

Carbon monoxide

- ⚠ The exhaust fumes contain carbon monoxide, a poisonous gas that can cause death. Therefore, for certain operations, make sure you are in an open space, or in a suitable and well-ventilated room, never in enclosed spaces. If operating in enclosed spaces, use an evacuation system for the exhaust fumes.

Fuel

- ⚠ The fuel used is extremely flammable and can become explosive under certain conditions. Refuelling and maintenance operations must be carried out in a ventilated area and with the vehicle switched off. Do not smoke during refuelling and near fuel vapours; avoid contact with open flames, sparks and any other source that could cause ignition or explosion.
- ⚠ Do not disperse in the environment and keep away from children.

Hot components

- ⚠ The engine and certain components become very hot and remain hot for a while even when the engine is off. Before carrying out any operation near the engine or exhaust system, wear insulating gloves or wait for their cooling.

Used engine and gearbox oil

- ⚠ Used engine and gearbox oil is harmful to health, whether it is inhaled or swallowed. It is also irritating and can cause serious consequences if it comes into contact with the skin.
- ⚠ Spreading and dispersion into the environment is prohibited.
- ⚠ If swallowed, do not induce vomiting, but go urgently to a first aid centre, indicating the cause and how the accident occurred.
- ⚠ In case of contact with the skin, immediately wash the affected part with soap and water, repeating the operation until the affected part is free from residues.
- ⚠ In case of contact with eyes and ears, immediately rinse the affected parts with plenty of water and urgently go to a first aid center, indicating the cause and how the accident occurred.
- ⚠ In case of contact with clothing, undress and wash thoroughly with soap and water. Change the dirty cloths which must be specifically washes as soon as possible.
- ⚠ Always use gloves suitable to protect your hands during the maintenance operations.
- ⚠ Keep out of the reach of children.
- ⓘ Used engine and gearbox oil must be collected in a sealed container, and delivered to the nearest service station or at a waste oil collection centre where you will find personnel authorized to dispose of it.

Brakes

- ⚠ Brake fluid may damage the vehicle painted, plastic or rubber surfaces. Protect these components with a clean rag when performing certain operations.
- ⚠ Always wear protective glasses and in case of accidental contact of the brake fluid with eyes, rinse immediately with plenty of clean, fresh water and consult a doctor immediately. Keep out of the reach of children.
- ⚠ Clean the brake pads in a ventilated environment, directing the compressed air jet so as not to inhale the dust produced by the wear of the friction material. Although the latter does not contain asbestos, inhaling dust is however harmful.

Electrolyte and hydrogen gas from the battery


- ⚠ The electrolyte of the battery is toxic and caustic. In contact with skin it can cause burns, as it contains sulphuric acid. Wear gloves and protective clothing.
- ⚠ If the electrolyte liquid comes into contact with the skin, wash it thoroughly with fresh water.
- ⚠ Protect your eyes, as battery fluid can cause blindness. If it comes into contact with the eyes, wash thoroughly with water for fifteen minutes and promptly contact an eye specialist.
- ⚠ The battery emits explosive gases, it is advisable to keep away flames, sparks and any other source of heat. Provide adequate ventilation when servicing or recharging the battery.
- ⚠ Keep out of the reach of children.

 The battery fluid is corrosive. Do not pour it or spread it, especially on plastic parts.

 Provide for regular disposal.

Coolant


 Under certain conditions, the ethylene glycol present in the engine coolant is combustible and its flame is not visible. If ethylene glycol is ignited, its flame is not visible but it is able to cause serious burns.

 Avoid pouring engine coolant to the exhaust system or on engine parts. These parts may be hot enough to ignite the liquid which then burns without visible flames. Coolant (ethylene glycol) can cause skin irritation and is poisonous if swallowed. Keep out of the reach of children. Do not remove the radiator cap when the engine is still hot. Coolant is under pressure and may cause burns.


 Keep hands and clothes away from the cooling fan as it starts automatically.


Precautions and general warnings

 The clothing of the operator performing the repair operations must be adequate to avoid the risk of injury when working on moving parts (for example, too wide clothes that can get caught).

 Do not wear personal items (e.g. rings, wristwatches, etc.) while performing repairs on the vehicle, and in particular on the electrical system.

 Keep the work area tidy, to avoid that elements left on the ground interfere with the repair operations.

 Clean the floors of the working areas from oil, grease or other residual fluids, to avoid slipping.

 Perform compression or decompression operations on the springs, using only suitable tools to prevent the operations from causing damage to the operator.

 Avoid inhalation of vapours from cleaning fluids: they can be highly toxic. Make sure the work area is properly ventilated.

 Use suitable cleaning products for each operation, making sure that they are approved.

 Wear eye protection when using electrical tools such as drills, grinders or milling machines.

2.1 MAINTENANCE

- ❗ Always use original fantic motor spare parts and lubricants recommended by the manufacturer. Non-original spare parts can damage the vehicle.
- ⚠ Use only the specific tools designed for this vehicle.
- ❗ Always use new gaskets, seals and o-rings during assembling.
- ❗ After disassembling, clean the components with non-flammable thinners.
- ❗ Lubricate all the work surfaces before assembling, except the tapered fittings.
- ⚠ Use only metric measuring tools for disassembling, overhaul and assembling operations. Metric screws, nuts and pins are not interchangeable with coupling parts having english units of measurement.
- ❗ All surfaces with gaskets, oil seals and o-rings must be cleaned with special care.
- ❗ Carefully examine all the retaining rings before replacing the deformed ones. Use the new piston pin retaining rings after each use.
- ❗ After assembling, check that all components have been correctly installed and are working perfectly.
- ❗ Always use high quality equipment. Use, for lifting the vehicle, equipment expressly made and complying with national and local laws and regulations.
- ❗ In case of interventions that involve the electrical system, check the correct installation of electrical connections, in particular the earth and battery connections

2.2 PREPARATION FOR INTERVENTIONS

- ❗ Before carrying out the disassembling operations, carefully clean the elements from dirt, dust, mud and foreign bodies.
- ♻ Use appropriate tools and cleaning products.
- ❗ When disassembling the vehicle always keep the coupled elements together, i.E. Gears, cylinders, pistons and other elements adapted to each other through normal wear. These coupled elements must always be reused together or completely replaced.
- ⚠ During the motorcycle disassembling clean all the elements and place them in containers following the disassembling order, so as to facilitate assembling operations and allow a correct installation of all components. If necessary, mark parts or positions that could be exchanged with each other during assembling.
- ⚠ Keep all items away from heat sources.
- ❗ Keep, during the operations, the tools at hand, possibly according to a predetermined sequence and never on the vehicle or in hidden or inaccessible positions.
- ❗ Keep the working area tidy and clean.
- ⚠ Do not lift the vehicle grasping the license plate holder frame, in order to avoid damage.





Fantic Motor vehicles are equipped with frame and engine identification numbers.

i These numbers that identify the motorcycle model must be mentioned for the request for spare parts.

Frame number

The frame number "A" is punched on the steering tube on the right side.





Engine number

The engine number "B" is punched on the left side of the engine crankcase.

We recommend using only original Fantic Motor parts for all the needs. It is recommended to use lubrication products such as greases and oils recommended by Fantic Motor.



4.1 GASKETS, OIL SEALS AND O-RINGS

-  When performing engine repairs, always use new gaskets, o-rings and oil seals. Also, clean all mating surfaces and edges of sealing rings and o-rings.
-  Prior to assembling, lubricate the coupled elements and bearings with the specified oil and apply the prescribed grease to the edges of the sealing rings.

4.2 WASHERS, PLATES AND SPLIT PINS

-  If washers, plates and split pins are disassembled, always use new elements during assembling. The locking tabs must be folded over the tops of the relative nut or bolt after they have been properly tightened.





4.3 BEARINGS AND OIL SEALS

-  Install bearings and oil seals with the manufacturing identification markings facing outwards, i.E. Towards the visible side. When installing the oil seals, apply a thin layer of lithium grease on their edges.
-  To avoid damaging the rolling surfaces, do not dry the bearings with compressed air.

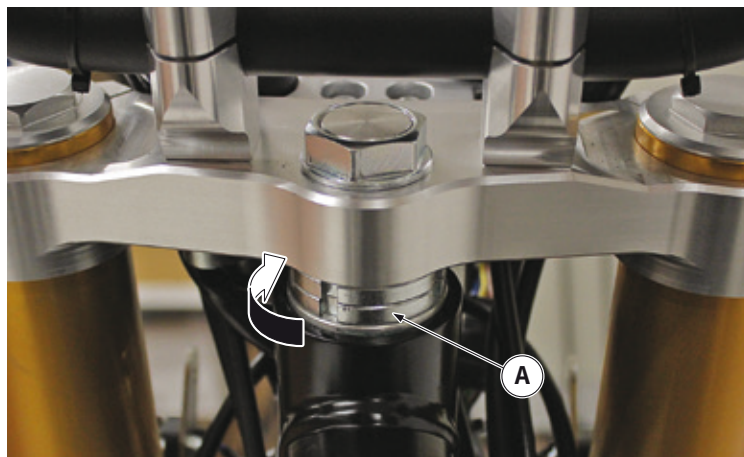
4.4 RETAINING RINGS

-  Check all the retaining rings before installing them. Always replace the retaining rings that have been removed during disassembling. Replace the deformed elastic rings. When mounting a new retaining ring, turn it so that the side with the sharp edge is on the side opposite the point where pressure is applied.

5.1 FRAME TIGHTENING TORQUES

Component	Screw	Tightening torque	Remarks
Fork upper plate fastening screws	M6 (8.8)	10 Nm (1.0 m·kgf, 7 ft·lbf)	
Fork bottom plate fastening screws	M6 (8.8)	10 Nm (1.0 m·kgf, 7 ft·lbf)	
Screws fastening the headlight support bracket to the lower fork plate	M8 (8.8)	18 Nm (1.8 m·kgf, 13 ft·lbf)	
Front brake calliper fastening screws	M8 (10.9)	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Front wheel pin	M14	50 Nm (5.0 m·kgf, 37 ft·lbf)	
Rear wheel pin	M16	80 Nm (8.0 m·kgf, 59 ft·lbf)	
Right fork foot tightening screw	M8 (8.8)	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Screws fastening the riser to the fork upper plate	M10 (8.8)	45 Nm (4.5 m·kgf, 33 ft·lbf)	
Screws fastening the U-bolts to the Riser (handlebar clamping)	M8 (8.8)	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Screws fastening the clutch control to the handlebar	M6 (10.9)	10 Nm (1.0 m·kgf, 7 ft·lbf)	
Screws fastening the brake pump to the handlebar	M6 (10.9)	10 Nm (1.0 m·kgf, 7 ft·lbf)	
Screws fastening the engine mounting plate to the chassis	M8 (8.8)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Screws fastening the engine mounting plates to the engine	M10 (8.8)	45 Nm (4.5 m·kgf, 33 ft·lbf)	
Screws fastening the engine head mounting plate to the engine	M12 x 1.5 (8.8)	40 Nm (4.0 m·kgf, 30 ft·lbf)	
Swingarm pivot	M16	80 Nm (8.0 m·kgf, 59 ft·lbf)	
Rear connecting rod nuts	M12	50 Nm (5.0 m·kgf, 37 ft·lbf)	
Mono-shock absorber upper fastener	M10	40 Nm (4.0 m·kgf, 30 ft·lbf)	
Mono-shock absorber lower fastener	M10	40 Nm (4.0 m·kgf, 30 ft·lbf)	
Rim fastening screws	M8 (10.9)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Front brake disc fastening screws	M8 (8.8)	20 Nm (2.0 m·kgf, 15 ft·lbf)	
Rear brake disc fastening screws	M6 (8.8)	10 Nm (1.0 m·kgf, 7 ft·lbf)	
Kickstand screw	M10 (10.9, special)	screw: 25 Nm (2.5 m·kgf, 18 ft·lbf) locknut: 25 Nm (2.5 m·kgf, 18 ft·lbf)	
Rear brake lever screw	M10 (8.8)	40 Nm (4.0 m·kgf, 30 ft·lbf)	
Screws fastening the chassis side plates to the chassis	M8 (8.8)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Screws fastening the rear brake pump to the chassis side plate	M6 (8.8)	10 Nm (1.0 m·kgf, 7 ft·lbf)	
Steering column fastening nut and ring nuts	Follow the instructions for the appropriate tightening sequence. (Refer to "Steering column tightening sequence" on page 14)		


 It is recommended using Loctite® 243 to tighten the fastening element indicated.

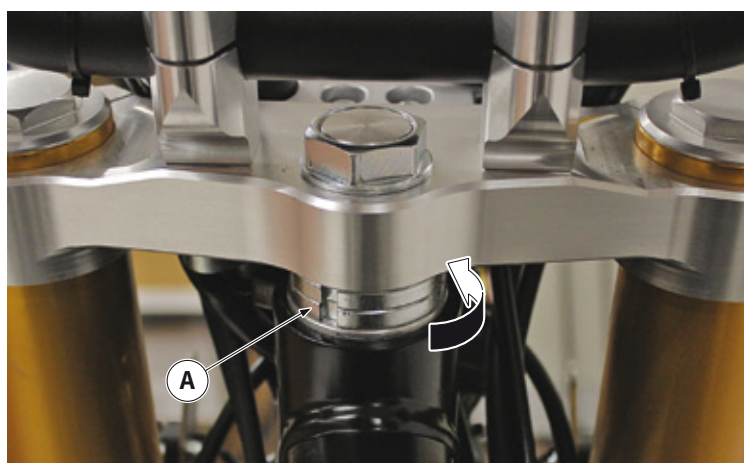


5.1.1 Sequences for tightening chassis parts

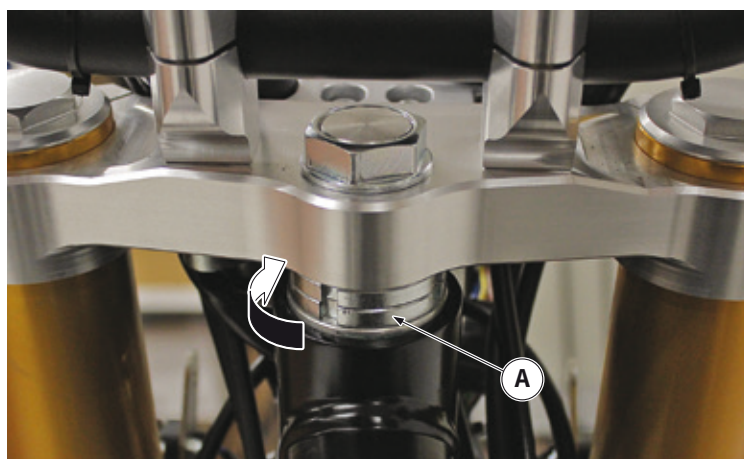
Steering column tightening sequence

Tighten the 1st steering column fastening ring nut "A" to the following tightening torque.


 **1st ring nut initial tightening torque: 25 Nm (2.5 m·kgf, 18 ft·lbf)**

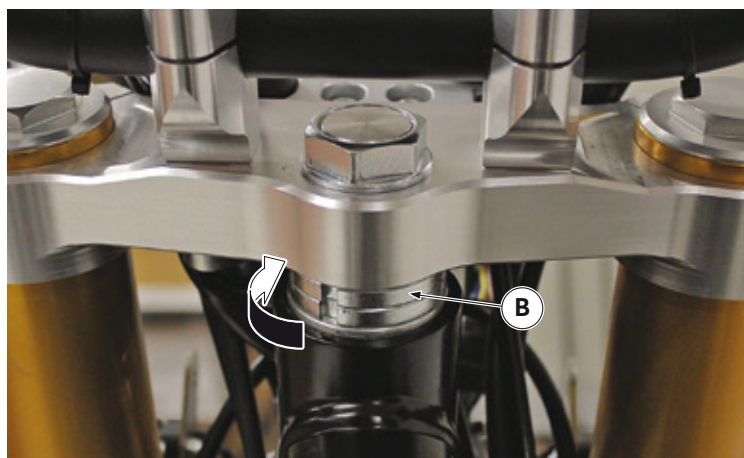


Loosen the 1st steering column fastening ring nut "A" 1/2 turn.



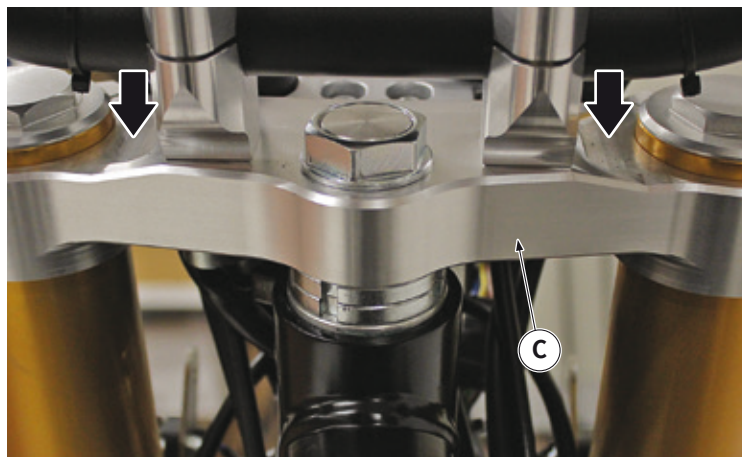
Re-tighten the 1st steering column fastening ring nut "A" to the following tightening torque:

 **1st ring nut final tightening torque: 8 Nm (0.8 m·kgf, 6 ft·lbf)**

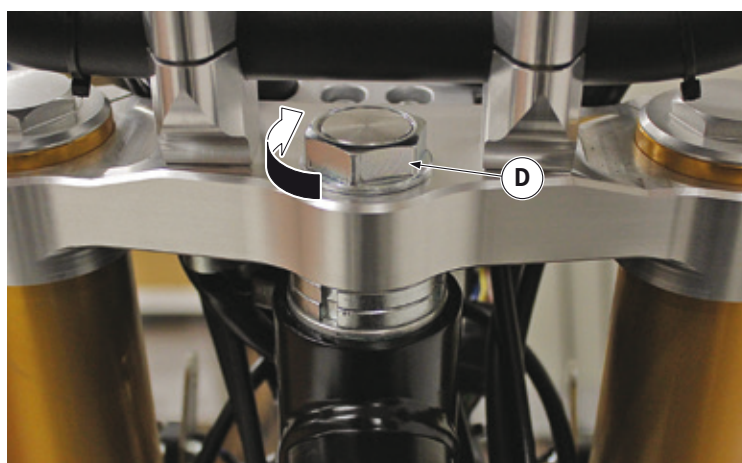


Screw the 2nd ring nut "B" fastening the steering column onto the 1st ring nut "A", preventing it from turning, at the following tightening torque:

 **2nd ring nut tightening torque: 10 Nm (1.0 m·kgf, 7 ft·lbf)**



Install the upper steering plate "C".







Tighten the upper steering column fastening nut "D" to the following tightening torque:

 **Upper nut tightening torque: 80 Nm (8.0 m·kgf, 59 ft·lbf)**

5.2 ENGINE TIGHTENING TORQUES

Component	Screw	Tightening torque	Remarks
Spark plug	M10	8 ~ 10 Nm (0.8 ~ 1.0 m·kgf, 5.4 ~ 7.4 ft·lbf)	
Radiator bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Radiator fan bolt	M6	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Coolant tank bolt	M6	11 Nm (1.1 m·kgf, 8.0 ft·lbf)	
Thermostat cover fastening screws	M6 x 20	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Exhaust pipe stud screw	M8 x 40	12 ~ 18 Nm (1.2 ~ 1.8 m·kgf, 8.9 ~ 13.3 ft·lbf)	①
Secondary air intake cover bolts	M6 x 16	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	①
Temperature sensor		11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Camshaft plate fastening screw	M6 x 12	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Rocker arms shafts fastening bolts	M14 x 1	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Rocker arms shafts locking bolts	M14 x 1	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Cylinder head fastening stud screws	M10 x 152	55 ~ 60 Nm (5.5 ~ 6.0 m·kgf, 40.6 ~ 44.3 ft·lbf)	
Cylinder head fastening bolt	M6 x 40	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Camshaft sprocket fastening bolt	M6 x 10	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Pressure relief valve fastening bolt	M6 x 16	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Cylinder head cover fastening bolt	M6 x 29.7, M6 x 50.7	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Chain tensioner plate fastening bolt	M6 x 105	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	②
Engine flywheel fastening nut		85 ~ 90 Nm (8.5 ~ 9.0 m·kgf, 62.7 ~ 66.4 ft·lbf)	②
Starter motor fastening bolts	M6 x 25	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Chain tensioner fastening bolts	M6 x 20	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	②
Chain tensioner spring fastening bolt		5 ~ 7 Nm (0.5 ~ 0.7 m·kgf, 3.7 ~ 5.2 ft·lbf)	
Timing inspection hole cap on cylinder head cover	M8 x 12	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Primary oil strainer cap		11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Thin oil strainer cap fastening bolts	M6 x 16	9 ~ 11 Nm (0.9 ~ 1.1 m·kgf, 6.6 ~ 8.1 ft·lbf)	
Oil pump right cover fastening bolts	M5 x 18	7 ~ 9 Nm (0.7 ~ 0.9 m·kgf, 5.2 ~ 6.6 ft·lbf)	
Oil pump left cover fastening bolts	M5 x 12	7 ~ 9 Nm (0.7 ~ 0.9 m·kgf, 5.2 ~ 6.6 ft·lbf)	
Starter axle fastening screw	M6 x 25	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Crankshaft locking nut	M18 x 1	115 ~ 125 Nm (11.5 ~ 12.5 m·kgf, 84.8 ~ 92.2 ft·lbf)	②
Primary shaft locking nut	M18 x 1	85 ~ 90 Nm (8.5 ~ 9.0 m·kgf, 62.7 ~ 66.4 ft·lbf)	②
Clutch thrust plate fastening bolts	M5 x 25	8 ~ 10 Nm (0.8 ~ 1.0 m·kgf, 5.4 ~ 7.4 ft·lbf)	
Water pump impeller		2 ~ 4 Nm (0.2 ~ 0.4 m·kgf, 1.5 ~ 3.0 ft·lbf)	
Small inspection cap on the right cover		4 ~ 6 Nm (0.4 ~ 0.6 m·kgf, 3.0 ~ 4.4 ft·lbf)	
Right cover decorative cover fastening bolts	M6 x 30	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Right cover bolts	M6 x 35	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Water pump cover bolts	M6 x 25, M6 x 45	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Crankshaft fastening nut	M24 x 1	115 ~ 125 Nm (11.5 ~ 12.5 m·kgf, 84.8 ~ 92.2 ft·lbf)	②
Countershaft locking nut	M16 x 1	85 ~ 90 Nm (8.5 ~ 9.0 m·kgf, 62.7 ~ 66.4 ft·lbf)	
Rotor fastening bolts	M5 x 30	7 ~ 9 Nm (0.7 ~ 0.9 m·kgf, 5.2 ~ 6.6 ft·lbf)	②
Stator fastening bolts	M5 x 10	7 ~ 9 Nm (0.7 ~ 0.9 m·kgf, 5.2 ~ 6.6 ft·lbf)	②

Component	Screw	Tightening torque	Remarks
Generator small inspection cap		24 ~ 27 Nm (2.4 ~ 2.7 m·kgf, 17.7 ~ 19.9 ft·lbf)	
Generator large inspection cap		24 ~ 27 Nm (2.4 ~ 2.7 m·kgf, 17.7 ~ 19.9 ft·lbf)	
Left cover bolts	M6 x 30	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	 2
Intake flange bolts on cylinder head	M6 x 20	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Air intake sleeve clamps		5 ~ 7 Nm (0.5 ~ 0.7 m·kgf, 3.7 ~ 5.2 ft·lbf)	
Rim locking nut	M16 x 1	85 ~ 90 Nm (8.5 ~ 9.0 m·kgf, 62.7 ~ 66.4 ft·lbf)	 2
Deflector fastening screws	M6 x 12	9 ~ 11 Nm (0.9 ~ 1.1 m·kgf, 6.6 ~ 8.1 ft·lbf)	
Secondary shaft bolt		11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Starting shaft bolt	M8 x 40	18 ~ 20 Nm (1.8 ~ 2.0 m·kgf, 13.3 ~ 14.8 ft·lbf)	
Oil drain bolt	M16 x 1.5	24 ~ 27 Nm (2.4 ~ 2.7 m·kgf, 17.7 ~ 19.9 ft·lbf)	
Engine oil nozzle		2 ~ 4 Nm (0.2 ~ 0.4 m·kgf, 1.5 ~ 3.0 ft·lbf)	
Inspection bolt on left crankcase	M8 x 12	24 ~ 27 Nm (2.4 ~ 2.7 m·kgf, 17.7 ~ 19.9 ft·lbf)	
Half-crankcase coupling bolts	M6 x 45, M6 x 45, M6 x 70	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	 2
Gear sensor fastening bolt	M6 x 20	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Plate fastening bolt on right half-crankcase	M6 x 12	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Gear drum fastening bolt	M6 x 20	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	
Gear drum plate fastening bolt	M6 x 35	11 ~ 13 Nm (1.1 ~ 1.3 m·kgf, 8.1 ~ 9.6 ft·lbf)	 2

 1 For tightening the fastening element indicated, we recommend using Loctite® 243.

 2 For tightening the fastening element indicated, we recommend using Loctite® 263.

5.3 GENERIC TIGHTENING TORQUES

5.3.1 General specifications of the tightening torques

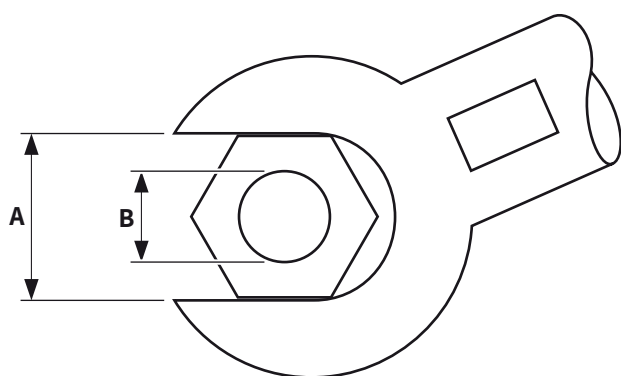
The following table contains the tightening torques of standard nuts and bolts with standard ISO thread pitch.

i The tightening torques of components or special units can be found in the relevant chapters of this manual.

! To avoid deformation, tighten the bolt or nut assemblies gradually until the specified torque is reached.

! Unless otherwise specified, the tightening torques indicated are intended with clean and dry threads.

! The components must be at room temperature.



"A" (nut)	"B" (bolt)	General tightening torques		
10 mm	6 mm	6 Nm	0.6 m·kgf	4.3 ft·lbf
12 mm	8 mm	15 Nm	1.5 m·kgf	11 ft·lbf
14 mm	10 mm	30 Nm	3.0 m·kgf	22 ft·lbf
17 mm	12 mm	55 Nm	5.5 m·kgf	40 ft·lbf
19 mm	14 mm	85 Nm	8.5 m·kgf	61 ft·lbf
22 mm	16 mm	130 Nm	13.0 m·kgf	94 ft·lbf

A. Key opening

B. External thread diameter

5.3.2 Conversion table

i All the specifications in this manual follow the International System (IS) and the Metric System units.

Use the following table to convert the values expressed with units of the Metric System into values expressed with units of the English System.

Feature	Metric system unit	Multiplication factor	Unit of the English system
Tightening torque	m·kg	7.233	ft·lb
	m·kg	86.794	in·lb
	cm·kg	0.0723	ft·lb
	cm·kg	0.8679	in·lb
Counterweight	kg	2.205	lb
	g	0.03527	oz
Speed	km / h	0.6214	mph
Distance	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
Volume / Capacity	cc (cm ³)	0.03527	oz (Liquid IMP = liq.)
	cc (cm ³)	0.06102	cu.in
	l (litri)	0.8799	qt (Liquid IMP = liq.)
	l (litri)	0.2199	gal (Liquid IMP = liq.)
Other	kg / mm	55.997	lb / in
	kg / cm ²	14.2234	psi (lb/in ²)
	degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

6.1 FRAME TECHNICAL DATA

Technical data	Value(s)
Maximum length (Scrambler)	2166 mm (85.27 in)
Maximum length (Flat Track)	2180 mm (85.82 in)
Maximum width	820 mm (32.28 in)
Maximum height (Scrambler)	1135 mm (44.68 in)
Maximum height (Flat Track)	1154 mm (45.43 in)
Wheel base	1423 mm (56.02 in)
Weight in running order	160 kg (352.74 lb)
Weight at full load (vehicle, rider, baggage)	330 kg (727.52 lb)
Seats	2
Maximum allowable weight (rider, passenger, baggage)	177 kg (390.21 lb)
Frame	Closed double cradle frame in molybdenum chrome steel with forged aluminium elements
Swingarm	Steel swingarm with variable section
Steering angle (with extended suspensions)	24°
Steering angle (both sides)	39° ± 1°
Front suspension	Upside down swingarm ø41 Stroke 150 mm (5.90 in)
Rear suspension	Mono-shock absorber in adjustable compression and progressive linkage Stroke 56 ± 2 mm (2.20 ± 0.07 in)
Front brake	Four-piston calliper 28 mm (1.10 in) , 320 mm disk (12.59 in)
Rear brake	One-piston floating calliper 32 mm (1.25 in) , 230 mm disk (9.05 in)
Wheels (Scrambler version)	Spoke wheels with aluminium rims and tubeless tires with inner tube: front 2.50 x 19" / rear 3.50 x 17". Front/rear inflation pressure: from 1.7 bar (170 kPa ± 10) (24.66 PSI) to 1.9 bar (190 kPa ± 10) (27.55 PSI).
Wheels (Flat Track version)	Spoke wheels with aluminium rims and tubeless tires with inner tube: front 2.50 x 19" / rear 3.00 x 19". Front/rear inflation pressure: from 2.1 bar (210 kPa ± 10) (30.45 PSI) to 2.3 bar (230 kPa ± 10) (33.35 PSI).
ABS system	ABS system on two independent and disconnectable channels
Spark plug	NGK-ER9EH-6N
Battery	12 V - 8 Ah
Fuses	Main fuse 30 A Secondary fuses 2 A, 5 A (4), 7.5 A, 30 A
Generator	12 V - 300 W
Turn signals	12 V - 6 W
High/low beam light	Led
Position/brake light	Led
License plate light	Led
ABS warning light	Led
Fuel reserve indicator light	Led
Turn signal indicator light	Led
Neutral indicator light	Led
Oil pressure warning light	Led: not activated
Engine warning light	Led

Technical data	Value(s)
High beam light indicator	Led

6.2 ENGINE TECHNICAL DATA

Technical data	Value(s)
Main	
Engine type	4-stroke single cylinder
Number of cylinders	1
Total displacement	448.88 cc (27.39 cu in)
Bore/Stroke	94.5 mm/64 mm (3.72/2.51 in)
Compression ratio	10.8 / 11.5:1
Starting type	Electric
N ° of engine revolutions at idle speed	1600 (1 ± 10%) rpm
Type of cooling	Liquid
Coolant	1.5 l (0.32 UK gal, 0.39 US gal)
Clutch	Multidisc in oil bath Control on the left side of the handlebar
Lubrication system	Casing in oil bath. Pressure system regulated by trochoid pump
Engine oil	Quantity (disassembled) 1.8 l (0.4 UK gal, 0.48 US gal) Without oil filter change 1.15 l (0.25 UK gal, 0.3 US gal) With oil filter change 1.2 l (0.26 UK gal, 0.32 US gal)
Type of gearbox	6-speed mechanical Pedal control on the left side of the engine
Transmission ratios (Scrambler)	Primary drive: 64/28 = 2.286 1st gear ratio: 33/14 = 2.357 2nd gear ratio: 31/17 = 1.824 3rd gear ratio: 28/19 = 1.747 4th gear ratio: 26/22 = 1.182 5th gear ratio: 25/23 = 0.920 6th gear ratio: 21/27 = 0.778 Secondary drive: 48/13 = 3.692
Transmission ratios (Flat Track)	Primary drive: 64/28 = 2.286 1st gear ratio: 33/14 = 2.357 2nd gear ratio: 31/17 = 1.824 3rd gear ratio: 28/19 = 1.747 4th gear ratio: 26/22 = 1.182 5th gear ratio: 25/23 = 0.920 6th gear ratio: 21/27 = 0.778 Secondary drive: 52/13 = 4
Drive chain	520 Regina model 135 ZRA
Air filter	Paper
Fuel system	34 mm single-body Athena electronic injection, singlepoint single injector.
Fuel	95-98 octane super lead-free petrol
Tank capacity (including reserve)	11.5 l (2.52 UK gal, 3.03 US gal)
Capacity of the fuel reserve only	3.5 l (0.76 UK gal, 0.92 US gal)

- i** Use lubricating and fluid products that meet the equivalent specifications, or higher than those prescribed. These same indications are also valid for topping up.

Product	Characteristics	Remarks
4-stroke gear engine oil	SAE 10W30,10W40,15W40, 20W40, 20W50, API service type SG or greater, JASO standard MA	Do not use mineral oils: see table in section "13.3 Engine oil volume" on page 173.
Grease for bearings, joints, articulations and levers	Lithium grease	
Coolant	Antifreeze liquid based on ethylene glycol with organic additives	Do not dilute with water.
Fork oil	Fork oil gradation 15W	
Transmission chain lubricant	Spray grease for transmission chains	
Brake oil	Dot 4 or 5.1 brake fluid	
Cleaner for electrical contacts	Contact cleaner	
Fuel	95 or 98 octane super lead-free petrol	<div> <div>PETROL FUEL TYPE</div> <div> <div>E5</div> <div>E10</div> </div> </div>
Paste for carter and engine covers coupling	Three Bond N. 1215®	
Safety lock medium tightening	Medium threadlocker	
Safety lock strong tightening	Strong threadlocker	
Lubricant for bolts unlocking	Unlocking protective lubricant	
Anti-friction lubricant for screw tightening torques	Generic engine oil	
Lubricant for rubber oil seals and OR parts	Lithium soap grease	
Battery poles	White vaseline grease	
Vehicle wash	Low pressure water at room temperature Ecological neutral liquid soap	Avoid aggressive detergents.
External cleaning of the brake system (brake discs and seats)	Spray Disc Brake Cleaner	Do not use to clean brake pads and plastic parts.

This chapter includes all the information necessary to perform the recommended checks and adjustments. These preventive maintenance procedures, if complied with, will ensure more reliable operation and longer vehicle life and will limit the need for costly overhaul work. This information applies to both vehicles already in use and new vehicles in preparation for sale. All maintenance technicians must be familiar with the instructions contained in this chapter.

Carry out maintenance operations more frequently if the vehicle is used in rainy, dusty areas, rough roads or in the case of fast riding.

Check the engine oil level every 1,000 km (600 mi).

It is essential to carry out the first service within the end of the first year of use of the vehicle even if the expected deadline of 1,000 km (600 mi) has not been reached.

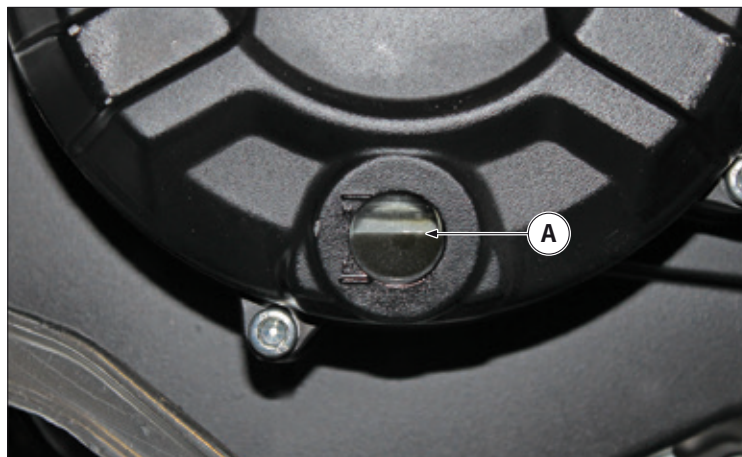
It is essential to carry out a service within the end of the second year of use of the vehicle even if no scheduled deadline has been reached.

The timely execution of the service and servicing indicated (the first one in the first year and the second one in the second year) is necessary for the correct use of the warranty.

Perform the annual checks on a regular basis unless a kilometre (or mileage) interval has expired previously.

Position	Operation	1.000 km (600 mi)	5.000 km (3.500 mi)	10.000 km (6.000 mi)	15.000 km (9.000 mi)	20.000 km (12.000 mi)
Fuel circuit	– Check that the fuel pipes are not cracked or damaged.		√		√	
Spark plug	– Check its status. – Clean and restore the electrode distance.	√	√	√	√	√
	– Replace.			√		√
Valves	– Check the valve clearance. – Adjust.	√	√	√	√	√
Cylinder head	– Check the tightness of the head fixing bolts cylinder.	√				
Additional fuel filter	– Replace.	Every 10,000 km (6,000 mi).				
Air filter	– Clean.	√		√		
	– Replace.		√		√	
Clutch	– Check its operation. – Adjust.	√	√		√	
Front brake	– Check its operation, the fluid level and absence of leakage in the vehicle.	√	√		√	
	– Replace the brake pads.	If worn up to the limit.				
Rear brake	– Check its operation, the fluid level and absence of leakage in the vehicle.	√	√		√	
	– Replace the brake pads.	If worn up to the limit.				
Brake tubes	– Check for cracks or damage. – Check that the installation and tightening are correct.		√		√	
	– Replace.	Every 4 anni.				
Brake fluid	– Replace.	Every 2 anni.				
Wheels	– Check for misalignment and damage.		√		√	
Tires	– Check the tread depth and damage.		√		√	
	– Replace if necessary.					
	– Check the air pressure.					
	– Correct if necessary.					
Wheel bearings	– Check that the bearings are not loose or damaged.		√		√	
Swing arm	– Check its operation and excessive clearance.		√		√	
	– Lubricate with lithium soap based grease.	Every 24.000 km (14.000 mi).				

Position	Operation	1.000 km (600 mi)	5.000 km (3.500 mi)	10.000 km (6.000 mi)	15.000 km (9.000 mi)	20.000 km (12.000 mi)
Transmission chain	<ul style="list-style-type: none"> – Check the tension, alignment and conditions of the transmission chain. – Check the rim and pinion. – Check the play on the rear sprocket coupling. – Fully adjust and lubricate the drive chain with a specific lubricant. 	Every 500 km (300 mi). Following heavy use				
	<ul style="list-style-type: none"> – Replace. 	If the chain elongation exceeds 2%.				
Handlebar bearings	<ul style="list-style-type: none"> – Check the bearing clearance and the handlebar hardness.. 	√	√		√	
	<ul style="list-style-type: none"> – Lubricate with lithium soap based grease. 	Every 24.000 km (14.000 mi).				
Fixings the frame parts	<ul style="list-style-type: none"> – Make sure that all nuts, bolts and screws are properly tightened. 	√	√	√	√	√
Brake lever rotation pin	<ul style="list-style-type: none"> – Lubricate with silicone grease. 		√		√	
Brake pedal rotation pin	<ul style="list-style-type: none"> – Lubricate with lithium soap based grease. 		√		√	
Clutch lever rotation pin	<ul style="list-style-type: none"> – Lubricate with lithium soap based grease. 		√		√	
Side kickstand	<ul style="list-style-type: none"> – Check its operation. – Lubricate with lithium soap based grease. 		√		√	
Side kickstand switch	<ul style="list-style-type: none"> – Check its operation. 	√	√	√	√	√
Fork	<ul style="list-style-type: none"> – Check its operation and the absence of oil leaks. 		√		√	
	<ul style="list-style-type: none"> – Replace oil. 			√		√
	<ul style="list-style-type: none"> – Oil seal replacement 	Every 15.000 km (9.000 mi).				
Rear shock absorber	<ul style="list-style-type: none"> – Check its operation and the absence of oil leaks in the shock absorber. 		√		√	
Rear suspension rotation points	<ul style="list-style-type: none"> – Check the transmission arm operation. 		√		√	
	<ul style="list-style-type: none"> – Check the junction arm operation. 	√	√	√	√	√
	<ul style="list-style-type: none"> – Lubricate the suspension rotation points. 	√	√	√	√	√
Passenger foot pegs	<ul style="list-style-type: none"> – Lubricate the passenger foot pegs. 	√	√	√	√	√
Engine oil	<ul style="list-style-type: none"> – Check the oil level and the absence of oil leaks in the vehicle. 	Every 1.000 km (600 mi).				
	<ul style="list-style-type: none"> – Change. 	√	√	√	√	√
Engine oil filter	<ul style="list-style-type: none"> – Replace. 	√	√	√	√	√
Cooling system	<ul style="list-style-type: none"> – Check the coolant level and the absence of oil leaks in the vehicle. 		√		√	
	<ul style="list-style-type: none"> – Coolant change. 	Every 3 anni.				
Front brake and rear brake switches	<ul style="list-style-type: none"> – Check its operation. 	√	√		√	
Moving parts and cables	<ul style="list-style-type: none"> – Lubricate. 	√	√	√	√	√
Throttle control knob	<ul style="list-style-type: none"> – Check its operation. – Check the throttle knob grip clearance and adjust if necessary. – Lubricate the cable and the knob body. 		√		√	
Lights, signals and switches	<ul style="list-style-type: none"> – Check its operation. – Adjust the headlight beam. 	√	√		√	



9.1 ENGINE OIL LEVEL CHECK

Place the vehicle on a level surface.

- i** Place the vehicle on a suitable support and make sure that the vehicle is upright.

Start the engine, warm it up for a few minutes, then turn it off.

Check the engine oil level by observing the inspection window "A": the engine oil level should be between the minimum level reference "MIN" and the maximum level reference "MAX".

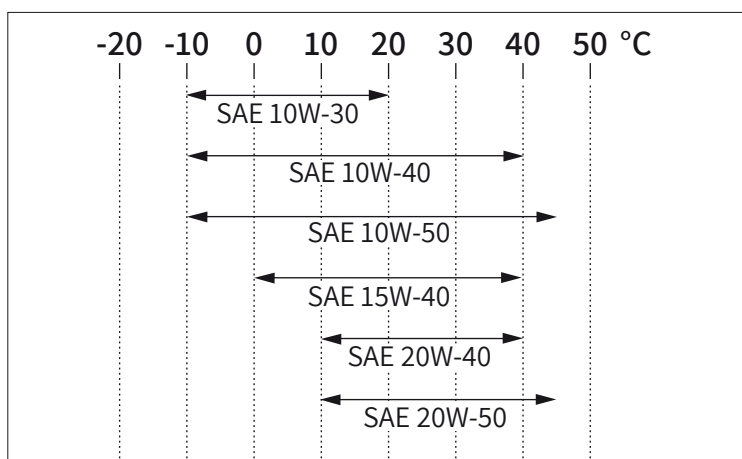
If the level is below the minimum level reference, remove the cap "1" and top up with the recommended engine oil up to the correct level.

- i** Before checking the engine oil level, wait a few minutes until the oil has settled.

♻️ Type:
SAE 10W-30, 10W-40, 15W-40, 20W-40 o 20W-50.
Recommended engine oil grade:
API service type SG or greater, JASO standard MA

- ⚠️** The engine oil also lubricates the clutch; an incorrect type of oil or chemical additives can cause the clutch to slip. Therefore, do not add chemical additives or use engine oil with a "CD" grade or higher and do not use oils labelled "ENERGY CONSERVING II".

- ⚠️** Do not allow foreign material to enter the crankcase.



Start the engine, warm it up for a few minutes, then turn it off.
Check the engine oil level again.

- i** Before checking the engine oil level, wait a few minutes until the oil has settled.



9.2 COOLANT LEVEL CHECK

- ⚠️** Check the coolant level with the engine cold, off and with the vehicle resting on the side kickstand on the left.

Check that the coolant reaches and does not exceed the level shown in the figure.

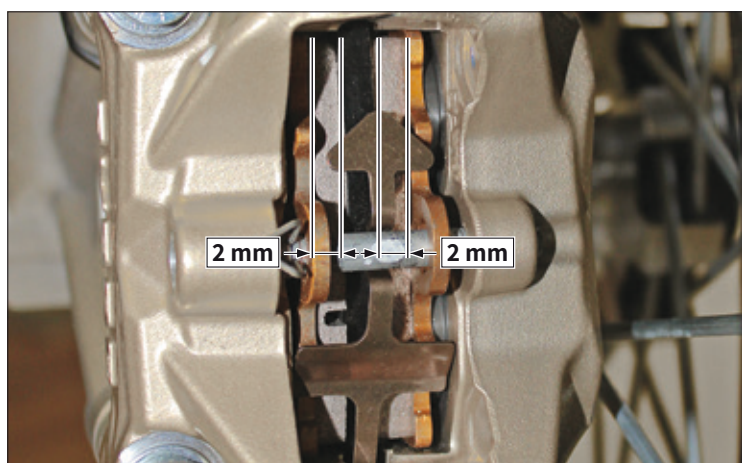
If the vehicle needs topping up add distilled water, instead if it is a complete restoration of the liquid, add a mixture of water and antifreeze.

♻️ Recommended product:
Antifreeze liquid based on ethylene glycol with organic additives.

- ⚠ Press the rubber tubes several times to facilitate the release of any air bubbles.

Close the cap and start the vehicle: keep it on for at least one minute, before re-checking the level.

- ⚠ Repeat the procedure until the coolant level has settled.

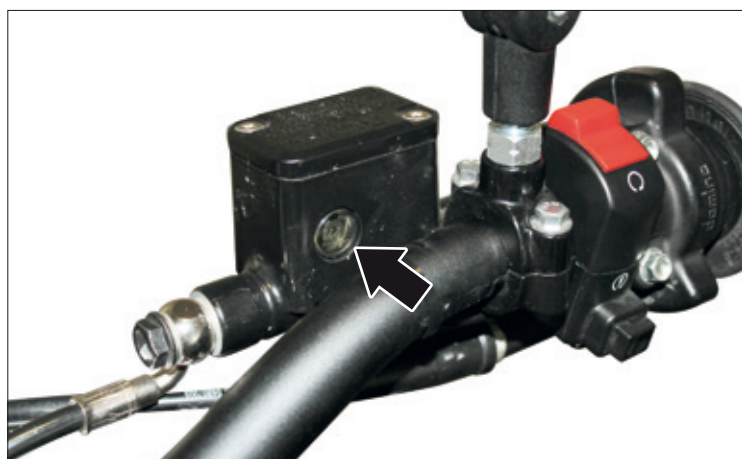


9.3 PADS WEAR CHECK

- ⚠ Check the wear condition of the front brake pads from the back of the calliper, where it is possible to see the ends of the pads which must have at least a 2 mm layer of lining, if the layer is lower, proceed immediately to replace them.

- ⚠ Check the wear condition of the rear brake pads from the upper part of the calliper, where it is possible to see the ends of the pads which must have at least a 2 mm layer of lining. If the layer is lower, proceed immediately to replace them.

- i Perform the check following the times indicated in the scheduled maintenance table of the use and maintenance booklet.



9.4 CHECK THE FRONT BRAKE MASTER CYLINDER OIL LEVEL

Check the front brake fluid level

To check the front brake fluid level, position the vehicle on the kickstand and turn the handlebar, so that the liquid contained in the brake oil reservoir is parallel to the cap. Check that the liquid is over the "MIN" mark.

- ⚠ If the liquid level does not reach at least the "MIN" mark, check the brake disc and pads wear.

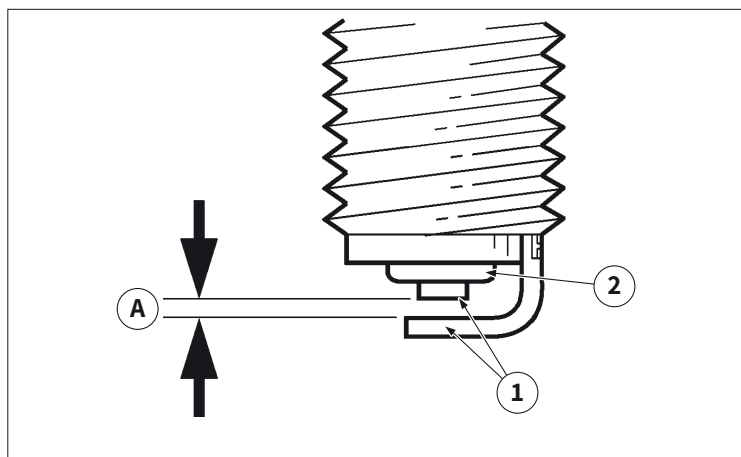


9.5 CHECK THE REAR BRAKE MASTER CYLINDER OIL LEVEL

Check the rear brake fluid level

To check the rear brake fluid, keep the vehicle in vertical position, so that the liquid contained in the brake oil reservoir is parallel to the cap. Check that the liquid is between the "MIN" and "MAX" marks.

- ⚠ If the liquid level does not reach at least the "MIN" mark, check the brake disc and pads wear.



9.6 SPARK PLUG CHECK

Disconnect the spark plug cap and remove the spark plug. Refer to "10.8.2 Spark plug removal" on page 94.

⚠ Before removing the spark plug, remove the impurities, if any, accumulated in the sump, using compressed air, to prevent them from entering the cylinder.

Check the type of spark plug and if it is not correct replace it with the correct model.

♻ Spark plug:
- model NGK-ER9EH-6N

Check the Electrode "1": if it shows any damage or signs of wear replace the spark plug.

Check the isolator "2": if it's colour is anomalous replace the spark plug.

i The normal colour varies between medium reddish brown and light reddish brown.

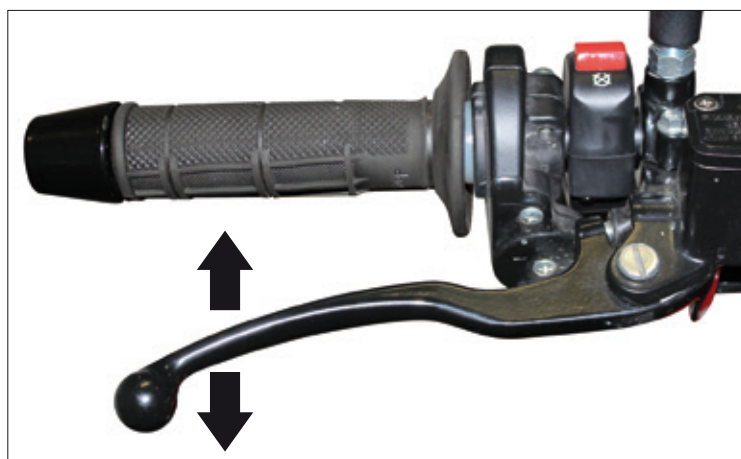
Clean the spark plug with a spark plug cleaner or a wire brush. Measure the distance between the electrodes "A" with a thickness gauge: if the distance does not comply with the specifications, restore the distance.

✂ Distance between the electrodes: 0.7 - 0.8 mm (0.028 - 0.031 in)

i Before installing the spark plug, clean the surface of the gasket and of the spark plug.

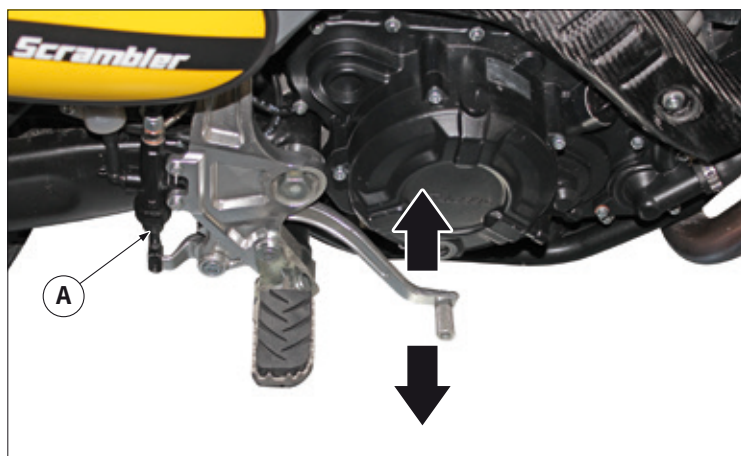
Install the spark plug and connect the spark plug cap.

🔧 Tightening torque: Spark plug 13 Nm (1.3 m•kg, 9.4 ft•lb)



9.7 FRONT BRAKE ADJUSTMENT

Check the clearance of the front brake lever; if it is excessive, top up the front brake fluid reservoir.

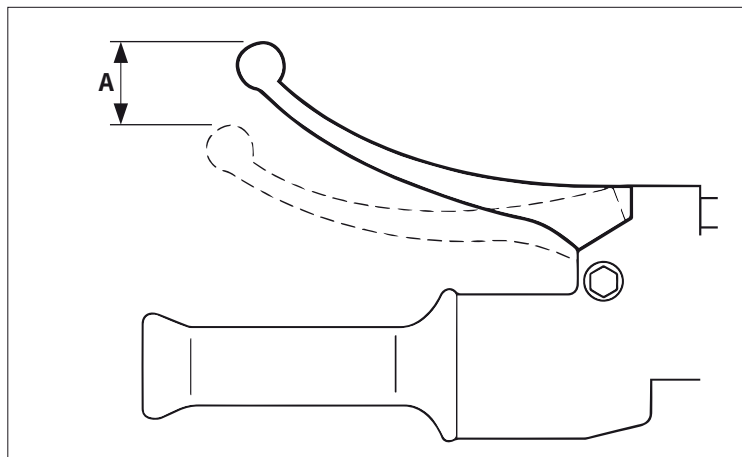


9.8 REAR BRAKE ADJUSTMENT

Check the clearance of the rear brake lever, if it is excessive, act on the adjuster "A".

i If the adjustment is not enough to reduce the lever clearance, top up the rear brake fluid reservoir.

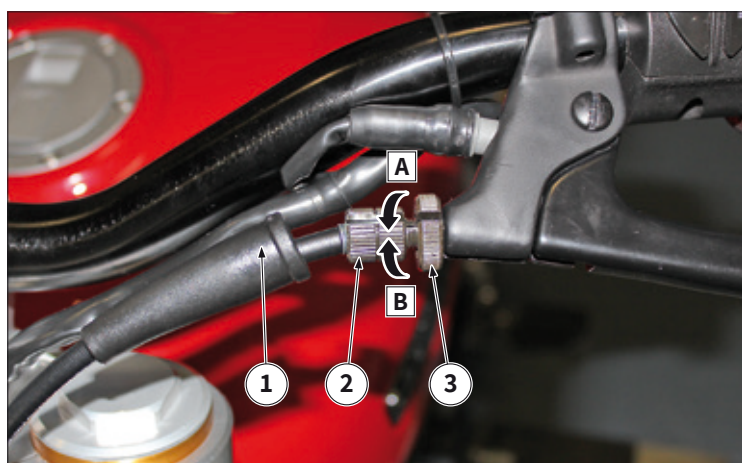
⚠ Keep a compulsory free 1 mm clearance on the brake pedal for the master cylinder operation.



9.9 CLUTCH LEVER CLEARANCE ADJUSTMENT

Check the clutch lever clearance "A" and if it does not comply with the prescribed values, proceed with the adjustment.

Clutch lever clearance: 10.0-15.0 mm (0.39-0.59 in)



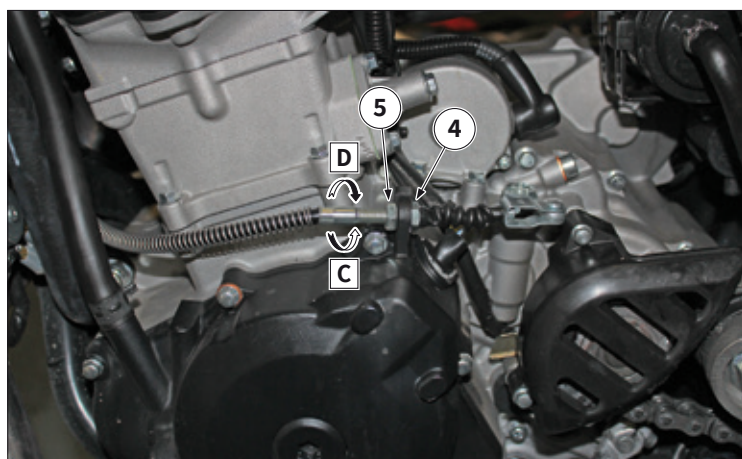
Adjust the clutch lever clearance by operating on the end of the handlebar:

- Pull back the rubber cover "1".
- Loosen the locknut "2".
- Turn the adjustment bolt "3" in direction "A" or "B" until the prescribed clutch lever clearance is obtained.

i Direction "A": the clutch lever clearance increases.
Direction "B": the clutch lever clearance decreases.

- Tighten the locknut.
- Replace the rubber cover in the original position.

i If the specified clutch lever clearance can not be obtained at the handlebar end of the cable, use the adjusting nut on the drive end.

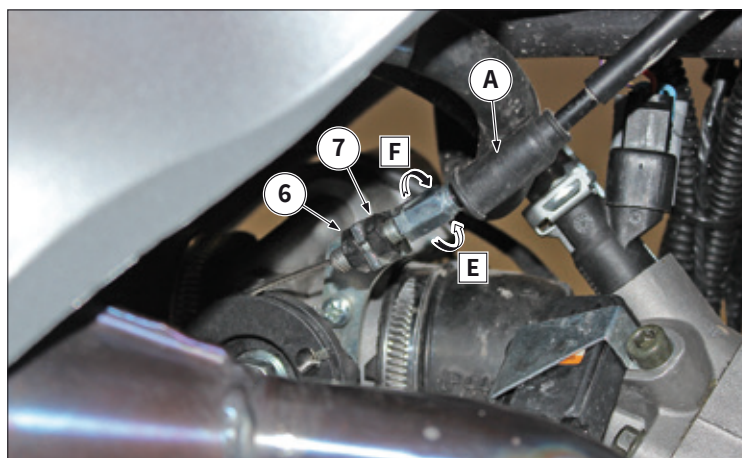


- Adjust the clutch lever clearance acting on the drive side of the cable:
- Loosen the locknut "4".
- Turn the adjustment nut "5" in direction "C" or "D" until the prescribed clutch lever clearance is obtained.

i Direction "C": the clutch lever clearance increases.
Direction "D": the clutch lever clearance decreases.

Tighten the locknut.

Tightening torque:
Clutch lever locknut: 8 Nm (0.8 m·kgf, 5.8 ft·lbf)



9.10 THROTTLE CABLE ADJUSTMENT

Working on the right side of the vehicle, lift the protection grommet "A".

- Loosen the nuts "6" and "7".
- Rotate the throttle cable in direction "E" or "F" to increase/decrease the throttle knob clearance.

Once the desired adjustment has been achieved, tighten the screws "6" and "7" and reposition the grommet.