MANUALE STAZIONE DI SERVIZIO

1Q000905

Vespa Primavera 125 i.e. - 150 i.e. 3V ABS (i-get 2016)

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MANUALE STAZIONE DI SERVIZIO
Vespa Primavera 125 i.e. - 150 i.e. 3V ABS (i-get 2016)

Questo manuale per stazioni di servizio è stato realizzato da Piaggio & C. Spa per essere utilizzato dalle officine dei concessionari e sub-agenzie Piaggio. Si presuppone che chi utilizza questa pubblicazione per la manutenzione e la riparazione dei veicoli Piaggio, abbia una conoscenza base dei principi della meccanica e dei procedimenti inerenti la tecnica della riparazione dei veicoli. Le variazioni importanti nelle caratteristiche dei veicoli o nelle specifiche operazioni di riparazione verranno comunicate attraverso aggiornamenti di questo manuale. Non si può comunque realizzare un lavoro completamente soddisfacente se non si dispone degli impianti e delle attrezzature necessarie, ed è per questo che vi invitiamo a consultare le pagine di questo manuale riguardanti l'attrezzatura specifica e il catalogo degli attrezzi specifici.

N.B. Provides key information to make the procedure easier to understand and carry out.

CAUTION Refers to specific procedures to carry out for preventing damages to the vehicle.

WARNING Refers to specific procedures to carry out to prevent injuries to the repairer.

Personal safety Failure to completely observe these instructions will result in serious risk of personal injury.

Safeguarding the environment Sections marked with this symbol indicate the correct use of the vehicle to prevent damaging the environment.

Vehicle intactness The incomplete or non-observance of these regulations leads to the risk of serious damage to the vehicle and sometimes even the invalidity of the guarantee.

INDEX OF TOPICS

INDEX OF TOPICS

Aesthetic inspection

Appearance check:

- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

Safety locks check

Make sure that the marking is on the:

- Safety fasteners
- Fastening screws

Safety fasteners:

- Upper fastening of rear shock absorber
- Rear shock absorber lower fastener
- Brake calliper fixing
- Front wheel axle nut
- Wheel hub nut
- Swingarm bolt - Frame
- Swinging arm pin - Engine
- Engine arm pin - Frame arm
- Handlebar lock-nut
- Lower steering ring nut
- Upper steering ring nut

Electrical system

Electrical system:

- Master switch
- Headlamps: high beam lights, low beam lights, tail lights, parking lights and their warning lights
- Headlight adjustment according to regulations in force
- Rear light, parking light, stop light
- Front and rear stop light switches
- Turn indicators and their warning lights
- ABS Warning Light
- Instrument panel lights
- Instrument panel: fuel and temperature indicator

- Instrument panel warning lights
- Horn
- Starter

TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATELY CHARGING THE BATTERY WITH A LOW ELECTROLYTE LEVEL BEFORE IT IS USED FOR THE FIRST TIME WITH SHORTEN THE LIFE OF THE BATTERY.

WARNING

KEEP THE BATTERY AWAY FROM NAKED FLAMES OR SPARKS WHILE IT IS CHARGED. REMOVE THE BATTERY FROM THE VEHICLE, DISCONNECTING THE NEGATIVE TERMINAL FIRST.

CAUTION

WHEN INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE ONE.

WARNING

BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
IF IT ACCIDENTALLY COMES INTO CONTACT WITH YOUR EYES OR SKIN, WASH WITH ABUNDANT WATER FOR APPROX. 15 MIN. AND SEEK IMMEDIATE MEDICAL ATTENTION.
IF ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.
BATTERIES PRODUCE EXPLOSIVE GAS; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES. VENTILATE THE AREA WHEN RECHARGING INDOORS. ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES.
KEEP OUT OF THE REACH OF CHILDREN.

CAUTION

NEVER USE FUSES WITH A CAPACITY HIGHER THAN THAT RECOMMENDED. USING A FUSE OF UNSUITABLE RATING MAY SERIOUSLY DAMAGE THE VEHICLE OR EVEN CAUSE A FIRE.

The vehicle is equipped with an OBD (On-Board Diagnostics) port to monitor its correct operation at an **Authorised Service Centre**.

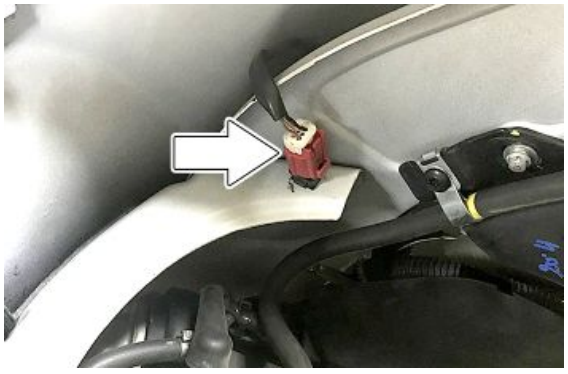
N.B.

APPLICABLE VERSIONS

The vehicle is equipped with an OBD (On-Board Diagnostics) port, compliant with the Euro 5 directives and which allows the connection between the vehicle and the diagnostic tool.

N.B.

AT EACH SCHEDULED MAINTENANCE A VERIFICATION MUST BE PERFORMED WITH THE DIAGNOSTIC TOOL TO CHECK IF THERE ARE ERRORS AND THE IF THE PARAMETERS ARE CORRECT. ENSURE THAT THE VEHICLE CALIBRATION IS UP TO DATE AFTER UPDATING THE DIAGNOSTIC TOOL.



Levels check

Level check:

- Hydraulic braking system fluid level.
- Rear hub oil level.
- Engine coolant level.

Road test

Test ride:

- Cold start
- Instrument operations
- Response to throttle control
- Stability when accelerating and braking (ABS where applicable)
- Front and rear brake efficiency
- Front and rear suspension efficiency
- Abnormal noise

Static test

Static control after the test drive:

- Warm start
- Starter operation
- Minimum holding (turning the handlebar)
- Uniform turning of the steering
- Possible leaks

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

CAUTION

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES SINCE THE TYRES MAY BURST.

Functional inspection

Functional Checks:

Braking system (hydraulic)

- Lever travel

Braking system (mechanical)

- Lever travel

Clutch

- Proper functioning check

Engine

- Check throttle control travel

Others

- Check documentation
- Check the chassis and engine numbers
- Tool kit
- Licence plate fitting
- Locks checking
- Tyre pressure check
- Fitting of mirrors and possible accessories

Instruments start-up

UNIT OF MEASUREMENT

It is possible to change the unit of measure (from km to miles) following the procedure below:

- move the key to «**OFF**»;
- press the MODE key;
- Holding in the MODE button, turn the key to the «**ON**» position;
- after about 2 seconds release the MODE button.

N.B.

THE FOLLOWING ARE DEFINED WHEN NAVIGATING THE DISPLAY:
- «BRIEF PRESS»: A PRESS OF THE INDICATED BUTTON, FOR A PERIOD OF LESS THAN TWO SECONDS;
- «PROLONGED PRESS»: A PRESS OF THE INDICATED BUTTON, FOR A PERIOD OF MORE THAN TWO SECONDS.

FOR "S" VERSION

With **"SETTINGS"** mode highlighted on the digital display, press and hold the MODE selector to the right to access the following menu options:

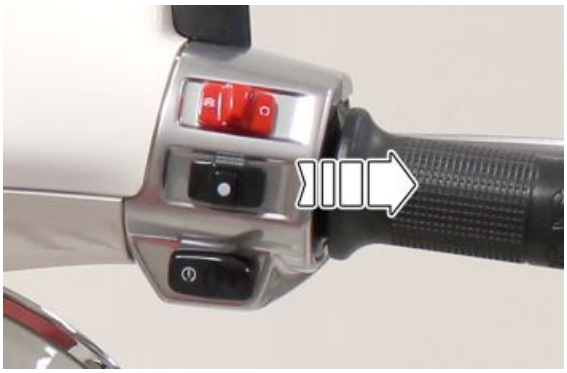
CONFIGURATION

- Clock
- Units of measurement: speed, temperature, exit
- Pairing configuration
- Exit

Press the CENTRE button of the mode selector briefly to select the parameter:

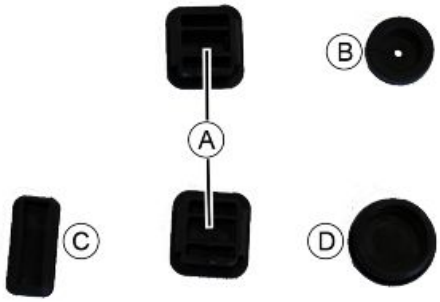
Speed:select the required unit of measurement, choosing from the following options: **Km/h, mph / ON, OFF.**

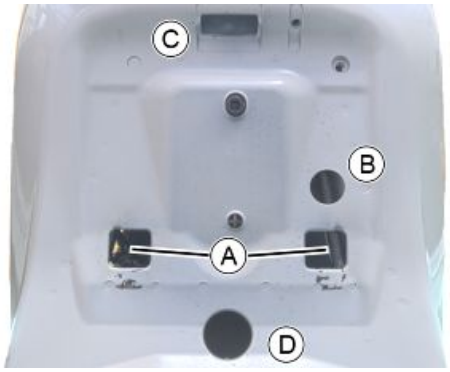
Temperature: select the required unit of measurement, choosing from the following options: **degrees°C, °F / ON, OFF.**



Specific operations for the vehicle

Install the underbody caps as shown in the figure.





INDEX OF TOPICS

This section describes the general specifications of the vehicle.

Rules

This section describes general safety rules for any maintenance operations performed on the vehicle.

Safety rules

- If work can only be done on the vehicle with the engine running, make sure that the premises are well ventilated, using special extractors if necessary; never let the engine run in an enclosed area. Exhaust fumes are toxic.
- The battery electrolyte contains sulphuric acid. Protect your eyes, clothes and skin. Sulphuric acid is highly corrosive; in the event of contact with your eyes or skin, rinse thoroughly with abundant water and seek immediate medical attention.
- The battery produces hydrogen, a gas that can be highly explosive. Do not smoke and avoid sparks or flames near the battery, especially when charging it.
- Fuel is highly flammable and it can be explosive given some conditions. Do not smoke in the working area, and avoid naked flames or sparks.
- Clean the brake pads in a well-ventilated area, directing the jet of compressed air carefully to avoid the risk of inhaling dust produced by worn friction material. Even though the latter contains no asbestos, inhaling dust is harmful.

Maintenance rules

- Use original PIAGGIO spare parts and lubricants recommended by the Manufacturer. Non-original or non-conforming spare parts may damage the vehicle.
- Use only the appropriate tools designed for this vehicle.
- Always use new gaskets, seal rings and cotter pins when reassembling.
- After removal, clean the components using non-flammable or low flash-point solvents. Lubricate all the work surfaces, except tapered couplings, before refitting these parts.
- After refitting, make sure that all the components have been installed correctly and work properly.
- Use only equipment with metric sizes for removal, service and reassembly operations. Metric bolts, nuts and screws are not interchangeable with coupling members using English measurements. Using unsuitable coupling members and tools may damage the vehicle.
- When carrying out maintenance operations on the vehicle that involve the electrical system, make sure the electrical connections have been made properly, particularly the ground and battery connections.

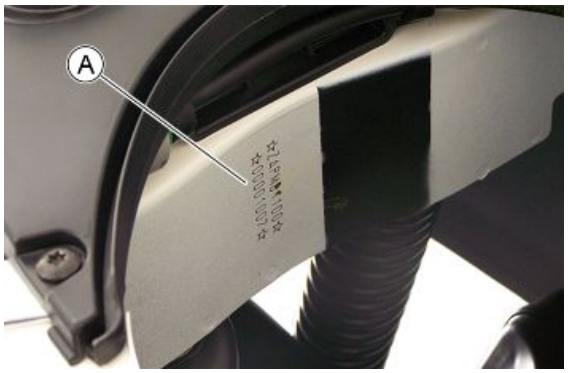
Vehicle identification

Frame number

The chassis number «**A**» is stamped near the fuel tank.

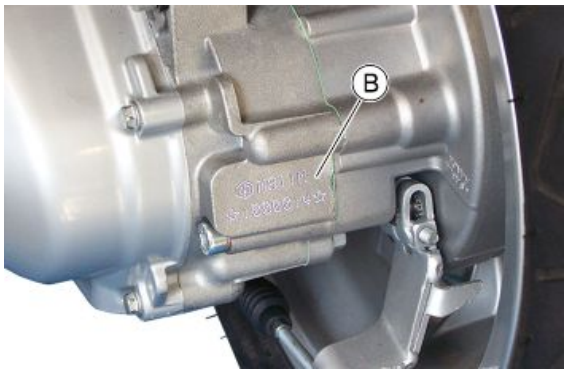
To read it, proceed as follows:

- lift the saddle;
- lift the helmet compartment by removing it.



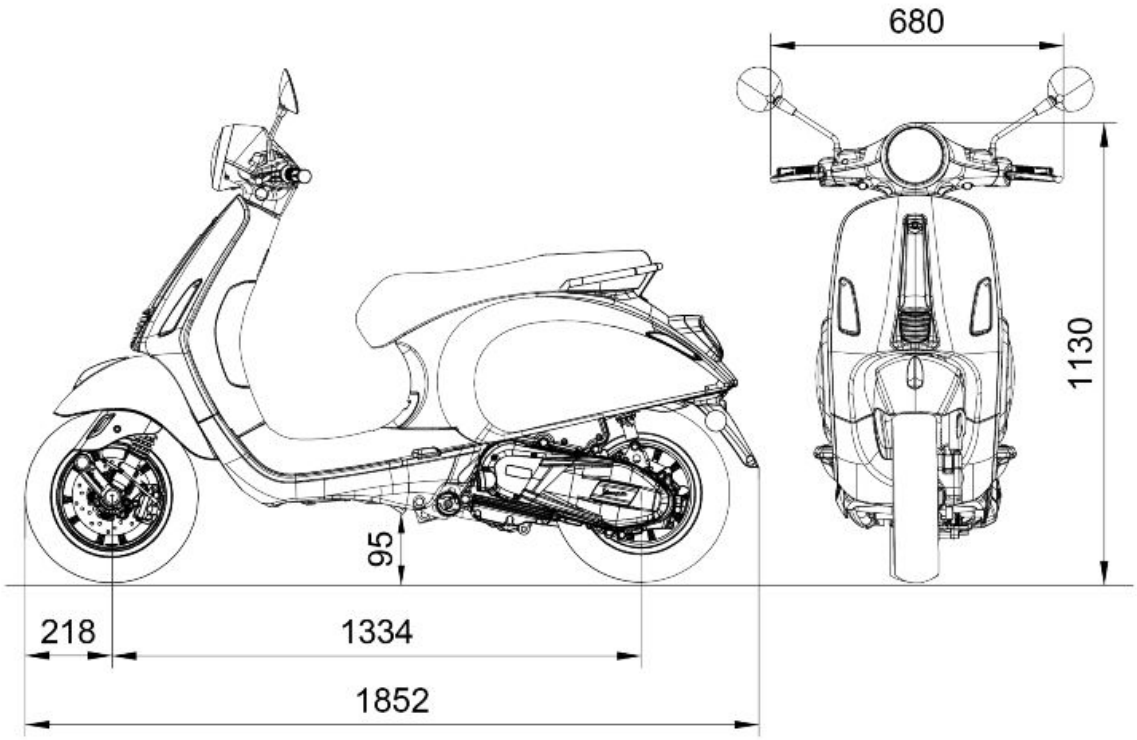
Engine number

The engine number «**B**» is stamped near the rear left shock absorber lower support.

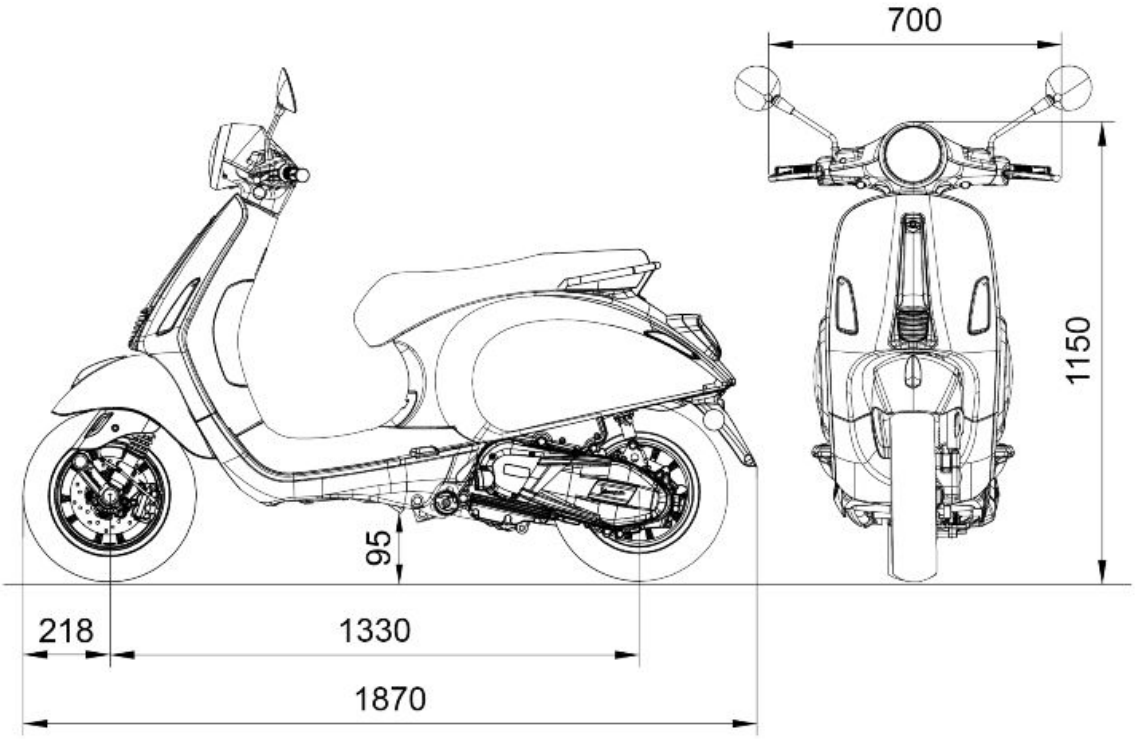


Vehicle data

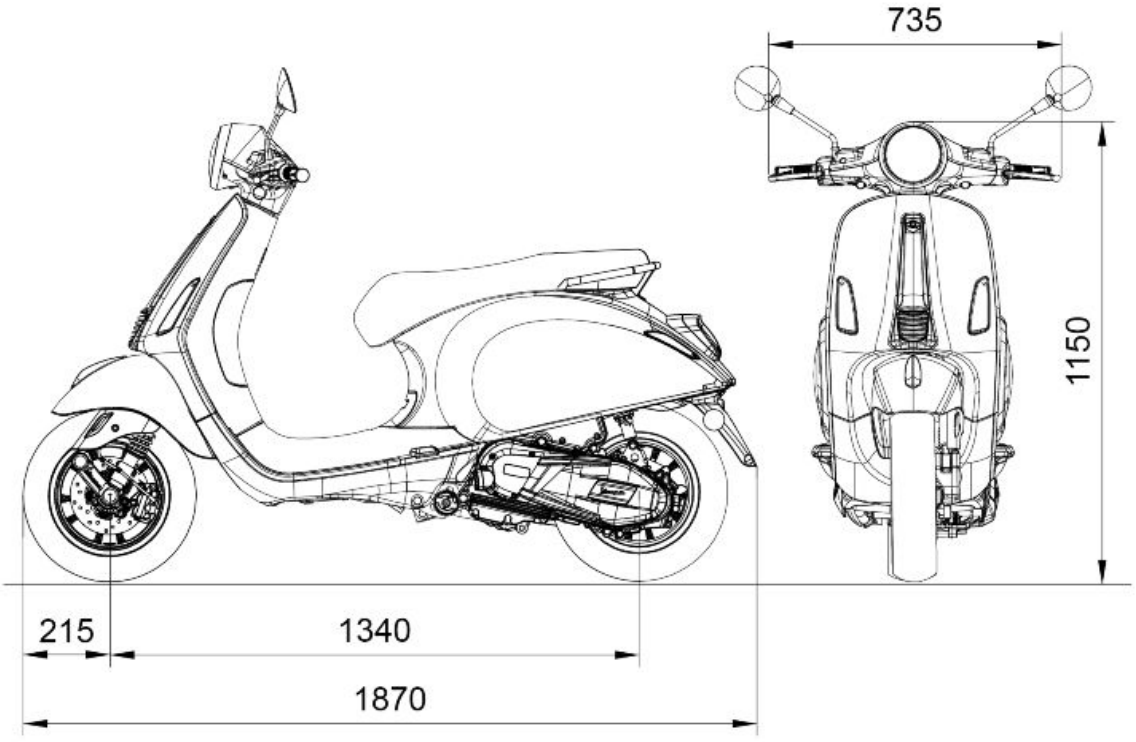
"VESPA PRIMAVERA" DIMENSIONS, PAP MARKETS



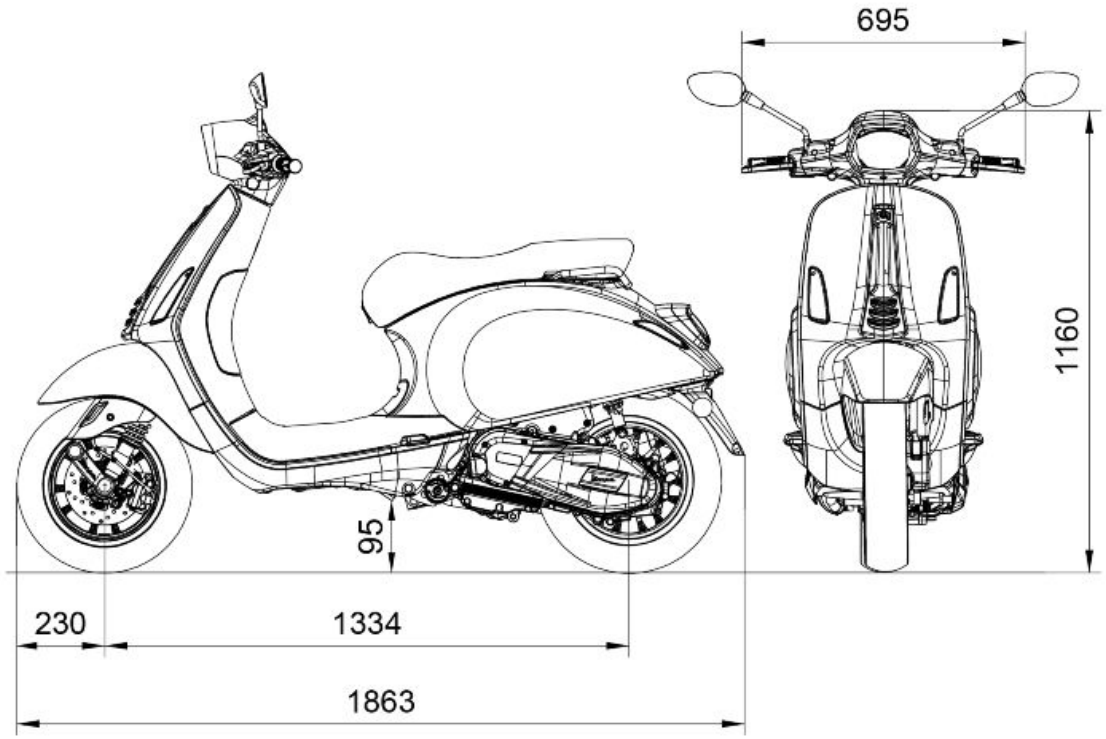
"VESPA PRIMAVERA S" DIMENSIONS, VIETNAM MARKET



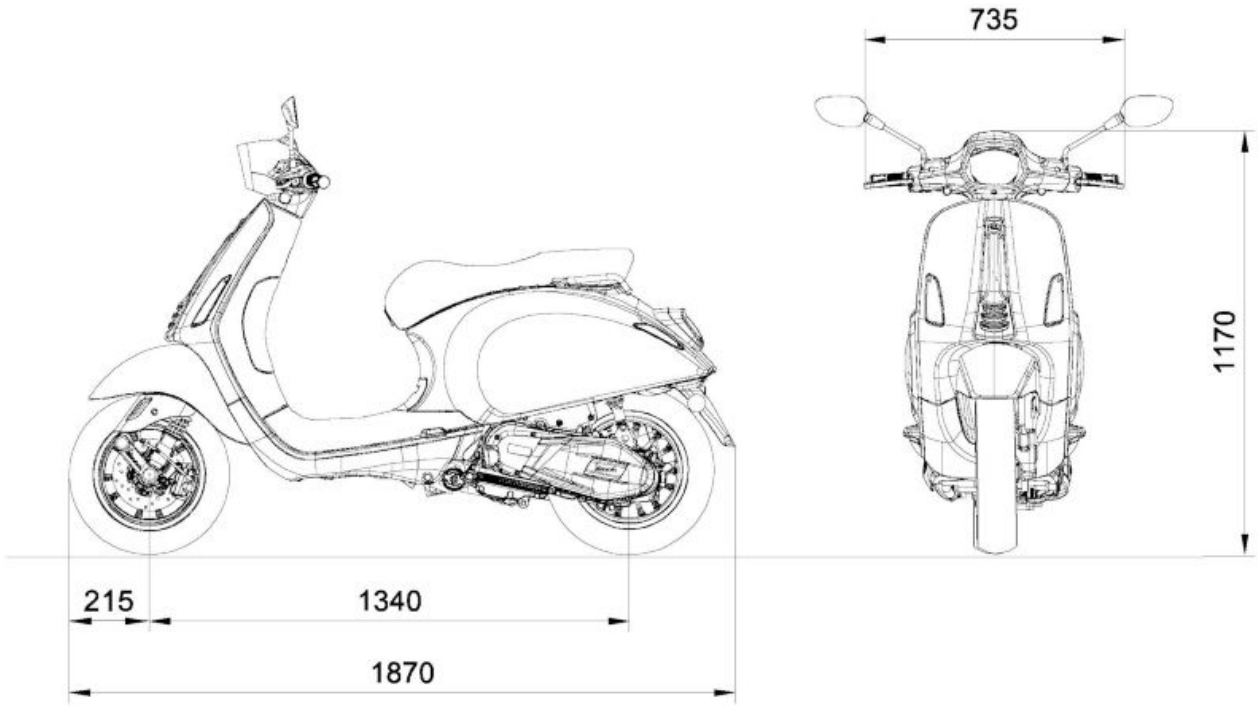
"VESPA PRIMAVERA S" DIMENSIONS, PAP MARKETS



"VESPA SPRINT" DIMENSIONS, PAP MARKETS



"VESPA SPRINT S" DIMENSIONS, PAP MARKETS

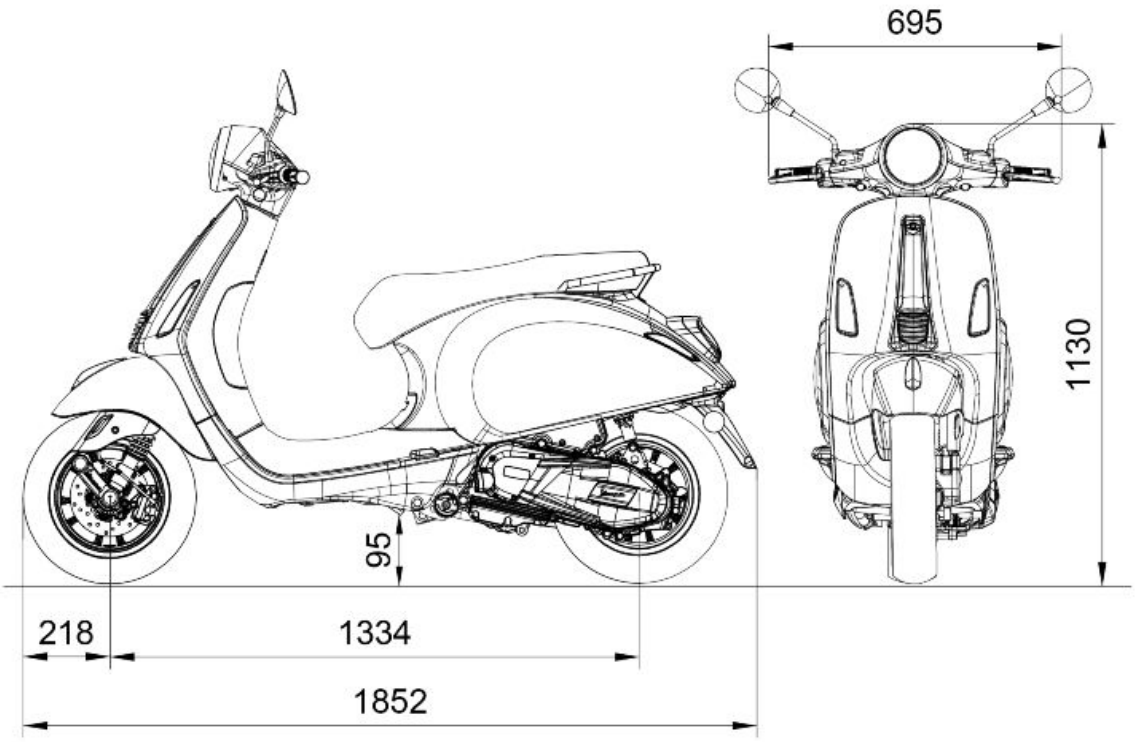


VEHICLE DATA

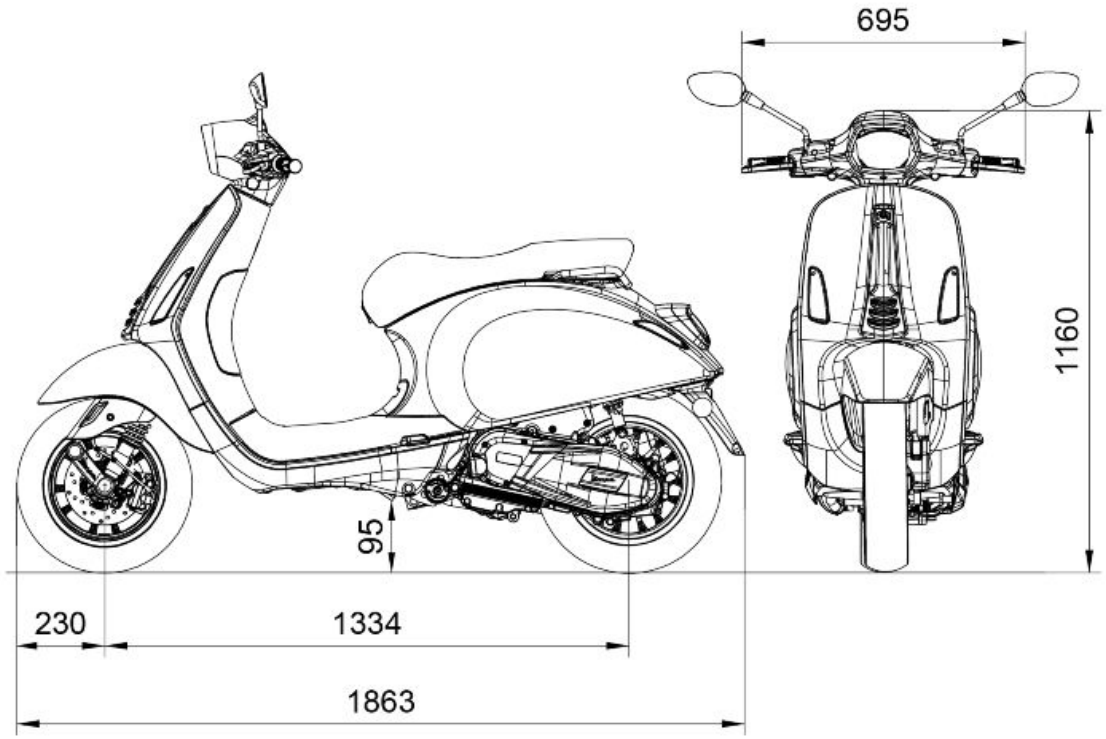
Specification	Desc./Quantity
Chassis	Stamped plate body with welded structural reinforcements.

Specification	Desc./Quantity
Front suspension	Single arm with helical spring and single double-acting hydraulic shock absorber.
Rear suspension	Double-acting shock absorber, adjustable to four positions at pre-loading.
Front brake	Ø 200 mm hydraulically operated disc brake controlled from RH handlebar lever; braking assisted by ABS system.
Rear brake	Ø 140-mm drum brake with mechanical control controlled from LH handlebar lever.
Wheel rims type	Light alloy.
Front rim	12"x 3.00"
Rear rim	12"x 3.00"
Front tire	110/70 - 12" M/C 47P
Rear tire	120/70 - 12" M/C 58P
Front tire pressure (with passenger)	1.6 bar (1.6 bar)
Rear tire pressure (with passenger)	2.0 bar (2.2 bar)
Rear tyre pressure (with passenger) - for Vietnam market	2.0 bar (2.3 bar)
Kerb weight (for Vietnam market and EURO 3 version)	130 kg
Kerb weight (other markets)	120 kg
Kerb weight (for Thailand market and EURO 5 version)	126 kg
Maximum weight limit (Vietnam market and EURO 3 version)	280 kg
Maximum weight limit (other markets)	270 kg
Maximum weight limit (Thailand market and EURO 5 version)	305 kg
Battery	Sealed, 12 V / 6 Ah

"VESPA PRIMAVERA AND PRIMAVERA S" DIMENSIONS, CHINA AND TAIWAN MARKETS



"VESPA SPRINT AND SPRINT S" DIMENSIONS, CHINA AND TAIWAN MARKETS



VEHICLE DATA

Specification	Desc./Quantity
Chassis	Stamped plate body with welded structural reinforcements.
Front suspension	Single arm with helical spring and single double-acting hydraulic shock absorber.
Rear suspension	Double-acting shock absorber, adjustable to four positions at pre-loading.
Front brake	Ø 200 mm hydraulically operated disc brake controlled from RH handlebar lever; braking assisted by ABS system.
Rear brake	Ø 140-mm drum brake with mechanical control controlled from LH handlebar lever.
Wheel rims type	Light alloy.
Front rim	12"x 3.00"
Rear rim	12"x 3.00"
Front tire	110/70 - 12" M/C 47P
Rear tire	120/70 - 12" M/C 58P
Front tire pressure (with passenger)	1.6 bar (1.6 bar)
Rear tire pressure (with passenger)	2.0 bar (2.2 bar)
Kerb weight	130 kg
Kerb weight (Taiwan market)	128 kg
Maximum weight limit	280 kg
Maximum weight limit (Taiwan market)	278 kg
Battery	Sealed, 12 V / 6 Ah

Engine Data

125 CM³ ENGINE SPECIFICATIONS

Specification	Desc./Quantity
Type	Single cylinder 4-stroke
Engine capacity	124.5 cm³
Bore per stroke	52.0 x 58.6 mm
Max. power	7.9 kW at 7,700 rpm
MAX torque	10.4 Nm at 6,000 rpm
Compression ratio	10:1

Specification	Desc./Quantity
Idle speed	1,800 ± 50 rpm
Valve clearance (cold engine)	Intake: 0.10 ± 0.02 mm Exhaust: 0.10 ± 0.02 mm
Timing system	3 valves (2 intake, 1 drainage). single overhead camshaft chain-driven.
Transmission	CVT expandable pulley continuously variable transmission with torque server, V-belt, self-ventilating dry automatic centri-fugal clutch and transmission housing with forced-circulation air cooling.
Final drive reduction gear	Gear reduction unit in oil bath.
Lubrication	Engine lubrication with lobe pump (inside crankcase), chain-driven, with double filter: mesh and paper.
Cooling	Forced-air circulation cooling.
Starting	Electric
Ignition	Electronic inductive discharge ignition, with variable advance and separate H.V. coil.
Ignition advance	Three-dimensional map managed by control unit
Spark plug (125 cm³)	NGK CR8EB
Electrode gap	0.7 - 0.8 mm
Power supply	Electronic injection with Ø26 mm throttle body, single injector.
Fuel	Unleaded gasoline E10 (95 R.O.N.)
Exhaust silencer	Absorption-type exhaust silencer with catalytic converter.
Emissions compliance	EURO 3

150 CM³ ENGINE SPECIFICATIONS

Specification	Desc./Quantity
Type	Single cylinder 4-stroke
Engine capacity (Indonesia)	154.8 cm³
Capacity (China and Taiwan)	155 cm³
Bore x stroke	58.0 x 58.6 mm
Max Power (Indonesia market)	8.7 kW at 7,500 rpm
Max. power (China and Taiwan)	9.5 kW at 7750 rpm
Max. torque (Indonesia market)	12 Nm at 5,000 rpm
Max. torque (China and Taiwan)	12.8 Nm at 6500 rpm
Compression ratio	10.5: 1
Idle speed (Indonesia market)	1,750 ± 50 rpm
Idle speed (China and Taiwan)	1,800 ± 50 rpm
Valve clearance (cold engine)	Intake: 0.10 ± 0.02 mm Exhaust: 0.10 ± 0.02 mm
Timing system	3 valves (2 intake, 1 drainage). single overhead camshaft chain-driven.
Transmission	CVT expandable pulley continuously variable transmission with torque server, V-belt, self-ventilating dry automatic centri-fugal clutch and transmission housing with forced-circulation air cooling.
Final drive reduction gear	Gear reduction unit in oil bath.
Lubrication	Engine lubrication with lobe pump (inside crankcase), chain-driven, with double filter: mesh and paper.
Cooling	Forced-air circulation cooling.
Starting	Electric
Ignition	Electronic inductive discharge ignition, with variable advance and separate H.V. coil.
Ignition advance	Three-dimensional map managed by control unit
Spark plug (150 cm³)	NGK CR8EB
Electrode gap	0.7 - 0.8 mm
Power supply	Electronic injection with Ø26 mm throttle body, single injector.
Fuel	Unleaded gasoline E10 (95 R.O.N.)
Exhaust silencer	Absorption-type exhaust silencer with catalytic converter.
Emissions compliance	EURO 3

FOR VERSIONS MY2018 - MY2020

125 CM³ ENGINE SPECIFICATIONS

Specification	Desc./Quantity
Engine	Single-cylinder, 4-stroke Piaggio i-Get
Engine capacity	124.5 cm³

Specification	Desc./Quantity
Bore per stroke	52 x 58.6 mm
Max. power	7.9 kW at 7700 rpm
MAX torque	10.4 Nm at 6000 rpm
Compression ratio	10 : 1
Timing	3 valves, single overhead camshaft, chain-driven.
Valve clearance (cold engine)	Intake: 0.10 ± 0.02 mm Exhaust: 0.10 ± 0.02 mm
Spark plug	NGK CR8EB
Power supply	Electronic injection with Ø26 mm throttle body, single injector.
Cooling	Forced-air circulation cooling.
Lubrication	Wet sump
Starting	Electric
Gearbox	Continuously variable transmission with torque server
Clutch	Automatic centrifugal dry clutch
Fuel	Unleaded gasoline E10 (95 R.O.N.)
Exhaust silencer	Absorption-type exhaust silencer with catalytic converter.
Emissions compliance	EURO 3
Emissions compliance (Thailand market)	EURO 4

150 CM³ ENGINE SPECIFICATIONS

Specification	Desc./Quantity
Engine	Single-cylinder, 4-stroke Piaggio i-Get
Engine capacity	154.8 cm³
Bore per stroke	58 x 58.6 mm
Max. power	9.2 kW at 7,900 rpm
MAX torque	12.2 Nm at 6,500 rpm
Compression ratio	10.5: 1
Timing	3 valves, single overhead camshaft, chain-driven.
Valve clearance (cold engine)	Intake: 0.10 ± 0.02 mm Exhaust: 0.10 ± 0.02 mm
Spark plug	NGK CR8EB
Power supply	Electronic injection with Ø26 mm throttle body, single injector.
Cooling	Forced-air circulation cooling.
Lubrication	Wet sump
Starting	Electric
Gearbox	Continuously variable transmission with torque server
Clutch	Automatic centrifugal dry clutch
Fuel	Unleaded gasoline E10 (95 R.O.N.)
Exhaust silencer	Absorption-type exhaust silencer with catalytic converter.
Emissions compliance	EURO 3
Emissions compliance (Thailand market)	EURO 4

FOR CHINA MARKET

150 CM³ ENGINE SPECIFICATIONS

Specification	Desc./Quantity
Engine	Single-cylinder, 4-stroke Piaggio i-Get
Engine capacity	155 cm³
Bore per stroke	58 x 58.6 mm
Max. power	9.5 kW at 7750 rpm
MAX torque	12.8 Nm at 6500 rpm
Compression ratio	10.5: 1
Timing	3 valves, single overhead camshaft, chain-driven.
Valve clearance (cold engine)	Intake: 0.10 ± 0.02 mm Exhaust: 0.10 ± 0.02 mm
Spark plug	NGK CR8EB
Power supply	Electronic injection with Ø26 mm throttle body, single injector.
Cooling	Forced-air circulation cooling.
Lubrication	Wet sump
Starting	Electric
Gearbox	Continuously variable transmission with torque server
Clutch	Automatic centrifugal dry clutch
Fuel	Unleaded gasoline E10 (95 R.O.N.)
Exhaust silencer	Absorption-type exhaust silencer with catalytic converter.
Emissions compliance	EURO 4

Transmission

TRANSMISSION

Specification	Desc./Quantity
Transmission	CVT expandable pulley continuously variable transmission with torque server, V-belt, self-ventilating dry automatic centrifugal clutch and transmission housing with forced-circulation air cooling.
Final drive reduction gear	Gear reduction unit in oil bath.

Capacities

CAPACITY

Specification	Desc./Quantity
Engine oil	1,340 cm³ (of which 120 cm³ in the filtering cartridge)
Hub oil	270 cm³
Fuel tank capacity	7.5 ± 0.5 l (9.0 ± 0.5 l without internal parts)

FOR VERSIONS MY2018 - MY2020

CAPACITY

Specification	Desc./Quantity
Engine oil	1,340 cm³ (of which 120 cm³ in the filtering cartridge)
Hub oil	270 cm³
Fuel tank	7 ± 0.5 litres

FOR CHINA MARKET

CAPACITY

Specification	Desc./Quantity
Engine oil	1,340 cm³ (of which 120 cm³ in the filtering cartridge)
Hub oil	270 cm³
Fuel tank	9 ± 0.5 litres

Frame and suspensions

FRAME AND SUSPENSION

Specification	Desc./Quantity
Chassis	Stamped plate body with welded structural reinforcements.
Front suspension	Single arm with helical spring and single double-acting hydraulic shock absorber.
Rear suspension	Double-acting shock absorber, adjustable to four positions at pre-loading.

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 200-mm disc brake with hydraulic control controlled from RH handlebar lever; braking assisted by ABS system (where available).
Rear brake	Ø 140-mm drum brake with mechanical control controlled from LH handlebar lever.

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Wheel rims type	Light alloy.
Front rim	11" x 2.50
Front wheel rim (ABS versions)	12" x 3.00
Rear rim	11" x 2.75
Rear wheel rim (ABS versions)	12" x 3.00
Front tire	Tubeless, 110/70 - 11" 45L
Front tire (ABS versions)	Tubeless 110/70 - 12" 47P
Rear tire	Tubeless, 120/70 - 11" 56L
Rear tire (ABS versions)	Tubeless 120/70 - 12" 58P
Front tire pressure	1.6 bar
Rear tyre pressure	1.8 bar

FOR VERSIONS MY2018 - MY2020

WHEELS AND TYRES

Specification	Desc./Quantity
Wheel rims type	Light alloy.
Front rim	12"x 3.00"
Rear rim	12"x 3.00"
Front tire	110/70 - 12" M/C 47P
Rear tire	120/70 - 12" M/C 58P
Front tire pressure (with passenger)	1.6 bar (1.6 bar)
Rear tire pressure (with passenger)	2.0 bar (2.2 bar)

Tightening Torques

FRAME ASSEMBLY

Name	Torque in Nm
Frame-swinging arm bolt	44 to 52 (32.5 to 38.4 lb*ft)
Engine-swinging arm bolt	40 to 45 (29.5 to 33.2 lb*ft)
Silent block-swinging arm retaining bolts	40 to 45 (29.5 to 33.2 lb*ft)
Centre stand pin	40 to 45 (29.5 to 33.2 lb*ft)

STEERING ASSEMBLY

Name	Torque in Nm
Upper steering ring nut	35 to 40 (25.8 to 29.5 lb*ft)
Lower steering ring nut	12 to 14 (8.9 to 10.3 lb*ft)
Handlebar fixing screw	50 to 55 (36.9 to 40.6 lb*ft)

FRONT BRAKE

Name	Torque in Nm
Brake fluid pump-hose joint	8 to 12 (5.9 to 8.9 lb*ft)
Brake fluid pipe-calliper fitting	20 to 25 (14.8 to 18.4 lb*ft)
Screw tightening calliper to support	20 to 25 (14.8 to 18.4 lb*ft)
Brake disc screw (°)	5 to 6.5 (3.7 to 4.8 lb*ft)
Oil bleed valve (on the calliper)	10 to 12 (7.4 to 8.9 lb*ft)
Handlebar pump	7 to 10 (5.2 to 7.4 lb*ft)
Brake pump reservoir screw	15 to 20 (11.1 to 14.8 lb*ft)

(°) Apply LOCTITE 242 threadlock

SILENCER

Name	Torque in Nm
Silencer heat guard fixing screw	4 to 5 (3.6 to 3.7 lb*ft)
Screws fixing silencer to the crankcase	24 to 27 (17.7 to 19.9 lb*ft)
Lambda probe tightening on exhaust manifold	40 to 50 (29.5 to 36.9 lb*ft)
Exhaust manifold - Cylinder	17.0 ± 1.0 Nm

FRONT SUSPENSION

Name	Torque in Nm
Shock absorber upper nut	20 to 30 (14.8 to 22.8 lb*ft)
Front wheel axle nut	75 to 90 (55.3 to 66.4 lb*ft)
Shock absorber upper bracket bolts	20 to 25 (14.8 to 18.4 lb*ft)
Wheel screw	20 to 25 (14.8 to 18.4 lb*ft)
Shock absorber lower bolts (°)	20 to 27 (14.8 to 19.9 lb*ft)

(°) Apply LOCTITE 242 threadlock

REAR SUSPENSION

Name	Torque in Nm
Rear wheel axle	104 to 126 (76.7 to 92.9 lb*ft)
Rear wheel axle - self-locking nut	108 to 130 (79.7 to 95.9 lb*ft)
Shock absorber - chassis nut	20 to 25 (14.8 to 18.4 lb*ft)
Lower shock absorber clamp	40 to 45 (29.5 to 33.2 lb*ft)

FLYWHEEL

Name	Torque in Nm
Flywheel cover screw	11 to 13 (8.1 to 9.5 lb*ft)
Starter sprocket check fixing screw	5 to 6 (3.7 to 4.4 lb*ft)
Starter screws	11 to 13 (8.1 to 9.5 lb*ft)
Flywheel fixing nut	100 to 110 (73.7 to 81 lb*ft)
Freewheel fixing screws	10 to 11 (7.4 to 8.1 lb*ft)

FLYWHEEL COVER

Name	Torque in Nm
Pick-up screws	3 to 4 (2.2 to 2.9 lb*ft)
Stator fixing screws	5 to 6 (3.7 to 4.4 lb*ft) (Loctite 242)
Stator cable plates clamping screws	3 to 4 (2.2 to 2.9 lb*ft)
Fixing clamps of head pump cover by-pass pipe	1.3 to 1.7 (0.9 to 1.2 lb*ft)
Coil fixing screw	11 to 13 (8.1 to 9.5 lb*ft)

CRANKCASE

Name	Torque in Nm
Calibrated fixing dowel	5 to 7 (3.7 to 5.2 lb*ft)
Oil filter cover	24 to 30 (17.7 to 22 lb*ft)
Engine oil level shaft	1.3 to 1.7 (0.9 to 1.2 lb*ft)
Engine-crankcase coupling screws	11 to 13 (8.1 to 9.5 lb*ft)
Rear brake screw	15 to 17 (11 to 12.5 lb*ft)
Oil sensor	12 to 14 (8.8 to 10.3 lb*ft)
Oil filter	5 to 6 (3.7 to 4.4 lb*ft)
Oil drain screw	14.7 to 16.7 (10.8 to 12.3 lb*ft)
Oil pump bulkhead screw	4 to 6 (2.9 to 4.4 lb*ft)
Freewheel fixing screws	10 to 11 (7.4 to 8.1 lb*ft)
Oil pump fastener screw	5 to 6 (3.7 to 4.4 lb*ft)
Oil pump command sprocket screw	10 to 14 (7.4 to 10.3 lb*ft)
Rotor cover	1 to 1.50 (0.7 to 1.1 lb*ft)
Rotor clamp	3 to 4 (2.2 to 2.9 lb*ft)

HEAD AND CYLINDER

Name	Torque in Nm
Head cover screws	10.8 to 12.7 (7.9 to 9.4 lb*ft)
Cylinder head nut (PRE-TIGHTENING)	6 to 8 (4.4 to 5.9 lb*ft)

Name	Torque in Nm
Cylinder head nut (TIGHTENING)	9 to 11 (6.6 to 8.1 lb*ft) (Tighten to the specified torque then rotate 270.0°±5.0°)
Cylinder stud bolt fitting	See section ENGINE/LUBRICATION/STUD BOLT
Throttle body clamp screws	1.3 to 1.7 (0.9 to 1.2 lb*ft)
Tensioner spring retaining screw	5 to 6 (3.7 to 4.4 lb*ft)
Fastener chain tensioner	11 to 13 (8.1 to 9.5 lb*ft)
Thermostat cover screws	3 to 4 (2.2 to 2.9 lb*ft)
Pressure reducer counterweight retainer screw	7 to 8.5 (5.2 to 6.2 lb*ft)
Injection manifold fixing screws	11 to 13 (8.1 to 9.5 lb*ft)
Valve clearance adjustment screw	6 to 9 (4.4 to 6.6 lb*ft)
Spark plug tightening	10 to 12 (7.4 to 8.8 lb*ft)
Timing system sprocket fixing screw	4 to 6 (2.9 to 4.4 lb*ft)
Screws fixing cylinder to crankcase	10.8 to 12.7 (7.9 to 9.4 lb*ft)
Head blow by	3 to 4 (2.2 to 2.9 lb*ft)

TRANSMISSION AND FINAL REDUCTION

Name	Torque in Nm
Transmission cover screws	11 to 13 (8.1 to 9.5 lb*ft)
Final reduction cover screws	24 to 27 (17.7 to 20 lb*ft)
Driven pulley fixing nut	53 to 59 (40 to 43.5 lb*ft)
Hub oil drain screw	15 to 17 (11 to 12.5 lb*ft)
Freewheel fixing screws	10 to 11 (7.4 to 8.1 lb*ft)
driving pulley retainer nut	75 to 83 (55 to 61 lb*ft)

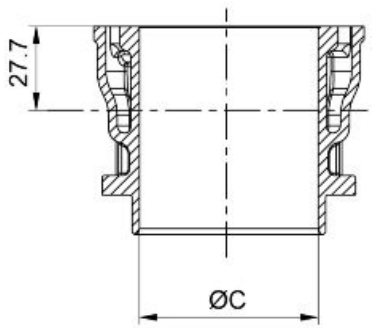
LUBRICATION

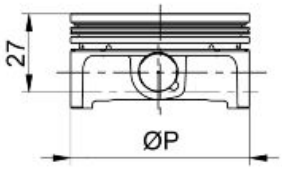
Name	Torque in Nm
Crankcase timing cover screws	11 to 13 (8.1 to 9.5 lb*ft)
Screws fixing oil pump to the crankcase	4 to 6 (2.9 to 4.4 lb*ft)
Pump rod screw	13 to 15 (9.5 to 11 lb*ft)
Minimum oil pressure sensor locking	12 to 14 (8.8 to 10.5 lb*ft) (LOCTITE 5091 Edge closure between metal body and plastic block)

Overhaul data

Assembly clearances

Cylinder - piston assy.





CYLINDER - PISTON (125)

Specification	Desc./Quantity
Plunger diameter	51.961 (±0.014) mm
Cylinder diameter	52 (+0.008 -0.020) mm

CYLINDER - PISTON (150)

Specification	Desc./Quantity
Plunger diameter	57.947 (± 0.014) mm
Cylinder diameter	58 (+0.008 -0.020) mm

COUPLING CATEGORIES (125)

Name	Initials	Cylinder	Piston	Play on fitting
cylinder - piston	A	51.980 - 51.987	51.947 - 51.954	0.026 - 0.040
cylinder - piston	B	51.987 - 51.994	51.954 - 51.961	0.026 - 0.040
cylinder - piston	C	51.994 - 52.001	51.961 - 51.968	0.026 - 0.040
cylinder - piston	D	52.001 - 52.008	51.968 - 51.975	0.026 - 0.040

COUPLING CATEGORIES (150)

Name	Initials	Cylinder	Piston	Play on fitting
cylinder - piston	A	57.980 - 57.987	57.933 - 57.940	0.040 - 0.054
cylinder - piston	B	57.987 - 57.994	57.940 - 57.947	0.040 - 0.054
cylinder - piston	C	57.994 - 58.001	57.947 - 57.954	0.040 - 0.054
cylinder - piston	W	58.001 - 58.008	58.954 - 58.961	0.040 - 0.054

N.B.

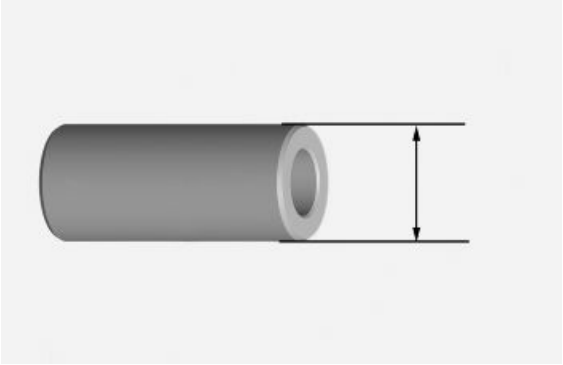
THE PISTON MUST BE INSTALLED WITH THE ARROW FACING TOWARDS THE EXHAUST SIDE, THE PISTON RINGS MUST BE INSTALLED WITH THE WORD «TOP» OR THE STAMPED MARK FACING UPWARDS.

- Check the pin external diameter.

Characteristic

Pin external diameter

14 (+0 -0.004) mm

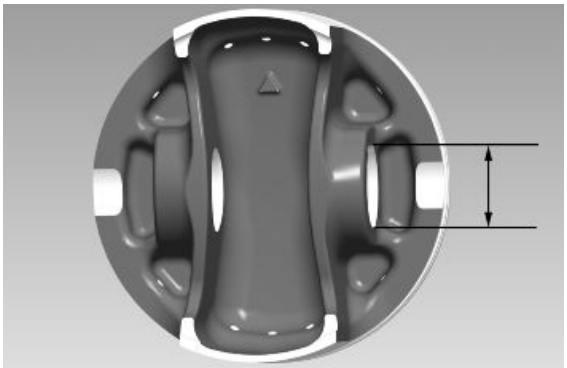


- Measure the diameter of the housings on the piston

Characteristic

Standard diameter

14 (+0.006 +0.001) mm

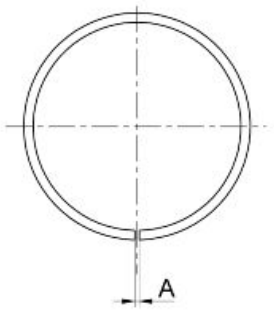


- Check that the head coupling surface is not worn or misshapen.

- Pistons and cylinders are classified according to diameter. The coupling is carried out in pairs (A-A, B-B, C-C, D-D).

Piston rings

- Carefully clean the seal housings.
- Measure the coupling clearance between the sealing rings and the piston grooves using suitable sensors, as shown in the diagram.
- If the clearance is greater than that indicated in the table, replace the piston.
- Check the clearance upon mounting (A) of the bands:



N.B.

MEASURE THE CLEARANCE BY INSERTING THE BLADE OF THE FEELER THICKNESS GAUGE FROM THE SECOND SEAL SIDE.

ASSEMBLY CLEARANCE OF BANDS - SEAL RINGS (125)

DENOMINATION	DIMENSIONS	ASSEMBLY CLEARANCES (A)
1° compression ring (mm)	52x0.8	0.20 - 0.35
2° compression ring (mm)	52x1.0	0.20 to 0.45
Oil scraper rings (mm)	52x2.0	0.25 to 0.55

ASSEMBLY CLEARANCE OF BANDS - SEAL RINGS (150)

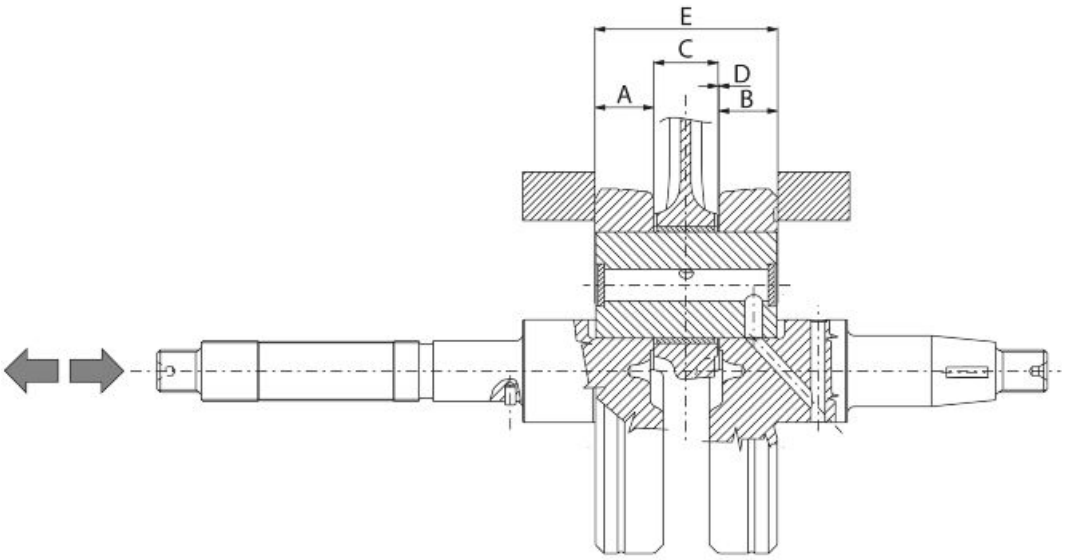
DENOMINATION	DIMENSIONS	ASSEMBLY CLEARANCES (A)
1° compression ring (mm)	58x0.8	0.20 - 0.35
2° compression ring (mm)	58x1.0	0.20 to 0.45
Oil scraper rings (mm)	58x2.0	0.25 to 0.55

Crankcase - crankshaft - connecting rod

CRANKSHAFT

Titolo	Durata/Valore	Testo Breve (< 4000 car.)	Indirizzo Immagine
Crankshaft		Axial clearance between crankshaft and connecting rod	

Axial clearance between crankshaft and connecting rod

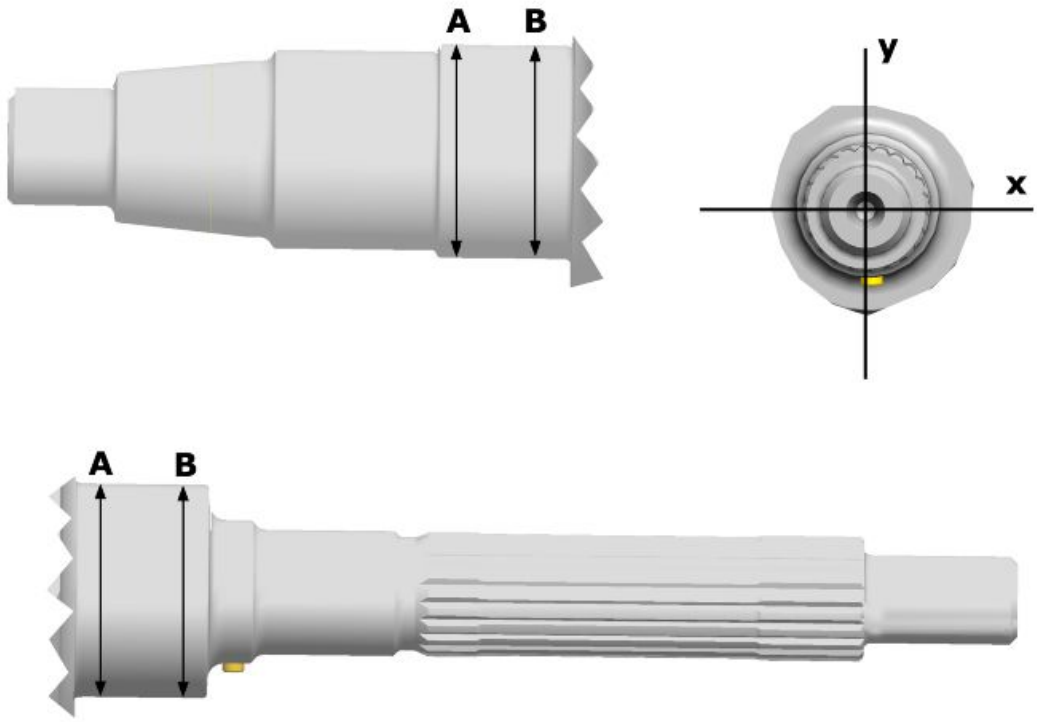


AXIAL CLEARANCE BETWEEN CRANKSHAFT AND CONNECTING ROD

Name	Code	Dimensions	Assembly clearance
Transmissionside half-shaft	A	18.1 (+0; -0.05) mm	D = 0.20 - 0.50
Flywheel-side halfshaft	B	18.1 (+0; -0.05) mm	D = 0.20 - 0.50
Connecting rod	C	15 (-0.10; -0.15) mm	D = 0.20 - 0.50
Spacer tool	E	51.4 (+0; +0.05) mm	D = 0.20 - 0.50

Diameter of crankshaft bearings.

Measure the bearings on both axes x-y.



CRANKSHAFT

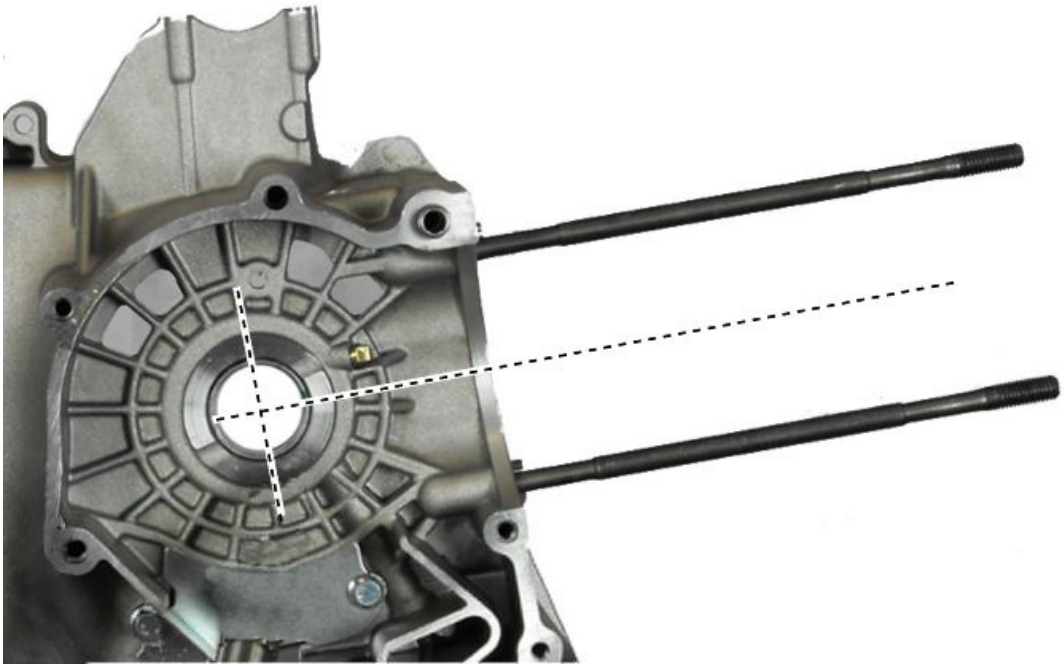
Specification	Desc./Quantity
Crankshaft bearings: Standard diameter: Cat. 1	26.998 - 27.004 mm
Crankshaft bearings: Standard diameter: Cat. 2	27.004 - 27.010 mm

- To obtain a good bushing lubrication it is necessary to have both an optimal lubricating pressure and a good oil flow rate; the bushings must be correctly positioned so as not to obstruct the oil supply channels.

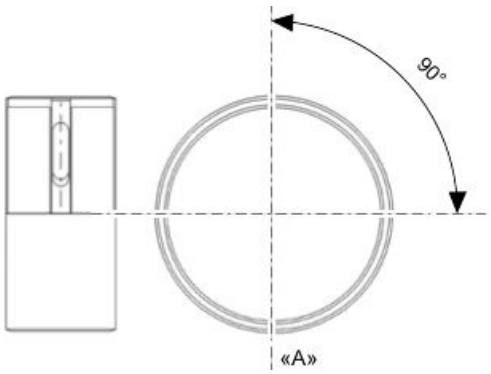
Characteristic

«A»

AXIS CYLINDER



- The main bushings have 2 half-bearings, 1 with and 1 without the lubrication channel.
- The solid half-bearing is intended to stand the thrusts caused by combustion, and for this reason it is arranged opposite the cylinder.
- To prevent shutters in the oil feeding channels, the matching surface of the two half-bearings must be perfectly orthogonal to the cylinder axis, as shown in the photo.



Characteristic

«A»

AXIS CYLINDER

BEARINGS

TYPE	IDENTIFICATION	CRANKSHAFT HALF-BEARING
B	BLUE	1.971 - 1.976
C	YELLOW	1.974 - 1.979
E	GREEN	1.977 - 1.982

- The section of the oil feeding channels is also influenced by the driving depth of the bushings.
- Visually check the wear of the bushings: in the coupling ends shown in the photo the bushing usually keeps the original look, check in the rest of the bushing if there is evident removal of material. **If this occurs as stated, proceed to replace the crankcase halves.**

N.B.

SMALL MARKS AND SCRATCHES OF THE SHAFT ROTATION ARE NORMAL SIGNS OF ENGINE USAGE, AND DO NOT AFFECT THE CORRECT FUNCTIONING.

Measurement of crankcase halves - crankshaft coupling clearance

- The nominal diameters of the bushings, even if of the same coupling category, may differ by hundredths due to the plastic slackening of the material of the crankcase due to the driving load.
- Measure along the axis of the «**A**» cylinder, using a bore meter at two depths indicated in the figure, the diameter of the bushings.
- After measuring the two diameters, take the average.

Characteristic

«A»

AXIS CYLINDER

- The bushings housing hole in the crankcase half is divided into two categories depending on the size, Category 1 and Category 2.

DIAMETER OF CRANKCASE WITHOUT BUSHING

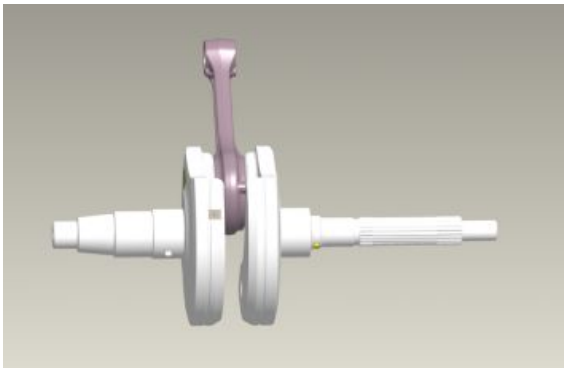
Specification	Desc./Quantity
CAT 1	30.959 - 30.965 mm
CAT 2	30.953 - 30.959 mm

- Combine the shaft with two category 1 crankwebs with the category 1 crankcase (or cat. 2 with cat. 2). Furthermore a spare crankcase cannot be matched with a crankshaft with mixed categories. The spare crankshaft has half-shafts of the same category.
- According to the classification of the shaft CAT.1 - CAT.2 combine a complete crankcase pre-fitted with suitable bushings according to the starting shaft.

CATEGORIES

CRANKCASE HALVES	ENGINE HALF-SHAFT	BUSHING
Cat. 1	Cat. 1	E
Cat. 2	Cat. 2	B
Cat. 1	Cat. 2	C
Cat. 2	Cat. 1	C

THE CRANKSHAFT is available in two **CATEGORIES:**



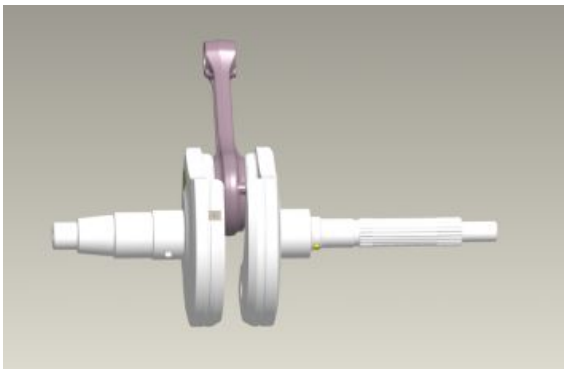
Characteristic
Crankshaft category:
CAT. 1 - CAT. 2

CRANKSHAFT CATEGORY IDENTIFICATION:

The identification is indicated on the counterweight shoulder «***1 - *2**», if carried out with micropinholing. Otherwise, «**1 - 2**» if done manually with an electric pen. The spare part identification is located on the package with **a drawing number** plus **FC1/FC2** or (**001/002**).

If a crankshaft comprising two half-shafts of different categories needs to be replaced, also replace both crankcase halves, combining the two components (Shaft and Crankcase) featuring the same category.

THE CRANKSHAFT is available in two **CATEGORIES:**



Characteristic
Crankshaft category:
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If a crankshaft comprising two half-shafts of different categories needs to be replaced, also replace both crankcase halves, combining the two components (Shaft and Crankcase) featuring the same category.

Cylinder Head

Before performing head service operations, thoroughly clean all coupling surfaces. Note the position of the springs and the valves so as not to change the original position during refitting

- Using a trued bar and a feeler gauge, check that the cylinder head surface is not worn or distorted.

Characteristic
Maximum allowable run-out:
0.03 mm

- In case of faults, replace the head.
- Check the sealing surfaces for the exhaust manifold.
- Check that the camshaft and the rocker pin capacities exhibit no wear.
- Check that the head cover shows no signs of wear.
- Check that there is no cooling liquid leakage from the seals.

- Insert the valves into the cylinder head.
- Alternatively check the intake and exhaust valves.
- The test is carried out by filling the manifold with petrol and checking that the head does not ooze through the valves when these are just pressed with the fingers.

HEAD BEARINGS

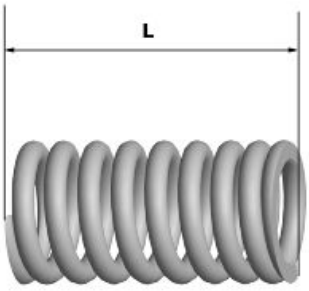
Specification	Desc./Quantity
bearing «A»	Ø 10.000 (+0.015) mm
bearing «B»	Ø 28.000 (+0.007 +0.028) mm
bearing «C»	Ø 42.000 (+0.009 +0.034) mm

Measure the unloaded spring length

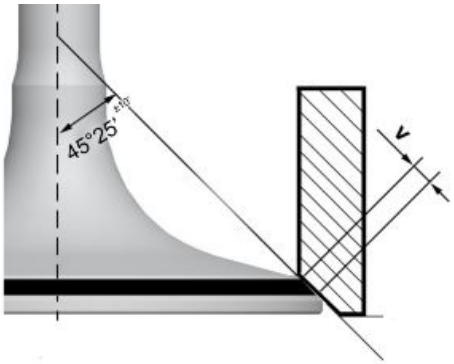
Characteristic

Standard length

35.8 mm



- Clean the valve seats of any carbon residues.
- Using the Prussian blue, check the width of the impression on the valve seat "**V**".



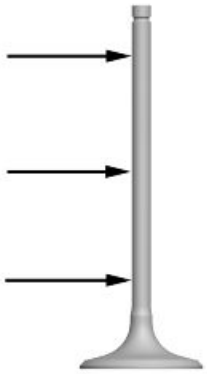
Characteristic

Standard value:

1 - 1.3 mm

- If the impression width on the valve seat is larger than the prescribed limits, true the seats with a 45° mill and then grind.
- In case of excessive wear or damage, replace the head.

- Measure the diameter of the valve stems in the three positions indicated in the diagram.

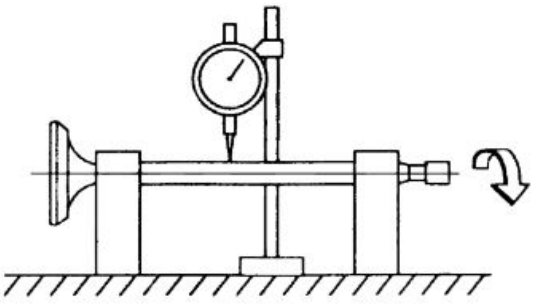


STANDARD DIAMETER

Specification	Desc./Quantity
Intake:	4.030 to 4.015 mm
Exhaust:	4.975 - 4.960 mm

- Calculate the clearance between the valve and the valve guide.

- Check the deviation of the valve stem by resting it on a «**V**» shaped abutment and measuring the extent of the deformation with a dial gauge.

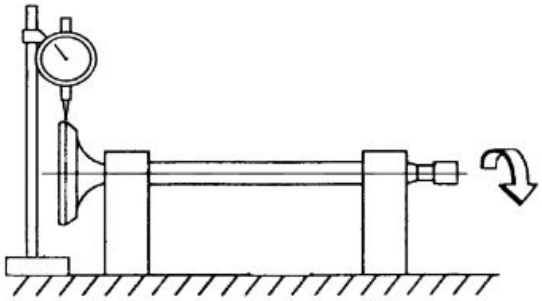


Characteristic

Limit value admitted:

0.02 mm

- Check the oscillation of the valve head by arranging a dial gauge at right angle relative to the valve head and rotate it on a "**V**" shaped abutment.

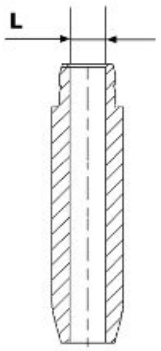


Characteristic

Limit allowed:

0.3 mm

Measure the valve guide.



Characteristic

Valve guide:

4.3 ± 0.1 mm

- After measuring the valve guide diameter and the valve stem diameter, check clearance between guide and stem.

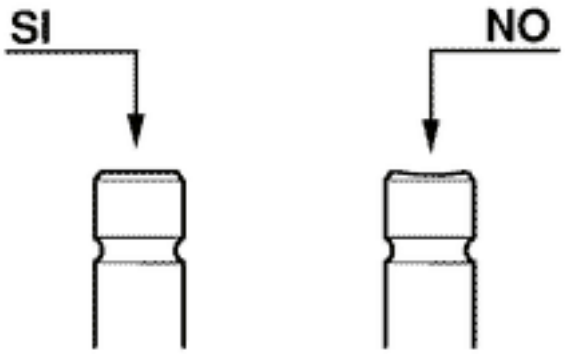
INTAKE

Specification	Desc./Quantity
Standard clearance:	0.10 mm
Limit allowed:	0.08 mm

EXHAUST

Specification	Desc./Quantity
Standard clearance:	0.15 mm
Limit allowed:	0.1 mm

- Check that there are no signs of wear on the mating surface with the set screw articulated terminal.



- If no anomalies are found during the above checks, you can use the same valves. To obtain better sealing performance, grind the valve seats. Grind the valves gently with a fine-grained lapping compound. During the grinding, keep the cylinder head with the valve axes in a horizontal position. This will prevent the lapping compound residues from penetrating between the valve stem and the guide (see figure).

CAUTION

TO AVOID SCORING THE MATING SURFACE, DO NOT ROTATE THE VALVE WHEN NO LAPPING COMPOUND IS LEFT. CAREFULLY WASH THE CYLINDER HEAD AND THE VALVES WITH A SUITABLE PRODUCT FOR THE TYPE OF LAPPING COMPOUND BEING USED.

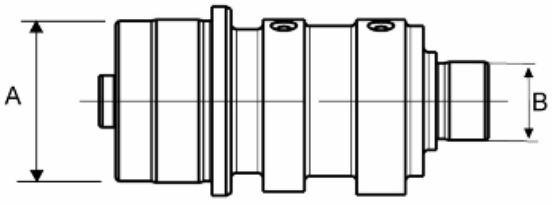
CAUTION

DO NOT REVERSE THE FITTING POSITIONS OF THE VALVES (RIGHT - LEFT).

- Check that the camshaft bearings exhibit no scores or abnormal wear.
- Using a micrometer, measure the camshaft bearings.

STANDARD DIAMETER

Specification	Desc./Quantity
Camshaft check: Standard diameter	Bearing A Ø: 25.002 to 25.015 mm
Camshaft check: Standard diameter	Bearing B diameter: 12.002 to 12.013 mm

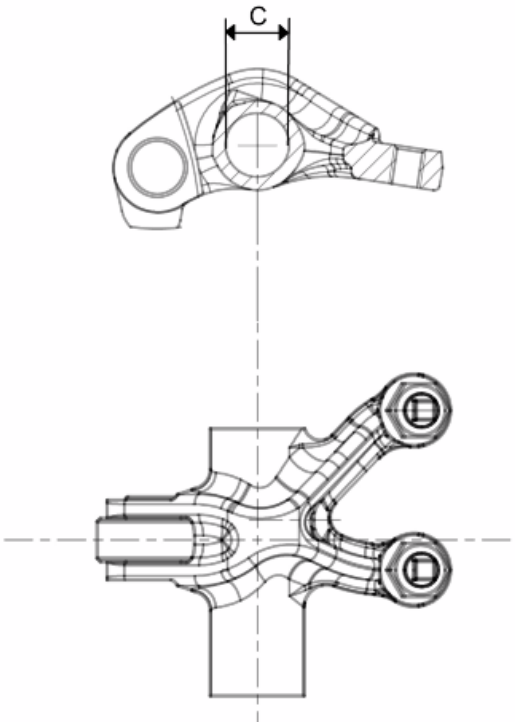


- Measure the external diameter of the rocking lever pins
- Check the rocker pins do not show signs of wear or scoring.
- Measure the internal diameter of each rocker

Check there are no signs of wear on the pad from contact with the cam and on the jointed adjustment plate.

DIAMETER OF PINS AND ROCKING LEVERS

Specification	Desc./Quantity
Rocking lever inside diameter: Standard diameter (C)	Ø 10.015 to 10.035 mm
Rocking lever pin diameter: Standard diameter (D)	Ø 10.015 to 10.023 mm

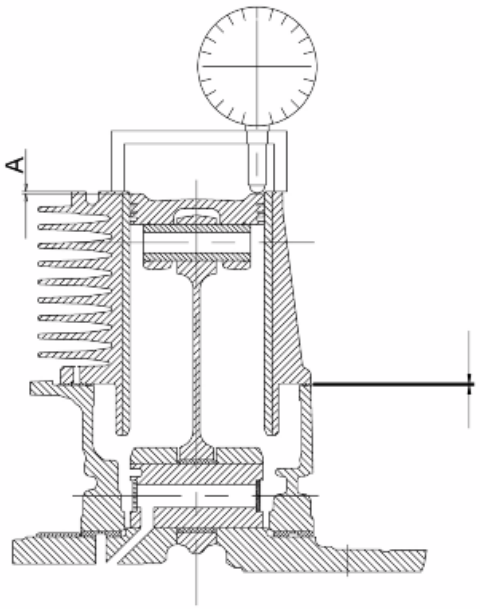


Slot packing system

Characteristic

Compression ratio

(10.5±0.5):1



Measurement "**A**" to be taken is a value of piston re-entry, it indicates by how much the plane formed by the piston crown falls below the plane formed by the top of the cylinder. The further the piston falls inside the cylinder, the less the base gasket to be applied (to recover the compression ratio) and vice versa.

N.B.

MEASUREMENT "A" MUST BE TAKEN WITHOUT ANY GASKET FITTED BETWEEN THE CRANK-CASE AND CYLINDER AND AFTER RESETTING THE DIAL GAUGE, EQUIPPED WITH A SUP-PORT, ON A GROUND PLANE

ENGINE 125/150 SHIMMING

Name	Measure A	Thickness
Shimming	0 - -0.1	0.8 ± 0.05
Shimming	-0.1 - -0.3	0.6 ± 0.05
Shimming	-0.3 - -0.4	0.4 ± 0.05

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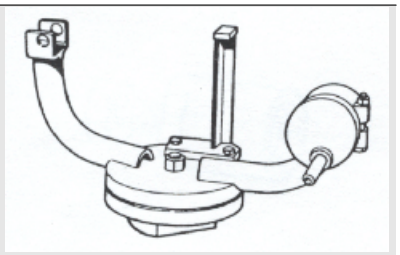
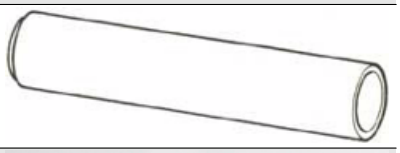
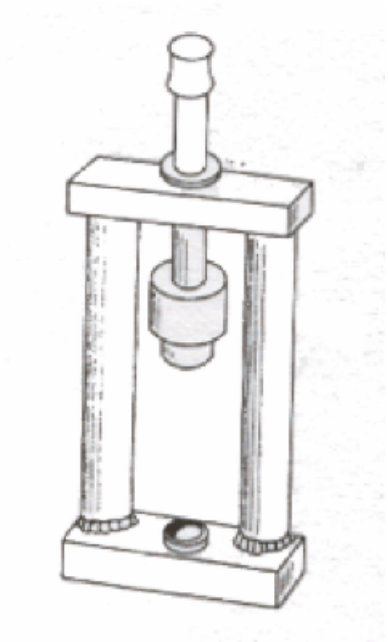
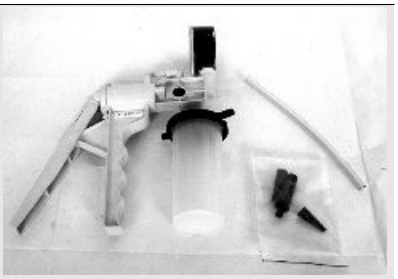
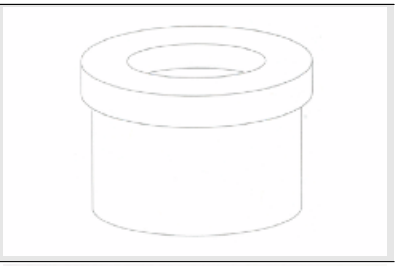
SPECIFIC TOOLS

Stores code	Description	
001330Y	Tool for fitting steering seats	
001467Y008	Clamp to extract 17 mm ø bearings	
001467Y009	Bell for OD 42-mm bearings	
001467Y013	Calliper to extract ø 15-mm bearings	
005095Y	Engine support	
006029Y	Punch for fitting steering bearing on the steering tube	
020004Y	Punch for removing steering bearings from headstock	

Stores code	Description	
020021Y	Front suspension service tool	
020036Y	Punch	
020037Y	Punch	
020038Y	Punch	
020055Y	Wrench for steering tube ring nut	

Stores code	Description	
020074Y	Support base for checking crankshaft alignment	
020151Y	Air heater	
020193Y	Oil pressure gauge	
020263Y	Driven pulley assembly sheath	
020329Y	Mity-Vac vacuum pump	

Stores code	Description	
020331Y	Digital multimeter	
020332Y	Digital rpm indicator	
020335Y	Magnetic mounting for dial gauge	
020357Y	32 x 35-mm Adaptor	
020358Y	37 x 40 mm Adaptor	

Stores code	Description	
020359S	42 x 47 mm Adaptor	
020360S	52 x 55 mm adaptor	
020363Y	20-mm guide	
020364Y	25-mm guide	
020375Y	28 x 30 mm adaptor	
020376Y	Adaptor handle	
020382Y	Tool to extract valve cotters	

Stores code	Description	
020412Y	15-mm guide	
020424Y	Driven pulley roller casing fitting punch	
020426Y	Piston fitting fork	
020427Y	Piston assembly band	
020431Y	Valve oil seal extractor	
020434Y	Union for oil pressure measurement	

Stores code	Description	
020441S	26 x 28 mm adaptor	
020444Y011	adapter ring	
020444Y009	wrench 46 x 55	
020439Y	17-mm guide	
020442Y	Pulley lock wrench	
020444Y	Tool for installing/removing clutch on/ from driven pulley	

Stores code	Description	
020468Y	Piston fitting ring	
020480Y	Fuel pressure measurement kit	
020933Y	Flywheel extractor	
020939Y	Flywheel retainer	
020941Y	Crankshaft timing adjustment tool	
020942Y	Piston protrusion check tool	

Stores code	Description	
020922Y	Diagnosis Tool	
020994Y	Driven pulley stop	
021017Y	EOBD E5 diagnostics cable	

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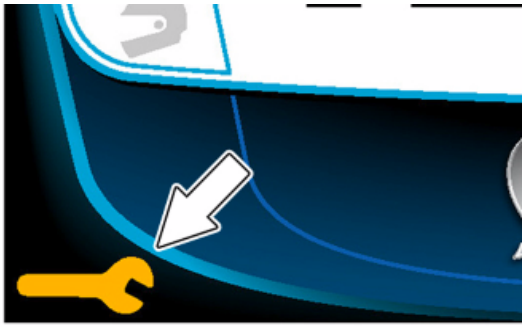
FOR "S" VERSION

SERVICE ICON BEHAVIOUR



When the ignition switch is turned to **ON**, immediately after the initial check cycle, the SERVICE icon flashes for 10 seconds and then turns off if less than 300 km (187.5 mi) remain until the next scheduled service.

Once the service interval mileage is reached, the SERVICE icon lights up steadily when the ignition switch is turned to **ON** and will remains lit until it is reset.

SERVICE ICON RESET

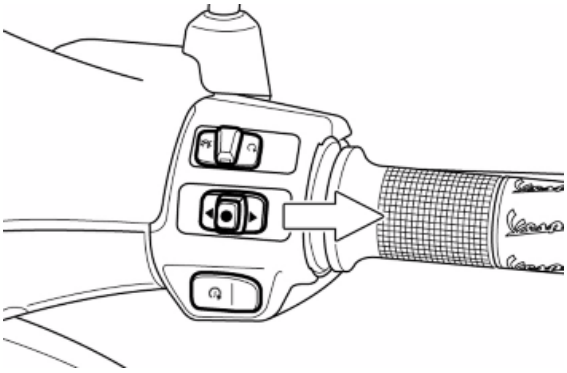
Reset the SERVICE icon as follows:

turn the ignition switch to **ON** and then push the handlebar MODE button briefly and repeatedly to the RIGHT to scroll through the functions available on the digital display, until the **BATTERY** function is displayed.

N.B.

"PRESS BRIEFLY AND RELEASE": PRESS THE BUTTON AND RELEASE WITHIN 0.5 SECONDS;
"PRESS AND HOLD": PRESS THE BUTTON AND HOLD FOR AT LEAST 2 SECONDS.

Press and hold the MODE button to the RIGHT for at least 10 seconds but not more than 15 seconds.



The SERVICE icon extinguishes when the button is released.

If the MODE button is released without waiting 10 seconds, the SERVICE icon will not extinguish and the service interval counter will not be reset.

N.B.

THE PROCEDURE TO RESET THE SERVICE ICON MAY ONLY BE PERFORMED WHEN THE VEHICLE IS STATIONARY (SPEED = 0 Km/h).

Maintenance chart

SCHEDULED MAINTENANCE TABLE

***I**: CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE, IF NECESSARY **C**: CLEAN; **R**: REPLACE; **A**: ADJUST; **L**: LUBRICATE*
** Check level every 2,500 km*
*** Replace every 2 years*

km x 1,000 or (months) maximum	1 (1)	5 (5)	10 (10)	15 (15)	20 (20)	25 (25)	30 (30)	35 (35)	40 (40)	45 (45)	50 (50)
Safety blocks	I		I		I		I		I		I
Spark plug			I		R		I		R		I
Centre stand		L	L	L	L	L	L	L	L	L	L
Drive belt (125 cm³)			I		R		I		R		I
Drive belt (150 cm³)			R		R		R		R		R
Throttle control	I		I		I		I		I		I
Rollers housing			I		I		I		I		I
Diagnosis by tool	I	I	I	I	I	I	I	I	I	I	I
Air filter			R		R		R		R		R
Engine oil filter	R		R		R		R		R		R
Valve clearance	A		A		A		A		A		A
Clutch assembly					I				I		
Electrical system and battery	I	I	I	I	I	I	I	I	I	I	I
Braking system	I		I		I		I		I		I
Cylinder cooling system						I					I
Brake fluid **	I	I	I	I	I	I	I	I	I	I	I
Engine oil *	R	I	R	I	R	I	R	I	R	I	R
Hub oil			I		I		I		I		I
Headlight direction adjustment			I		I		I		I		I
Brake pads	I	I	I	I	I	I	I	I	I	I	I
Sliding shoes / CVT rollers			I		R		I		R		I
Engine oil pre-filter	C		C		C		C		C		C
Tire pressure and wear	I	I	I	I	I	I	I	I	I	I	I
Vehicle road test	I	I	I	I	I	I	I	I	I	I	I
Driven pulley - roller casings			I		L		I		L		I
Suspensions			I		I		I		I		I
Steering	I		I		I		I		I		I
Transmission			L		L		L		L		L
Labour time (minutes)	90	40	170	40	170	40	170	40	170	40	170

N.B.

AT EACH SCHEDULED SERVICE, USE THE DIAGNOSTIC TOOL TO CHECK FOR ERRORS AND CHECK THAT ALL PARAMETERS ARE CORRECT.
ENSURE THAT THE VEHICLE CALIBRATION IS UP TO DATE AFTER UPDATING THE DIAGNOSTIC TOOL.

CAUTION

AFTER THE PROVIDED MAINTENANCE PROGRAM IS INDICATED TO PROCEED WITH THE MAINTENANCE OF THE VEHICLE STARTING FROM THE SERVICE OF 5,000 Km (3,106 mi) OR 5 MONTHS.

Recommended products

Piaggio Group recommends the use of products from its Castrol official partner for the scheduled maintenance of its vehicles.

Only use lubricants and fluids which meet or exceed the performance characteristics specified.

This also applies when topping up only.

TABLE OF RECOMMENDED PRODUCTS

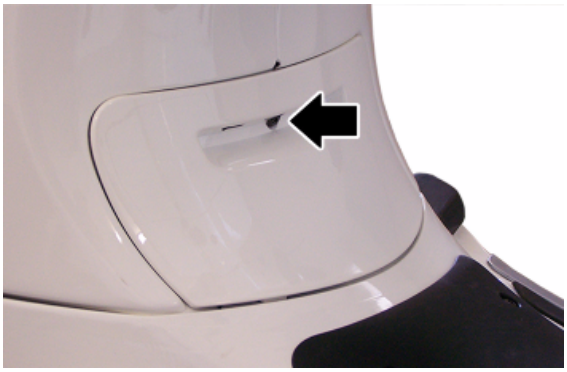
Product	Description	Specifications
Engine oil 10W-40	Synthetic lubricant for four stroke engines (0°C< T <45°C)	SAE 10W-40; JASO MB, MA, MA2; API SL
Transmission oil 80W-90	Lubricant for gearboxes and transmissions.	SAE 80W-90 API GL-4
DOT 4 brake fluid	Synthetic brake fluid.	SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4
Lubricant grease	Lithium and medium fibre yellow brown coloured grease suitable for various uses.	ISO L-X-BCHA 3 - DIN 51 825 K3K -20
Water repellent spray grease	Water repellent pouring calcium spray grease.	White, soap base spray grease with NLGI 2 Calcium complex; ISO-L-XBCIB2

MEASUREMENT UNITS CONVERSION - FROM THE ANGLO-SAXON SYSTEM TO THE INTERNATIONAL SYSTEM (I.S.).

Specification	Desc./Quantity
1 Inch (in)	25.4 Millimetres (mm)
1 Foot (ft)	0.305 Metres (m)
1 Mile (mi)	1.609 Kilometres (km)
1 US gallon (gal US)	3.785 Litres (l)
1 Pound (lb)	0.454 Kilograms (Kg)
1 Cubic inch (in^3)	16.4 Cubic centimetres (cm^3)
1 Pound per foot (lb ft)	1.356 Newton metres (N m)
1 Mile per hour (mi/h)	1.602 Kilometres per hour (km/h)
1 Pound per square foot (PSI)	0.069 (bar)
1 Fahrenheit (°F)	32+(9/5) Celsius (°C)

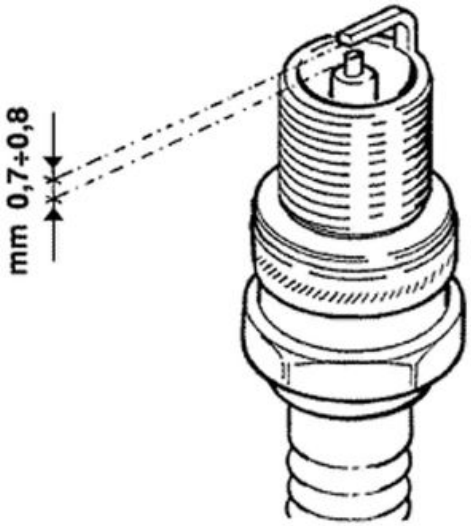
Spark plug

- Position the vehicle on the stand.
- Remove the spark plug external inspection door by undoing the indicated screw



- Disconnect the spark plug H.V. cable cap.
- Undo the spark plug with the specific spark plug spanner.

- Check the conditions of the spark plug, make sure the insulation is intact, that the electrodes are not excessively worn or sooty, the conditions of the washer, and measure the distance between the electrodes using the appropriate feeler gauge.
- In case of anomaly (as described before), replace the spark plug with another one of the recommended type.



- Tighten the spark plug manually, being sure to insert it at the right angle. Use the wrench only to tighten it.
- Fit the cap on the spark plug as far as it will go.
- Carry out refit operations.

CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE ENGINE IS COLD. CHECK AND REPLACE THE SPARK PLUG AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE. USING NON-COMPLYING IGNITION CONTROL UNITS OR SPARK PLUGS OTHER THAN THOSE PRESCRIBED MAY SERIOUSLY DAMAGE THE ENGINE.

Characteristic

Electrode gap

0.7~0.8 mm

Spark plug

NGK CR8EB

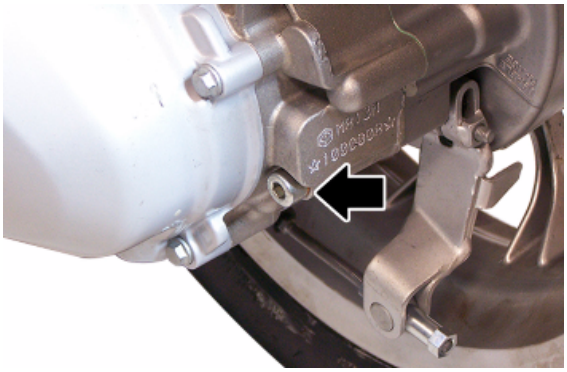
Locking torques (N*m)

Spark plug tightening 10 to 12

Hub oil

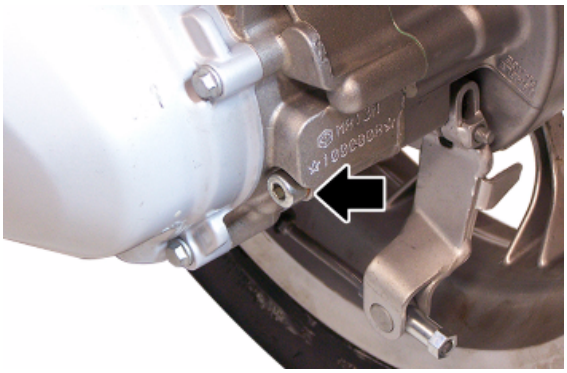
Check

Check oil level with the vehicle placed on the centre stand and on a flat surface.
Undo the indicated screw and check for oil by inserting a shank/plug. The level should be just under the lower margin of the fill hole.
In case of oil leakage, carefully clean the transmission crankcase with a cloth.



Replacement

- Remove the oil level check and filler screw.



- Prepare an adequately sized container.
- Unscrew the oil drainage plug and drain out all the oil.

- Screw in the drainage cap again and fill the hub with the prescribed oil.

Recommended products

Transmission oil 80W-90 Lubricant for gearboxes and transmissions.

SAE 80W-90 API GL-4

Characteristic

Hub oil

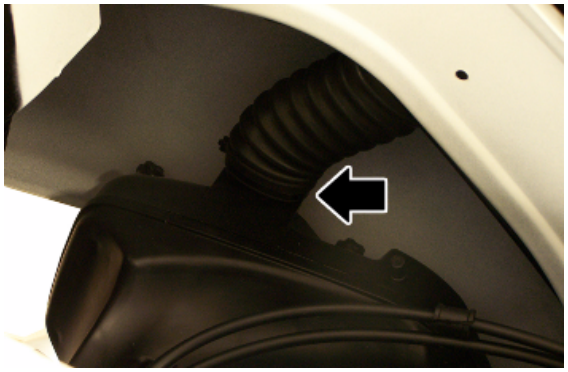
270 cm^3

Locking torques (N*m)

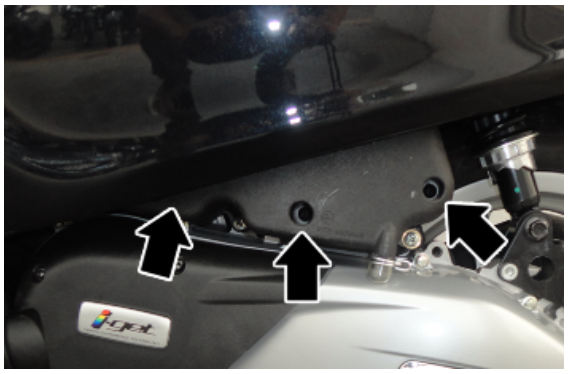
Hub oil drain screw 15 to 17

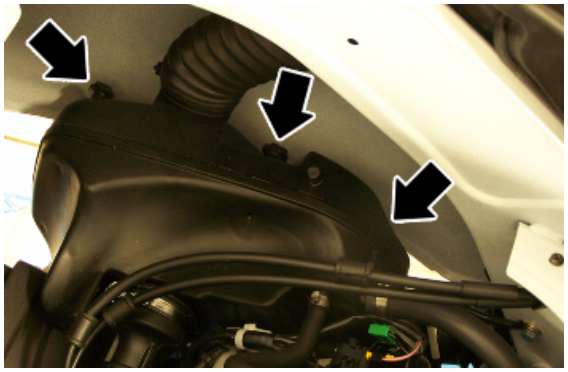
Air filter

- Remove the helmet compartment.
- Disconnect the air intake pipe from the filter box.



- Undo the six screws and remove the air-box cover.





- To clean the filtering element proceed as follows: remove the paper filtering element, blast with compressed air and then refit it.
- Make sure the filtering element is in the correct position.
- Check that the air passage sections are not damaged or deformed.
- Check the correct sealing of the coupling between the filter housing and the cover.

CAUTION

IF THE VEHICLE IS USED ON DUSTY ROADS IT IS NECESSARY TO CARRY OUT MAINTENANCE CHECKS OF THE AIR FILTER MORE OFTEN TO AVOID DAMAGING THE ENGINE.

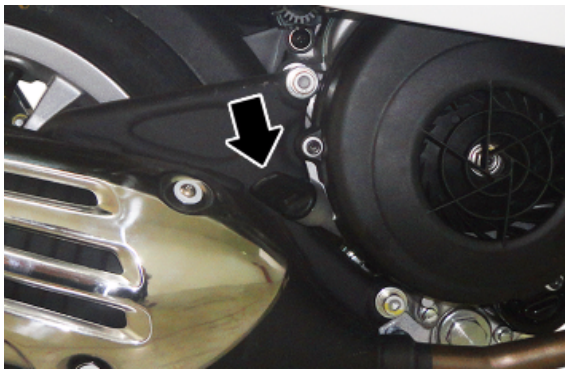
Engine oil

In four-stroke engines, the engine oil is used to lubricate the timing elements, the bench bearings and the head-engine block-piston assembly. **An insufficient quantity of oil can cause serious damage to the engine**.

In all four stroke engines, the deterioration of the oil characteristics, or a certain consumption should be considered normal, especially if during the run-in period. Consumption levels in particular can be influenced by the conditions of use (e.g.: oil consumption increases when driving at "full throttle".

Replacement

Change oil and replace filter as indicated in the scheduled maintenance table. The engine must be emptied by draining off the oil through the drainage plug of the mesh pre-filter, flywheel side; furthermore to facilitate oil drainage, loosen or remove the cap/dipstick. Once all the oil has drained through the drainage hole, unscrew the oil cartridge filter and remove it.

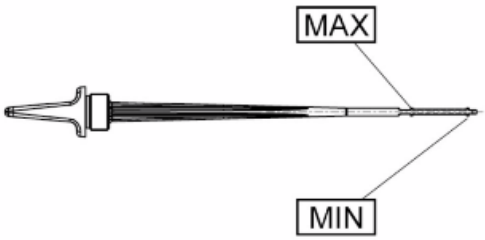


Make sure the pre-filter and drainage plug O-rings are in good conditions.

Lubricate them and refit the mesh filter and the oil drainage plug, screwing them up to the prescribed torque.

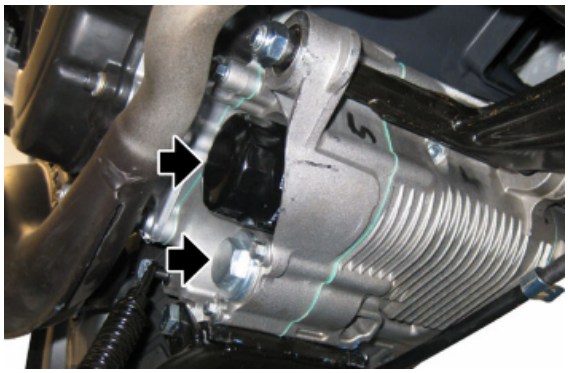
Refit the new cartridge filter being careful to lubricate the O-ring before fitting it.

Change the engine oil.



Since a certain quantity of oil still remains in the circuit, oil must be filled from oil dipstick/cover.

Then start up the vehicle, leave it running for a few minutes and switch it off: After about five minutes, check the level and, if necessary, top-up but never exceeding the **MAX** level reference mark. The cartridge filter must be replaced every time the oil is changed. Use new oil of the recommended type for topping up and changing purposes.



N.B.

THE ENGINE MUST BE HOT WHEN THE OIL IS CHANGED.

Recommended products

Engine oil 10W-40 Synthetic lubricant for four stroke engines (0°C< T <45°C)

SAE 10W-40; JASO MB, MA, MA2; API SL

Check

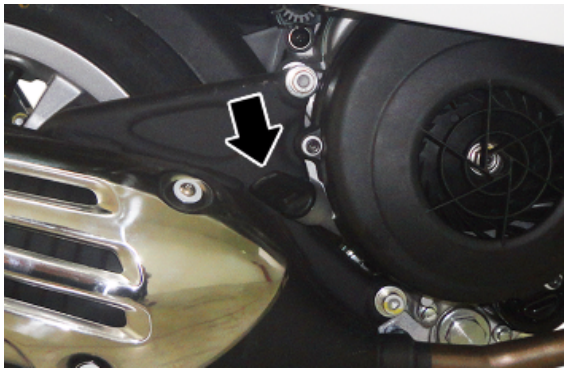
This operation must be carried out with the engine cold and following the procedure below:

- Place the vehicle on its centre stand and on flat ground.
- Undo cap/dipstick, dry it off with a clean cloth and reinsert it, **screwing down completely**.
- Remove the cap/dipstick again and check that the level is between the MIN and MAX reference marks; top-up, if required.

The MAX level mark indicates a quantity of around 1,220 cm^3 of engine oil. If the check is carried out after the vehicle has been used, and therefore with a hot engine, the level will be lower; in order to carry out a correct check, wait at least 10 minutes after the engine has been stopped so as to get the correct level.

Engine oil top-up

The oil should be topped up after having checked the level and in any case by adding oil **without ever exceeding the MAX. level**.



Engine oil filter

Change oil and replace filter as indicated in the scheduled maintenance table. Use new oil of the recommended type for topping up and changing purposes.

Make sure the pre-filter and drainage plug O-rings are in good conditions. Lubricate them and refit the mesh filter and the oil drainage plug, screwing them up to the prescribed torque. Refit the new cartridge filter being careful to lubricate the O-ring before fitting it. Change the engine oil.

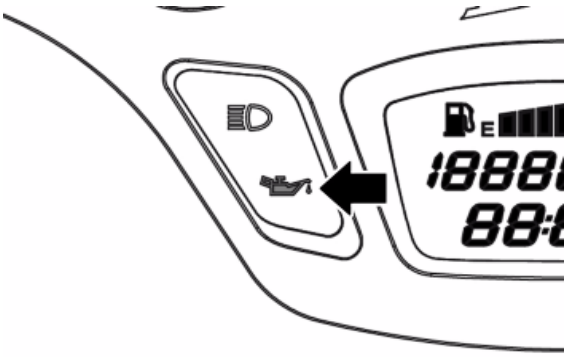
Recommended products

Engine oil 10W-40 Synthetic lubricant for four stroke engines (0°C< T <45°C)

SAE 10W-40; JASO MB, MA, MA2; API SL

Oil pressure warning light

The vehicle is equipped with a tell-tale light on the instrument cluster that lights up when the key is turned to the «**ON**» position. However, this light should come 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.**

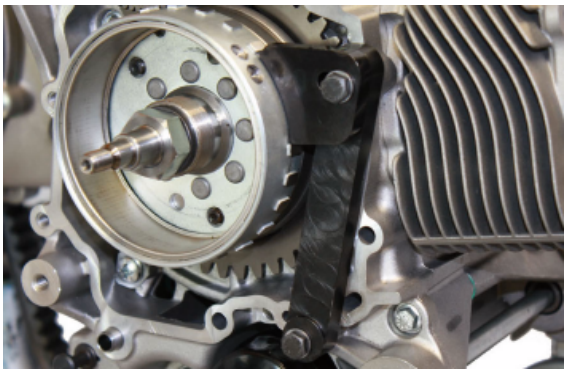


Checking the ignition timing

Position the engine at top dead centre (TDC) in compression. To do this, use the appropriate tools. Use the holes on the engine crankcase to secure the tool.

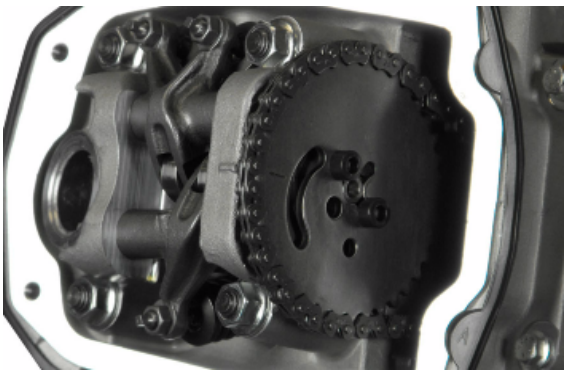
Position the specific tool in the window between the flywheel pick-up references as illustrated in the figure.

The arrows stamped respectively on the valve frame and sprocket must coincide.

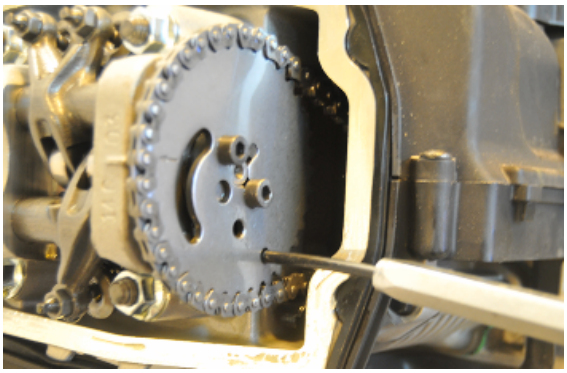


N.B.

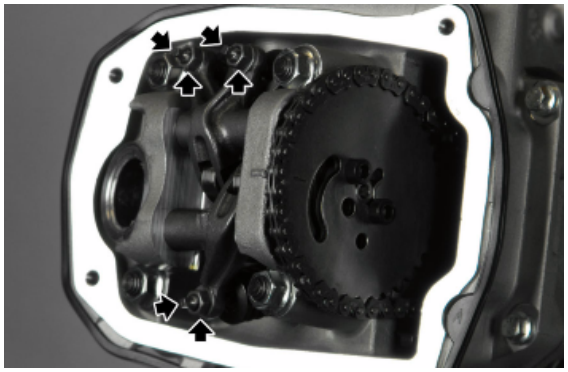
IF THE TIMING UNIT IS NOT IN PHASE CHECK THE CORRECT FITTING OF COMPONENTS.



- As a further verification of the correct distribution timing, insert a pin into the hole on the gear of the camshaft and check that it coincides with the special blind hole on the frame of the head.



Checking the valve clearance



To remove the head cover:

- Remove the rear shock absorber.
- Remove the helmet compartment.
- Lift the body.
- Remove the clamp of the H.V. wire.

To check valve clearance, centre the reference marks of the timing system.

Use a feeler gauge to check that the clearance between the valve and the set screw corresponds with the indicated values. When the valve clearance values, intake and exhaust respectively, are different from the ones indicated below, adjust them by loosening the lock nut and operating on the corresponding set screw, as shown in the figure.

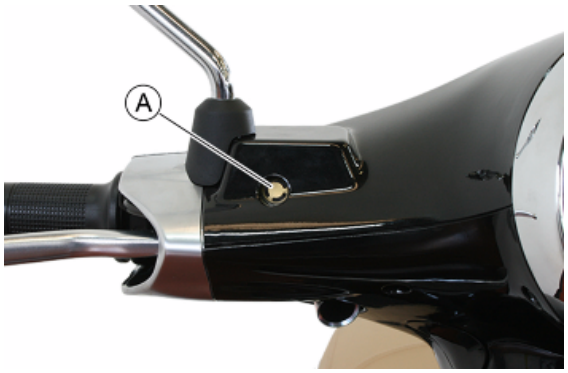
Characteristic

Valve clearance (cold engine)

intake: 0.08 mm outlet: 0.08 mm

Braking system

Level check



Proceed as follows:

- Rest the vehicle on its centre stand with the handlebars perfectly horizontal;
- Check the level of liquid with the related warning light «**A**».

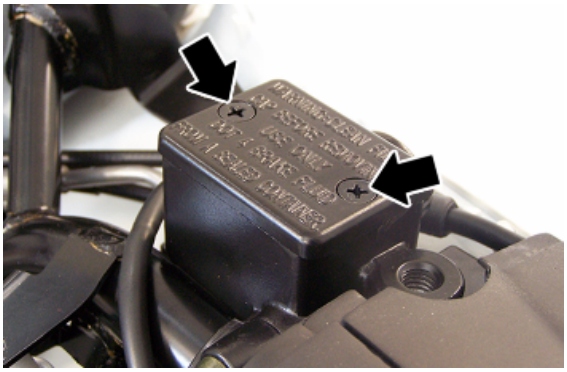
A certain lowering of the level is caused by wear on the brake pads.

Top-up

Proceed as follows:

- Remove the upper handlebar cover.

- Remove the reservoir cap by loosening the two screws, remove the gasket and top-up using only the fluid specified without exceeding the maximum level.



CAUTION

ONLY USE DOT 4-CLASSIFIED BRAKE FLUID.

CAUTION

AVOID CONTACT OF BRAKE FLUID WITH EYES, SKIN, AND CLOTHING. IN CASE OF ACCIDENTAL CONTACT, RINSE WITH WATER.

CAUTION

BRAKE CIRCUIT FLUID IS HIGHLY CORROSIVE: DO NOT LET IT COME INTO CONTACT WITH PAINTED PARTS.

CAUTION

BRAKE FLUID IS HYGROSCOPIC; THAT IS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF THE CONTENT OF MOISTURE IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, BRAKING WILL BE INEFFICIENT.
NEVER USE BRAKE LIQUID FROM OPEN OR PARTIALLY USED CONTAINERS.
UNDER NORMAL CLIMATIC CONDITIONS, REPLACE FLUID AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE.

N.B.

SEE THE BRAKING SYSTEM CHAPTER WITH REGARD TO THE CHANGING OF BRAKE FLUID AND THE BLEEDING OF AIR FROM THE CIRCUITS.

Recommended products

DOT 4 brake fluid Synthetic brake fluid.

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

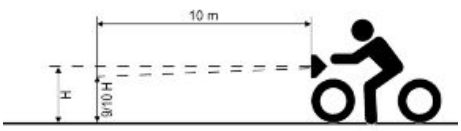
Locking torques (N*m)

Brake pump reservoir screws **15 - 20**

Headlight adjustment

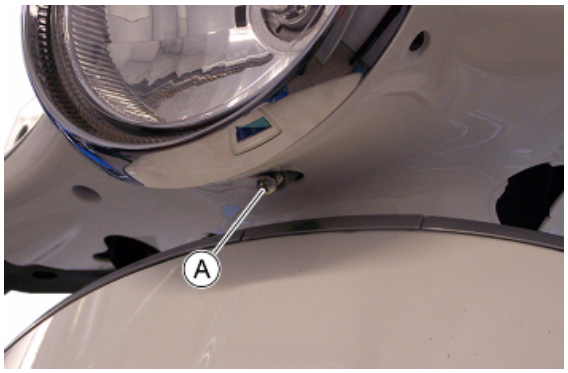
Proceed as follows:

1. Position the vehicle in running order and with the tyres inflated to the prescribed pressure, onto a flat surface 10 m away from a half-lit white screen; ensure that the longitudinal axis of the vehicle is perpendicular to the screen;



2. Turn on the headlight and check that the boundary of the light beam projected onto the screen is not higher than 9/10 or lower than 7/10 of the distance between the centre of the headlight and the ground;

3. Otherwise, adjust the right headlight with screw «**A**».



N.B.

THE PROCEDURE DESCRIBED IS THAT ESTABLISHED BY EUROPEAN STANDARDS FOR THE MAXIMUM AND MINIMUM HEIGHT OF THE LIGHT BEAM. REFER TO THE STATUTORY REGULATIONS IN FORCE IN EVERY COUNTRY WHERE THE VEHICLE IS USED.

Anti-evaporation system

N.B.

APPLICABLE VERSIONS

The vehicle is equipped with the "Canister", main component of the system for the control of evaporative emissions, compliant with the current standards.

A. Fuel pump

B. Fuel tank

C. Two-way fuel vapour ventilation valve

D.Canister

E.Air purge pipe into atmosphere

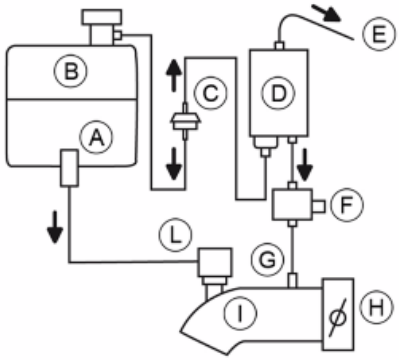
F.One-way electronic fuel vapour purge control valve (controlled by ECU)

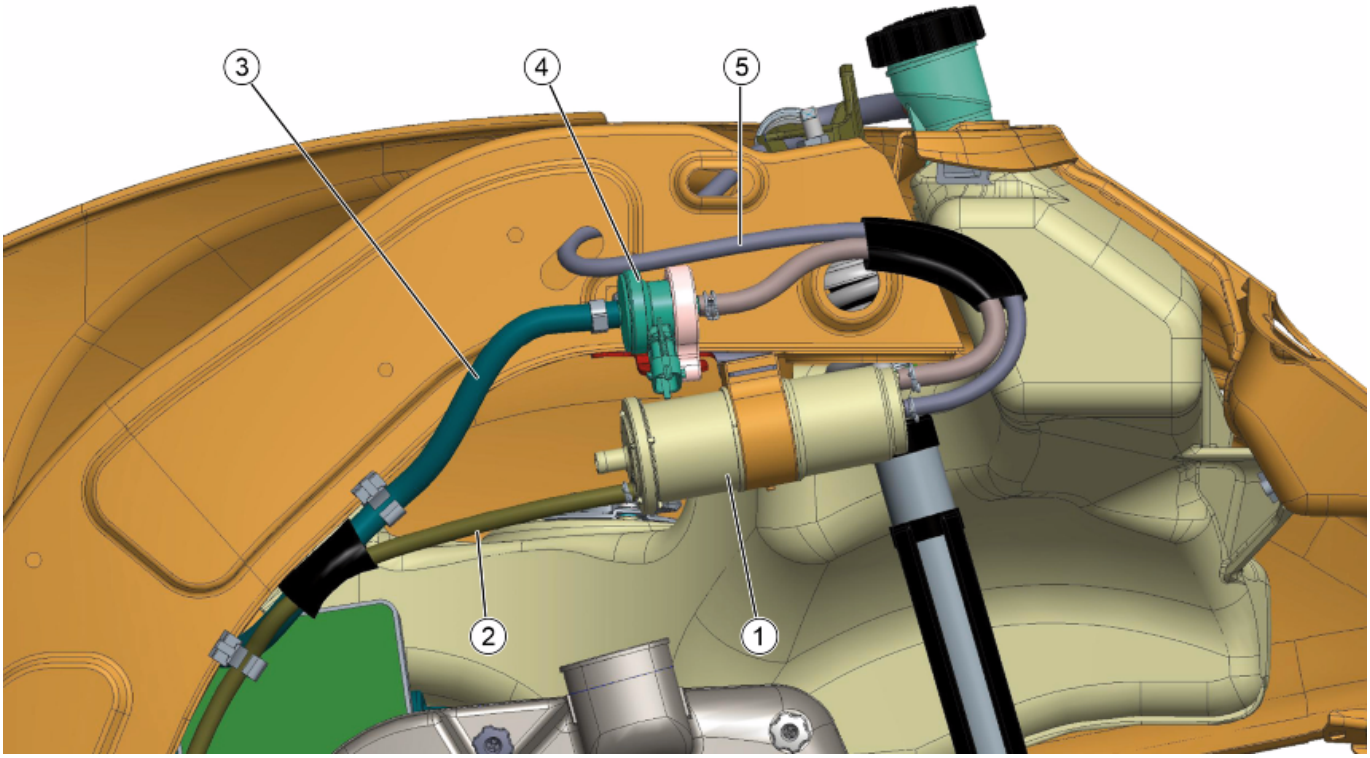
G. Vacuum fitting

H. Throttle body

I. Air induction fitting

L. Injector





The evaporative emissions control system is located on the rear left hand side of the vehicle.

Key:

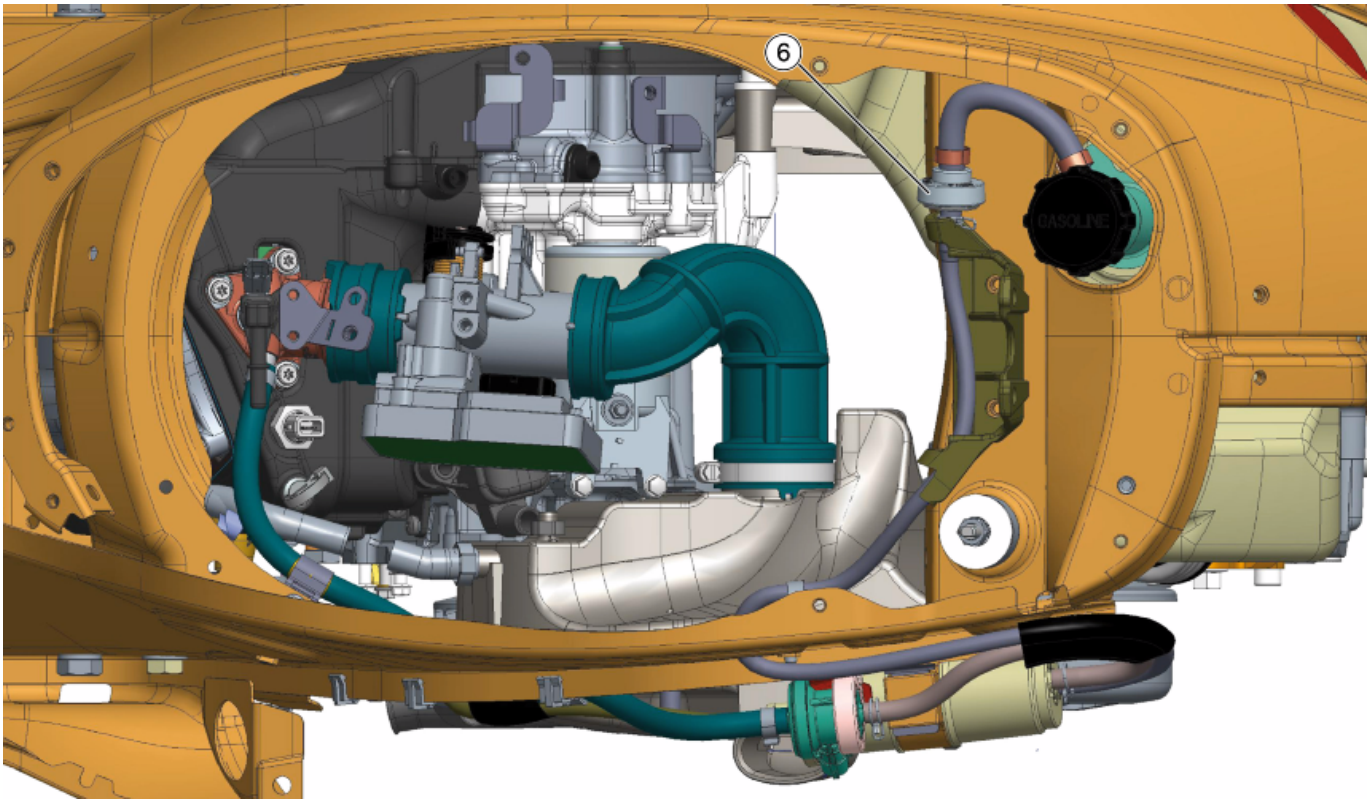
1 Canister

2 Bleeder pipe

3 Pipe for connecting the canister to the inlet fitting

4 Canister valve

5 Pipe for connecting the fuel tank to the canister



Key:

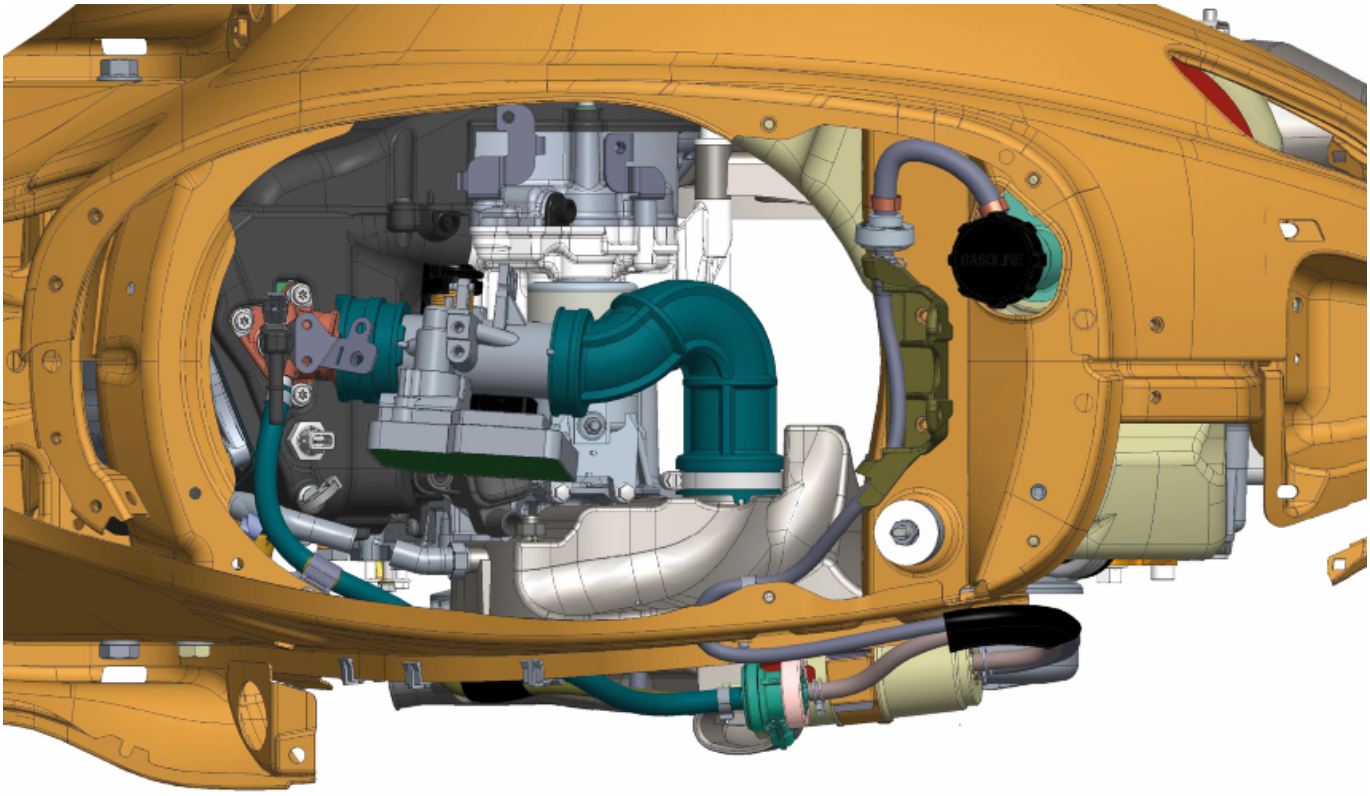
6 Breather valve

Removing system components

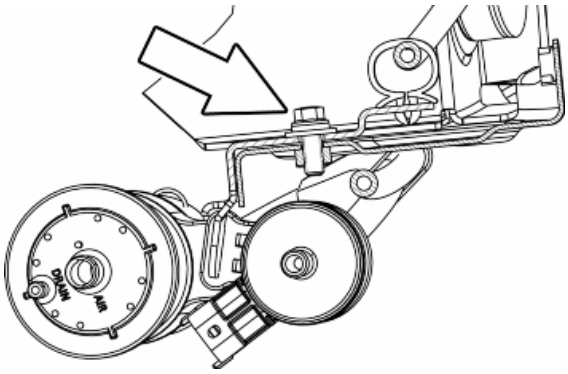
N.B.

APPLICABLE VERSIONS

Remove the helmet compartment to gain access to the components of the evaporative emissions control system.



After having removed the clamps, unscrew the fastening screw to release the system and bring the components inside the engine compartment.

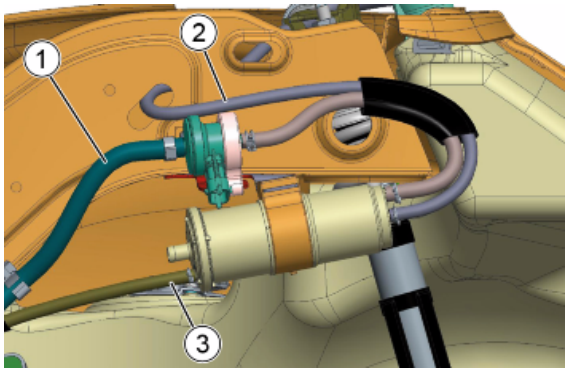


Refitting system components

N.B.

APPLICABLE VERSIONS

Upon reassembling the components, use caution when connecting the pipes to the canister.



1. canister - insertion coupling connection pipe.

2. tank - canister connection pipe.

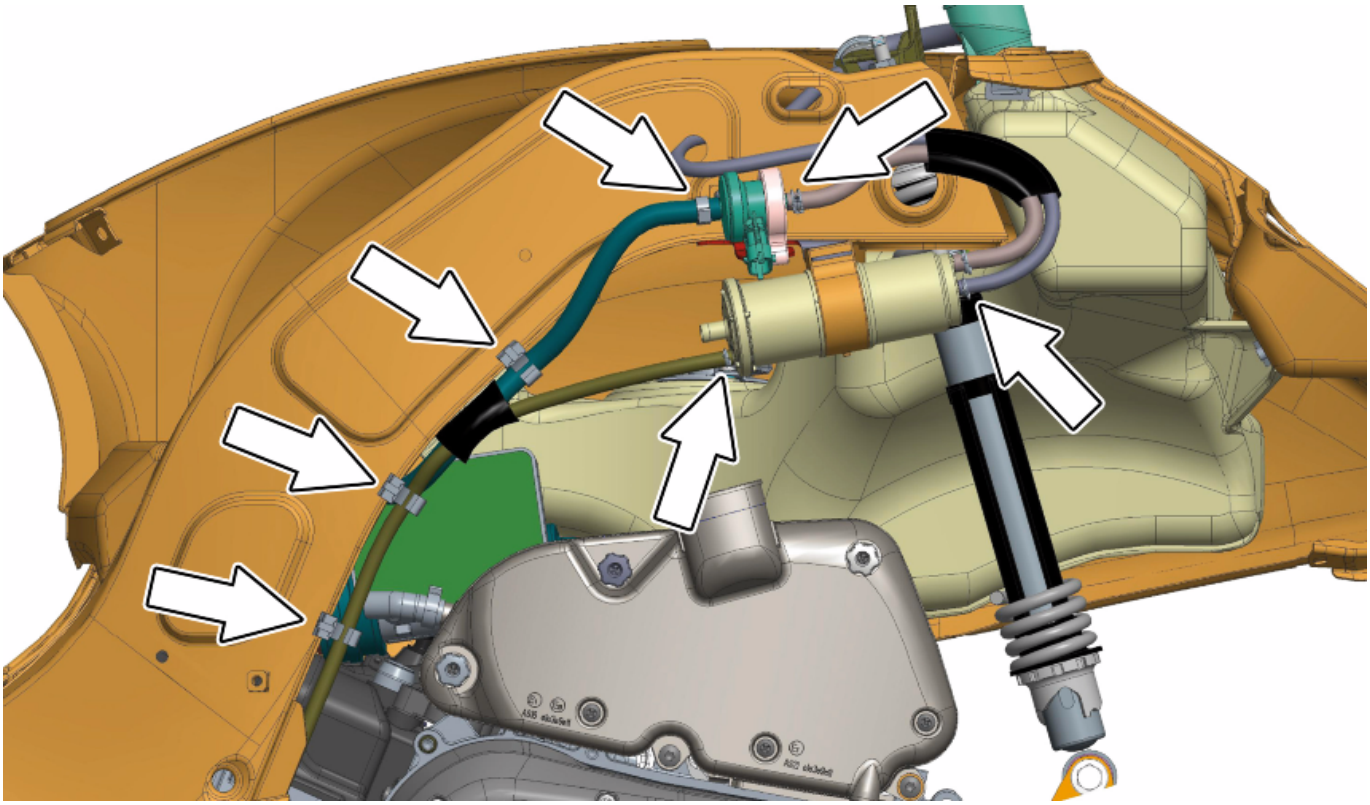
3. Bleeder pipe.

Refit the components by properly inserting the pipes and securing them with new metal clamps.

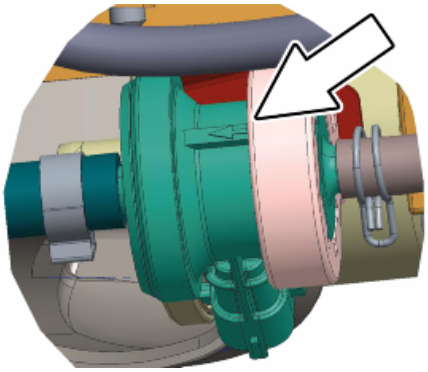
CAUTION

TAKE CARE TO ENSURE THE PROPER DIRECTION OF THE COMPONENTS' INSTALLATION: IF INSTALLED IN REVERSE, THEY COULD COMPROMISE THE FUNCTIONALITY OF THE ENTIRE EVAPORATING SYSTEM.

After having installed the components, secure the pipes with new ties.



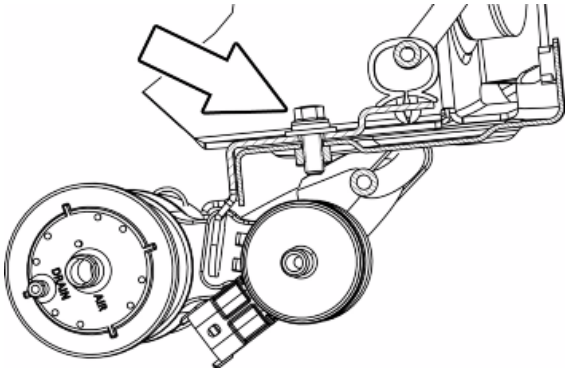
Upon refitting the canister valve, observe the direction of the arrow toward the engine.



Refit the canister support bracket on the chassis and tighten the fastening screws.

Locking torques (N*m)

Canister - Frame support bracket **12.0 ± 1.0 Nm**



Make sure that the orientation of the breather valve is correct.

If you detect different pressures, replace the valve.

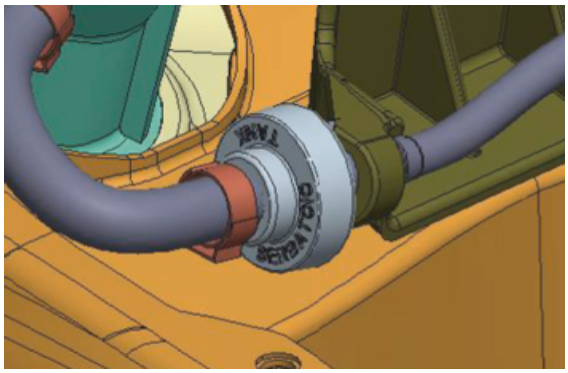
Characteristic

Discharge pressure

80/100 mbar

Intake pressure

≤ 20 mbar



Canister inspection

N.B.

APPLICABLE VERSIONS

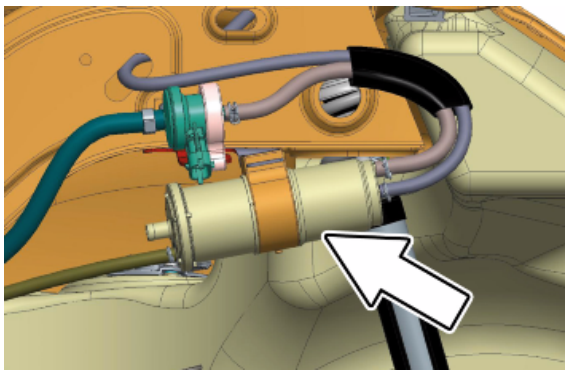
The canister is essential to treat the hydrocarbons present in the volume of gas that escapes from the tank when there is an increase in internal pressure (tank heating induced by the cooling radiator, by the motor or by the external environment).

Although the amount of hydrocarbons coming from the tank is small enough to avoid the saturation of the canister, it is necessary to regenerate the activated carbon by means of a reversed flow of ambient air sucked by the engine.

These vacuums of pollution and carbon regeneration take place at each cycle of use of the vehicle.

To control the canister, it is necessary to proceed with its removal while keeping the 2 pipes connected.

- Shake the Canister and make sure there is no noise.
- Using a compressed air gun, blow alternately in 3 ducts and make sure that pressure does not build inside the canister.



- Check that the air flow is kept free and that no carbon residues escape out of any pipe.

If you detect noise, clogging or loss of carbon, replace the canister.

INDEX OF TOPICS

Engine

Poor performance

POOR PERFORMANCE

Possible Cause	Operation
Air filter blocked or dirty	Remove the sponge, wash with water and car shampoo, soak with specific oil for foam filter treatment. Press with your hand without squeezing, allow it to drip dry and refit
Excessive drive belt wear	Check it and replace, if necessary
Lack of compression: parts, cylinder and valves worn	Replace the worn parts
Engine oil level exceeds maximum	Check for causes and fill to reach the correct level
Excess of scales in the combustion chamber	Descale the cylinder, the piston, the head and the valves
Incorrect timing or worn timing system elements	Time the system again or replace the worn parts
Silencer obstructed	Replace
Inefficient automatic transmission	Check the rollers and the pulley movement, replace the damaged parts and lubricate the movable guide of the driven pulley with grease
Wrong valve adjustment	Adjust the valve clearance properly
Overheated valves	Remove the head and the valves, grind or replace the valves
Valve seat distorted	Replace the head unit
Worn cylinder, Worn or broken piston rings	Replace the piston cylinder assembly or just the piston rings

Starting difficulties

START-UP PROBLEMS

Possible Cause	Operation
Flat battery	Check the state of the battery. If it shows signs of sulphation, replace it and bring the new battery into service by charging it for not more than ten hours at a current of 1/10 of the capacity of the battery itself.
Faulty spark plug	Replace the spark plug
Incorrect valve sealing or valve adjustment	Inspect the head and/or restore the correct clearance
Starter motor and start-up system fault	Check starter motor.
Altered fuel characteristics	Drain off the fuel no longer up to standard; then, refill
Air filter obstructed or dirty	Remove the sponge, wash with water and car shampoo, soak with specific oil for foam filter treatment. Press with your hand without squeezing, allow it to drip dry and refit
Fuel pump fault	Check the pump.

Excessive oil consumption/Exhaust smoke

EXCESSIVE CONSUMPTION

Possible Cause	Operation
Wrong valve adjustment	Adjust the valve clearance properly
Overheated valves	Remove the head and the valves, grind or replace the valves
Misshapen/worn valve seats	Replace the head unit
Worn cylinder, Worn or broken piston rings	Replace the piston cylinder assembly or piston rings
Worn or broken piston rings or piston rings that have not been fitted properly	Replace the piston cylinder unit or just the piston rings
Oil leaks from the couplings or from the gaskets	Check and replace the gaskets or restore the coupling seal
Worn valve oil seal	Replace the valve oil seal
Worn valve guides	Check and replace the head unit if required

Insufficient lubrication pressure

LOW LUBRICATION PRESSURE

Possible Cause	Operation
By-Pass remains open	Check the By-Pass and replace if required. Carefully clean the By-Pass area.
Oil pump with excessive clearance	Perform the dimensional checks on the oil pump components
Oil filter too dirty	Replace the cartridge filter
Oil level too low	Restore the level adding the recommended oil type

Transmission and brakes

Clutch grabbing or performing inadequately

IRREGULAR CLUTCH PERFORMANCE OR SLIPPAGE

Possible Cause	Operation
Slippage or irregular functioning	Check that there is no grease on the masses. Check that the faying surface between the clutch masses and the clutch housing is mainly in the middle and with equivalent specifications on the three masses. Check that the clutch housing is not scored or worn abnormally.

Insufficient braking

INEFFICIENT OR NOISY BRAKING

Possible Cause	Operation
Worn brake pads or shoes	Replace the brake pads or shoes and check for brake disk or drum wear conditions.
Front brake disk loose or deformed	Check the brake disc screws are locked; use a dial gauge and a wheel mounted on the vehicle to measure the axial shift of the disc.
Air bubbles inside the hydraulic braking system	Carefully bleed the hydraulic braking system, (there must be no flexible movement of the brake lever).
Fluid leakage in hydraulic braking system	Failing elastic fittings, plunger or brake pump seals, replace
Excessive clearance in the rear brake control cable	Adjust the clearance with the appropriate adjuster located on the back part of the crankcase.

Brakes overheating

BRAKES OVERHEATING

Possible Cause	Operation
Rubber gaskets swollen or stuck.	Replace gaskets.
Compensation holes on the pump clogged.	Clean carefully and blast with compressed air.
Brake disc slack or distorted	Check the brake disc screws are locked; use a dial gauge and a wheel mounted on the vehicle to measure the axial shift of the disc.
Defective piston sliding.	Check calliper and replace any damaged part.

Electrical system

Battery

BATTERY

Possible Cause	Operation
Battery	The battery is the electrical device in the system that requires the most frequent inspections and thorough maintenance. If the vehicle is not used for some time (1 month or more) the battery needs to be recharged periodically. The battery runs down completely in the course of 5 - 6 months. If the battery is fitted on a motorcycle, be careful not to invert the connections, keeping in mind that the black ground wire is connected to the negative terminal while the red wire is connected to the terminal marked+. For the recharging of the batteries follow the instructions in chap. ELECTRICAL SYSTEM.

Steering and suspensions

Heavy steering

STEERING HARDENING

Possible Cause	Operation
Steering hardening	Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: replace them if they are recessed or if the balls are flattened.

Excessive steering play

EXCESSIVE STEERING CLEARANCE

Possible Cause	Operation
Excessive steering clearance	Check the tightening of the top ring nut. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: replace if they are recessed.

Noisy suspension

NOISY SUSPENSION

Possible Cause	Operation
Noisy suspension	If the front suspension is noisy, check: that the front shock absorber works properly and the ball bearings are good condition. Finally, check the locking torque of the wheel axle nut, the brake calliper and the disc. Check that the swinging arm connecting the engine to the frame and the rear shock absorber work properly.

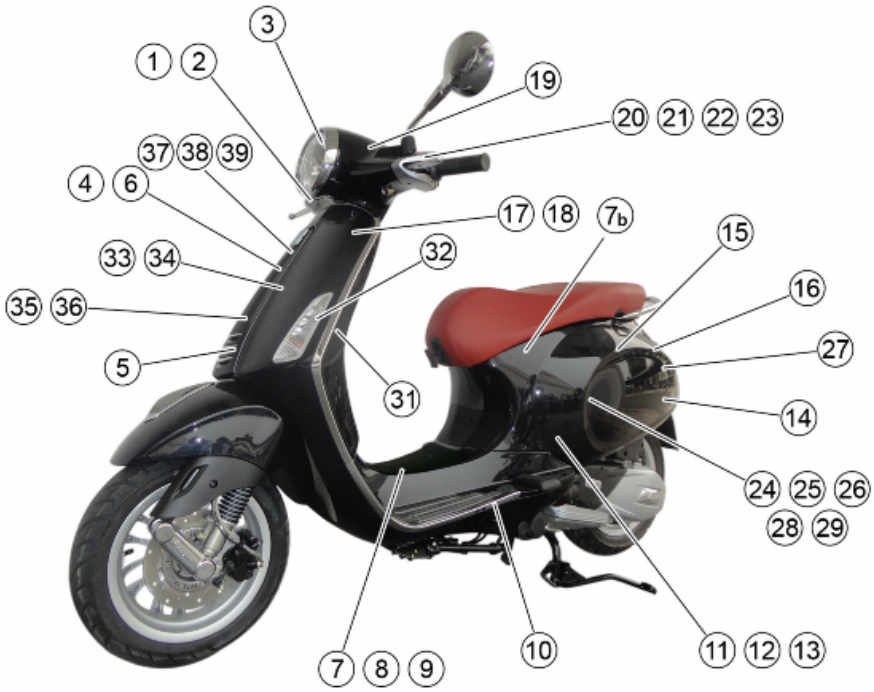
Suspension oil leakage

OIL LEAKAGE FROM SUSPENSION

Possible Cause	Operation
Faulty or broken seals	Replace the shock absorber. Check the condition of wear of the steering covers and the adjustments.

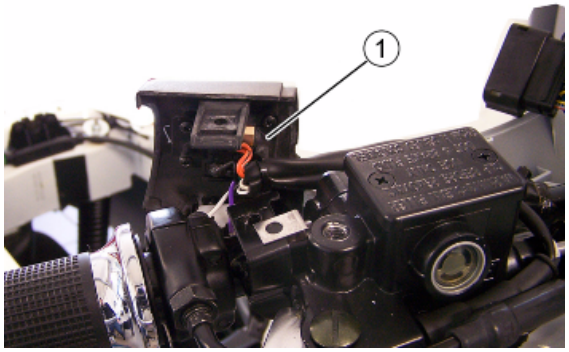
INDEX OF TOPICS

Components arrangement



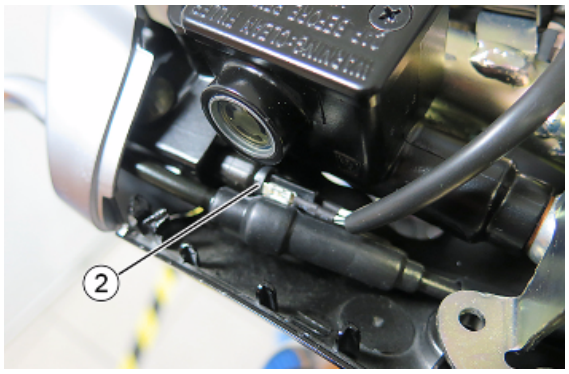
1. STARTER BUTTON

- Remove the upper handlebar cover to reach it.



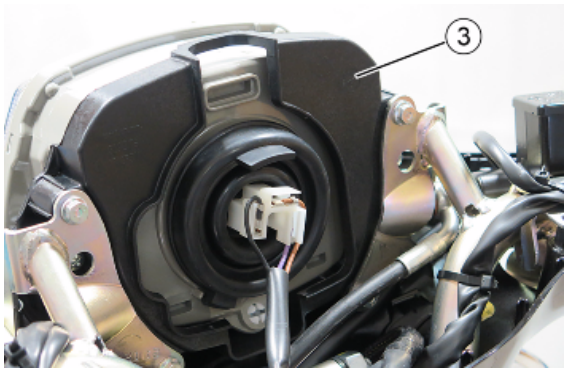
2. RIGHT HAND STOP SWITCH

- Remove the upper handlebar cover to reach it.



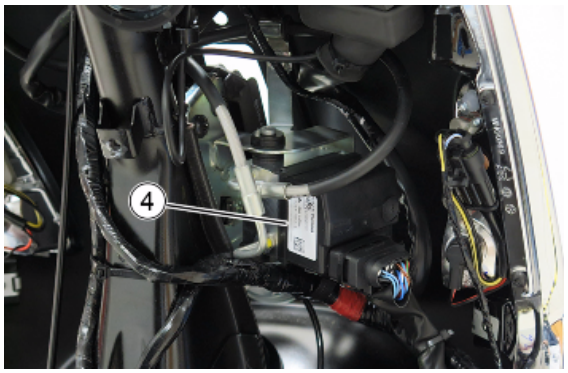
3. HEADLIGHT

- Remove the upper handlebar cover to reach it.



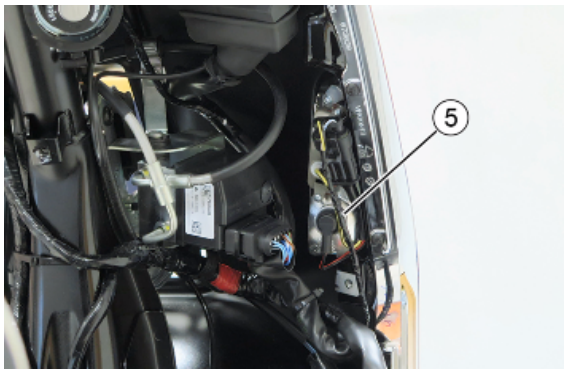
4. ABS CONTROL UNIT (APPLICABLE VERSIONS)

- Remove the leg shield back plate to reach it.



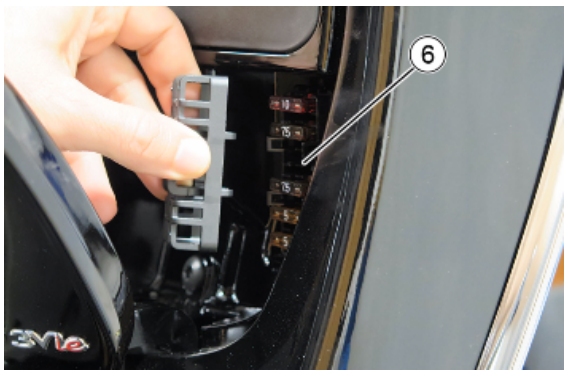
5. FRONT RIGHT TURN INDICATOR

- Remove the leg shield back plate to reach it.



6. SECONDARY FUSES

- Open the front case to reach it.

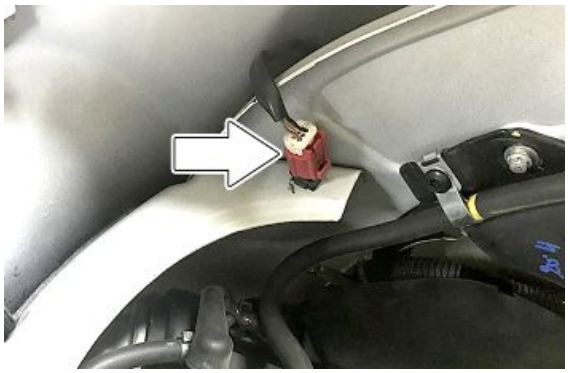


7. DIAGNOSTIC SOCKET

- Remove the battery cover to reach it.

7b. DIAGNOSTIC SOCKET CHINA AND EURO 5 VERSION

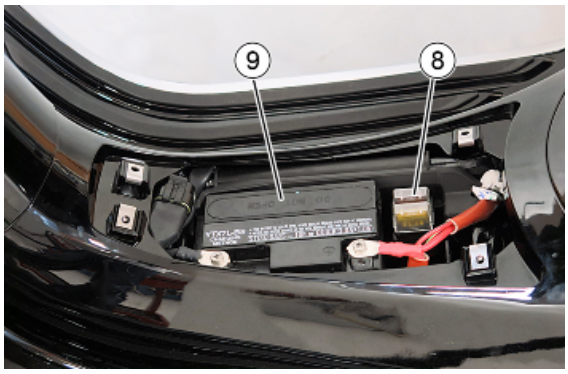
- To reach it, remove the helmet compartment.



8. MAIN FUSE/S

9. BATTERY

- Remove the battery cover to reach it.



10. LAMBDA PROBE