

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.

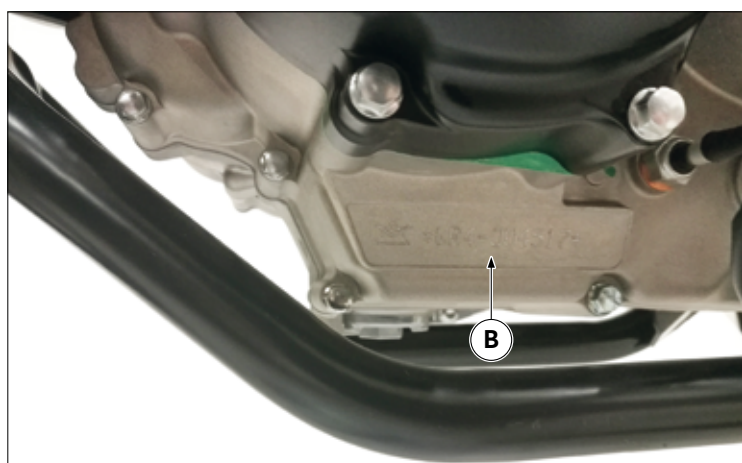


Fantic Motor vehicles are equipped with frame and engine identification numbers.

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.

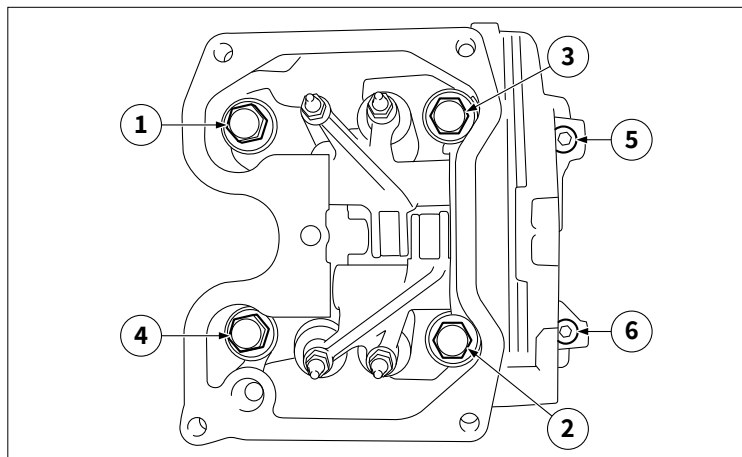
5.1 FRAME TIGHTENING TORQUES

Component	Screw	Tightening torque	Remarks
Engine fastening screws	M10 (8.8)	50 Nm (5.0 m·kgf, 36 ft·lbf)	
	M8 (8.8)	27 Nm (2.7 m·kgf, 20 ft·lbf)	
Swingarm pin	M14	80 Nm (8.0 m·kgf, 59 ft·lbf)	
Rear connecting rods nuts	M12	60 Nm (6.0 m·kgf, 43 ft·lbf)	
Mono-shock absorber nuts Upper pin	M10	40 Nm (4.0 m·kgf, 30 ft·lbf)	
Mono-shock absorber nuts Lower pin	M10	40 Nm (4.0 m·kgf, 30 ft·lbf)	
Fastening screws for frame side plates	M8 (8.8)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
	M6 (8.8)	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Kickstand screw	M8 (10.9)	38 Nm (3.8 m·kgf, 28 ft·lbf)	
Collar clutch/Brake pump screws	M6 (10.9)	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Lower ring nut for swingarm lower fork plate	-	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Locknut for swingarm upper plate	-	80 Nm (8.0 m·kgf, 59 ft·lbf)	
Swingarm plates fastening screws	M6 (8.8)	from 22 Nm (2.2 m·kgf, 16 ft·lbf) to 25 Nm (2.5 m·kgf, 18 ft·lbf)	
	M6 (8.8)	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Handlebar bolts fastening screws	M10 (8.8)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
	M8 (8.8)	55 Nm (5.5 m·kgf, 41 ft·lbf)	
Front brake calliper fastening screws	M8 (10.9)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Swingarm foot screws	M8 (8.8)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Front wheel pin	M14	50 Nm (5.0 m·kgf, 36 ft·lbf)	
Rear wheel pin	M17	80 Nm (8.0 m·kgf, 59 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)	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Rear brake disc fastening screws	M6 (8.8)	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Rear brake lever screw	M10 (8.8)	50 Nm (5.0 m·kgf, 36 ft·lbf)	

5.2 ENGINE TIGHTENING TORQUES

Component	Screw	Tightening torque	Remarks
Cylinder head bolt	M8	22 Nm (2.2 m·kgf, 16 ft·lbf)	
	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Spark plug	M10	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Cylinder head cover bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil level inspection cap	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Drain pipe stud screw	M8	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Coolant draining bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Balancer driven gear nut	M10	50 Nm (5.0 m·kgf, 36 ft·lbf)	
Locknut for valve adjustment screw	M5	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Camshaft sprocket bolt	M8	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Camshaft retainer bolt	M6	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Timing chain guide bolt (intake side)	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Timing chain tensioner bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Timing chain tensioner cap bolt	M8	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Radiator bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	

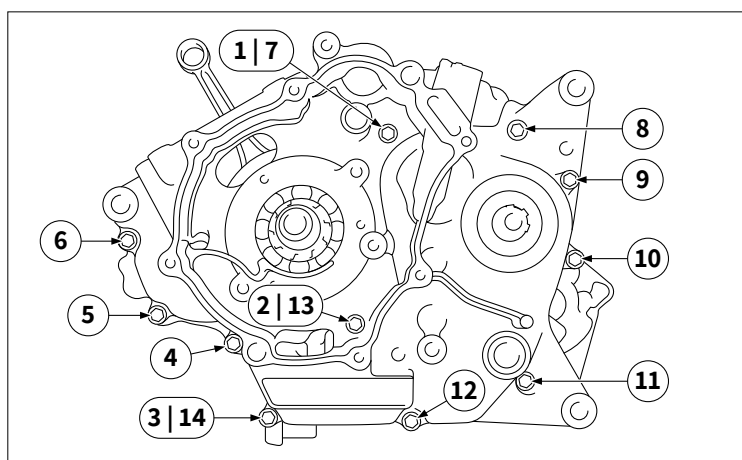
Component	Screw	Tightening torque	Remarks
Radiator fan bolt	M6	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Coolant tank bolt	M6	11 Nm (1.1 m·kgf, 8.0 ft·lbf)	
Water pump unit bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Water pump housing cover bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Impeller shaft retainer bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Thermostat cover bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil pump unit screw	M5	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Oil drain plug	M35	32 Nm (3.2 m·kgf, 23 ft·lbf)	
Oil filter element cover bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil deflector bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Intake manifold bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Fuel injector bolt	M6	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Tightening clamp for throttle body joint	M4	2 Nm (0.2 m·kgf, 1.4 ft·lbf)	
Tightening band for air filter casing joint	M4	2 Nm (0.2 m·kgf, 1.4 ft·lbf)	
Air filter casing bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
O2 sensor	M12	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Exhaust pipe nut	M8	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Exhaust group bolt (central)	M8	32 Nm (3.2 m·kgf, 23 ft·lbf)	
Exhaust group bolt (rear)	M8	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Crankcase bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Generator cover bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Clutch crankcase bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Rim cover bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Unidirectional starter bolt	M6	14 Nm (1.4 m·kgf, 10 ft·lbf)	
Primary drive driving gear nut	M12	60 Nm (6.0 m·kgf, 43 ft·lbf)	
Clutch spring bolt	M6	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Short clutch control rod locknut	M6	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Clutch hub nut	M14	70 Nm (7.0 m·kgf, 51 ft·lbf)	
Rim retaining bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankcase bearing retaining bolt	M6	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Gear shift selector drum segment screw	M6	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Cut off lever bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Stator coil bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankshaft position sensor bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Generator rotor nut	M12	70 Nm (7.0 m·kgf, 50 ft·lbf)	
Neutral gear switch	M10	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Speed sensor	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter motor bolt	M6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Coolant temperature sensor	M10	14 Nm (1.4 m·kgf, 10 ft·lbf)	



5.2.1 Engine parts tightening sequences

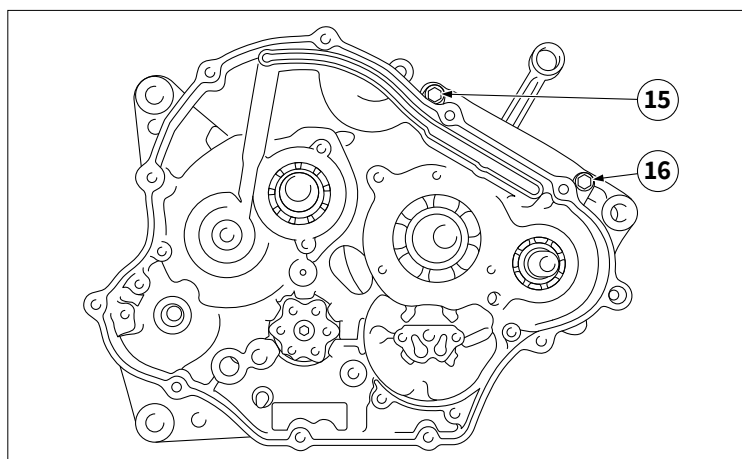
Cylinder head

Tightening sequence from point 1 to point 6.



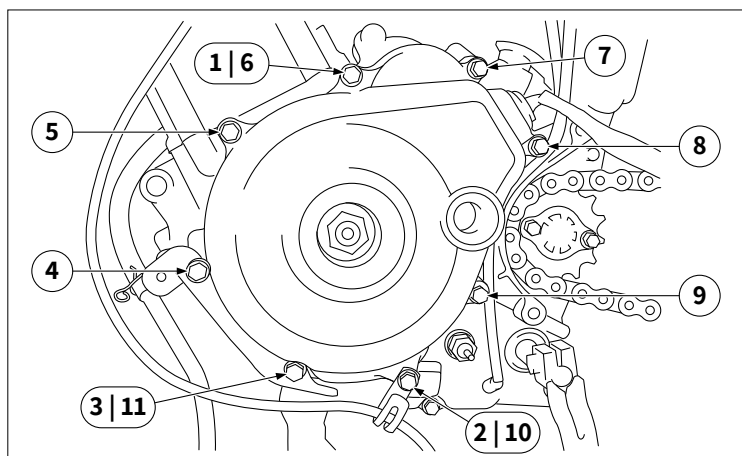
Engine crankcase

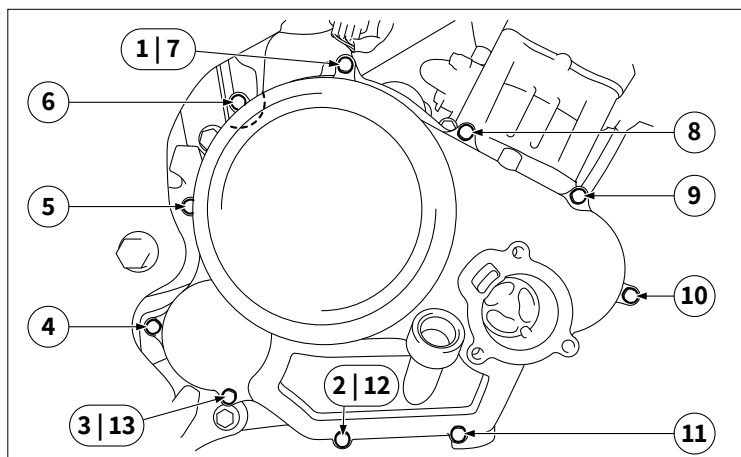
Tightening sequence from point 1 to point 16.



Clutch crankcase

Tightening sequence from point 1 to point 11.




Generator cover

Tightening sequence from point 1 to point 13.

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	135 kg (297.62 lb)
Weight at full load (vehicle, rider, baggage)	330 kg (727.52 lb)
Seats	2
Maximum allowable weight (rider, passenger, baggage)	195 kg (429.90 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 2.0 bar (200 kPa ± 10) (29.01 PSI) to 2.1 bar (210 kPa ± 10) (30.45 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-CR8E Electrodes distance 0.8 ± 0.01
Battery	12 V - 3.2 Ah
Fuses	Main fuse 30 A Secondary fuses 5 A (5), 30 A
Generator	12 V - 235 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
engine warning light	Led
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	125 cc (7.62 cu in)
Bore/Stroke	52 mm/58.6 mm (2.04/2.30 in)
Compression ratio	11.2:1
Starting type	Electric
N ° of engine revolutions at idle speed	1900 ± 200 rpm (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) 1.5 l (0.32 UK gal, 0.39 US gal) Without oil filter change 0.95 l (0.20 UK gal, 0.25 US gal) With oil filter change 1 l (0.21 UK gal, 0.26 US gal)
Type of gearbox	6-speed mechanical Pedal control on the left side of the engine
Transmission ratios (Scrambler)	Primary drive: 73/24 = 3.042 1st gear ratio: 34/12 = 2.833 2nd gear ratio: 30/16 = 1.875 3rd gear ratio: 30/22 = 1.364 4th gear ratio: 24/21 = 1.143 5th gear ratio: 22/23 = 0.957 6th gear ratio: 21/25 = 0.840 Secondary drive: 58/14
Transmission ratios (Flat Track)	Primary drive: 73/24 = 3.042 1st gear ratio: 34/12 = 2.833 2nd gear ratio: 30/16 = 1.875 3rd gear ratio: 30/22 = 1.364 4th gear ratio: 24/21 = 1.143 5th gear ratio: 22/23 = 0.957 6th gear ratio: 21/25 = 0.840 Secondary drive: 61/14
Drive chain	428 Regina model 126 RSH
Air filter	Paper
Fuel system	Keihin Carburettor ø30
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)
Oil pump	
Oil pump type	Trochoid
Clearance between internal rotor - external rotor end	Less than 0.15 mm (0.0059 in), limit: 0.23 mm (0.0091 in)
Clearance between external rotor - oil pump housing	0.13–0.18 mm (0.0051–0.0071 in) Limit
Clearance between oil pump housing - internal and external rotor	0.25 mm (0.0098 in)
Internal rotor limit	0.06–0.11 mm (0.0024–0.0043 in)
External rotor limit	0.18 mm (0.0071 in)

Technical data	Value(s)
Safety valve operating pressure	39.2-78.4 kPa (0.39-0.78 kgf/cm ² , 5.7-11.4 psi)
Pressure check position	Check the oil pressure inspection bolt on the cylinder head body
Thermostat	
Valve opening temperature	80.5–83.5 °C (176.9–182.3 °F)
Complete valve opening temperature	95.0 °C (203.0 °F)
Valve lift (fully open)	3.0 mm (0.12 in)
Water pump	
Water pump type	Centrifugal pump with single intake
Reduction ratio	19/38 (0.500)
Cylinder head	
Cylinder head combustion chamber volume	9.90–10.50 cm ² (0.60–0.64 cu.in)
Cylinder head deformation limit	0.03 mm (0.0012 in)
Drive system	Chain drive (left)
Camshaft	
Lobe height (intake)	30,225-30,325 mm (1.1900-1.1939 in), limit: 30,125 mm (1.1860 in)
Primitive circle diameter (intake)	25,064-25,194 mm (0.9868-0.9919 in), limit: 24,964 mm (0.9828 in)
Lobe height (exhaust)	30,261-30,361 mm (1.1914-1.1953 in)
Primitive circle diameter (exhaust)	25,121-25,221 mm (0.9890-0.9930 in), limit: 25,021 mm (0.9851 in)
Camshaft misalignment limit	0,030 mm (0.0012 in)
Rocker arm	
Rocker arm inside diameter	9,985-10,000 mm (0.3931-0.3937 in)
Rocker arm inside diameter - Limit	10,015 mm (0.3943 in)
Outside diameter of the rocker arm shaft	9,966-9,976 mm (0.3924-0.3928 in), limit: 9,941 mm (0.3914 in)
Rocker arm clearance - rocker arm shaft	0.009–0.034 mm (0.0004–0.0013 in), limit 0.074 mm (0.0029 in)
Valves, springs, seats and valve guides	
Valve clearance (cold) - Intake	0.10-0.14 mm (0.0039-0.0055 in)
Valve clearance (cold) - Exhaust	0.20-0.24 mm (0.0079-0.0094 in)
Valve head diameter (intake)	19.40-19.60 mm (0.7638-0.7717 in)
Valve head diameter (exhaust)	16.90-17.10 mm (0.6654-0.6732 in)
Valve seat contact width (intake)	0.90–1.10 mm (0.0354–0.0433 in), limit: 1.6 mm (0.06 in)
Valve seat contact width (exhaust)	0.90–1.10 mm (0.0354–0.0433 in), limit: 1.6 mm (0.06 in)
Valve margin thickness (intake)	0.50-0.90 mm (0.0197-0.0354 in)
Valve margin thickness (exhaust)	0.50-0.90 mm (0.0197-0.0354 in)
Valve stem diameter (intake)	4,475-4,490 mm (0.1762-0.1768 in), limit: 4,445 mm (0.1750 in)
Valve stem diameter (exhaust)	4,460-4,475 mm (0.1756-0.1762 in), limit: 4,430 mm (0.1744 in)
Valve guide internal diameter (intake)	4,500-4,512 mm (0.1772-0.1776 in), limit: 4,550 mm (0.1791 in)
Valve guide internal diameter (exhaust)	4,500-4,512 mm (0.1772-0.1776 in), limit: 4,550 mm (0.1791 in)
Valve stem-valve guide clearance (intake)	0,010-0,037 mm (0.0004-0.0015 in), limit: 0,080 mm (0.0032 in)
Valve stem-valve guide clearance (exhaust)	0,025-0,052 mm (0.0010-0.0020 in), limit: 0,100 mm (0.0039 in)
Valve stem misalignment	0,010 mm (0.0004 in)
Free valve spring length (intake)	41.71 mm (1.64 in), limit: 39.62 mm (1.56 in)
Free valve spring length (exhaust)	41.71 mm (1.64 in), limit: 39.62 mm (1.56 in)
Installed valve spring length (intake)	35.30 mm (1.39 in)
Installed valve spring length (exhaust)	35.30 mm (1.39 in)
Valve K1 spring flexibility (intake)	23.54 N/mm (2.40 kgf/mm, 134.41 lbf/in)
Valve K2 spring flexibility (intake)	36.58 N/mm (3.73 kgf/mm, 208.87 lbf/in)
Valve K1 spring flexibility (exhaust)	23.54 N/mm (2.40 kgf/mm, 134.41 lbf/in)

Technical data	Value(s)
Valve K2 spring flexibility (exhaust)	36.58 N/mm (3.73 kgf/mm, 208.87 lbf/in)
Installed compression spring pressure (intake)	140.00–162.00 N (14.28–16.52 kgf, 31.47–36.42 lbf)
Installed compression spring pressure (exhaust)	140.00–162.00 N (14.28–16.52 kgf, 31.47–36.42 lbf)
Spring inclination (intake)	1.8 mm (0.07 in)
Spring inclination (exhaust)	1.8 mm (0.07 in)
Valve spring winding direction (intake)	Clockwise
Valve spring winding direction (exhaust)	Clockwise
Cylinder	
Cylinder boring	52,000-52,010 mm (2.0472-2.0476 in)
Cylinder wear limit	52,110 mm (2.0516 in)
Cylinder taper limit	0,050 mm (0.0020 in)
Cylinder ovality limit	0,005 mm (0.0002 in)
Piston	
Cylinder - piston clearance	0,015-0,048 mm (0.0006-0.0019 in)
Piston diameter	51,962-51,985 mm (2.0457-2.0466 in)
Measuring point (from the lower side of the piston skirt)	5.0 mm (0.20 in)
Piston misalignment	0.50 mm (0.0197 in)
Misalignment direction	intake side
Pin hole inside diameter	14,002-14,013 mm (0.5513-0.5517 in), limit: 14,043 mm (0.5529 in)
Pin outside diameter	13.995–14.000 mm (0.5510–0.5512 in), limit 13.975 mm (0.5502 in)
Piston pin clearance - piston pin hole	0,002-0,018 mm (0.0001-0.0007 in), limit: 0,068 mm (0.0027 in)
Segment 1	Upper piston ring
Type of piston ring	Cylinder
Clearance between the ends (installed)	0.10-0.25 mm (0.0039-0.0098 in), limit: 0.50 mm (0.0197 in)
Piston ring lateral clearance	0,030-0,065 mm (0.0012-0.0026 in), limit: 0,100 mm (0.0039 in)
Segment 2	Second piston ring
Type of piston ring	Taper
Clearance between the ends (installed)	0.10-0.25 mm (0.0039-0.0098 in), limit: 0.60 mm (0.0236 in)
Piston ring lateral clearance	0,020-0,055 mm (0.0008-0.0022 in), limit: 0,100 mm (0.0039 in)
Segment 3	Oil scraper ring
Clearance between the ends (installed)	0.20–0.70 mm (0.0079–0.0276 in)
Piston ring lateral clearance	0,040-0,160 mm (0.0016-0.0063 in)
Crankshaft	
Crank group width	47.95-48.00 mm (1,888-1,890 in)
Misalignment limit	0,030 mm (0.0012 in)
Connecting-rod big end lateral clearance	0,110-0,410 mm (0.0043-0.0161 in)
Connecting-rod big end radial clearance	0,004-0,014 mm (0.0002-0.0006 in)
Balancer control method	Gear
Clutch	
Clutch type	With multiple discs, wet
Clutch release method	Internal control, cam control
Clutch lever clearance	10.0-15.0 mm (0.39-0.59 in)
Clutch driving plate thickness 1	2.90-3.10 mm (0,114-0,122 in)
Wear limit	2.80 mm (0,110 in)
Number of plates	4 pieces
Clutch driving plate thickness 2	2.90-3.10 mm (0,114-0,122 in)
Wear limit	2.80 mm (0,110 in)
Number of plates	1 piece

Technical data	Value(s)
Thickness of the driven plate	1.90-2.10 mm (0,075-0,083 in)
Number of plates	4 pieces
Deformation limit	0.20 mm (0.0079 in)
Clutch spring free length	40.48 mm (1.59 in), limit: 36.80 mm (1.45 in)
Number of springs	4 springs
Thrust rod bending limit	0,500 mm (0.0197 in)
Transmission and gear shift	
Final drive	Chain
Operation	Operation on the left side
Primary shaft misalignment limit	0.08 mm (0.0032 in)
Secondary shaft misalignment limit	0.08 mm (0.0032 in)
Type of gear shift mechanism	Drum gear shift selector with front couplings
Gear shift fork thickness	5.76–5.89 mm (0.227–0.232 in) × 1
Gear shift fork thickness	4.76–4.89 mm (0.187–0.193 in) × 2
Type of device	Self decompressor

- 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 "9.1 Engine oil level check" on page 26.
Grease for bearings, joints, articulations and linkage	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	
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	Unblocking protective lubricant	
Anti-friction lubricant for screw tightening torques	Generic engine oil	
Oil seals and O-rings lubricant for rubber parts	Lithium soap grease	
Battery terminals	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.
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.

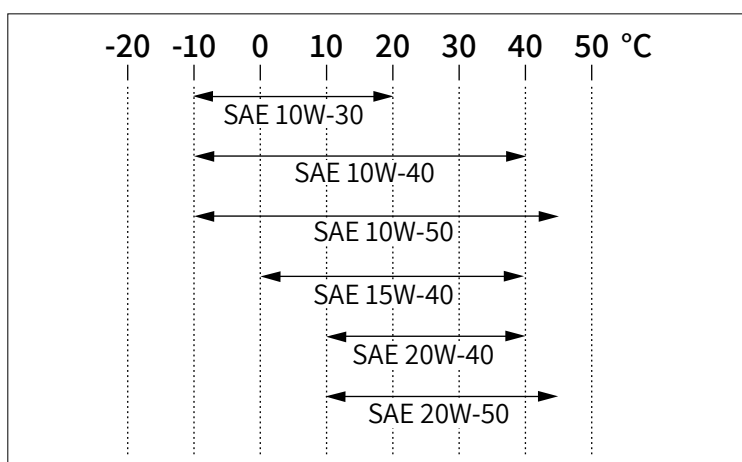
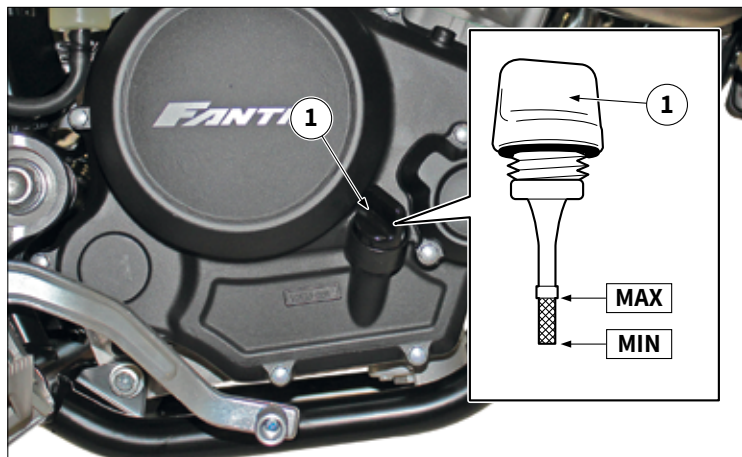
Carry out maintenance operations more frequently if the vehicle is used in rainy, dusty areas, rough roads or in the case of fast riding.

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

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

Position	Operation	1.000 km (600 mi)	3.000 km (1.750 mi)	6.000 km (3.500 mi)	9.000 km (5.250 mi)	12.000 km (7.000 mi)	Yearly check
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.			✓		✓	
Carburettor	– Adjust the idle speed (engine revolutions). – Clean.	✓		✓		✓	✓
Additional fuel filter	– Check.	✓					
	– Replace.				✓		
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.			✓		✓	
Swingarm	– Check its operation and excessive clearance.			✓		✓	
	– Lubricate with lithium soap based grease.	Every 24.000 km (14.000 mi).					
Drive chain	– Check the tension, alignment and conditions of the transmission chain. – Check the rim and pinion. – Fully adjust and lubricate the drive chain with a specific lubricant.	Every 500 km (300 mi). After washing the motorcycle. After riding the motorcycle in the rain or in wet areas.					
Handlebar bearings	– Check its operation and excessive clearance.	✓		✓		✓	
	– Lubricate with lithium soap based grease.	Every 24.000 km (14.000 mi).					
Fixings the frame parts	– Make sure that all nuts, bolts and screws are properly tightened.			✓		✓	✓

Position	Operation	1.000 km (600 mi)	3.000 km (1.750 mi)	6.000 km (3.500 mi)	9.000 km (5.250 mi)	12.000 km (7.000 mi)	Yearly check
Brake lever rotation pin	– Lubricate with silicone grease.			✓		✓	✓
Brake pedal rotation pin	– Lubricate with lithium soap based grease.			✓		✓	✓
Clutch lever rotation pin	– Lubricate with lithium soap based grease.			✓		✓	✓
Side kickstand	– Check its operation.			✓		✓	✓
Side kickstand switch	– Lubricate with lithium soap based grease.	✓		✓		✓	✓
Fork	– Check its operation.			✓		✓	
Rear shock absorber	– Check its operation and the absence of oil leaks in the shock absorber.			✓		✓	
Rotation points of the swingarm and the junction arm of the rear suspension	– Check their operation.			✓		✓	
	– Check its operation.					✓	
Engine oil	– Check the oil level and the absence of oil leaks in the vehicle.	Every 1.000 km (600 mi).					✓
	– Change.	✓	✓	✓	✓	✓	
Engine oil filter	– Replace.	✓	✓	✓	✓	✓	
Cooling system	– Check the coolant level and the absence of oil leaks in the vehicle.			✓		✓	
	– Coolant change.	Every 3 anni.					
Front brake and rear brake switches	– Check its operation.	✓		✓		✓	✓
Moving parts and cables	– Lubricate.			✓		✓	✓
Throttle control knob	– Check its operation.			✓		✓	✓
	– Check the throttle knob grip clearance and adjust if necessary.						
	– Lubricate the cable and the knob body.						
Lights, signals and switches	– 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: 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 mark, top up with the recommended engine oil to the correct level.

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

- i** Do not screw the engine oil filler cap (dipstick) "1" when checking the oil level.

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

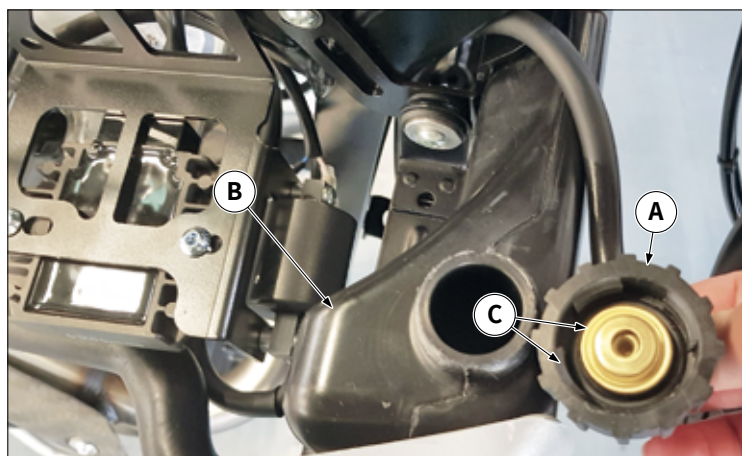
- !** The engine oil also lubricates the clutch; an incorrect type of oil or chemical additives can cause the clutch to slip. Therefore, do not add chemical additives or use engine oil with a "CD" grade or higher and do not use oils labelled "ENERGY CONSERVING II".

- !** 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.

Unscrew the cap "A" from the tank "B" and check that the liquid touches the lower edge of the thread "C" on the cap.

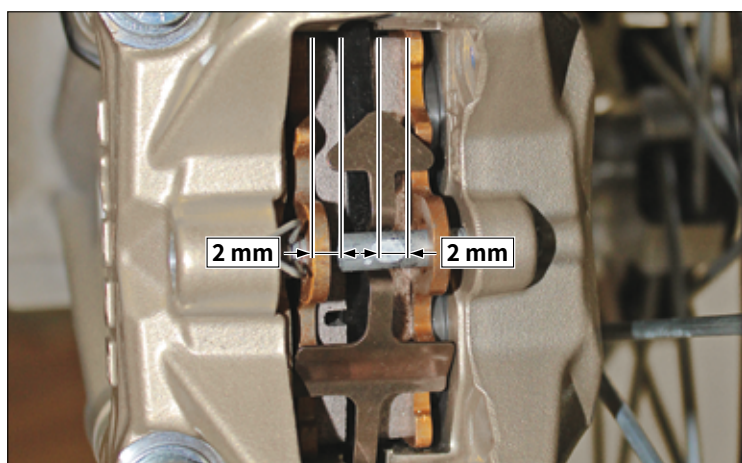
If the vehicle needs topping up add distilled water, instead if it is a complete restoration of the liquid, add a mixture of water and antifreeze.

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.**

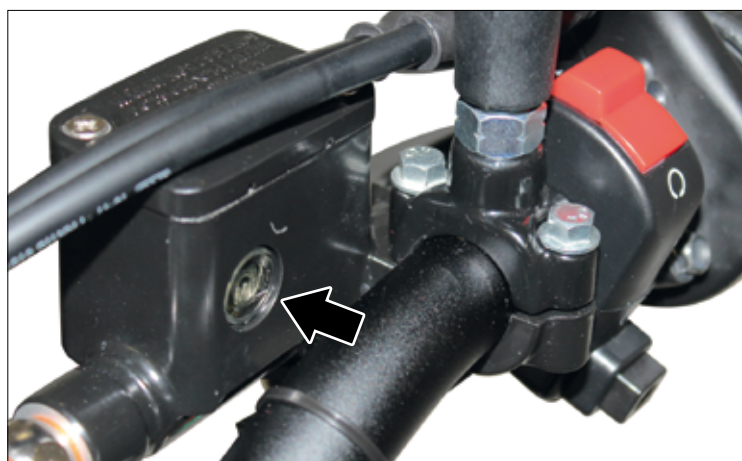


9.3 PADS WEAR CHECK

- ⚠ **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.**

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

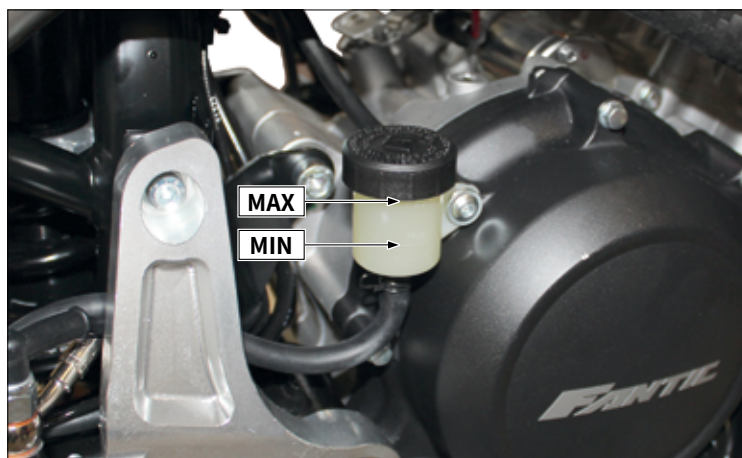


9.4 CHECK THE FRONT BRAKE MASTER CYLINDER OIL LEVEL

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.**

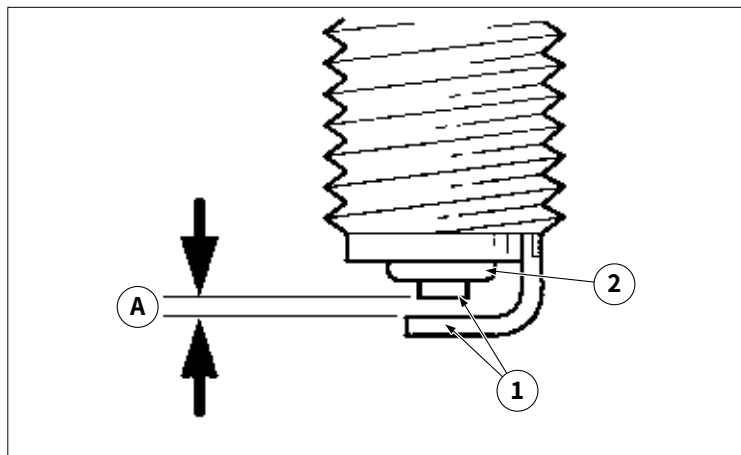


9.5 CHECK THE REAR BRAKE MASTER CYLINDER OIL LEVEL

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 89.

⚠ 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: NGK/CR8E model

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

Check the isolator "2": if its colour is anomalous replace the spark plug.

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

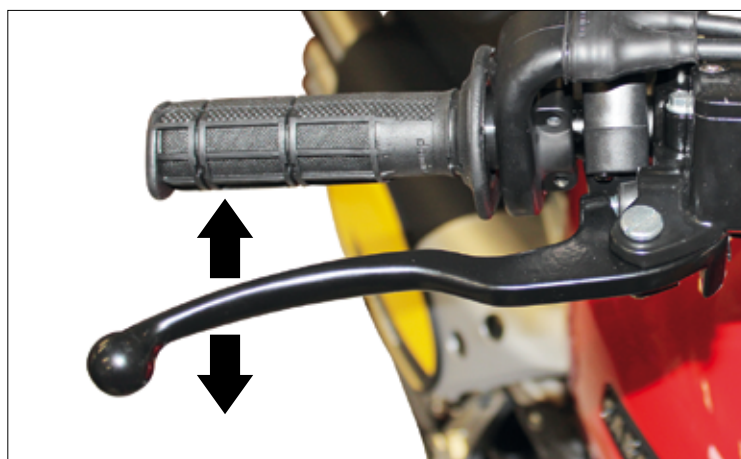
Clean the spark plug with a spark plug cleaner or a wire brush. Measure the distance between the electrodes "A" with a thickness gauge: if the distance does not comply with the specifications, restore the distance.

✂ 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.

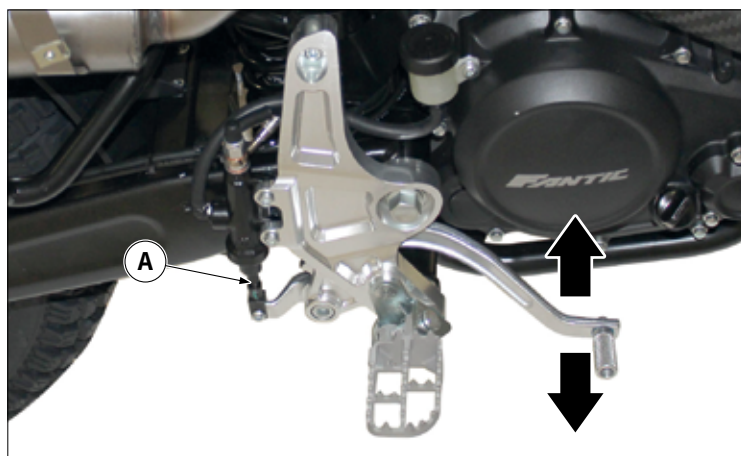
Install the spark plug and connect the spark plug cap.

🔧 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.

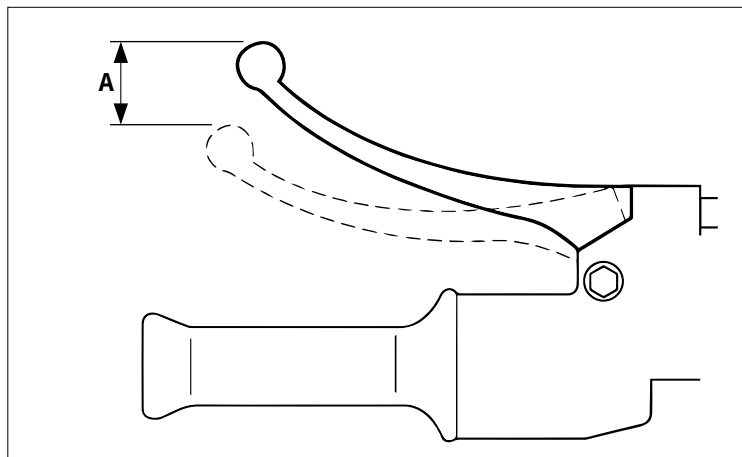


9.8 REAR BRAKE ADJUSTMENT

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.

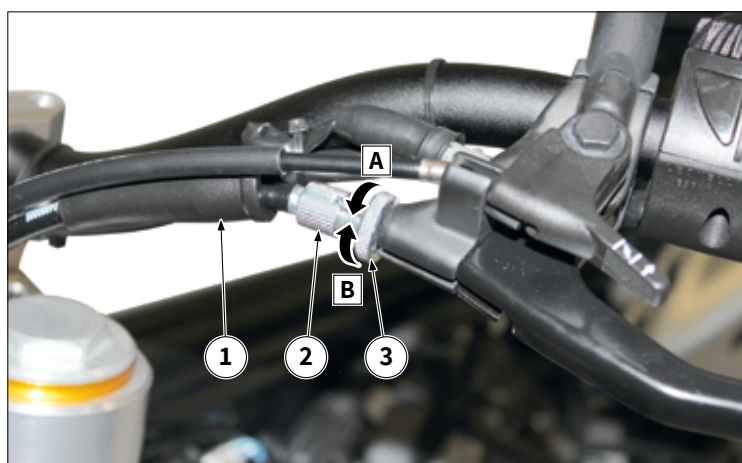
⚠ Keep a compulsory free 1 mm clearance on the brake pedal for the master cylinder operation.



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)



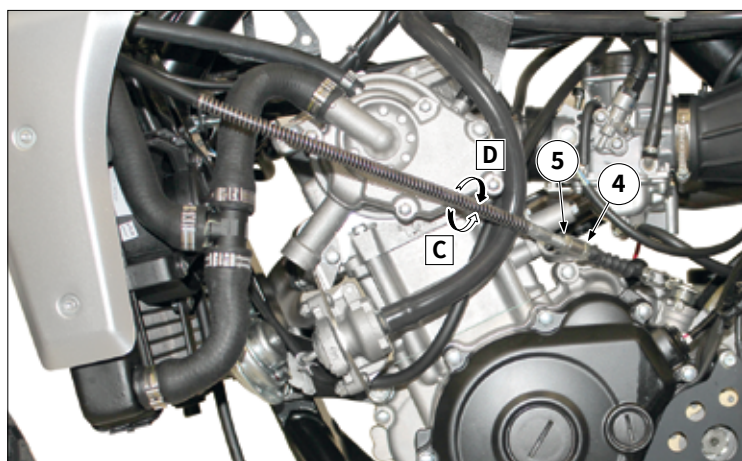
Adjust the clutch lever clearance by operating on the end of the handlebar:

- 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.**

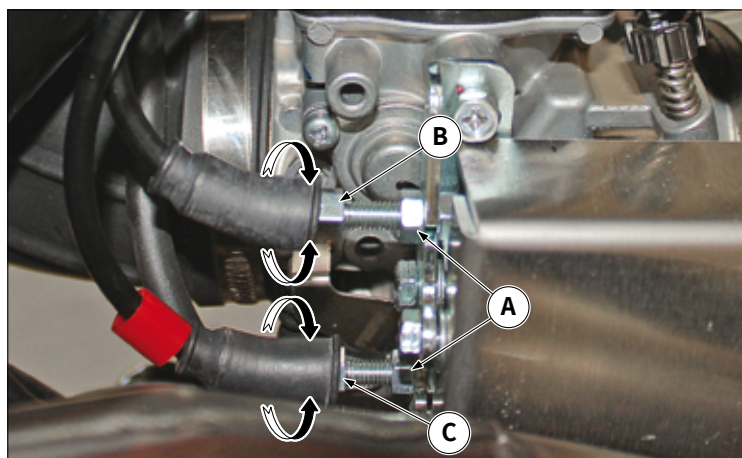


- Adjust the clutch lever clearance acting on the drive side of the cable:
- Loosen the locknut "4".
- Turn the adjustment nut "5" in direction "C" or "D" until the prescribed clutch lever clearance is obtained.

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 grommets and loosen the screws "A".

Adjust the throttle cables "B" and "C" to increase/decrease the throttle knob clearance.

Rotating them clockwise the knob clearance will increase.

Rotating them counter-clockwise the knob clearance will decrease.

Once the desired adjustment has been achieved, tighten the screws "A" and reposition the protection grommets.