's natural resources, properly dispose of used vehicles and parts.

EXTERIOR PHOTOGRAPH



NOTE

Difference between photographs and actual motorcycles depends on the markets.

FUNCTION OF EI SENSOR EI

★ ECU (Engine Control Unit, EI Control Unit) ECU

: ECU decide the fuel injection volume and ignition time to adjust the fuel injector opening and closing rate which is considered the engine speed, intake air pressure, intake air volume, engine temperature, oxygen volume and throttle opening angle, etc.

★ EI (Electric fuel Injector) EI

: EI spray the fuel to intake pipe by ECU's injection signal.

Fuel which is needed combustion in the combustion chamber is supplied from the fuel tank.

★ GP switch (Gear Position Switch) GP

: GP switch is used when start / stop and control ECU as the converted electrical signal of the gear position is supplied ECU.

★ IAP sensor (Intake Air PRESSURE : IAPS)

: IAP sensor measure the pressure which is generated from the intake pipe and compare with the provided absolute pressure, then analogize the air volume indirectly and help to work the fuel injector properly.

★ IAT sensor (Intake Air Temperature Sensor : IATS)

: IAT sensor perceive the atmospheric temperature and is located the air cleaner case.

★ ISC solenoid (Idle Speed Control Solenoid)

: ISC solenoid is interlocked with the throttle body, so ECU control the engine idle speed.

★ O₂ sensor (Oxygen Sensor : O₂S)

: O₂ sensor measure the oxygen volume from the exhaust gas and convert the oxygen volume into voltage value, then communicate the output voltage to ECU.

★ Pick-up Coil

: Pick-up coil perceive the front and rear cylinder's engine speed and realtime of piston position.

★ PV (Purge control Valve)

: Purge control valve is part of the evaporative emission control system. The purge control valve closes to prevent the vapor from reaching the engine when it is turned off. When the engine is started and is ready to receive the canister's contents, the purge control valve opens to allow the vapor flow.

★ RO switch (Roll Over Switch)

: RO switch is the fuel cut-off system when the motorcycle is leaned over 60° for upset accident.

★ TP sensor (Throttle Position Sensor : TPS)

: TP sensor detect the throttle opening angle and is located the throttle body.

It decide the fuel injection volume and compensate the ignition time as inform idle· acceleration· deceleration condition and throttle full opening etc. to ECU.

★ WT sensor (Water Temperature Sensor : WTS)

: WT sensor is located on the cylinder block's water jacket, the intake pipe or the cylinder head coolant passage's thermostat part for contact with the coolant.

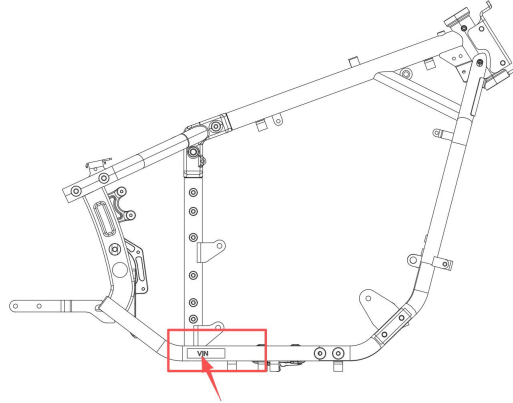
WT sensor is the NTC (Negative Temperature Coefficient) resister that measure the coolant temperature and inform ECU.

SERIAL NUMBER LOCATION

The frame serial number or V.I.N. (Vehicle Identification Number) is stamped on the Lower beam. The engine serial number is located on the left upside of crankcase assembly.

These numbers are required especially for registering the machine and ordering spare parts.

◎ FRAME SERIAL NUMBER



◎ ENGINE SERIAL NUMBER



FUEL AND OIL RECOMMENDATION

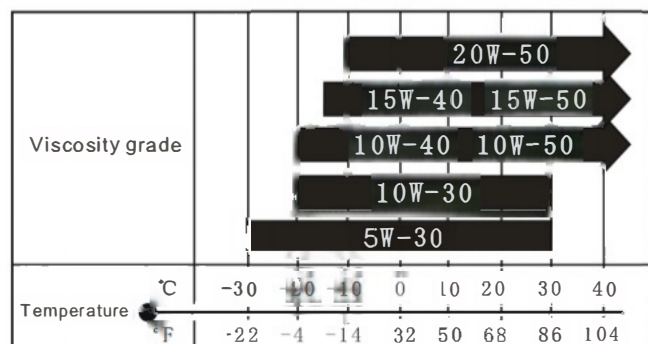
◎ FUEL

Gasoline used should be graded 92 octane (Research Method) or higher. An unleaded gasoline type is recommended.

◎ ENGINE OIL

ENGINE OIL SPECIFICATION

Classification system	Grade
API	SG grade or above
SAE	10W-40



- *If an SAE 10W-40 API SG grade or above motor oil is not available, select*

an alternative according to the following chart.

Use a premium quality 4-stroke motor oil to ensure longer service life of your motorcycle.

Oil drain bolt torque: 25-30N·m

 **WARNING**

- ❖ Don't mix the unrecommended oil. It could damage the engine.
- ❖ When refilling the oil tank, don't allow the dust to get inside.
Mop the oil spilt.

● **BRAKE FLUID**

Specification and classification: DOT4

 **WARNING**

Since the brake system of this motorcycle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result. Do not use any brake fluid taken from old or used or unsealed containers. Never re-use brake fluid left over from a previous servicing, which has been stored for a long period.

● **ANTIFREEZE**

Antifreeze selection:

1. Antifreeze must not be mixed using.
2. The freezing point of antifreeze is normally lower than the local minimum ambient temperature 5-10 degrees.
3. The boiling point of antifreeze is more than 107 ° C.

 **WARNING**

This motorcycle engine is water cooling system. During motorcycle running, the antifreeze is high temperature and high pressure in the cooling system. So, it is strictly forbidden opening the radiator cap in this state, avoiding burn.

The antifreeze must be added in a timely manner and sufficient amount to prevent damaging the engine.

The antifreeze must be added after the engine is stopped and cooled.

WARNING

Antifreeze belongs to chemicals, which include toxic substances. If the antifreeze gets into your eyes or skin, wash with plenty of water immediately.

BREAK-IN PROCEDURES

During manufacture only the best possible materials are used and all machined parts are finished to a very high standard but it is still necessary to allow the moving parts to BREAK-IN before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. The general rules are as follows:

- Keep to these break-in procedures:

Initial 800km	Less than 1/2 throttle
Up to 1,600km	Less than 3/4 throttle

- Upon reaching an odometer reading of 1,600 km you can subject the motorcycle to full throttle operation. Do not maintain constant engine speed for an extended period during any portion of the break-in. Try to vary the throttle position.

CYLINDER CLASSIFICATION

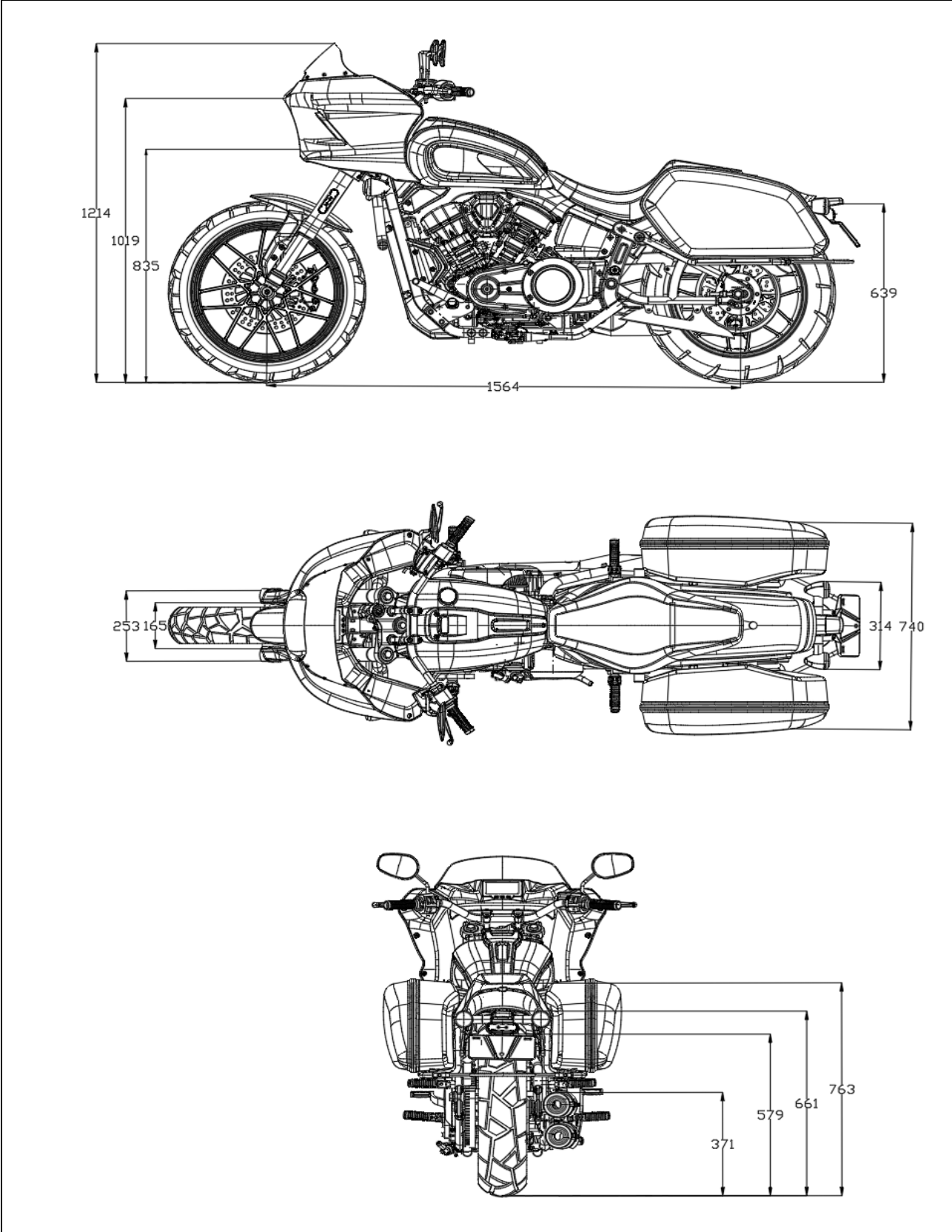
The engine of V250is composed of the two cylinder, is classified into the front cylinder and rear cylinder as basis of the motorcycle ahead.

Rear cylinder



Front cylinder

EXTERIOR ILLUSTRATION



SPECIFICATIONS

⊙ DIMENSIONS AND MASS

ITEM	V250
Overall length	2120 mm
Overall width	836 mm
Overall height	1050 mm
Wheelbase	1420 mm
Minimum ground clearance	160 mm
Overall mass	175 kg

⊙ ENGINE

ITEM	V250
Type	V-type Duplex cylinder, 4-stroke, water cooling
Number of cylinder	V-2 cylinder
Bore	58.0 mm
Stroke	56.0mm
Total displacement	295.9
Fuel system	#92 or higher unleaded gasoline
Starter system	Electric starter
Lubrication system	Pressure and splashing

⊙ TRANSMISSION

ITEM	V250	
Clutch	Wet type normal pressure multi disc	
Transmission	Foot operated 6-gear transmission	
Primary reduction ratio	3.328	
Final stage reduction ratio	2.810	
Gear ratio	1st	2.417
	2nd	1.529
	3rd	1.182
	4th	1.043
	5th	0.909
	6th	0.808
Drive chain	STD1816	

⊙ CHASSIS

ITEM	V250
Front suspension	Spring oil damping
Rear suspension	Spring oil damping
Steering angle	35° (right & left)
Front brake	Disk brake
Rear brake	Disk brake
Front tire size	120/80-16
Rear tire size	150/80-15
Front fork stroke	216 mm

⊙ ELECTRICAL

ITEM	V250	
Ignition type	ECU	
Ignition timing	BTDC 12°/1900rpm and 30°/7000rpm	
Spark plug	CR8E	
Battery	12V 11.2Ah	
Fuse	ABS IGN	1A
	HEAD LIGHT	20A
	ABS ECU	10A
	ABS MOTOR	15A
	ECU	15A
	MAIN	20A
	SPARE	20A
		15A
		1A
Head light specification	12V 35W/35W	
Turning light	12V LED	
Brake light / rear-position light	LED TYPE	
Rear license plate lamp	LED TYPE	
Meter indicator light	LED TYPE	
Horn model	13V 3A 105-118dB	

※ LED : Light Emitting Diode

LCD : Liquid Crystal Display

BRIEF DESCRIPTION

Engine and the chassis separation:

1. Remove the seat and fuel tank (Tubing and trachea and power cord coupler).
2. Drain the engine oil and antifreeze. Remove the air cleaner.
3. Remove the throttle cable, stepper motor, throttle open power cord, clutch cable, muffler, front right footrest.
4. Remove the drive chain, Disconnect the battery lead wire and magneto coupler and gear display switch. Remove the gear shift cam lever and left footrest. Remove the starting motor.
5. Remove the left frame cover, front and rear tubing, tubing three-wire, upper water pipe, Ignition coil, intake air temperature sensor (IATS), fuel injector power cord, horn wire, thermostat comp.
6. Remove the oxygen sensor, water temperature sensor, stepper motor, throttle open power cord, engine mounting bolts. Remove the engine from the frame.

Engine decomposition:

1. Remove the throttle body, intake air connector, muffler connector comp.
2. Remove the cylinder head cover, magneto cover bolt, observation hole bolt.
3. Remove the engine sprocket outer cover, adjust the timing sprocket. Remove the chain drive sprocket.
4. Remove the front cylinder head, cylinder comp, piston comp.
5. Remove the rear cylinder head, cylinder comp, piston comp, engine oil filter comp, Magneto.
6. Remove the clutch inner and drive gears.
7. Remove the gear shift shaft comp, oil pump, camshaft plate, oil pump idle gear, gear shift cam driven gear, crankshaft bearing limit plate, cam chain tension plate.
8. Remove the left and right crankcase fixing bolts, open the left and right crankcase,
9. Remove the gear shift fork, gear shift pawl return spring, remove the camshaft and drive shaft, counter shaft.
10. Decomposition the cylinder head.
11. Decomposition the piston.

Maintenance section:

1. Cylinder head combination Check repair;
2. Piston combination Check repair;
3. Crankshaft Check repair;
4. Magneto combination inspection repair;
5. Starting motor combination inspection repair;
6. Clutch inspection repair;
7. Crankcase inspection repair.

Assembly considerations:

1. When reassembling the engine, do so in the reverse order as when decomposition and removal occur.
2. In the assembly of the left and right box to apply sealant evenly, do not let the sealant into the oil passage and water passage.
3. According to the requirements of assembly torque, the bolts in each part are tightened.
4. Fill with lubrication oil and antifreeze as required.

Engine and the chassis separation:

Open the cushion lock and remove the saddle backward;



Remove fixed bolts on the left and right sides of the tank.

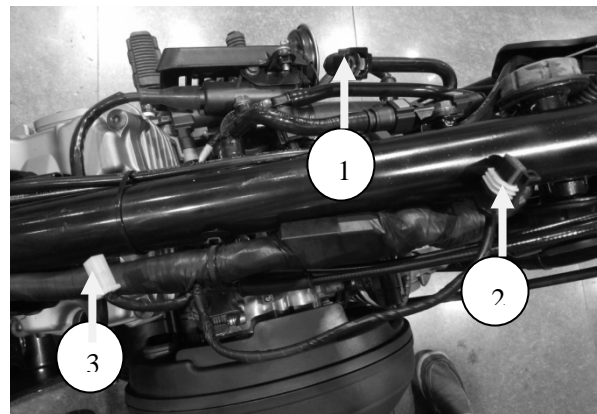


After exiting the tank backwards, gently lift the rear of the tank to facilitate the removal of the lower switch of the tank;

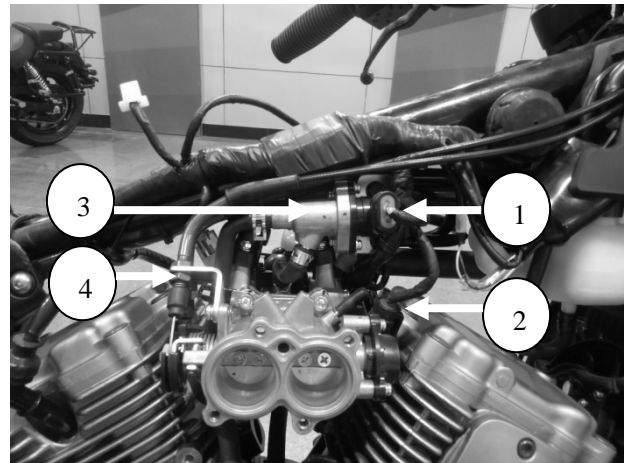


Remove the injection pump tubing 1, fuel pump power supply 2, fuel sensor 3.

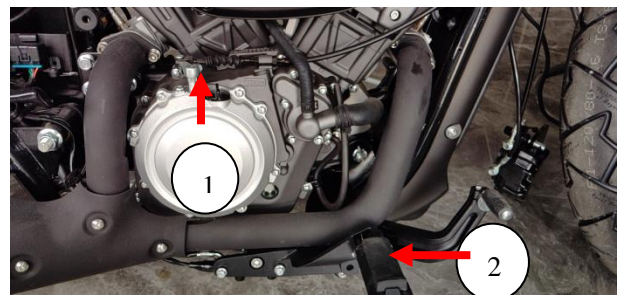
Reverse operation during installation, requires installation in place.



Remove the idle speed control solenoid coupler 1.
 Remove the throttle position sensor (TPS) coupler 2.
 Remove the ISC 3.
 Remove the throttle cable 4.



Remove the clutch cable 1.
 Remove the front right footrest 2.

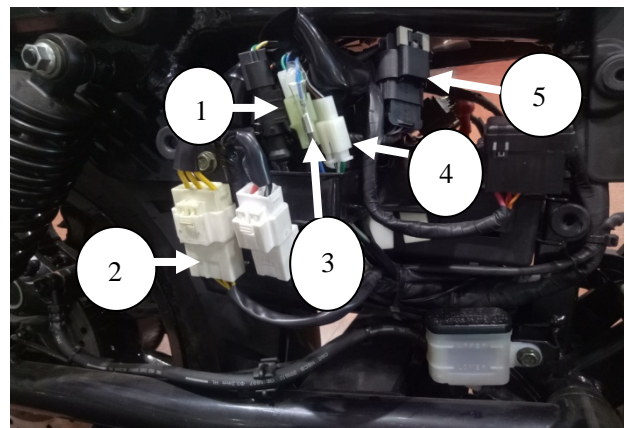


Remove the right side cover.

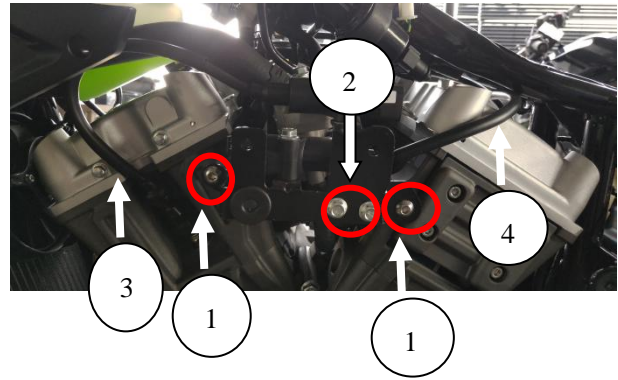


Disconnect the side stand switch 1.
 Disconnect magneto coupler 2
 Disconnect the gear position switch coupler 3.
 Disconnect the brake switch coupler 4.
 Disconnect the rear cylinders oxygen sensor coupler 5.

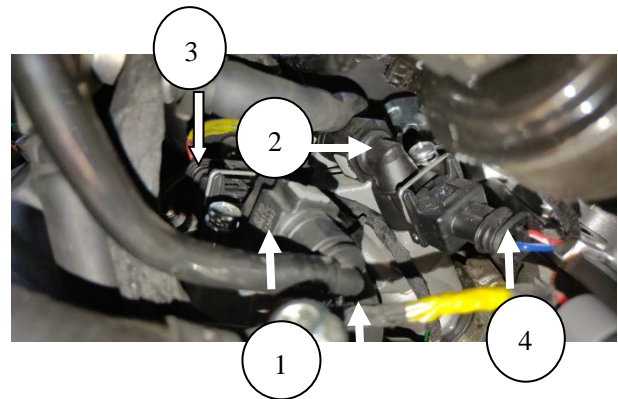
NOTE
The installation is connected by wire color and interface shape and must be installed accurately.



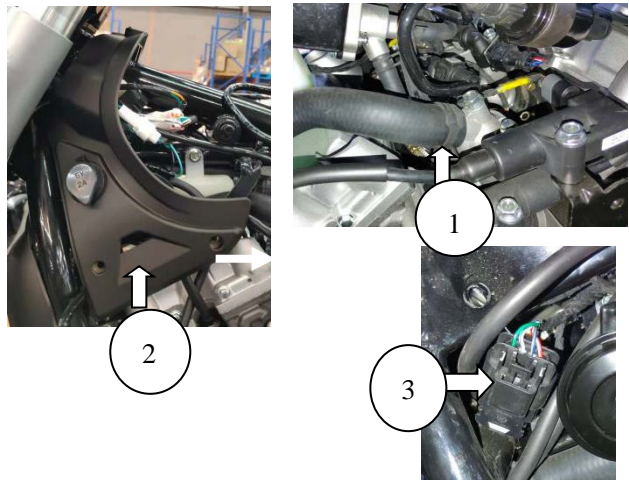
- Remove the high-pressure package assembly 1
- Remove thermostat 2
- Remove the front and rear high voltage package assembly cables 3 and 4



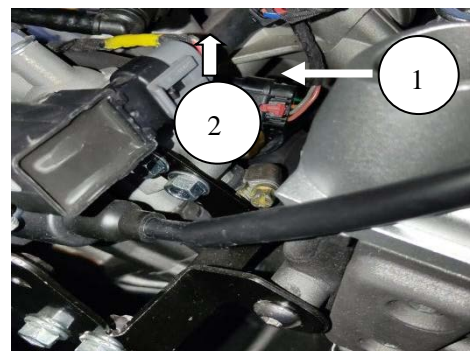
- Remove the fuel injection nozzle link pipe 1 and 2
- Remove the electrical plug-ins of the front and rear fuel injection nozzles 3 and 4



- Remove the hose 1.
- Remove the front left trim cover of the fuel tank 2.
- Remove the front cylinder oxygen sensor 3.



- Remove the thermostat connector 1.
- Remove the pressure sensor plug-in 2



Disconnect the ignition coil coupler 1.
Remove the thermostat connector 2.

NOTE

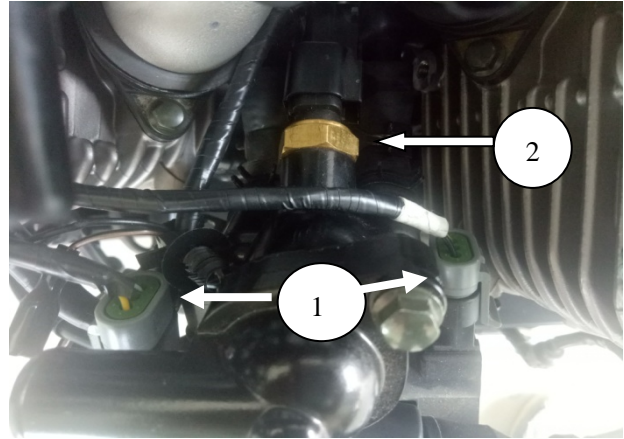
Ignition coil coupler with white marked as front cylinder during installation.

Remove the thermostat power cord.

Remove the antifreeze circulation pipe.

Remove the ignition coil

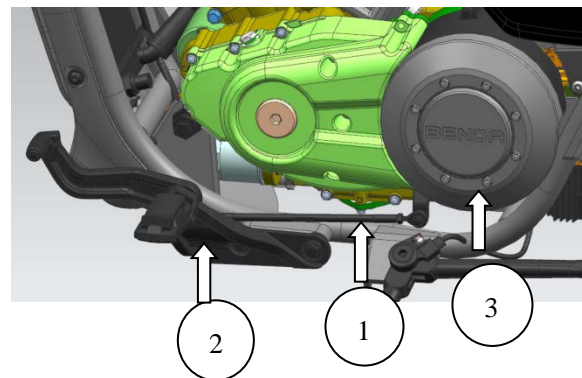
Remove the thermostat power.



Remove the gear shift cam lever 1.

Remove the left footrest 2.

Remove the engine sprocket outer cover 3.



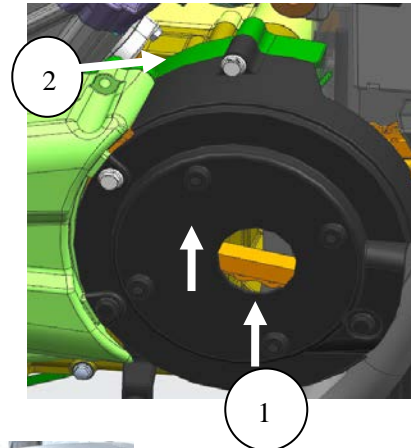
Remove drive chain 1.

NOTE

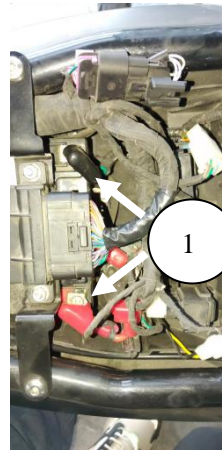
Be careful not to use sharp objects to lift the chain



Remove the sprocket cover mounting seat 1
 Remove the mounting bracket of sprocket cover 2

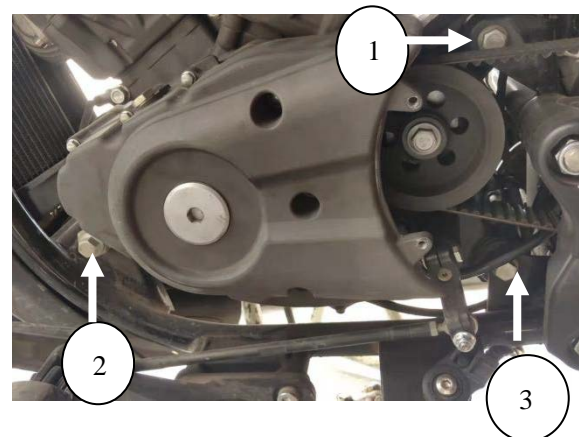


Disconnect the battery lead wire 1.
 Remove the engine ground wire and the main harness link port 2.
 Remove the starter motor lead wire 3.



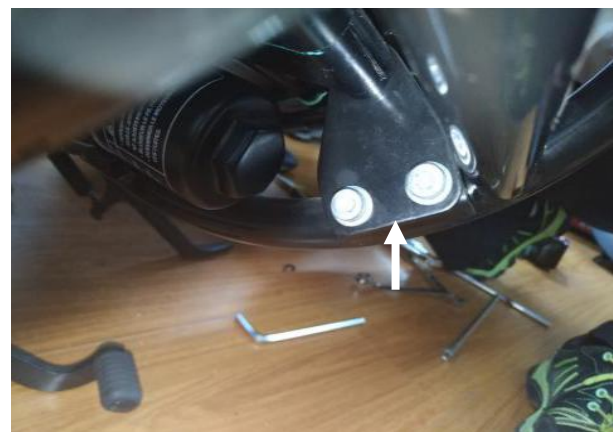
NOTE
Place all connectors between the engine and the body harness in order.

Remove the engine's three fixing bolts.



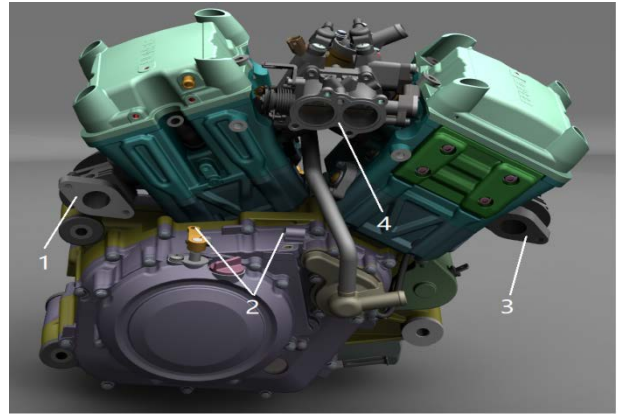
Remove the left-hand fixed connection plate at the front of the engine.

Lift the engine out of the left side of the body.



Engine decomposition

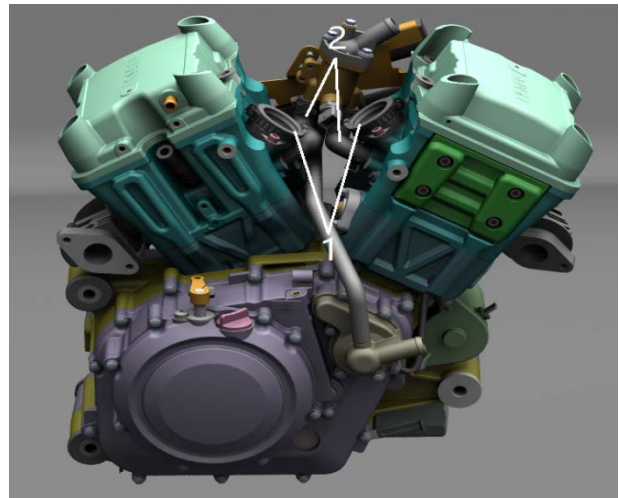
- Loosen the rear cylinder inlet bending pipe 1.
- Remove the clutch cable 2.
- Loosen the front cylinder inlet bending pipe 3.
- Remove the valve body 4.



- Remove the front and rear cylinder intake connector 1.
- Remove the thermostat antifreeze connection tube 2.

NOTE

The tube port of the thermostat connecting the elbow should be oriented in the direction of the magnet.

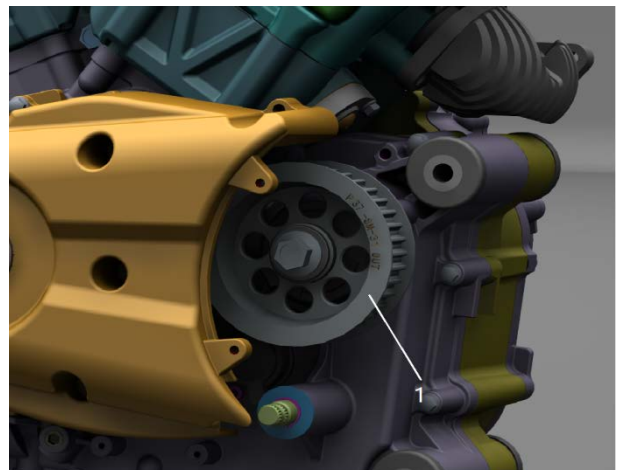


- Remove the engine sprocket 1.

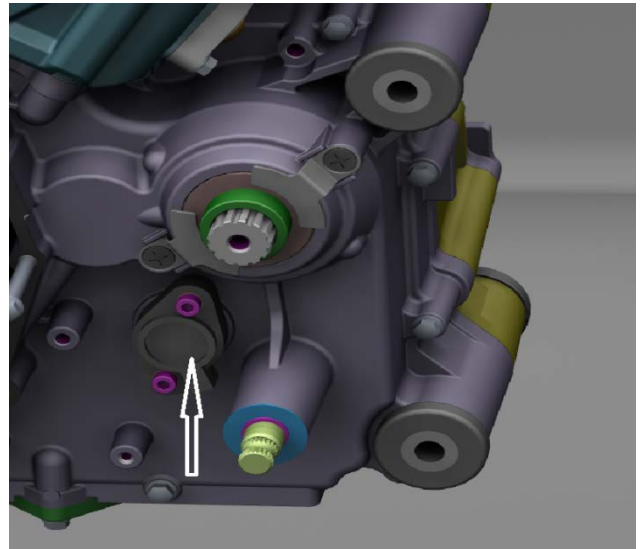
NOTE

Engine sprocket mounting lock nut torque requirement 80-100Nm.

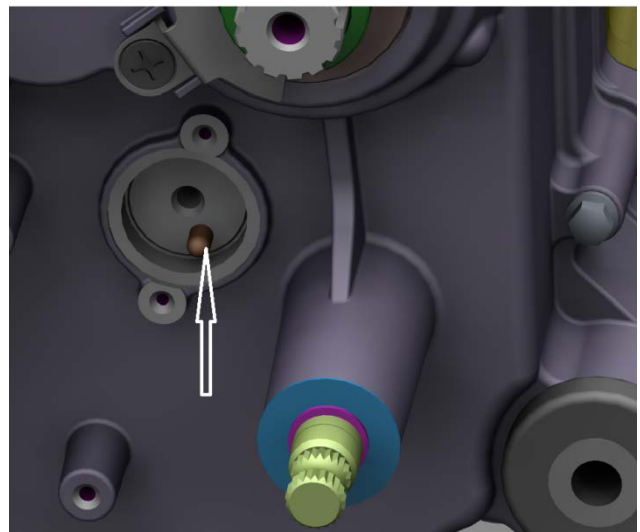
After the nut is locked, raise the edge of the stop gasket to prevent the nut from loosening during operation.



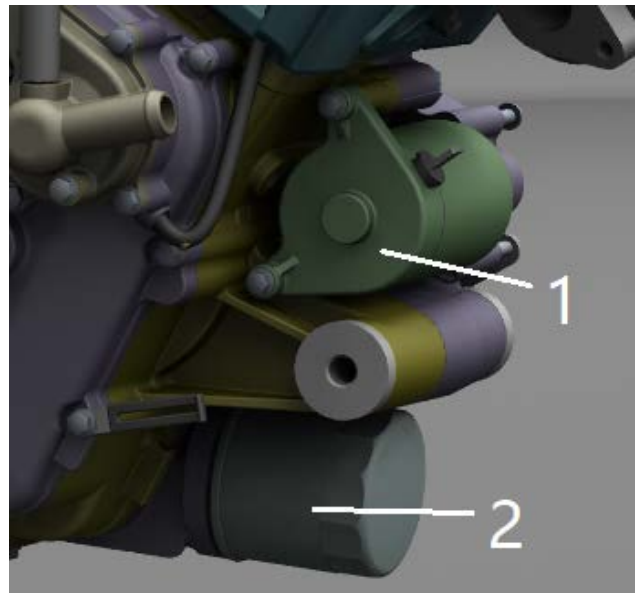
Remove the gear shift switch.



Remove gear shift switch contact and spring.

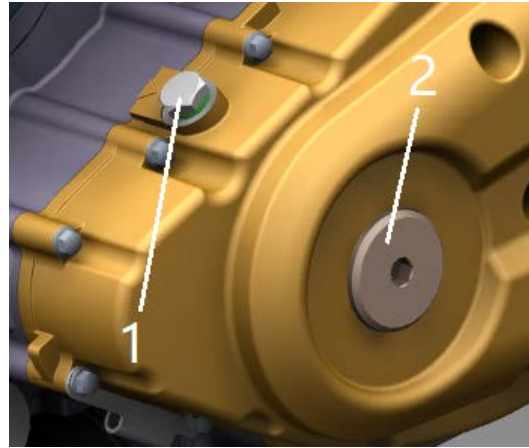


Remove the starting motor1.
Remove the oil filter2.



Remove the magnetic motor gas timing observation hole mounting bolt 1.

Remove the magnetic motor cover bolt 2.

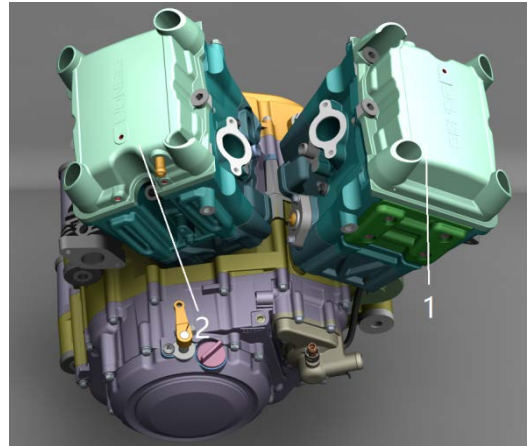


Remove the front cylinder head cover 1.

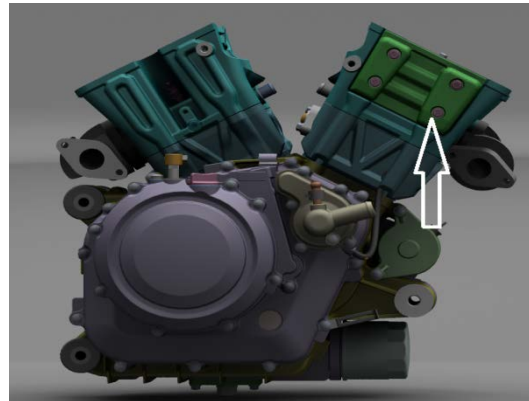
Remove the rear cylinder head cover 2.

NOTE

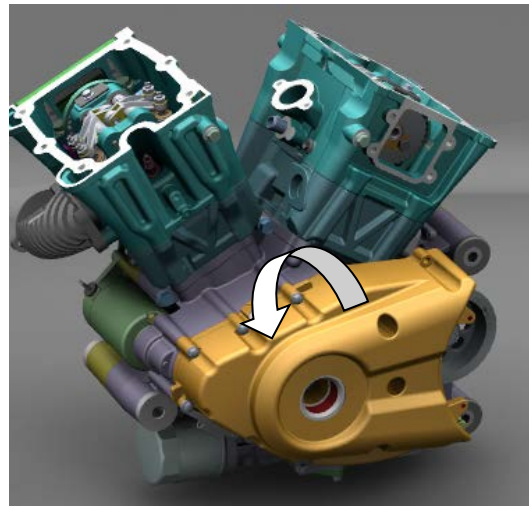
The front and rear valve covers are not interchangeable when reassembling.



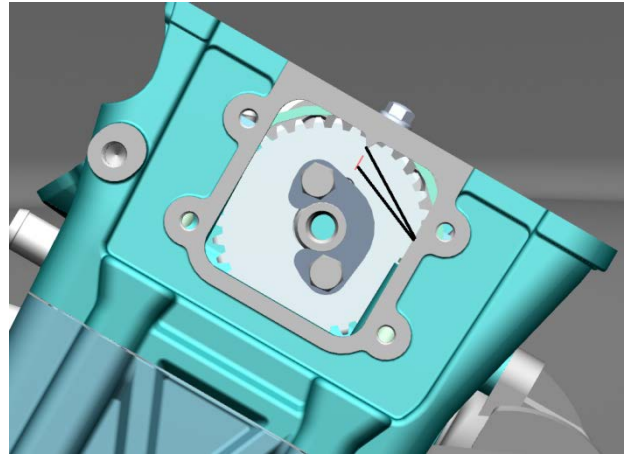
Remove the cylinder head side cover.



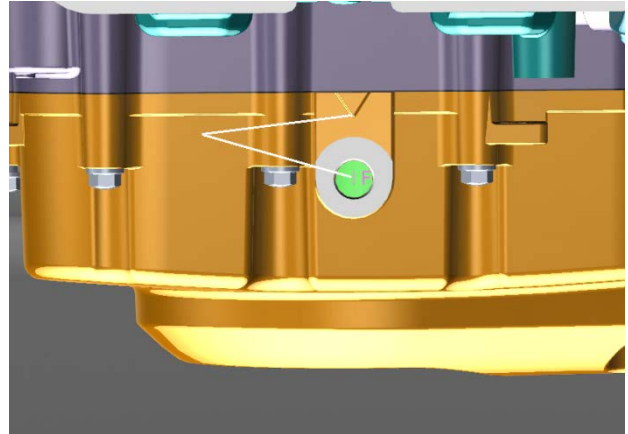
Turn the crankshaft counterclockwise.



Front cylinder head with sprocket marked in a straight line.

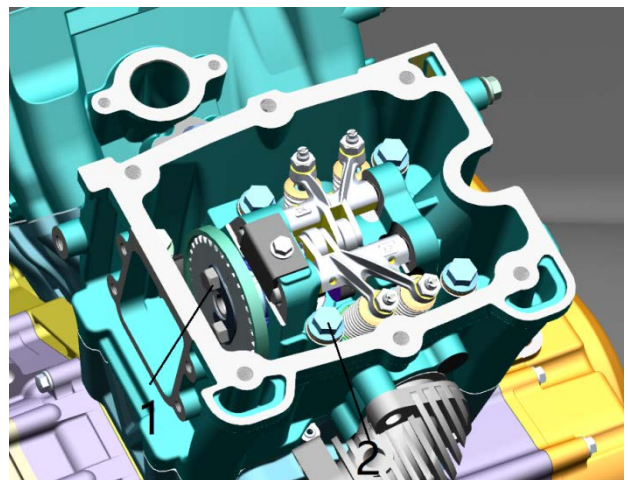


Align the arrow with the magnetor rotor timing "F".

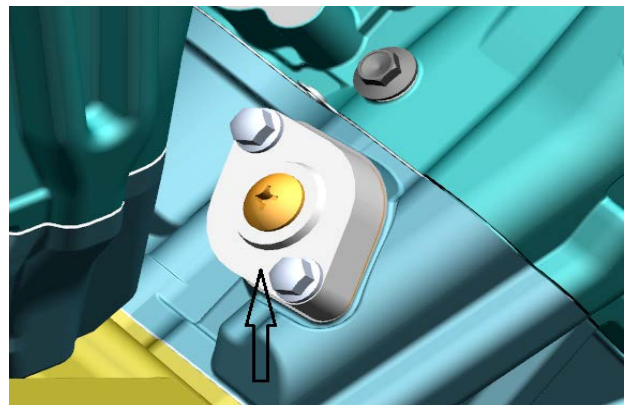


Remove the sprocket and remove the positioning pin 1
Remove cylinder head six fixing Bolts 2.

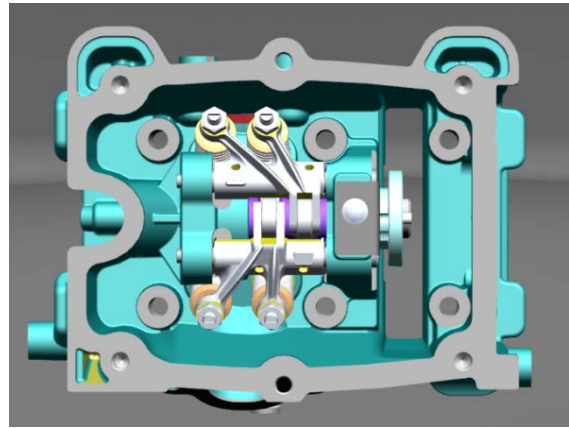
NOTE
Six fixed bolt torque values of 30Nm at assembly.



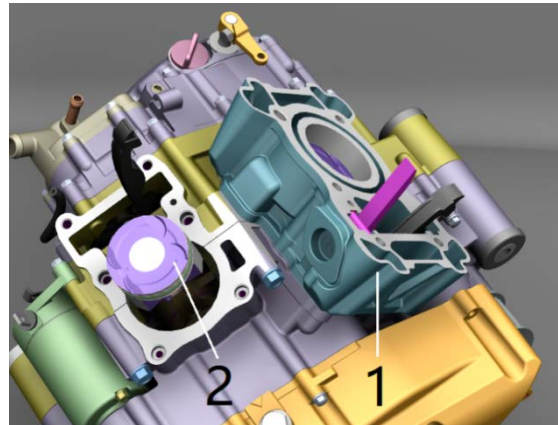
Remove the chain tensioning device.



Remove the front cylinder head.

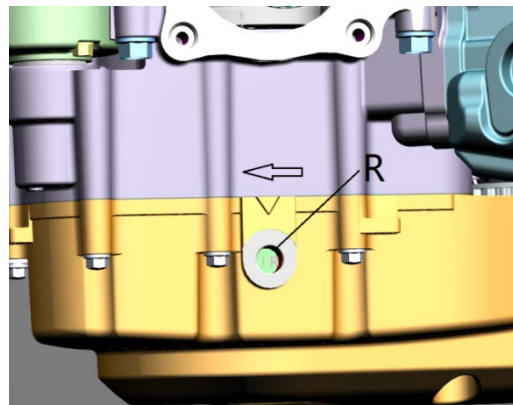


Remove the cylinder 1.
Remove the piston 2.

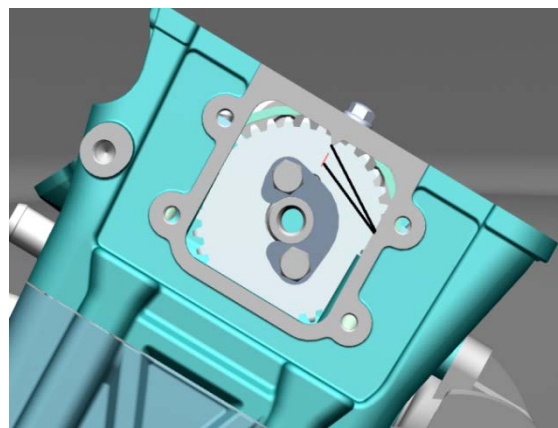


Remove the rear cylinder head. Cylinder and Piston:
The steps are the same as the front cylinder.

NOTE
Turn the magneto rotor counterclockwise, rotate the 300°, Mark the "R" Alignment arrow.



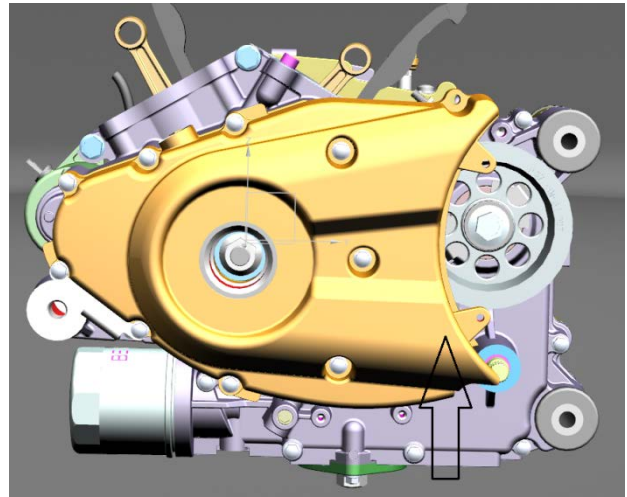
Rear cylinder head with sprocket marked in a straight line.



Remove 9 bolts and remove the magneto cover.

NOTE

That the stator coil is fixed on the inside.



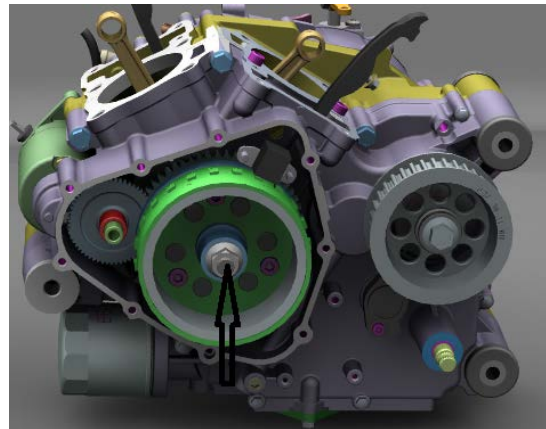
Stator Coil fixing.



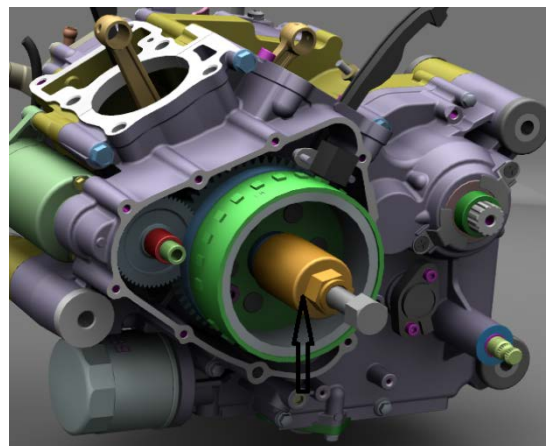
Remove the crankshaft nut.

NOTE

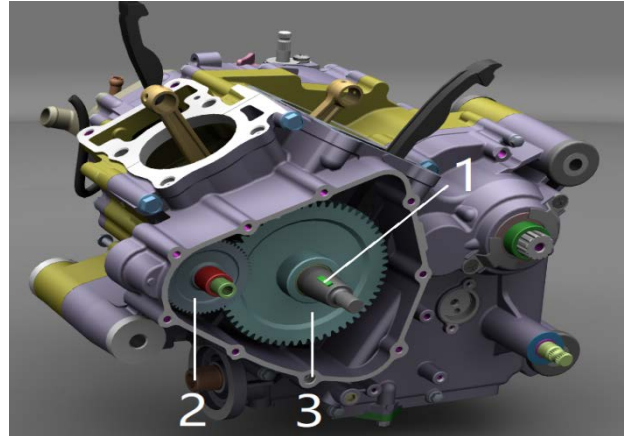
Torque 50-60N-m when mounting nuts.



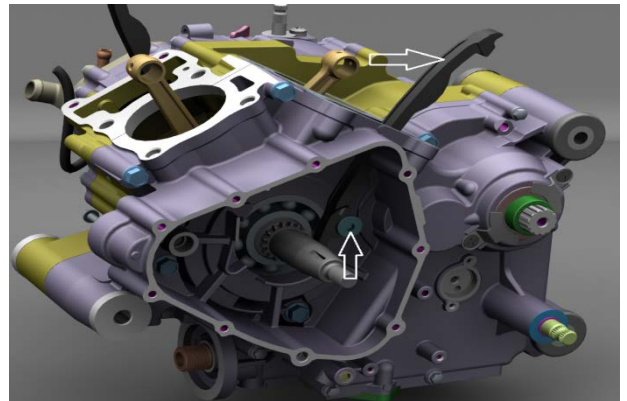
Remove the rotor with special tools.



- Remove the semicircle key 1.
- Starter idle gear 2.
- Electric start clutch 3.

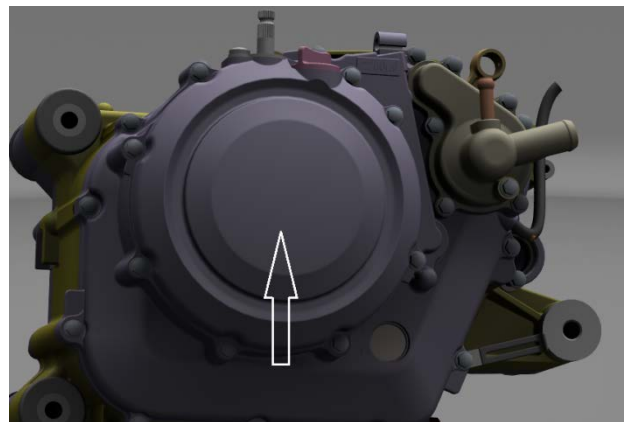


Remove the bolt and remove the cam chain guide.



Remove 11 right cover bolts and remove the right cover.

NOTE		
Torque	Requirements	During
installation 8-12Nm.		



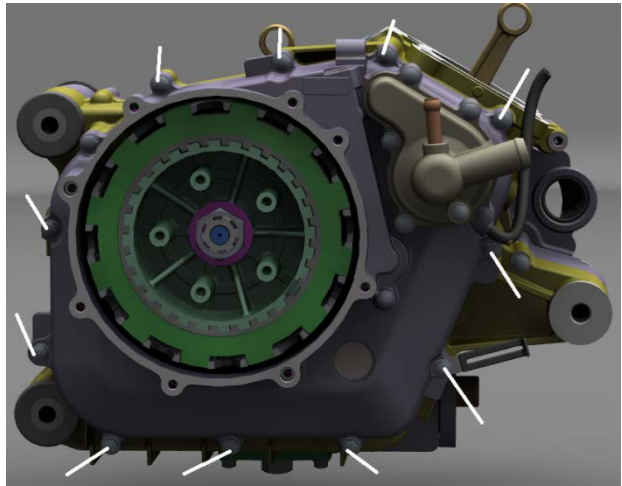
Remove 5 clutch press plate fixing bolts.

NOTE		
Diagonal	fastening	torque
requirements during installation 6-10Nm.		



NOTE

Diagonal fastening torque requirements during installation 6-10Nm.



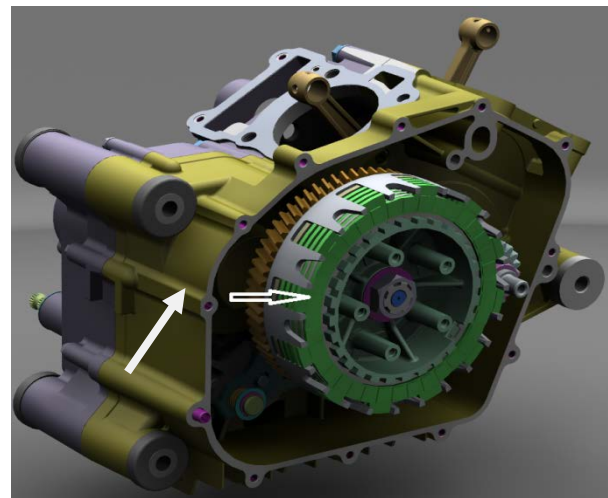
Remove the clutch friction sheet.

Disassembly clutch Large hub fixing nut 1.

Mounting torque 30-50Nm.

Remove the drive gear fixing nut 2.

Mounting torque 40-60Nm.

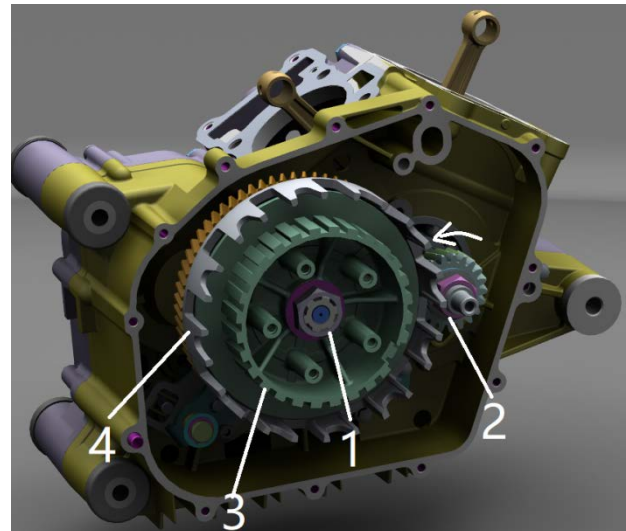


NOTE

The nut is left-handed and the gasket convex is outward oriented.

Remove Clutch small Hub 3.

Demolition of clutch Large hub 4.



Remove the gas distribution chain tightening guide rail 1.

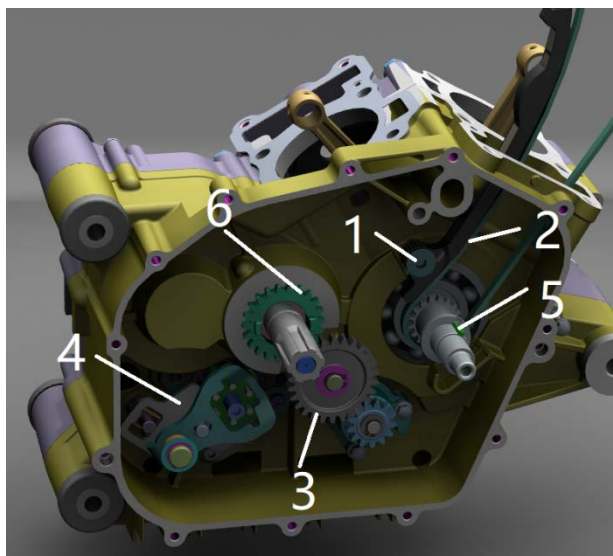
Remove the gas distribution chain 2.

Remove the machine oil pump drive inert wheel 3.

Remove the variable shaft 4.

NOTE

The installation is assembled in the opposite order, This location is gap position.



Remove the gas distribution chain tightening guide rail 1.

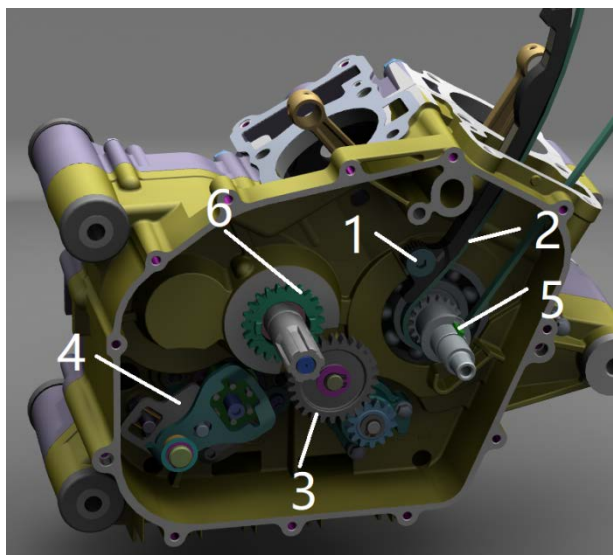
Remove the gas distribution chain 2.

Remove the machine oil pump drive inert wheel 3.

Remove the variable shaft 4.

NOTE

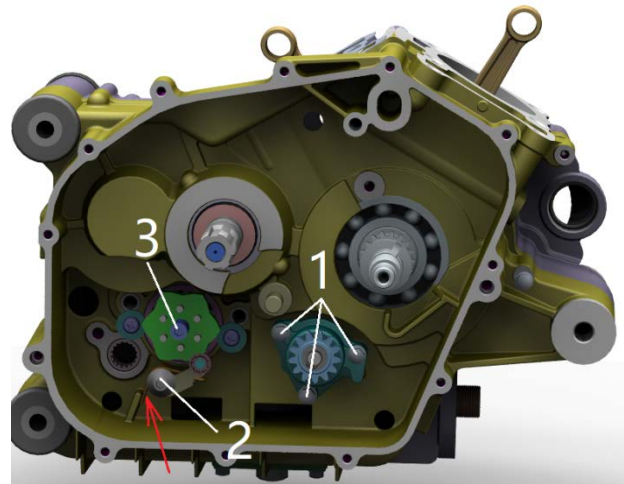
The installation is assembled in the opposite order, This location is gap position.



Remove 3 bolts from the pump and remove the oil pump 1.

Remove the variable camshaft bezel 2 bolts and remove the bezel 2.

Remove the variable camshaft holder 2 bolts and remove the cage 3.



NOTE

When installing the shift drum set-up wheel, the spring is stuck in the position indicated by the arrow

Remove 13 box fixing bolts on the left side of the engine.

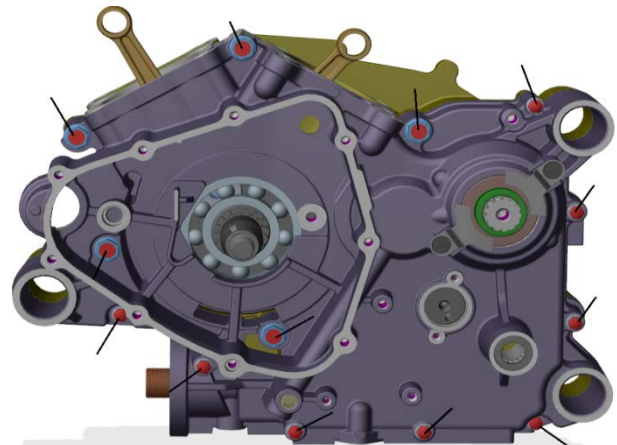
NOTE

Diagonal disassembly.

Assembly torque M8 Bolt 18-28Nm.

Assembly torque M6 Bolt 8-12Nm.

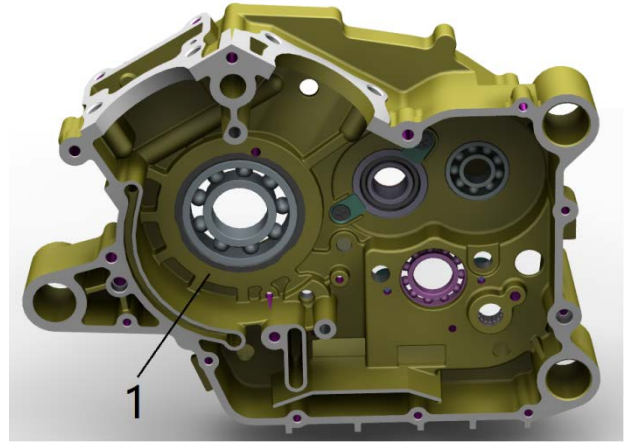
Separate engine crankcase: use a special tool (box separation rama) on the right side of the box (clutch side), take the crankshaft as the center, find the three focus points, install the pull horse, turn the pull horse center bolt, and make the box separate;



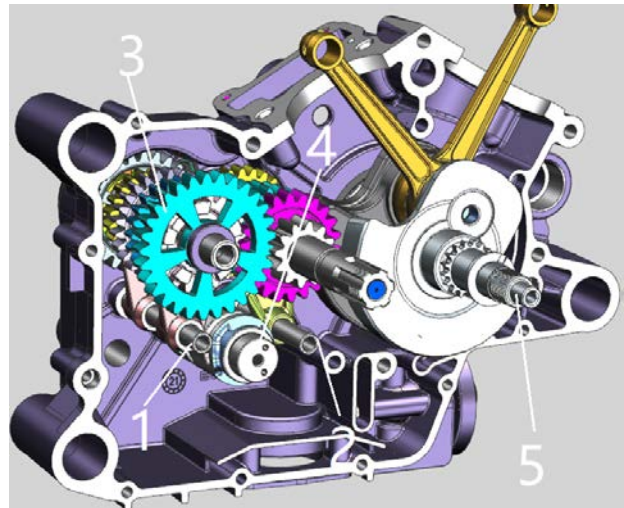
NOTE

Only the right box can be separated.

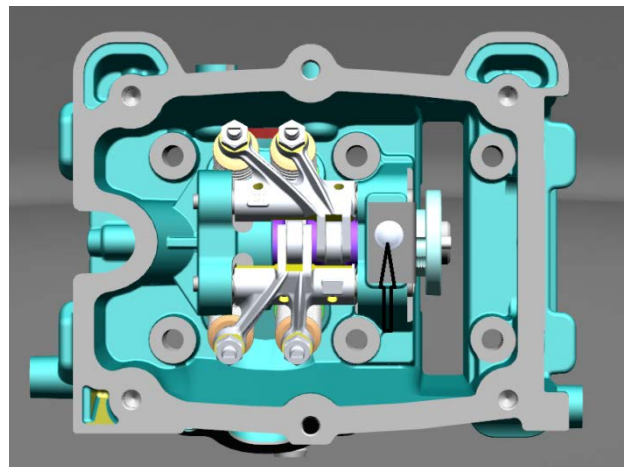
Remove the right crankcase comp 1.



Remove the gear shift fork shaft, remove gear shift fork 1.
Remove the gear shift fork shaft and remove gear shift fork 2.
To remove the main and pay shafts together two sets of gears 3.
Remove the camshaft 4.
Remove the crankshaft assembly 5.



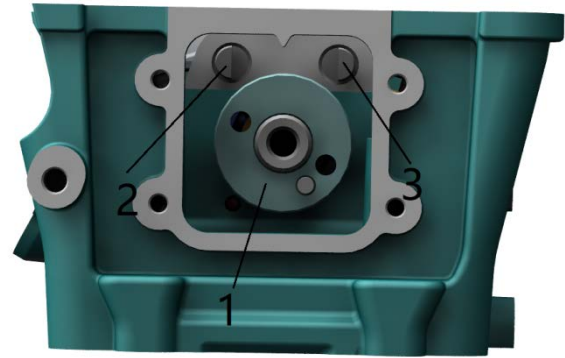
Cylinder head combination decomposition.
Remove the camshaft and rocker shaft limit plate.



Remove Camshaft 1.

Remove the intake valve rocker shaft 2.

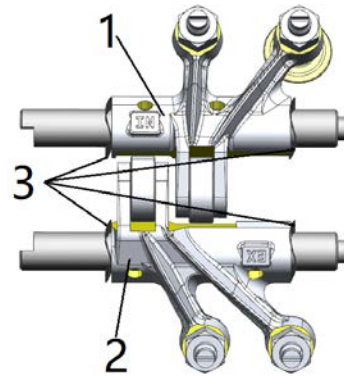
Remove the exhaust valve rocker shaft 3.



Remove the intake valve rocker and the exhaust valve rocker arm.

Intake valve rocker (IN) 1.

Exhaust valve rocker (EX) 2.



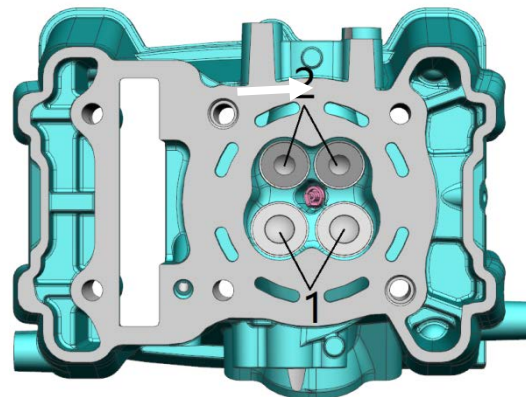
NOTE

Do not miss the gasket of each rocker shaft during assembly.

See if the valve room is carbon-accumulating.

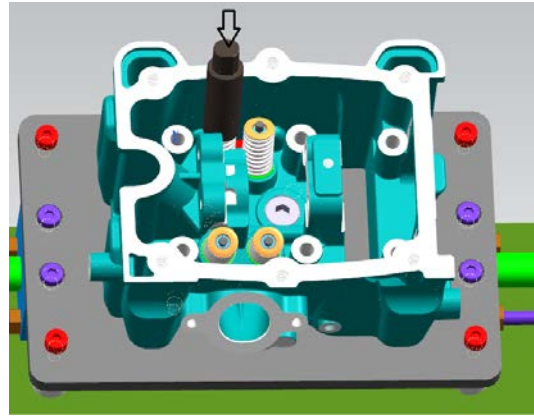
2 Intake valve, slightly larger in diameter.

2 Exhaust valve, slightly smaller in diameter.



Pressurized gas door lock disassembly device, remove the lock plate, remove the valve base, valve oil seal.

The same removal method for the intake and exhaust valves.

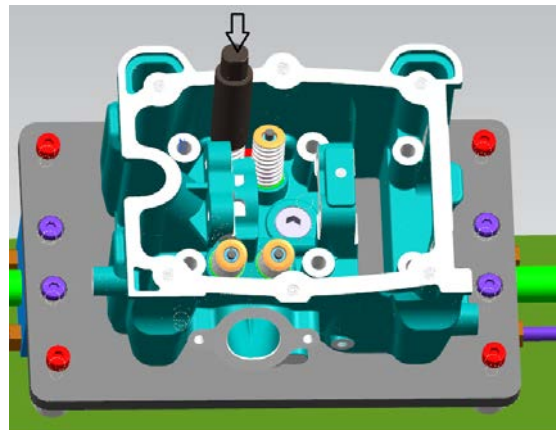


- Valve lock plate 1.
- Valve retainer 2.
- Valve spring 3.
- Valve oil seal 4.
- Valve spring seat 5.
- Valve 6.



NOTE

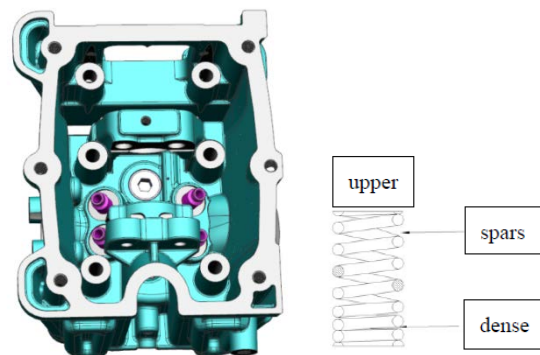
When combining the cylinder heads, use a special tool (valve lock chip installer) to press down the valve spring to install the lock gasket in place.



Cylinder head.

NOTE

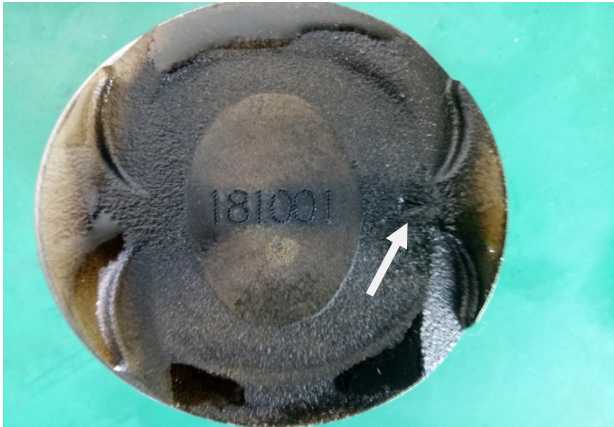
When installed, the valve springs are closely turned down.



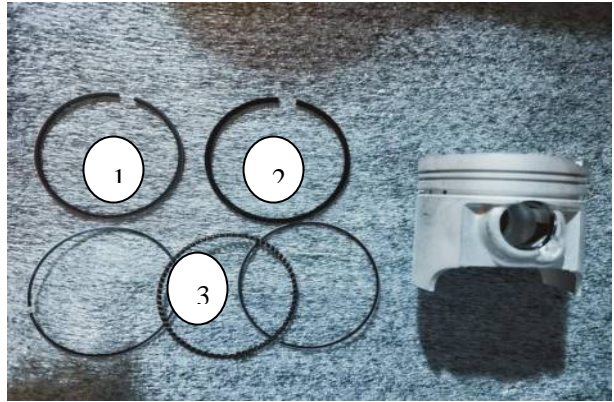
When the piston ring is installed, 3 ring openings are staggered 120° respectively.



NOTE
When installing the piston, the top notch portion corresponds to the valve and the arrow markings on the piston face the exhaust valve.



NOTE
Note When replacing: A gas ring chrome plating 1. Two air ring Black 2. Three oil ring combination up and down a scraper ring, the middle is a spring-like oil storage ring 3.



Engine assembly Considerations:

1. Reverse operation in the above order.
2. The disassembled engine must be cleaned clean.
3. When the left and right box is merged, apply the sealant evenly and the fixing bolt diagonally according to the torque requirement to lock.
4. When installing the piston, apply lubricating oil.
5. The mounting cylinder head must be aligned with the timing mark, the requirement corresponds to the magneto rotor mark, the fixed bolt diagonally according to the torque requirements locking, the valve clearance must be within the specified value.
6. Clutch large hub, magneto rotor, small sprocket according to the torque requirements of the lock.
7. Engine using oil model SAE10W-40. Oil volume 2200ml.
8. Water tank filling antifreeze 0.1L, required between the upper and lower scales.
9. 0.9L of antifreeze in radiator.

ENGINE COMPONENT INSPECTION AND SERVICE

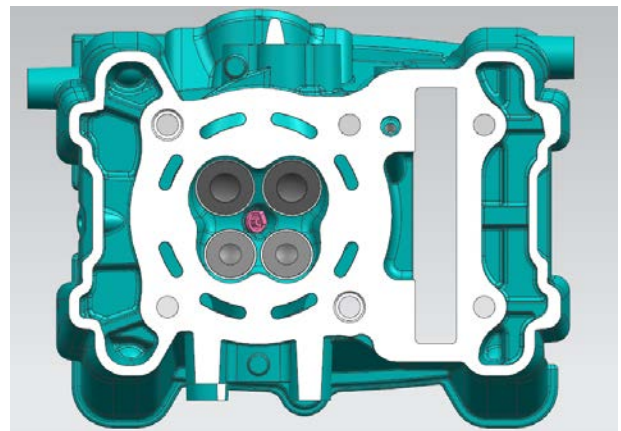
CAUTION

Be sure to identify each removed part as to its location, and lay the parts out in groups designated as “Front cylinder”, “Rear cylinder”, “Exhaust”, “Intake”, so that each will be restored to the original location during assembly.

CYLINDER HEAD DISTORTION

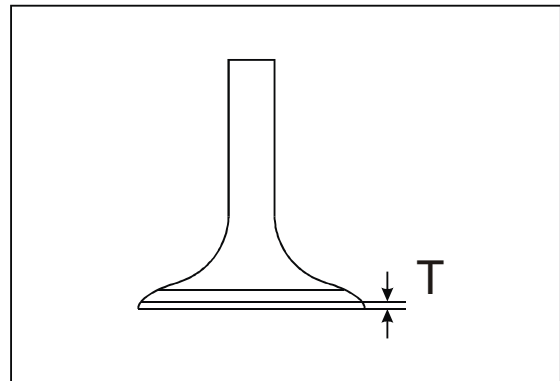
Decarbonate in combustion chamber.

Check the gasketed surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.



Cylinder head distortion	Service limit
	0.05 mm

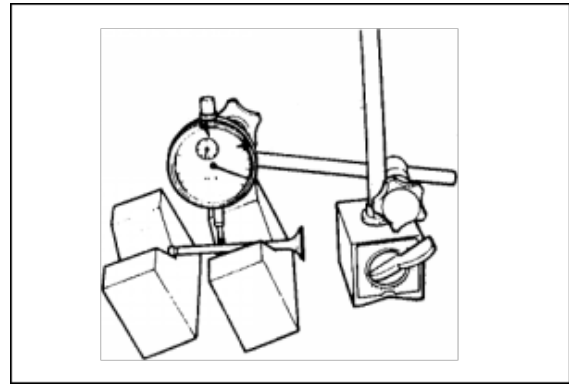
 Thickness gauge : 09900-20806



VALVE FACE WEAR

Visually inspect each valve face for wear. Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve head T . If it is out of specification, replace the valve with a new one.

Valve face wear	Service limit
	0.5 mm



 **Vernier calipers :**

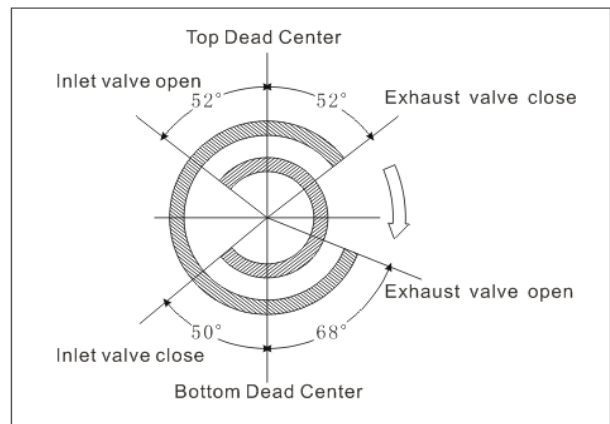
VALVE STEM RUNOUT

Check the valve stem for abnormal wear or bend.

Place the valve on V-blocks and measure runout.

If the service limit is exceeded or abnormal condition exists, replace the valve.

Valve stem runout	Service limit
	0.05 mm



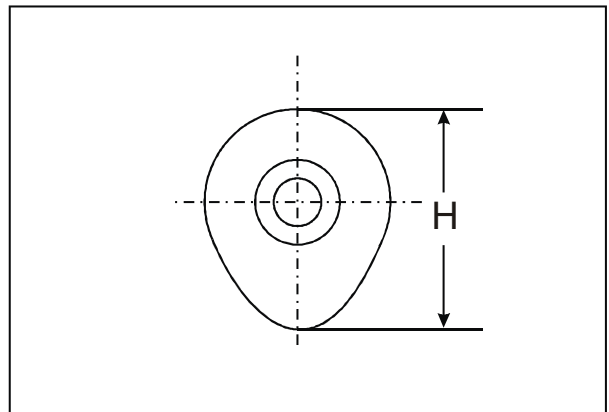
 **Dial gauge :**

 **Magnetic stand :**

V-block :

CAMSHAFT

The camshaft should be checked for runout and also for wear of cams and journals if the engine has been noted to produce abnormal noise or vibration or a lack of out-put power. Any of these abnormality could be caused by a worn camshaft.




CAMSHAFT WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced output power.

The limit of cam wear is specified for both intake and exhaust cams in terms of cam height H , which is to be measured with a micrometer.

Replace camshafts if found it worn down to the limit.

Cam height H	Service limit
Intake cam	29.67mm
Exhaust cam	30.04mm

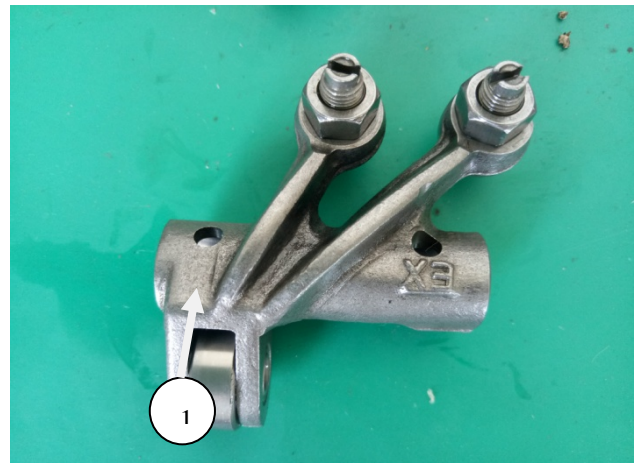
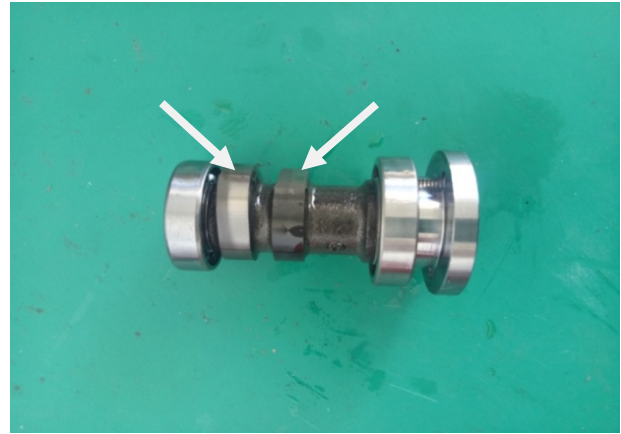
 Micrometer(25~50 mm): 09900-20202

Valve rocker arm

If the engine produces abnormal noise or vibration or the output power decreases, the valve rocker arm should be checked, and any of these anomalies may be caused by the worn valve rocker arm.

Intake valve rocker arm 1 (IN)

Exhaust valve rocker arm 2 (EX)



Tappet & shimwear

When measuring the valve clearance, the clearance should be within the standard range.

Valve clearance	Standard(When cold)
Intake valve	0.08±0.01mm
Exhaust valve	0.11±.0.01mm

Inspect the tappet for wear and scratch.



VALVE HEAD RADIAL RUNOUT

Place a dial gauge as shown and measure valve head radial runout.

If the service limit is exceeded, replace the valve.

Valve head radial runout	Service limit
	0.03 mm



Dial gauge: 09900-20606

Magnetic stand: 09900-20701

V-block: 09900-21304



VALVE GUIDE-VALVE STEM CLEAR- ANCE

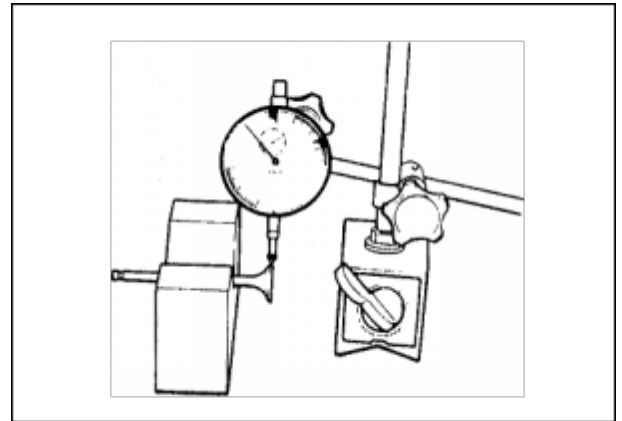
Measure the clearance in the valve guide-valve stem, by rigging up the dial gauge as shown. If the clearance is measured exceeds the limit specified below, then deter- mine whether the valve or the guide should be replaced to reduce the clearance to within the standardrange:

Valve guide-valve stem clearance	Standard
IN.	0.010~0.037 mm
EX.	0.030~0.057 mm



Dial gauge : 09900-20606

Magnetic stand: 09900-20701



VALVE STEM DIAMETER

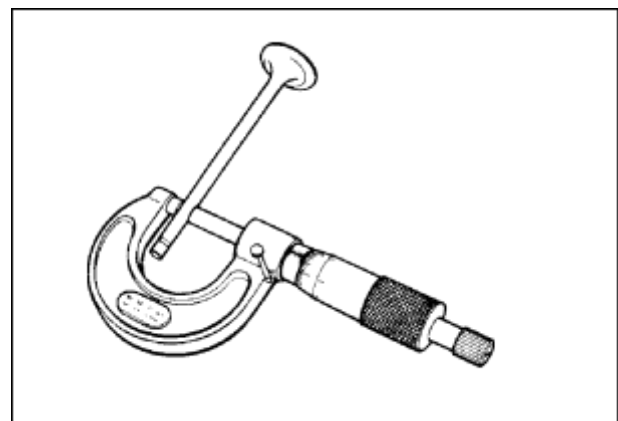
Measure the valve stem outside diameter.

If the diameter measured exceeds the standard, replace the valve.

Valve stem diameter	Standard
IN.	4.975~4.990 mm
EX.	4.955~4.970 mm



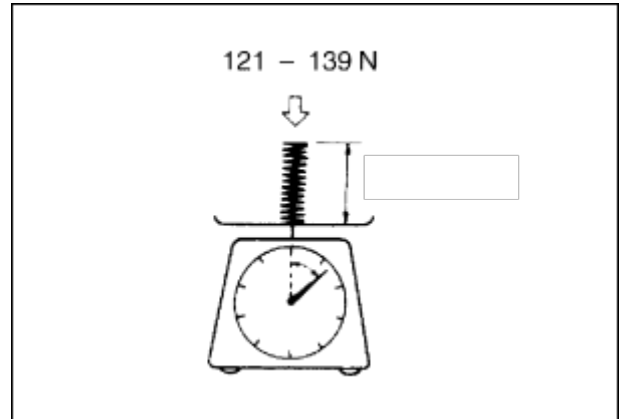
Micrometer (0~25 mm) : 09900-20201



VALVE SPRING

The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.

Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the specified range, replace both the inner and outer springs as a set.



Valve spring free length(IN. & EX.)	Service limit極
	38.2 mm

 **Venier calipers : 09900-20101**

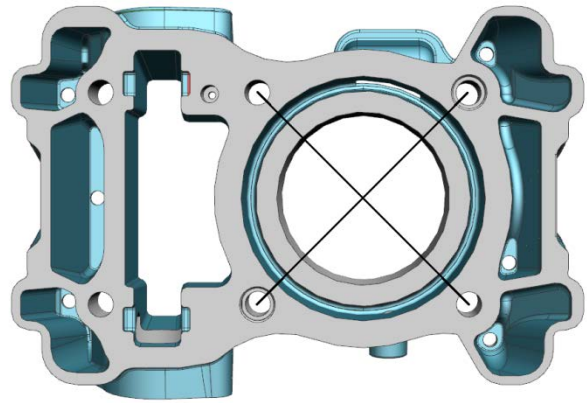
Valve spring tension (IN. & EX.)	Standard
	19.4~22.4kgf (at length 31.5mm)

CYLINDER DISTORTION

Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

Cylinder distortion	Service limit
	0.05 mm

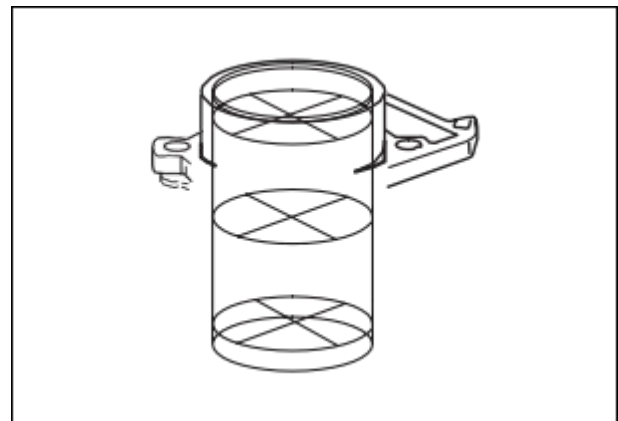
 Thickness gauge : 09900-20806



CYLINDER BORE

Measure the cylinder bore diameter at six place.


If any one of the measurements exceeds the limit, overhaul the cylinder and replace the piston with an oversize, or replace the cylinder.



Clearance is 0.035-0.040mm			
Piston	Red	Yellow	Blue
	Ø58 ^{-0.035} _{-0.040}	Ø58 ^{-0.040} _{-0.045}	Ø58 ^{-0.045} _{-0.050}
Cylinder Ø58	Red	Yellow	Blue
	>0~0.005	>-0.005~0	-0.010~-0.005

 Cylinder gauge set : 09900-20508

CAM CHAIN TENSION ADJUSTER

Check that the push rod slides smoothly with the lock shaft handle ① clockwise ().

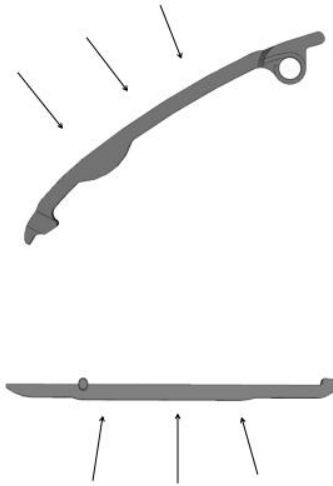


If it does not slide smoothly, replace the cam chain tension adjuster with a new one.

CAM CHAIN TENSIONER

Check the contacting surface of the cam chain tensioner.

If it is worn or damaged, replace it with a new one.



CAM CHAIN AND CAM CHAIN GUIDE

Check the cam chain for wear, damage and kinked or binding links. If any defects are found, replace it with a new one.

Check the cam chain guide for wear and damage. If it is found to be damaged, replace it with a new one.

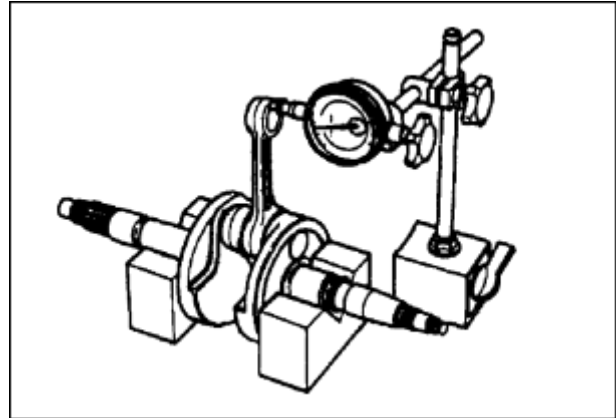


CONROD SMALL END INSIDE DIAMETER INSPECTION

Using a dial calipers, measure the conrod small end inside diameter both in vertical and horizontal directions. If any of the measurements exceeds the service limit, replace the conrod.

Conrod small end inside diameter	Standard	Service limit
	13.006~13.014 mm	13.040 mm

 Dial calipers : 09900-20605

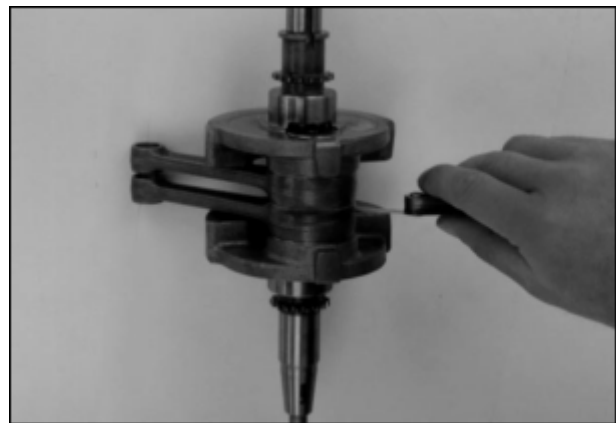


CONROD BIG END SIDE CLEARANCE INSPECTION

Using a thickness gauge, measure the side clearance at the conrod big end. If the measurement is out of standard value, measure the conrod big end and the crank pin widths individually to determine which one is to be replaced.

Conrod big end side clearance	Standard	Service limit
	0.40~0.85 mm	1.0 mm

 Thickness gauge : 09900-20806



CRANKSHAFT RUNOUT INSPECTION

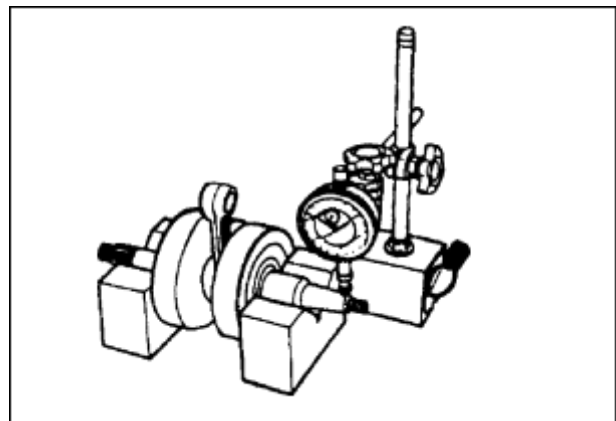
With the right and left crank journals supported with V-block, turn the crankshaft slowly. At this time, measure the crankshaft end runout using a dial gauge. If the runout exceeds the service limit, replace the crankshaft.

Crankshaft runout	Service limit
	0.05 mm

 Magnetic stand: 09900-20701

Dial gauge : 09900-20606

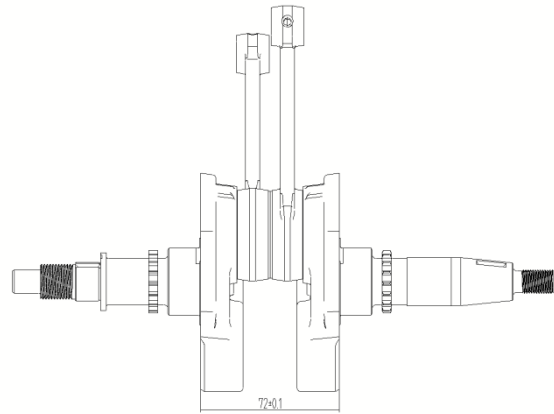
V-block: 09900-21304



CRANKSHAFT REASSEMBLY

Measure the width between the webs referring to the figure below when rebuilding the crankshaft.

Width between webs	Standard
	72 ± 0.1 mm



MAGNETO COVER

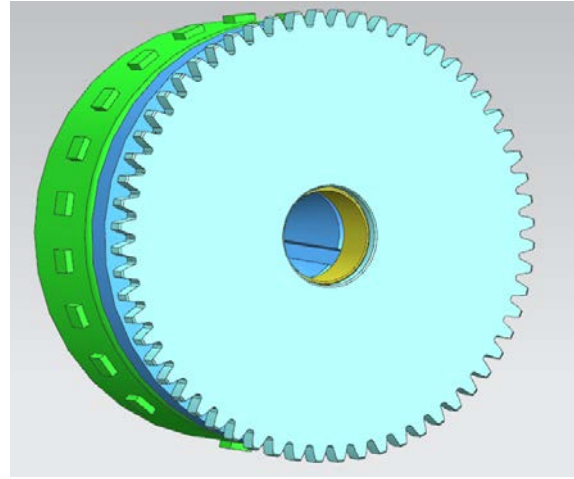
MAGNETO INSPECTION DISASSEMBLY

Remove the stator.



STARTER CLUTCH

Install the starter driven gear onto the starter clutch and turn the starter driven gear by hand(the gear turns in only one direction). The starter driven gear should turn smoothly. If excessive resistance is felt while turning the starter driven gear, inspect the starter clutch. Also, inspect the surface of the starter driven gear which contacts the starter clutch, for wear or damage. If any wear or damage is found, replace the defective part(-s).



DISASSEMBLY

Hold the magneto rotor with the rotor holder and remove the starter clutch bolts.

 **Rotor holder : 09930-44510**




ENGINE 2-35

REASSEMBLY

Apply a small quantity of THREAD LOCK“1324” to the starter clutch bolts and tighten them to the specified torque while holding the rotor holder.

 **Thread Lock “1324”**

Rotor holder: 09930-44510

 **Starter clutch bolt**

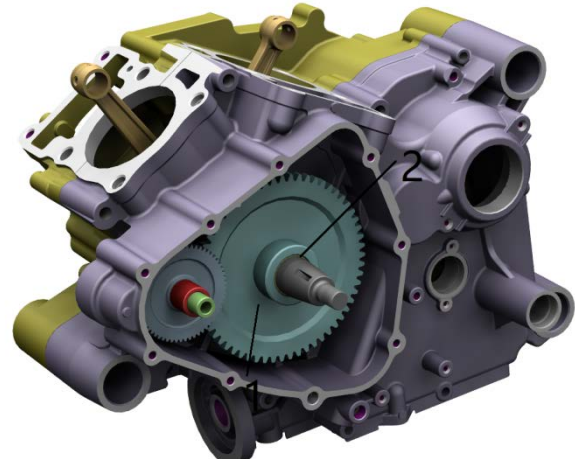
23~28 N•m(2.3~2.8 kg•m)



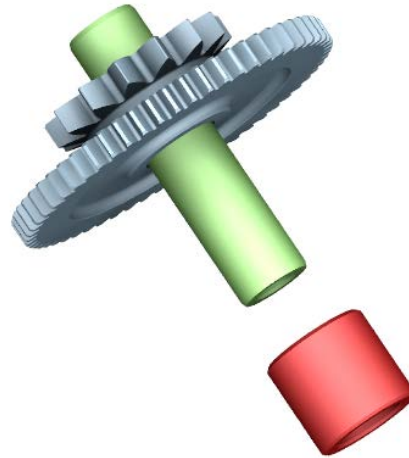
STARTER DRIVEN GEAR

STARTER DRIVEN GEAR BUSHING

Install the starter driven gear bushing ① and gear ② onto the crankshaft and turn the starter driven gear by hand. Inspect the starter driven gear bushing for smooth rotation and any abnormal noise. If the bushing does not turn smoothly or there is any abnormal noise, replace it.



Electric starting motor idler wheel assembly

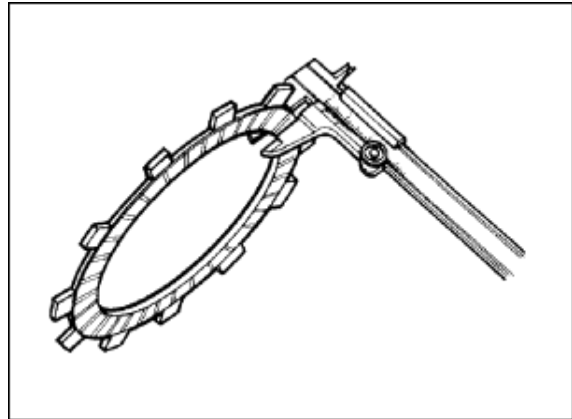


CLUTCH DRIVE PLATES

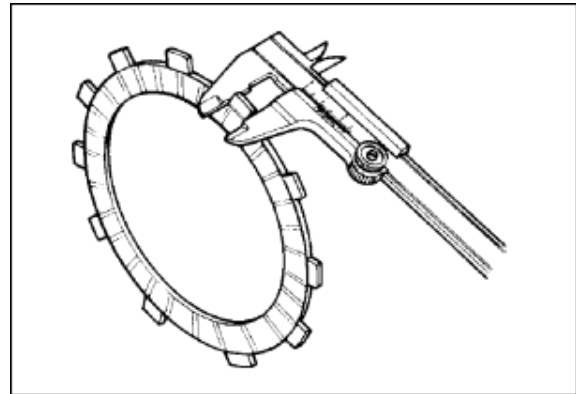
Measure the thickness and claw width of the clutch drive plates using vernier calipers. If a clutch drive plate is not within the service limit, replace the clutch plates as a set.

Clutch drive plate thickness	Standard	Service limit
	2.9~3.1 mm	2.6 mm

 Vernier calipers : 09900-20101



Clutch drive plate claw width	Standard	Service limit
	11.8~12.0 mm	11.0 mm

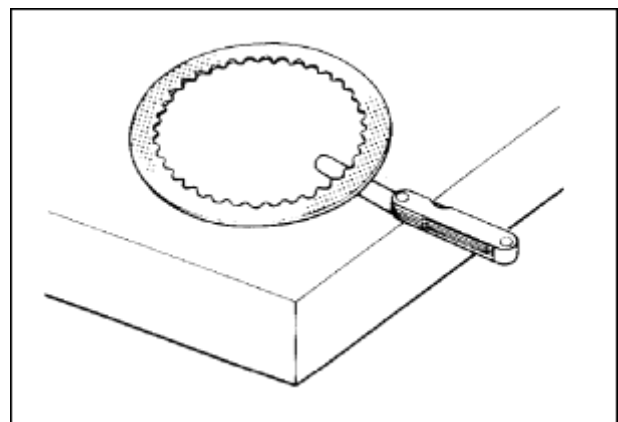


CLUTCH DRIVEN PLATES

Measure each clutch driven plates for distortion using the thickness gauge. If a clutch driven plate is not within the service limit, replace the clutch plates as a set.

Clutch driven plate distortion	Service limit
	0.1 mm

 Thickness gauge: 09900-20806



CLUTCH SPRING FREE LENGTH

Measure the free length of each clutch spring using vernier calipers. If any spring is not within the service limit, replace all of the spring.

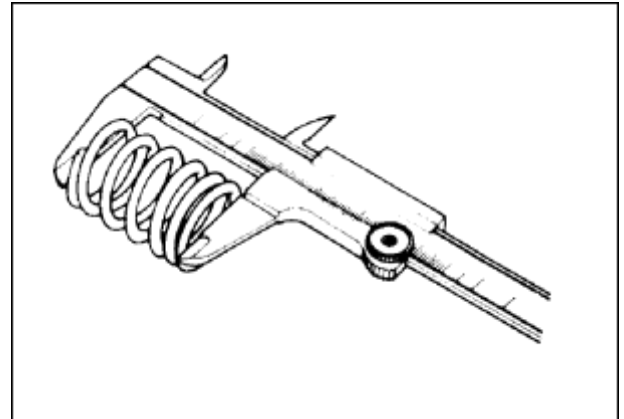
Clutch spring free length	Service limit
	34.3mm

 Vernier calipers : 09900-20101

CLUTCH RELEASE BEARING

Inspect the clutch release bearing for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.

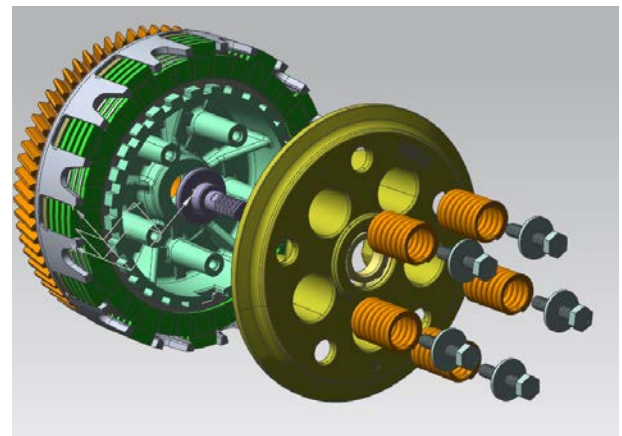
Smooth engagement and disengagement of the clutch depends on the condition of this bearing.



PRIMARYDRIVENGEAR

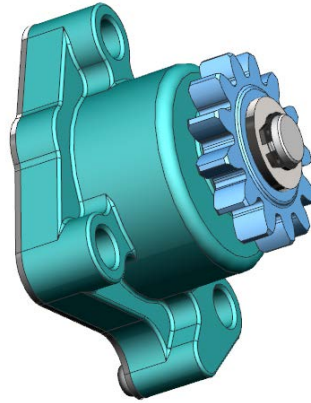
Inspect the primary driven gear bearing for any damage.

If any abnormal condition are found, replace the primary driven gear.



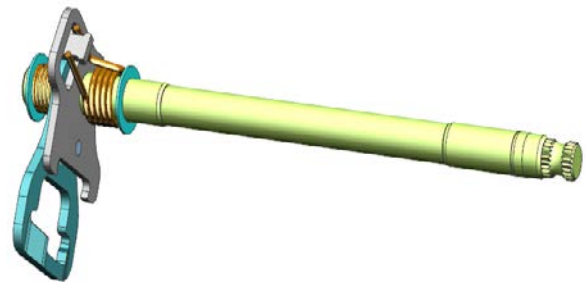
OIL PUMP

Turn the oil pump shaft and check that rotation is smooth. If any abnormal condition is found, replace the oil pump with new one.



GEARSHIFT SHAFT

Disassemble and reassemble the gearshift shaft as shown in right picture.



TRANSMISSION

INSPECTION

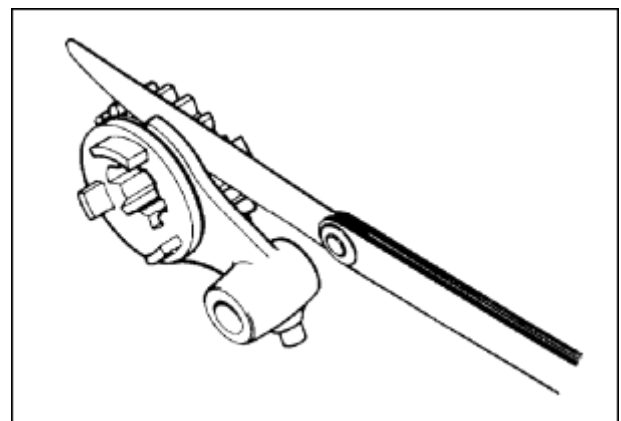
GEAR-SHIFTING FORK

Using a thickness gauge, check the clearance between in the groove of its gear and shifting fork.

The clearance for each of the three shifting forks plays an important role in the smoothness and positiveness of shifting action.

If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

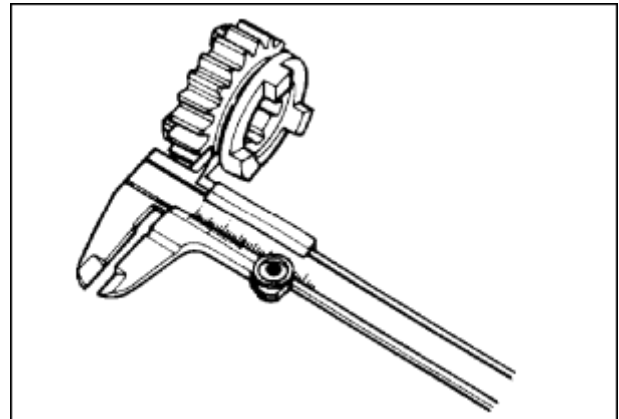
Shift fork-groove clearance	Standard	Service limit
	0.10~0.30 mm	0.5 mm



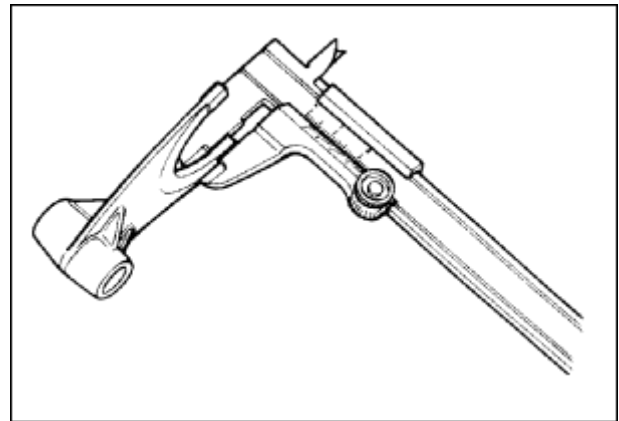
 Thickness gauge : 09900-20806

Vernier calipers: 09900-20101

Shift fork groove width	Standard
NO.1 & NO.2	5.0~5.1 mm
NO.3	5.0~5.1mm



Shift fork thickness	Standard
NO.1 & NO.2	4.8~4.9 mm
NO.3	4.8~4.9 mm

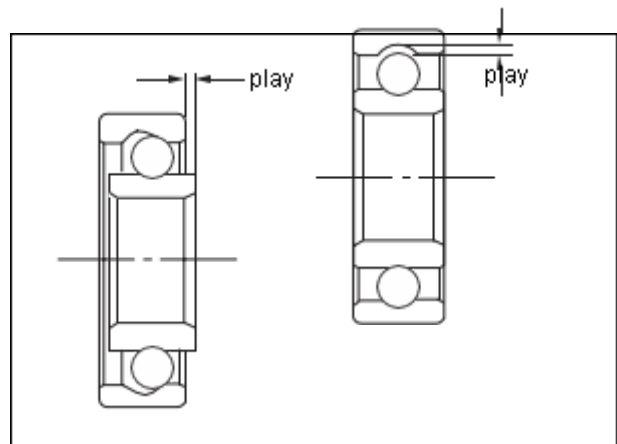


CRANKCASE

BEARING INSPECTION

Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.

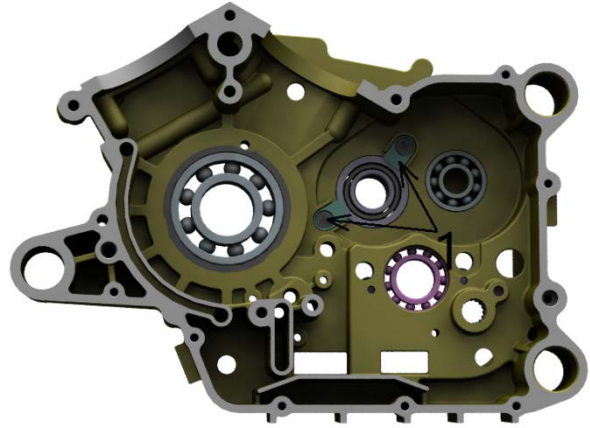
Replace the bearing in the following procedure if there is anything unusual.




DISASSEMBLY

RIGHT CRANKCASE BEARING

Remove the bearing retainers.



Remove the bearings ① and ②.

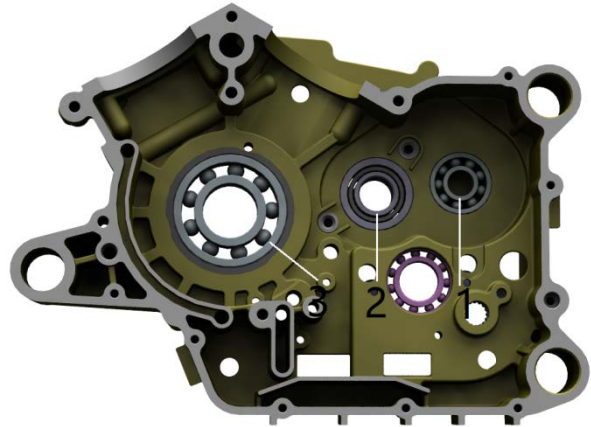
 **Bearing remover (17 mm) : 09923-73210**

Bearing remover (20~35 mm) : 09923-74510

 **Bearing installer: 09913-76010**

 **CAUTION**

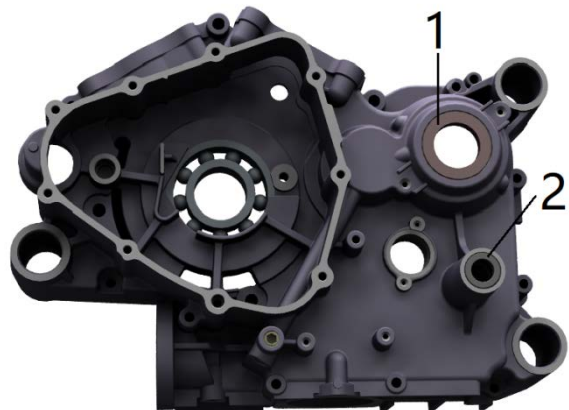
The removed bearing should be replaced with a new one.



LEFT CRANKCASE BEARING


Remove the oil seals 1 and 2.

 **Oil seal remover : 09913-50121**

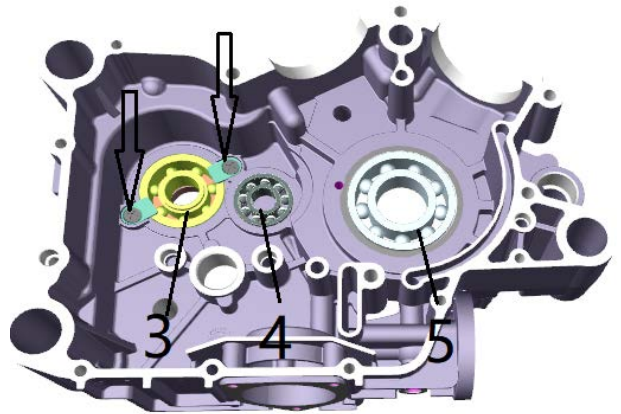


Remove the bearing retainer.

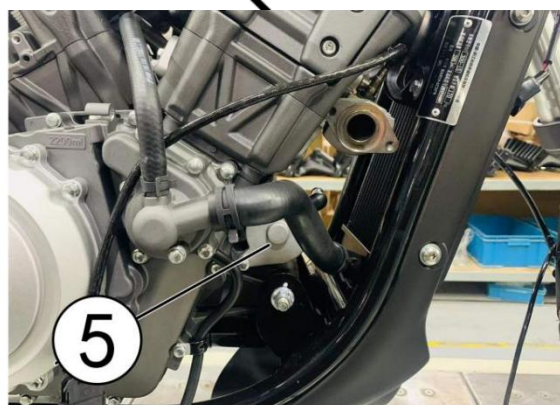
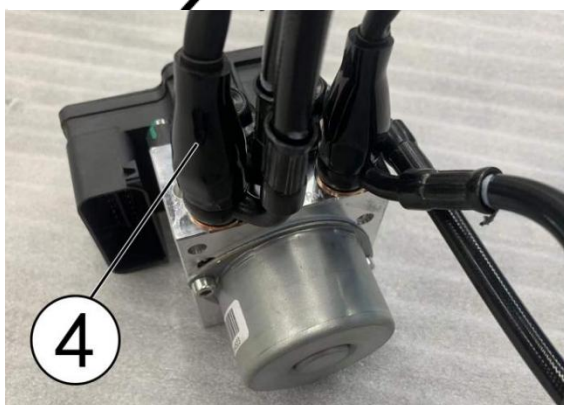
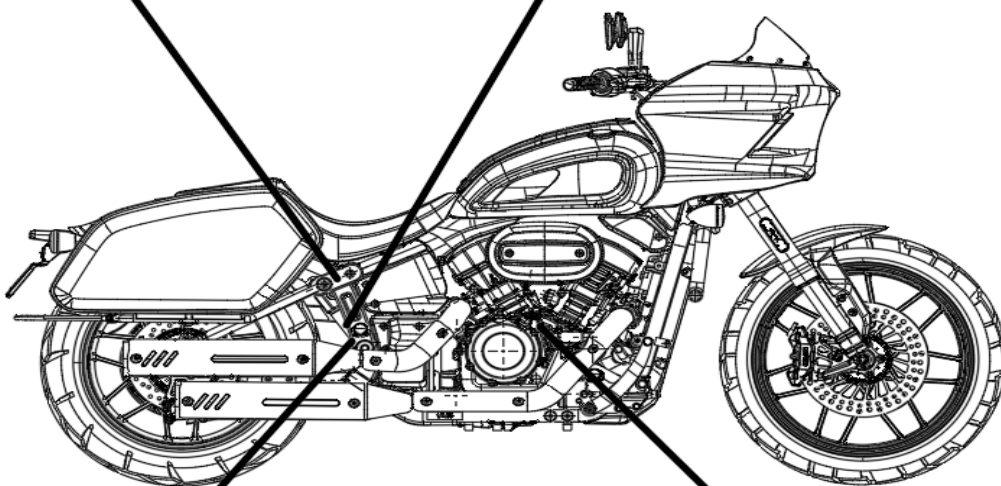
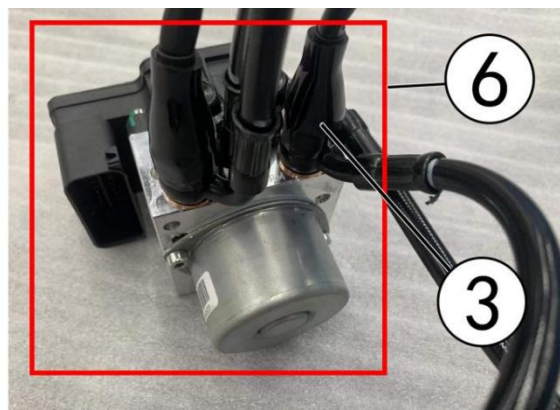
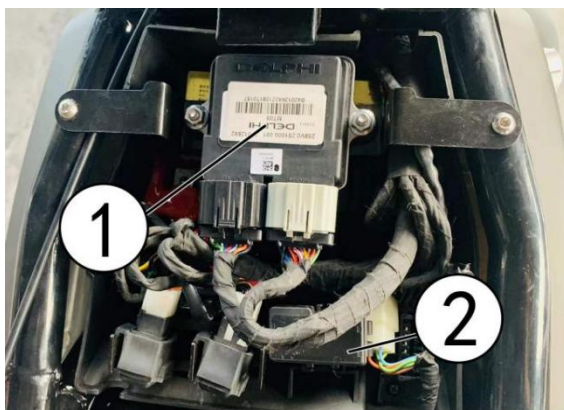
Remove the bearings 3,4 and 5.

 **Bearing remover (17 mm) : 09923-73210**

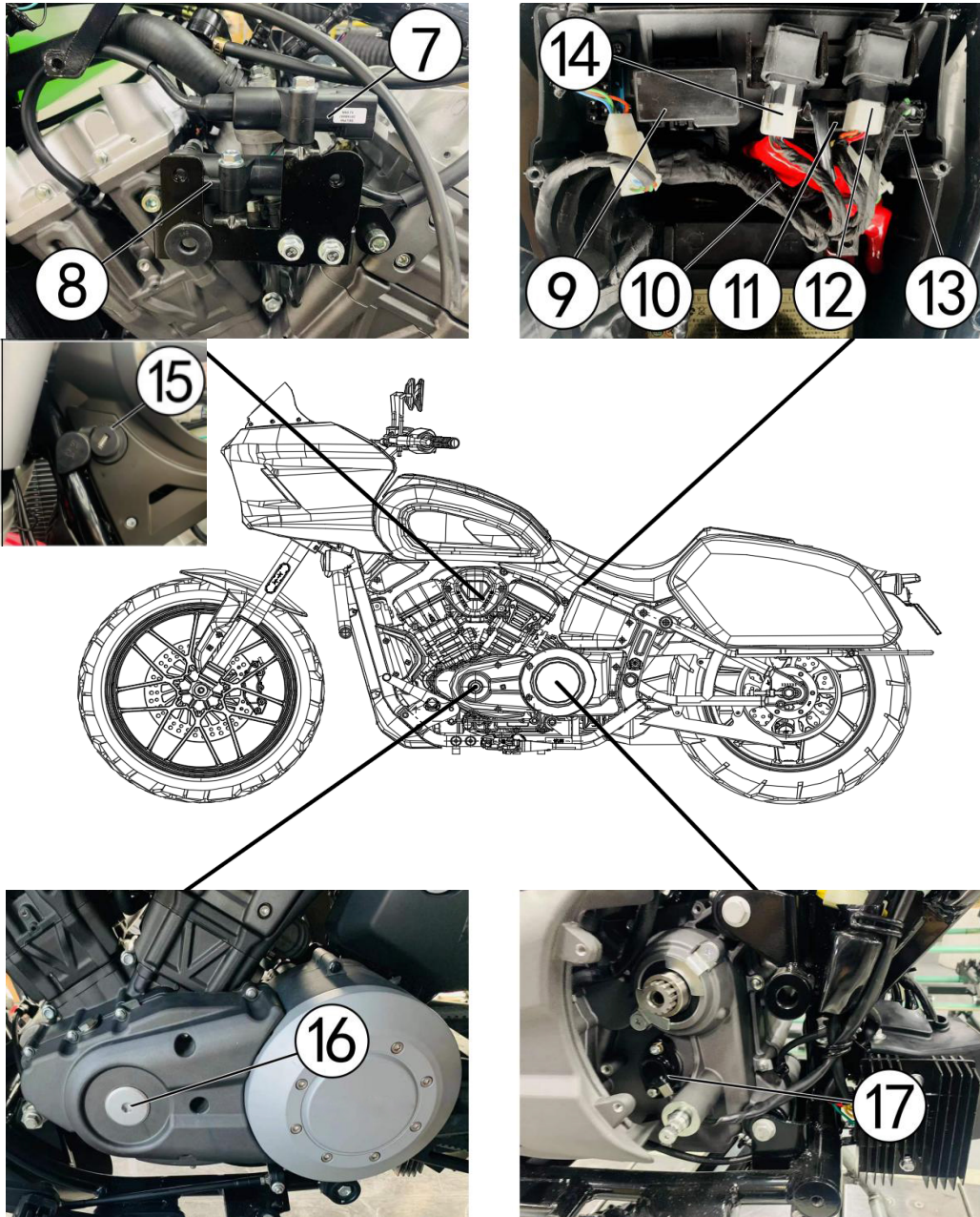
Bearing remover (20~35 mm) : 09923-74510



LOCATION OF ELECTRICAL COMPONENTS



①	ECU	②	Fuse	③	Front brake lamp switch
④	Rear brake lamp switch	⑤	Starter motor	⑥	ABS



⑦	Ignition coil (NO.1 FRONT)	⑧	Ignition coil (NO.2 REAR)	⑨	ECU fuse box
⑩	Main relay	11	(RO) switch	12	Logic relay1
13	Flasher	14	Logic relay2	15	USB socket
16	Magneto	17	Gear position switch		

⚠ CAUTION

Be sure not to misassemble the position of battery plus & minus terminal.

ELECTRIC INJECTION SYSTEM

Brief introduction of electric injection system

The V250 uses Delphi electric injection system, which is oxygen sensor closed-loop control, ECU injection and ignition control. The system adopts closed-loop control self-learning system, which can effectively eliminate the manufacturing differences of the system and related mechanical parts, improve the comprehensive consistency of the vehicle, and eliminate the errors caused by wear and tear after actual use of the vehicle.

Electric injection system components

Engine controller ECU working principle

The electric injection management system of DELPHI is adopted. The ECU of the system analyzes and calculates the working state of the engine by receiving sensor signals and work request switch signals at different positions of the engine and the body. According to the preset control model, through the actuator of the engine and the body, Precise control of engine oil, fire, gas and corresponding mechanism.

appearance



Stitch definition

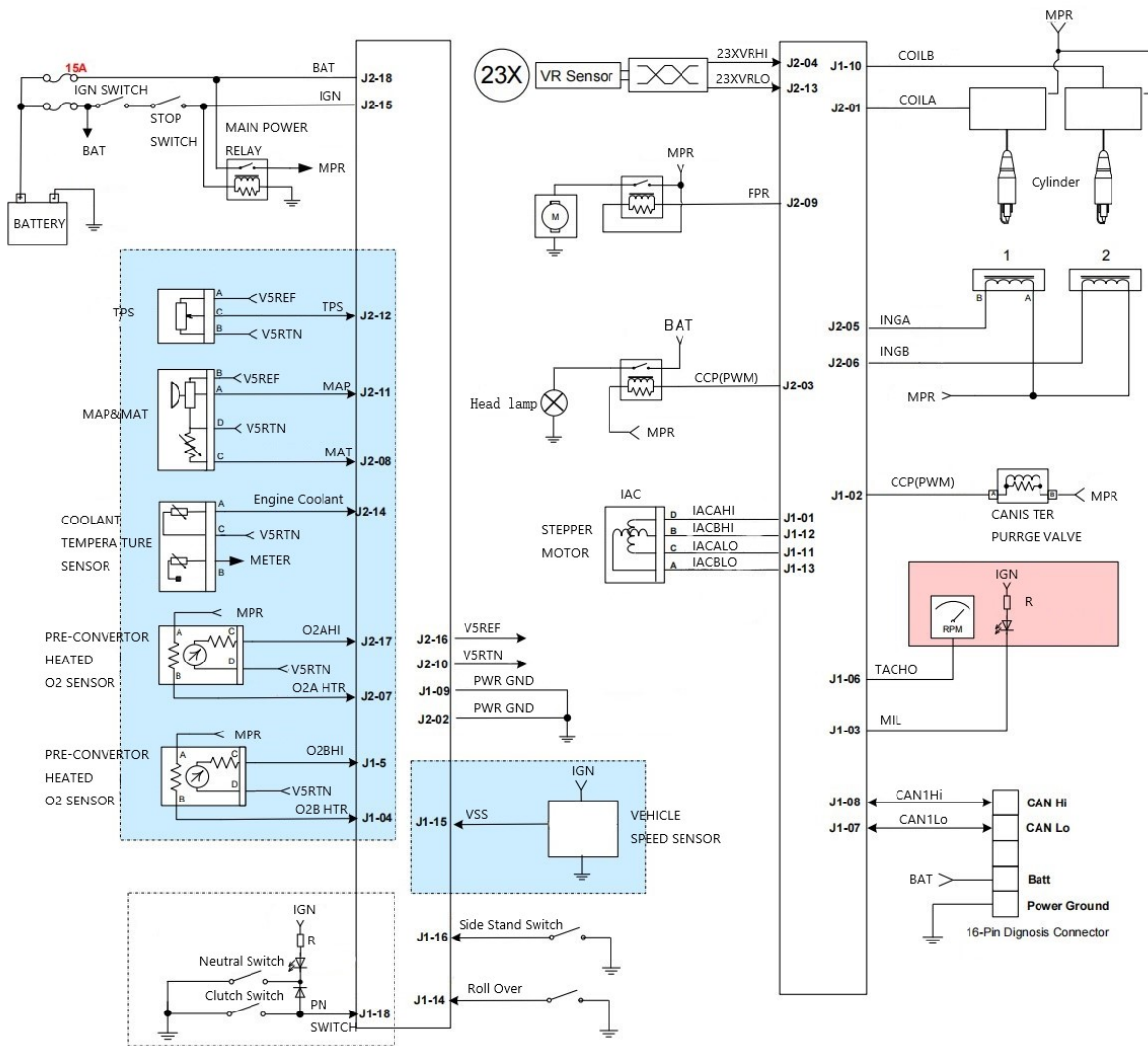
J1-1	IACAH1	J2-1	COILA
J1-2	MAGNETO CUT RELAY	J2-2	GND
J1-3	MIL	J2-3	Head lamp
J1-4	O2BHTR	J2-4	CRANK Hi
J1-5	O2B	J2-5	INJA
J1-6	TACH	J2-6	INJB
J1-7	CAN Lo	J2-7	O2AHTR
J1-8	CAN Hi	J2-8	IAT_MAT
J1-9	GND	J2-9	FUEL PUMP RELAY
J1-10	COILB	J2-10	5V RTN
J1-11	IACA Lo	J2-11	MAP
J1-12	IACB Hi	J2-12	TPS
J1-13	IACB Lo	J2-13	CRANK Lo
J1-14	ROLLOVER	J2-14	CLT

J1-15	VSS	J2-15	IGN
J1-16	Side Stand Switch	J2-16	5VREF
J1-17		J2-17	O2A
J1-18	PNSW	J2-18	VBATT

Remark:

J1 indicates the grey plug-in on the ECU, J2 indicates the black plug-in on the ECU, and J1-1 indicates the pin # 1 on the grey plug-in on the

ECU schematic diagram



Electric fuel Injector

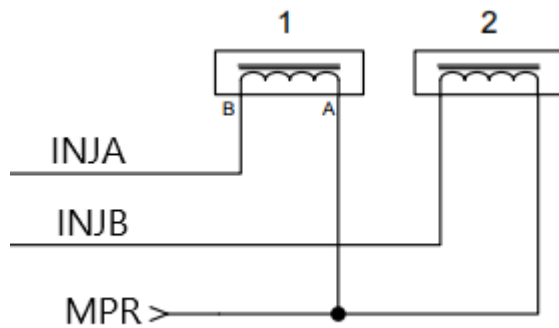
working principle

Injector interior design with surrounding the core of electromagnetic coil, an electromagnetic coil leads to the two electrodes is the fuel injector input control interface, when the electromagnetic coil current and electromagnetic force generated by overcoming the ball valve spring force and oil pressure, make the ball valve rises, the fuel tube of high pressure fuel (300 kpa) can through the fuel valve seat hole, Flow through the orifice plate and form a conical fog spray to the inlet valve, when the fuel injector power off, the electromagnetic force of the solenoid coil disappears, the valve valve of the fuel injector under the action of the return spring closed, so that the fuel injection action stopped.




appearance



Stitch definition



technical specification

A.	SYSTEM FUEL PRESSURE (kPa) SET POINT PULSE WIDTH/PERIOD (ms)	350.0±0.2% 2.0/10.0
B.	SET POINT FLOW RATE (g/s) 	0.222±5%
C.	STATIC FLOW RATE (g/s) 	1.37±5%
D.	COIL RESISTANCE	12.0±0.6 Ohms
E.	MINIMUM OPERATING VOLTAGE - MAX INDIVIDUAL	7.0 V
F.	TIP LEAK RATE (N ₂) - MAX. (cc/min) 	0.6
G.	SET POINT DURABILITY FLOW SHIFT - INDIVIDUAL (%)	10%
H.	STATIC DURABILITY FLOW SHIFT - INDIVIDUAL (%)	10%
J.	DURABILITY TEST FUEL	NAE10
K.	DURABILITY TEST FUEL TEMPERATURE (DEGREE C)	24±2
L.	INJECTOR TIP TO SPRAY AUDIT PLANE DISTANCE	100mm
L1.	DUAL SPRAY SEPARATION ANGLE - MAX. INDIVIDUAL MANUFACTURING SITE INFORMATION	20.5° ±6°
L2.	DUAL SPRAY SEPARATION ANGLE - SUBGROUP MEAN MANUFACTURING SITE INFORMATION	20.5° ±3°
L3.	DUAL SPRAY CONE ANGLE - MAX. INDIVIDUAL MANUFACTURING SITE INFORMATION	12.5° ±6°
L4.	DUAL SPRAY CONE ANGLE - SUBGROUP MEAN MANUFACTURING SITE INFORMATION	12.5° ±3°
L5.	DUAL SPRAY ORIENTATION ANGLE	90° ±5°

throttle body

working principle

It is mainly composed of the main casting body, return spring, throttle pull wire, stepper motor, throttle body position sensor and idle speed regulating screw. Throttle body position sensor provides throttle opening to the ECU; The stepper motor and the idle speed regulating screw can control the idle speed and its stability, clockwise to reduce the bypass air volume, reduce the idle speed, counterclockwise to increase the bypass air volume, increase the idle speed (this step has been set before factory), generally requires its position to be about 2 turns. Stepper motor is used for idling stability self-regulation of electric injection system.

appearance



Throttle Position Sensor

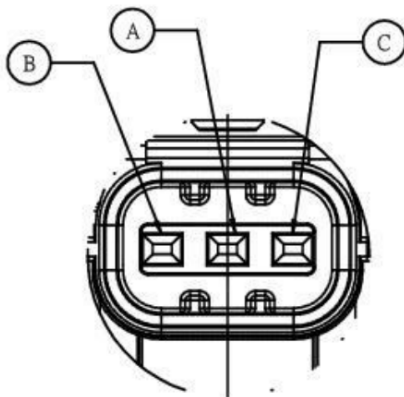
working principle

Throttle position detection - provides throttle opening feedback signal to engine control system.

appearance



Stitch definition



ID	DESIGNATION
A	INPUT
B	OUTPUT
C	GND

technical specification

SPECIFICATION REQUIREMENTS

Linearity	See Fig. 1
Hysteresis	±50mV over the electrical travel (no filter used)
Index	0.5V at 38.1° ±2°
Resistance (ΩAR)	5 Kohm ±40%
Microgradient (0° - 40°)	40 mV/1° ±10 mV/1° (Initial before durability test)
	40 mV/1° ±20 mV/1° (Final after durability test)
Input Voltage (Vs)	5.0 Vdc ±0.1 Vdc
Output Voltage at Full Rotation (Minimum)	4.89 Vdc
Operating Torque	0.89 Ncm to 5.1 Ncm
Insulation Resistance	100 MΩ Minimum (based on 500 V source)
Output Deviation (Temperature)	Within region -30°C to +110°C, 0.3mV/°C or less
Storage Temperature	-40°C to +120°C
Operating Temperature	-30°C to +110°C
Connector Cycles	100 max on-off cycles (sensor only) [3]
Rotor Stop Strength	1.0 Nm maximum
Fastening Torque	No excessive play, buckling, deformation, fracture, or other abnormalities allowed when tightened by a 4.5 Nm torque with M5 bolt and Ø8.9 mm minimum X 1.0 mm thick washer. Scratches on bearing surfaces are allowed.
Tensile Strength	Connector integrity remains intact after a load of 49 N

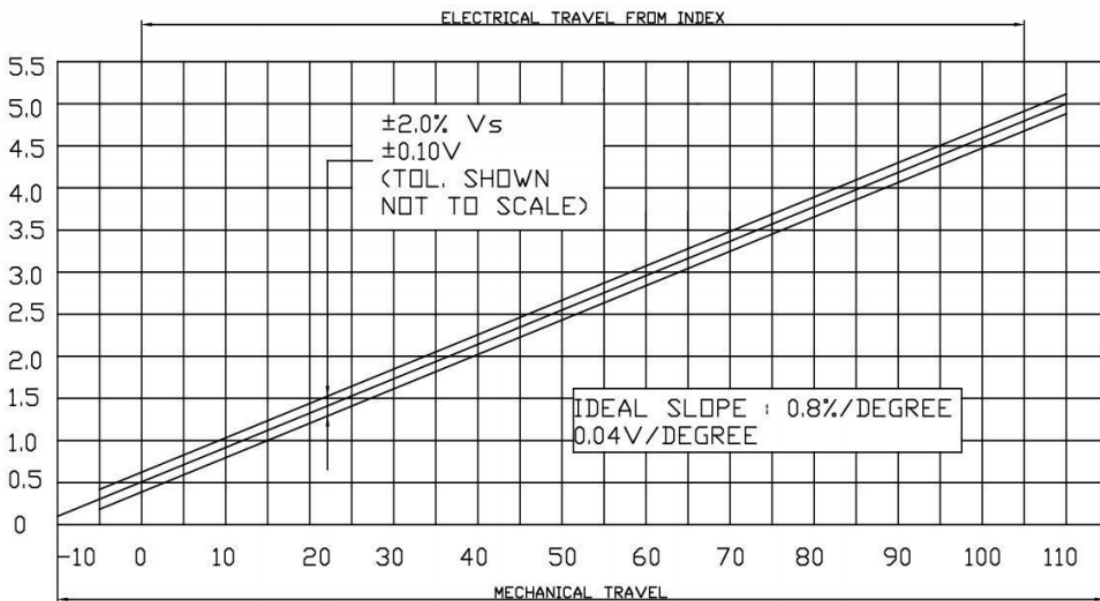


FIG. 1

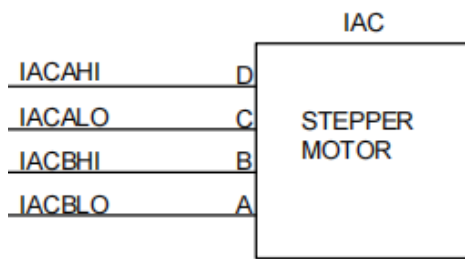
**Stepper motor
working principle**

The function of the idle stepper motor is to control the flow area of the vent beside the throttle body to adjust the amount of air entering the engine and control the idle speed of the engine.

appearance



Stitch definition



technical specification

NUM	ITEM	Arguments
1	NOMINAL VOLTAGE	12V
2	Allowable Opeering Voltage	7.5VDC-14VDC
3	Each phase resistance(25°C)	53±3Ω
4	Each phase resistance(-40°C)	≥35 Ω
5	Each phase inductance(25°C)	35±5mH(Test under 1KHz sine wave)
6	Step torque Angle	15° ±15'
7	Step into the distance	0.0417mm±0.0063mm
8	Current by phase	160±30mA
9	Adjustable torque (12V/200pps)	20N.m
10	Maximum working distance	≥10mm
11	Dielectric strength of insulation	No breakdown or arc
12	Gas tightness(-61KPa VACUO)	leakage ≤100CC/min
13	Resonance frequency range	70-120 PPS

Water Temperature Sensor

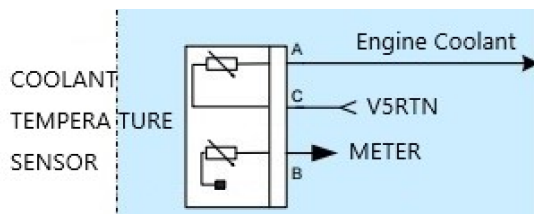
working principle

Engine water temperature sensor is used for water-cooled engine to measure the temperature of engine cylinder head. Within the temperature range of the sensor, its resistance will change with the temperature of the engine, and its temperature characteristics are negative temperature coefficient resistance characteristics. It is a non-repairable part.

appearance



Stitch definition



technical specification

R (a-c)				R(b-METER)	
T (°C)	R(Ω)	R Accuracy (±%)	T Accuracy(±°C)	T (°C)	R(Ω)
-40	100856	4.87	0.7	45	265.0-323.0
-35	72437	4.64	0.7	50	216.0-264.0
-30	52594	4.43	0.7	54	185.0-226.0
-25	38583	4.21	0.7	60	148.5-180.5
-20	28582	4.00	0.7	80(Z)	74.6-90.6
-15	21371	3.80	0.7	90	53.5-66.5
-10	16120	3.60	0.6	100	40.6-48.6
-5	12261	3.40	0.6	108	34.0-38.0
0	9399	3.21	0.6	110	32.0-36.0
5	7263	3.06	0.6	113	30.0-34.0
10	5658	2.92	0.6	115(Z)	25.7-31.7
15	4441	2.78	0.6	120	23.0-27.0
20	3511	2.64	0.6	125	20.5-24.5

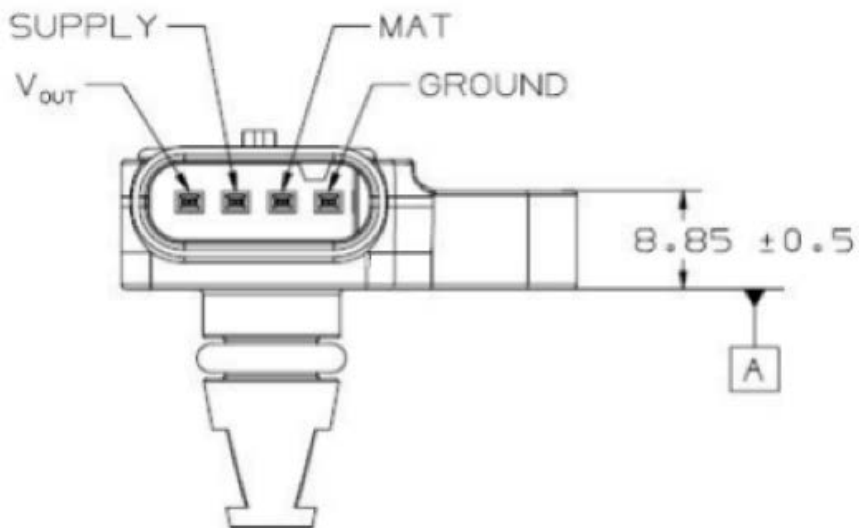
Intake Air Temperature Sensor working principle

The sensor is used to measure the absolute pressure of the inlet bend pipe, according to the different resistance values reflect the size of the inlet pressure, so as to indirectly convert into the calculation of the size of the inlet gas into the engine combustion chamber, it is also a non-repairable part. At the same time for measuring the temperature of the air entering, the resistance will change with the temperature of the air intake, its characteristics are also negative temperature coefficient resistance characteristics, it is not repairable parts.

appearance



Stitch definition



technical specification

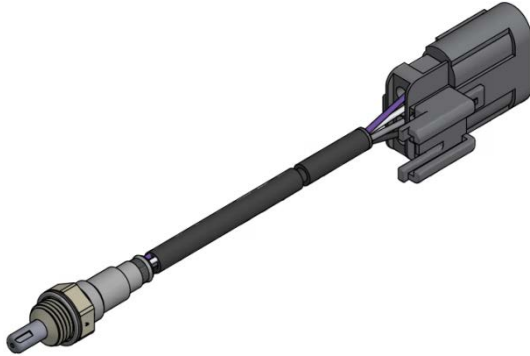
- working voltage : 5DVC
- response time : < 15S
- operating temperature : -40~150°C
- relative humidity : 0 to 100% RH

Oxygen Sensor

working principle

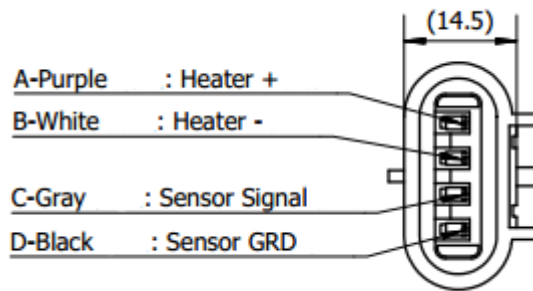
The oxygen sensor can detect the oxygen content in the exhaust gas of the engine exhaust pipe, which is used in the closed-loop control of the fuel inside the ECU, so that the engine combustion is always maintained at the most reasonable air to gasoline ratio.

appearance



Stitch definition

COLOR REF:
 HEATER +(PURPLE)
 HEATER -(WHITE)
 SENSOR SIGNAL (GRAY)
 SENSOR GRD. (BLACK)



technical specification

Functional Values	
Exhaust gas temperature	450 °C
Sensor voltage at $\lambda=0.97$ (mV)	≥ 720
Sensor voltage at $\lambda=1.10$ (mV)	≤ 120
Internal resistance (kohm)	≤ 0.5
Response time (ms) 600~300mv	≤ 120
Response time (ms) 300~600mv	≤ 80
Heater Current(A) U=13.5V	0.30±0.2

ignition coil

appearance

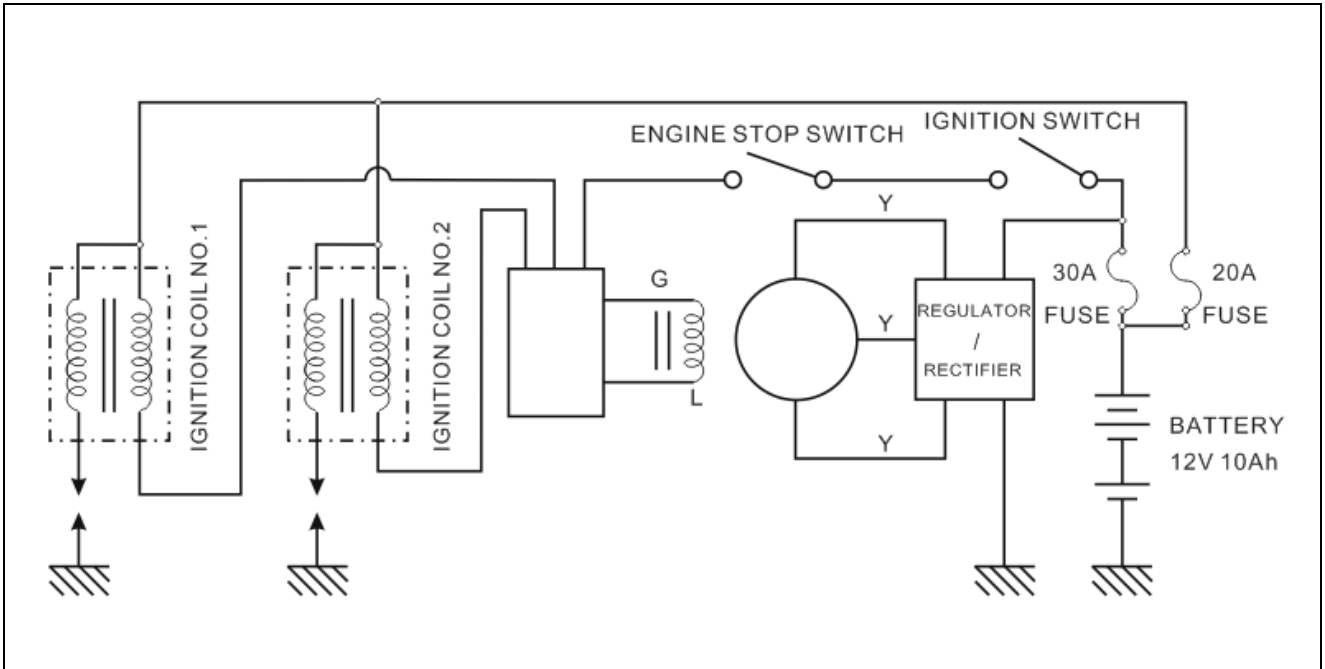


working principle

The ignition coil provides energy to the spark plug, and a high voltage wire connects the ignition coil to the spark

plug.

IGNITION SYSTEM



- **INSPECTION**
- **MAGNETO**
- Using the pocket tester, measure the resistance between the lead wires in the following table.
- If the resistance is not within the specified value, replace the stator coil, with a new one.

Stator coil resistance	Standard
Pick-up coil	G-L Approx. 95 ~ 125 Ω
Charging coil	Y-Y Approx. 0.3 ~ 0.6 Ω

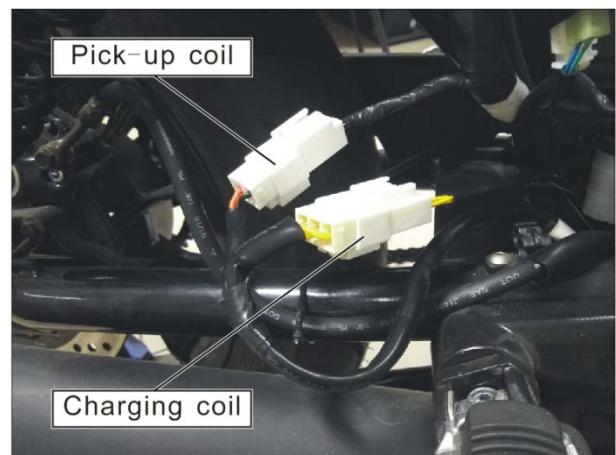
 Pocket Tester : 09900-25002

 Multimeter: 09900-25002

 Tester knob indication : Resistance(Ω)

NOTE

When making above test, it is not necessary to remove the magneto.



IGNITION COIL PRIMARY PEAK VOLTAGE INSPECTION

- Remove the fuel tank and frame cover.
- Disconnect the two spark plug caps.
- With the spark plug cap connected, place a new spark plug on the engine to ground it.

NOTE

- ❖ Check that all the couplers are connected.
- ❖ Check that the all battery is fully charged.

Measure the No.1 and No.2 ignition coil primary peak voltage using the tester in the following procedure.

- Connect the tester as follows.

NO.1 Ignition coil

⇒	⊕ Probe : BY lead wire terminal
	⊖ Probe : Ground

NO.2 Ignition coil

⇒	⊕ Probe : WL lead wire terminal
	⊖ Probe : Ground


NOTE

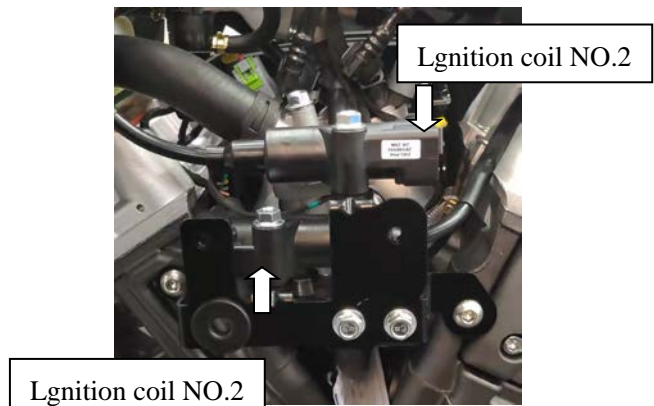
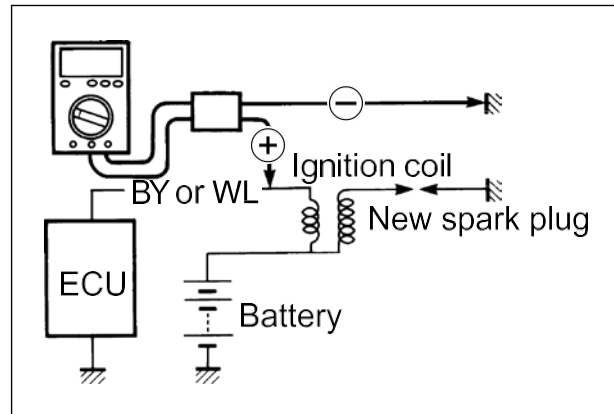
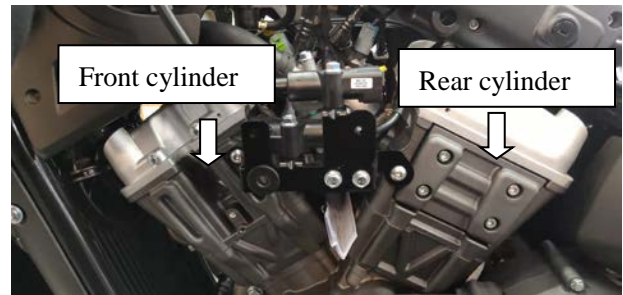
Do not disconnect the ignition coil / plug cap lead wire couplers.

- Shift the transmission into the neutral and then turn the ignition switch to the “ON” position.
- Squeeze the clutch lever.
- Press the starter switch and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage.

Ignition coil primary peak voltage	400 V and more
---	----------------

 **TOOL** Pocket tester : 09900-25002

 **Tester knob indication : Voltage (---)**



■ SPARK PLUG

▷ CARBON DEPOSITS

Check to see if there are carbon deposits on the spark plug.

If carbon is deposited, remove it with a spark plug cleaner machine or carefully use a tool with a pointed end.

▷ SPARK PLUG GAP

Measure the spark plug gap with a thickness gauge.
If the spark plug gap is out of specification, adjust the gap.

Spark plug gap

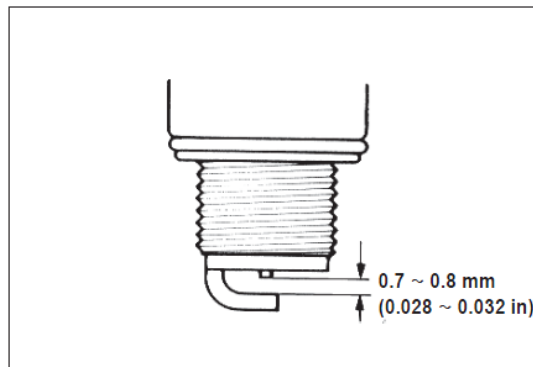
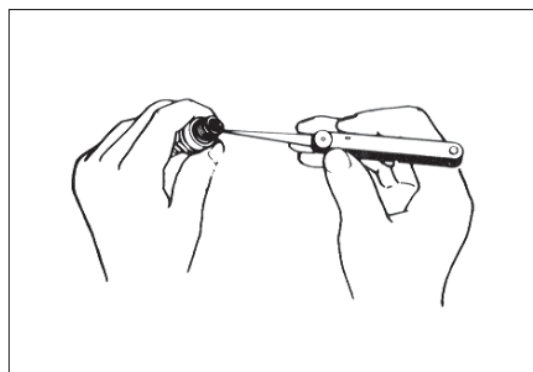
0.7 ~ 0.8 mm
(0.028 ~ 0.032
in)

 Thickness gauge : 09900-20806

▷ ELECTRODE'S CONDITION

Check to see the worn or burnt condition of the electrodes.

If it is extremely worn or burnt, replace the spark plug.
Replace the spark plug if it has a broken insulator, damaged thread, etc.



CAUTION


Use recommended spark plug only.
A spark plug of the wrong rating may shorten engine life and cause loss of performance.

▷ SPARK PLUG INSTALLATION

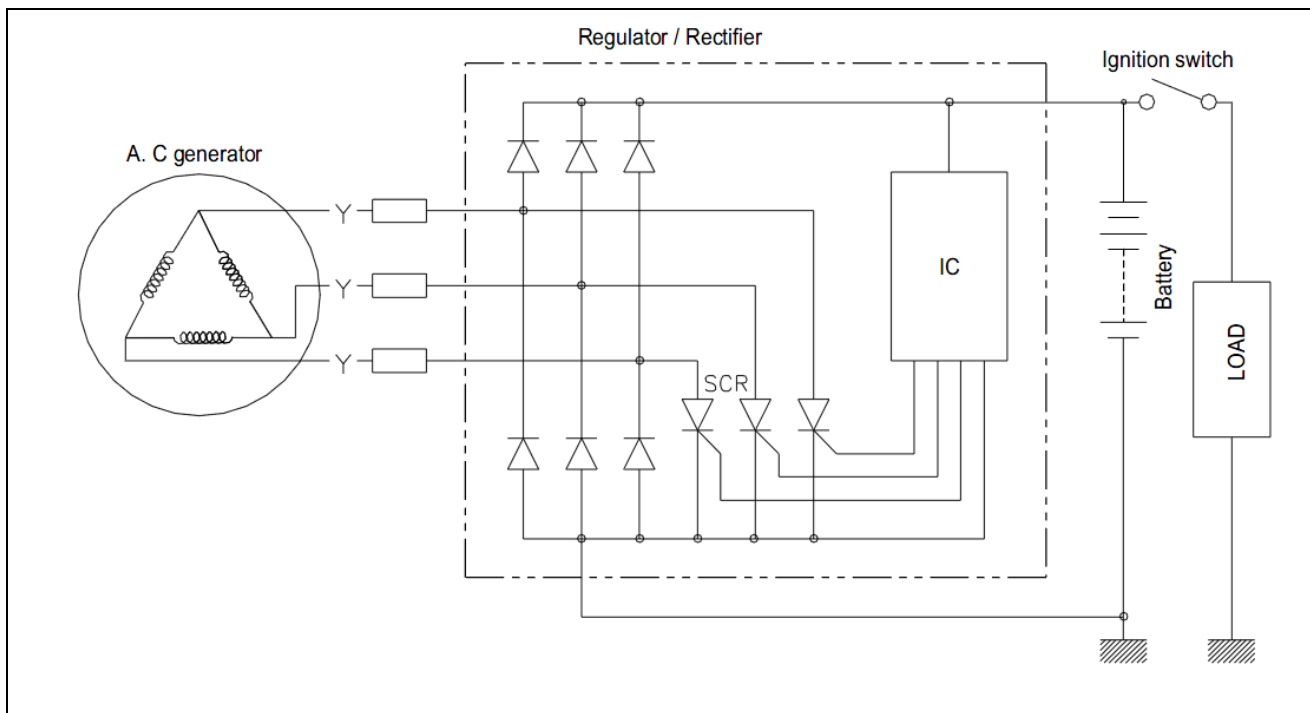
CAUTION

Before tightening the spark plug to the specified torque, carefully turn the spark plug by finger into the threads of the cylinder head to prevent damage the aluminum threads.

● First, finger tighten the spark plug, and then tighten them to the specified torque.

 Spark plug
: 15 ~ 20 N·m (1.5 ~ 2.0 kgf·m)

CHARGING SYSTEM



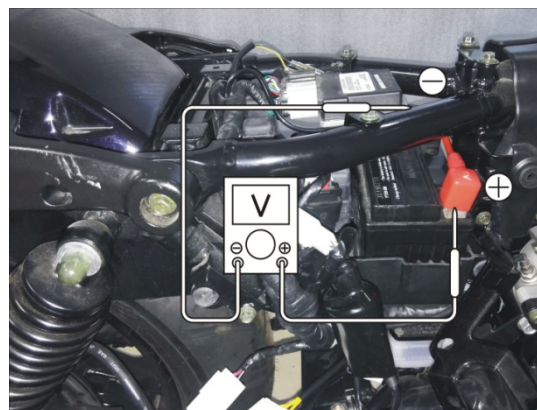
INSPECTION

CHARGING OUTPUT CHECK

Start the engine and keep it running at 5,000 rpm.
Using the pocket tester, measure the DC voltage

between the battery terminal \oplus and \ominus .

If the voltage is not within the specified value, check the magneto no-load performance and regulator / rectifier.



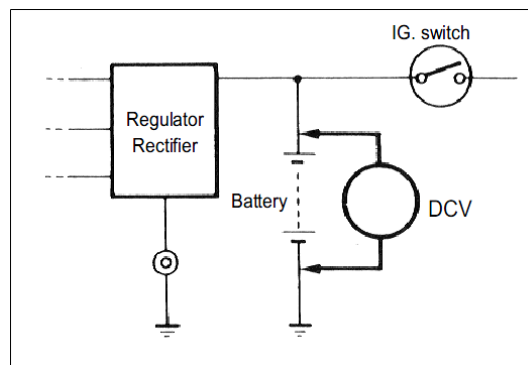
CAUTION

When making this test, be sure that the battery is full-charged condition.

Standard charge	13.5 ~ 15.0 V (at 5,000 rpm)
------------------------	---------------------------------

TOOL Pocket tester : 09900-25002

Tester knob indication : Voltage (---)



MAGNETO NO-LOAD PERFORMANCE

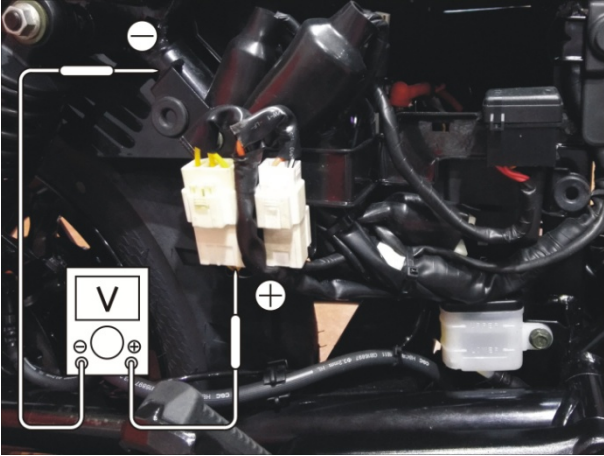
Disconnect the three lead wires from the magneto terminal.

Start the engine and keep it running at 5,000 rpm.

Using the pocket tester, measure the AC voltage between the three lead wires.

If the voltage is under the specified value, replace the magneto with a new one.

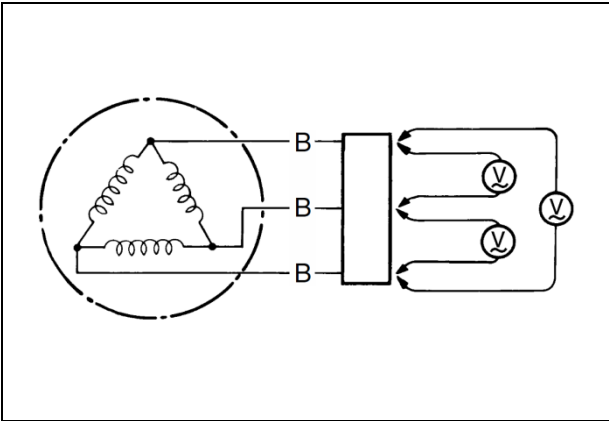
Standard no-load performance of magneto	Over60V (at5,000rpm)
--	-------------------------



TOOL Pocket tester :



Tester knob indication : Voltage (~)



REGULATOR / RECTIFIER

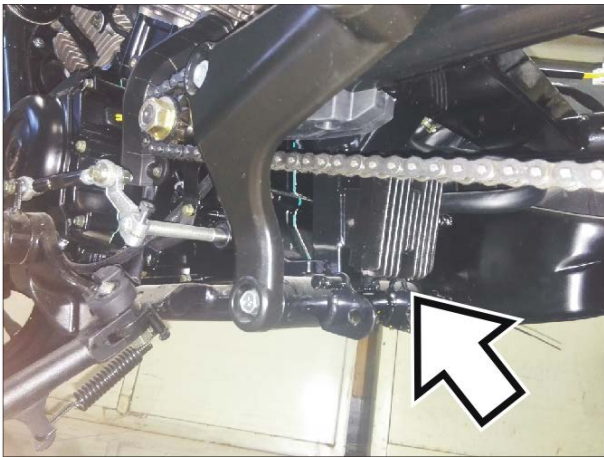
Disconnect the regulator / rectifier couplers.

Measure the voltage between the terminals using the pocket tester as indicated in the table below.

If the voltage is not within the specified value, replace the regulator / rectifier with a new one.

Unit: V

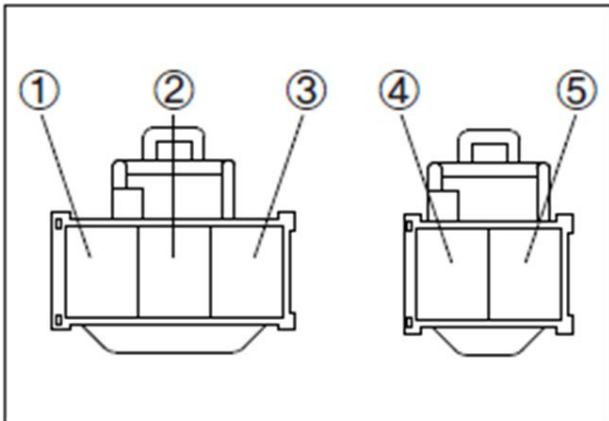
- Tester probe	+ Tester probe 測				
	①	②	③	④	⑤
①	0	0	0	0	0.4~0.7
②	0	0	0	0	0.4~0.7
③	0	0	0	0	0.4~0.7
④	0	0	0	0	1.8 ~ 2.1
⑤	0	0	0	0	0



TOOL Pocket tester :



Tester knob indication: Diode test (⚡)

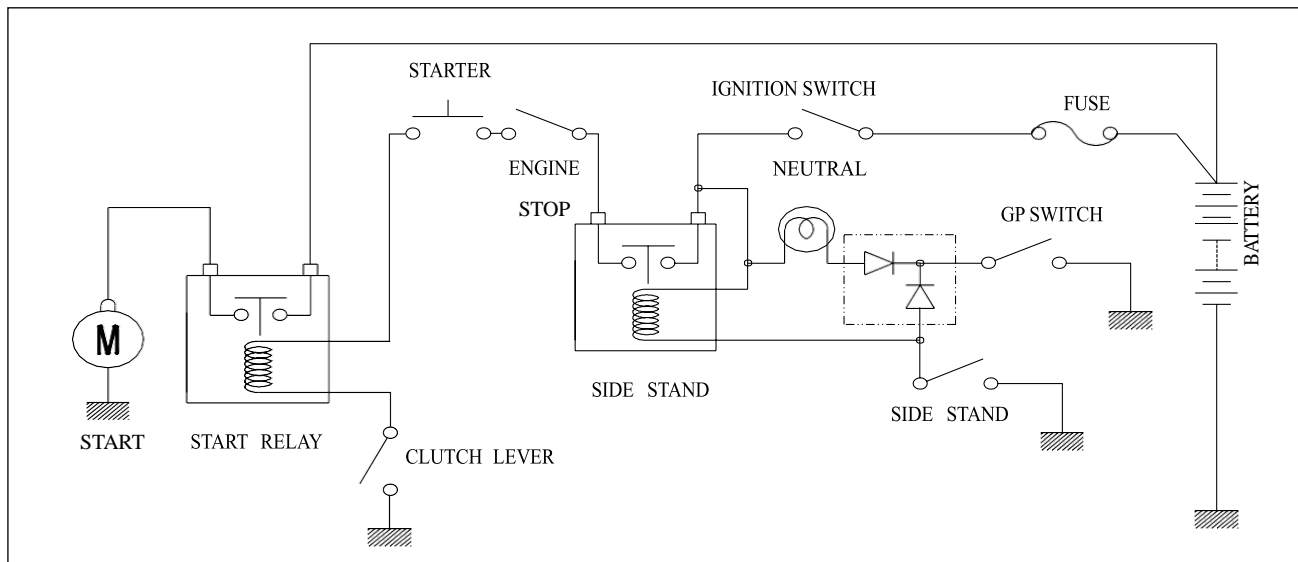


STARTER SYSTEM AND SIDE STAND IGNITION INTERLOCK SYSTEM

⊙ STARTER SYSTEM DESCRIPTION

The starter system consists of the following components : the starter motor, starter relay, clutch lever switch, side stand switch, GP switch, starter switch, engine stop switch, ignition switch and battery.

Pressing the starter switch (on the right handlebar switch) energizes the starter relay, causing the contact points to close, thus completing the circuit from the starter motor to the battery.



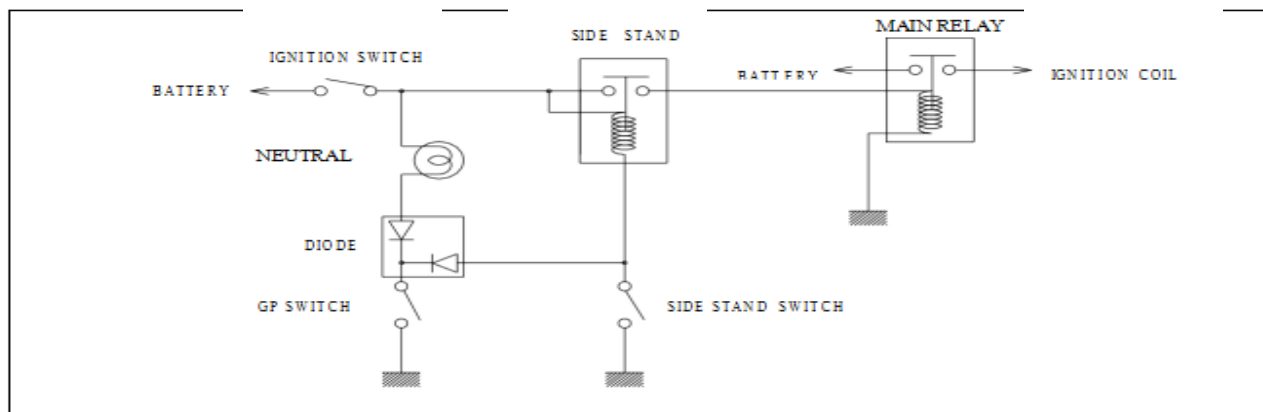
SIDE STAND / IGNITION INTERLOCK SYSTEM DESCRIPTION

This side stand / ignition interlock system prevents the motorcycle from being started with side stand down. The system is operated by an electric circuit provided between the battery and ignition coil.

The circuit consists of the neutral indicator light and switches.

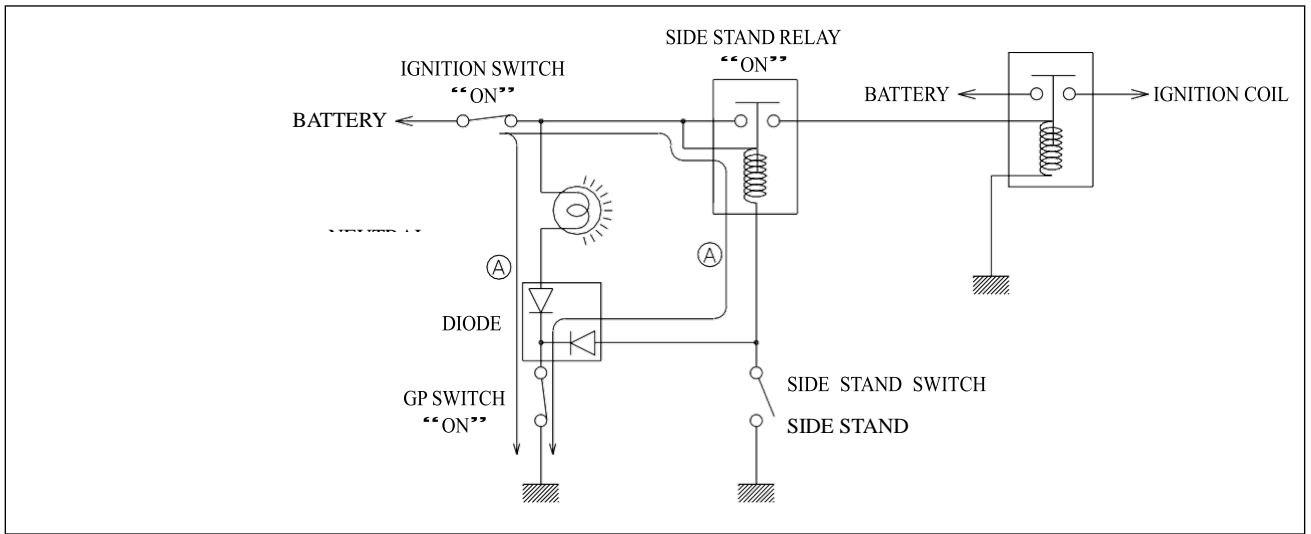
The ignition coils will send voltage to the spark plugs depending on what gear the transmission is in and whether the side stand is either up or down.

The gear position and side stand switches work together in this system. The ignition coil work only in two situations as follows.



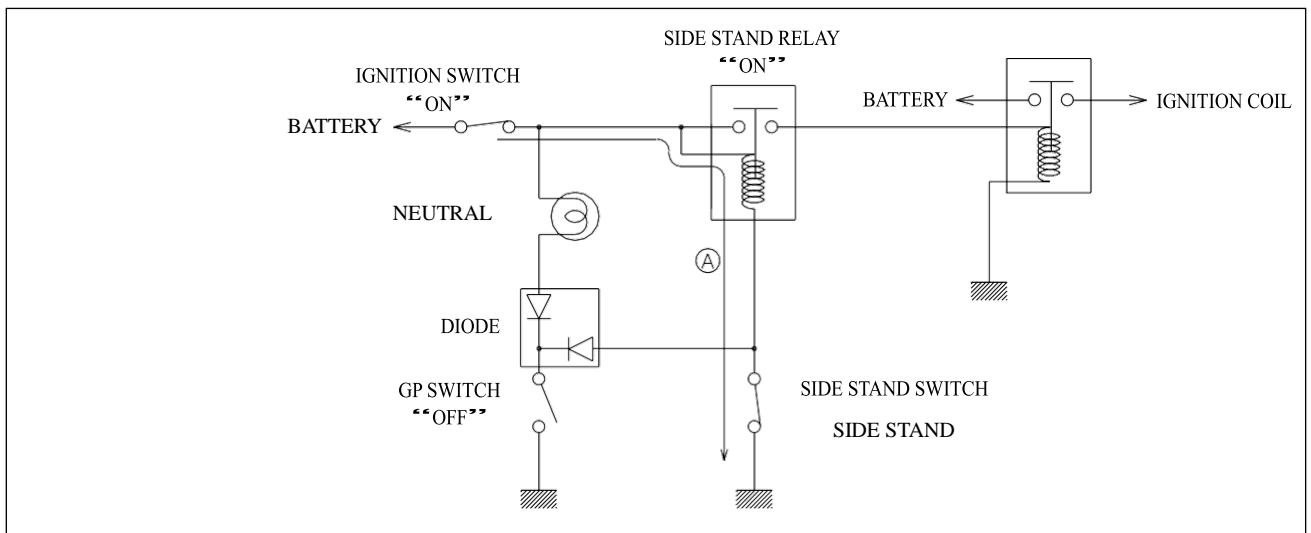
TRANSMISSION : Neutral –“ON”

Side stand - Down
Clutch lever - Squeeze



TRANSMISSION : Neutral -“OFF”

Side stand - Up
Clutch lever - Squeeze



V250are equipped with the side stand ignition interlock system.

If the transmission is in neutral, the engine can be started. If the transmission is not in neutral, the clutch lever must be pulled to start the engine.

NO	Neutral switch	Clutch lever	Side stand	Engine Start				
1	●	△	△	Possible	NOTE			
2	△	●	●	Possible				
3	△	●	△	Possible			●	On or Up
4	△	△	●	Impossible			△	Off or Down
5	△	△	△	Impossible				

STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the starter motor lead wire ②. (Refer to page 3-6)
- Loosen the bolt ①, remove the starter motor. (Refer to page 3-6)
- Disassemble the starter motor.

STARTER MOTOR INSPECTION

CARBON BRUSH

Inspect the brushes for abnormal wear, crack or smoothness in the brush holder.

If the brush has failed, replace the brush sub assy.

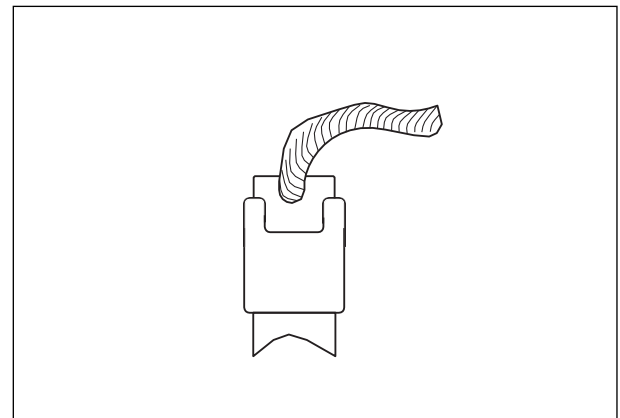


COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut ③.

If the commutator is abnormally worn, replace the armature.

When surface is discolored, polish it with #400 sand paper and clean it with dry cloth.



ARMATURE COIL INSPECTION


Check for continuity between each segment.

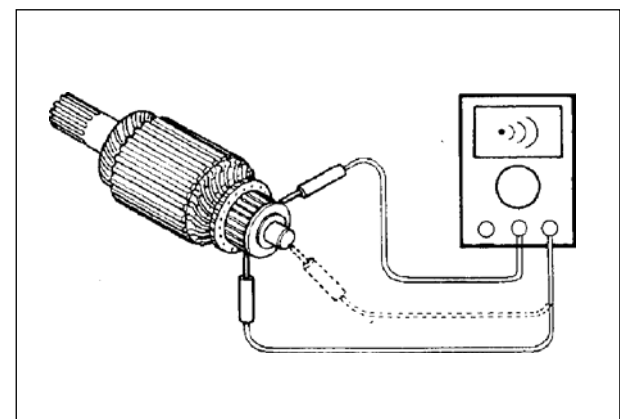
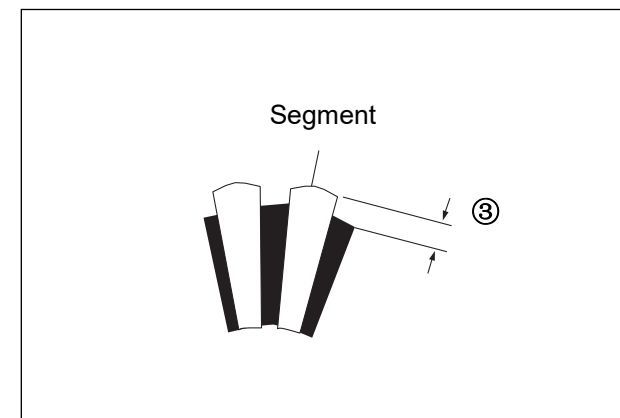
Check for continuity between each segment and the armature shaft.

If there is no continuity between the segments or there is continuity between the segment and shaft, replace the starter motor with a new one.

 **Pocket tester : 09900-25002**



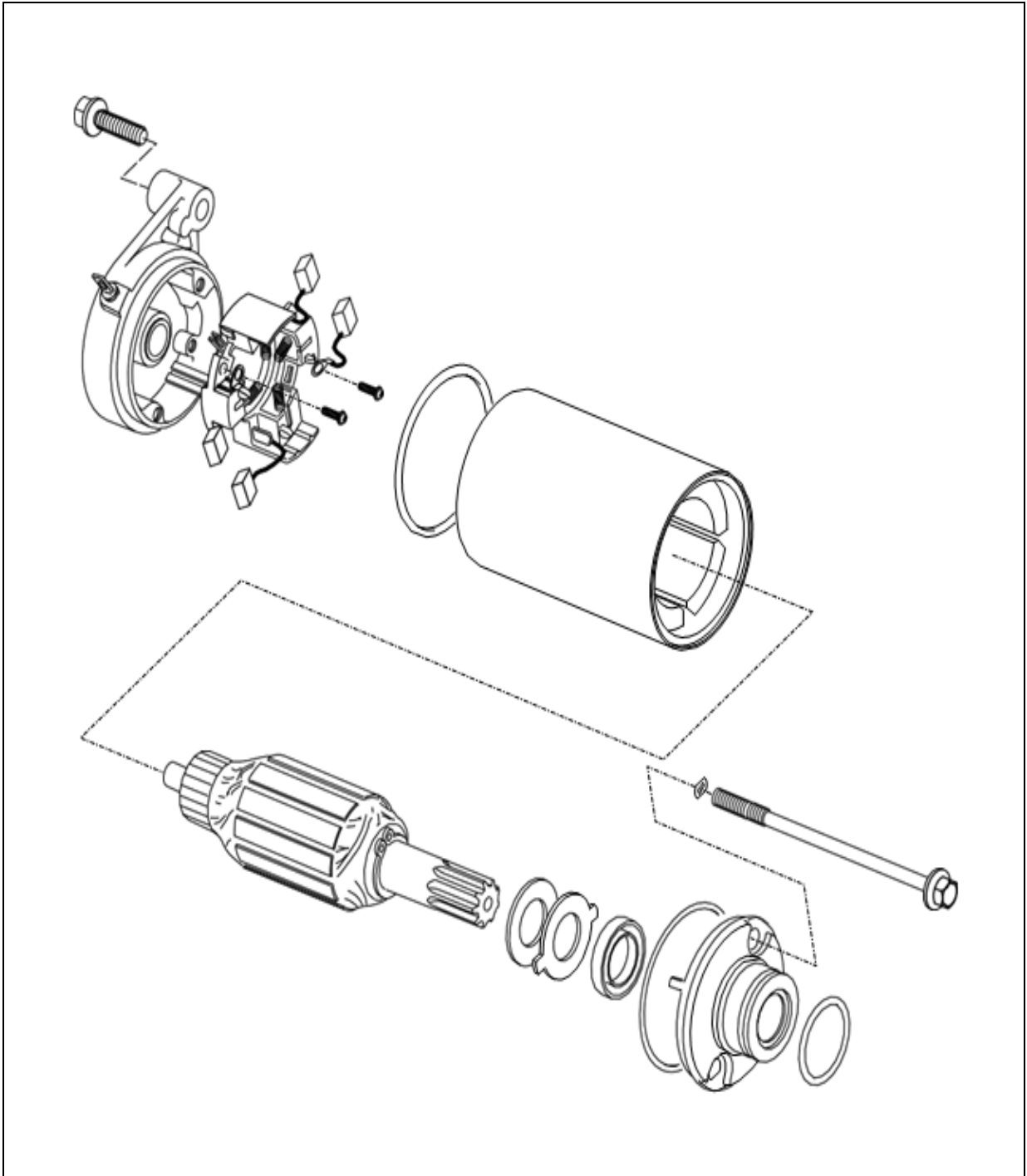
 **Tester knob indication**
: Continuity test (•))



□ **STARTER MOTOR REASSEMBLY**

Reassembly the starter motor. Pay attention to the following points :

- Reassembly the starter motor as shown in the illustration.



- Align the mark ① on the housing with the line ② on the housing end.



- Apply GREASE to the O-ring ① and remount the starter motor. □



SWITCHES

Measure each switch for continuity using a tester. If any abnormality is found, replace the respective switch assemblies with new ones.

LIGHT SWITCH			
	BN/WH	BK	BN

ENGINE STOP SWITCH		
	GN	BK/WH

HAZARD SWITCH			
	LB	GY	OG

START SWITCH		
	BK/WH	YE/RD

DIMMER SWITCH				
	BN/WH	BU	WH	BK

ABS SWITCH		
	BU/GN	BN/RD
ABS		

TURN SIGNAL SWITCH			
	LB	GY	OG
→			
←			

HORN SWITCH		
	LG	GN

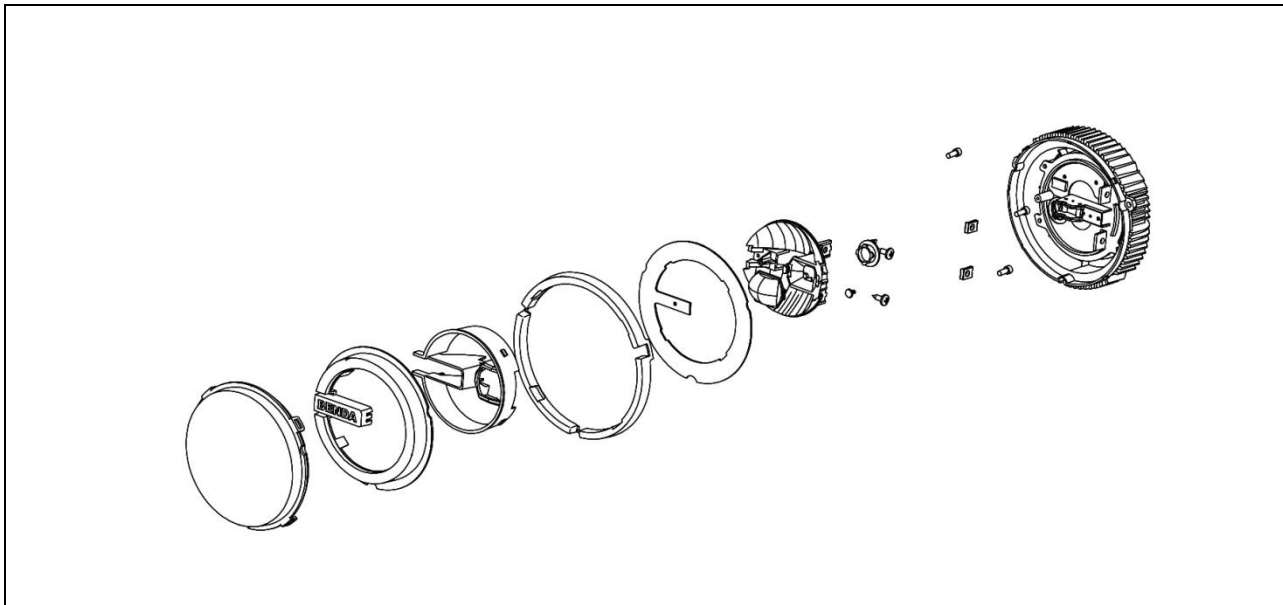
PASS SWITCH				
	BN/WH	BU	WH	BK
PASS				

LAMP

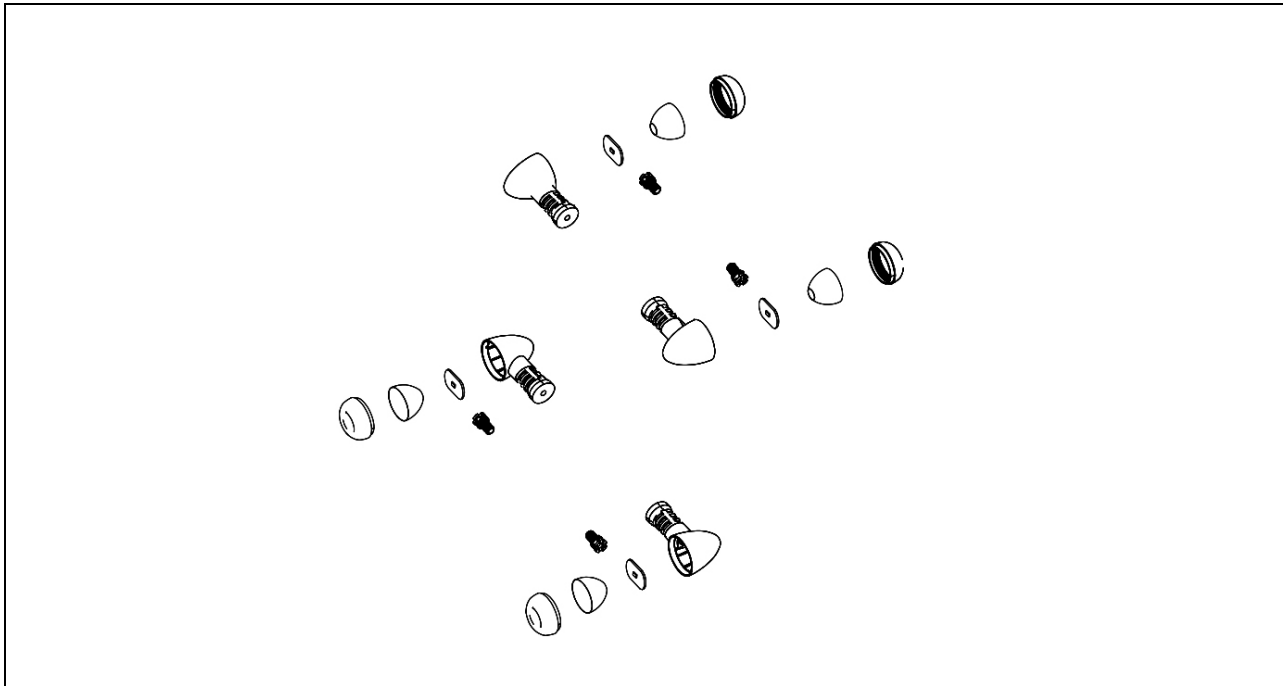
⚠ CAUTION

If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

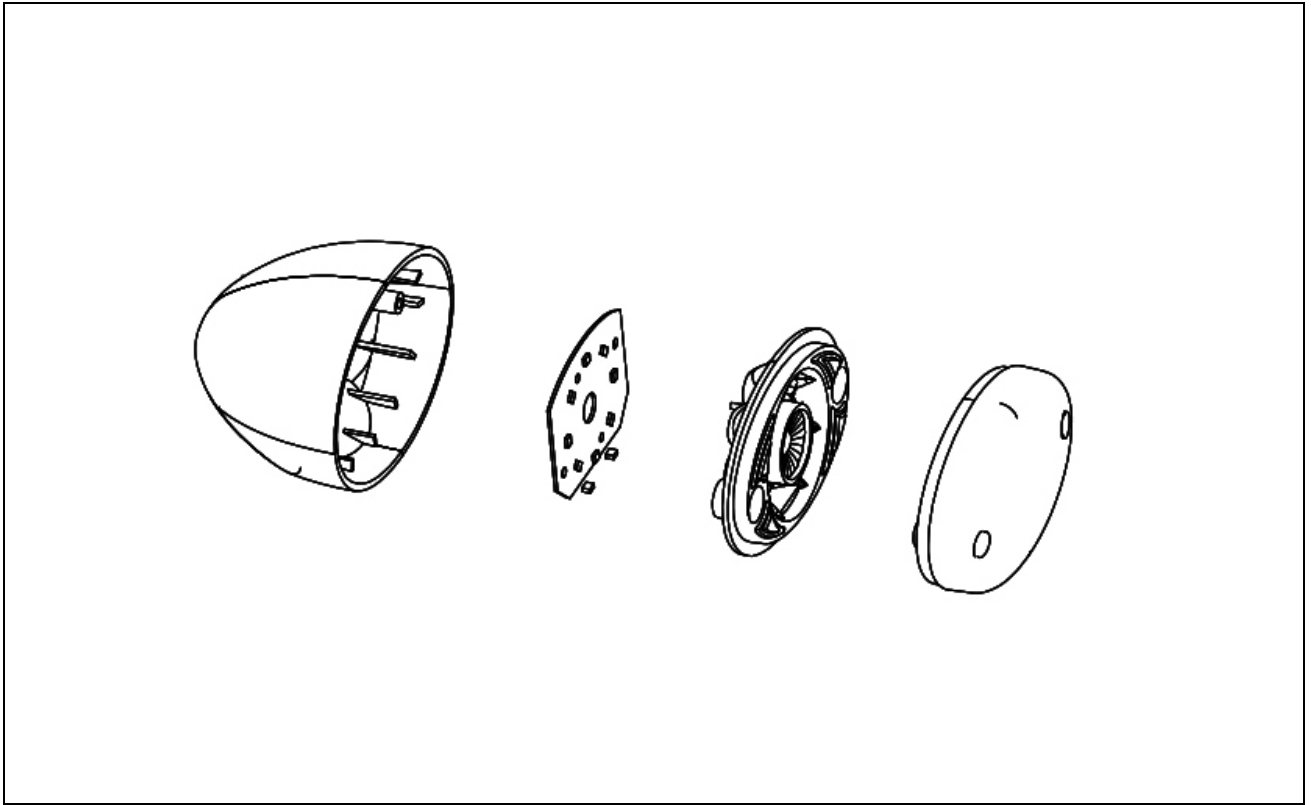
● HEADLAMP



● TURN SIGNAL LAMP



● **TAIL / BRAKE LAMP**



COMBINATION METER

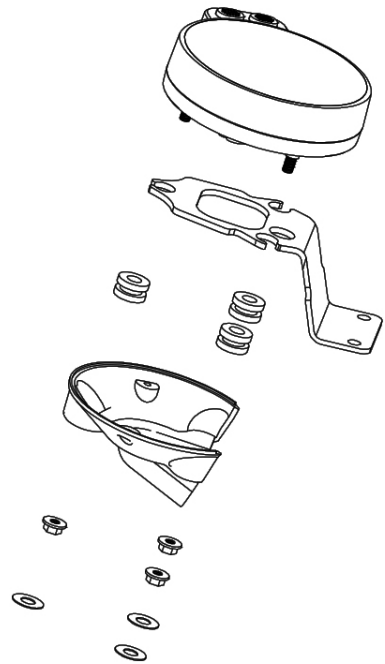
Remove the combination meter.

Disassemble the combination meter as shown in the illustration.

INSPECTION

Using the pocket tester, check the continuity between lead wires in the following illustration.

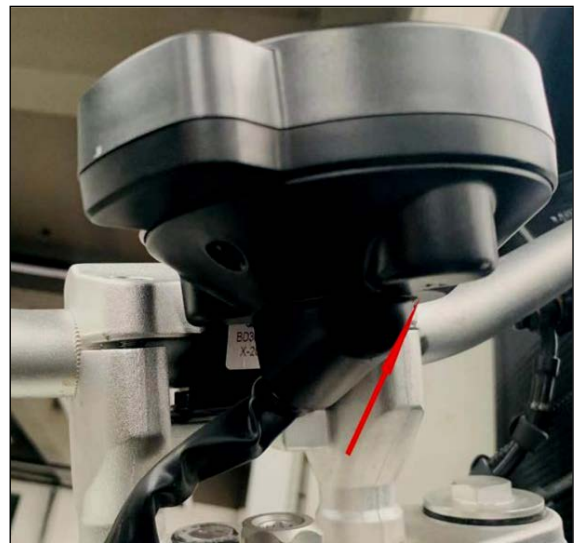
If the continuity measured incorrect, replace the respective part.

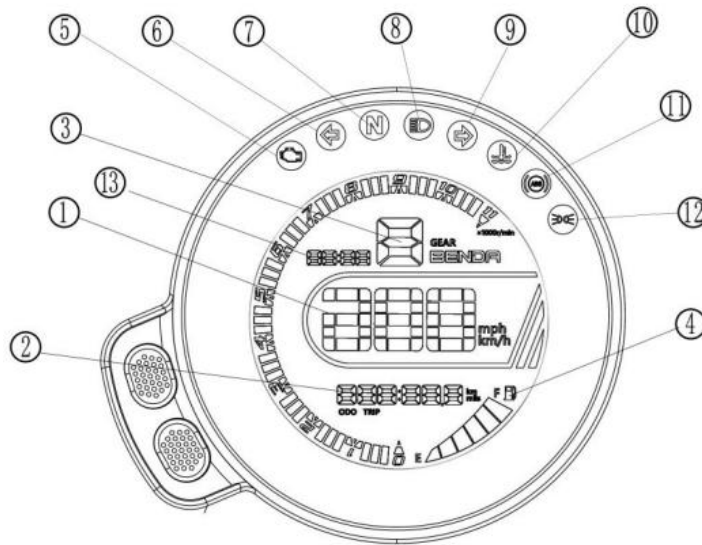


CAUTION

When making this test, it is not necessary to remove the combination meter.

<p>12 well waterproof insert (grey)</p>												<p>Nine hole waterproof insert</p>									
Viewed from the incoming end																					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Function	Normal Electricity	Lock Electricity	Electrospray failure lamp	Left turn	Right turn	distance light	mileage	ABS	Water Temp	oil level	rotate speed	1st gear	2nd gear	3rd gear	4th gear	5th gear	6th gear	Neutral			
Line color	R	B	G	R/W	O	Sb	B	V	Br/V	B/GY	WY/B	Gy/B	L/W	Gy/R	R/L	L/BY	GG/R				
Symbol																					
Color	12V+	12V+	12V-	12V+	12V+	12V+		12V+				LCD 12V-	LCD 12V-	LCD 12V-	LCD 12V-	LCD 12V-	LCD 12V-	12V-G			
Disturbance																					





Please refer to the table for the names and functions of indicator symbols.

Code No.	Title	Function
1	Speed indicator	Instantaneous speed of the vehicle
2	Mileage indication	The total mileage of the vehicle
3	Gear indication	Display the gear position of the engine
4	Fuel quantity indicator	Display the amount of fuel left in the fuel tank
5	EFI failure indicator	After the engine is running, the light goes out, if there is a fault, it will show yellow light and flash
6	Left turn indicator	The front and rear left turn signals are flashing, light up to display green
7	Neutral indicator	Lights up green when in neutral
8	High beam indicator	The high beam light is on, and it lights up to show blue
9	Right turn indicator	The front and rear right turn signals are flashing and light up to display green
10	Water temperature alarm indication	Lights up and displays red: the coolant is overheated, and the cooling system is faulty
11	ABS instructions	Show ABS status
12	Marker light indication	Front position lamp, instrument panel lighting lamp, rear position lamp light up
13	Time indicator	Display current Beijing time

Note: When the upper button is pressed once, the total and subtotal of the mileage will be switched. When in the subtotal state, long-time presses the button to clear the subtotal mileage.

Long press the up button to enter the clock setting mode. At this time, press the up button once to switch the clock to adjust the position. Press the button once to adjust the time.

BATTERY

[Battery model]

Model: MG12ZS-C

Capacity: 12V 11.2Ah

Standard charging: 1A~1.5A×6~8 hours

[Assembly and disassembly battery]

Dismantling:

1. Open the seat cushion lock and remove the seat cushion;
2. Open the battery box cover;
3. Remove the ECU bracket;
4. First remove the negative lead (—);
5. Then remove the positive lead (+);
6. Remove the battery.

installation:

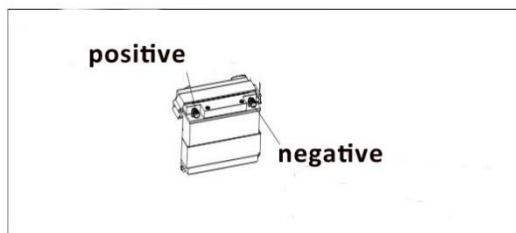
1. The installation sequence is opposite to the removal steps.
2. Install the positive lead (+) first, and then install the negative lead (—), and make sure the positive and negative pole terminal is not loose, and the positive and negative poles cannot be reversed. Reverse connection will damage electrical parts.

[Battery charging]

1. Remove the vehicle seat cushion.
2. Remove the battery tie, remove the positive and negative wires, and take out the battery.
3. Connect the charger wire and ensure that the charging current is 1/10A of the battery capacity. For example, if you charge a battery with a capacity of 10Ah, its charging current is 1 ampere.
4. For detailed instructions on the charger, please contact your dealer.

[Inspection and maintenance of battery]

1. When used frequently, the motorcycle charging system automatically fully charges the battery. If the motorcycle is used occasionally or for a short period of time, the battery power may be insufficient. The battery will self-discharge, and the self-discharge speed will vary with the battery type and ambient temperature.
2. When the motorcycle is not used for a long time, the battery must be removed and stored after charging, and the battery should be charged regularly;
3. The positive (+) and negative (—) terminals of the battery should be cleaned regularly.
4. When replacing batteries, use batteries of the same model and specifications.



 **CAUTION**

Use only the genuine BENDA battery on V250.

◎ BRAKES

The V250 uses disc brakes.

Properly operating the brake systems is vital to safe riding. Be sure to perform the brake inspection requirements as schedules.

The brakes should be inspected at periodic inspection by your authorized BENDA dealer.

WARNING

Failure to properly inspect and maintain your motorcycle brake systems can be hazardous. Improper maintenance of the brakes increases your chances of having an accident. Be sure to inspect the brakes before each use of the motorcycle according to the INSPECTION BEFORE RIDING section. Always maintain your brakes according to the MAINTENANCE SCHEDULE.

WARNING

Operating the motorcycle in harsh condition can be hazardous if you do not inspect brake wear often. Operating in mud, water, sand, or other extreme conditions can cause accelerated brake wear. This could lead to an accident. If you operate your motorcycle under these conditions, the brakes must be inspected more often than recommended in the MAINTENANCE SCHEDULE.

◎ ABS (Anti-lock Brake System)

The ABS unit, which consists of a hydraulic unit, ABS control unit, and return pump, is installed inside the right decoration cover.

A wheel speed sensor is located at the front and rear wheels.

WARNING

- ABS cannot function properly if certain modifications have been made such as shorter or longer suspension travel, other rim diameters, other tires, an incorrect tire air pressure, other brake pads, etc.**
- ABS will only function correctly if the spare parts used in the brake system and the tires have been approved and/or recommended by BENDA.**
- Maintenance work and repairs must be carried out professionally. (Your authorized BENDAworkshop will be glad to help.)**

ABS is a safety system that prevents locking of the wheels when driving straight ahead without the influence of lateral forces.

ABS operates with two independent brake circuits (front and rear brakes).

During normal operation, the brake system operates like a conventional brake system without ABS.

When the ABS control unit detects a locking tendency in a wheel, ABS begins regulating the brake pressure.

The regulating process causes a slight pulsing of the front brake lever and rear brake pedal.

ABS warning lamp will light up after the ignition switch is set to “ON” position and the vehicle has traveled until a speed of 5 km/h (3 mph) for a self-diagnosis test, and will go out after the vehicle has traveled over a speed of 5 km/h (3 mph).

If it does not go out after the vehicle has traveled over a speed of 5 km/h (3 mph) or if it lights up while riding, this indicates a fault in ABS system.

In this case, ABS is no longer enabled and the wheels may lock during braking. The brake system itself stays functional ; only ABS control is not available.

The ABS warning lamp may also light up if the rotating speeds of the front and rear wheels differ greatly under extreme riding conditions, for example when making wheelies or if the rear wheel spins.

This causes ABS to switch off.

To reenale ABS, the vehicle must be stopped and the ignition switch is set to “OFF” position. ABS is reenabled when the vehicle is switched on again. The ABS warning lamp goes out when you start off.



ABS

ABS (Anti-lock Brake System) features a dual electronic control system, which acts on the front and rear brakes independently.

Operate the brakes with ABS as you would conventional brakes.

If the ABS is activated, a pulsating sensation may be felt at the brake lever or brake pedal.

In this situation, continue to apply the brakes and let the ABS work ; do not “pump” the brakes as this will reduce braking effectiveness.

WARNING

Always keep a sufficient distance from the vehicle ahead to match the riding speed even with ABS.

- ABS performs best with long braking distances.**
- On certain surfaces, such as rough or gravel roads, the braking distance may be longer with the ABS than without.**

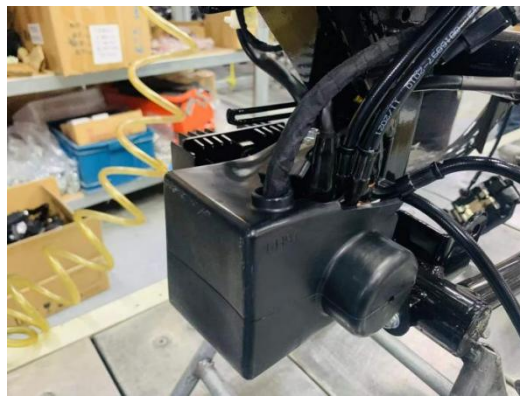
ABS is monitored by an ECU, which will revert the system to conventional braking if a malfunction occurs.

 **CAUTION**

ABS performs a self-diagnosis test each time the vehicle first starts off after the key is turned to “ON” and the vehicle has traveled until a speed of 5 km/h (3 mph) or higher.
During this test, a “clicking” noise can be heard from inside the right decoration cover, and if the brake lever or brake pedal is even slightly applied, a vibration can be felt at the lever and pedal, but these do not indicate a malfunction.

NOTE

Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front and rear wheel's, tone wheels, otherwise the front and rear wheel's tone wheel may become magnetized, resulting in improper performance of ABS system.

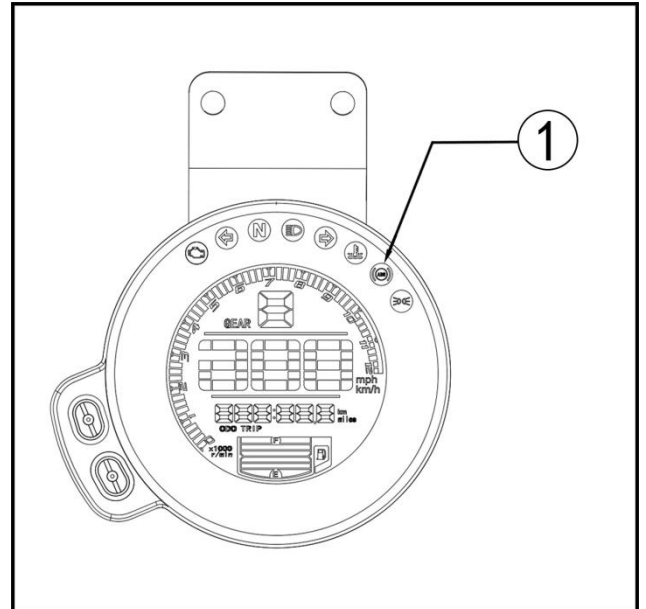


ABS WARNING LAMP

ABS warning lamp will light up after the ignition switch is set to "ON" position and the vehicle has traveled until a speed of 5 km/h (3 mph) for a self-diagnosis test and will go out after the vehicle has traveled over a speed of 5 km/h (3 mph). If ABS system fails, ABS warning lamp lights up and remains lit after the vehicle has traveled over a speed of 5 km/h (3 mph).

CAUTION

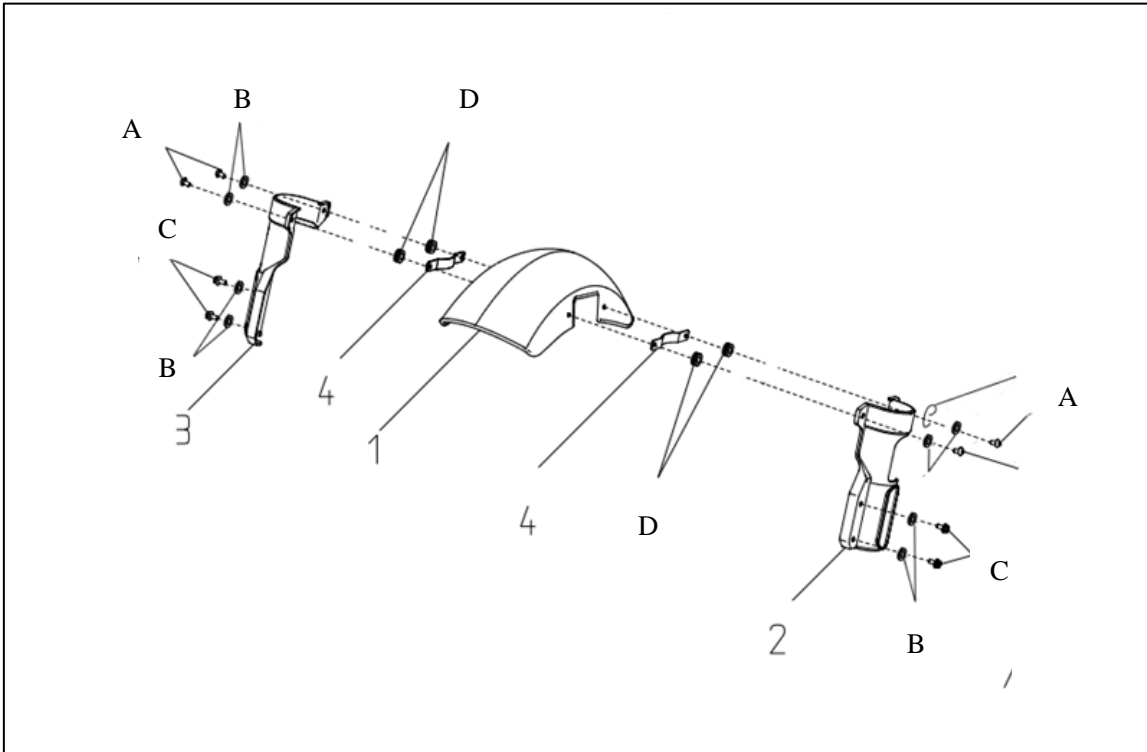
If ABS warning lamp does not light up after the ignition switch is set to "ON" position and the vehicle has traveled until a speed of 5 km/h (3 mph) or fail to go out after the vehicle has traveled over a speed of 5 km/h (3 mph), contact an authorized BENDA dealer.



Disassembly and installation of exterior parts

Disassemble and assemble body cover parts

Remove and assemble front fender and front fender bracket



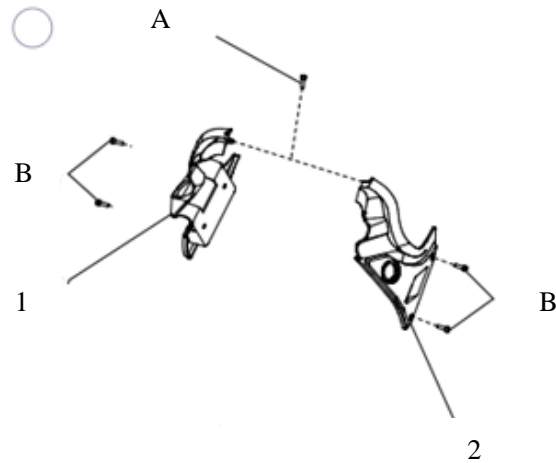
- disassembly

1. Hexagon socket large flat head screw M6x20 (A)
2. Hexagon socket large flat head screw M6x16 (C)
3. Increase the flat pad $\phi 6 \times \phi 15 \times 1$ (B)
4. Front fender right bracket (2) 和 Front fender left bracket (3)
5. I-buffer ring (D)
6. Front mud lining bracket (4)
7. front mudguard (1)

- install

Install the previously removed parts as opposed to the disassembly process.

Remove and install trim cover before fuel tank



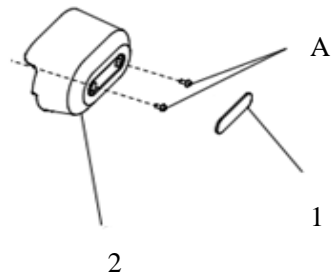
● disassembly

1. Hexagon socket head screws M5*16 (A)
2. Hexagon socket head screws M6×12 (B)
3. Tank front left trim cover (1)
4. Tank front right trim cover (2)

● install

Install the previously removed parts as opposed to the disassembly process.

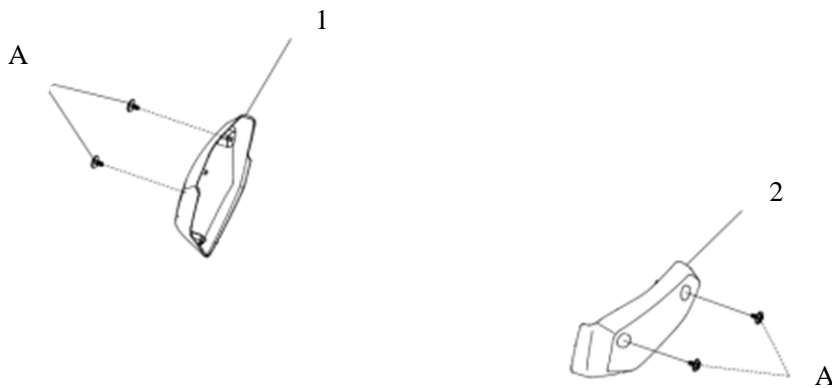
Remove and assemble the thermostat decoration cover



- disassembly
 - 1. Thermostat decorative cover decorative strip (1)
 - 2. Hexagon socket large flat head screw M6x16 (A)
 - 3. Thermostat decoration cover
- install

Install the previously removed parts as opposed to the disassembly process.

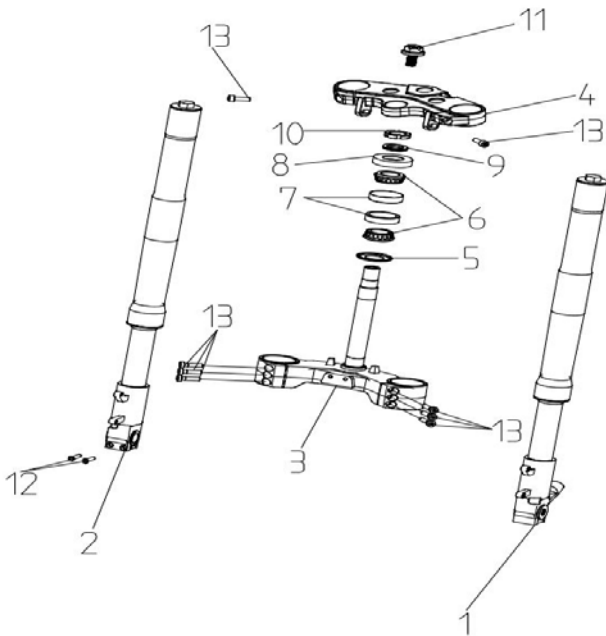
Remove and assemble left and right guard plates



- disassembly
 - 1. Quincunx aluminum bolt M10x1.5 (A)
 - 2. left guard plate (1)
 - 3. right guard plate (2)
- install

Install the previously removed parts as opposed to the disassembly process.

Disassembly before suspension



- disassembly

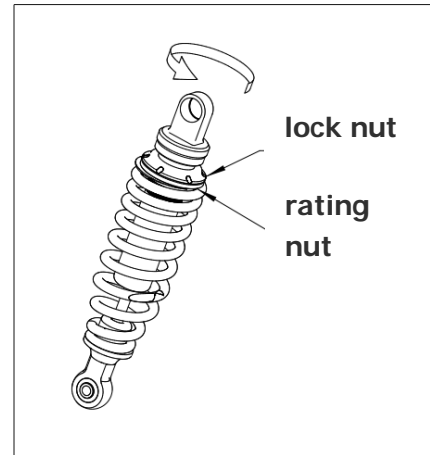
1. Clamping bolts for upper plate (11)
2. Hexagon socket Head screws M8×30 (13)
3. Hexagon socket head screw M6x30 (12)
4. Front left shock absorber (1)
5. Front right shock absorber (2)
6. Top allied board (4)
7. Bearing lock nut M25X1 (10)
8. Dust cover bracket (9)
9. Dust cover (8)
10. Tapered Needle Roller Bearing (Bearing) (320/28x) (6)
11. Needle Roller cone bearing (steel bowl) (320, 28Y) (7)
12. Dust ring (5)

- install

Install the previously removed parts as opposed to the disassembly process.

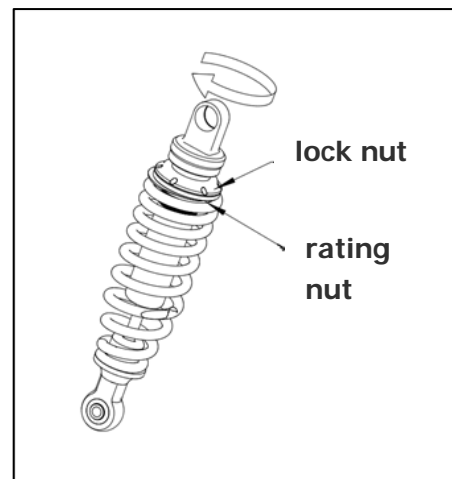
[Damping adjustable soft]

- 1: Loosen lock nut on top of shock absorption.
- 2: Turn the adjusting nut counterclockwise. Adjust the stiffness of shock absorption to a suitable degree.
- 3: Tighten the lock nut.



[Damping adjustable hard]

- 1: Loosen lock nut on top of shock absorption.
- 2: Turn the adjusting nut clockwise. Adjust the stiffness of shock absorption to a suitable degree.
- 3: Tighten the lock nut.



Maintenance

Maintenance times Maintenance item	Maintenance period	Odometer km (remark ②)				
		1000km	4000km	8000km	12000km	remark
★tank,tubing		Damage and aging should be repaired or replaced in time				Before use
★throttle		I	I	I	I	Before use
★Coolant		Replace every 2 years				Inspection before use
Air filter element	Remarks ①	Every 40 hours driving or 1000km/l; every 80 hours driving or 2000km/C; every 8000km/R driving				
Spark plug		Every 2000km or 80 hours/l; every 8000km/R				
Engine lubricating oil		Replace once when a new car is 1000km, and then every 4000km or so.				
Lubricating oil filter		Replace once when a new car is 1000km, and then every 4000km or so.				
Chain\sprocket	Remarks ① I and L are carried out every 500km	Remarks ① I and L are carried out every 500km				
★Brake friction plate	I and R if necessary every 1000km	I and R if necessary every 1000km				
★★Brake oil		Replace every 2 years				
★★Front and rear brake system	Remark ③	I	I	I	I	before use
★Switch		I	I	I	I	before use
★Lights, speakers		I	I	I	I	before use
★Battery	per month	I	I	I	I	
fuse		I	I	I	I	
Connection line		I	I	I	I	
★★Valve clearance	Remark ③	Initially: 20 hours or 200km/l; every 4000km or 80 hours/l				
★Clutch		Every 4000km or 80 hours/l				before use
★Suspension system		I	I	I	I	
★ Fastening of nuts and bolts		I	I	I	I	before use
★wheel		I	I	I	I	before use
★★Steering handle bearing	Remark ③	I	I	I	I	
★★Engine maintenance	Remark ③	I	I	I	I	

The symbols in the above table are: "I" timely inspection, cleaning, adjustment, lubrication or replacement; "C" cleaning; "R" replacement; "L" lubrication.

None★The item is maintained by you, or you can go to the designated dealership store for maintenance.

One ★ item is maintained by the personnel of the designated dealership; if you have special tools, repair spare parts or repair capabilities, you can also repair and maintain it yourself.

For the two ★★ projects, for the sake of driving safety, maintenance can only be carried out by the personnel of the designated dealership.

Remark ① means: when driving in dusty areas, the cleaning cycle should be shortened.

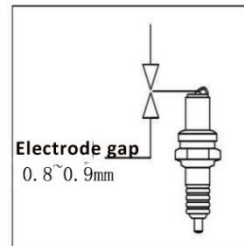
Remark ② means: when the odometer reading exceeds the highest number in the table, the maintenance and repair cycle will still be repeated according to the mileage specified in the table.

Remark ③ means: Only the personnel of designated dealership can carry out maintenance and adjustment.

Selection and replacement of spark plugs

Spark plug model: CR8E

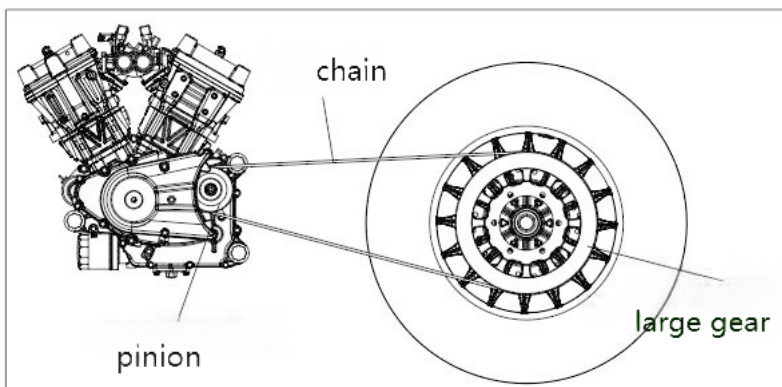
Opposite side of spark plug sleeve: 16mm



[Check and Replace]

1. The replacement cycle of the spark plug is: once every 8000 km.
2. Remove the spark plug cap, remove the surrounding dirt, use the spark plug socket wrench in the tool bag to remove the spark plug, and use a wire brush to remove the carbon deposits and dirt on the spark plug.
3. Check whether the spark plug is damaged, whether the electrode gap is ablated, and whether the gasket is intact; if it is damaged, it should be replaced.
4. Check the electrode gap with a high-precision feeler gauge, the normal electrode gap is 0.8 ~ 0.9mm.
5. When installing the spark plug: first screw the spark plug into the thread by hand, and then tighten it with a spark plug socket wrench.

chain



chain model: STD1816

[Check]

Before every ride, check whether the chain drive system is working properly. If you notice any defect or damage, you must check and repair it immediately, and replace the parts of the transmission system if necessary, and the parts can only be obtained from a qualified dealer. Your dealer can recognize any signs of wear and can replace parts that are needed if necessary. Therefore, if necessary, bring the vehicle to the dealer for testing.

[Adjustment]

The chain installation tension needs to be detected with professional tools. If you need to detect or adjust the chain tension, please go to the vehicle dealer. Do not adjust it yourself.

Portable drive chain tension gauge code:P0821M00-890120 70±2HZ

Sonic drive chain tension gauge code:P0821M00-890130 76±2HZ

[replace]

1. Remove the big sprocket and small sprocket with tools;
2. Install the large pulley, small pulley, and transmission chain in the reverse order of disassembly and adjust the swing of the chain;

3. Pay attention to the chain installation and debugging process:

If the chain is operated incorrectly, the tension cord may be broken.

This will cause the chain to lose tensile strength and tear, and there is a danger of failure!

● Avoid kinking, bending, twisting, knotting or turning over the chain, and never use it as a chainwhip.

● Do not lift the chain with the sprocket during installation.

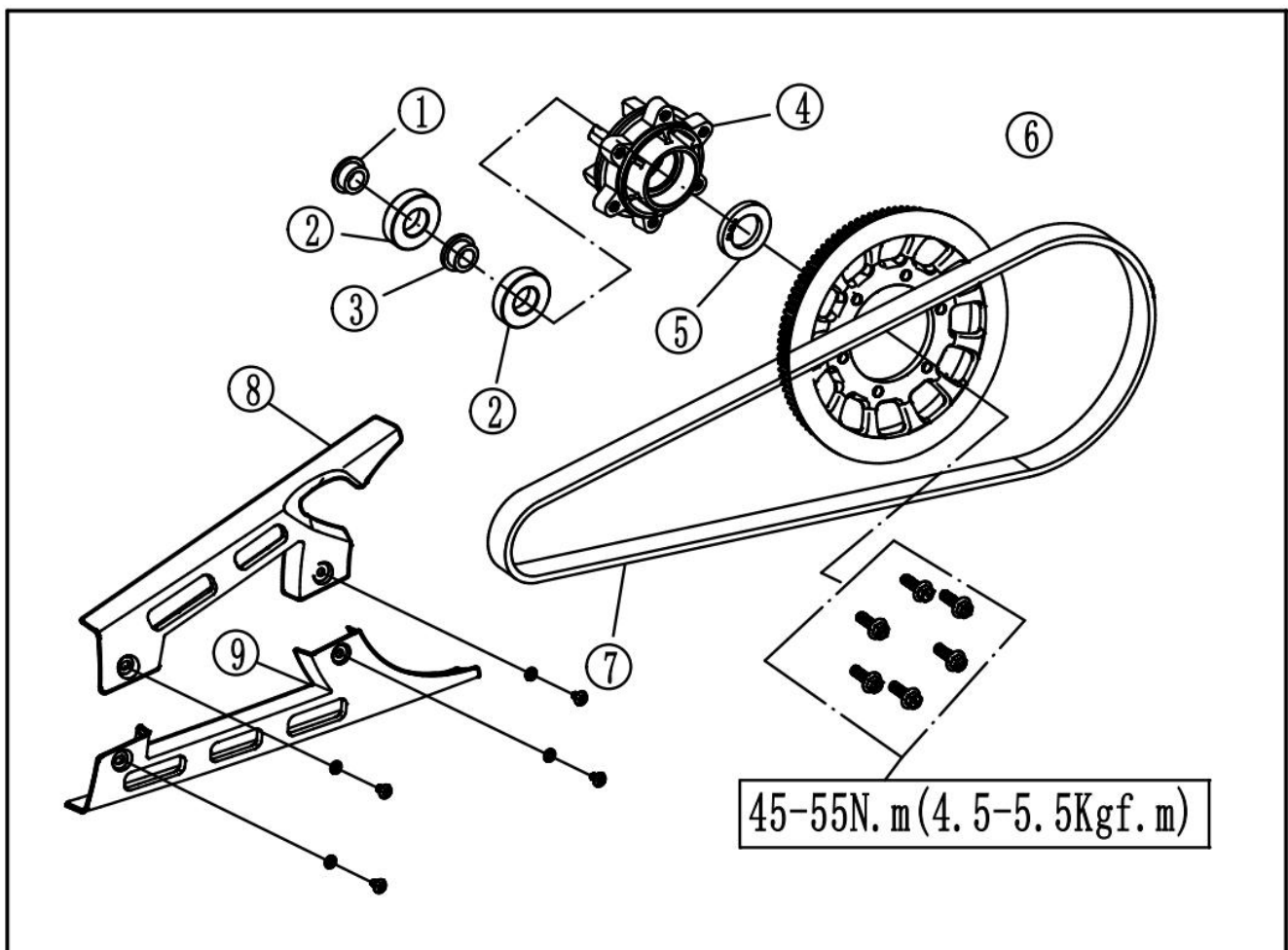
● Do not use (sharp-edged) tools to tamper with the chain.

● Do not oil or lubricate the chain.

● Do not try to open or repair the chain

Drive chain

1	Spacer 2	6	Large pulley
2	Deep groove ball bearing	7	Drive chain
3	Spacer 1	8	Upper chaincover
4	Pulley seat	9	Lower chaincover
5	Oil seal		



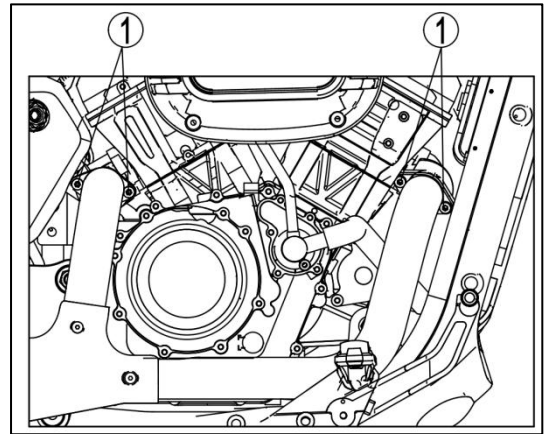
Warning

Park the motorcycle on a flat surface.
Place the motorcycle on its center stand.

1. Removal

Two flange bolts ① on the muffler

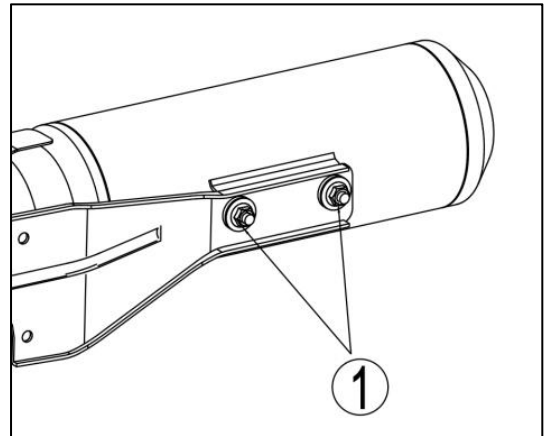
Tool: 6 mm hex socket



2. Removal

Rear mounting nut ① of muffler

Tool: 13 mm wrench

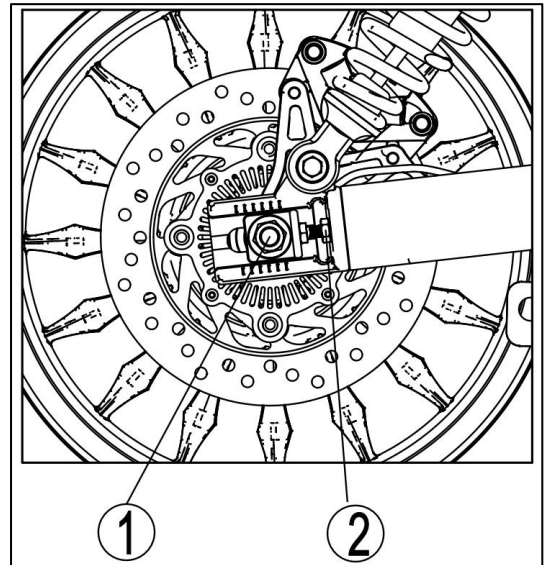


3. Removal

Loosen the rear axle nut ①

Loosen the chainadjustment nuts ② on both sides

Tools: 21 mm hex socket, 13 mm open-end wrench



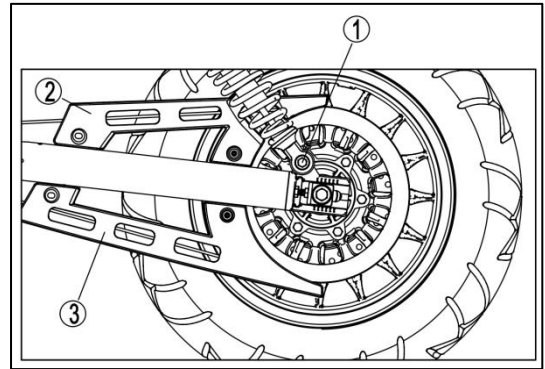
4. Removal

Lower mounting bolt of the left rear shock absorber ①

Upper chain cover ②

Lower chain cover ③

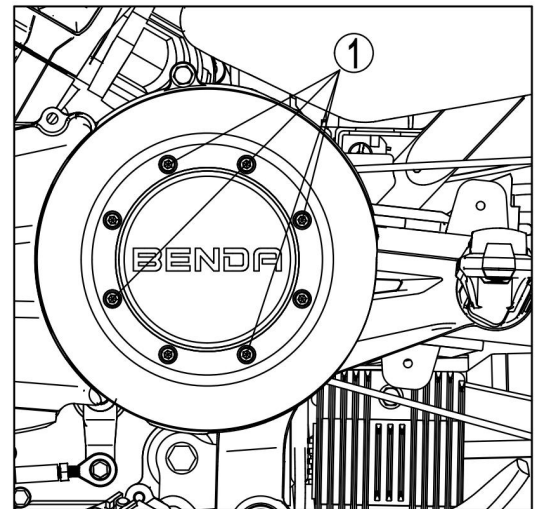
Tools: 15 mm hex socket, 5 mm hex socket



5. Removal

Decorative cover mounting bolt of the small pulley ①

Tool: 5 mm hex socket

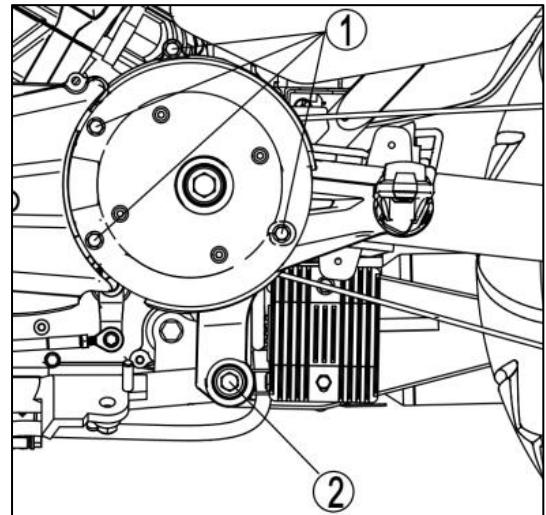


6. Removal

Mounting bolts of the small pulley bracket ①

Lower mounting bolt of the left rear footrest ②

Tools: 10 mm and 15 mm hex sockets



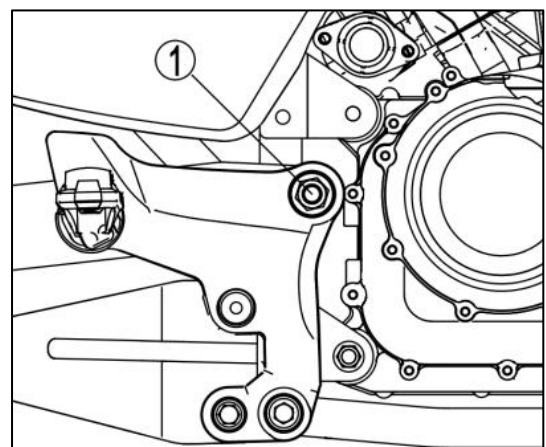
7. Removal

Loosen the rear swingarm axle nut ①

Rotate the left rear footrest bracket to create space for removing the chain.

Remove the drive chain.

Tools: 21 mm and 14 mm hex sockets



Drive chain inspection

1. Safety Usage Warnings

Each time before riding, check if the chaindrive system is functioning properly. If any abnormalities or damage are noticed, carefully inspect and repair the system. If necessary, consult a qualified retailer for the replacement of drive system components and obtain the corresponding technical and after-sales support.

Carefully read the precautions in the user manual to avoid damaging the chaindrive system. To ensure safe use, avoid the following improper usage:

Damage caused to the chain by human error

Using the system in races, stunts, or tricks

Chain failure due to wheel lockup

Improper repairs or maintenance

External interference or structural changes

Any incorrect operation or improper use can lead to early chain failure and termination of warranty.

2. chain Installation and Usage Precautions

The chain must be installed with the recommended tension value (65-70Hz).

The drive chain should be placed on or removed from the wheel system in its natural state. Do not use any tools to pry the chain or apply excessive force during installation, as this can damage the chain's strength, leading to premature failure.

Parallel alignment is particularly important when installing the synchronous chain.

Ensure the maximum misalignment does not exceed 0.25° .

Proper alignment is also crucial. The maximum misalignment should not exceed 0.5% of the wheel system's center distance.

The following are strictly prohibited:

Torsion of the teeth

Bending of the back surface

Twisting or flipping

Tying the chain

Applying lubricating oil to the teeth

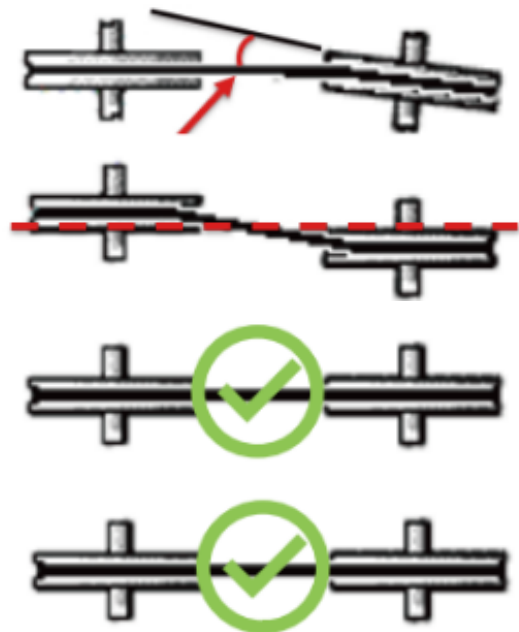
Using the chain to remove pulleys

Using pry bars to install the chain

3. chain Maintenance Precautions

Check the chain tension at fixed intervals. If it is below the lower limit the chain should be retensioned, and the tensioning bolts should be inspected for any abnormalities.

If the chain drifts off-track or shows signs of edge wear, check for






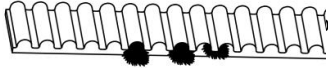

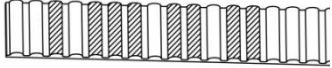

alignment issues and adjust the chain alignment as needed.

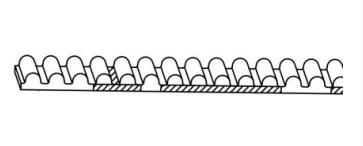
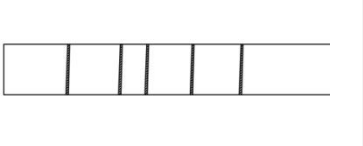
After riding in harsh conditions, inspect the drive system. If dirt or debris has accumulated, wash it off with clean water before riding again.

If foreign objects cause abnormal chain damage, replace the chain promptly and check for pulley damage.

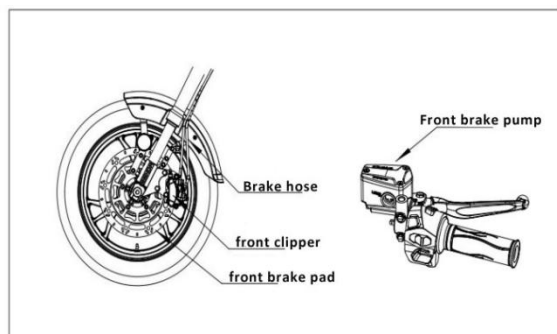
Replace the pulley if damaged.

4.Common issues and solutions for daily use of the chain

Common issues	Illustrative images	Possible causes	Solutions
Tooth shearing		Improper operation Out of service life	Replace with a new chain, use the chain properly Replace with a new chain
chain regular break		chain excessively bent before or during installation Foreign objects entering the drive system Pulley diameter too small Installation tension too low	1. Replace with a new chain and install correctly 2. Remove foreign objects and replace with a new chain 3. Choose the appropriate pulley and replace with a new chain 4. Replace with a new chain and set the correct tension
chain irregular break		System impact load too high Exceeding the service life of the rope	1. Inspect the drive system and replace with a wider or stronger chain 2. Replace with a new chain
Tooth damage on one side of the chain		1. Drive system alignment abnormality	1. Check the drive system alignment and replace with a new chain
chain tooth surface scratches		Foreign objects in the drive system Abnormal pulley surface	1. Remove foreign objects and replace with a new chain 2. Check the pulley surface condition, and replace with a new pulley and chain
chain canvas wear		Foreign objects in the drive system Installation tension too high Abnormal pulley surface chain and pulley mismatch	1. Remove foreign objects and replace with a new chain 2. Replace with a new chain and set the correct tension 3. Check the pulley surface condition, and replace with a new pulley and chain 4. Replace with a pulley and chain that match the tooth profile
Localized chain damage		1. Foreign objects entering the drive system	1. Remove foreign objects and replace with a new chain

chainside wear		Drive system alignment abnormality Pulley edge defects	1.Check the drive system alignment and replace with a new chain 2.Replace with a new pulley and chain
chainback surface cracking		Environmental temperature too high or too low chainaging	1.Check the working environment and replace with a new chain 2.Replace with a new chain

Inspection and adjustment of the front brake



[Check]

- Measure the free stroke of the front brake handle: 5~10mm.
- Measure the thickness of the front brake disc and brake friction lining
- Check the oil level in the oil cup; check whether the brake caliper is normal; check the brake oil pipe ; there is no oil leakage or cracks in the brake oil cup; check the wear of the brake disc.
- When operating the brake handle, if you feel that the handle pressure is

insufficient, then there is air in the brake system; the air in the brake system should be completely discharged before normal use; otherwise it will reduce the braking performance or brake failure. This work should be completed at the designated dealership.

⚠Warning:

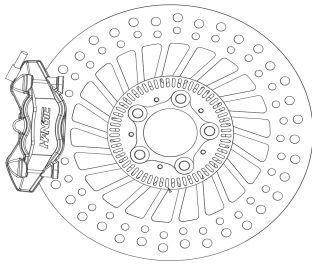
1. It should be added: non-petroleum-based brake oil of DOT3 or DOT4; different brands cannot be mixed;
2. Brake oil is highly corrosive, do not splash on the surface of painted or plastic parts; if you drink it by mistake, you should force it to spit out; if it gets on your eyes or skin, you should rinse it with plenty of water immediately and consult a doctor;
3. Hydraulic disc brakes work under high pressure. In order to ensure safety and reliability, the replacement time of brake friction pads and brake oil should not exceed the maintenance period;
4. When the hydraulic disc brake system needs to be repaired, it can only be repaired by professional technicians.

⚠Note:

The brake is an extremely important component to ensure the personal safety of the rider, and the brake should be checked and adjusted frequently.

Replace with a new brake disc or brake friction pad, and do not drive immediately; you should first manipulate (hold and release) the front brake handle several times until the brake disc and the brake caliper mesh well.

Check the front brake disc



The brake disc will gradually wear out during long-term use, so it is necessary to check the thickness of the brake disc at multiple positions of the brake disc. And check its appearance to confirm whether the brake disc is damaged, cracked or deformed.

If the thickness of the brake disc is lower than the specified value: please replace the brake disc.

If the brake disc is damaged, cracked or deformed: please replace the brake disc

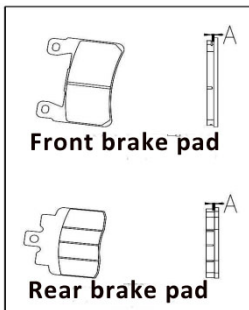
Brake disc wear limit	
Front	3mm
Rear	3mm

⚠Warning:

The wear of the brake disc will reduce the thickness of the brake disc within the contact surface of the brake friction lining, which will reduce the braking effect and threaten your driving safety. Once damage, cracks, or deformation occur, please replace the brake disc immediately .

When the brake disc is worn to the limit thickness of 3mm, it must be replaced; remove the front brake caliper and front wheel, and then replace the brake disc.

Check the brake pads of the front brake



Check the minimum thickness of the brake pads (A).

The minimum thickness of the brake friction pad: $A=1.5\text{mm}$.

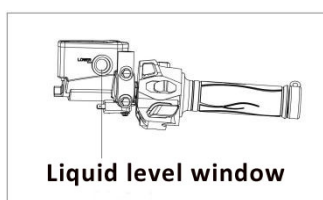
If the thickness is lower than the minimum thickness: please replace the friction plate in time.

If the friction plate is found to be damaged or cracked: please replace the friction plate in time.

⚠Note:

The friction lining will gradually wear out during the braking process of the vehicle. The braking effect will gradually decrease. To ensure the safety of you and the vehicle, please check it frequently and replace it in time. If you do not understand the specifications of the friction plate or cannot replace it by yourself, please go to the designated after-sales point for repair.

Check the brake fluid level of the front brake system



Adjust the placement posture of the vehicle so that the brake fluid in the brake fluid is in a horizontal position, and check the brake fluid level through the fluid level window.

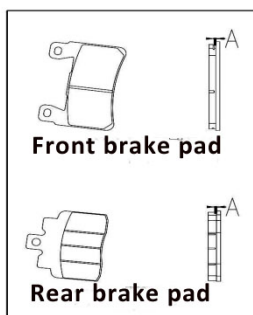
When the brake fluid level is below the scale line: please replenish the brake fluid in time.

⚠Warning:

The wear of the brake disc will reduce the thickness of the brake disc within the contact surface of the brake friction lining, which will reduce the braking effect and threaten your driving safety. Once damage, cracks, or deformation occur, please replace the brake disc immediately

When the brake disc is worn to the limit thickness of 3mm, it must be replaced; remove the rear brake caliper and rear wheel, and then replace the brake disc.

Check the brake pads of the rear brake



Check the minimum thickness of the brake pads (A).

The minimum thickness of the brake friction pad: A=1.5mm.

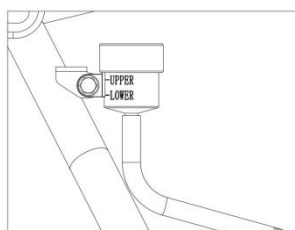
If the thickness is lower than the minimum thickness: please replace the friction plate in time.

If the friction plate is found to be damaged or cracked: please replace the friction plate in time

⚠Note:

The friction lining will gradually wear out during the braking process of the vehicle. The braking effect will gradually decrease. To ensure the safety of you and the vehicle, please check it frequently and replace it in time. If you do not understand the specifications of the friction plate or cannot replace it by yourself, please go to the designated after-sales point for repair.

Check the brake fluid level of the rear brake system



Adjust the placement posture of the vehicle so that the brake fluid in the brake fluid is in a horizontal position, and check the brake fluid level through the fluid level window.

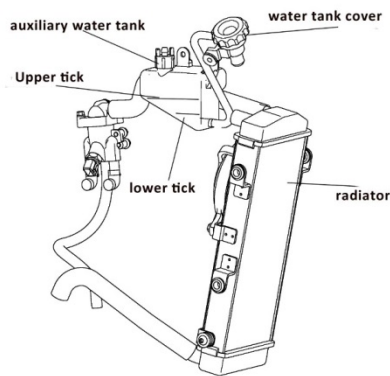
When the brake fluid level is below the scale line: please replenish the brake fluid in time.

⚠Warning:

If the brake fluid level is lower than the scale line, it means that the brake system is not sealed, or the brake friction lining has been completely worn. Check the braking system and do not continue driving. Please go to designated after-sales point for repairs.

If the brake fluid is used for too long, the braking effect will be reduced. Please replace the brake fluid in time.

Cooling System



The cooling system can prevent the engine from overheating, and the correct use and maintenance of the cooling system can extend the service life of the engine.

The radiator is located in the front of the engine. According to the road conditions you are driving, the radiator should be regularly cleaned of dust and dirt. ◦

[Coolant Type]

Coolant has five characteristics of anti-corrosion, anti-cavitation, high boiling point, anti-scaling and anti-freezing.

The coolant is generally mixed with concentrated antifreeze and soft water (pure water or distilled water) in an appropriate ratio. Please adjust it to a fixed concentration that is suitable for the local minimum temperature. Generally, when it is adjusted to a concentration of 40% to 50%, the antifreeze function is the best.

It is recommended that you use the direct coolant specially designed for aluminum alloy engines. This coolant has been prepared in the factory and contains antifreeze, rust inhibitor, foam inhibitor and trace silicate, etc., and the use is indicated on the container Ambient temperature.

⚠Note:

1. This coolant is a special coolant and cannot be replaced with tap water or other liquids, otherwise it may cause damage to the engine.
2. Please go to the designated dealership to purchase direct type coolant exclusively for aluminum alloy engines.
3. If the coolant needs to be replaced or coolant leakage occurs, please go to the designated dealership for replacement and maintenance.

[Check coolant capacity]

The total amount of coolant in the cooling system is about 4000ml

1. Park the motorcycle on a flat ground with a single support.
2. Check the coolant level when the engine is cooling. The coolant level should be between the upper and lower scale lines.

[Add a small amount of coolant]

If the coolant in the auxiliary water tank is at or below the lower mark, please add special coolant to the upper mark in time.



[How to add]

1. Park the motorcycle with a single support on a flat ground and wait for the engine to cool; otherwise the heat may cause burns to the skin;
2. Unscrew the water tank cover;
3. Pour the cooling liquid from the mouth of the water tank, and add the cooling liquid to the position of the upper scale line;
4. Close the water tank cover.

[Storage of Coolant]

1. When the coolant is not in use, it should be stored in a special sealed container.
2. It should be placed in a cool and dry place. The coolant is a toxic liquid and must be kept away from children.
3. Note that the coolant should be strictly prevented from being contaminated by petroleum products, and it is not allowed to mix or store two different brands of coolant.

Danger:

- 1. Ethylene glycol antifreeze is an organic solvent, which is toxic and corrosive. Do not spill on the surface of rubber products and painted parts during use, let alone contact with human skin. If accidentally splashed on the surface of rubber products, painted parts or human body, immediately rinse with water.**
- 2. When servicing the engine, if you need to loosen the cylinder nut, please drain the coolant first to prevent the coolant from entering the crankcase.**
- 3. Since the boiling point of antifreeze is higher than pure water, the radiator cover must not be opened when the engine is running normally or the temperature does not drop (60°C) after stopping to avoid burns.**

TROUBLE SHOOTING

⊙ MALFUNCTION CODE AND DEFECTIVE CONDITION

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
noEr	NO FAULT		—
P0031	NO.1 O ₂ Sheater Circuit	Low Voltage	After engine running, if oxygen sensor heater signal open or is happened the ground short fault for 1 second by 10 times in 12 times test cycle, the code 0031 is indicated. Oxygen sensor, lead wire / coupler connection.
		High Voltage	After engine running, if oxygen sensor heater signal is happened the high short fault for 1 second by 10 times in 12 times test cycle, the code 0032 is indicated. Oxygen sensor, lead wire / coupler connection.
P0037	NO.2 O ₂ Sheater Circuit	Low Voltage	After engine running, if oxygen sensor heater signal open or is happened the ground short fault for 1 second by 10 times in 12 times test cycle, the code 0037 is indicated. Oxygen sensor, lead wire / coupler connection.
		High Voltage	After engine running, if oxygen sensor heater signal is happened the high short fault for 1 second by 10 times in 12 times test cycle, the code 0038 is indicated. Oxygen sensor, lead wire / coupler connection. .
P0107	IAP&TS (Temperature function) Circuit	Low Voltage or Open	The sensor should produce following voltage. 0.15 V ≤ Sensor output voltage Without the above range for 2.2 sec. and more, 0107 is indicated. Intake air pressure sensor, lead wire / coupler connection.
		High Voltage	The sensor should produce following voltage. Sensor output voltage ≤ 5 V Without the above range for 10.0 sec. and more, 0108 is indicated. Intake air pressure sensor, lead wire / coupler connection.
P0112	IAP&TS (Temperature function) Circuit	Low Voltage	The sensor voltage should be the following. 0.1 V ≤ Sensor output voltage Without the above range for 6.25 sec. and more, 0112 is indicated. Intake air temperature sensor, lead wire / coupler connection.
		High Voltage or Open	The sensor voltage should be the following. Sensor output voltage ≤ 4.9V Without the above range for 6.25 sec. and more, 0113 is indicated. Intake air temperature sensor, lead wire / coupler connection.

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0117	WTS Circuit	Low Voltage	The sensor voltage should be the following. 0.1 V ≤ Sensor output voltage Without the above range for 6.25 sec. and more, 0117 is indicated.
			Water temperature sensor, lead wire / coupler connection.
P0118		High Voltage or Open	The sensor voltage should be the following. Sensor output voltage ≤ 5V Without the above range for 6.25 sec. and more, 0118 is indicated.
			Water temperature sensor, lead wire / coupler connection.
P0122	TPS Circuit	Low Voltage or Open	The sensor should produce following voltage. 0.2 V ≤ Sensor output voltage Without the above range for 7.8 sec. and more, 0122 is indicated.
			Throttle position sensor, lead wire / coupler connection.
P0123		High Voltage	The sensor should produce following voltage. Sensor output voltage ≤ 4.9 V Without the above range for 7.8 sec. and more, 0123 is indicated.
			Throttle position sensor, lead wire / coupler connection.
P0131	NO.1 O ₂ Circuit	Low Voltage	After engine running, the oxygen sensor signal is inputted in ECU since then 300 sec. In this case, the sensor voltage should be the following. 30 mV ≤ Sensor output voltage Without the above range for 28.1 sec. and more, 0131 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0132		High Voltage	After engine running, the oxygen sensor signal is inputted in ECU since then 300 sec. In this case, the sensor voltage should be the following. Sensor output voltage ≤ 1.0V Without the above range for 29.4 sec. and more, 0132 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0137	NO.2 O ₂ Circuit	Low Voltage	After engine running, the oxygen sensor signal is inputted in ECU since then 300 sec. In this case, the sensor voltage should be the following. 30 mV ≤ Sensor output voltage Without the above range for 28.1 sec. and more, 0137 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0138		High Voltage	After engine running, the oxygen sensor signal is inputted in ECU since then 300 sec. In this case, the sensor voltage should be the following. Sensor output voltage ≤ 1.0V Without the above range for 29.4 sec. and more, 0138 is indicated.
			Oxygen sensor, lead wire / coupler connection.

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0171	Fuel Injection	Injection Fuel Shortage	After engine running, rate of fuel calibration remains less than standard value (0.7) for 10 sec. and more, the code P0171 is indicated.
			ECU, O2 sensor, Fuel pump, Fuel hose line
P0172	Circuit Malfunction	Injection Fuel Excess	After engine running, rate of fuel calibration remains less than standard value (01.3) for 10 sec. and more, the code P0172 is indicated.
			ECU, O2 sensor, Fuel pump, Fuel hose line
P0201	NO.1 Fuel Injector Circuit Malfunction		After engine running, if NO.1 fuel injector signal open or is happened the high / ground short fault for 1 second by 5 times in 10 times test cycle, the code 0201 is indicated.
			Injector, wiring / coupler connection, power supply to the injector.
P0202	NO.2 Fuel Injector Circuit Malfunction		After engine running, if NO.2 fuel injector signal open or is happened the high / ground short fault for 1second by 5 times in 10 times test cycle, the code 0202 is indicated.
			Injector, wiring / coupler connection, power supply to the injector.
P0230	Fuel pump relay Circuit	Low Voltage or Open	After engine running, if fuel pump relay signal open or is happened the ground short fault for 1 second by 10 times in 20 times test cycle, the code 0230 is indicated.
			Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injector.
P0232	Fuel pump relay Circuit	High Voltage	After engine running, if fuel pump relay signal is happened the high short fault for 1 second by 10 times in 20 times test cycle, the code 0232 is indicated.
			Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injector.
P0336	Pick-up coil	Noisy Signal	After engine running, if the magneto rotor tooth's error is happenedcontinuouslyby10timesin100timestestcycle,the code 0336 is indicated.
			Pick-up coil wiring and mechanical parts.(Pick-up coil lead wire coupler connection)
P0337	Pick-up coil	No Signal	After engine running, if the pick-up coil signal does not reach ECU for more than 0.5 sec., the code 0337 is indicated.
			Pick-up coil wiring and mechanical parts. (Pick-up coil, lead wire coupler connection)
P0351	NO.1 IG coil Malfunction		After engine running, if NO.1 ignition coil signal open or is happened the high / ground short fault for 1 second by 5 times in 10 times test cycle, the code 0351 is indicated.
			Ignition coil, wiring / coupler connection, power supply from the battery.
P0352	NO.2 IG coil Malfunction		After engine running, if NO.2 ignition coil signal open or is happened the high / ground short fault for 1 second by 5 times in 10 times test cycle, the code 0352 is indicated.
			Ignition coil, wiring / coupler connection, power supply from the battery.

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0500	Speed sensor Malfunction		Motorcycle speed < 10km/h Water temperature < 20°C IAP&TS pressure > 40kpa 20% < TPS open angle < 100% 2,000rpm < Engine speed < 6,000rpm If the above conditions are maintained for 32.5sec. and more, The code P0500 is indicated
			Speedo sensor, wiring/coupler connection to ECU
P0505	ISC Error		After engine running, if idle speed is different to 500 rpm from the specified range in 25 seconds test cycle, the code 0505 is indicated.
			Idle speed control solenoid, wiring / coupler connection.
P0562	Battery Voltage	Low	The battery voltage should be the following following 9 V ≤ Battery voltage Without the above range for 3.125sec. and more, 0562 is indicated.
		Battery, wiring / coupler connection to ECU.	
P0563	Battery Voltage	High	The battery voltage should be the following. Battery voltage ≤ 16V Without the above range for 3.125 sec. and more, 0563 is indicated.
		Battery, wiring / coupler connection to ECU.	
P0601	ECU Fault ECU		When ML on The ECU will check malfunction code, if there's ECU error the code P0601 is indicated.
			The fuel injection will be cut off Accordingly ECU
P0650	Engine warning lamp Circuit Malfunction		After engine running, if "FI" check lamp signal open or is happened the high / ground short fault for 1 second by 40 times in 80 times test cycle, the code 0650 is indicated.
			"FI" check lamp, wiring / coupler connection.
P0850	GP or Clutch lever Switch Circuit Malfunction		If gear position or clutch lever switch signal feedback is not active in continuous by 20 times in fully power down cycles, the code 0850 is indicated. (Fully power down cycle : Ignition switch "ON" "OFF" position)
			Gear position or clutch lever switch, wiring / coupler connection, gearshift cam etc.

⊙ ENGINE

Complaint	Symptom and possible causes	Remedy
<p>Engine will not start or is hard to start.</p>	<p>Compression too low</p> <ol style="list-style-type: none"> 1. Tappet clearance out of adjustment. 2. Worn valve guides or poor seating of valves. 3. Mistimed valves. 4. Excessively worn piston rings. 5. Worn-down cylinder bore. 6. Starter motor cranks too slowly. 7. Poor seating of spark plugs. <p>Plug not sparking</p> <ol style="list-style-type: none"> 1. Fouled spark plugs. 2. Wet spark plugs. 3. Defective ignition coils. 4. Open or short in high-tension cord. 5. Defective pick-up coil. 6. Defective ECU. 7. Open-circuited wiring connections. <p>No fuel reaching the intake pipe</p> <ol style="list-style-type: none"> 1. Clogged fuel filter or fuel hose. 2. Defective fuel pump. 3. Defective fuel pressure regulator. 4. Defective fuel injector. 5. Defective fuel pump relay. 6. Defective ECU. 7. Open-circuited wiring connections. <p>Incorrect fuel / air mixture</p> <ol style="list-style-type: none"> 1. Defective fuel pump. 2. Defective fuel pressure regulator. 3. Defective pick-up coil. 4. Defective IAP sensor. 5. Defective ECU. 6. Defective ET sensor. 7. Defective IAT sensor. 8. Defective TP sensor. 	<p>Adjust. Repair or replace. Adjust. Replace Replace See electrical section. Retighten.</p> <p>Clean. Clean and dry. Replace. Replace. Replace. Replace. Repair or replace.</p> <p>Clean or replace. Replace. Replace. Replace. Replace. Replace. Check and repair.</p> <p>Replace. Replace. Replace. Replace. Replace. Replace. Replace. Replace.</p>

Complaint	Symptom and possible causes	Remedy
Noisy engine.	<p>Excessive valve chatter</p> <ol style="list-style-type: none"> 1. Too large tappet clearance. 2. Weakened or broken valve springs. 3. Worn tappet or cam surface. 4. Worn and burnt camshaft journal. <p>Noise seems to come from piston</p> <ol style="list-style-type: none"> 1. Worn down pistons or cylinders. 2. Combustion chambers fouled with carbon. 3. Worn piston pins or piston pin bore. 4. Worn piston rings or ring grooves. <p>Noise seems to come from cam chain</p> <ol style="list-style-type: none"> 1. Stretched chain. 2. Worn sprockets. 3. Tension adjuster not working. <p>Noise seems to come from clutch</p> <ol style="list-style-type: none"> 1. Worn splines of countershaft or hub. 2. Worn teeth of clutch plates. 3. Distorted clutch plates, driven and drive. 4. Worn clutch release bearing. 5. Weakened clutch dampers. <p>Noise seems to come from crankshaft</p> <ol style="list-style-type: none"> 1. Rattling bearings due to wear. 2. Worn and burnt big-end bearings. 3. Worn and burnt journal bearings. <p>Noise seems to come from transmission</p> <ol style="list-style-type: none"> 1. Worn or rubbing gears. 2. Worn splines. 3. Worn bearings. 4. Worn or rubbing primary gears. 	<p>Adjust.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Clean.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace the primary driven gear.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

Complaint	Symptom and possible causes	Remedy
<p>Engine runs poorly in high speed range.</p>	<p>Defective engine internal / electrical parts</p> <ol style="list-style-type: none"> 1. Weakened valve springs. 2. Worn camshafts. 3. Valve timing out of adjustment. 4. Too narrow spark plug gaps. 5. Ignition not advanced sufficiently due to poorly working timing advance circuit. 6. Defective ignition coils. 7. Defective pick-up coil. 8. Defective ECU. 9. Clogged fuel hose, resulting in inadequate fuel supply to injector. 10. Defective fuel pump. 11. Defective TP sensor. 12. Clogged air cleaner element. <p>Defective air flow system</p> <ol style="list-style-type: none"> 1. Clogged air cleaner element. 2. Defective throttle valve. 3. Sucking air from throttle body joint. 4. Defective ECU. <p>Defective control circuit or sensor</p> <ol style="list-style-type: none"> 1. Low fuel pressure. 2. Defective IAT sensor. 3. Defective pick-up coil. 4. Defective IAP sensor. 5. Defective ECU. 6. Defective TP sensor. 	<p>Replace. Replace. Adjust. Adjust. Replace. Replace. Replace. Replace. Clean and prime. Replace. Replace. Clean. Clean or replace. Adjust or replace. Repair or replace. Replace. Repair or replace. Replace. Replace. Replace. Replace. Replace.</p>

Complaint	Symptom and possible causes	Remedy
Engine lacks power.	<p>Defective engine internal / electrical parts</p> <ol style="list-style-type: none"> 1. Loss of tappet clearance. 2. Weakened valve springs. 3. Valve timing out of adjustment. 4. Worn piston rings or cylinders. 5. Poor seating of valves. 6. Fouled spark plugs. 7. Incorrect spark plug gaps. 8. Clogged injectors. 9. Clogged air cleaner element. 10. Sucking air from throttle valve or vacuum hose. 11. Too much engine oil. 12. Defective fuel pump or ECU. 13. Defective pick-up coil and ignition coils. 14. Defective TP sensor. <p>Defective control circuit or sensor</p> <ol style="list-style-type: none"> 1. Low fuel pressure. 2. Defective IAT sensor. 3. Defective pick-up coil. 4. Defective IAP sensor. 5. Defective ECU. 6. Defective TP sensor. 7. Defective GP switch. 	<p>Adjust. Replace. Adjust. Replace. Repair. Clean or replace. Adjust or replace. Clean. Clean. Retighten or replace. Drain out excess oil. Replace. Replace. Replace. Repair or replace. Replace. Replace. Replace. Replace. Replace. Replace.</p>
Engine overheats.	<p>Defective engine internal parts</p> <ol style="list-style-type: none"> 1. Heavy carbon deposit on piston crowns. 2. Not enough oil in the engine. 3. Defective oil pump or clogged oil circuit. 4. Sucking air from intake pipes. 5. Use incorrect engine oil. 6. Defective oil cooler. <p>Lean fuel / air mixture</p> <ol style="list-style-type: none"> 1. Short-circuited IAP sensor / lead wire. 2. Short-circuited IAT sensor / lead wire. 3. Sucking air from intake pipe joint. 4. Defective fuel injectors. 5. Defective ET sensor. <p>The other factors</p> <ol style="list-style-type: none"> 1. Ignition timing too advanced due to defective timing advance system (ET sensor, pick-up coil, GP switch and ECU). 2. Drive chain is too tight. 	<p>Clean. Add oil. Replace or clean. Retighten or replace. Change. Clean or replace. Repair or replace. Repair or replace. Repair or replace. Replace. Replace. Replace. Adjust.</p>

Complaint	Symptom and possible causes	Remedy
Dirty or heavy exhaust smoke.	<ol style="list-style-type: none"> 1. Too much engine oil in the engine. 2. Worn piston rings or cylinders. 3. Worn valve guides. 4. Cylinder wall scored or scuffed. 5. Worn valves stems. 6. Defective stem seals. 7. Worn side rails. 	<p>Check with inspection window, drain out excess oil.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Slipping clutch.	<ol style="list-style-type: none"> 1. Weakened clutch springs. 2. Worn or distorted pressure plates. 3. Distorted clutch plates or pressure plates. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Dragging clutch.	<ol style="list-style-type: none"> 1. Some clutch springs weakened while others are not. 2. Distorted pressure plates or clutch plates. 	<p>Replace.</p> <p>Replace.</p>
Transmission will not shift.	<ol style="list-style-type: none"> 1. Broken gearshift cam. 2. Distorted gearshift forks. 3. Worn gearshift pawl. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Transmission will not shift back.	<ol style="list-style-type: none"> 1. Broken return spring on shift shaft. 2. Rubbing or sticky shift shaft. 3. Distorted or worn gearshift forks. 	<p>Replace.</p> <p>Repair or replace.</p> <p>Replace.</p>
Transmission jumps out of gear.	<ol style="list-style-type: none"> 1. Worn shifting gears on driveshaft or countershaft. 2. Distorted or worn gearshift forks. 3. Weakened stopper spring on gearshift stopper. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

RADIATOR (COOLING SYSTEM)

Complaint	Symptom and possible causes	Remedy
Engine overheats.	<ol style="list-style-type: none"> 1. Not enough engine coolant. 2. Radiator core clogged with dirt or scale. 3. Faulty cooling fan. 4. Defective cooling fan thermo-switch. 5. Clogged water passage. 6. Air trapped in the cooling circuit. 7. Defective water pump. 8. Use of incorrect engine coolant. 9. Defective thermostat. 	<p>Add coolant.</p> <p>Clean.</p> <p>Repair or replace.</p> <p>Replace.</p> <p>Clean.</p> <p>Bleed out air.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Engine overcools.	<ol style="list-style-type: none"> 1. Defective cooling fan thermo-switch. 2. Extremely cold weather. 3. Defective thermostat. 	<p>Replace.</p> <p>Put on the radiator cover.</p> <p>Replace.</p>

⊙ ELECTRICAL

Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking.	<ol style="list-style-type: none"> 1. Defective ignition coils or spark plug caps. 2. Defective spark plugs. 3. Defective pick-up coil. 4. Defective ECU. 5. Defective RO switch. 6. Open-circuited wiring connections. 	Replace. Replace. Replace. Replace. Replace. Check and repair.
Spark plug soon become fouled with carbon.	<ol style="list-style-type: none"> 1. Mixture too rich. 2. Idling speed set too high. 3. Incorrect gasoline. 4. Dirty element in air cleaner. 5. Spark plugs too cold. 	Inspect EI system. Inspect EI system. Change. Clean or replace. Replace by hot type plug.
Spark plug become fouled too soon.	<ol style="list-style-type: none"> 1. Worn piston rings. 2. Pistons or cylinders worn. 3. Excessive clearance of valve stems in valve guides. 4. Worn stem oil seal. 	Replace. Replace. Replace. Replace.
Spark plug electrodes overheat or burn.	<ol style="list-style-type: none"> 1. Spark plugs too hot. 2. The engine overheats. 3. Spark plugs loose. 4. Mixture too lean. 	Replace by cold type plug. Tune up. Retighten. Inspect EI system.
Magneto charge, but charging rate is below the specification.	<ol style="list-style-type: none"> 1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals. 2. Grounded or open-circuited stator coils of magneto. 3. Defective regulator / rectifier. 4. Defective cell plates in the battery. 	Repair or retighten. Replace. Replace. Replace the battery.
Magneto overcharges.	<ol style="list-style-type: none"> 1. Internal short - circuit in the battery. 2. Resistor element in the regulator / rectifier damaged or defective. 3. Regulator / rectifier poorly grounded. 	Replace the battery. Replace. Clean and tighten ground connection.
Magneto does not charge.	<ol style="list-style-type: none"> 1. Open - or short - circuited lead wires, or loose lead connections. 2. Short - circuited, grounded or open stator coil. 3. Short - circuited or punctured regulator / rectifier. 	Repair or replace or retighten. Replace. Replace.
Unstable charging.	<ol style="list-style-type: none"> 1. Lead wire insulation frayed due to vibration resulting in intermittent shorting. 2. Magneto internally shorted. 3. Defective regulator / rectifier. 	Repair or replace. Replace. Replace.
Starter switch is not effective.	<ol style="list-style-type: none"> 1. Battery run down. 2. Defective switch contacts. 3. Brushes not seating properly on commutator in starter motor. 4. Defective starter relay / ignition interlock switch. 5. Defective main fuse. 	Recharge or replace. Replace. Repair or replace. Replace. Replace.

BATTERY

Complaint	Symptom and possible causes	Remedy
Battery runs down quickly.	<ol style="list-style-type: none"> 1. The charging method is not correct. 2. Cell plates have lost much of their active material as a result of over-charging. 3. Battery is too old. 	<p>Check the generator, regulator/rectifier and circuit connections, and make necessary adjustments to obtain specified charging operation.</p> <p>Replace the battery, and correct the charging system.</p> <p>Replace the battery.</p>
Reversed battery polarity.	The battery has been connected the wrong way round in the system, so that it is being charged in the reverse direction.	Replace the battery and be sure to connect the battery properly.
Battery discharges too rapidly.	<ol style="list-style-type: none"> 1. Dirty container top and sides. 	Clean.

CHASSIS

Complaint	Symptom and possible causes	Remedy
Steering feels too heavy or stiff.	<ol style="list-style-type: none"> 1. Steering stem nut overtightened. 2. Worn bearing or race in steering stem. 3. Distorted steering stem. 4. Not enough pressure in tires. 	<p>Adjust.</p> <p>Replace.</p> <p>Replace.</p> <p>Adjust.</p>
Steering oscillation.	<ol style="list-style-type: none"> 1. Loss of balance between right and left front suspensions. 2. Distorted front fork. 3. Distorted front axle or crooked tire. 	<p>Replace.</p> <p>Repair or replace.</p> <p>Replace.</p>
Wobbling front wheel.	<ol style="list-style-type: none"> 1. Distorted wheel rim. 2. Worn-down wheel bearings. 3. Defective or incorrect tire. 4. Loosen nut on axle. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Retighten.</p>
Front suspension too soft.	<ol style="list-style-type: none"> 1. Weakened springs. 2. Not enough fork oil. 	<p>Replace.</p> <p>Refill.</p>
Front suspension too stiff.	<ol style="list-style-type: none"> 1. Fork oil too viscous. 2. Too much fork oil. 	<p>Replace.</p> <p>Drain excess oil.</p>

Noisy front suspension.	<ol style="list-style-type: none"> 1. Not enough fork oil. 2. Loosen nuts on suspension. 	<p>Refill.</p> <p>Retighten.</p>
Wobbling rear wheel.	<ol style="list-style-type: none"> 1. Distorted wheel rim. 2. Worn-down rear wheel bearing. 3. Defective or incorrect tire. 4. Loose nut on axle. 5. Worn swing arm bushing or bearing. 6. Loosen nut on the rear shock. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Retighten.</p> <p>Replace.</p> <p>Retighten.</p>
Rear suspension too soft.	<ol style="list-style-type: none"> 1. Weakened springs. 2. Rear suspension adjuster improperly set. 	<p>Replace.</p> <p>Adjust.</p>
Rear suspension too stiff.	<ol style="list-style-type: none"> 1. Rear suspension adjuster improperly set. 2. Worn swing arm bushing or bearing. 	<p>Adjust.</p> <p>Replace.</p>
Noisy rear suspension.	<ol style="list-style-type: none"> 1. Loosen nuts on suspension. 2. Worn swing arm bushing or bearing. 	<p>Retighten.</p> <p>Replace.</p>

BRAKES

Complaint	Symptom and possible causes	Remedy
Poor braking (FRONT and REAR)	<ol style="list-style-type: none"> 1. Not enough brake fluid in the reservoir. 2. Air trapped in brake fluid circuit. 3. Pads worn down. 4. Too much play on brake lever or pedal. 5. Shoes worn down. 	<p>Refill to level mark.</p> <p>Bleed air out.</p> <p>Replace.</p> <p>Adjust.</p> <p>Replace.</p>
Insufficient brake power.	<ol style="list-style-type: none"> 1. Leakage of brake fluid from hydraulic system. 2. Worn pads. 3. Oil adhesion of engaging surface of pads. 4. Worn disk. 5. Air in hydraulic system. 	<p>Repair or replace.</p> <p>Replace.</p> <p>Clean disk and pads.</p> <p>Replace.</p> <p>Bleed air.</p>
Brake squeaking.	<ol style="list-style-type: none"> 1. Carbon adhesion on pad surface. 2. Tilted pad. 3. Damaged wheel bearing. 4. Loosen front-wheel axle or rear-wheel axle. 5. Worn pads. 6. Foreign material in brake fluid. 7. Clogged return port of master cylinder. 	<p>Repair surface with sandpaper.</p> <p>Modify pad fitting.</p> <p>Replace.</p> <p>Tighten to specified torque.</p> <p>Replace.</p> <p>Replace brake fluid.</p> <p>Disassemble and clean master cylinder.</p>

Excessive brake lever stroke.	<ol style="list-style-type: none"> 1. Air in hydraulic system. 2. Worn brake lever cam. 3. Insufficient brake fluid. 4. Improper quality of brake fluid. 	<p>Bleed air.</p> <p>Replace brake lever.</p> <p>Replenish fluid to specified level ; bleed air.</p> <p>Replace with correct fluid.</p>
Leakage of brake fluid.	<ol style="list-style-type: none"> 1. Insufficient tightening of connection joints. 2. Cracked hose. 3. Worn piston and/or cup. 	<p>Tighten to specified torque.</p> <p>Replace.</p> <p>Replace piston and/or cup.</p>

TIGHTENING TORQUE

ITEM	N • m	kg • m
Rear shock absorber fitting nut (Upper)	20 ~ 30	2.0 ~ 3.0
Rear shock absorber fitting nut (Lower)	35 ~ 55	3.5 ~ 5.5
Rear sprocket nut	20 ~ 30	2.0 ~ 3.0
Rear axle nut	90 ~ 140	9.0 ~ 14.0
Swing arm pivot nut	45 ~ 70	4.5 ~ 7.0
Steering stem nut	40 ~ 50	4.0 ~ 5.0
Steering stem head nut	80 ~ 100	8.0 ~ 10.0
Front brake disc bolt	18 ~ 28	1.8 ~ 2.8
Front brake master cylinder mounting bolt	5 ~ 8	0.5 ~ 0.8
Front brake caliper air bleeder valve	6 ~ 9	0.6 ~ 0.9
Front brake caliper mounting bolt	18 ~ 28	1.8 ~ 2.8
Front brake hose union bolt	20 ~ 25	2.0 ~ 2.5
Front axle	50 ~ 80	5.0 ~ 8.0
Front axle pinch bolt	15 ~ 25	1.5 ~ 2.5
Front fork damper rod bolt	15 ~ 25	1.5 ~ 2.5
Front fork cap clamp bolt	22 ~ 35	2.2 ~ 3.5
Front fork lower clamp bolt	15 ~ 30	1.5 ~ 3.0
Front fork upper bolt	22 ~ 35	2.2 ~ 3.5
Front footrest bolt	40 ~ 60	4.0 ~ 6.0
Handlebar clamp bolt	24 ~ 28	2.4 ~ 2.8
Handlebar holder lower nut	40 ~ 60	4.0 ~ 6.0

Service Data

CLUTCH

Unit : mm

ITEM	STANDARD	LIMIT
Clutch cable play	4	—
Drive plate thickness	2.9~3.1	2.6
Drive plate claw width	11.8~12.0	11.0
Driven plate distortion	—	0.1
Clutch spring free length	36.3	34.3

TRANSMISSION + DRIVE CHAIN

Unit : mm

ITEM	STANDARD		LIMIT
Primary reduction ratio	3.238		—
Final stage reduction ratio	3.714		—
Gear ratio	1st	2.42	—
	2nd	1.53	—
	3rd	1.18	—
	4th	1.04	—
	5th	0.91	—
	6th	0.81	—
Shift fork to groove clearance	0.10~0.30		0.5
Shift fork groove width	NO.1 & NO.2	5.0~5.1	—
	NO.3	5.0~5.1	—
Shift fork thickness	NO.1 & NO.2	4.8~4.9	—
	NO.3	4.8~4.9	—
Drive chain	Type	STD1816	—

⊙ EI SYSTEM PARTS EI

ITEM	N - m	kgf - m
Water temperature sensor (WT sensor)	5 ~ 8	0.5 ~ 0.8
Fuel injector mounting bolt	5 ~ 8	0.5 ~ 0.8
Intake air temperature & temperature sensor (IAP&T sensor)	5 ~ 6	0.5 ~ 0.8

⊙ THROTTLE BODY

ITEM	SPECIFICATION	NOTE
I.D. No.	13400KH9100	
Bore size	∅ 28	
Idle rpm	1,500 ~ 1,700 rpm	
Throttle cable play	0.5 ~ 1.0 mm (0.02 ~ 0.04 in)	

⊙ FUEL INJECTOR + FUEL PUMP

ITEM	SPECIFICATION	NOTE
Fuel injector resistance	11.4 ~ 12.6 Ω at 20°C (68°F)	
Fuel injector voltage	Battery voltage	
Fuel pressure of fuel pump	350 kPa	

⊙ ELECTRICAL

Unit : mm (in)

ITEM	SPECIFICATION		NOTE
Ignition timing	BTDC 12° /1900rpm and 30° /7000rpm		
Spark plug	Type	CR8E	
	Gap	0.7 ~ 0.8 (0.028 ~ 0.032)	
	Hot type	CR7E	
	Standard type	CR8E	
	Cold type	CR9E	
Spark performance	More than 8 (0.32)		
Ignition coil primary peak voltage	400 V and more		
Ignition coil resistance	Primary	0.52 ~ 0.64 Ω	1st ⊕ - ⊖
	Secondary	6.4 ~ 7.8 kΩ	2nd ⊕ - ⊖
Spark plug cap resistance	10 kΩ		
Ignition coil secondary/ Spark plug cap resistance	16.4 ~ 17.8 kΩ		spark plug cap - ⊖
Stator coil resistance	Pick-up coil	Approx. 95 ~ 125 Ω	G - L
	Charging coil	Approx. 0.3 ~ 0.6 Ω	Y - Y
Magneto no-load performance	Over 60 V / 5,000 rpm		

Battery standard charging voltage	13.5 ~ 15.0 V / 5,000 rpm		
Battery	Type	MG12ZS-C	
	Capacity	12V 11.2Ah/10HR	
Fuse size	ABS IGN ABS	1A	
	HEAD LIGHT	20A	
	ABS ECU ABS ECU	10A	
	ABS MOTOR ABS	15A	
	ECU ECU	15A	
	MAIN	20A	
	SPARE	20A	
		15A	
1A			

⊙ WATTAGE

Unit:W

ITEM	SPECIFICATION
Head lamp	12V—HS1 : 35W/35W
Position lamp	12V – 5W
License lamp	12V – 0.5W
Brake/Tail lamp	8V – 1W/0.5W
Turn signal lamp	12V 1W x 4
Speedometer lamp	LED TYPE
Engine warning lamp	LED TYPE
Turn signal indicator lamp	LED TYPE
High beam indicator lamp	LED TYPE
Odometer/ Trip meter/ clock	LCD TYPE
Fuel meter/ Coolant temp. meter	LCD TYPE
Neutral indicator lamp	LED TYPE

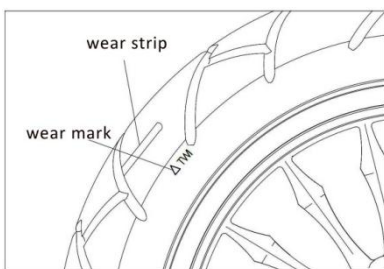
- ※ LED: Light Emitting Diode
LCD: Liquid Crystal Display

CAUTION

Do not use except the specified bulb (Wattage).

TIRE

Code Tyre pressure	Cold inflation tire pressure (Solo riding)			Cold inflation tire pressure (Dual riding)		
	kPa	kgf/cm2	psi	kPa	kgf/cm2	psi
FR TYRE	225	2.25	33	225	2.25	33
RR TYRE	225	2.25	33	225	2.25	33



1. The triangle mark indicates the location of the wear bar. If the wear bar touches the ground, the tire has worn to the limit. The tires must be replaced.

2. When replacing tires, make sure that the size and model of replacement tires should conform to the contents of Table 3. If you change the tires of a different size or model, it will affect the handling performance of the motorcycle and may cause the motorcycle to lose control.

3. After repairing or replacing tires, balance the wheels. It is very important to balance the wheel correctly to avoid uneven contact between the tire and the road, and to avoid uneven wear of the tire.

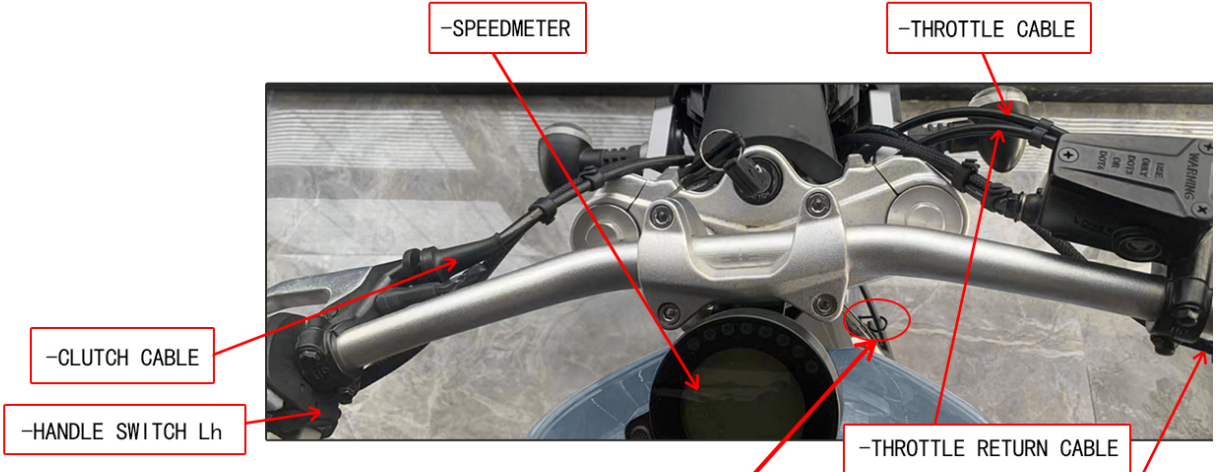
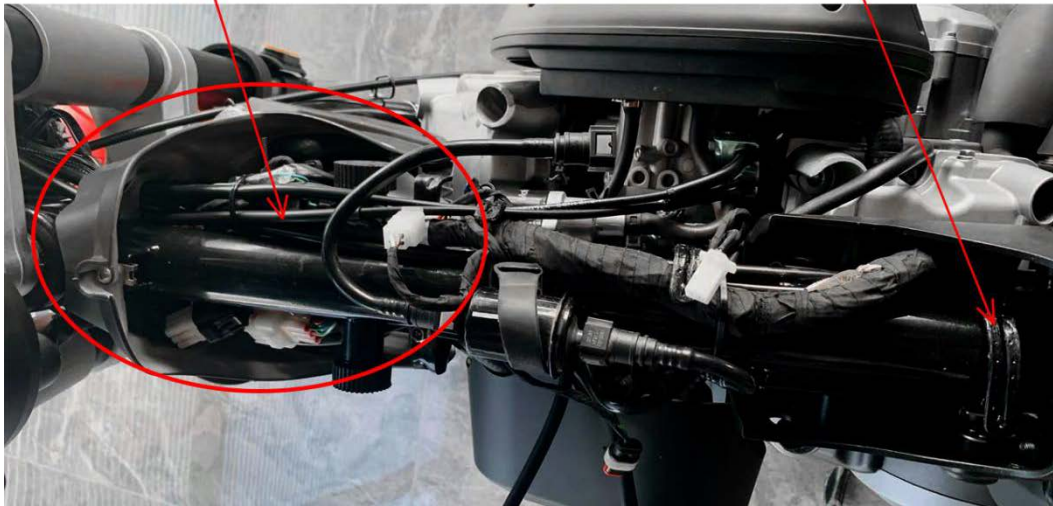
FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	The gasoline used shall be unleaded gasoline above 95# grade.		
Fuel tank capacity	Including reserve	15 L	
	Reserve	5 L	
Engine oil type	SAE 10W-40 API SG grade or above		
Engine oil capacity	Oil addition amount of new machine	2000 ml	
	oil change amount (without oil filter)	2000 ml	
	oil change amount (with oil filter)	2200 ml	

WIRING AND CABLE ROUTING

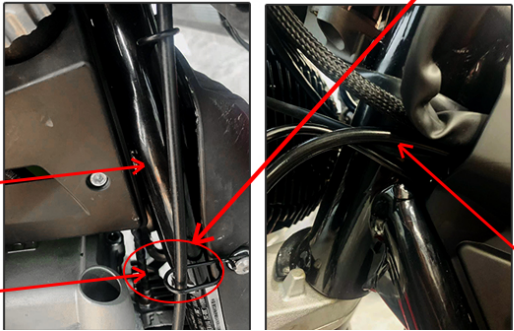
- HARNESS
- HANDLE SWITCH Rh
- HANDLE SWITCH Lh
- TURN SIGNAL LAMP Rh
- TURN SIGNAL LAMP Lh
- STEERING LOCK

- CLAMP, HARNESS
(INSTALL FRAME HOLE)



- #ROUTING (INSIDE KEY BOX)
- HANDLE SWITCH Lh LEAD WIRE

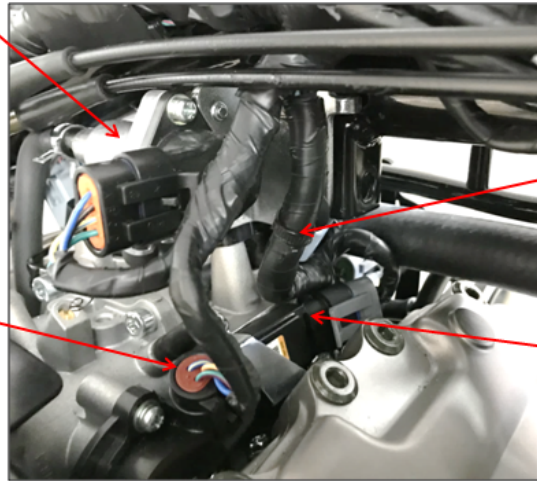
- SPEEDOMETER BRACKET
(HOOKING CLUTCH CABLE)



- HANDLE SWITCH Rh

- #ROUTING (INSIDE KEY BOX)
- Ft, BRAKE HOSE
- HANDLE SWITCH Rh LEAD WIRE

37900HG7200
- I.S.C. SOLENOID
ASSY



- CLAMP, HARNESS
(INSTALL ISC BRACKET HOLE)

13580HG7200
- THROTTLE POSITION SENSOR

37920HG7200
- INTAKE AIR PRESSURE
SENSOR

[CLAMP]
- FRONT ABS SPEED
SENSOR



[CLIP]
- FRONT ABS SPEED
SENSOR

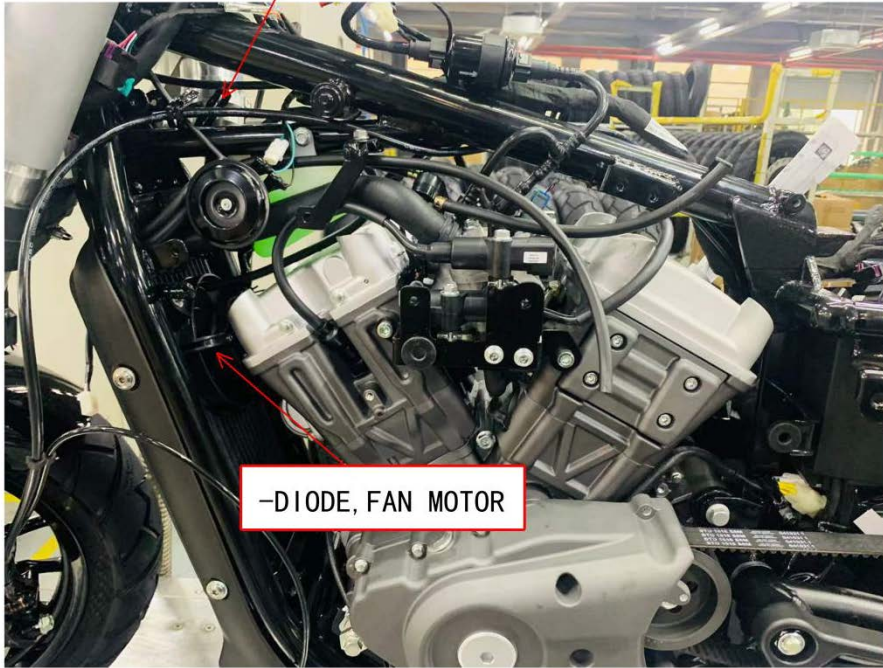


[CLAMP]
- FRONT ABS SPEED
SENSOR



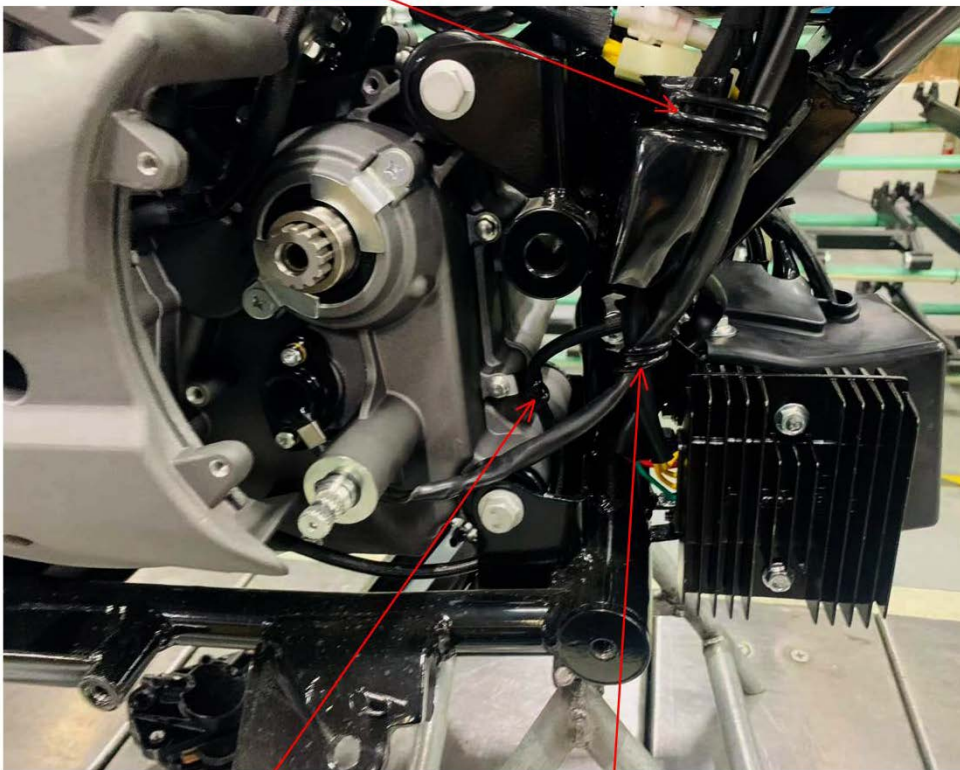
[CLAMP]
- FRONT ABS SPEED
SENSOR

[CLAMP]
-HARNESS, WIRING



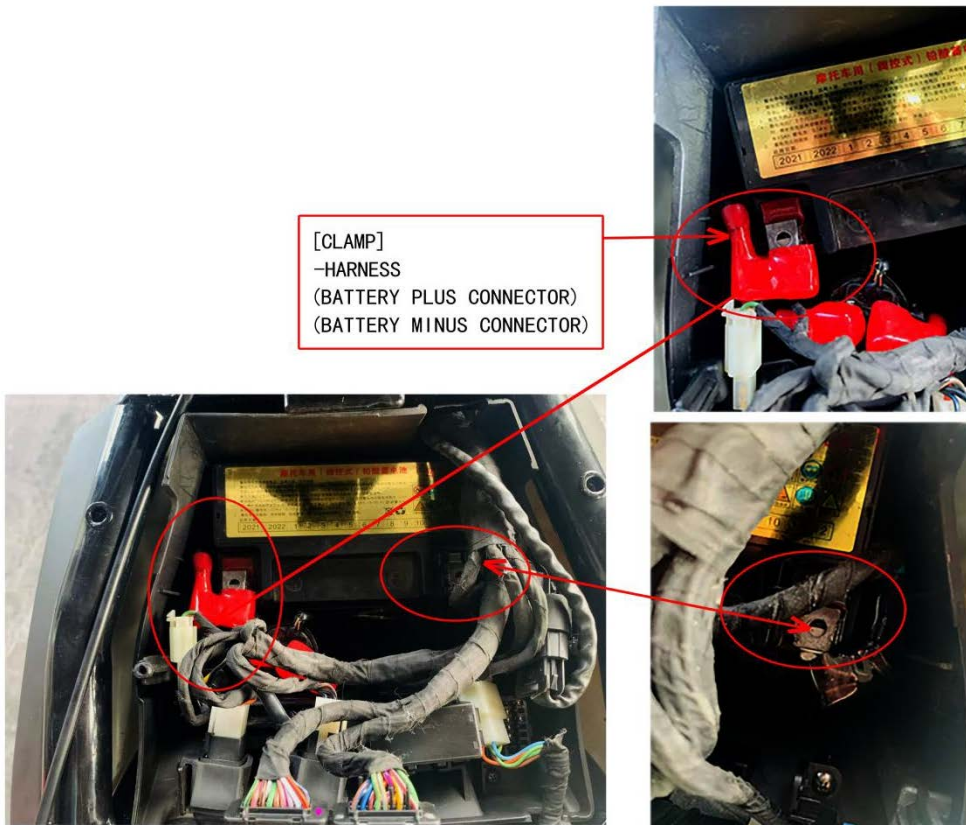
-DIODE, FAN MOTOR

[CLAMP]



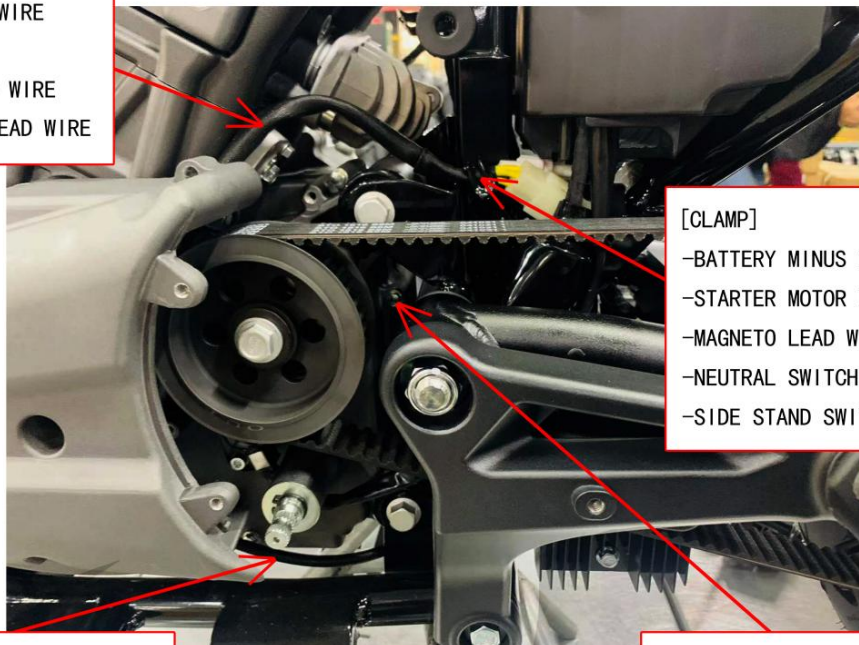
-[CLAMP], HARNESS

[CLAMP]



[CLAMP]
 -HARNESS
 (BATTERY PLUS CONNECTOR)
 (BATTERY MINUS CONNECTOR)

[CLAMP]
 -STARTER MOTOR LEAD WIRE
 -MAGNETO LEAD WIRE
 -NEUTRAL SWITCH LEAD WIRE
 -SIDE STAND SWITCH LEAD WIRE



[CLAMP]
 -BATTERY MINUS LEAD WIRE
 -STARTER MOTOR LEAD WIRE
 -MAGNETO LEAD WIRE
 -NEUTRAL SWITCH LEAD WIRE
 -SIDE STAND SWITCH LEAD WIRE

[CLAMP]
 -SIDE STAND SWITCH LEAD WIRE

[CLAMP]
 -STARTER MOTOR LEAD WIRE



PLASTIC WRAPPED CLAMP

WIRING DIAGRAM

