



Lambretta

SERVICE MANUAL I ENG

Mod. # X300

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This manual details maintenance information, tools & special tools, disassembly and assembly procedures, inspection and adjustment methods, defect correction and technical specifications of the LAMBRETTA model X300.

Due to continuous improvements of product we reserves the right to update this manual without prior notice.

Regulation

To ensure safety while carrying out repairs, follow the following regulations.

Safety rules

General specifications of operation manual repair

- When starting the engine, make sure that the operating area is well ventilated.
- The electrolyte solution in the battery contains sulfuric acid. Avoid contact with eyes, skin and clothing. If this gets in contact with eyes or skin, rinse with plenty of clean water for at least 15 minutes and seek medical attention immediately.
- Batteries can produce hydrogen gas, a gas that can be flammable and explosive. Therefore, while charging the battery and storing the battery, do not smoke and avoid sparks or flames in such areas.
- Fuel can be easily ignited and exploded in certain conditions. Do not smoke in the work area and avoid flames or sparks near the work area.
- Cleaning the brake pads and clutch assembly should be done in a well-ventilated area, as they are parts that are subject to fine dust while cleaning will be scattered, which is harmful to the respiratory system.
- Only genuine Lambretta parts and manufacturer-recommended lubricants must be used. To prevent damage to the motorcycle.
- Use special tools that accurately match the vehicle model only to carry out repairs.
- Replace gaskets, seals, O-rings, pins, latches, bolts, studs. When every engine is disassembled and assembled.
- After disassembling the engine, it must be cleaned using low-flash or non-flammable chemicals and lubricant applied to the moving parts.
- After disassembling and disassembling the engine, it must be ensured that all components are properly assembled, installed and working properly.
- Use only equipment or instruments with dimension indicators measured in metric units for removing or assembling bolts, nuts, screws. The equipment or tools used must be suitable for operation. If improper equipment or tools are used, it may cause damage.
- When performing electrical maintenance, it must be checked that the electrical system is properly connected. Specifically, connecting batteries, wires and ground wires.

Applicable

This manual for Lambretta X 300 model year 2023 Euro5 only.

We reserve the right to change and update any information without any notice.

Always use Lambretta Genuine Parts and recommended lubricants. Using parts not designed for Lambretta motorcycles may damage the motorcycle.



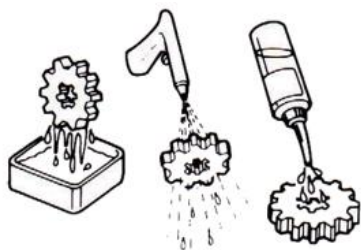
Special tools are designed to disassemble and install components without damaging the working part. Using the wrong tool may damage the part.



When servicing this motorcycle, use only metric tools. Bolts, nuts and metric screws are not interchangeable with the English system, incorrect use of tools and fasteners may damage this vehicle.

Clean the outside of the part or cover before removing it from the motorcycle. Otherwise, dirt and deposits accumulated on the surface of the part may fall into the engine, frame or brake system to cause damage.

Wash and clean parts with a high-ignition solvent and blow dry with compressed air. Pay special attention to O-rings or oil seals, since most cleaning agents have a negative effect on them.



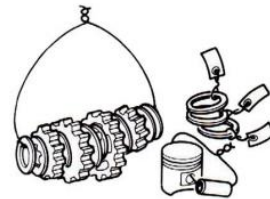
Do not bend or twist the control cable to prevent premature rigid and deterioration of control.



Rubber parts can wear out as they age and are prone to damage from solvents and oils. Check these parts before installation to make sure they are in good condition, replace them if necessary.

When loosening of components with fasteners of different sizes, work with a diagonal pattern and work from the inside out. Loosen the small fasteners first. If the larger one is loosened before, the smaller fasteners may be subjected to excessive stress.

Store complex components such as gear parts in proper assembly order and tie them together with wires for ease of installation later.

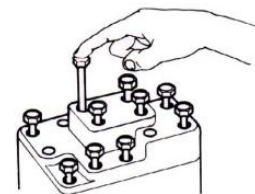


Observe the location of important components before disassembling to ensure they are reassembled in the correct size (depth, distance or position).

Components that should not be reused should be replaced when disassembling, including gaskets, metal sealing rings, O-rings, oil seals, snap rings and split pins.



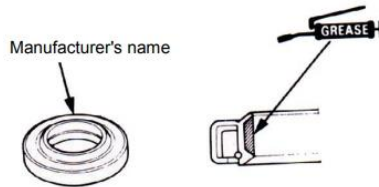
The length of bolts and screws for assembling the cover plate or box is different from the other, make sure they are installed correctly. In case of confusion, insert the bolt into the hole to compare the length with other bolts. If the length out on the side of the hole is the same as the other bolts, then this is the correct bolt. The bolts for the same assembly should be the same length.



Compact kit includes various dimensional fasteners as follows: Tighten all fasteners with fingers, and then first tighten the large fasteners with a special tool diagonally from the inside out. 2 to 3 times, increasing gradually to avoid warping unless otherwise noted. Bolts and fasteners should be kept clean and dry. Do not apply oil to the thread.



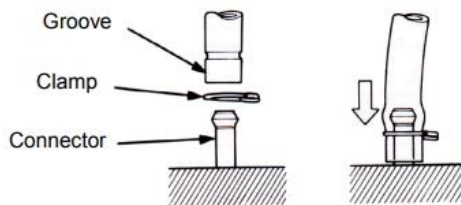
Once the oil seal is installed, add grease to the groove, install the oil seal with the manufacturer's name facing the outside, check the shaft where the oil seal will be installed for smoothness and for fins that may damage the oil seal.



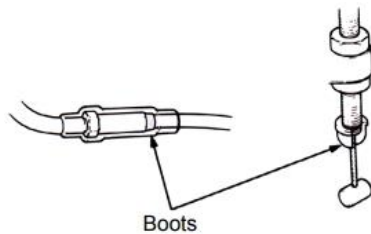
Remove residues of old gaskets or sealants before reinstalling, grind with a grindstone if the contact surface has any damage.



The end of the rubber hose (for vacuum fuel or coolant) should be pushed as far as possible to allow enough space under the enlarged end for tightening the clamps.

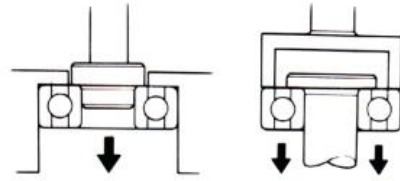


Rubber and plastic boots should be properly reinstalled in the correct position as designed.



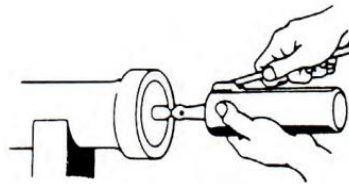
The tool should be pressed against two bearing fixtures (inside and outside). When removing bearings Damage may be caused if the instrument is pressed against only one race (either an internal or

external race). To avoid damage to the bearings, apply the same force to both species.

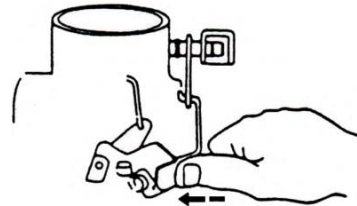


Both of these examples may result in damage to the bearing.

Lubricate the rotating pages with the lubricant that is specified on the lubrication points before assembly.



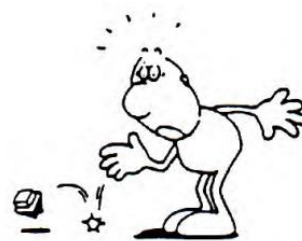
Check whether the position and application of the correct and correct installation parts.



Ensure that the service is safe with each other when performed by two people.

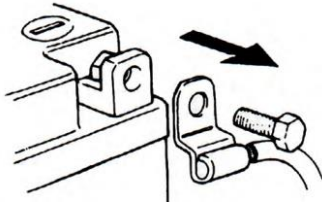


Note that do not allow parts to fall.

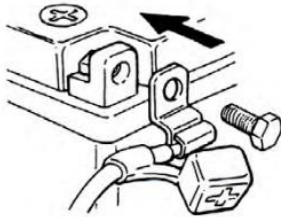


Before proceeding with battery removal, the negative (-) wire of the battery must first be disconnected, without the wrench coming into

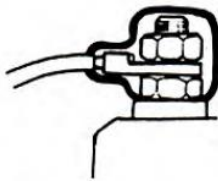
contact with the body to prevent the circuit from short circuiting and generating sparks.



After the service is completed, make sure all connection points are secure, the positive (+) battery cable should be connected first, and the battery terminals must be greased after connecting the cable.



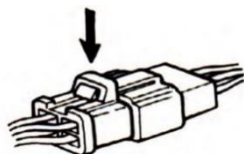
Make sure the battery cover is positioned correctly after the battery pole has been serviced.



If the fuse burns, it must be determined and corrected, and then replaced with the specified capacity fuse.

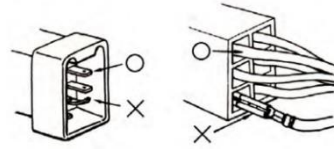


When isolating the connector, the locker must be unlocked first, and then the service is performed.

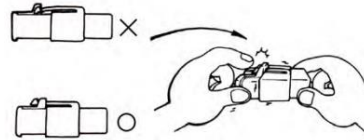


Do not pull the power cord to disconnect the connector or the power cord from the connector.

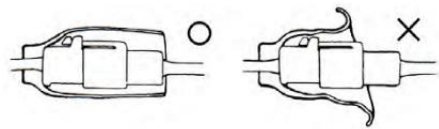
Make sure the terminal pins are bent or loosened.



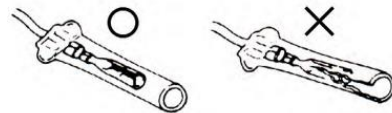
Fully insert the connector. If there are two storage cabinets on the two connector sides, make sure the locker locks properly. Check if there is a loose wire.



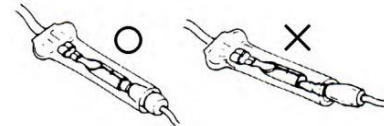
Check if the connectors are completely covered with a pair of connector boots.



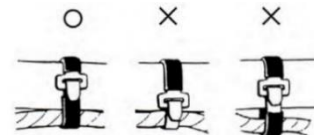
Before connecting the terminal, check if the boot is broken or the terminal is loose.



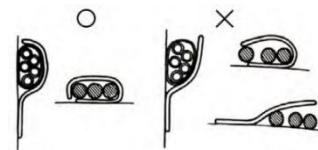
Fully insert the connector, check if the connector is covered with a boot, do not allow the boot to open.



Secure the power cord and the strap to the frame with the strip in sequence in the designated location. Tighten the strip so that only the shielded surface touches the wire or strap.



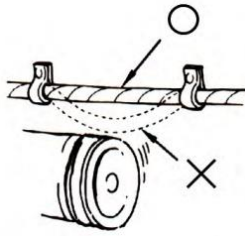
Wire bands and straps must be securely fastened.



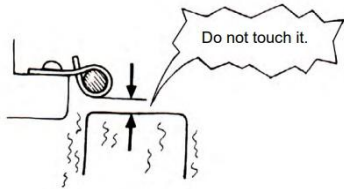
Do not squeeze the power cord against a weld or clamp.



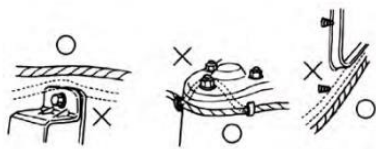
Do not allow the harness to contact rotating, moving, or vibrating components to route the harness.



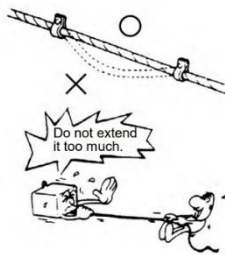
Keep the strap away from hot parts.



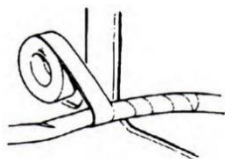
Route the straps to avoid sharp edges or corners, and also avoid protruding ends of bolts and screws.



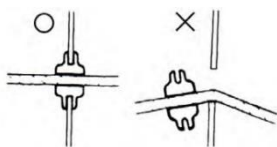
Route straps so as not to pull too tightly or slack too much.



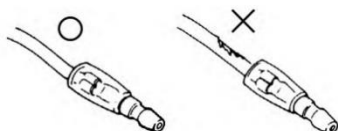
Protect wires or straps with electrical tape or hoses if they come into contact with sharp edges or corners. Thoroughly clean the surface on which the tape will be applied.



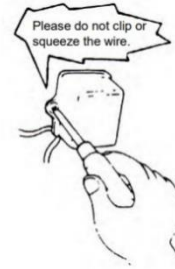
Secure rubber shoes when applied to the strap.



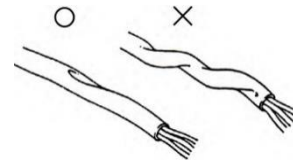
Do not use broken cords or harnesses. Wrap electrical tape around damaged parts or replace them.



Do not pinch or squeeze the strap as it does to install other components.



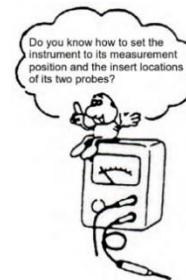
Do not allow the wiring harness to twist while installing.



The straps that walk along the handlebars should not be pulled too tightly or too slack, rubbing or interfering with adjacent or surrounding parts in any steering position.

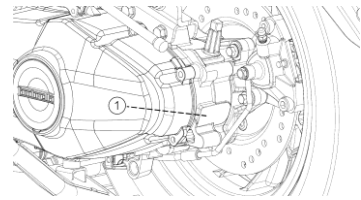


Before operating the test tool, the operator should read the instruction manual of the instrument, and then perform the test according to the instructions.

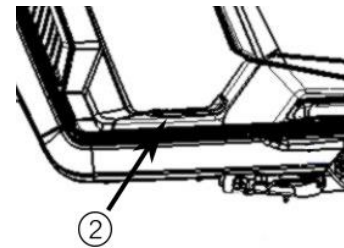


**Engine Number :**

The engine number (1) is stamped at the rear of the engine

**Frame Number (VIN) :**

Remove the rubber cover of the footrest. The frame number (2) is stamped on the frame.



Perform the following pre-delivery inspections before deliver to the customer.

Check external conditions.

Check general condition:

- Painting
- Various plastic components and parts
- Scratches
- Dust, dirt stains

Check tightening torque

Make sure that the color markings are made on the following points:

- Screws – nuts fastening safety-related parts
- Screws – nuts fasten various parts;

Check safety parts

- Front shock absorbers
- Rear shock absorber
- Swing arm
- Front wheel brake calipers
- Rear wheel brake calipers
- Radiator rubber hose and water pump cover
- Install rear view mirrors.

Check electrical parts

- Ignition Switch
- Lighting system: high beam, low beam, Dimmer, taillight, license plate light and emergency light
- Adjust the headlight level according to applicable laws.
- Headlight switches, brake lights and switchgear related lighting systems
- Turn signals and related lighting
- Fuel and temperature indicator
- Instrument cluster lights, warning lights
- Horn
- Starter Motor

Caution

- To optimal battery life and performance, the battery must be fully charged before being put into operation.
- When installing batteries, always connect the anode first before cathode.

Warning

The electrolyte solution in the battery is a dangerous substance and can cause severe burns, irritation. Due to the presence of sulfuric acid, it is best to avoid contact with eyes, skin and clothing. If accidentally touched by eyes or skin, it must be washed off with a large amount of clean water. Take at least 15 minutes and immediately seek medical attention. If swallowed, drink plenty of clean water or drink vegetable oil and immediately seek medical attention. The battery can produce explosive gases. It should not be stored near open flames, sparks or smoking areas. The charging area should be well ventilated. When charging chemicals in the battery, eye protection should be worn and for safety reasons, children should not be near the area.

Check fluid level

- Brake fluid level.
- Transmission oil level
- Coolant level.
- Engine oil level

Test Ride

- Push starting.
- Check default reading of speedometer.
- Check throttle and brake control.
- Check engine and transmission operation.
- Check front and rear suspension for smooth operation.
- Check steering for smooth turning.
- Check abnormal noise.

Check after riding

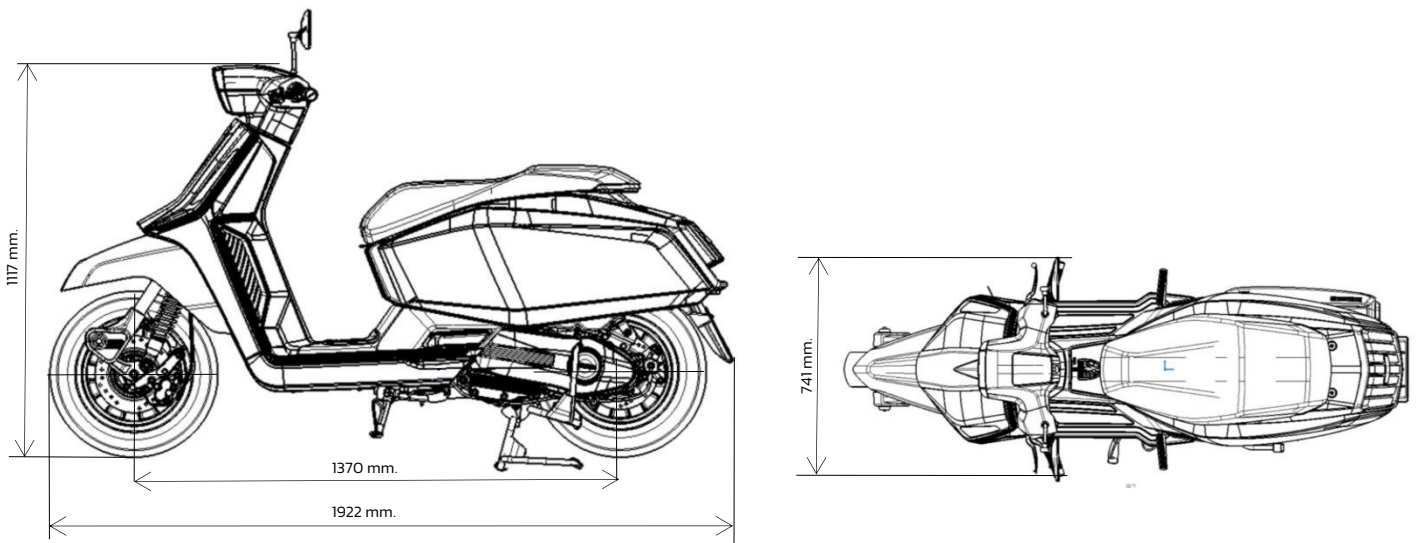
- Restarting the engine while the engine is warm.
- Check default reading of speedometer.
- Check any leakage of various system.
- Check cooling fan operation.

Caution

- Only check tire pressure when cold.
- Excessive tire pressure may cause tire explode.

Others

- Check that all manuals, tools, plate number are equipped.
- Check frame number and engine number are correct.



Dimensions	
Length	1,922 mm (75.6in)
Width	741 mm (29.1 in)
Height	1,117 mm (43.9 in)
Wheelbase	1,370 mm (53.9 in)
Minimum ground clearance	153 mm (6.0in)
Caster angle	26.5°
Trail range	90°
Curb weight	174 kg (383lb)
Maximum weight capacity	165 kg (363lb)
Passenger capacity	Rider and 1 passenger
Engine	
Type	Single cylinder, 4 stroke, 4 valve, SOHC, Liquid-cooled
Bore x stroke	75 x 62.3 mm
Displacement	275 cm ³
Compression ratio	11.5 : 1
Idle speed	1,600 ± 150 rpm
Max power	18 kW at 7,500 rpm
Max torque	24 Nm at 6,750 rpm
Drive system	V-Matic continuously variable
Lubrication system	Lubrication by high pressure oil pump
Starting system	Electric starter motor with freewheel
Ignition system	Electronic system (ECU control)
Spark plug type	NGK CR8EKB
Fuel supply	Electronic injection is controlled by a 34 mm diameter throttle body and electric fuel pump.
Fuel	Fuel Unleaded gasoline, 91 or 95 octane, mixed with not more than 10% ethanol.
Vehicle emissions standards	EURO 5
Information	
Frame	
Front suspension	Dual front shock absorbers / link arm
Back suspension	Dual rear shock absorbers
Front brake	Hydraulic system 2 pistons, right hand operated Single disc brake, diameter 220 mm, with ABS
Rear brake	Hydraulic system 2 pistons, left hand operated Single disc brake, diameter 219 mm, with ABS
Type of wheels	Aluminum alloy
Front rim	12 x 3.0 inches
Rear rim	12 x 3.5 inches
Front tire	120 / 70 - 12 51M Tubeless

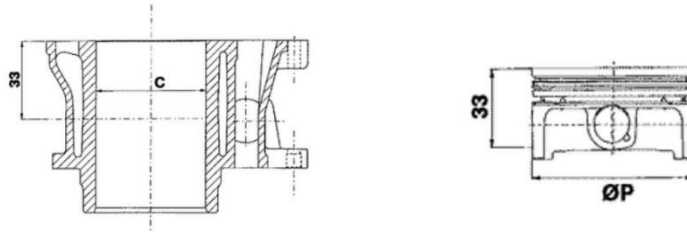
Rear tire	130 / 70 - 12 56M tubeless
Front tire pressure	28 PSI
Rear tire pressure	32 PSI (34 PSI when there are passengers)
Vehicle weight	160 Kg
Maximum payload	160 Kg
Battery	YTZ10 12V, 9.1Ah (Yuasa)
Liquid capacity	
Engine oil type	4 stroke JASO : MB, SAE : 5W-40, API : SG or higher
Engine oil capacity	Oil change only : 1.15 L
	Change engine oil and oil filter : 1.3 L
	After disassembly : 1.5 L
Gear oil type	API : GL - 4 / GL - 5 SAE 80W - 90
Gear oil capacity	After draining : 0.23 L
	After disassembly : 0.25 L
Coolant type	LEC - II - 40 antifreeze coolant
Coolant capacity	2 L
Fuel tank capacity	7.5 L
Brake fluid type	DOT 4

Torque value

Various components around the steering handle		
Headlight fixing nut	2	8 - 12 Nm
Headlight mounting bolt	1	3 - 5 Nm
Neck adjusting nut	1	17 Nm
Neck adjusting nut	1	40 Nm
Bolt fixing the handlebars to the lower mane	1	40 - 50 Nm
Frame		
Side stand fits into frame	1	35 - 45 Nm
Side stand sensor	1	8 - 12 Nm
Dual stand bolts	1	37 - 43 Nm + Threadlocker 243
The nut attaches to the rocker to the engine.	1	37 - 43 Nm + Threadlocker 243
The nut holds the rocker to the frame.	1	50 - 55 Nm + Threadlocker 243
Nuts attaching the rocker frame to the engine.	1	35 -40 Nm
Anti-shock rubber mounting bolt	1	8 - 12 Nm
BKT ECU box with frame	2	8 - 12 Nm
Steel that holds the radiator to the frame.	1	8 - 12 Nm
Fixing boltBKT ABS with frame	2	8 - 12 Nm
Key switch bolt	2	18 - 22 Nm
Bolt attaches to water pipe (aluminum) to the frame.	2	8 - 12 Nm
Footrest mounting bolt, right	3	20 - 25 Nm + Threadlocker 243
Left footrest mounting bolt	3	20 - 25 Nm + Threadlocker 243
Bolts attach the pot to the frame.	2	8 - 12 Nm
Bolts attach the rear fender to the frame.	2	8 - 12 Nm
ECU and BKT	2	8 - 12 Nm
Radiator cover fixing bolt	3	8 - 12 Nm
Fastening nutBKT front windshield	2	18 - 22 Nm
Front fender and lower neck bolts	3	8 - 12 Nm
Color set screws	every point	1 - 3 Nm
Color fastening bolt (hexagonal head)	every point	3 - 5 Nm
Bolt securing the reserve water tank	2	5 - 8 Nm
Ignition coil mounting bolt	2	3 - 5 Nm + threadlocker 243
Bolt fixing turn signal	2	3 - 5 Nm
Suspension system		
Box boltABS vs. BKT	2	8 - 12 Nm
BKT shock mount (left side)	2	30 - 35 Nm

Bolt securing the rear shock to the frame (top left)	1	18 – 22 Nm
Bolt securing the rear shock (lower left) toBKT	1	37 – 43 Nm
Bolt attaches right rear shock to frame (above).	1	37 – 43 Nm
Bolt to secure rear right shock to swingarm (lower)	1	18 – 22 Nm + Threadlocker 243
Bolt held under the front fork	1	18 – 25 Nm
Front shock strut boltM12x50 with lower mane (top)	2	40 – 50 Nm + Threadlocker 243
Front shock strut boltM12x60 with pedal (bottom)	2	28 – 30 Nm + Threadlocker 263
Shock rocker shaftM10x60	2	40 – 50 Nm + Threadlocker 243
Cap nut securing right-left shock absorber(top-bottom)	4	40 – 50 Nm + Threadlocker 243
Cap nut securing shock cover (right – left)	2	5 – 7 Nm
Stud boltM6x16 fork cover fixing (right-left)	2	8 – 12 Nm + threadlocker 243
Brake system		
Bolts attaches the front brake caliper to the rocker.	2	25 – 30 Nm + threadlocker 243
Stud bolts M8x34.5 fixing front caliper connecting rod	2	15 – 20 Nm + threadlocker 263
Rear brake caliper mounting bolts.	2	35 – 40 Nm + threadlocker 243
Bolts secures the rear brake hose bracket.	3	10 – 15 Nm
Front wheel		
Disc brake bolts	5	20 – 25 Nm + threadlocker 243
Front axle	1	60 – 70 Nm
Sensor mounting bolt	1	8 – 12 Nm
Rear wheel		
Disc brake bolts	5	20 – 25 Nm
ABS sensor mounting bolts	5	8 – 12 Nm
Rear axle nut	1	90 – 105 Nm
Swing arm pivot bolts	2	25 – 30 Nm
ABS sensor mounting bolt	1	8 – 12 Nm
Sensor cable bracket bolt.	1	8 – 12 Nm
Exhaust pipe		
exhaust pipe nuts	2	20 – 25 Nm
O2 sensor	1	20 – 25 Nm
Muffler clamp bolt	1	18 – 25 Nm
Fuel tank		
fuel level sensor bolts	4	8 – 12 Nm
fuel pump nuts	8	5 Nm
Engine		
Cylinder head cover bolts	5	6 – 7 Nm
Cylinder head bolts (M10)	4	7±1 + 10±1 Nm + 270°
Cylinder head bolts (M6)	2	11 – 12 Nm
Spark plug	1	12 – 14 Nm
Valve clearance adjusting nuts	4	6 – 8 Nm
Intake pipe bolts	3	8 – 12 Nm
Chain tensioner fixing bolts	2	10 – 14 Nm
Chain tensioner adjuster bolt	1	10–12 Nm
Decompression valve counterweight mounting bolt	1	11 – 15 Nm
Decompression valve stop plate bolt	1	5 – 6 Nm
Camshaft mounting bolt	1	4 – 6 Nm
Timing chain slipper bolt	1	11 – 13 Nm
RH engine cover fixing bolts	10	11 – 13 Nm
Magneto fixing screws	3	3 – 4 Nm (using LOCTITE 242 threadlocker)
CPS sensor fixing screws	2	3 – 4 Nm
Magneto nut	1	94 – 102 Nm
Flywheel bolts	6	8 – 12 Nm
Pickup cable clamp bolts	2	13 – 15 Nm
Drive pulley cover screws	3	4 – 6 Nm
Crankcase bolts	10	11 – 13 Nm
Starter motor mounting bolts	2	11 – 13 Nm
Ground cable fixing bolt	1	7 – 8,5 Nm
Air filter bracket bolt	1	8 – 12 Nm
Coolant pipe fixing bolts	2	11 – 13 Nm
Coolant bleed valve	1	4 – 6 Nm

Coolant hose clamps	All	3 - 5 Nm
BKT attaches the water hose to the engine.	2	10-12 Nm
Transmission unit		
Clutch mounting nut - belt drive wheel	1	45 - 50 Nm
Drive pulley nut	1	75 - 83 Nm
Transmission cover bolts	7	11 - 13 Nm
Drive shaft fastening nut	1	54 - 60 Nm

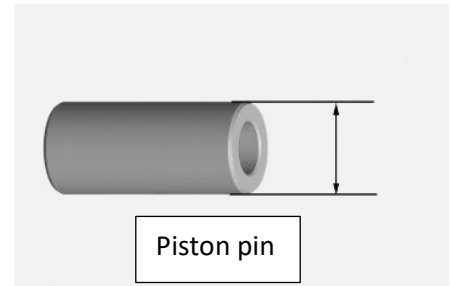
Assembly clearance**Cylinder – piston assy.****Cylinder – Piston**

Piston diameter (P)	74.967 ± 0.014 mm
Bore diameter (C)	75 + 0.038 + 0.01 mm

- The piston rings must be installed with the word <TOP> or the stamped mark racing upwards.
- Measure the outer diameter of the piston pin.

Standard diameter of piston pin

16 + 0.006 – 0.001 mm.

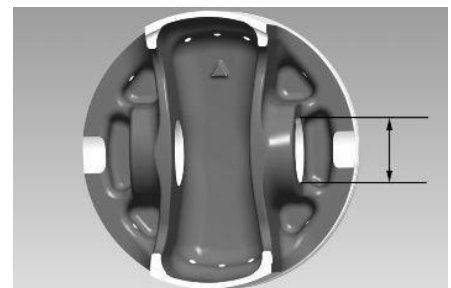


- Measure the diameter of the bearings on the piston.

Standard diameter

16 + 0.006 – 0.001 mm.

- Calculate the piston pin coupling clearance.

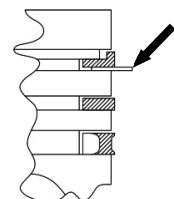
**Note**

The pin housings have 2 lubrication channels. For this reason, measurements must be made according to the piston axis.

Standard diameter

0.001 – 0.010mm.

- Carefully clean the sealing ring housings.
- Measure the coupling clearance between the sealing ring and the grooves using suitable sensors, as shown in the diagram.
- If the clearance is greater than that indicated in the table, replace the piston.



Note

- Measure the clearance by inserting the blade of the feeler Thickness gauge from the second seal side.
- Top piston ring – standard coupling clearance : 0.015 – 0.06 mm.
(Top piston ring – maximum clearance allowed after use : 0.07 mm.)
- Middle piston ring – standard coupling clearance : 0.015 – 0.06 mm.
(Middle piston ring – maximum clearance allowed after use : 0.07 mm.)
- Oil scraper ring – standard coupling clearance : 0.015 – 0.06 mm.
(Oil scraper ring – maximum clearance allowed after use : 0.07 mm.)

Piston ring

- Check the spacing on every ring lip. By inserting them one at a time so that the ring size remains original diameter size The ring should be inserted perpendicular to the cylinder.
- Check ring lip clearance using a feeler gauge.
- The ring should be replaced if it is found that the gap between the ring lips exceeds the specified value.

Note

Before replacing the piston rings, the clearance must be checked between the ring and the ring groove within the specified standard values. If the distance It is not as specified to change the piston and new cylinder block.

Standard diameter

Top piston ring

Standard value for ring lip spacing is 0.15 – 0.30 mm.

Middle piston ring

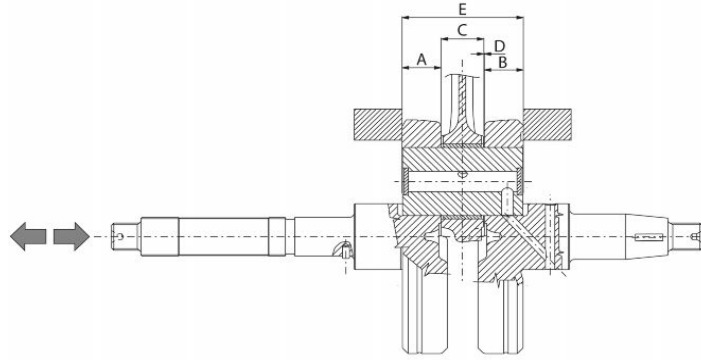
Standard value for ring lip spacing is 0.20 – 0.40 mm.

Oil scraper ring

Standard value for ring lip spacing is 0.20 – 0.40 mm.



Crankcase - crankshaft - connecting rod

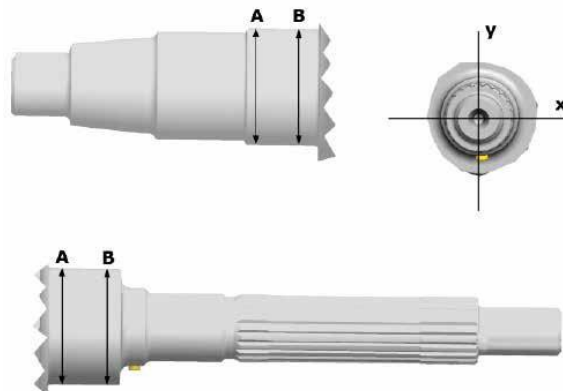


Axial clearance between crankshaft and connecting rod

Name	Size	Position	Quantity
Half-shaft, transmission side	16.6 +0-0.05	A	D = 0.20 - 0.50
Flywheel-side haft-shaft	16.6 +0-0.05	B	D = 0.20 - 0.50
Connecting rod	18 -0.10 -0.15	C	D = 0.20 - 0.50
Spacer tool	51.4 +0.05	E	D = 0.20 - 0.50

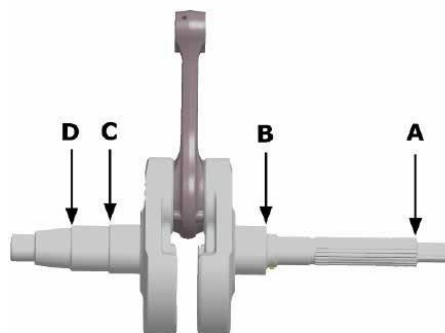
Diameter of crankshaft bearing

Measure the bearings on both axes X-Y.



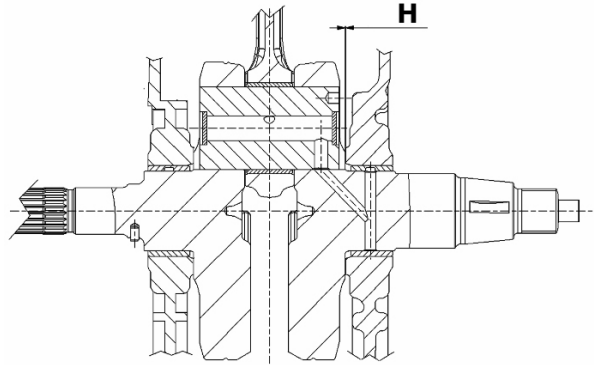
Crankshaft

- Crankshaft bearing : standard diameter : Cat. 1 28.998 - 29.004 mm.
- Crankshaft bearing : standard diameter : Cat. 2 29.004 - 29.010 mm.



Maximum admissible displacement

A	0.15 mm.
B	0.010 mm
C	0.010 mm
D	0.10 mm.

**Standard diameter**

Crankshaft – crankcase axial clearance $\langle H \rangle$: 0.15 – 0.43 mm.

- Using a bore gauge, measure the connecting rod small end diameter.

Note

If the connecting rod small end diameter exceeds the standard diameter, Exhibits wear or Overheating, proceed to replace the crankshaft as described In the crankshaft chapter.

**Standard diameter**

16 +0.025 +0.015 mm.

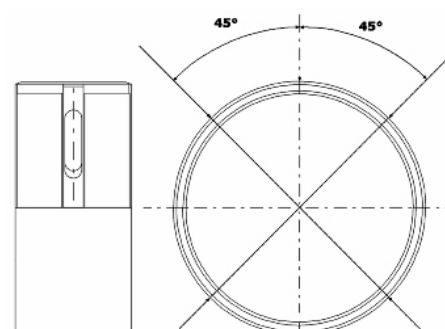
- so that the bushings have good lubrication There must be two important parts: Proper lubricant pressure and good lubricant flow rate Components bushing must be in the correct position In order not to obstruct the lubricating oil passageway.
- The main bushing will contain bearings. (Sharp connecting rod) is a piece made of metal with 1 hole and an oil groove.
- The bearing acts as a support for the spindle or movement, resulting in wear from the movement of the part. For this reason, 2 bearings must be installed in a splicing manner.
to prevent the oil passage from being clogged Match the pair of bearings correctly as in the picture.
- The distance between the crankshaft gap and the depth of the bushings affect the lubricant flow.
- Check the inner diameter of the main bushing in all 3 directions given as shown.
- There is only one type of main bushing housing hole in the crankcase. The standard bushing diameter after driving is variable on the basis of a coupling selection.

Bushings**Standard diameter**

Crankshafts – bushing maximum clearance admitted : 0.08 mm.

Diameter of crankcase without bushing

CAT : 32.959 – 32.965 mm.



Note

Because bearings will wear out with use, it is not necessary to measure the size on both sides of the bearing surface.

Cylinder head

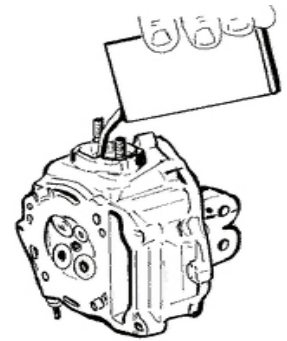
- Before doing anything, clean all contact surfaces of the cylinder head.
Assemble the valve and valve spring to their original position.
- Use a a trued bar and a feeler thickness to measure wear. cylinder head deflection



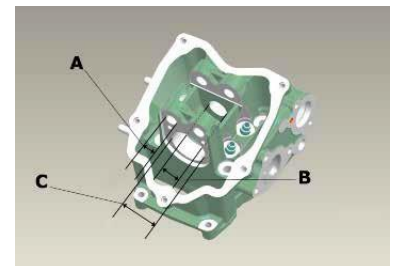
Standard diameter

Maximum allowable run-out : 0.1 mm.

- If the measured value is greater than the specified standard value
Replace the cylinder head with a new one.
- Inspect the surfaces around the intake and exhaust ports.
- Inspect the camshaft and rocker-arm must not wear
- Check that the valve covers are free of signs of wear.
- Check that there is no coolant leaking from the sealing area.
- Assemble the valve to the cylinder head.
- Inspect both intake and exhaust valves.
- Check the valve for leaks by pouring fuel.
At the intake and exhaust ports, use your finger to push the valve (as in the picture).



- Measure the diameter of the bearings on the cylinder head, camshaft,
Rocking lever support pin with a bore diameter. According to the value specified



Bearing diameter at cylinder head

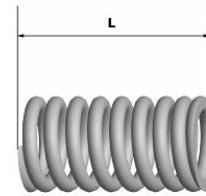
Bearing<A>	12.000 - 12.018
Bearing	20.000 - 20.021
Bearing<C>	37.000 - 37.025

- Measuring the length of valve springs

Standard

Standard length:40.2 mm.

Acceptable length after use:38.2 mm.

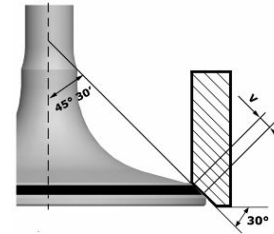


- Clean the soot from the valve seats.
- use Prussian blue checks the size of the valve seat contact area. as shown in figure<V>

Standard value

1 – 1.3 mm.

acceptable value :1.6 mm.

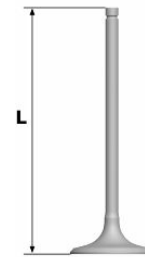


- If the angle of the valve seat is wider than the specified standard size
The required standard width is 45 degrees. Grind the valve seat and grind the valve.
- In the event that the valve seat is found to have excessive wear or damage, the valve must be replaced.
-

valve standard length

intake valve : 94.6 mm.

Exhaust valve : 94.4 mm.



- Measure the diameter of the valve stem in the three locations indicated in the figure.

Valve Standard Diameter

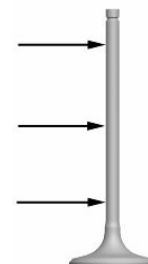
intake valve : 4.987 – 4.972 mm.

Exhaust valve : 4.975 – 4.960 mm.

Minimum acceptable valve diameter

intake valve : 4.96 mm.

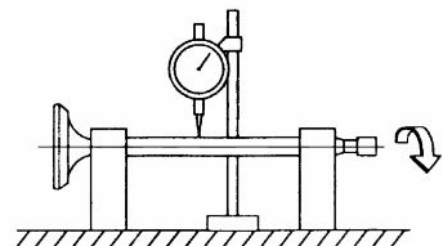
Exhaust valve : 4.945 mm.



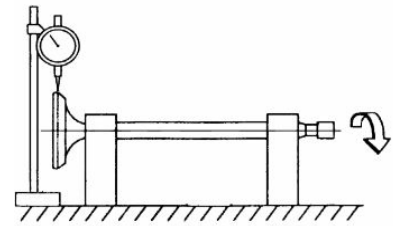
- Check the deviation of the valve stem by resting it on a <V> shaped abutment and measuring the extent of the deformation with a comparator

Standard

0.1 mm.



- Check the concentricity of the valve head by arranging a comparator at right angle relative to the valve head and rotate it on a "V" shaped abutment.



Standard

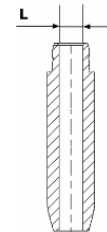
0.03mm.

- Measure the size of the valve housing.

Standard

5 +0.012 mm.

around the edge of the valve seat and turn around as shown in the figure



Standard

0.03mm.

- After measuring the diameters of the valve stem and valve housing, calculate the clearance.

Intake valve

Standard clearance : 0.013 – 0.04 mm.

Admissible limit : 0.08 mm.

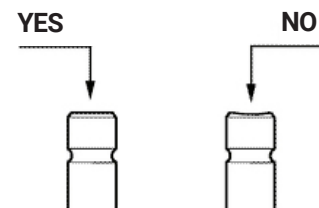
Exhaust valve

Standard clearance : 0.025 – 0.052 mm.

Admissible limit : 0.09 mm



- Check for wear at the end of the valve stem.



- If the valve is inspected and no abnormalities are found, the original valve can be continued to be used. To achieve better performance, fine-grained valve grinding diamonds are used to grind valves. Keep the cylinder head and valves in a horizontal axis to prevent debris from falling in between. Valve stem as shown



Caution

- to prevent surface damage caused by scratches Do not grind valves without grinding diamonds for valve grinding.
- doClean the cylinder head and valves with appropriate cleaning agents.
- Do not switch the position of the left-right valve assembly.
- Check the camshafts for no signs of wear or abnormal condition.
- Use a micrometer. Measure the diameter of the camshaft.

Camshaft

Standard diameter

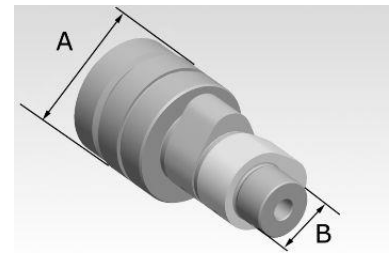
Camshaft : standard diameter bearing A : 36.95 – 36.975 mm.

Camshaft : standard diameter bearing B : 19.959 – 19.98 mm.

Minimum Admissible diameter

Camshaft : standard diameter bearing A : 36.94 mm.

Camshaft : standard diameter bearing B : 19.950 mm.

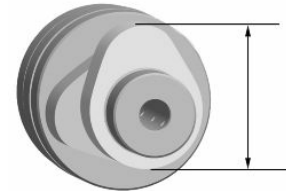


- Using a micrometer, measure the cam height

Standard height

Check camshaft : Standard inlet : 30.285 mm.

Check camshaft : Standard outlet : 29.209 mm.

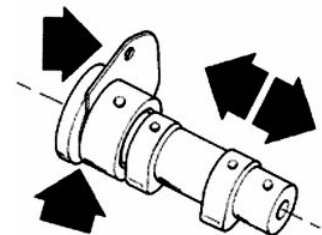


- Check the axial clearance of the camshafts.

Axial clearance of camshafts

Camshaft : Standard axial clearance : 0.11 – 0.41 mm.

Camshaft : Maximum Admissible axial clearance : 0.42 mm.



- Measure the outer diameter of the valve rocker shaft.
- Check the condition of the valve rocker shafts. There must be no signs of wear.
- Measure the inside diameter of each valve rocker.
- Check valve rocker condition, the area of contact with the camshaft and The valve clearance adjustment area must not be worn.

Valve rocker shaft diameter – valve rocker

Inside the valve rocker : Standard : 12.000 – 12.011 mm.

valve rocker shaft : Standard : 11.977 – 11.985 mm.



Compressive reducer and camshaft

Compressive Reducer








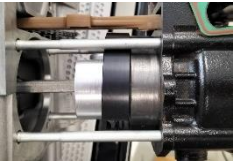











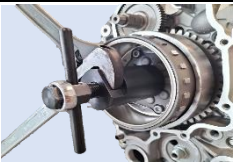




Camshaft









- Check the compression in the combustion chamber and the engine rotation during ignition to be within the specified values.
- Perform a compression check when the battery has sufficient voltage. Using a compression gauge Measure while the engine is rotating. (at room temperature)

Checking compression in the combustion chamber during ignition

Engine speed (R.P.M.)	Compression in the combustion chamber (bar)
400	4.5
600	8.0

No.	Name	Pasts numbers	pictures	How to use
1	Flywheel holder	GZZ-NEXUS250-001		
2	Timing system fixing	GZZ-NEX US250-002		
3	Piston assembling	GZZ-NEXUS250-003		
4	Front pulley nut fixing	GZZ-NEXUS250-011		
5	Cylinder head stud seal ring assembling 1	GZZ-NXS250-015		
6	Cylinder head stud seal ring assembling 2	GZZ-NXS250-008		
7	Cylinder head stud seal ring assembling 3	GZZ-NXS250-009		
8	Rear pulley nut fixing	GZZ-FI25-011		
9	Flywheel dis-assembling			
10	Oil filter assembling	GZZ-NXS250-041		
11	Pulley shaft oil seal assembling 1	GZZ-FI25-004		

12	Pulley shaft oil seal assembling 2	GZZ-V125-006		
13	Timing cover assembling	GZZ-V125-007		
14	Seal ring assembling	GZZ-NEXUS-001		

Periodic maintenance table

Inspection items	Period inspection	Mileage / Km	First 1,000	Every 4,000	Every 8,000	Every 12,000
		Time / Month	First 3 M	Every 15 M	Every 30 M	Every 45 M
Fuel system			J		J	
Fuel level display			J		J	
Throttle operation			J		A	
Air filter element				J	R	
Crankcase ventilation					A	
Spark plug *					R	
Valve clearance						A
Engine oil			R	R		
Engine oil filter *			R		R	
Engine idle speed					J	
Radiator coolant */▲					J	
Cooling system					J	
Secondary Air Supply System					J	
Evaporative Emission Control System					J	
Drive Belt *					J	R
Belt case filter *					J	
Final Drive Oil			R		R	
Brake fluid */▲			J		J	
Brake pads wear *					J	
Brake system *					J	
Headlight Aim					A	
Lights / horn					J	
CVT's Parts *					J	R
Side Stand / Center Stand					J	
Suspension *					J	
Nut, Bolt, Fasteners			J		J	
Wheel / tire			J	J		
Steering *					A	

J : Check and clean, adjust, or replace if necessary. **R** : Replace. **A** : Check and clean. **▲** : Replace every 2 years.

* : This job must be carried out by the authorized dealer only.

Specification of liquids

Product introduction

Type	Details	Grades
Engine oil 5W-40	Synthetic base oil for engines 4 stroke	SAE 5W - 40; JASO MB; API SL; ACEA A3
Transmission oil 80W - 90	Lubricating oil for gears and Transmission	SAE 80W-90 API GL-4
Coolant	Ready-mixed coolant type Ethylene Glycol	ASTM D 3306 - ASTM D 4656 - ASTM D 4985 - CUNA NC 956 -16
Brake fluid DOT4	Synthetic brake fluid type DOT 4	SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4

Maintenance warning

- This function will remind you of scheduled maintenance. To turn the key to position<ON> each time the dashboard will perform a preliminary check. The maintenance warning symbol shows when it comes to maintenance. This symbol will disappear when reset after completed servicing.

**Resetting the maintenance warning symbols**

- Turn the key to the position<ON>
- press the button<Mode>Hold for 10 seconds.

Caution

The procedure for resetting the maintenance symbols must be done while the motorcycle is stationary only.

Spark plug

- Put the vehicle on the center stand.
- Open the seat and remove 4 bolts (M6).
- Remove the luggage box.
- Remove the spark plug cable.
- Loosen the spark plug by a spark plug box wrench.
- Remove the spark plug and inspect.
- When assembling the spark plug, turning in by hand and tighten with the specified torque value.

**Caution**

- Removing the spark plug must only be done while the engine is cold. Spark plug must be changed at the specified intervals, Unspecified spark plug or worn-out spark plug will damage the engine and electrical system.

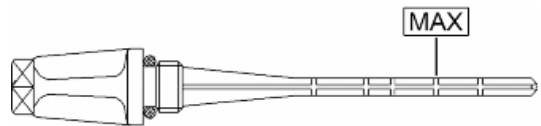
Transmission oil

Check the transmission oil level

- Put the vehicle on the main stand and level ground.
- Remove the dipstick and dry the tip of dipstick with clean cloth.
- Turn the dipstick in all the way down.

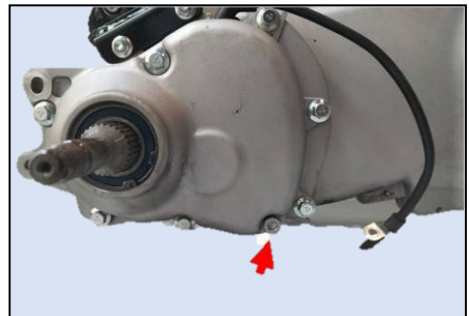


- Remove the dipstick. Check the oil level between the lowest level (MIN) and highest level (MAX), if the oil level is too low, adding more oil, but must not exceed the maximum level.
- Put the dipstick back and tighten it.
Make sure it is screwed in correctly.



Changing the transmission oil

- Put the vehicle on the main stand and level ground.
- Loosen the dipstick.
- Loosen the oil drain screw. Let the oil drain out.
- Tighten the oil drain screw to the specified torque and fill oil according to recommended spec.



Air filter

- Remove the rubber mat at footrest.
- Loosen screws and bolts (M6).



- Remove the LH footrest cover by loosen the screw and push down the lock pin behind the cover.



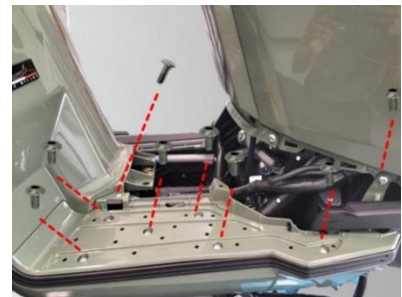
- Remove the RH footrest cover by loosen the screw and push down the lock pin behind the cover.



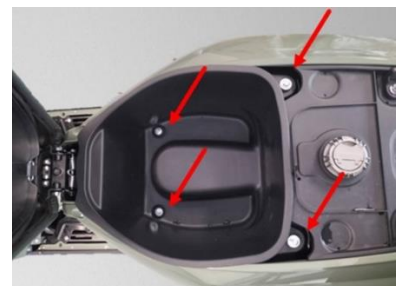
- Remove the 3 rubber floor strips on the left side.



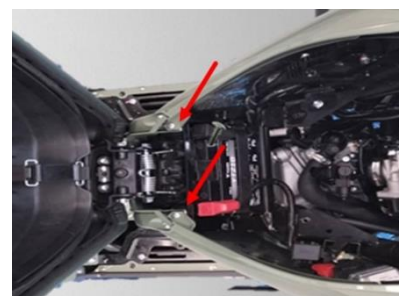
- Pull out the left footrest by loosen 8 bolts (M6).



- Remove the luggage box by loosen 4 mounting bolts.



- Remove upper body cover by loosen 2 screws and



- Loosen 4 bolts (M6) and



- loosen 3 bolts (M8) and



- Remove the fuel tank cap
- Remove the rubber plate



- Remove the drain hose
- Remove the plastic cover



- Loosen 2 bolts (M8)
- Remove the upper cover.



- Loosen 2 screws.
- Remove the taillight rim.



- loosen 4 bolts (M6) to remove the LH side cover.



- Loosen 9 screws of air filter cover.
- Remove the air filter element.

caution

Replace the air filter element according to the maintenance schedule.

If the vehicle is operated on rough or dusty roads. It is essential to inspect the air filter more frequently to prevent damage to the engine.



Engine oil

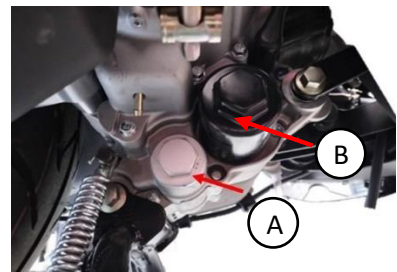
For 4-stroke engine, the lubricant is responsible for lubricating parts such as bearings, cylinder, piston, etc. Inadequate lubricant may damage the engine. In general the operation of a 4-stroke engine can degrade the lubricant and its properties, especially during the run-in period. The amount of engine oil decreases depending on operating conditions (e.g. accelerating the engine at high revs for long periods of time will result in high oil consumption).

Oil change

- Change the engine oil according to the maintenance schedule.
- Unscrew the oil dipstick to make it easier for the engine oil to drain out.



- Unscrew the oil drain plug (A) and remove the strainer to allow the engine oil to drain into the container.
- Unscrew the oil filter (B).



- Check the O-ring on the drain plug and strainer.
- Apply the new engine oil to the O-rings. Install the strainer and tighten to specified torque.



- Apply the new engine oil to the O-ring of new oil filter and tighten the filter with the specified torque.



- fill the specified engine oil to level.
Start the engine and let it idle for approx 2 – 3 minutes and turn off the engine.
Check the oil level at the dipstick, If the oil level is too low, adding more oil but do not exceed the maximum level.



Note

Oil change must be done while engine is warm.

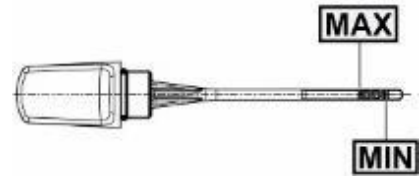
Caution

The drained engine oil contains substances that are harmful to the environment.

Measuring the engine oil level

Must be checked while the engine is cold with the following steps :

- Put the vehicle on the center stand on level ground.
- Unscrew the dipstick. Wipe the tip with clean cloth, then insert the dipstick back and turn it all the way down.
- Unscrew the dipstick. Check the oil level between MIN and MAX level. If the oil level is below the MIN, adding more engine oil but do not exceed the maximum level.
- Replace the dipstick and securely tighten.

**Oil filter**

The oil filter must be changed according to the maintenance schedule

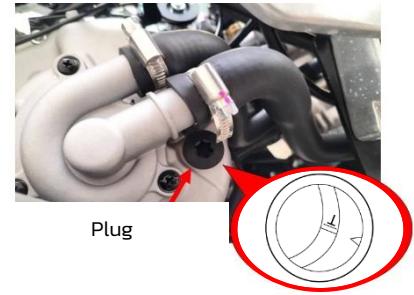
**Oil pressure warning light**

The vehicle is equipped with a warning light on the dashboard panel that lights up when the key is turned to the (ON) position. However, this light should switch off once the engine has been started. If the light turns on during braking, at idling speed or while turning a corner, it is necessary to check the oil level and the lubrication system.

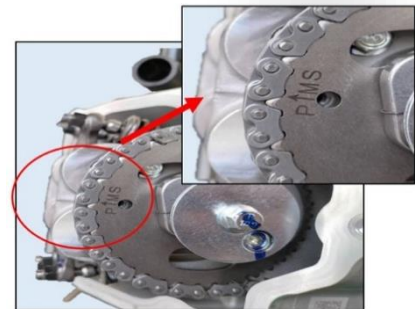


Valve clearance adjustment

- Remove LH and RH side covers (refer to previous described procedures)
- Remove the LH engine cover.
- Remove the spark plug.
- Remove the plug of timing mark hole.
- turning drive pulley to align the mark "T" on the magneto wheel with reference mark on RH engine cover, as shown in the picture.



- Remove the cylinder head cover.
- Check the alignment of mark "PSM" on the camshaft sprocket with the mark on the cylinder head.
- If the marks are deviated, the ignition timing is wrong and require timing adjustment.



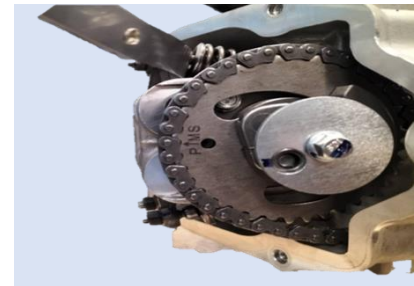
- Use a feeler gauge to measure valve clearance and adjust the clearance to meet the specified standards.

Standard value

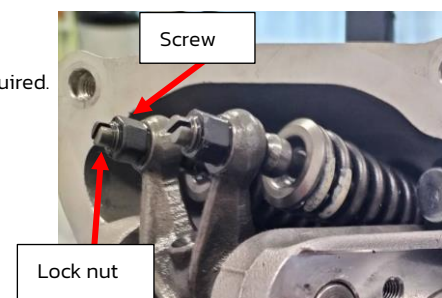
valve clearance (while the engine is cold)

Intake valve : 0.10 mm.

Exhaust valve : 0.15 mm.



- If the valve clearance does not meet the specified standard value, the adjustment is required. Adjust the valve clearance by loosening the lock nut and adjusting on the set screw, as shown in the figure.
- Install the cylinder head cover.
- Reinstall the removed parts in vice versa.



Engine cooling system

- The coolant level must be checked according to the maintenance schedule. and must be checked while the engine is cold.
- If the engine operating temperature is high, the warning light will appear in the dashboard. The engine must be stopped immediately and check the cooling system when the engine is cold



Checking the coolant level

- Put the vehicle on the center stand on level ground.
- If the coolant level is at low level or below, top up more coolant, it must be between the low (L) and full (F) level.

Warning

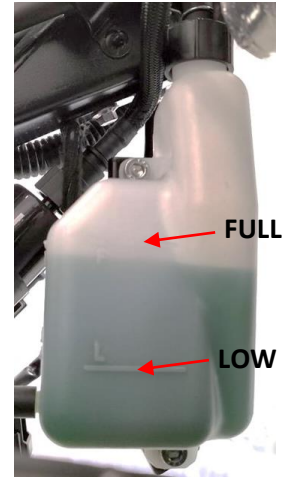
- Make sure that the coolant does not exceed the full level to prevent coolant from flowing out of the reservoir while riding.
- For safety, do not open the radiator cap while the engine is hot.

Recommended coolant

Ready-to-use green coolant contains ethylene glycol and anti-corrosion agents and mix antifreeze : ASTM D 3306 – ASTM D 4656 – ASTM D 4985 – CUNA NC 956-16

Coolant filling

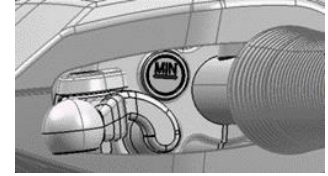
- Coolant should be added while the engine is cold.
- If you need to top up frequently, check the system to find the cause and fix it.
- Change the new coolant at the specified intervals.



Brake system

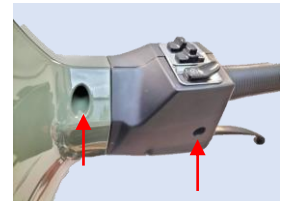
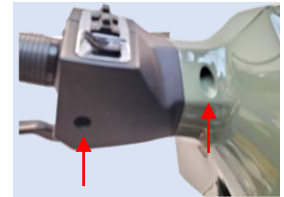
Checking the brake fluid level

- Put the vehicle on level ground with the center stand holding the handlebars straight.
- Check the brake fluid level at the peephole. If the brake fluid level is low, add more brake fluid.
- If the brake fluid level at the peephole is full, it is normal.



Adding brake fluid

- Remove the headlight rim.
- Remove the handlebar cover by loosen 4 screws.
- Remove the handlebar cover.
- Disconnect the speedometer from harness.
- Remove the reservoir cover and fill with recommended brake fluid



Caution

- Be careful not to let the brake fluid touch your skin or clothing. If contacted, rinse thoroughly with water.
- Be careful not to let the brake fluid come into contact with the painted parts.
- Brake fluid has the ability to absorb moisture from the air. If the brake fluid has high humidity will result in reduced braking performance.
- Do not use brake fluid that has been used or has been opened or is left over from previous use.
- Brake fluid should be replaced at the intervals specified in the maintenance schedule.

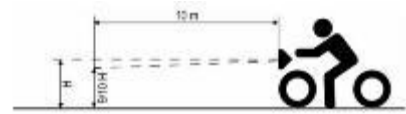
Recommended Brake fluid

Brake fluid : DOT4 SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4

Headlight adjustment

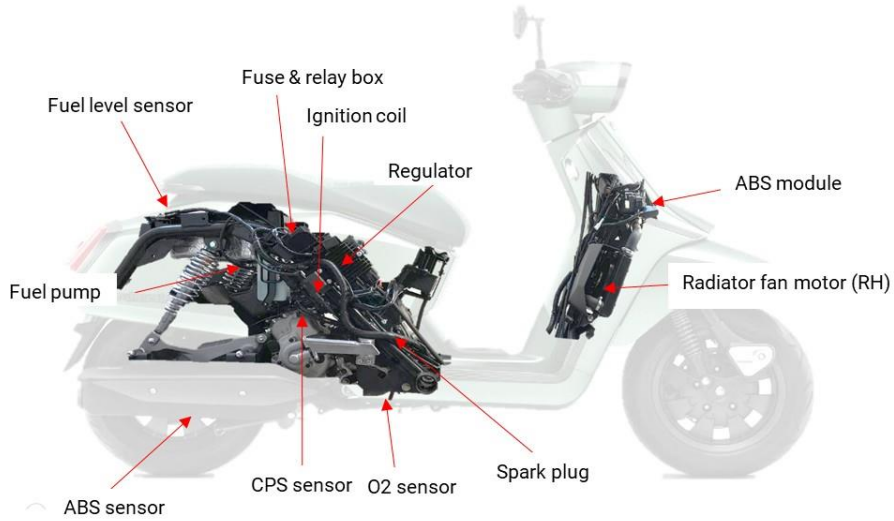
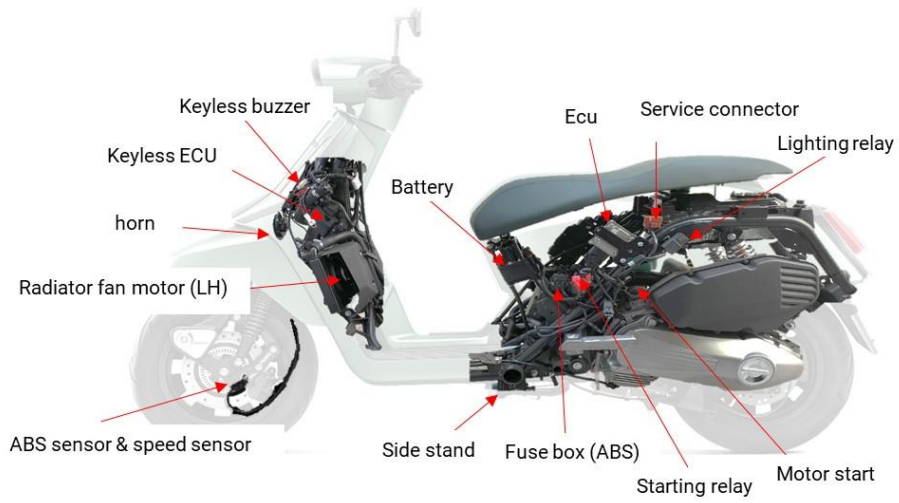
Follow these steps:

1. Adjust the vehicle position so that it is straight. Check that the tire pressure is within value according to specified standard, The vehicle is located on a level surface away from the screen or white wall about 10 meters. The the longitudinal axis of vehicle must be perpendicular to the screen or wall in the front.
2. Turn on the headlight and check the beam on the screen or wall is not higher than 9/10 or lower than 7/10 of the distance from the ground to the center of vehicle headlight.
3. Adjust the headlight by turning the adjusting screw if beam level is found out of specified level.

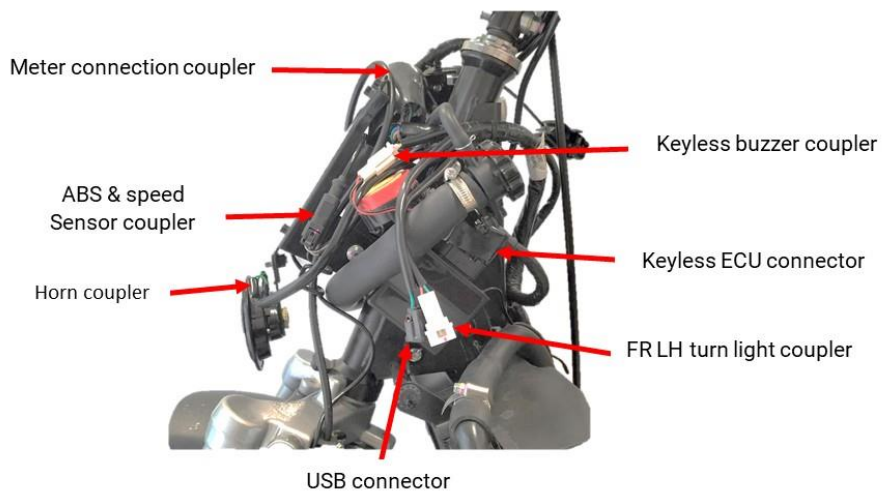
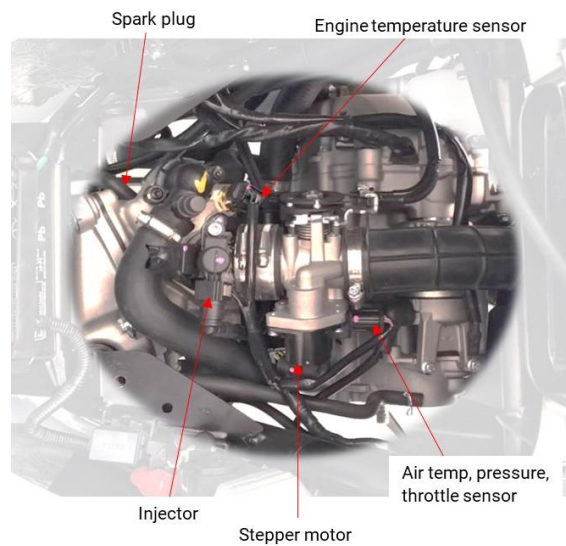


Electrical system

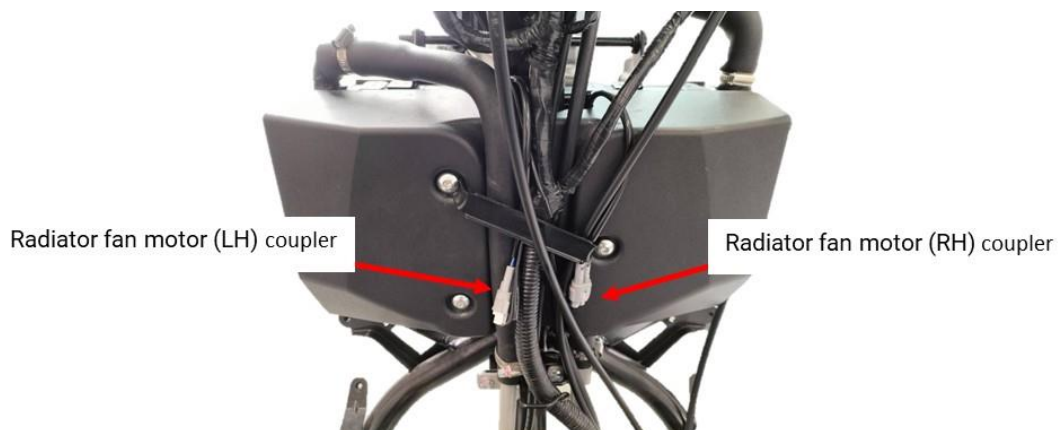
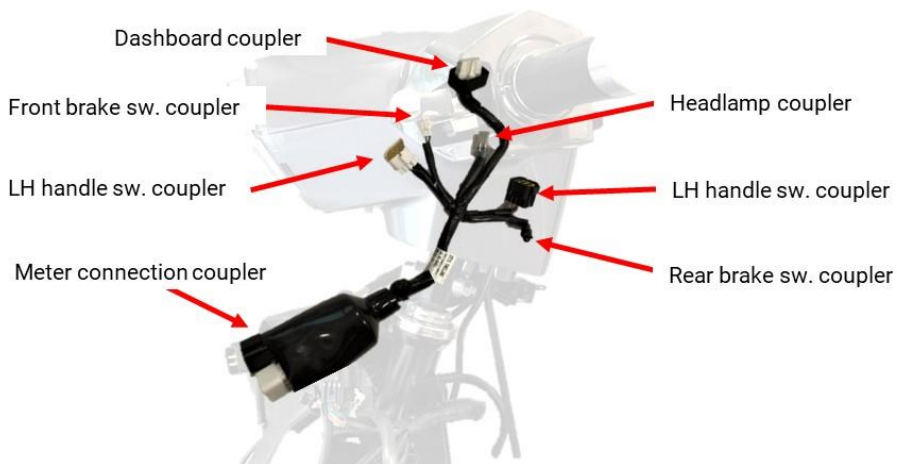
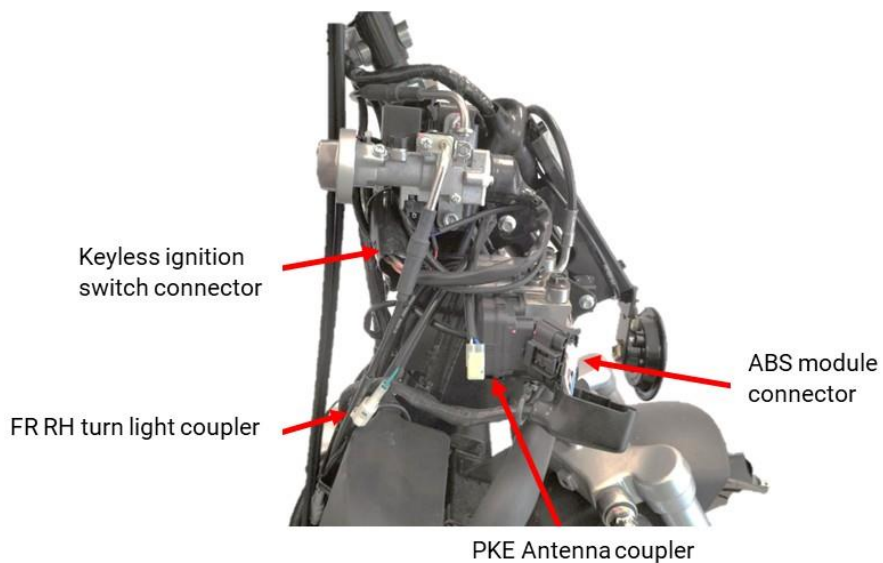
Location of electrical equipments



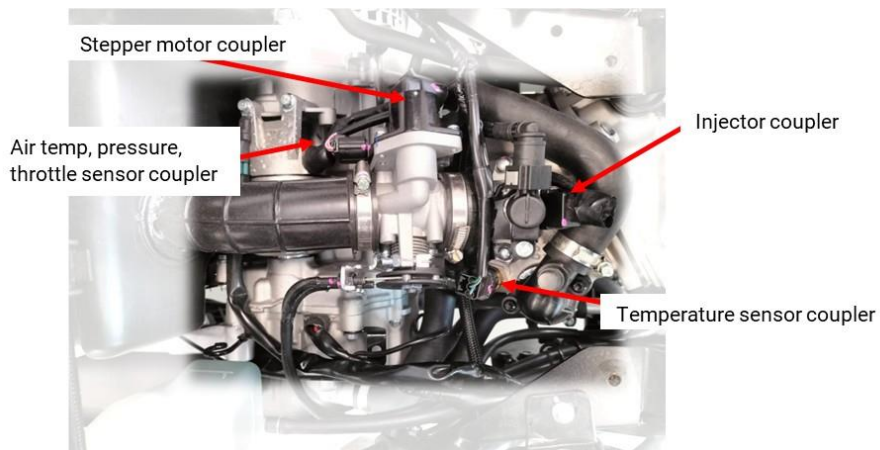
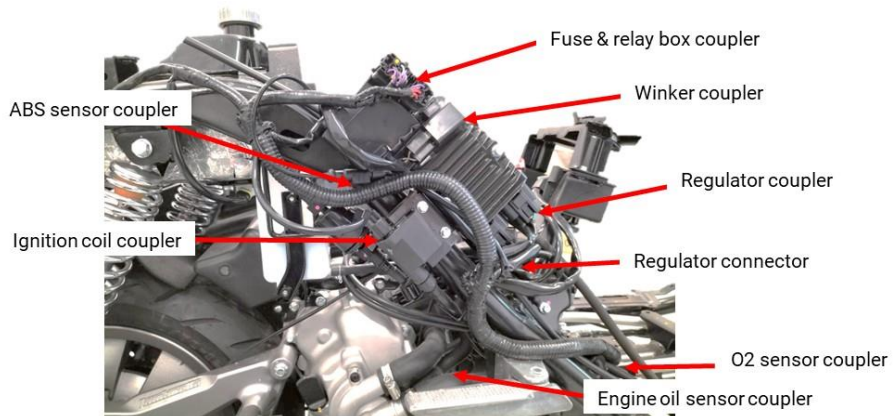
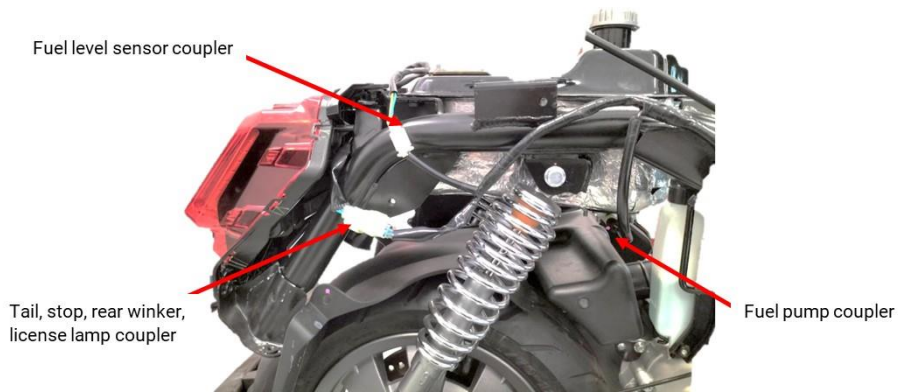
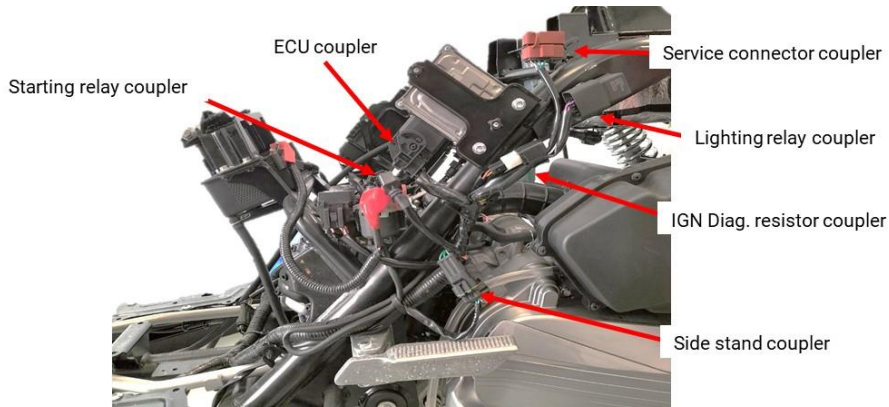
Location of electrical equipments



Location of electrical equipments

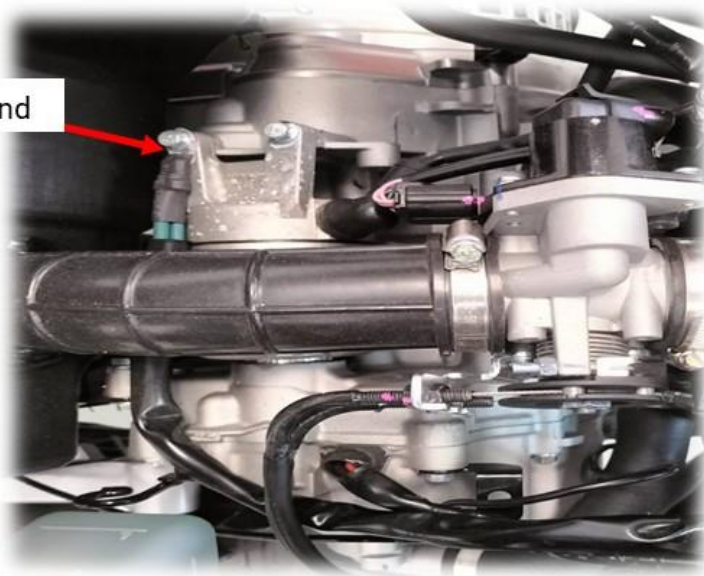


Location of electrical equipments



Location of electrical equipments

Engine ground



Frame ground 1



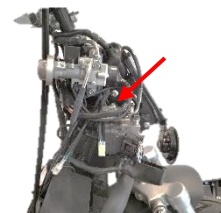
Frame ground 2



Location of electrical equipments

1. ABS Module

- Located inside the right front windscreen as shown in the picture.



2. APK Antenna

- Located inside the right front windshield as shown in the picture.



3. ECU box

- Located under U Box left side



4. PDA connector

- Located under U Box on the left above ECU box



5. Ignition coil

- Located inside the right body cover. Under the regulator



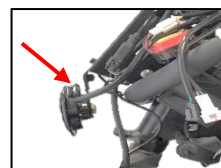
6. Headlight relay

- around Inside the left body cover, under the connector plug.PDA



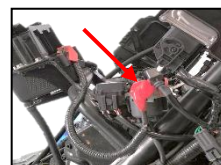
7. Horn

- around inside shield Front wind



8. Starter relay

- Located inside the left body cover. Under the ECU box



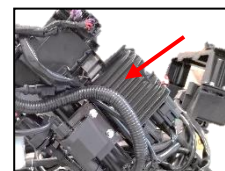
9. Fuse box

- The ABS fuse box is located under the left luggage box.
- The main fuse box is located inside the right body cover, above the regulator.



10. Regulator

- Located inside the right body cover. Under the main fuse box



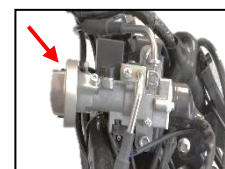
11. Magnetic wheel connector

- Located Inside the right body cover Under the regulator



12. Key switch

- Located inside the front windshield.



13. fuel level sensor

- in the southtop tank cover



14. coolant temperature sensor

- Located under the storage box under the seat.



15. turn signal relay

- Located in the area around inside shield Front wind



16. Front wheel speed sensor plug

- located in the area of the front windshield Next to the speaker



17. Left front turn signal assembly

- Located in the area of the left front windshield



18. Set of front right turn signals

- Located in the area of the windshield on the right side



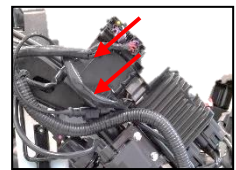
19. fuel pump

- Locate under fuel tank



20. rear wheel speed sensor plug

- Locate Inside right body cover Under turn signal relay

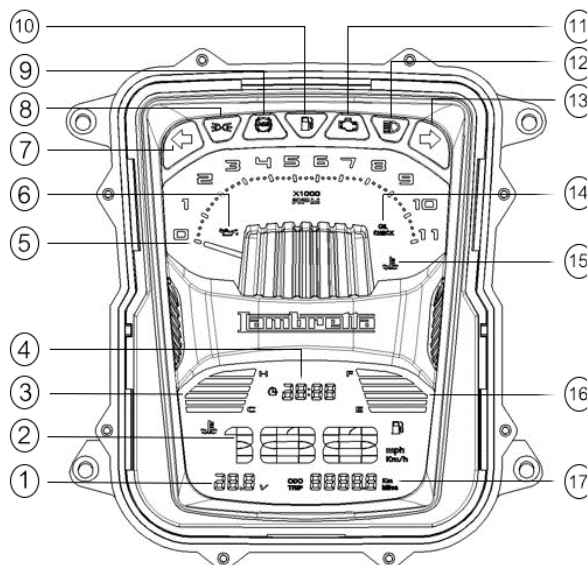


21. Fuel injector holder

- located under U Box under the seat



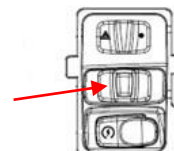
Dashboard



① battery voltage gauge	⑩ Low fuel warning light
② speedometer	⑪ Warning lightEFI
③ coolant temperature gauge	⑫ high beam warning light
④ clock	⑬ right turn signal
⑤ tachometer	⑭ warning light traction Check distance
⑥ Low oil pressure warning light	⑮ overheat warning light
⑦ left turn signal	⑯ fuel gauge
⑧ dimmer signal	⑰ Odometer
⑨ system warning lightABS	

Mode button (MODE)

It allows access to information displayed on the screen. It also helps. Set parameters with short or long press of a button.



Note

press short button: Pressgo downon the button1 time
 press long button: Press down on the buttonholdfor more than 2 seconds

Distance check warning lamp

Each time you turn the ignition into position, ON The screen will display an Oil check warning lamp. This symbol indicates a periodic maintenance reminder. If a certain distance is reached, every time the ignition is turned to the ON position, this symbol is always displayed.Until the periodic check-up service.



Resetting the range check warning lamp

Resetting the range check warning lamp must follow the procedure. As follows:

- Turn the ignition switch to the ON position.
- Keep the odometer at the ODO position.
- Press and hold the MODE button for 15 seconds but not more than 20 seconds.
- Oil check will turn off. If you release your hand from the MODE button before 15 seconds, the
- The range check will not turn off because the system has not reset.

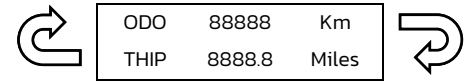
Caution

Procedure for resetting the warning light: actionCheckdistanceMust be done while the vehicle is stationary only. (speed equal to 0 km/hour)

Section showing various functions

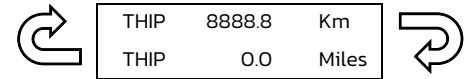
Total distance

This part of the screen will display the following information: actionCycle using the buttons MODE



trip distance

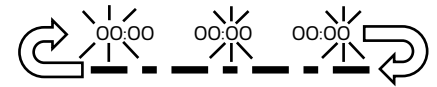
This screen will display the information as below. and when the button is pressed MODE Press and hold, the trip distance value returns to the default value.



Clock settings

actionAdjust the clock settings Must follow the steps as follows:

- Turn the ignition switch to the ON
- Let the distance measure be at its position. ODO
- press the button MODE hold 10 seconds but not more than 15 second Then the numbers will flash. Short press to change the numerical value. Long press to change the time value.



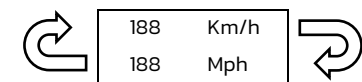
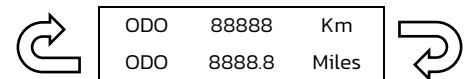
Warning

Disconnecting the battery terminals will cause the watch to be reset.

Adjusting the measurement unit settings

Adjust measurement units Must follow the steps as follows :

- Turn the ignition switch to the ON
- The screen will display as shown.
- Press the button MODE and hold for 10 seconds, the measurement unit will change.



Removing the engine from the vehicle

- Put the vehicle on a suitable level surface.
- This operation must only be done while the engine is cold.
- Remove the luggage box.
- Remove the covers (Refer to the steps checking the ignition timing)
- Remove the battery terminals.

Exhaust pipe removal

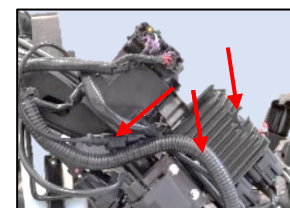
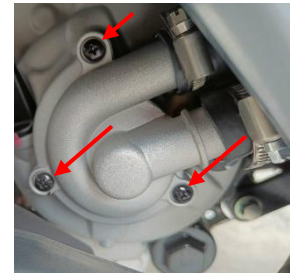
- Loosen the muffler clamp.
 - Loosen the 3 screws mounting muffler.
 - Remove muffler.
-
- unplug O2 sensor.
 - Loosen 2 nuts mounting the exhaust pipe.
 - Remove exhaust pipe.

Caution

When reinstall the exhaust pipe and muffler, both gaskets must be replaced.

- Place a container under the engine to accommodate the amount of coolant.
- Unbolt the water pump cover and remove cover.

- Unplug the rear ABS sensor.
- Unplug CPS and the magneto coil.
- Remove the rear wheel nut lock clip.
- Remove the rear wheel nut.
- Remove a bolt (M8) mounting the rear shock absorber.
- Remove 2 bolts (M8) that hold the swingarm and remove the swingarm



- Remove 5 bolts (M6) mounting ABS sensor



- Slightly loosen 5 bolts (M8) mounting rear wheel.



- Remove 2 bolts (M6) air filter holder



- unplug the spark plug cap.
- Unplug the injector.
- Unplug Map sensor.
- Unplug the idle speed sensor.
- Unplug the temperature sensor.
- Disconnect the fuel line.
- Remove the throttle cables.
- Disconnect the ground wire.
- Disconnect the wires to the starter motor.
- Disconnect the air filter pipe and remove the air filter.



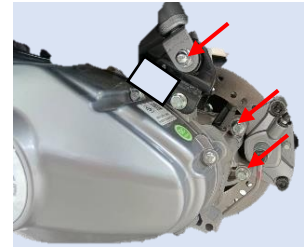
- Unplug the oil pressure switch.



- Remove the rear brake cable mounting bracket to the engine crankcase.



- Remove 2 bolts (M8) mounting rear brake caliper.
- Remove a bolt (M8) mounting rear shock absorber.



- Remove the nut mounting the engine and remove related bolt from opposite side.
- Remove the engine.



- Reinstall process vice versa and tightening procedures with the specified torque value.

Warning

When assembly is complete, please check the throttles operation and electrical equipments.

Disassemble of engine

Remove LH cover

- Use a screw driver flat remove the front plastic cover.



- Use a special tool to lock the pulleys.

special tools

GZZ-F125-011 REAR PULLEY NUT FIXING



- Loosen the retaining nut and remove the retaining nut with the washer.



- Loosen bolts and remove belt cover fixing bolts.



- Remove the belt cover.



Removing the clutch shaft bearing

- Remove the bearing locking ring.
- Use a special tool to remove the axle shaft seal.



Clutch shaft bearing assembly

- Use a hot air gun to blow the ball socket.
- Use a special tool to hammer the ball into the socket.



- Put the ball bearing lock ring back



Removing the rear clutch assembly

- Remove the Clutch outer and clutch assembly.

Note

The Clutch outer can be removed without removing the pulley assembly.



Clutch outer inspection

- Check that the Clutch outer is not deformed or abnormal.
- Measure the inside diameter.



Standard

Maximum value : Diameter : 134.5 mm.

Standard value : Diameter : 134 - 134.2 mm.

Check the rotation of the Clutch outer.

- Assemble the Clutch outer and clutch shaft with 15 and 17 mm ball bearings..with axle shaft
- Put the washer together with the nut and install it on the stand to measure.
- Place the clutch/shaft bowl on the support to measure the shaft curvature.
- Rotate the shaft and read the value from the dial gauge by measuring eccentricity on inner edges.
- repeat the measurement in 3 positions (center, outside, inside)
- If the value exceeds the standard, replace the Clutch outer.



Standard

Maximum allowable 0.15 mm.

Inspecting the clutch

- Check the thickness of the clutch cloth.
- Check that the clutch lining contact surfaces are free of grease or lubricant.
If lubricant is found, check the seals.

**Note**

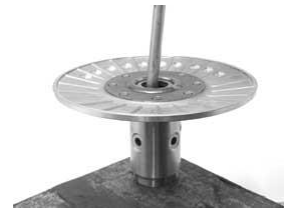
The thickness of the entire clutch cloth. The 3 parts must not be too different.
If the difference in thickness is too large it may cause the clutch to slip or make a sound.

Standard value

Minimum thickness: 1 mm

Removing the driven half-pulley bearing

- Check that the pulley bearings are not worn or noisy. If found, replace it.
- Use two flathead screwdrivers to remove the lock ring.
- Place the pulley using a support stick.
- Take out the outer bearing.



- Place the parts using wood or other suitable tools as shown.
- Use a special tool to suck out the inner bearing.

**Inspection the driven fixed half-pulley**

- Measure the outer bushing core of the pulley
- Check that the contact between the pulley and the belt is not damaged.
- joint check, pins, various pivot points
- Check that the belt contact is consistent.

**Standard**

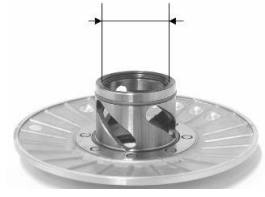
Minimum diameter of rear pulleys : 40.96 mm.

Rear Pulley Standard Diameter : 40.985 mm.



Inspection the driven sliding half-pulley

- Remove 2 washers and 2 O-rings.
- Measure the size bushing inside of the front pulley
- Check that the contact between the pulley and the belt is not damaged.
- joint check, pins, pivot points
- Check that the belt contact is consistent.



Standard

Surface contact: 0.3 mm.

Standard diameter of rear drive pulleys : 41.000 – 41.035 mm.

Minimum diameter of the rear drive pulley : 41.08 mm.



Rear pulley assembly

- Place the pulley on a wooden floor.
- Reinsert the bearings.
- Reassembling the bearing using a hammer bearing hammer in and assembling. Sample locking ring as shown in the picture



Note

Hammer the ball bearing into the groove of the locking ring.



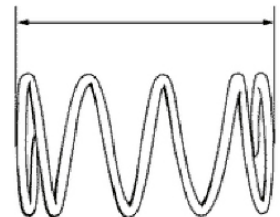
Clutch Spring Inspection

- Measure the length of the spring while the spring is fully extended.

Standard value

Standard Length : 123 mm.

Acceptable after-use length: 118 mm



Assembling the rear clutch assembly

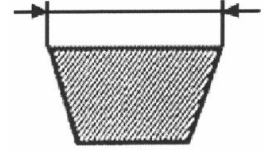
- Reassemble the removal process

Torque value

Pulley clutch clamp nut : 45 – 50 Nm

Drive-Belt Inspection

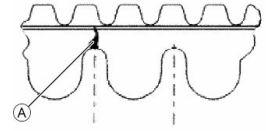
- Check that the belt is not damaged, torn or worn abnormally.
- The belt must have the correct width according to the standard value.



Standard value

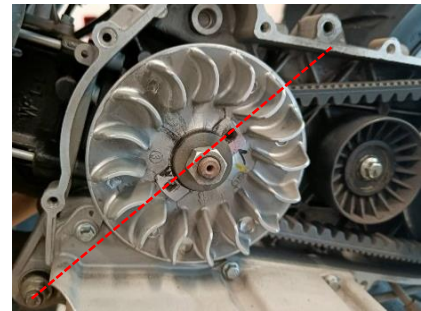
Minimum belt width : 21.0 mm

- Check the wear condition of the belt especially visually.
The belt groove may have cracks as shown. If the belt is found to be worn Or there are cracks to replace.



Removing Drive pulley

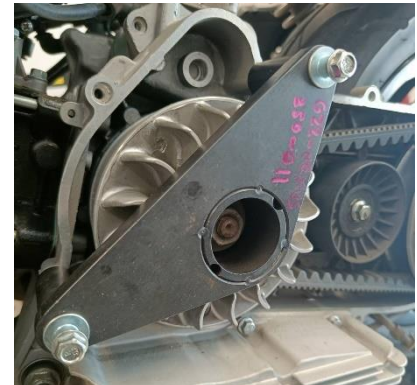
- Turn the crankshaft until the attachment point position coincides with the special tool, as shown.



- Use special tools to lock the drive pulley suit.

Special tools

GZZ-NEXUS250-011 FRONT PULLEY NUT FIXING



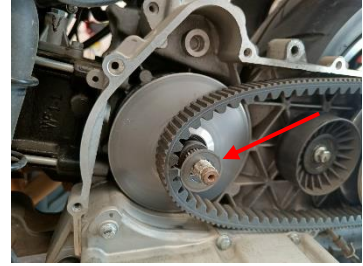
- Loosen the driving pulley fastening nut.
- Remove special nuts and tools.



- Remove the nut, washer, drive pulley impeller.



- Remove the washer, belt and drive pulley.



Inspecting the rollers case

- Check the inside of the pulley slide bush rod must be free of damage or abnormal wear and measure the inner diameter at position A.
- Measure the outer diameter of the bush slide axis at position B as shown in the figure.
- Inspect rollers must be free of damage or wear.
- Check the wear of the roller housings and of the
- Check that the outer pulley must not be in abnormal wear and tear condition.
- Check that the contact surface of the pulley to the belt is not damaged or abnormal wear and tear.
- Check the locking ring must be in normal condition, not deformed.



Caution

Do not lubricate or clean slide bushing



Standard Value

Pulley sliding bush gap movable	: 0.15 mm.
Roller diameter	: 20.5 - 20.7 mm.
Minimum diameter limit	: 20 mm.



Assembling the face pulley assembly

- Reassemble the removal and tightening process with the required torque value.

Torque value

Outer Pulley Clamp Nut - Crankcase Engine 79.0 ± 4.0 Nm



Assembling the belt cover

- Align the latch and belt cover gasket in position before assembling.
- Replace the belt cover and tighten the screws with the specified torque value.
- Reassemble the removal process
- Insert the pulley mounting nut accordingly, assemble the special tool and tighten with the required torque value.

Torque value

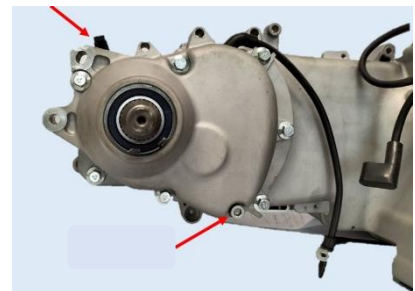
Belt cover screws : 11 – 13 Nm

Pulley mounting bolts follow: 54 – 60 Nm

Transmission set

Remove rear gear

- drain the transmission oil (Loosen the dipstick to vent the oil drain).

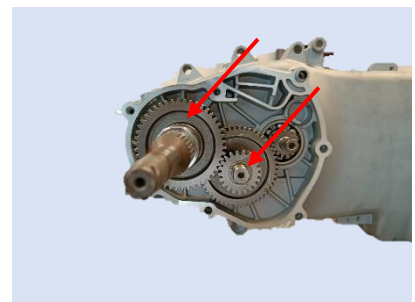


- Loosen 7 bolts as shown.
- Remove the transmission housing and gasket.



Remove the wheel axle

- Remove the wheel axle.
- Remove the intermediate gear.



Rear transmission bearing removal

- Check the condition of the bearings (wear , looseness , noise).
If abnormalities are found, proceed as follows.
- Use a special tool to pull out 3 bearings
(2 bearings in the engine crankcase , 1 in the transmission housing).

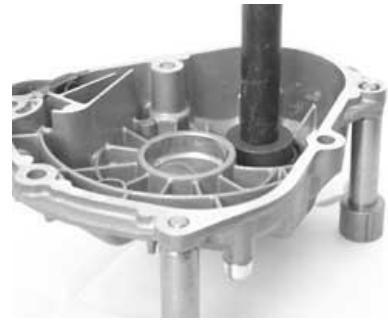


Remove the wheel axle bearings

- Remove the bearing lock ring from the outside of the transmission housing.

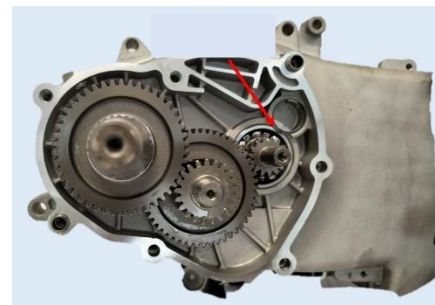


- Place the transmission housing and use a special tool to remove the axle seal as shown.



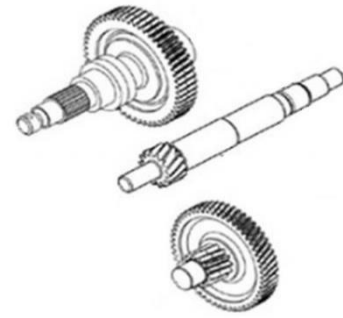
Remove the clutch shaft bearing

- To remove the clutch shaft bearing, remove the transmission housing and shaft seal. Follow the steps described above.
- Remove the bearing from the clutch shaft.
- Use a screwdriver to remove the axle seal and remove the bearing, being careful not to damage the bearing, or slipped into the belt chamber
- Remove the lock ring as shown.
- Use a special tool to suck out the bearings.



Inspecting the final gear set

- Check 3 final gear teeth , bearing surfaces and oil seals for wear.
- If worn parts are found, replace them.



Inspecting the rear gear

- Check that the surface is not worn or deformed.
- Check the bearing socket area.
- If worn or damaged parts are found, replace them.

Assembly of wheel bearings

- Place the transmission cover on the wooden floor.
- Use a hot air gun to blow the ball socket.
- Use a special tool to hammer the ball into the socket at a level level as shown in the picture.

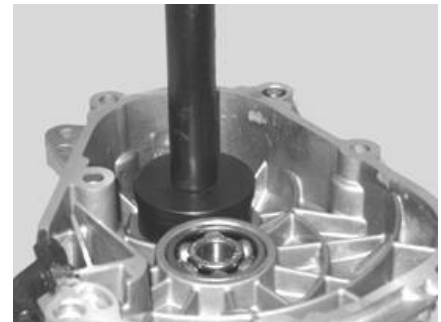


- Assemble the lock ring .
- Insert the seal with the seal lip facing inward.
- Point the 52mm adapter toward the bearing.



Assembly of rear transmission bearings

- Use a hot air gun on the bearing socket.
- Assemble all 3 ball bearings 15 mm using special tools.
- Point the 42mm adapter towards the bearing.
- Assemble the clutch shaft bearing with special tools as shown in the picture.



Note

If the ball bearing is a type, the ball bearing inside can be seen. Turn to the visible side. The inner bearing is placed on the side of the wheel hub.

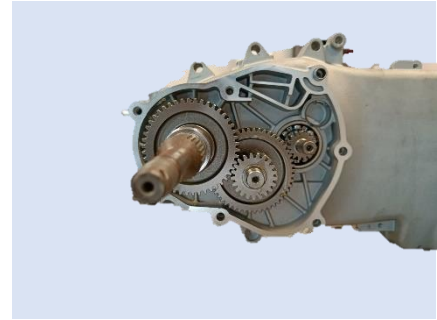


Caution

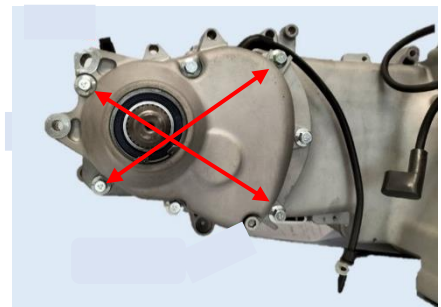
- In assembling the bearing, a secondary device must be found to keep the bearing socket in a straight line, and assemble the ball bearings in alignment
- Assemble the lock ring and replace the seal from the pulley side.

**Assembling the transmission bearing**

- Assemble all 3 shafts on the crankcase as shown in the picture.

**Assembling the transmission gear**

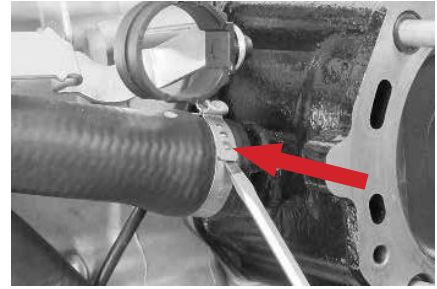
- Reassemble the transmission cover oil line to its original position and install a new gasket. Apply black silicone on the gasket area.
- Assemble the transmission housing, making sure the fuel lines are in the correct position.
- Place the short screw in the position as shown.
- Tighten the short screw to secure the fuel line.
- Tighten the rest of the screws with the predetermined torque.



RH engine cover

Remove the RH engine cover

- Remove water pipe clamp on the pump .



- Remove the bolts and remove the RH engine cover.

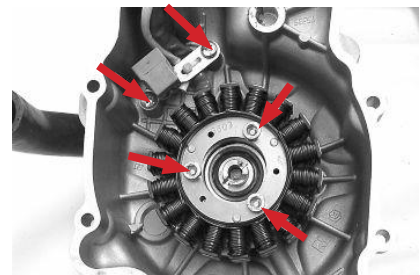


- Remove the spring
- Remove the cover gasket.



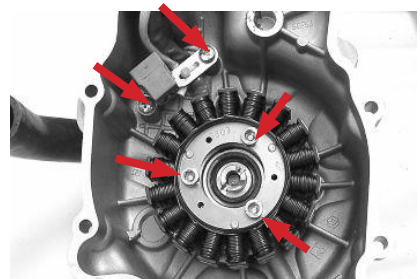
Remove magneto

- Remove the 2 screws on the CPS sensor and 3 mounting screws as shown.
- Remove the magneto and CPS sensor.



Install the magneto

- Reverse the disassembly process. Follow Tightening torque of the screws.
torque value
3 - 4 Nm.



Remove flywheel and starter motor**Remove starter motor**

- Remove the positive wire on the starter motor.
- Remove 2 bolts and disconnect the ground wire.
- Remove the starter motor.

**Remove flywheel**

- Remove the water pump shaft and the crankshaft sprocket lock clip .



- Use flywheel holder to hold the flywheel and loosen nut to remove the flywheel as shown in the picture.

**Special tools**

GZZ-NEXUS250- 001 FLYWHEEL Holder



- Use the flywheel puller to remove the flywheel.
- Remove the flywheel.



Install flywheel

- Install the starter gear to the flywheel.
- Lubricate the starter gear with engine oil.



- Use the flywheel holder(GZZ-NEXUS250- 001) to install the flywheel tighten torque value.

**Torque value**

94 - 102 Nm

Install the starter motor

- Install the starter motor with the crankcase.
- Install the ground cable and tighten the bolt with the specified torque value .

Torque value

12 ± 1 Nm

Install RH engine cover**Caution**

- when assembling the RH engine cover, align the marks of water pump shaft and flywheel as shown.



- install RH engine cover, vice versa, tightening the mounting screws to the specified torque.

Torque value

11 - 13 Nm



Cylinder and valve control mechanism assembly system

Remove intake manifold

- Remove the throttle body and injector.
- Remove 3 bolts securing the intake manifold.



- Remove the intake manifold.

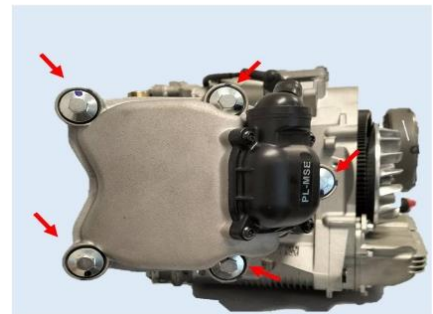


- remove the o-ring of intake manifold.



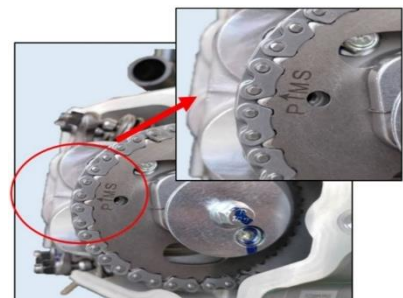
Remove the cylinder head cover

- Remove 5 bolts as shown in the picture.
- Remove the cylinder head cover.

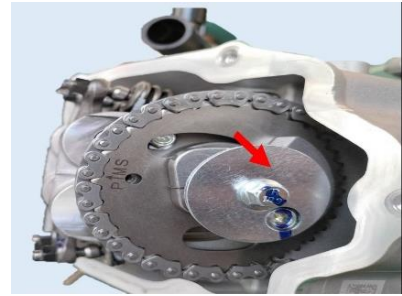


Remove the timing sprocket and decompressor

- Turn the crankshaft into position as shown.



- Remove a bolt and decompressor cover.



- Remove a bolt and remove the decompressor.



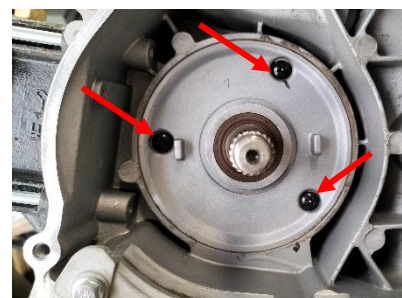
- Loosen the chain tensioner adjusting bolt.
- Remove the chain tensioner by loosen 2 mounting bolts.



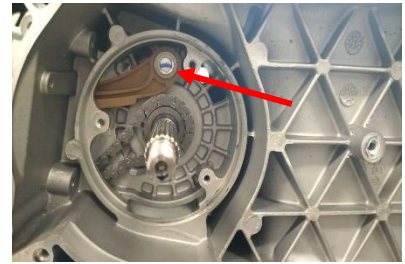
- Remove the timing sprocket.



- Remove 3 screws securing the crankshaft gear holder on the LH crackcase.

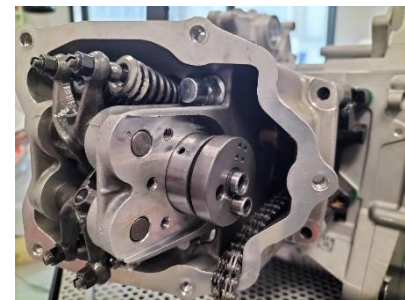
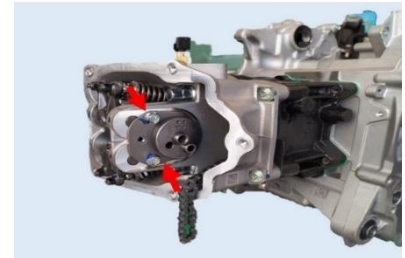


- Remove a bolt securing the chain tensioner pad and remove the timing chain



Remove the camshaft

- Remove the camshaft by loosen 2 bolts.



- Remove rocker arm shafts and rocker arms.



Remove cylinder head

- Remove the parts, refer to the procedure for removing the cylinder head cover timing chain sprocket .and camshaft

- Remove the spark plug.



- Remove 4 nuts and 2 bolts securing the cylinder head.
- Remove the cylinder head.



Remove the valve

- Use a valve spring compressor to remove the valves.
- Use a valve stem seal plier to remove the valve stem seals.
- Remove the valve springs.

cautions

Remember the original position of each valve.

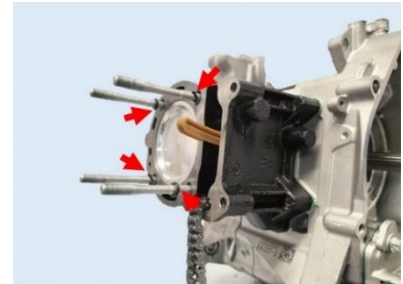


Remove the cylinder and piston

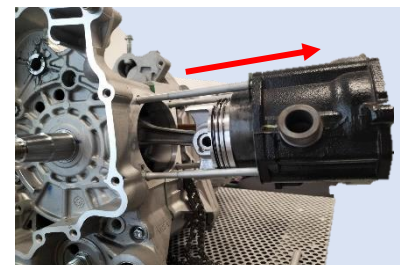
- Remove the chain tensioner pad and chain guide.



- Remove the stud o-rings of the cylinder.



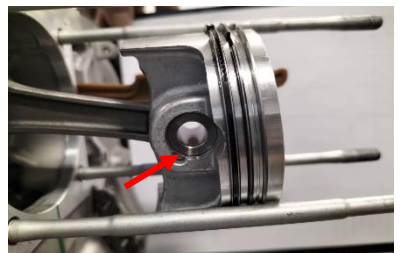
- Remove the cylinder.



Caution

To prevent piston damage, use a clean cloth to protect the piston.

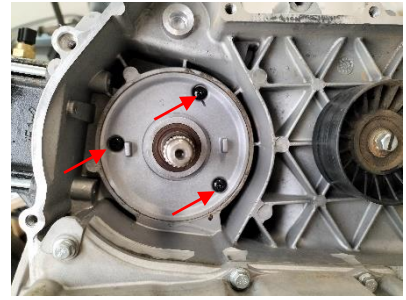
- Remove the piston pin.
- Remove the piston.



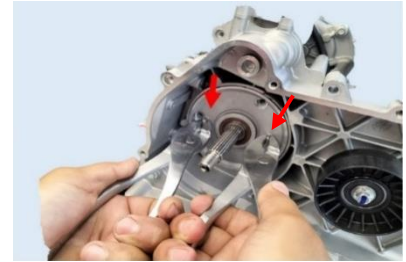
Crankshaft seal

Removing the left crankshaft cover

- Loosen the left crankshaft cover bolt.



- Remove the left crankshaft cover.



Assembly of the left crankshaft cover

- Replace the crankshaft seal with a new one every time you assemble it.
- Lubricate the seal before assembly.
- The assembly process will reverse the disassembly process.
- Use a special tool to insert the crankshaft seal onto the crankshaft and tighten it.

cautions

Do not lubricate the gear groove area.

- To install the oil seal, align it so that the groove on the cover is aligned with chain position in a downward direction. Assemble completely, then do not pull the seal back out.



- Failure to do so may cause incorrect seal position and damage.
- Failure to follow correct assembly procedures. May cause damage to the engine. This is because the lubricant pump drive chain is not working properly .



Special tools

GZZ-V125-007 TIMING COVER ASSMBLING

Remove the oil pump

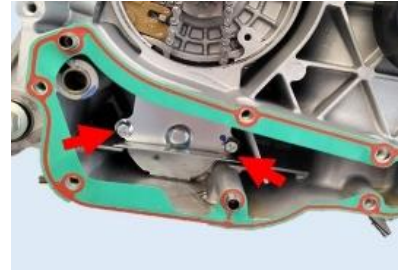
- Remove the engine oil pan.



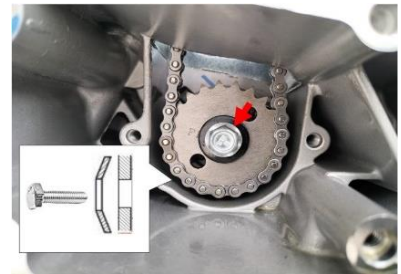
- Remove the oil pressure relief valve.



- Remove the oil pump gear cover .



- Remove the bolt securing the oil pump gear .
- Remove the chain that drives the oil pump sprocket .
- and remove the oil pump gear



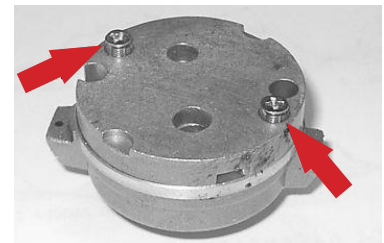
Note

It is recommended to make a mark or symbol on the chain for the process of assembling it back so that the chain rotates in the original direction.

- Remove the engine oil pump.

Inspecting the engine oil pump

- Remove the 2 screws, then remove the cover.
- Disassemble the pump rotor and clean it.



- Assemble the rotor with the pump housing. Use a feeler gauge to measure the value as shown in the picture.



Standard value

- Rotor shaft clearance : 0.09 mm.
- Distance from outside rotor to pump housing : 0.20 mm.

- Use the angle line to place on the pump as shown. Measure the distance between plane of the rotor and pump housing.

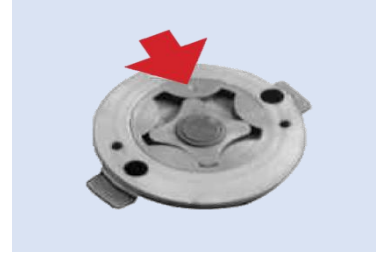


Standard

Plane clearance of rotor to pump housing: 0.12 mm.

Assembling the oil pump

- Check the rotor and pump housing for wear.
- Make sure the cover is not scratched.
- If worn or scratched parts are found, replace them.
- Assemble in reverse according to the disassembly procedure.
Tighten the fixing screws with the specified torque.



Note

Make sure the gasket is positioned properly as shown in the picture.

Torque value

Oil pump fixing screw	: 5 – 6 Nm
Pump gear fixing screw	: 10 – 14 Nm
Oil pump cover fixing screw	: 0.7 – 0.9 Nm



Checking the oil pressure relief valve

- Check the parts for abnormal wear.
- If parts are worn or values are out of standard, replace them.
- Check the length of the spring.

Standard length of spring

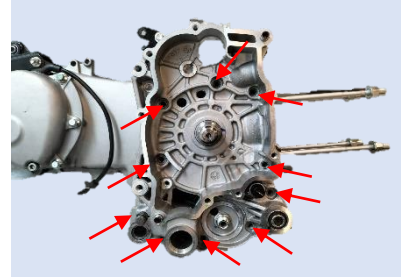
53.0 ± 0.5 mm.



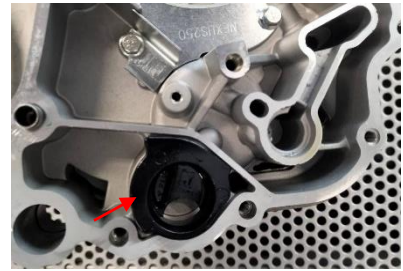
Engine crankcase and crankshaft

Remove the engine crankcase

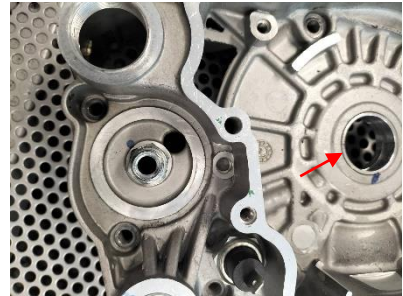
- Remove 10 screws.
- Remove the crankcase on one side, with the crankshaft still attached to the other.
- Remove crankshaft



- Remove the oil strainer seal.
- Remove the oil filter.
- Check clearance of crankshaft and connecting rod.
- Check the size on the small end on the connecting rod.



- Check the inside surface of the main bearing.
- The main bearing are comprised of two half bearings, one with holes and channels For lubrication whereas the other is solid.
- Check crankshaft bearing diameter.
- Check inner diameter of main bearing.



Caution

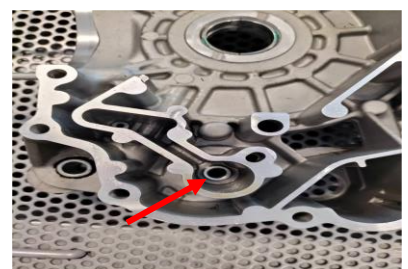
- The old crankshaft can still be used. If it is within the specified standard value.
- When disassemble the engine crankcase, be careful not to damage the surface of main bearings by the crankshaft groove.

Inspection of crankcase

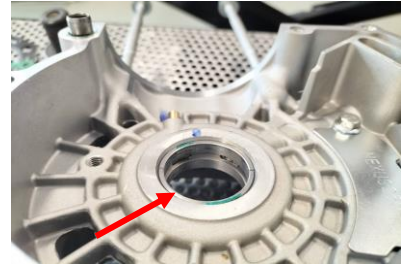
- To clean the engine crankcase , oil nozzle.
- Be careful when handling other components such as Oil pipe , bypass pipe , bushing , oil spray on the left engine crankcase to prevent damage.



- Check the parts to make sure they are not broken or damaged.
- The contact surfaces of the engine crankcase on both sides must not be damaged.

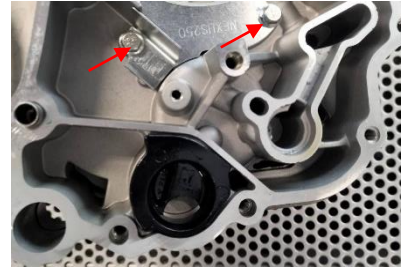


- Check and measure the various parts that are within the specified values.



Assembling the engine crankcase

- The assembly process reverses the disassembly process.
- Cleaning contact surface of both side of crankcase.
- Replace the new crankcase gasket
- Place the gasket so that the holes align with where the screws are inserted.
- Assemble both sides of the engine crankcase together .
- Insert the bolts and tighten it to the specified torque.



Torque value

- Cover plate fixing screw : 4 – 6 Nm
- Screw fixing the dampen plate inside the engine crankcase : 11 – 13 Nm
- Oil drain plug : 27 – 33 Nm
- Oil filter : 24 – 30 Nm



Stud bolt (cylinder block pillar)

- Check that the stud bolts have not worked loose from their seat in the crankcase.
- Check the depth of stud bolt driving with a gauge, as indicated in the photograph. If it varies significantly from the driving depth indicated, it means that the stud bolt has yielded.
- In this case, replace it.



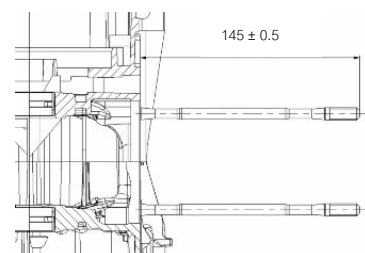
Replace the new stud

- By working on two fitted cylinder head fixing nuts, nut and lock nut, as shown in the photograph, remove the stud bolt from its seat.
- Clean the threaded seat on the crankcase thoroughly and lubricate with engine oil
- Refit a new stud on crankcase and apply the special product on the threading crankcase side.
- Tighten up to the depth of the driving indicated.



Recommended products

Loctite 'Quick Set' Strong 270 threadlock



Checking engine oil pressure

- Remove the oil pressure sensor.
- Check that the pressure is between 0.5 – 1.2 bar.
The engine is idling at 1,650 rpm at the engine's operating temperature.
- Check that the pressure is between 3.2 – 4.2 bar.
While engine operates at 6,000 rpm at the operating temperature of the engine.



- Remove the gauge and insert the oil pressure sensor.
Replace the new washer, tighten it with the specified torque value.
- If the oil pressure value does not meet the standard
Check the oil filter and crankshaft seal.

**Note**

To check the oil filter must be in normal condition and engine oil level.
Must have the quantity according to the specified standards.

Standard

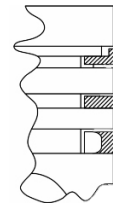
Minimum engine operates at 6,000 rpm : oil pressure 3.2 bar.

Torque value

Engine oil pressure sensor : 12 – 14 Nm.

Piston ring assembly

- Point the arrow mark of the piston towards the exhaust side.
- Insert the ring with the "TOP" mark facing upwards and align each ring gap 120 degrees apart.
- Lubricate with oil while assemble.
- Top ring with L - shaped cross section.

**Assembling the cylinder block**

- Reassemble the cylinder block vice versa.
- Use a piston ring compressor tool to install the cylinder block.

Note

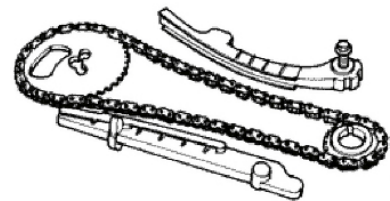
Before assemble the cylinder block, use compressed air to clean the dirt in the oil passages of the cylinder block.

Special tools

GZZ-NEXUS250- 003 PISTON RING COMPRESSOR

Inspection of timing system parts

- Check the chain guide, timing chain, and chain tensioner pad to make sure they are not worn.
- Check the condition of the gear teeth to see if they are not worn.
- If it is found that the parts are worn, replace them with new ones. If found either the timing chain or camshaft sprocket worn, replace all parts together.

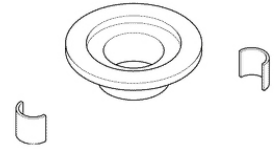


- Remove the screw from the center of the chain tensioner and inspect the movement mechanism of the chain tensioner. If any wear is detected, replace it.



Inspection of valve spring seats and valve cotter

- Check both valve spring seats and valve cotter for wear or abnormal conditions. If worn parts are found, replace them.
- The inspection is performed when disassembly valve.



Valve assembly

- Use engine oil to lubricate the valve stem while assembling.
- Assemble all components with valve spring compressor tool.

Note

Do not reverse the valve spring position and install the valve spring with the greater pitch on cotter side.



Assemble the cylinder head and timing chain

- Attach the timing gear to the camshaft so that the mark on the gear matches the mark on the cylinder head.

Torque value

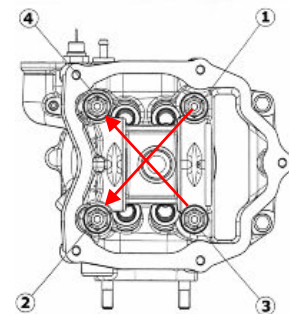
12.0 ± 1.0 Nm

- Reinstall cylinder head and timing chain in vice versa.



Reinstall cylinder head

- Fit the timing chain guide pad.
- Insert the centring dowel between the cylinder head to the cylinder, fit the cylinder head gasket and the cylinder head.
- Lubricate the stud bolt threading and o-rings.
- Tighten up the nuts to an initial pre-torque of 7 ± 1 N·m
- Tighten up the nuts to a second pre-torque of 10 ± 1 N·m
- Rotate by an angle of 270°
- To carry out the operations described above, follow the tightening sequence in the figure.



Excessive engine oil consumption / smoke from the exhaust pipe	
Causes	Inspection and remedy
Incorrect valve clearance	Check and adjust the valve clearance to meet the standard values.
Damaged valve , worn valve seat ?	Replace cylinder head , valves / grind valves
Cylinder – worn pistons , damaged or broken piston rings	Replace cylinder , piston , piston ring
Piston rings wear out , in the wrong position	Check the piston ring position and correct it / change
Engine oil leaking from different gaskets or seals other	Check for leaks and replace with new gaskets or seals.
valve stem seal is damaged	Replace new valve stem seals
Tube valve wear	inspect , replace cylinder head
low oil pressure	
Causes	Inspection and remedy
Pressure relief valve stuck open	Check the operation of the relief valve , clean the relevant parts or replace the valve with a new one.
The oil pump has too much clearance.	Check and measure the size of the oil pump parts or replace them.
Filter clogged	change oil filter
Low engine oil level	Fill the engine oil to the specified level .by using engine oil of the specified standard grade

Transmission and braking system

inefficiency of transmission or clutch slipping .	
Causes	Inspection and remedy
The clutch or malfunction of the clutch system.	Inspect the clutch lining – the Clutch outer must not have grease between the contact surfaces and all 3 parts of the clutch lining should be evenly worn. together Inspect the Clutch outer. It must not be distorted, deformed or abnormally worn .
The braking system is not working efficiently.	
Causes	Inspection and remedy
The braking system is not working efficiently.	Check the brake pads (must be 15 mm thick) , disc brakes must not Check the brake fluid level in the brake pump or replace it with new brake fluid. There must be no air in the brake system. If there is, bleed air from the system. Check that the movement of the brake caliper must be level with the brake disc.
The brake fluid in the system is leaking.	Check for leaks and fix or replace parts.
The disc brake is loose or the disc brake is faulty .	Check the brake system fixing screws. Use the dial gauge to measure the smoothness of the disc by rotating the wheel shaft until it completes. If the plate is crooked, replace it.
Burnt brake-pads	
Causes	Inspection and remedy
Stuck brake piston	Check the caliper – piston. replace defective parts
Loose disc brake or disc brake	Check the brake system fixing screws. Use the dial gauge to measure the smoothness of the disc by rotating the wheel shaft until it completes. If the plate is c , replace it with a new one.
The hole in which the brake master cylinder is clogged.	Use air to clean with care.
Brake shoes are swollen or jammed.	Change brake rubber

The steering system is difficult / stiff.	
Causes	Inspection and remedy
difficult to steer	Check tightness – Adjust the nut, fix the upper and lower neck bearings , check the bearings and bearing rails. If found to be damaged, replace it with a new one.
The steering system is loose.	
Causes	Inspection and remedy
Incorrect torque value	Check the tightness of the bolts, fix the upper and lower necks, adjust the correct settings , check the bearings and bearing rails. If it is found to be damaged, replace it with a new one .
The weight support system is noisy.	
Causes	Inspection and remedy
there is noise	Check the operation of the shock absorber , mounting bolts , bushings Check the torque value Shock absorber mounting bolts , wheels , calipers , discs and neck axis
The weight support system is leaking oil.	
Causes	Inspection and remedy
Damaged fork seals – damaged	Change new shock absorbers. Verify that the fork cover is not damaged and The anchor point is in the correct position.

Can't start	
Problems that the ECU can detect	RELAY PUMP , COIL , INJECTOR , RPM SENSOR
Fuel system	Fuel , fuel pump operation Fuel pressure (low), dirty injectors – ton
Fire into the spark plug	Coil wire insulation
Parameter value	Engine temperature , timing settings , injector settings while starting air temperature
Compressive strength	Check compression
Hard to start	
Problems that the ECU can detect	Pump relay , coil , injector , engine speed sensor , air temperature sensor – engine temperature
speed at startup	Starter motor , relay , battery , ground terminal
compression	check the compression
spark plug	Spark plugs , coil wires , ignition coils , rpm sensors , ignition advance degrees
fuel system	Fuel pressure (low), dirty injectors – clogged , leaking injector seals.
Check the parameters.	Engine temperature , Air temperature , Idle control motor opening time , Clean throttle body , Air filter
The engine cannot idle / does not idle smoothly / rpm drops / stall while idling	
Problems that the ECU can detect	Pump relay , coil , injector , engine speed sensor , air temperature sensor – engine temperature
Performance of the ignition system	Spark plug , ignition angle
Check the parameters.	Throttle position sensor , air temperature sensor – engine temperature
Intake Air Cleanliness	Air filter , throttle body , idle control valve
intake valve leak	Intake pipe neck , throttle body , air filter , air pipe
low fuel pressure	Fuel pump , regulator , fuel filter , injector
Engine does not slow down to idle / high idle rpm	
Problems that the ECU can detect	Relay pump , coil , injector , engine speed sensor , air temperature sensor – engine temperature
ignition system	ignition timing degree
Check the parameters.	Throttle position sensor Air temperature sensor – machine temperature
intake valve leak	Intake pipe neck , throttle body , air filter , air pipe
low fuel pressure	Fuel pump , regulator , fuel filter , injector
Engine backfire while decelerating	
Problems that the ECU can detect	Pump relay , coil , injector Engine speed sensor , air temperature sensor – machine temperature , oxygen sensor
Check the parameters	Throttle position sensor , air temperature sensor – engine temperature
intake valve leak	intake manifold , throttle body , air filter , air pipe
low fuel pressure	Fuel pump , Regulator , Fuel filter , Injector
exhaust leak	Exhaust manifold , Exhaust manifold – welding seam
The engine has no power while gradually accelerating / the engine rpm is abnormal.	
Dirty intake system	Clogged air filter , dirty throttle body
Intake valve leak	Air filter , air duct connection point
Ignition system	spark plug wear
Throttle opening	Change the throttle
Check the parameters.	engine temperature , air temperature , throttle position , ignition advance degree
Problems that the ECU can detect	Coil , nozzle , engine speed sensor , air temperature sensor – engine temperature , oxygen sensor

The engine has no power while accelerating / There is no power when twisting the throttle fully.

Problems that the ECU can detect	Relay pump , coil , injector , engine speed sensor , air temperature sensor – engine temperature , oxygen sensor
----------------------------------	--

Spark plug	Spark plugs , coil wires , ignition coils
Intake system	Air filter , leaking air filter , leaking intake system
Check the parameters	Engine temperature , air temperature , throttle position , ignition advance degree
Fuel system	Fuel level , fuel pressure , fuel filter , injector
engine misfire (pre ignition)	
Problems that the ECU can detect	Pump relay , coil , injector Engine speed sensor , air temperature sensor - engine temperature , oxygen sensor
Ignition system	Spark plug
Check the parameters.	Throttle position , engine temperature , air temperature , ignition advance
Intake leak	Air filter , air pipe connection point
Throttle opening	Change the throttle
Fuel system	fuel pressure , fuel filter , injector , fuel quality
Cylinder block gasket	Engine gasket thickness

Inspection process

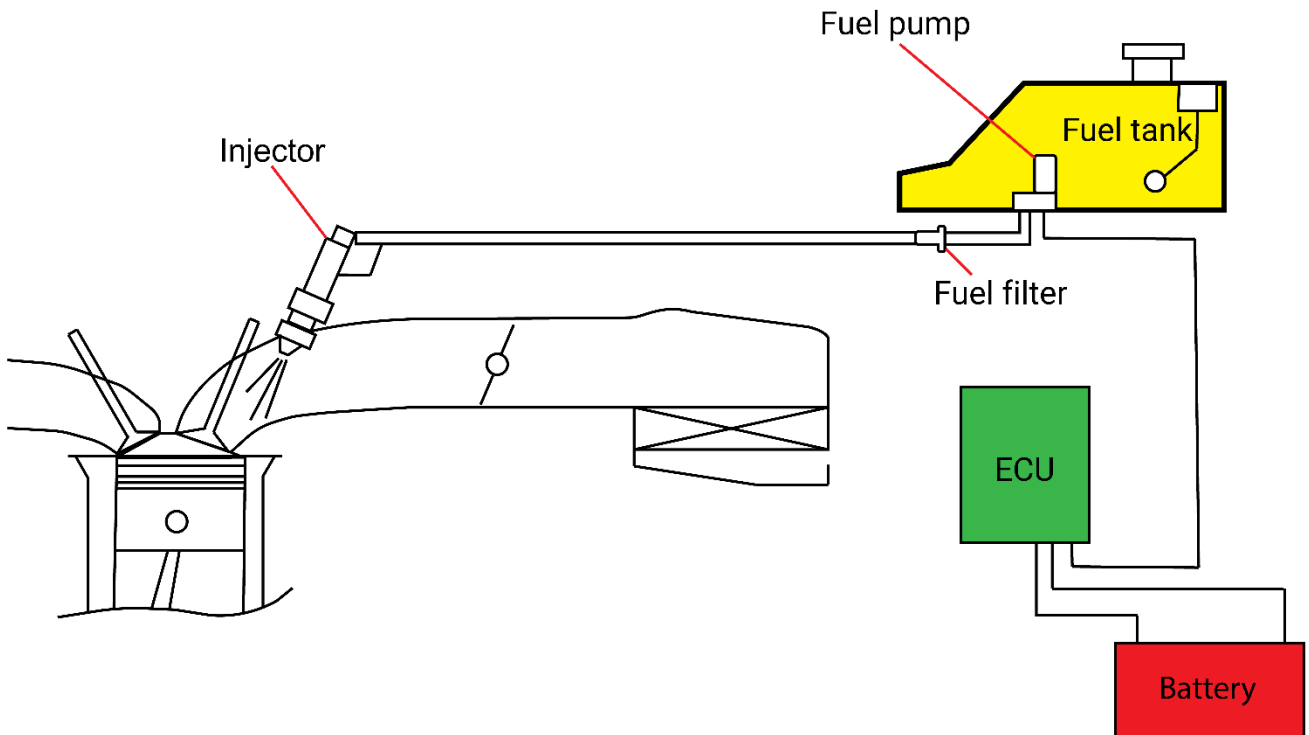
1. Before troubleshooting, check if there are any trouble codes in the system's memory. Do not disconnect the battery terminals before checking the code.
2. The fuel system has a pressure of 3 bar. Be careful before removing the fuel line. No flammable objects or sparks, no smoking, and be careful not to get fuel in your eyes.
3. Always disconnect the battery terminals when inspecting and repairing the electronic system.
4. To check the operation of a device or system, the battery must have a voltage higher than 12 volts.
5. before starting the engine Make sure there is at least 2 liters of fuel to prevent damage to the fuel pump.
6. Before disconnecting the ECU plug terminal , turn the ignition switch to the OFF position . Then always disconnect the battery terminals first.
7. While washing the vehicle, do not spray water into the electrical equipment and connectors , plugs , and wires.
8. Problems with the ignition system Start checking the battery and ignition system connectors.
9. Turn the key switch to the (OFF) position. And disconnect the battery terminals before removing the ECU to protect the ECU from damage.
10. It is strictly forbidden to replace the battery terminals.
11. To prevent damage that occurs Disconnect the ECU plug terminals only when necessary.
12. When using any instrument meter, do not apply excessive pressure to the tip of the probe against the terminal.
13. When the inspection is complete, plug the plug back. Failure to observe this precaution will damage the ECU .
14. Before reinserting the plug terminals, check that the plug is free of dirt or clean it before reassembly.

Precautions

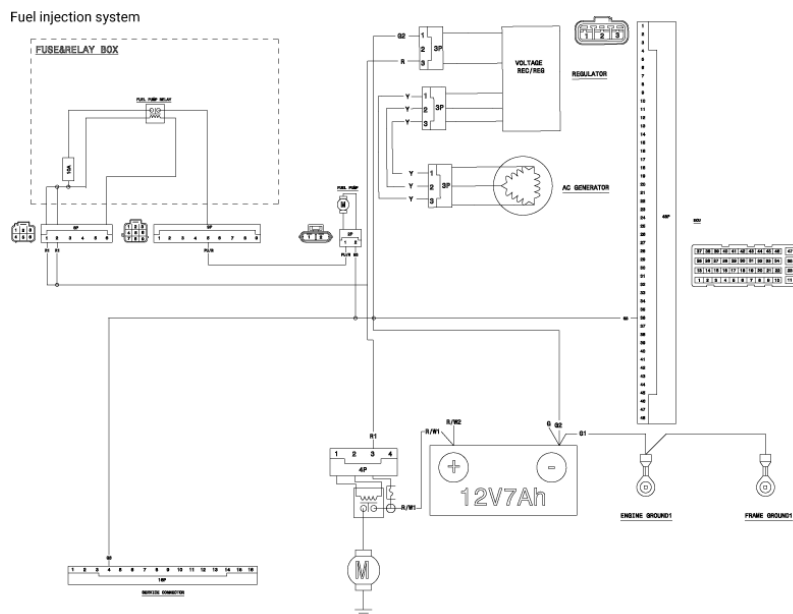
1. problems with the fuel system It was found that it was caused by various power plug terminals rather than by damage to the equipment. Before analyzing the problem, check as follows:
 1. : from the power supply , battery , main fuse , relay , various plug terminals
 2. : frame ground terminal
 3. : Fuel system , fuel pump not working , dirty fuel filter
 4. : Ignition system , broken spark plug , broken coil , broken spark plug wire
 5. : Intake system , dirty air filter – clogged , clogged relief valve , broken idle valve
 6. : Others such as wrong ignition angle , improper idle mixture , incorrect throttle torque reset.
2. The fuel supply system is defective due to loose plug terminals. Check the various plug terminals to make sure they are not disconnected , loose , or distorted.
3. Check other equipment before replacing the ECU. If you try replacing the ECU and the problem is solved, insert the original ECU and check whether the problem occurs again or not.
4. In measuring electrical circuits Use a multimeter with an internal resistance higher than 10 kW/V. Improper use of measuring tools can damage the ECU. Recommended measuring tools should read more than 0.1 V and 0.5. Watt has an accuracy of more than 2 percent .

Fuel system

- The fuel system consists of Fuel pump , fuel filter , fuel pressure relief valve (regulator) , fuel pipe , injector
- The fuel pump and regulator are mounted inside the fuel tank.



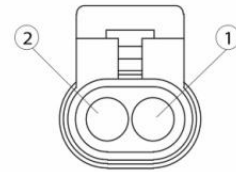
Fuel Pump Light Circuit



- When the ignition key is turned to position (on), the fuel pump will operate for 2 seconds and stop
- When the engine is started, the ECU will keep the fuel pump running because of the engine revolution signal.

Electronic system information

- Fuel pump resistance ~ 1.5 ohms
- Normal current while the fuel pump is working is 1.4 – 1.8 amps.
- The current required to close the hydraulic circuit . ~ 2 amps
 1. Disconnect the fuel pump electrical connector.
 2. Turn the ignition switch to «ON».
 3. Check the voltage between terminal 2 and fuel pump terminal ground for about 2 seconds.
 4. Check the connection between terminal 2 of the fuel pump connector and the injection system relay. (ignition system)
 5. Check the connection between terminal 1 of the fuel pump connector and ground.



Fuel system inspection

- Install special tools for monitoring the system. Connect the fuel pressure gauge to the fuel line.
- Check voltage between fuel pumps – battery injectors must have voltage greater than 12 volts.
The fuel must have a pressure of 3 bar and a current of 1.4 – 1.8 amps at a battery voltage of more than 12 volts.
Check the fuel flow by using the PDA to run the pump. Find a container with a capacity of more than 1 liter.
Disconnect the fuel pipe. Check that the oil pressure is consistent at 3.0 bar.
Measure the amount of fuel that in 15 minutes has a volume of 120 cc.

Checking the Fuel Filter

- Remove the fuel lines from the injectors.
- Disassemble the fuel lines from the fuel filter.
- Remove the fuel filter.



Injection

- Check the injector resistance.

Standard

14.5 ± 5% ohms

Injector operation check

- Remove a bolt and remove the injector holder.



- Connect the pressure gauge.
- Place a container to accommodate approximately 100 cc of oil.
- Using a PDA to control the fuel pump to operate at a fuel pressure of 3 bar.
Check that within 15 seconds approximately 40 cc of fuel is released from the injector.



- Use air to dry the nozzle completely.
- Use a PDA to control the fuel pump.
- Check that there are no fuel leaks from the injectors.

Ignition coil

- The ECU controls the operation of the injectors and ignition coils from two variables :
 1. Ignition advance degree By ordering the ignition at the right timing from the calculation of the engine's working load , engine rpm , temperature
 2. The duration of the magnetic field The magnetic field at the coil windings is controlled by the ECU . When starting the engine, the ECU commands to increase the ignition light. The ignition circuit remembers the engine's 4- stroke cycle. Therefore, the ignition will be ordered only during compression.
- While the ECU is not connected to the coils, check the ECU and ignition coils.

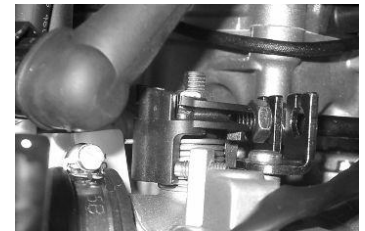
Throttle body and throttle position (TPS)

- The throttle body is equipped with a throttle valve inside which has been calibrated for opening and closing degrees to control the appropriate amount of air flow for various conditions at idle.
- Do not adjust the throttle angle under any circumstances when installing the throttle body to the engine. An abnormality of the throttle angle may occur.
- Due to many factors such as assembly , tolerances in the design of engine parts. Therefore, in order for the engine to work properly and adjust the mixture appropriately, the throttle valve must be reset according to the following steps:
 - Pads System
 - Key switch on (on)
 - Select topic
 - turn the throttle to test the throttle angle.

Special Tools

Diagnosis Tool (PDA)

- Make sure that the throttle control is close to the screw end.
- At the fully closed throttle position, make sure that there is free range of the throttle line at all positions, turn the handlebar angle, and then press OK to confirm the throttle position in front of the PDA.
- Turn on the throttle so that the throttle valve is fully open and confirm the throttle position in the PDA.



Note

Do not adjust , fix the screws under the throttle body. Because idle has already been set from the factory

- Assemble in reverse of the disassembly steps. Be careful to position the clamp lock .
Fasten the throttle body connector at an angle of 45 degrees to the air filter tube.



Remove front shock absorber

- Put the vehicle on the center stand.
- Remove the lower rocker arm cover.

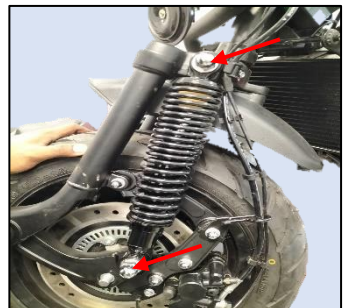
- Remove 2 bolts (M6).

- Remove the stud.
- Remove the lower rocker arm cover.

- Remove 4 nuts of LH and RH front shock absorbers.

- Loosen the bolt that holds the RH lower rocker arm.

- Loosen the nut securing the front brake caliper bracket.
- Loosen the bolt that holds the LH lower rocker arm



Removing the front wheel and front wheel hub

- Park the vehicle with the center stand.
- Loosen 2 bolt (M8)
- Loosen the front axle nut
- Loosen the nut M6 Fasten the ABS sensor on the front wheel and remove it.



- Loosen a bolt (M8)



- Remove the front wheel lock nut.

Warning

Please find a vehicle stand to keep the front wheels afloat before performing the next step.



- Remove the front axle.
- Remove a bolt (M8) secures the front brake caliper.
- Loosen a bolt (M8) fastening the front wheel to the hub

Warning

Please be extremely careful when performing this procedure.



- Remove the caliper and front wheel hub.
- Remove the front wheel.



Assembling the front wheel and wheel hub

- The assembly process reverses the disassembly process.

Note

- bolt to the hub with the predetermined torque value .
Always tighten the front axle locking nut .



Assembling the front shock set

- Assembly reverses the disassembly process.

Remove the handlebar

- Park with the center stand.
- Remove the headlight rim

- Loosen left handlebar cover screws .

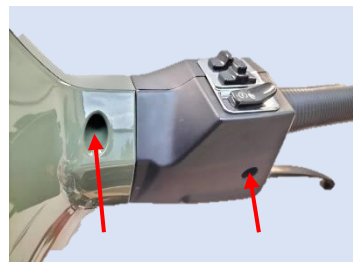
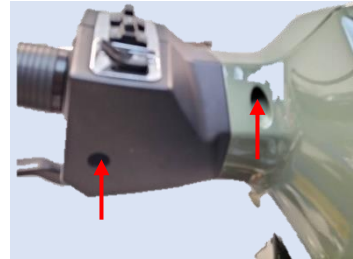
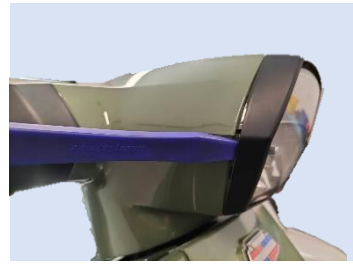
- Loosen right handlebar cover screws .

- Remove the handlebar cover.

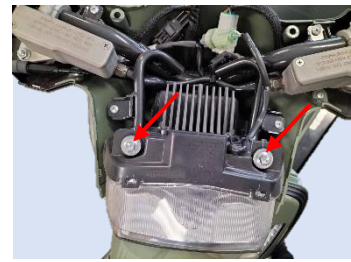
- Unwire the dashboard.

- Unplug the headlight.

- Remove the headlight adjusting bolt.



- Remove the headlight mounting bolt and remove the headlight.



- Unplug the left-right handlebar switches.



- Unplug the brake switches on both the right and left.



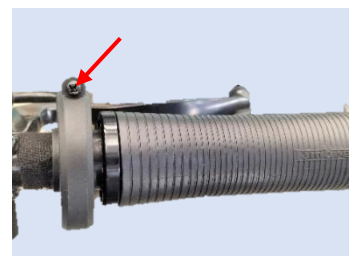
- Loosen the mounting bolts of the left and right of master cylinder.



- Disconnect the throttle cables.



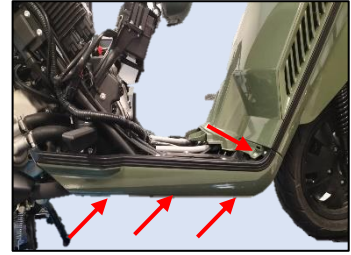
- Loosen the mounting screw to the throttle cable.



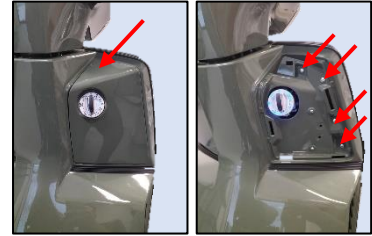
- Remove the throttle housing bracket.



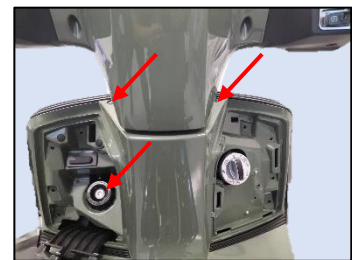
- Remove the footrest.
- Loosen the bolts (M6).
- Remove the left and right bottom footrest covers.



- Remove the ignition key cover.
- Loosen 4 screws.



- Open the lid of USB.
- Remove the radiator cap.
- Remove the lock pin.



- Loosen 4 screws of leg shield cover.



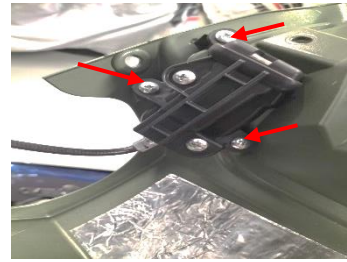
- Loosen 2 screws.
- Remove the leg shield cover.



- Unplug Antenna and USB.



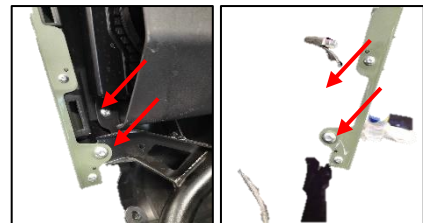
- Loosen 3 screws of lid lock.



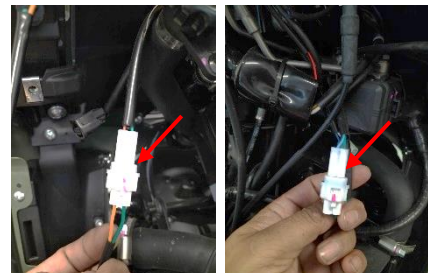
- Remove the front legs shield cover.



- Loosen 2 screws of the legs shield.



- Unplug the left and right turn lights.



- Remove 3 screws and remove the legs shield.



- Loosen the handlebar nut.



- Remove the handlebar and the lower handlebar cover.



Remove the steering bearing

- put the vehicle on the center stand.
- Loosen the upper steering lock nut .



- Loosen steering adjusting nut.



Warning

Please be careful when performing this step.

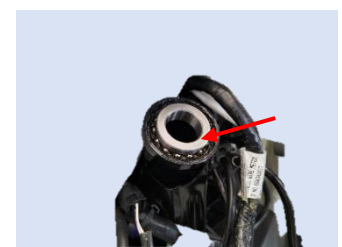
- Remove the steering shaft.



- Remove the dust cover.



- Remove the ball bearings.



Replace steering bearing

Note

Before replace steering balls, bearing races and seals must be replaced. Check the condition of the shaft to ensure that it is not crooked or deformed.

If the steering shaft is found to be abnormal, replace it with a new one.

Assembling the steering shaft

- Assembly reverses the disassembly process.

Note

Not to damage the electrical wires and brake fluid hoses.

- Put on the steering shaft bearing set. Lubricate with grease .
- Install the nut, adjust the steering shaft, Tighten with the specified torque value.

Recommended lubricant

Lithium-soap-based grease

Torque value

14 – 17 Nm

- Install the steering shaft lock nut. Tighten with the specified torque value.

Torque value

40 Nm



Assembling the Handle Bar

- The assembly process reverses the disassembly process.
- Tighten the hand lock nut with the specified torque .

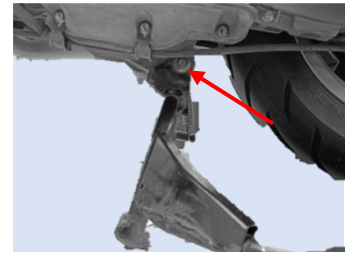
Torque

50 – 55 Nm

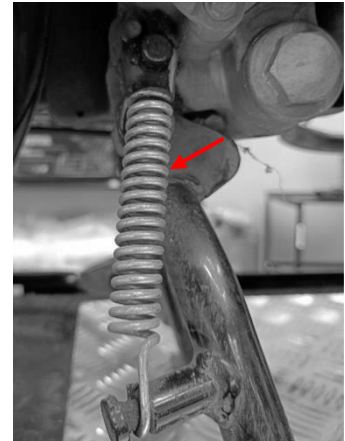


Remove the center stand

- Put a block support under the vehicle.
- Remove the nut securing the center stand as shown in the picture .



- Remove the center stand spring.
- Remove the center stand shaft.
- Remove the center stand.



Assembling the center stand

- The assembly will be the reverse of the disassembly process. Tighten the nut according to the specified torque value.

Torque

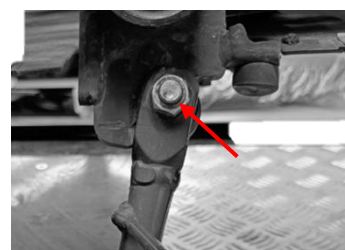
37 - 43 Nm + Threadlocker 243

Remove the side stand

- Put the vehicle on the center stand.
- Loosen a bolt securing the stand sensor.
- Remove the side stand spring.



- Loosen the nut locking the side stand.
- Remove the bolt securing the side stand.
- Remove the side stand



ABS system

Warning

- Removing the wheels for any service requires care not to damage the ABS disc.
- ABS braking system must be inspected by checking the ABS plate that there is no damage and having a test drive that the ABS braking system works normally.
- If the ABS disc is damaged, it may result in the ABS system works by itself without braking from the driver.
- Every time you assemble the wheel, you must check the distance between the speed sensor and the ABS disc , keeping the distance between 0.5 – 1.5 mm. If the distance is less or more than, this requires the adjustment by increase or decrease the thickness of the sensor washer to meet the specified distance.
- The operation of the ABS braking system will increase the braking distance compared to the braking distance without ABS in the following cases.
 - Road conditions are rough, with gravel – sand or snowy surfaces.
 - Road conditions are bumps or hills
- At speeds below 5 km/hr the ABS system will not work. It is recommended to drive with caution.

Note

The ABS system warning light will appear on the speedometer until driving faster than 5 km/h.

Remove the ABS pump assembly

- Procedure for disassembly of various parts refer to the topic of removing the handlebar.

Caution

When disassembling for maintenance or replacing parts related to the brake system, Care must be taken to prevent damage to any parts of the braking system, especially the ABS brake pump unit.

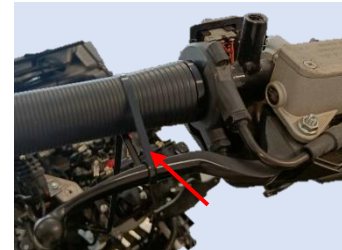
- Squeeze the brake lever all the way in and then secure it with the cable tie.

- Insert the brake fluid drain hose.
- Tighten the drain bolt to specified torque.

Note

Complete these steps for both front and rear brakes.

- Unplug the ABS controller .



- Remove the bolts holding all 4 brake fluid pipes.



- Remove a bolt (M6) mounting lower bracket of ABS controller.



- Remove a bolt (M6) mounting upper bracket ABS controller.
- Disconnect the ground cable.
- Remove ABS controller unit.



Assembling the ABS controller unit

- The assembly will be the reverse of the disassembly process.

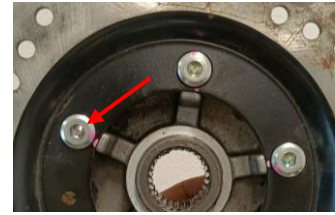
Warning

- To prevent malfunctions of various systems, the ground wire should be checked every time when disassembling - assembling.
- The bolt attaching the brake fluid pipe to the ABS controller unit must be tightened completely before squeeze the brake levers to the end, otherwise, air will enter the brake system.
- When fully assembly the brake fluid hoses, squeeze the front and rear brake levers repeatedly, to bleed the air from the system.
- If the brake hoses has been disconnected from front and rear calipers, bleed the air before reinstall.



Remove the rear brake disc

- Refer to the step of removing the engine from the vehicle that included rear wheel removal.
- Remove the rear brake caliper.
- Remove the rear wheel hub
- Remove 5 bolts holding the rear brake disc from the wheel hub.

**Rear brake disc assembly**

- Reinstall brake disc to the wheel hub. Tighten the screws followed by the specified torque value.

Torque value

20 – 25 Nm

- Assemble the other parts in reverse order of removing and inspecting the rear brake disc.
- Measure the thickness of the rear brake disc by measuring at least 6 locations around it.

**Standard thickness of rear brake disc**

3.90 – 4.20 mm.

- Use a dial gauge measuring the run out of brake disc when rotate wheel.

Standard run out of rear brake disc

0.1 mm.

- If the inspection value is not in the standard value, replace the new brake disc.

Remove the front brake disc

- Refer to step of front wheel removal and front wheel hub removal.
- Remove the front brake disc mounting bolt .
- Remove the brake disc from the wheel hub.

**Assembling the front brake disc**

- Assemble the front brake disc to the wheel hub. Tighten the mounting screws to the specified torque.

Torque value

20 – 25 Nm + threadlock 243

Inspection of the front brake disc

- Measure the thickness of the brake disc by measuring at least 6 locations around it.

Standard

3.90 – 4.20 mm.

- Use a dial gauge measuring the run out of brake disc when rotate wheel.

Standard

0.1 mm.

- If the inspection value is not within the specified standards, replace the brake disc

Remove the front brake pad

- Refer to step of front wheel removal and front wheel hub removal.
- Remove the dust cover.



- Slightly loosen the screws securing the brake pads.
- Remove the brake caliper.
- Remove the brake pads from the caliper .



Caution

Do not squeeze the brake lever after removed the brake pads.

Assembly of front brake pads

- Assemble in reverse according to the disassembly procedure.
- Tighten the screws to secure the brake pads with the required torque.

Torque

8 - 10 Nm

Remove rear brake pads

- Refer to step of removing the engine from the vehicle
- Remove the rear brake caliper.
- Remove the cotter pin.



- Remove the latch.
- Remove the brake pads.



Caution

Do not squeeze the brake lever after removed the brake pads.

Assembling the rear brake pad

- Assemble in reverse according to the disassembly procedure.
- Tighten the brake pad fixing screws to the specified torque .

Torque value

35 – 40 Nm+ threadlocker 243

Brake pad inspection (front and rear)

- Check the thickness of the brake pads. If the thickness is lower than the standard, replace the brake pads with new ones.

Standard

Minimum thickness : 1.5 mm.

- Check the condition of the brake pads, the surface of the brake pads must be smooth and even.
If the brake pads are worn unevenly beyond the specified value, replace the new brake pads.

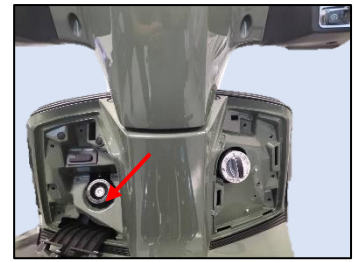


Warning

Do not open the radiator cap while the engine is hot.

Check coolant level

- Open the lid behind the leg shield, check coolant level of the reservoir, if require, top up the coolant while engine is cold.
- The normal coolant level while engine is cold should be between low and full level.

**Remove the thermostat**

- Remove the luggage box.
- Drain out coolant from the system.
- Loosen 2 screws of thermostat cover and remove the thermostat.

**Inspection of thermostat**

Check operation of thermostat.

Standard value

Thermostat starts to open at $85\pm 2^{\circ}\text{C}$.

Reinstall thermostat

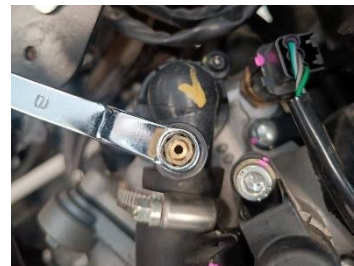
- Reverse the disassembly procedure and tighten the mounting screws to the specified torque.

Torque value

Thermostat cover fixing screw : 3 – 4 Nm

- when assembling the cooling system is complete, fill Coolant according to recommended coolant.

- Remove rubber cap of the bleed screw.



- Put the rubber hose on the bleed screw.
- Loosen the bleed screw 3 turns.
- Bleed air from the system.
- Tighten the bleed screw to the specified torque .

Torque value

3 Nm

- Add coolant to radiator until full.
- Run the engine at idle speed until fans operate.
- Fill the reservoir to full level.

Warning

Do not remove any parts of the cooling system while the engine is running or when the engine is hot.

Inspection of the cooling system

After reinstall the complete cooling system, inspect the operation of system as follow.

- When the engine is idling, place your hand near the water hose coming out of the engine.
- Check the operation of the thermostat by observing the temperature at the water hose increasing as soon as the thermostat valve open .
- After the thermostat open, twist the throttle slowly until medium engine RPM and hold for about 10 seconds.
- Close the throttle, wait for the cooling fans to operate.
- Wait the cooling fans to stop working and turn off the engine.



Components/Systems	Fault type	fault code	Check the strategy description.	Anomaly criteria
Fuel injector	max	P0262	Circuit check	Cylinder 1 Injector Circuit High
	min	P0261		Cylinder 1 Injector Circuit Low
	sig	P0201		Injector Circuit / open Cylinder 1
Fuel injector	max	P0265	Circuit check	Cylinder 2 Injector Circuit High
	min	P0264		Cylinder 2 Injector Circuit Low
	sig	P0202		Injector Circuit/open Cylinder
Fuel pump	max	P0629	Circuit check	Fuel Pump "A" Control Circuit High
	min	P0628		Fuel Pump "A" Control Circuit Low
	sig	P0627		Fuel Pump "A" Control Circuit / open
Cooling Fan	max	P0629	Circuit check	Fan 1 Control Circuit High
	min	P0691		Fan 1 Control Circuit Low
	sig	P0480		Fan 1 Control Circuit
Idle air control system	max	P0509	Circuit check	Idle Air Control System Circuit High
	min	P0508		Idle Air Control System Circuit Low
	sig	P0511		Idle Air Control Circuit
Ignition Coil	min	P2300	Circuit check	Ignition Coil "A" Primary Control Circuit Low
Ignition Coil	min	P2303	Circuit check	Ignition Coil "B" Primary Control Circuit Low
MIL	max	P0650	Circuit check	Malfunction Indication Lamp (MIL) Control circuit
	min			
	sig			
DUMP Sensor	max	P1099	Circuit check	short to battery plus
	min	P1098		Short to ground
second air system valve power stage	max	P0415	Circuit check	Secondary Air Injection System Switching Valve "B" circuit
	min	P0414		Secondary Air Injection System Switching Valve "A" circuit Shorted
	sig	P0413		Secondary Air Injection System Incorrect Flow Detected
	npl	P0411		Incorrect Flow Detected
Engine speed sensor	sig	P0322	Synchronization didn't take place by some certain phase sensor signals has been detected	Ignition / Distributor Engine Speed Input Circuit No Signal
Idle speed control	max	P0507	actuator blocked at higher position	Idle air Control System RPM Higher Than Expected
	min	P0506	actuator blocked at higher position	Idle air Control System RPM Lower Than Expected
Intake air temperature	max	P0113	Option 1: The voltage value of intake manifold temperature sensor is above the permissible upper threshold	Intake Air Temperature Sensor 1 Circuit High
			Option 2: Jitter Check	
	min	P0112	The voltage value of intake manifold temperature sensor is below the permissible lower threshold	Intake Air Temperature Sensor 1 Circuit Low
			Option 1: intake manifold temperature exceeds plausible threshold	
	npl	P0111	Option 2: intake manifold temperature is stuck	Intake Air Temperature Sensor 1 Circuit Range / performance
			Option 3: intake manifold temperature exceeds plausible threshold	
Engine coolant Temperature	max	P0118	Signal-voltage of the coolant temperature sensor lies above the permissible maximum threshold	Engine Coolant Temperature Sensor 1 Circuit High
	min	P0117	Option 1: Signal-voltage of the coolant temperature sensor lies below the permissible minimum threshold	Engine Coolant Temperature Sensor 1 Circuit Low
			Option 2: coolant temperature constantly lies below the threshold	
npl	P0116	Jitter Check	Engine Coolant Temperature Sensor 1 Circuit Range / Performance	
System voltage (onboard)	max	P0563	rationality check max limit exceed	System Voltage High
	min	P0562	rationality check max limit exceed	System Voltage Low
	npl	P0560	implausibility check	System Voltage
Vehicle speed	sig	P0501	Option 1: lower limit exceeded during fuel cut off	Vehicle Speed Sensor "A" Range / performance
			Option 2: vehicle speed is absolutely constant (stuck)	
			Option 3: vehicle speed sensor pulse non plausible	
Throttle position sensor	max	P0123	Circuit check, max limit exceeds	Throttle / Pedal Position Sensor / Switch "A" Circuit High
	min	P0122	Circuit check, max limit exceeds	Throttle / Pedal Position Sensor / Switch "A" Circuit Low

Components/Systems	Fault type	fault code	Check the strategy description.	Anomaly criteria
Fuel system cy1.1	max	P2177	fuel trim high limits exceeded	System Too Lean Off Idle
	min	P2178	fuel trim high limits exceeded	System Too Rich Off Idle
Fuel system cy1.2	max	P2179	fuel trim high limits exceeded	System Too Lean Off Idle
	min	P2180	fuel trim high limits exceeded	System Too Rich Off Idle
Misfire cy1.0	max	P0301	misfire rate that harmful to catalyst (mx fault)	Cylinder 1 Misfire Detected
	min		misfire rate that deteriorate emission (mn fault)	
	npl		implausible fault	
Misfire cy2.0	max	P0302	misfire rate that harmful to catalyst (mx fault)	Cylinder 2 Misfire Detected
	min		misfire rate that deteriorate emission (mn fault)	
	npl		implausible fault	
O2 sensor heater (Bank1)	max	P0032	Circuit check	HO2S Heater Control Circuit High
	min	P0031		HO2S Heater Control Circuit Low
	npl	P0030		HO2S Heater Control Circuit
	npl	P0053	current sensor resistance is greater than threshold value	HO2S Heater Resistance
O2 sensor heater (Bank2)	max	P0052	Circuit check	HO2S Heater Control Circuit High
	min	P0051		HO2S Heater Control Circuit Low
	npl	P0050		HO2S Heater Control Circuit
	npl	P0059	current sensor resistance is greater than threshold value	HO2S Heater Resistance
O2 sensor slow response (Bank1)	max	P0133	filtered cycle delay time of sensor signal upstream cat is greater than threshold value	O2 sensor Circuit Slow Response
O2 sensor slow response (Bank2)	max	P0153	filtered cycle delay time of sensor signal upstream cat is greater than threshold value	O2 sensor Circuit Slow Response
O2 sensor (Bank1)	max	P0132	O2 sensor circuit High Voltage	O2 sensor circuit High Voltage
	min	P0131	O2 sensor circuit Low Voltage	O2 sensor circuit Low Voltage
	sig	P0134	O2 sensor circuit No activity detected	O2 sensor circuit No activity detected
	npl	P0130	O2 sensor Voltage has a restricted amplitude Signal	O2 sensor circuit
	Sensor Voltage current has leakage to UB			
	O2 Sensor Voltage coupled with heater line			
O2 sensor (Bank2)	max	P0152	O2 sensor circuit High Voltage	O2 sensor circuit High Voltage
	min	P0151	O2 sensor circuit Low Voltage	O2 sensor circuit Low Voltage
	sig	P0154	O2 sensor circuit No activity detected	O2 sensor circuit No activity detected
			Sensor res. is high when exgaust Temperature high	
	npl	P0150	O2 sensor Voltage has a restricted amplitude Signal	O2 sensor circuit
	Sensor Voltage current has leakage to UB			
	O2 Sensor Voltage coupled with heater line			
Evaporativac Emissson system purge contri valve	max	P0459	Circuit check	Evaporative Emission System Purge Control Valve Circuit Low
	min	P0458		Evaporative Emission System Purge Control Valve Circuit High
	sig	P0444		Evaporative Emission System Purge Control Valve Circuit Open
	Npl	P0441	Incorrect Purge Flow	engine speed jump exceed threshold due to evaprative purge valve open or close
Manifold absolute pressure	max	P0108	Circuit check, max limit exceeds	Manifold Absolute Pressure / Barometric Pressure Circuit High
	min	P0107	Circuit check, min limit exceeds	Manifold Absolute Pressure / Barometric Pressure Circuit Low
	Si	P0105	signal check : no pressure drop after start	Manifold Absolute Pressure / Barometric Pressure Circuit
	Npl	P0106	signal non plausible	Manifold Absolute Pressure / Barometric Pressure Circuit Range / Performance

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