

**aprilia**

**1194 4**

00/2004-04

**LEONARDO 250 - 300**

[www.serviceaprilia.com](http://www.serviceaprilia.com)

**workshop** manual



8140782

INTRODUCTION

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## 0.1. INTRODUCTION

### 0.1.1. INTRODUCTION

- This manual provides the information required for normal servicing.
- This publication is intended for use by **aprilia** dealerships and their qualified mechanics; many concepts have been omitted inasmuch as their inclusion would be superfluous for such an audience. Since complete mechanical explanations have not been included in this manual, the reader must be familiar with basic notions of mechanics, as well as with basic repair procedures. Without such familiarity, repairs and checks could be ineffective and even hazardous. Since the repair and vehicle check instructions are not exhaustive, special care must be taken to avoid damage and injury. To ensure maximum customer satisfaction with the vehicle, **aprilia spa** continuously improves its products and their documentation. The main technical modifications and changes in repair procedures are communicated to all **aprilia** dealerships and agencies worldwide. Such modifications will be entered in subsequent editions of the manual. In case of doubt regarding specific repairs or checks, contact the **aprilia** SERVICE DEPARTMENT; we will be pleased to provide all necessary information and assistance as well as keeping you updated on changes and modifications to the vehicle.

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First edition: April 2004

Designed and printed by:

**DECA srl**

via Risorgimento, 23/1 - 48022 Lugo (RA) - Italy

Tel. +39 - 0545 35235

Fax +39 - 0545 32844

E-mail: [deca@decaweb.it](mailto:deca@decaweb.it)

[www.decaweb.it](http://www.decaweb.it)

On behalf of:

**aprilia S.p.A.**

Via G. Galilei, 1 – 30033 Noale (VE) – Italy

Tel. +39 – (0)41 58 29 111

Fax +39 – (0)41 58 29 190

[www.aprilia.com](http://www.aprilia.com)

[www.serviceaprilia.com](http://www.serviceaprilia.com)

0.1.2. REFERENCE MANUALS

Version 250 cc

SPARE PARTS CATALOGUES

aprilia part# (description)
I F D E UK

OWNER'S MANUALS

aprilia part# (description)
8104730 I F D
8104804 P E UK
8104805 ML DK SF
8104806 GR J UK

ENGINE TECHNICAL MANUAL

aprilia part# (description)
8140778 I
8140779 E
8140780 F
8140781 D
8140782 UK

CHASSIS PARTS TECHNICAL MANUAL

aprilia part# (description)
8140783 I
8140786 E
8140784 F
8140785 D
8140787 UK

Version 300 cc

SPARE PARTS CATALOGUES

aprilia part# (description)
6572 I F D E UK

OWNER'S MANUALS

aprilia part# (description)
8104730 I F D
8104804 P E UK
8104805 ML DK SF
8104806 GR J UK

ENGINE TECHNICAL MANUAL

aprilia part# (description)
8140778 I
8140779 E
8140780 F
8140781 D
8140782 UK

CHASSIS PARTS TECHNICAL MANUAL

aprilia part# (description)
8140783 I
8140786 E
8140784 F
8140785 D
8140787 UK

**0.1.3. ABBREVIATIONS/SYMBOLS/CONVENTIONS**

<b>#</b>	= number
<b>&lt;</b>	= less than
<b>&gt;</b>	= greater than
<b>≤</b>	= less than or equal to
<b>≥</b>	= more than or equal to
<b>~</b>	= approximately
<b>∞</b>	= infinity
<b>°C</b>	= degrees Celsius (centigrade)
<b>°F</b>	= degrees Fahrenheit
<b>±</b>	= plus or minus
<b>AC</b>	= alternating current
<b>A</b>	= Ampere
<b>Ah</b>	=Ampere per hour
<b>API</b>	= American Petroleum Institute
<b>HV</b>	= high voltage
<b>AV/DC</b>	= Anti-Vibration Double Countershaft
<b>bar</b>	= pressure measurement (1 bar =100 kPa)
<b>DC.</b>	= Direct Current
<b>cc</b>	= cubic centimetres
<b>CO</b>	= carbon monoxide
<b>CPU</b>	= Central Processing Unit
<b>DIN</b>	= German industrial standards (Deutsche Industrie Norm)
<b>DOHC</b>	= Double Overhead Camshaft
<b>ECU</b>	= Electronic Control Unit
<b>rpm</b>	= revolutions per minute
<b>HC</b>	= unburnt hydrocarbons
<b>ISC</b>	= Idle Speed Control
<b>ISO</b>	= International Standardization Organization
<b>Kg</b>	= kilograms
<b>Kgm</b>	= kilogram metre (1 kgm =10 Nm)
<b>km</b>	= kilometres
<b>kph</b>	= kilometres per hour
<b>kΩ</b>	= kilo Ohm
<b>kPa</b>	= kiloPascal (1 kPa =0.01 bar)
<b>KS</b>	= clutch side (from the German "Kupplungseite")
<b>kW</b>	= kiloWatt
<b>/</b>	= litres
<b>LAP</b>	= racetrack lap
<b>LED</b>	= Light Emitting Diode
<b>LEFT</b>	
<b>SIDE</b>	= left side
<b>m/s</b>	= metres per second
<b>max</b>	= maximum
<b>mbar</b>	= millibar (1 mbar =0.1 kPa)
<b>mi</b>	= miles
<b>MIN</b>	= minimum
<b>MPH</b>	= miles per hour
<b>MS</b>	= flywheel side (from the German "Magnetoseite")
<b>MΩ</b>	= megaOhm
<b>N.A.</b>	= Not Available
<b>N.O.M.M.</b>	= Motor Octane Number
<b>N.O.R.M.</b>	= Research Octane Number
<b>Nm</b>	= Newton metre (1 Nm =0.1 kgm)
<b>Ω</b>	= ohm
<b>PICK-UP</b>	= pick-up
<b>BDC</b>	= Bottom Dead Centre
<b>TDC</b>	= Top Dead Centre
<b>PPC</b>	= Pneumatic Power Clutch

<b>RIGHT</b>	
<b>SIDE</b>	= right side
<b>SAE</b>	= Society of Automotive Engineers
<b>TEST</b>	= diagnostic check
<b>T.B.E.I.</b>	= crown-head Allen screw
<b>T.C.E.I.</b>	= cheese-head Allen screw
<b>T.E.</b>	=hexagonal head
<b>TP</b>	= flat head screw
<b>TSI</b>	= Twin Spark Ignition
<b>UPSIDE-</b>	
<b>DOWN</b>	= inverted fork
<b>V</b>	= Volt
<b>W</b>	= Watt
<b>Ø</b>	= Diameter

GENERAL INFORMATION



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## 1.1. STRUCTURE OF THE MANUAL


























### 1.1.1. CONVENTIONS USED IN THE MANUAL

- This manual is divided in sections and subsections, each covering a set of the most significant components. Refer to the index of sections when consulting the manual.
- Unless expressly specified otherwise, assemblies are reassembled by reversing the dismantling procedure.
- The terms "right" and "left" are referred to the rider seated on the vehicle in the normal riding position.
- Motorcycle operation and basic maintenance are covered in the «OWNER'S MANUAL».

In this manual any variants are identified with these symbols:

	optional
	catalytic version
-	all versions
MP	national certification
SF	European certification (EURO 1 limits)

VERSION:

	Italy		Greece		Malaysia
	United Kingdom		Holland		Chile
	Austria		Switzerland		Croatia
	Portugal		Denmark		Australia
	Finland		Japan		United States of America
	Belgium		Singapore		Brazil
	Germany		Slovenia		South Africa
	France		Israel		New Zealand
	Spain		South Korea		Canada

**1.1.2. SAFETY WARNINGS**

The following precautionary warnings are used throughout this manual in order to convey the following messages:



**Safety warning.** This symbol appears, whether in the manual or on the vehicle itself, to indicate a personal injury hazard. Non-compliance with the indications given in the messages preceded by this symbol may result in grave risks for your and other people's safety and for the vehicle!

**WARNING**

Indicates a potential hazard which may result in serious injury or even death.

**CAUTION**

Indicates a potential hazard which may result in minor personal injury or damage to the vehicle.

**IMPORTANT:** *The word "IMPORTANT" in this manual precedes important information or instructions.*

## 1.2. GENERAL RULES

### 1.2.1. BASIC SAFETY RULES

#### CARBON MONOXIDE

Should it be necessary to perform some operations with the vehicle running, make sure to work outdoors or in a well-aerated room.

Avoid starting the engine in closed or badly-ventilated rooms.

In case you are working indoors, make use of an exhaust gases scavenging system.



#### DANGER

Exhaust gases contain carbon monoxide, which is extremely toxic if inhaled and may cause loss of consciousness or even lead to death by asphyxia.

#### FUEL



#### DANGER

The fuel used to operate engines is highly flammable and becomes explosive under particular conditions. Refuelling and engine service should take place in a well-ventilated area with the engine stopped. Do not smoke when refuelling or in the proximity of sources of fuel vapours, avoid flames, sparks and any element that could ignite fuel or provoke explosions.

**DO NOT DISPOSE OF FUEL IN THE ENVIRONMENT.**

**KEEP AWAY FROM CHILDREN.**

#### HIGH-TEMPERATURE COMPONENTS

The engine and the exhaust system parts become hot and continue to be hot even for some time after the engine has been stopped.

Before handling these parts, wear insulating gloves or wait for the engine and the exhaust system to cool completely down.

#### USED GEARBOX AND FORK OILS



#### DANGER

In case any maintenance operation should be required, it is advisable to use latex gloves.

Gear oil may cause serious damage to the skin if handled daily and for long periods.

Wash your hands carefully after use.

Put it in a sealed container and take it to the filling station where you usually buy it or to an oil salvage center.

In case any maintenance operation should be required, it is advisable to use latex gloves.

**DO NOT DISPOSE OF OIL IN THE ENVIRONMENT**

**KEEP AWAY FROM CHILDREN.**

#### BRAKE FLUID



#### WARNING

When using the brake fluid, take care not to spill it on the plastic, rubber or painted parts, since it can damage them.

When carrying out the maintenance operations on the braking system, use a clean cloth to cover these parts.

Always wear safety goggles when working on the braking system.

The brake fluid is highly irritant. Avoid contact with your eyes.

If the brake fluid gets in contact with the skin or the eyes, carefully wash the parts of your body that get in contact with the fluid and consult a doctor.

**KEEP AWAY FROM CHILDREN.**

**COOLANT**

The coolant is composed of ethylene glycol that, under certain conditions, can become inflammable and send out invisible flames causing severe burns.

**DANGER**

Be careful not to spill the coolant on the red-hot parts of the engine and the exhaust system: it may catch fire and send out invisible flames.

In case any maintenance operation should be required, it is advisable to use latex gloves.

Even if toxic, coolant has a sweet flavour. Never leave it inside open containers or within the reach of animals to prevent the risk of drinking.

**KEEP AWAY FROM CHILDREN.**

Do not remove the radiator plug when the engine is hot. The coolant is under pressure and could cause severe burns.

**HYDROGEN GAS AND BATTERY ELECTROLYTE****DANGER**

The battery electrolyte is a toxic, caustic substance containing sulphuric acid and thus able to cause severe burns in case of contact.

Always wear tight gloves and protective clothes when handling this fluid.

If the electrolyte gets in contact with the skin, carefully wash the parts of your body that get in contact with the fluid with abundant fresh water.

Always use a protection for your eyes since also a very small amount of the battery fluid can cause blindness. In the event of contact with your eyes, carefully wash them with water for fifteen minutes and then consult immediately an eye specialist.

Should you accidentally drink some fluid, drink abundant water or milk, then drink magnesia milk or vegetable oil and consult immediately a doctor. Battery releases explosive gases. Keep flames, sparks, cigarettes and any other heat source away from the battery. Make sure the room is well-aerated when servicing or recharging the battery.

**KEEP AWAY FROM CHILDREN.**

The battery fluid is corrosive

Do not pour it on the plastic parts.

Make sure that the electrolyte acid is suitable for the type of battery used.

**GENERAL PRECAUTIONS AND INFORMATION**

Follow these instructions closely when repairing, disassembling or reassembling the motorcycle or its components.

**DANGER**

Using bare flames is strictly forbidden when working on the motorcycle. Before servicing or inspecting the motorcycle: stop the engine and remove the key from the ignition switch; allow for the engine and exhaust system to cool down; where possible, lift the motorcycle using adequate equipment placed on firm and level ground. Be careful of any parts of the engine or exhaust system which may still be hot to the touch to avoid scalds or burns.

Never put any mechanical parts or other vehicle components in your mouth when you have both hands busy. None of the motorcycle components is edible. Some components are harmful to the human body or toxic.

Unless expressly specified otherwise, motorcycle assemblies are refitted or re-assembled by reversing the removal or dismantling procedure. Where a procedure is cross-referred to relevant sections in the manual, proceed sensibly to avoid disturbing any parts unless strictly necessary. Never attempt to polish matte-finished surfaces with lapping compounds.

Never use fuel instead of solvent to clean the motorcycle.

Do not clean any rubber or plastic parts or the seat with alcohol, petrol or solvents. Clean with water and neutral detergent.

Always disconnect the battery negative (-) lead before soldering any electrical components.

When two or more persons service the same motorcycle together, special care must be taken to avoid personal injury.

**BEFORE DISASSEMBLING ANY COMPONENTS**

- Clean off all dirt, mud, and dust and clear any foreign objects from the vehicle before disassembling any components.
- Use the model-specific special tools where specified.

**DISASSEMBLING THE COMPONENTS**

- Never use pliers or similar tools to slacken and/or tighten nuts and bolts. Always use a suitable spanner.
- Mark all connections (hoses, wiring, etc.) with their positions before disconnecting them. Identify each connection using a distinctive symbol or convention.
- Mark each part clearly to avoid confusion when refitting.
- Thoroughly clean and wash any components you have removed using a detergent with low flash point.
- Mated parts should always be refitted together. These parts will have seated themselves against one another in service as a result of normal wear and tear and should never be mixed up with other similar parts on refitting.
- Certain components are matched-pair parts and should always be replaced as a set.
- Keep the motorcycle and its components well away from heat sources.

**REASSEMBLING THE COMPONENTS****DANGER**

**Never reuse a circlip or snap ring. These parts must always be renewed once they have been disturbed. When fitting a new circlip or snap ring, take care to move the open ends apart just enough to allow fitment to the shaft.**

**Make a rule to check that a newly –fitted circlip or snap ring has located fully into its groove.**

**Never clean a bearing with compressed air.**

**NOTE** All bearings must rotate freely with no hardness or noise. Replace any bearings that do not meet these requirements.

- Use ORIGINAL **aprilia** SPARE PARTS only.
- Use the specified lubricants and consumables.
- Where possible, lubricate a part before assembly.
- When tightening nuts and bolts, start with the largest or innermost nut/bolt and observe a cross pattern. Tighten evenly in subsequent steps until achieving the specified torque.
- Replace any self-locking nuts, gaskets, seals, circlips or snap rings, O-rings, split pins, bolts and screws which have a damaged thread.
- Lubricate the bearings abundantly before assembly.
- Make a rule to check that all components you have fitted are correctly in place.
- After repairing the motorcycle and after each service inspection, perform the preliminary checks, and then operate the motorcycle in a private estate area or in a safe area away from traffic.
- Clean all joint surfaces, oil seal edges and gaskets before assembly. Apply a light coat of lithium grease along the edges of oil seals. Fit oil seals and bearings with the marking or serial number facing outwards (in view).

**ELECTRICAL CONNECTORS**

To disconnect the electrical connector, follow the procedures below. Failure to comply with these procedures may lead to irreparable damages to the connector and the wiring as well. If present, press the special safety hooks.

**WARNING**

**Do not pull cables to disconnect the two connectors.**

- Grasp the two connectors and disconnect them by pulling them in the two opposite directions.
- In case of dirt, rust, moisture, etc., thoroughly clean the inside of the connectors with compressed air.
- Make sure that the cables are correctly fitted inside the connectors terminals.

**NOTE** The two connectors have just one correct positioning. Make sure to position them in the right direction.

- Then fit the two connectors. Make sure they are correctly coupled (a click will be heard).

**TIGHTENING TORQUE SETTINGS****DANGER**

**Always remember that the tightening torque settings of all wheel, brake, wheel shaft and other suspension parts play a fundamental role to ensure vehicle safety. Make sure that these values are always within the specified limits.**

**Check fastening parts tightening torque settings at regular intervals. Upon reassembly, always use a torque wrench.**

**Failure to comply with these recommendations could lead to the loosening and detachment of one of these parts with a consequent locking of the wheel or other serious troubles affecting the vehicle maneuverability, and thus the risk of falls and serious injuries or death.**

### 1.3. DANGEROUS ELEMENTS

#### 1.3.1. WARNINGS

#### FUEL

**DANGER**

The fuel used to operate engines is highly flammable and becomes explosive under particular conditions. Refuelling and engine service should take place in a well-ventilated area with the engine stopped. Do not smoke when refuelling or in the proximity of sources of fuel vapours. Avoid contact with bare flames, sources of sparks or any other source which may ignite the fuel or lead to explosion.

Take care not to spill fuel out of the filler, or it may ignite when in contact with hot engine parts. In the event of accidental fuel spillage, make sure the affected area is fully dry before starting the engine. Fuel expands from heat and when left under direct sunlight.

Never fill the fuel tank up to the rim. Tighten the filler cap securely after each refuelling.

Avoid contact with skin. Do not inhale vapours. Do not swallow fuel. Do not transfer fuel between different containers using a hose.

**DO NOT RELEASE FUEL INTO THE ENVIRONMENT.**

**KEEP AWAY FROM CHILDREN.**

Use only premium grade unleaded petrol, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.).

#### LUBRICANTS

**DANGER**

A good lubrication ensures the vehicle safety.

Failure to keep the lubricants at the recommended level or the use of a non-suitable new and clean type of lubricant can lead to the engine or gearbox seizure, thus leading to serious accidents, personal injury or even death.

Gear oil may cause serious damage to the skin if handled daily and for long periods.

Wash your hands carefully after use.

Do not dispose of oil into the environment.

Take it to the filling station where you usually buy it or to an oil salvage center.

**WARNING**

When filling the vehicle with this oil, take care not to spill it out since it could damage the vehicle paintwork.

In case of contact with oil, the tyres surface will become very slippery, thus becoming a serious danger for your safety.

In case of leaks, do not use the vehicle. Check and trace the cause of leaks and proceed to repair.

#### ENGINE OIL

**DANGER**

Prolonged or repeated contact with engine oil may cause severe skin damage.

Wash your hands thoroughly after handling engine oil.

Do not release into the environment.

Dispose of engine oil through the nearest waste oil reclamation firm or through the supplier.

Wear latex gloves during servicing

#### FRONT FORK FLUID

**DANGER**

Front suspension response can be modified to a certain extent by changing damping settings and/or selecting a particular grade of oil. Standard oil grade is SAE 20 W. Different oil grades can be selected to obtain a particular suspension response. (Choose SAE 5W for a softer suspension, 20W for a stiffer suspension).

The two grades can also be mixed in varying solutions to obtain the desired response.

**BRAKE FLUID**

**NOTE** This vehicle is fitted with front and rear disc brakes. Each braking system is operated by an independent hydraulic circuit. The information provided below applies to both braking systems.

**DANGER**

Do not use the vehicle in case brakes are worn out or do not work properly! The brakes are the parts that most ensure your safety and for this reason they must always be perfectly working. Failure to comply with these recommendations will probably lead to a crash or an accident, with a consequent risk of personal injury or death.

A wet surface reduces brakes efficiency.

**DANGER**

In case of wet ground the braking distance will be doubled, since both brakes and tyres drives on the road surface are extremely reduced by the water present on the road surface.

Any water on brakes, after washing the vehicle or driving on a wet road surface or crossing puddles or gips, can wet brakes so as to greatly reduce their efficiency.

Failure to comply with these recommendations may lead to serious accidents, with a consequent risk of severe personal injuries or death.

Brakes are critical safety components. Do not ride the vehicle in case brakes are not working at their best.

Check for brakes proper operation before every trip.

Brake fluid is an irritant. Avoid contact with eyes or skin.

In the event of accidental contact, wash affected body parts thoroughly. In the event of accidental contact with eyes, contact an eye specialist or seek medical advice.

**DO NOT RELEASE BRAKE FLUID INTO THE ENVIRONMENT.KEEP AWAY FROM CHILDREN.**

When handling brake fluid, take care not to spill it onto plastic or paint-finished parts or they will damage.

**DANGER**

Do not use any brake fluids other than the specified type. Never mix different types of fluids to top up level, as this will damage the braking system.

Do not use brake fluid from containers which have been kept open or in storage for long periods.

Any sudden changes in play or hardness in the brake levers are warning signs of problems with the hydraulic circuits.

Ensure that the brake discs and brake linings have not become contaminated with oil or grease. This is particularly important after servicing or inspections.

Make sure the brake lines are not twisted or worn.

Prevent accidental ingress of water or dust into the circuit.

Wear latex gloves when servicing the hydraulic circuit.

**DISC BRAKES****DANGER**

The brakes are the parts that most ensure your safety and for this reason they must always be perfectly working; check them before every trip.

A dirty disc soils the pads.

Dirty pads must be replaced, while dirty discs must be cleaned with a high-quality degreaser.

Perform the maintenance operations with half the indicated frequency if the vehicle is used in rainy or dusty areas, on uneven surfaces or on racetracks.

When the disc pads wear out, the level of the fluid decreases to automatically compensate for their wear.

The front brake fluid reservoir is located on the right handlebar, near the front brake lever.

The rear brake fluid reservoir is located under the right fairing.

Do not use the vehicle if the braking system leaks fluid.



## COOLANT

**DANGER**

Coolant is toxic when ingested and is an irritant, contact with eyes or skin may cause irritation. In the event of contact with eyes, rinse repeatedly with abundant water and seek medical advice. In the event of ingestion, induce vomiting, rinse mouth and throat with abundant water and seek medical advice immediately.

**DO NOT RELEASE INTO THE ENVIRONMENT.  
KEEP AWAY FROM CHILDREN.**

**DANGER**

Take care not to spill coolant onto hot engine parts. It may ignite and produce invisible flames. Wear latex gloves when servicing.

**Do not ride when coolant is below the minimum level.**

Coolant mixture is a 50% solution of water and anti-freeze. This is the ideal solution for most operating temperatures and provides good corrosion protection.

This solution is also suited to the warm season, as it is less prone to evaporative loss and will reduce the need for top-ups.

In addition, less water evaporation means fewer minerals salts depositing in the radiator, which helps preserve the efficiency of the cooling system.

When temperature drops below zero degrees centigrade, check the cooling system frequently and add more anti-freeze (up to 60% maximum) to the solution.

Use distilled water in the coolant mixture. Tap water will damage the engine.

Refer to the chart given below and add water with the quantity of anti-freeze to obtain a solution with the desired freezing point:

Freezing point °C	Coolant % of volume
-20°	35
-30°	45
-40°	55

**NOTE** Coolants have different specifications. The protection degree is written on the label.

**WARNING**

Use nitrate-free coolant only, with a protection until at least -35°C.

## DRIVE CHAIN

Check drive chain operation, slack and lubrication at regular intervals.

The vehicle is equipped with an endless chain with a joint link.

**WARNING**

If too slack, the chain can come off the front or rear sprockets thus leading to serious accidents and damage to the vehicle, with consequent serious personal injury or death.

Do not use the vehicle if the chain tension has not been correctly adjusted.

To check chain, take it with your hand where it turns on the rear sprocket and pull it as to separate it from the crown itself.

If you can move the chain apart of the front sprocket for more than 3 mm (0.125 in), change chain, crown and pinion.

**DANGER**

If not properly maintained, chain can early wear out and lead to the damage of both crown and pinion.

Perform chain maintenance operations more frequently if the vehicle is used on rainy or dusty areas.

## TYRES

**WARNING**

If tyres are excessively inflated, the vehicle will be hard and uneasy to ride, thus making you feel not at your ease.

In addition the roadworthiness, mainly on wet surfaces and during cornering, will be impaired.

Flat tyres (insufficient pressure) can slip on the rim and make you lose the control of the vehicle.

In this case too, both vehicle roadworthiness, maneuverability and brake efficiency will be impaired.

Tyres changing, repair, maintenance and balancing must be carried out by specialized technicians using suitable equipment.

When new, tyres can have a thin slippery protective coating. Drive carefully for the first kilometers (miles). Never use rubber treating substances on tyres.

In particular, avoid contact with fluid fuels, leading to a rapid wear.

In case of contact with oil or fuel, do not clean but change tyres.

**DANGER**

Some of the factory-assembled tyres of this vehicle are provided with wear indicators.

There are several kinds of wear indicators.

For more information on how to check the wear, contact your Dealer.

Visually check if the tyres are worn and in this case have them changed.

If a tyre deflates while driving, stop immediately.

Avoid hard brakings or moves and do not close throttles too abruptly.

Slowly close throttle grip, move to the edge of the road and make use of the engine brake to slow down until coming to a halt.

Failure to comply with these recommendations can lead to serious accidents and consequent personal injuries or death.

Do not install tyres with air tube on rims for tubeless tyres and viceversa.

## 1.4. RUNNING-IN

### 1.4.1. RUNNING-IN RECOMMENDATIONS

The running-in of the engine is essential to ensure its duration and correct functioning.

If possible, drive on hilly roads and/or roads with many bends, so that the engine, the suspensions and the brakes undergo a more effective running-in.

During running-in, change speed.

In this way the components are first "loaded" and then "relieved" and the engine parts can thus cool down.

Even if it is important to stress the engine components during running-in, take care not to exceed.



#### **WARNING**

**Only after the first 500 km (312 mi) of running-in you can expect the best performance levels from the vehicle.**

Keep to the following indications:

- Do not open the throttle completely if the speed is low, both during and after the running-in.
- During the first 100 km (62 mi) pull the brakes with caution, avoiding sharp and prolonged brakings. This ensures a correct bedding-in of the pads on the brake disc.



#### **WARNING**

**After the first 1000 km (621 mi), Dealer carry out the checks indicated in the column "After running-in", see 2.1.2 (REGULAR SERVICE INTERVALS CHART), in order to avoid hurting yourself or other people and/or damaging the vehicle.**

- During the first 500 km (312 mi) do not exceed 80% of vehicle max. allowed speed.
- Avoid keeping a constant speed for a long time.

After the first 1000 km (621 mi), increase speed progressively until reaching vehicle max. performance levels.

## 1.5. VEHICLE IDENTIFICATION

### 1.5.1. POSITION OF THE SERIAL NUMBERS

These numbers are necessary for the registration of the vehicle.

**IMPORTANT** Do not alter the identification numbers if you do not want to incur severe penal and administrative sanctions; in particular, altering the frame number voids the warranty.

#### FRAME NUMBER

The frame number is stamped on the central tube of the frame. To be able to read it, it is necessary to remove the cover (1).



#### ENGINE NUMBER

The engine number is stamped near the lower support of the rear shock absorber.



## 1.6. USING TOOLS AND SPARE PARTS

### 1.6.1. SPARE PARTS

Use original aprilia spare parts only to replace original components.  
Original aprilia spare parts are high-quality components designed and built expressly for aprilia motorcycles.

**CAUTION**

Using any parts **OTHER THAN** original aprilia parts may lead to loss of performance and damage.

## 1.7. SPECIFICATIONS

## 1.7.1. SPECIFICATIONS

Description	250	300
<b>DIMENSIONS</b>		
Max. length	1865 mm	
Max. length (rear mudguard extension included )	1955 mm	
Max. width	770 mm	
Overall height (front part of the fairing included)	1410 mm	
Seat height	780 mm	
Distance between centres	1325 mm	
Min. ground clearance	135 mm	
Weight ready for starting	150 kg	
<b>ENGINE</b>		
Type	One-cylinder, 4-stroke engine with overhead camshaft	
Number of valves	2	
Number of cylinders	1	
Total displacement	249,78 cm <sup>3</sup>	264,47 cm <sup>3</sup>
Bore/stroke	69,0 mm / 66,8 mm	71,0 mm / 68,8 mm
Compression ratio	10 ± 0,5 :1	
Starting	Electric	
Engine idling rpm	1500 ± 100 rpm	1450 ± 100 rpm
Clutch	Automatic dry centrifugal	
Clutch gear	Automatic	
Lubrication system	Wet sump lubrication, forced circulation with mechanical pump; oil level check by means of a graduated dipstick	
Cooling system	Liquid cooling, forced circulation with centrifugal pump	
<b>TRASMISSION</b>		
Speed change gear	Automatic continuous	
Primary	V-belt	
Secondary	Gear	
Total engine / wheel ratio	Minimum 15,808 Maximum 5,539	
<b>CAPACITA'</b>		
Fuel (reserve included)	9,5 l	
Fuel reserve	1,5 l	
Engine oil		
- engine oil change only	1200 cm <sup>3</sup>	
- Engine oil and filter change	—	
- Change for engine overhaul	1400 cm <sup>3</sup>	
Transmission oil	250 cm	
Coolant (50% water + 50% antifreeze with ethylene glycol)	1,3 l	
Front fork oil	148 cm <sup>3</sup> (for each rod)	
Seats	2	
Vehicle max. load (rider + luggage)	105 kg	
Vehicle max. load (rider + passenger + luggage)	200 kg	
<b>CARBURENTTOR</b>		
Model	TEI KEI 5 GM1A	TK 5SE
- alternative	—	
Choke tube	equivalent diameter 28 mm	28 mm
Choke tube (Mikuni)	—	
Choke tube (Keihin)	—	
<b>FUEL SUPPLY</b>		
Type	Vacuum pump	
Fuel	Premium grade unleaded petrol, min. O.N. 91 (N.O.R.M.) and 81 (N.O.M.M.).	
<b>FRAME</b>		
Type	One beam at the front, split in two overlapping cradles at the rear, in steel tubes with high yield point	
Steering inclination angle	28°	
Fore stroke	100 mm	

SUSPENSIONS		
Front	Telescopic hydraulic fork	
Stroke	90 mm	
Rear	Two hydraulic shock absorbers with compression and rebound damping, spring preload adjustment	
Wheel stroke	90 mm	
BRAKES		
Front	Disc brake - Ø 220 mm - with hydraulic transmission	
Rear combined	Disc brake - Ø 220 mm - with hydraulic transmission	
WHEEL RIMS		
Type	in light alloy	
Front	3,00 x 12"	
Rear	3,50 x 12"	
PNEUMATICI		
Type	TUBELESS	
Front	130 / 70 - 12" 56 P	
- alternative	130 / 70 - 12" 56 P	
Rear	130 / 70 - 12" 62 L	
- alternative	130 / 70 - 12" 62 P	
Standard inflation pressure		
Front	190 kPa (1,9 bar)	
Rear	210 kPa (2,1 bar)	
Inflation pressure with passenger		
Front	210 kPa (2,1 bar)	
Rear	240 kPa (2,4 bar)	
IGNITION		
Type	C.D.I. / inductive	4 AS-AP
Spark advance	Minimum 10° a 1500 rpm Maximum 32° a 5000 rpm	Minimum 2° a 1500 rpm Maximum 22° a 8250 rpm
SPARK PLUG		
Standard	NGK - DR8EA	
Spark plug gap	0,6 - 0,7 mm	
ELECTRICAL SYSTEM		
Battery	12 V - 12Ah	
Fuses	20 - 15 - 7,5A	
Generator (with permanent magnet)	12V - 200 W	
BULBS		
Low / high beam	12 V - 35 / 35 W	
Front parking light	12 V - 3 W	
Direction indicators	12 V - 10 W	
Rear parking light / stop light	12 V - 5/21 W	
Number plate light	12 V - 5 W	
Dashboard lights	12 V - 1,2 W	
WARNING LIGHTS		
Direction indicators	12 V - 2 W	
Engine oil change	12 V - 2 W	
Low beam	12 V - 2 W	
High beam	12 V - 2 W	
Fuel reserve	12 V - 2 W	

### 1.7.2. HOW TO APPLY THE DECALS

Whenever you remove any body parts:



#### CAUTION

Handle the plastic and painted components with care to avoid scraping or damaging them.

Proceed with care.

Do not damage the snap-on tabs and matching recesses.

Strictly follow the instructions below

We recommend using:

- a medium spatula (1);

**IMPORTANT:** Soft spatulas – such as those commonly used on windscreen wipers - will leave excess water under the decal.

- a sponge or spray dispenser (2) and water.

**IMPORTANT:** Add water with 1-3% detergent and shake to obtain frothing.

Apply the decals as follows:

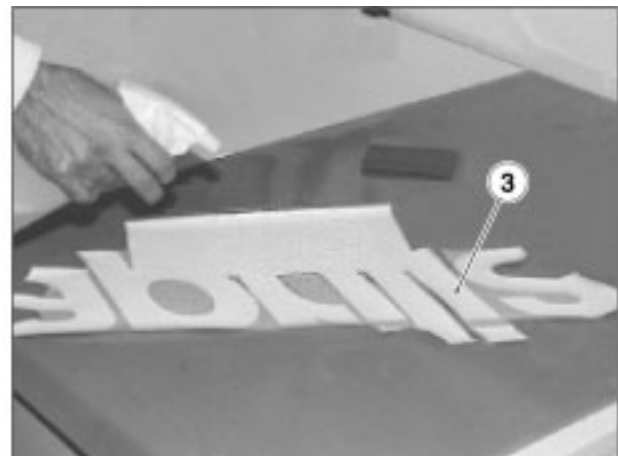
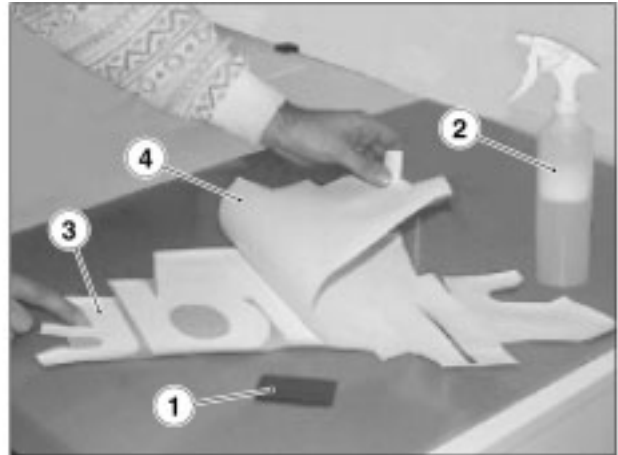
- Place a decal (3) on a bench with the adhesive face up.
- Keep the decal well stretched on the bench and remove the protective film (4).

**IMPORTANT:** A spray dispenser (2) will work best.

If you are using a sponge, dab the decal surface lightly or the adhesive will deteriorate.

- Wet the adhesive face with soap water.
- Place the decal (3) in the proper position on the part you wish to decorate.

**IMPORTANT:** Always apply the spatula to the decal centre and move it towards the edges with regular movements.

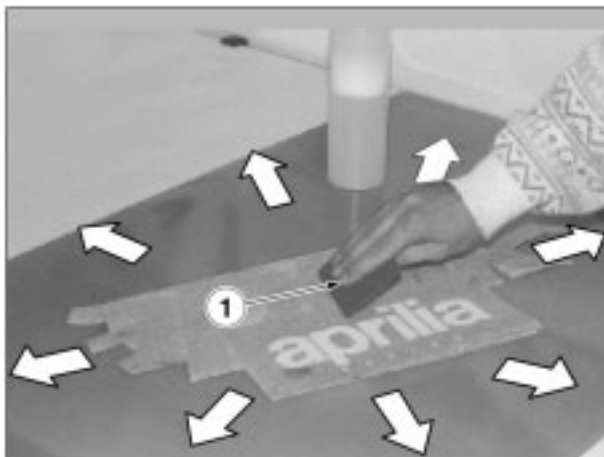




- Rub the spatula (1) across the decal surface pressing moderately until removing excess soap and water from under the decal.

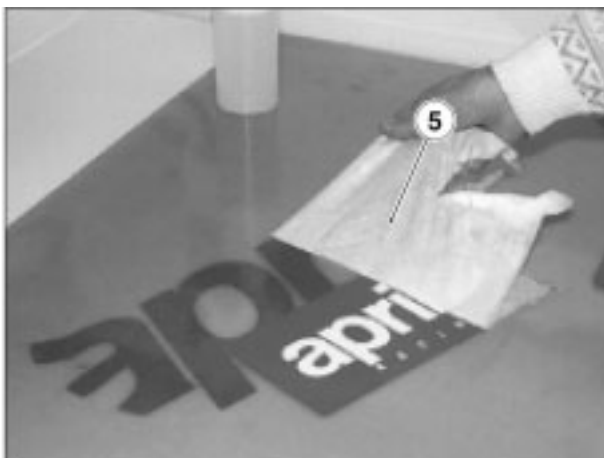
**IMPORTANT:** Take care not to lift the decal corners and edges in the process.

- Dry up the decal with an absorbent cloth. Apply cloth in the centre and move outwards.
- Rub the decal using the spatula with firm, regular strokes. Apply the spatula in the centre and move outwards. Take special care with corners and edges to ensure proper adhesion across the whole surface.



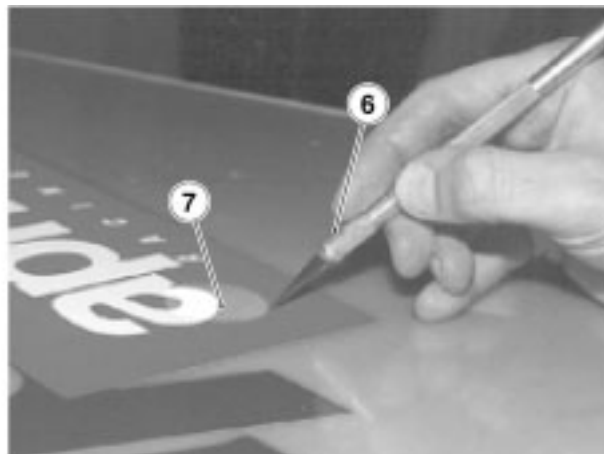
**IMPORTANT:** Where decals come with application tape (5), remove tape 20-30 minutes after decal application.

- Peel off the application tape (5) from decal surface.
- Pass the spatula across the decal again – particularly over corners and edges – to ensure proper adhesion.



**IMPORTANT:** Decals applied using water will take about 48 hours to stick to part permanently.



























- Once you have removed the application tape, check for any air trapped underneath the decal.
- If there are any air bubbles:
- Prick a hole on the edge (7) of the air bubble using a pin or a cutter (6).
  - Apply the spatula (1) at the opposite end and move it across the bubble to squeeze air out.



The application tape serves to facilitate applying trademarks and letters by keeping them aligned as well as giving more consistency to the adhesive during application.

## 1.8. PRODUCTS

## 1.8.1. TABLE OF LUBRICANTS

LUBRICANT	PRODUCT
Engine oil	RECOMMENDED:  SUPERBIKE 4, SAE 5W – 40 or  4T FORMULA RACING, SAE 5W - 40. Alternatively, use brand name oil complying with or exceeding the CCMC G-4, A.P.I. SG specifications.
Transmission oil	RECOMMENDED:  F.C., SAE 75W - 90 or  GEAR SYNTH, SAE 75W - 90. Alternatively, use brand name oil complying with or exceeding the API GL-4 specifications
Front fork oil	RECOMMENDED:  F.A. 5W or  F.A. 20W, alternatively  FORK 5W or  FORK 20W. When you wish to obtain an intermediate response between those offered by  F.A. 5W,  F.A. 20W or  FORK 5W and  FORK 20W oils, you may mix the different products as follows: SAE 10W =  F.A. 5W 67% volume, +  F.A. 20W 33% volume.  FORK 5W 67% volume +  FORK 20W 33% volume. SAE 15W =  F.A. 5W 33% volume, +  F.A. 20W 67% volume.  FORK 5W 33% volume +  FORK 20W 67% volume.
Bearings and other lubrication points	RECOMMENDED:  AUTOGREASE MP.+  GREASE SM2. As an alternative to recommended grease, use top brand rolling bearing grease that will resist a temperature range of -30°C...+140°C, with dropping point 150°C...230°C, high corrosion protection, good resistance to water and oxidation.
Battery poles	use neutral grease or vaseline.
Brake fluid	RECOMMENDED:  F.F DOT 4 (DOT 5 compatible) +  BRAKE 5.1 DOT 4 (DOT 5 compatible). <b>IMPORTANT:</b> do not mix different makes or types of oil without having checked their compatibility. As an alternative, use fluids with performance equal to or better than the synthetic fluids specifications SAE J1703, NHTSA 116 DOT 4, ISO 4925.
Engine coolant	RECOMMENDED:  ECOBLU – 40° C +  COOL. <b>IMPORTANT</b> Use nitrite-free coolant only, with a protection until at least – 35° C.






1.8.2. PRODUCT APPLICATIONS

Use only the products specified below for motorcycle maintenance.

These products have demonstrated suitability for all usage conditions specified by the manufacturer after long-time testing.

**IMPORTANT:** The products for which a part number is given are available at request, (SEE TABLE).

PRODUCT FEATURES

Description	Use
Molykote 111 / N. ROTAX 897 161 	<ul style="list-style-type: none"> <li>- Space between the two water pump oil seals.</li> <li>- Starter transmission gears.</li> </ul>
LOCTITE ANTI-SEIZE 76710 N. ROTAX 297 431 	<ul style="list-style-type: none"> <li>- Engine shaft ball bearing seats.</li> <li>- Engine countershaft ball bearing seats.</li> <li>- Gearshaft ball bearing seats.</li> </ul>
Lubricate	<ul style="list-style-type: none"> <li>- All ball bearings, sintered disks, gear sets, cylinder walls, unless otherwise specified.</li> </ul>
Grease	<ul style="list-style-type: none"> <li>- Oil seal edges, unless otherwise specified.</li> </ul>
Transmission oil	<ul style="list-style-type: none"> <li>- Engine oil SAE 30, 0.6 l</li> </ul>
Engine oil	<ul style="list-style-type: none"> <li>- Super 2-stroke oil</li> </ul>
LOCTITE 221 / N. ROTAX 899 785 	<ul style="list-style-type: none"> <li>- Flush-head countershaft bearing lockring screw.</li> <li>- Flush-head starter pedal bearing lockring screw (RX only).</li> <li>- Starter gear retainer hex bolt</li> <li>- Electric starter locking hex bolts.</li> <li>- Oil pump locking hex bolts.</li> <li>- All Taptite screws for reassembly of the clutch cover and casing.</li> </ul>
LOCTITE 648 / N. ROTAX 899 788 	<ul style="list-style-type: none"> <li>- Hex nut for locking the flywheel to the engine shaft.</li> <li>- Casing water hose.</li> <li>- Casing electric starter hole cover (RX only)</li> </ul>
Silastic 732 RTV / N. ROTAX 297386 	<ul style="list-style-type: none"> <li>- Idler indicator contact screw.</li> <li>- Ignition cable grommet.</li> </ul>

## 1.9. TIGHTENING

### 1.9.1. FASTENERS

Check and tighten as required after the first 1000 km (621 mi) and every 6000 km (3728 mi) or 12 months afterwards.



#### WARNING

The fasteners reported in the chart must be tightened to the specified torque using a torque wrench and applying LOCTITE® where specified. Safety-related items ( ) are in brackets.

#### NOTE:

L243= secure with Loctite® 243

lub = lubricate

#### CHART

Description	Size	Torque (Nm)	Notes
<b>FRAME</b>			
Grab rail – frame	M8	20	
<b>ENGINE LINK ROD</b>			
Engne link rod - frame	M12	60	
Tie rods - frame	M10	50	
<b>SIDE STAND</b>			
Side stand - frame	M10	38	
<b>FRONT SUSPENSION</b>			
Fork – frame	M36	110	
<b>REAR SUSPENSION</b>			
Shock absorber – frame	M8	22	
Shock absorber - engine	M8	20	
<b>ENGINE</b>			
Crankcase – engine cover	M6	7	
Converter air scoop – engine	M6	7	
Engine pivot	M10	32	
<b>FILTER BOX</b>			
Filter box – engine	M6	7	
<b>EXHAUST SYSTEM</b>			
Muffler – cylinder	M8	20	
Muffler – calliper shock anbsorber muffler mount	M10	42	
Muffler guard – engine	M6	9	
Calliper shock anbsorber muffler mount – engine	M8	23	
<b>RADIATOR</b>			
Electric fan mount – radiator	M5	3	
Starter and electric fan thermal switches	M18	23	
<b>FRONT WHEEL</b>			
Front wheel – fork	M12	50	
<b>REAR WHEEL</b>			
Rear wheel – engine – calliper shock anbsorber muffler mount	M14	130	
<b>FRONT BRAKE</b>			
Front brake callipers – fork	M8	28	
Brake master cylinder – handlebars	M6	9	
Brake line – master cylinder – callipers	M10	18	
<b>REAR BRAKE</b>			
Rear brake callipers – calliper shock anbsorber muffler mount	M8	28	
Brake master cylinder – handlebars	M6	9	
Brake line – master cylinder – callipers	M10	18	

HANDLEBARS AND CONTROLS			
Handlebars –fork (safety)	M8	15	
Handlebars – fork (clamp)	M10	40	
Vibration-damping weight - handlebars	M6	9	
Mirrors – handlebars	M8	20	
ELECTRIC SYSTEM			
Coil – frame	M5	5	
Control unit – helmet compartment	M6	6	
Horn – frame	M6	9	
Voltage adjuster – helmet compartment	M6	6	
FUEL TANK			
Fuel tank – frame	M6	9	
Fuel pump – fuel pump mount	M6	7	
BODY			
Body fastener	M6	5	
Body fastener	M5	4	
Body fastener	Self-tapping	3	
LOCKS			
Seat lock – helmet compartment	M6	7	
Ignition switch – frame	M6	10	
Seat release – helmet compartment	M6	7	

**NB: All indicated torques are nominal values, with a tolerance of +/- 5%.**

Screw or bolt thread	Spanner	Tightening torque	
		Nm	kgm
M 4	7	3	0,3
M 5	8	6	0,6
M 6	10	10	1,0
M 8	12	25	2,5
M 10	14	50	5,0
M 12	17	80	8,0
M 14	19	135	13,5
M 16	22	210	21,0

PERIODIC MAINTENANCE

2

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## 2.1. PERIODIC MAINTENANCE

### 2.1.1. INTRODUCTION

In order to preserve the motorcycle in sleek running order, aprilia recommends that you strictly observe the periodic maintenance intervals recommended for the different components.

Outlined in this section are the recommended procedures for the periodic maintenance of the key components of the motorcycle.



#### **DANGER**

**Before beginning any service operations or inspection of the vehicle, switch off the engine and remove the key, wait until the engine and the exhaust system have cooled down and, if possible, lift the vehicles with the proper equipment onto firm and flat ground. Pay particular attention to any parts of the engine or exhaust system that may still be hot to the touch to avoid burns. All component parts of the vehicle are inedible. Do not bite, suck, chew or swallow any vehicle parts. If not expressly indicated otherwise, for the reassembly of the units repeat the disassembly operations in reverse order.**



2.1.2. PERIODIC MAINTENANCE CHART

Component	After running-in [1000 km (625 mi)]	Every 6000 km (3750 mi) or 12 months	Every 12000 km (7500 mi) or 24 months
Rear shock absorber	-	-	1
Transmission cables and controls	1	-	-
Accelerator cable (adjustment)	-	1	-
Variator belt	1	1	-
Steering tube bearings and steering slack	1	1	-
Wheel bearings	-	1	-
Brake discs	1	1	-
Engine oil filter	-	1	-
General running of the vehicle	1	1	-
Clutch shoes	2	every 3000 km (1875 mi): 2	
Valve clearance	1	1	-
Braking systems	-	1	-
Cooling system	-	-	4
Stop light switches	1	1	-
Brake fluid	1	1	-
Coolant	-	1	-
Fork oil and oil seal	every 2 years: 3		
Engine oil	every 2 years: 3		
Transmission oil	every 12000 km (7500 mi): 1		
Center stand wheel	3	every 1000 km (625 mi): 1 / every 3000 km (1875 mi): 3	
Speed change gear rollers and speed change gear plastic guides	3	1	3
Wheels/tyres and inflation pressure	1	1	-
Nut, bolt, screw tightening	-	1	-
Fuel pipe	1	1	-
Clutch wear	1	1	-
Speed change gear (front pulleys and rear pulleys)	-	1	every 4 years: 3
Rear shock absorber	-	1	-
Transmission cables and controls	-	2	1
Battery - Terminal fastening - Electrolyte level	1	1	-
Spark plug	1	1	3
Carburettor - idling	4	1	-
Air cleaner	-	2	-
Speed change gear filter	-	2	-
Accelerator operation	1	1	-
Brake locking operation	1	1	-
Light system	1	1	-
Stop light switches	-	1	-
Brake fluid	1	1	-
Coolant		every 2000 km (1250 mi): 1	
Engine oil	every 1000 km (625 mi): 1		
Headlight beam direction - operation	-	1	-
Wheels/tyres and inflation pressure	every month: 1		
Suspensions	1	1	-
Engine oil change warning light	at every start: 1		
Front and rear brake pad wear	1	every 2000 km (1250 mi): 1	

1 = inspect and clean, set or adjust, lubricate or replace as required; 2 = clean; 3 = replace; 4 = set or adjust.  
Service the motorcycle more frequently when you ride in the rain, on dusty or bumpy roads, or in competition trials.

( ) = THESE OPERATIONS CAN BE CARRIED OUT BY THE OWNER  
 (\*) = For inspection, refer to INSTRUMENTS AND INDICATORS TABLE  
 (\*\*) = Check every two weeks or at the indicated interval.

## 2.2. BATTERY

### 2.2.1. BATTERY

There are two types of batteries available in the market:

- batteries that require maintenance, fitted with cell plugs;
- maintenance-free batteries, which have no cell plugs as they do not need inspecting or topping-up.

After the first 621 mi (1000 km) and every 3728 mi (6000 km) or 12 months thereafter, check the electrolyte level and the tightness of the battery terminal clamps.



#### **DANGER**

The battery electrolyte is a toxic, caustic substance containing sulphuric acid and thus able to cause severe burns in case of contact.

Always wear protective clothes, a mask and/or safety goggles when handling this fluid.

If any battery fluid gets on your skin, rinse the affected area with abundant fresh water.

If battery fluid is spilled into your eyes, flush with abundant water for fifteen minutes and contact an eye specialist immediately.

If battery fluid is swallowed accidentally, drink abundant water or milk. Seek medical attention immediately and keep drinking milk of magnesia or vegetable oil in the meantime.

The battery gives off explosive gases. Keep the battery well away from any sources of ignition, such as flames, sparks, or any heat sources.

Charge or use the battery in a well-ventilated place. Do not inhale the gases produced by the battery under charging.

**KEEP AWAY FROM CHILDREN**

Take care not to tilt the vehicle too far as the battery fluid may spill out.



#### **WARNING**

Never invert the connection of the battery cables.

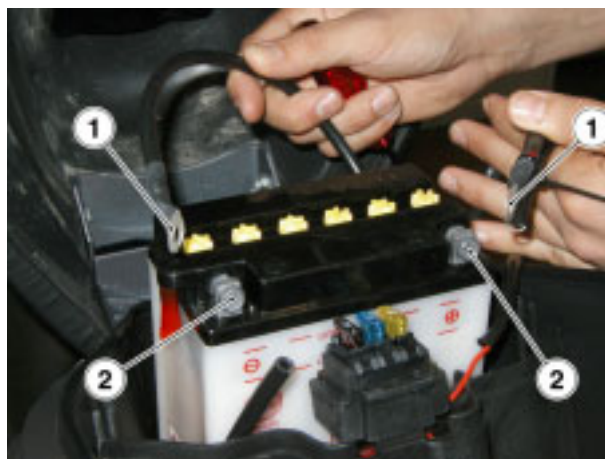
Set the ignition switch to "⊗" before connecting or disconnecting the battery.

Connect first the positive cable (+) and then the negative cable (-).

Disconnect in the reverse order.

**CHECKING AND CLEANING THE TERMINALS AND CLAMPS**

- Make sure that the ignition switch is set to "⊗".
- Raise the seat.
- Remove the battery cover.
- Loosen and remove the two screws on battery cables.



- Make sure that the cable terminals (1) and the battery terminals (2) are:
  - in good conditions (and not corroded or covered with deposits);
  - covered with neutral grease or vaseline.

If necessary, proceed as follows:

- Disconnect the negative (-) and positive (+) leads in that order. Clean off corrosion deposits using a wire brush.
- Reconnect the positive (+) and negative (-) leads in the order.
- Cover the terminals of the cables and of the battery with neutral grease or vaseline.

**CHECKING THE ELECTROLYTE LEVEL**

To check the electrolyte level:

- Place the motorcycle on the centre stand.
- Raise the seat.
- Remove the battery cover.
- Loosen and remove the two screws on battery cables.



- Check that the fluid level is between the **MIN** and **MAX** marks printed on the side of the battery.

If not:

- Remove the battery, see 7.2.1 (REMOVING THE BATTERY).
- Remove the cell plugs.

**WARNING**

**Use only distilled water to top up the battery level. Never exceed the MAX mark, inasmuch as the level increases during recharging.**

- Top up with distilled water.

## RECHARGING THE BATTERY

**IMPORTANT** You can tell that the battery is nearly flat when you hear a rattling sound from the starter relay when pressing the starter button "Ⓜ".

**IMPORTANT** Do not remove the battery plugs or the battery may damage.

- Remove the battery, see 7.2.1 (REMOVING THE BATTERY).
- Remove the cell plugs.
- Check the battery fluid level.
- Connect the battery to a battery charger.
- We recommend using a battery charger with amperage rating 1/10 that of the battery itself.
- After the battery is fully charged, check the fluid level and top up with distilled water if necessary.
- Refit the cell plugs.



### WARNING

Reassemble the battery only 5/10 minutes after disconnecting the recharge apparatus, since the battery continues to produce gas for a short lapse of time.

## LONG INACTIVITY



### WARNING

If the vehicle remains unused for more than twenty days, disconnect the 20 fuses, in order to avoid the deterioration of the battery caused by the current consumption due to the multi-function computer.

When the 20-A fuses are removed, the digital clock and red line setting will be reset to zero.

- If the vehicle remains unused for more than fifteen days, it is necessary to recharge the battery, in order to prevent its sulphation.
- Remove the battery, see 7.2.1 (REMOVING THE BATTERY) and store it in a cool, dry place.
- It is important to check the charge periodically (about once a month), during the winter or when the vehicle remains unused, in order to prevent the deterioration of the battery.
- Recharge it completely with a normal charger.

**IMPORTANT** If the battery remains on the vehicle, disconnect the cables from the terminals.

## 2.3. SPARK PLUG

### 2.3.1. SPARK PLUG

Check the spark plug after the first 1,000 km (621 mi), and then every 6,000 km (3,728 m). Change it every 1,2000 km (7,456 mi).

- Check the spark plug regularly, remove carbon deposits and replace if necessary.

To reach the spark plugs:



#### **DANGER**

Allow the engine to cool down to ambient temperature.

- Remove right and left inspection covers, see 7.1.4 (REMOVING RIGHT AND LEFT INSPECTION COVERS).

Removal and cleaning:



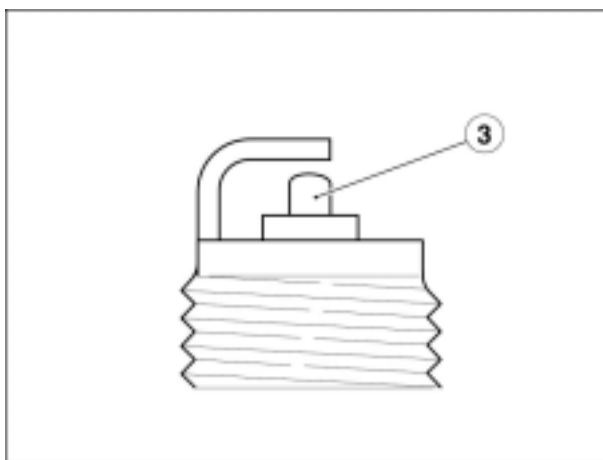
#### **DANGER**

**Never remove a spark plug cap while the engine is running. Shock hazard: the ignition system produces high voltages.**

- Remove the cap (1) of the spark plug (2).
- Remove any trace of dirt from the spark plug base.
- Introduce the special spanner provided in the tool kit on the spark plug (2).



- Unscrew the spark plug (2) and extract it from its seat, taking care to prevent dust or other substances from getting inside the cylinder.
- Make sure that there are neither carbon deposits, nor corrosion marks on the electrode and on the spark plug's ceramics; if necessary, clean with a plug cleaner or wire brush.
- If the spark plug (2) insulating material is cracked, if the electrodes are corroded, with excessive deposits or the tip of the central electrode (3) is rounded, it must be changed.



#### **WARNING**

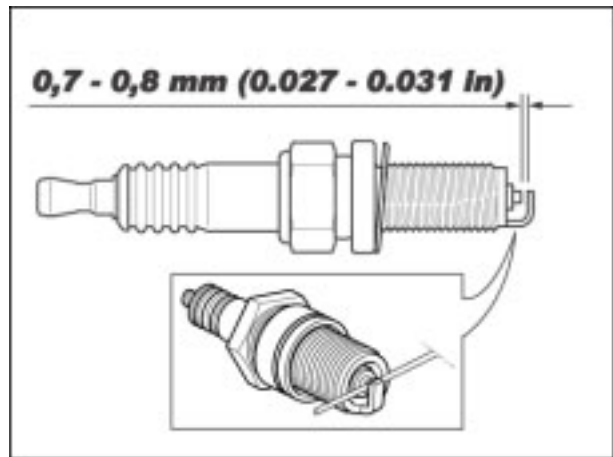
**When changing the spark plug, check the thread pitch and length.**

**If the threaded part is too short, the carbon deposits will accumulate on the thread seat, and therefore the engine may be damaged during the installation of the right spark plug.**

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

**To check the spark plug gap, use a wire thickness gauge to avoid damaging the platinum covering.**

- Check the electrode gap with a wire feeler gauge.
- Electrode gap should be 0.7 – 0.8 mm (0.027 – 0.031 in). If it needs adjusting, bend the earth electrode carefully.
- Make sure the washer is in good condition. Fit the washer and screw the spark plug finger-tight to avoid damaging the thread.
- Tighten the spark plug with the spanner you will find in the tool kit, giving it half a turn to compress the washer.

**WARNING**

The spark plug must be well tightened, otherwise the engine may overheat and be seriously damaged.

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

- Position the spark plug cap (1) properly, so that it does not come off due to the vibrations of the engine.

**DANGER**

Ensure the spark plug cap (1) is properly in place on the spark plug (2).



## 2.4. AIR CLEANERS

### 2.4.1. AIR CLEANER

Clean the air cleaner every 6,000 km (3,728 mi) or 12 months, or more frequently if the vehicle is used on dusty or wet roads.

- It is possible to clean the air cleaner partially after using the vehicle on this kind of roads.

### LEANING

- Remove the air cleaner, see 4.2.1 (REMOVING THE AIR CLEANER).
- Wash the filter element with clean, non-flammable or high flashpoint solvent, and dry it carefully.
- Apply a film of filter oil or dense oil (SAE 80W – 90), then wring out excess oil.



#### CAUTION

**When cleaning the filtering element, make sure that there are no tears.**

**Otherwise, change the filtering element.**

**IMPORTANT** *The filtering element must be well impregnated but not dripping with oil.*

- Clean the exterior of the air cleaner with a clean cloth.
- Clean the interior of the cleaner housing with a clean cloth.
- Clean the intake ducts.



### 2.4.2. DRIVING BELT CASING AIR CLEANER

**WARNING**

Do not use petrol or inflammable solvents to wash the air cleaner, in order to avoid fires or explosions.

Check the conditions of the belt casing air cleaner and clean it every 6000 km.

If the vehicle is used on dusty or wet roads, the cleaning operations and any replacement should be carried out more frequently.



To remove the filter, proceed as follows:

- Position the vehicle on the stand.
- Unscrew and remove the three screws (1).
- Remove the filter cover (2) and the filter (3).
- To clean the filtering element use clean, non-inflammable solvents or solvents with high volatility point, then let it dry thoroughly.

**WARNING**

DO NOT OIL THE FILTERING ELEMENT, since the oil may penetrate the belt casing and damage the belt or make it slip.





## 2.5. COOLANT

### 2.5.1. COOLANT

#### CHECKING AND TOPPING UP COOLANT LEVEL

- Check coolant level before each ride. Change coolant every 2 years.



#### WARNING

**Check and top up coolant level when the engine is cold.**

- The engine should be off and completely cold.

**IMPORTANT** Place the motorcycle on firm and level ground.

- Position the vehicle on the stand.
- Remove front cover, see 7.1.9 (REMOVING THE FRONT COVER).
- Check that the coolant level in the expansion (2) reservoir is between the MAX and MIN marks (see figure).

If not, proceed as follows:

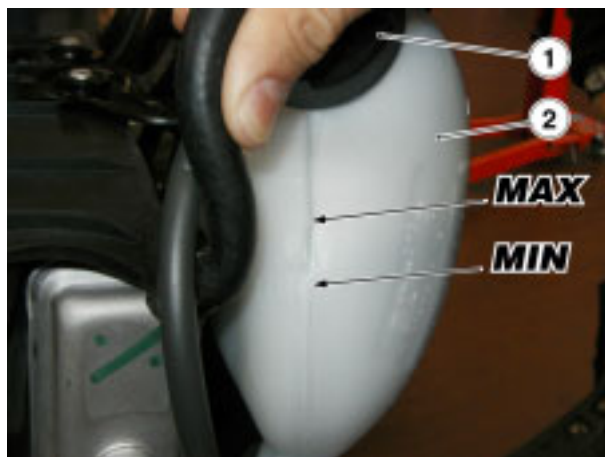
- Release and remove the filler cap (1).



#### WARNING

**Coolant is toxic when ingested and is an irritant, contact with eyes or skin may cause irritation.**

**Do not put your fingers or any tools into the filler opening to check coolant level.**



#### CAUTION

**Do not add any additives or other products. If you use a funnel or other similar items, make sure that they are perfectly clean.**

- Add coolant mixture until the level reaches just below the MAX mark.
- Never overfill (top up beyond the MAX mark), or coolant will leak out when the engine is running.
- Refit the filler cap (1).
- Refit front cover, see 7.1.9 (REMOVING THE FRONT COVER).



#### CAUTION

**In the event the motorcycle is using up exceeding coolant or the expansion (9) reservoir is empty, check the circuit for leaks.**

## CHANGING THE COOLANT

**CAUTION**

**Stop the engine and wait until the engine and the exhaust system have cooled down. DO NOT DISPOSE OF COOLANT IN THE ENVIRONMENT**

- Position the vehicle on the stand.
- Remove the front cover, see 7.1.9 (REMOVING THE FRONT COVER).

**CAUTION**

**Do not remove the expansion tank cap when the engine is hot, since the coolant is under pressure and its temperature is high. If it gets in contact with the skin or with clothes, it may cause severe burns and/or damages.**

- Unscrew and remove the filling cap (1) from the expansion tank (2).
- Put a container with at least 1500 cm<sup>3</sup> capacity under the base, in correspondence with the drain screw (3).
- Unscrew and remove the drain screw (3).
- Drain the coolant and let it drip into the container, then put it in a container for the collection of fluids.
- Screw and tighten the drain screw (3). Put 1200 cm<sup>3</sup> of coolant in the expansion tank (2).
- Top up until the coolant reaches the "MAX" level approximately. Do not exceed this level, otherwise the coolant will overflow while the engine is running.



- Put back the filling cap (1).
- Start the vehicle and allow engine to heat up
- Check coolant level and, top up, if necessary.
- Refit front cover, see 7.1.9 (REMOVING THE FRONT COVER).

## 2.6. BRAKES

### 2.6.1. BRAKES

**IMPORTANT** The brakes are the parts that most ensure your safety and for this reason they must always be perfectly working.

This vehicle is provided with front and rear hydraulic disc brakes. When the disc pads wear out, the level of the fluid decreases to automatically compensate for their wear. The brake fluid tanks are positioned under the handlebar cover, near the brake lever couplings.

Periodically check the brake fluid level in the tanks, see 2.1.2 (PERIODIC MAINTENANCE CHART).



#### CAUTION

Check the braking efficiency. In case of excessive stroke of the brake lever, of excessive elasticity or in case there is air in the circuit, check the seals and the braking system components; then bleed the system.

**NOTE** These operations apply to both brakes.

#### CHECKING THE BRAKE FLUID LEVEL

- Move instrument cluster grommet aside.
- Keep the vehicle in vertical position and rotate the handlebar so that the fluid contained in the tank is parallel to the brake fluid tank cover.
- Make sure that the fluid level exceeds the "MIN" notch on the glass (1).

If the fluid does not reach the "MIN" notch:

- Provide for topping up.



#### TOPPING UP

- Remove pump cover (2).
- Unscrew the two screws (3) of the brake fluid tank (4).
- Remove the cover (5).

**IMPORTANT** In order not to spill the brake fluid while topping up, keep the fluid in the reservoir parallel to the reservoir rim (in horizontal position).

- Remove the gasket (6).

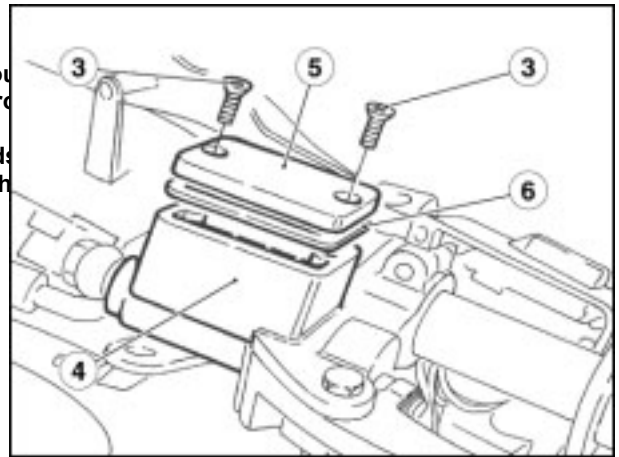
**IMPORTANT** In order to reach the "MAX" level, top up until covering the glass (1) completely, with the brake fluid reservoir rim parallel to the ground.



**CAUTION**

The topping up to the "MAX" level can be carried out only with new pads. The fluid level decreases progressively with the pad wear. Do not top up to the "MAX" level with worn pads since this may cause an outflow of liquid when the brake pads are changed.

- Fill the tank (4) with brake fluid, until it covers the glass (1) completely.
- To reassemble the components, follow the reverse order.

**CHECKING BRAKE PADS FOR WEAR**

**IMPORTANT** The following information refer to a single braking system, but are valid for both.

Check brake pads for wear, see 2.1.2 (PERIODIC MAINTENANCE CHART).

The wear of the disc brake pads depends on the use, on the kind of drive and on the road.

**CAUTION**

Check the wear of the brake pads, especially before every trip.



To carry out a rapid checking of the wear of the pads, proceed as follows:

- Place the motorcycle on the centre stand.
- Carry out a visual check between the brake calliper and the pads, proceeding as follows:  
from below, on the front part, for front brake calliper (7);  
from below, on the rear part, for the rear brake calliper (8).

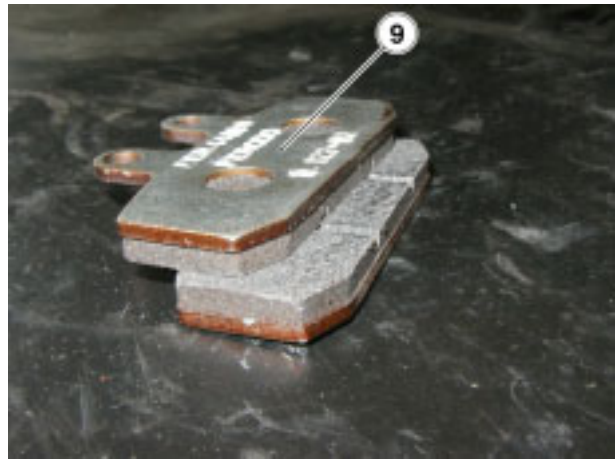
**CAUTION**

The excessive wear of the friction material would cause the contact of the pad metal support with the disc, with consequent metallic noise and production of sparks from the calliper; braking efficiency, safety and soundness of the disc would thus be negatively affected.

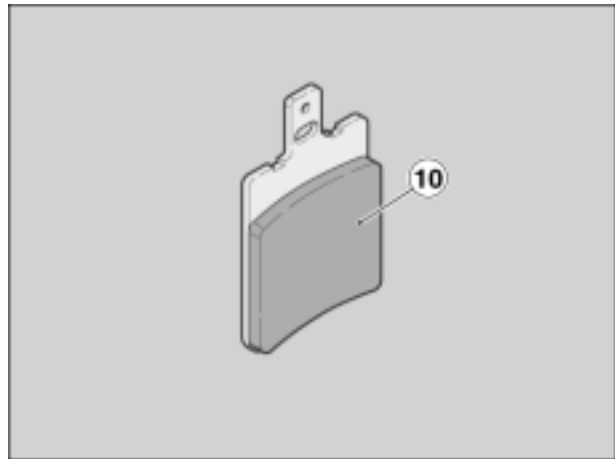


- When the lining material of even just one of the brake pads is worn down to nearly 1.5 mm (0.05 in), change both brake pads.

- Front brake pad (9).



- Rear brake pad (10).



**BLEEDING THE BRAKING SYSTEM**

The air, when present in the hydraulic circuit, absorbs most of the pressure exerted by the brake pump and therefore reduces the effectiveness of the calliper action during the braking. The presence of air is signalled by the elasticity of the brake control and by reduced braking capacity.



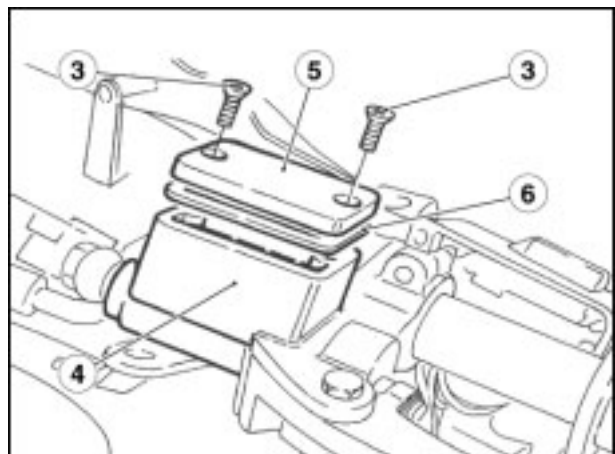
**CAUTION**  
 Since these conditions would be extremely dangerous for the vehicle and for the pilot, it is absolutely important to bleed the hydraulic circuit after the re-assembly of the brakes and the restoration of the normal conditions of use.



- Remove pump cover (2).
- Unscrew the two screws (3) of the brake fluid tank (4).
- Remove the cover (5).

**IMPORTANT** It is advisable to keep the fluid in the tank parallel to the ground (horizontally), in order not to spill it while topping up.

- Remove the gasket (6).
- Make sure that the fluid covers the glass (1) completely and top up if necessary.
- Remove the protection cap (11) of the air valve.
- Connect a transparent pipe (11) to the air valve (12).







**CAUTION**  
Do not dirt the pads or the disc with brake fluid.

- Put the free end of the transparent pipe inside a container.
- Slowly and thoroughly pull the brake lever for two or three times and do not release it.
- Loosen the air valve (11), press the lever and check if air bubbles still come out of the transparent pipe together with the brake fluid.



**CAUTION**  
Before releasing the brake lever, close the air valve (11) in order to prevent air from entering the brake circuit.

- When only brake fluid flows out of the pipe, tighten the air valve (11) and release the front brake lever.

**IMPORTANT** Repeat the last three operations until total elimination of the air bubbles.



**CAUTION**  
After reassembly, pull the brake lever repeatedly and check the proper functioning of the braking system.



## 2.7. ENGINE OIL

### 2.7.1. ENGINE OIL

Change engine oil at regular intervals, see 2.1.2 (PERIODIC MAINTENANCE CHART).

**IMPORTANT** Use the recommended oil only, see 1.8.1 (TABLE OF LUBRICANTS).

Do not overfill (top up beyond the "Max" level).

#### CHECKING ENGINE OIL

- Place the motorcycle on firm and level ground.
- Place the motorcycle on the centre stand.



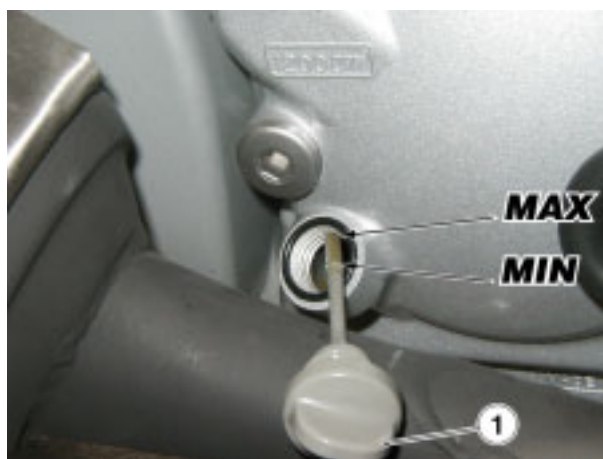
#### WARNING

Allow the engine and exhaust system to cool down before proceeding.

- Stop the engine and allow it to cool, before draining the oil in the crankcase, so that the oil itself is also cool.

**IMPORTANT** Proceeding without the preceding precautions risks mistaking the engine oil level.

- Unscrew and remove the cap/dipstick (1).
- Clean off any oil with a clean cloth.
- Completely insert the cap/dipstick (1) into the filler hole, but do not screw it.



- Now remove the cap/dipstick (1) and read the oil level off the dipstick.

**Max** = maximum level

**Min** = minimum level.

- The difference between the "MIN" and "MAX" levels is about: 400 cc (24.4 cu in).
- The correct level is just below the "Max" mark.



#### WARNING

Do not overfill (beyond the "Max" mark) or let level drop below the "Min" mark, as this will cause severe engine damage.

- Top up as necessary.

#### TOPPING UP ENGINE OIL

- Pour a small quantity of oil into the filler hole and wait a minute to allow the oil to flow into the crankcase.
- Check the oil level, and top up again as necessary.
- Top up with small amounts of oil until the prescribed level is reached.
- Tighten the cap/dipstick (1) securely at the end of the operation.

**IMPORTANT** Do not use the vehicle if insufficiently lubricated or if the oil is dirty or of the wrong type, as this will increase the wear of moving parts and can result in serious damage.

## ENGINE OIL AND FILTER CHANGE

- Place the motorcycle on firm and level ground.
- Place the motorcycle on the centre stand.

**WARNING**

**Allow the engine and exhaust system to cool down before proceeding.**

- Stop the engine and allow it to cool, before draining the oil in the crankcase, so that the oil itself is also cool.



- Unscrew and remove the cap/dipstick (1).
- Place a container under the engine oil filter.
- Loosen and remove engine oil filter (2).

**WARNING**

**Used oil contains substances that are harmful to the environment, even small quantities must be disposed of in compliance with the regulations in force.**

- Unscrew and remove the oil drain cap (3) and allow all the engine oil to drain out.
- Fit a new oil filter (2). Take care to lubricate filter O-rings.
- Refit and tighten the drain plug (3).
- Refill through the engine oil filler hole with 1500 cc (91.5 cu in) of oil.
- Refit and tighten the cap/dipstick (1).
- Start the engine and allow it to run for a few minutes. Switch off and allow to cool.
- Check the engine oil level.





## 2.8. THE TRANSMISSION OIL

### 2.8.1. THE TRANSMISSION OIL

#### CHECKING THE TRANSMISSION OIL LEVEL

To check the transmission oil level, proceed as follows.

- Drive for a few miles until the engine reaches the normal running temperature, then stop it.
- Position the vehicle on the stand.
- Put a graduated container with at least 100 cmC capacity under the drain plug (1).
- Unscrew the filling cap (2) and the oil drain plug (1).
- Let all the oil flow out of the oil pan, measure the quantity and if it is less than 90 cmC, top up by adding the lacking quantity.
- Tighten the drain plug (1).
- Inject the oil through the filling hole by means of a syringe or a similar system.

**IMPORTANT** To facilitate the filling of the oil pan, rotate the wheel with your hands.

- Screw and tighten the filling cap (2).



#### CHANGING THE TRANSMISSION OIL

To ensure vehicle good efficiency and durability, see 2.1.2 (PERIODIC MAINTENANCE CHART).

- Drive for a few miles until the engine reaches the normal running temperature, then stop it.
- Position the vehicle on the stand.
- Put a graduated container with at least 100 cmC capacity under the drain plug (1).
- Unscrew the filling cap (2) and the oil drain plug (1).
- Let all the oil flow out of the oil pan.
- Tighten the drain plug (1).
- Pour 90 cmC of oil through the filling hole, by means of a syringe or a similar system.



**IMPORTANT** To facilitate the filling of the oil pan, rotate the wheel with your hands.

- Screw and tighten the filling cap (2).



#### WARNING

**Tighten the filling cap and the drain plug thoroughly and make sure that there are no oil leaks.**

**Periodically make sure that there are no leaks in correspondence with the oil pan cover seal.**

**Do not use the vehicle with insufficient lubrication or with contaminated or unsuitable lubricants, since this would accelerate the wear of the moving parts and may also cause irreparable failures.**

## 2.9. FRONT END

### 2.9.1. FRONT END

#### CHECKING THE STEERING

Occasionally check the steering slack.

To check the steering:

- Position the vehicle on the centre stand.

**NOTE** Prepare a support whose height should be: 185 mm the support base must measure 200 x 200 mm.

- Place the support under the vehicle and a spongy cloth between them, so that the front wheel can move freely and the vehicle cannot fall down.



#### WARNING

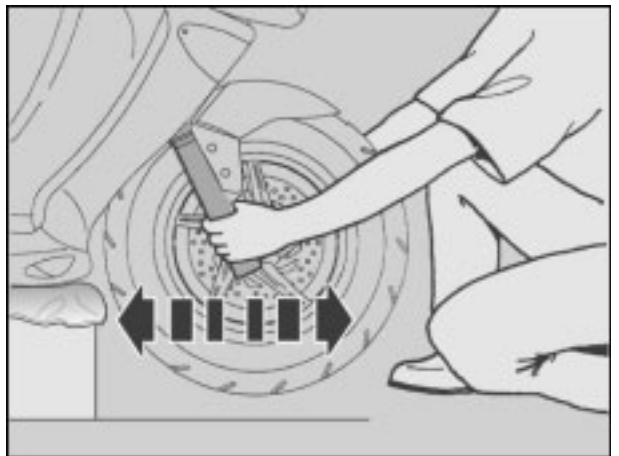
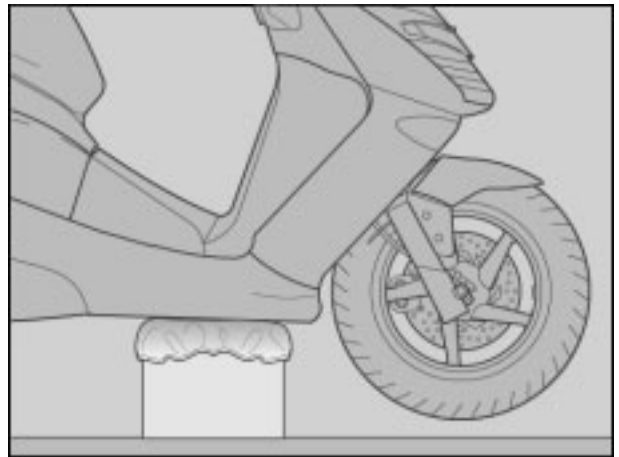
Make sure that the vehicle is stable..

- Shake the fork in the riding direction (see figure).



#### WARNING

Do not shake the fork excessively, otherwise stand movement could be perceived, thus giving an incorrect slack reading. Repeat the previous operation several times.



#### ADJUSTING THE BEARING SLACKS

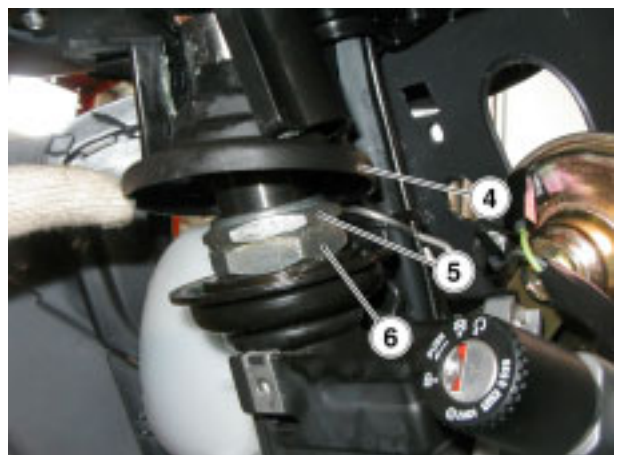
- Remove the front inner shield, see 7.1.6 (REMOVING THE INNER SHIELD).
- Remove the two rear rivets (1) from diaphragm holder.
- Loosen and remove the two screws (2).
- Unscrew and remove the screws (3).
- Move the diaphragm holder upwards.
- Unscrew and remove the protection element (4).
- Move the rubber gasket (5).



#### WARNING

Neither tighten, nor screw the adjusting nut (6) too firmly, in order not to damage the bearings.

- Screw the adjusting nut (6) until you take up the slack.
- Check the slack by shaking the fork in the driving direction and make sure that the steering rotates without problems.
- Hold the adjusting nut (6) and tighten the lock nut (5) by means of a spanner.
- Repeat slack check.



**INSPECTING THE FRONT**

- With pulled front brake lever, push the fork repeatedly downwards.  
The stroke must be gentle and there must be no trace of oil on the rods.
- Check the fastening of all the components and the functionality of the front and rear suspension joints.

## 2.10. TAIL END

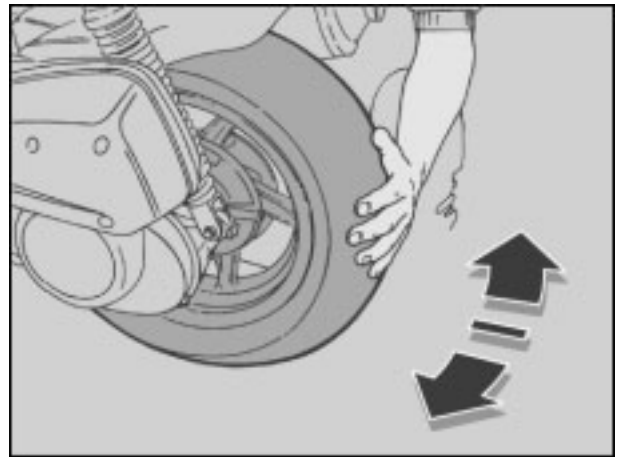
### 2.10.1. TAIL END

#### CHECKING THE ENGINE FULCRUM AXIS

Periodically check the slack existing between the engine pin bushings.

To carry out this operation, proceed as follows:

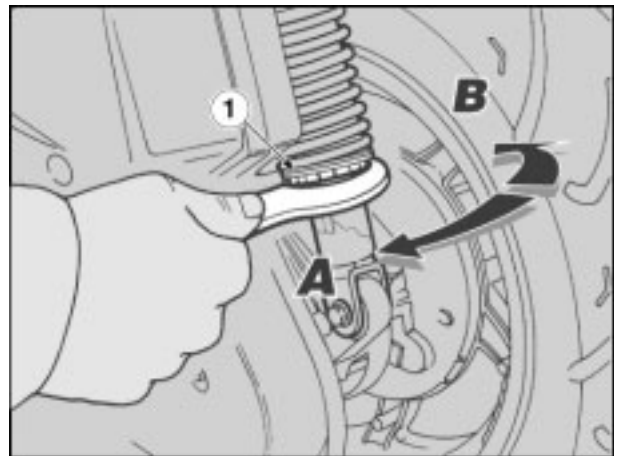
- Position the vehicle on the centre stand.
- Shake the wheel transversally with respect to the riding direction.
- If any slack should be noticed, check that all engine fulcrum axis fasteners are securely tightened.



#### ADJUSTING THE REAR SUSPENSION

The rear suspension is constituted by a pair of double-action shock absorbers (braking with compressed/extended shock absorber) fixed to the engine by means of silent-blocks. The shock absorbers are provided with a metal ring with five positions, for the adjustment of the spring preload. The standard adjustment, set by the manufacturer, is suitable for a driver weighing about 70 kg.

If your weight and needs are different, adjust the ring nut (1) with the appropriate spanner provided in the tool kit, thus setting the ideal travelling conditions (see table).



**CAUTION**  
Set both shock absorbers on the same position.



**CAUTION**  
Before adjusting the spring preload, verify what type of shock absorber is installed on the vehicle:  
- upper adjustment;  
- lower adjustment.

#### ADJUSTMENT OF THE REAR SUSPENSION SPRING PRELOAD

Adjusting ring	Rotation arrow A (*1) arrow B (*2)	Rotation arrow A (*2) arrow B (*1)
Function	Spring preload increase	Spring preload decrease
Attitude	The vehicle is more rigid	The vehicle is less rigid
Recommended kind of road	Smooth or normal roads	Roads with uneven surface
Notes	Drive with passenger	Drive without passenger

(\*1)= Rear suspension with lower adjustment.

(\*2)= Rear suspension with upper adjustment.

## 2.11. ACCELERATOR CONTROL

### 2.11.1. ACCELERATOR CONTROL

#### IDLING ADJUSTMENT

Adjust the idling every time it is irregular.

To carry out this operation, proceed as follows:

- Ride for a few miles until reaching the normal running temperature, then stop the engine.
- Position the vehicle on the centre stand.
- Remove the left inspection cover, see 7.1.4 (REMOVING THE RIGHT AND LEFT INSPECTION COVERS).
- Connect an electronic revolution counter to the spark plug cable.
- Start the engine.

The engine minimum rpm must be approximately the following:  $1500 \pm 100$  rpm.

In this case the engine does not make the rear wheel rotate.

If necessary:

- Act on the adjusting screw (1) positioned on the carburettor.  
By SCREWING IT (clockwise), you increase the engine rpm.  
By UNSCREWING IT (anticlockwise), you decrease the engine rpm.
- Act on the throttle grip, accelerating and decelerating a few times to make sure that it functions correctly and to check if the idling speed is constant.

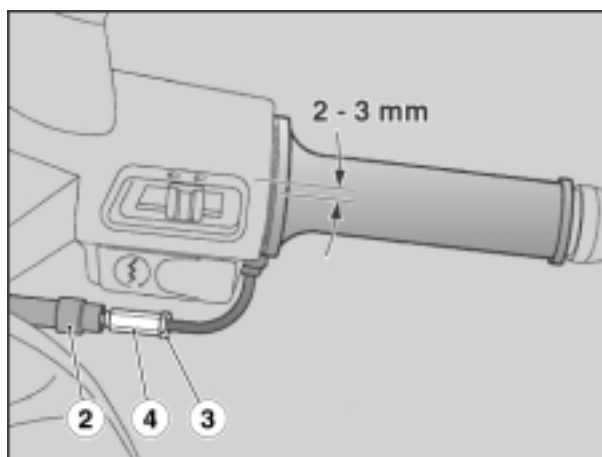


#### ADJUSTING THE ACCELERATOR CONTROL

The idle stroke of the throttle grip must be **2 – 3 mm**, measured on the edge of the grip itself.

If this is not the case, proceed as follows:

- Position the vehicle on the centre stand.
- Withdraw the protection element (3).
- Loosen the lock nut (4).
- Rotate the adjuster (5) in such a way as to restore the prescribed value.
- After the adjustment, tighten the lock nut (4) and check the idle stroke again.
- Put back the protection element (3).



#### CAUTION

After the adjustment, make sure that the rotation of the handlebar does not modify the engine idling rpm and that the throttle grip returns smoothly and automatically to its original position after being released.

## 2.12. WHEELS/TYRES

### 2.12.1. WHEELS/TYRES

#### ISPEZIONE RUOTE

- Make sure that the wheel rims are neither cracked, nor deformed. Change them if necessary.
- Check the wheel balancing. Make the wheel rotate several times and observe the point on which it stops. If the wheel is not statically balanced, it will always stop on the same point. Put a balancing weight on the lightest (highest) point.

#### TYRESÙ

This vehicle is provided with tubeless tyres.



#### **WARNING**

**Periodically check the tyre inflation pressure at room temperature (once a month). If the tyres are hot, the measurement is not correct. The pressure must be measured with the tyres at room temperature, that is, when the vehicle has not covered more than 1 km (0.621 mi) in the last 2 or 3 hours. Check the tread depth often and if this is worn beyond the allowed limit (2 mm) (0.079 in), change the tyre. Swelling and waves indicate that there are internal damages, therefore the tyre must be immediately replaced.**

**Check the surface and the wear of the tyres, since tyres in bad conditions can impair both the grip and the controllability of the vehicle. Change the tyre when it is worn out or in case of puncture on the tread side, if the puncture is larger than 5 mm (0.197 in).**

**After repairing a tyre, have the wheels balanced. Use only tyres in the size suggested by Aprilia. Do not install tyres with air tube on rims for tubeless tyres and viceversa. Make sure that the tyres always have their valve sealing caps on, to prevent them from suddenly going flat. If the tyres are new, they may still be covered with a slippery film: drive carefully for the first miles. Do not oil the tyres with unsuitable fluids.**

LUBRICATION

3

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**3.1. LUBRICATION**

**3.1.1. LUBRICATION**

The lubrication system is described in the engine workshop manual, see 0.1.2 (REFERENCE MANUALS).

FUEL SYSTEM

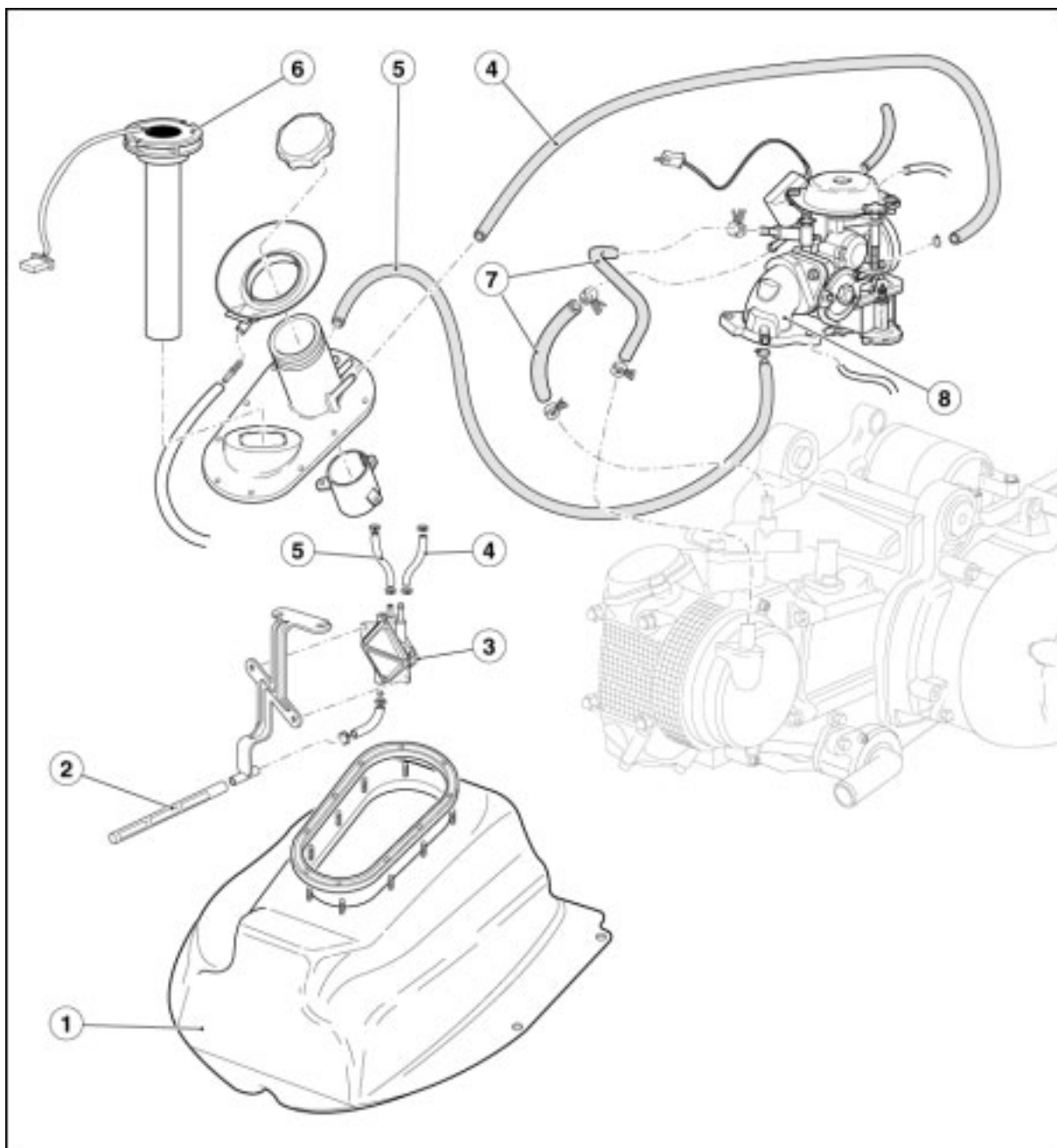
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## 4.1. FUEL TANK

## 4.1.1. FUEL SYSTEM DIAGRAM

**Key:**

1. Tank
2. Fuel pump filter
3. Fuel pump
4. Fuel supply pipe
5. Vacuum pipe
6. Fuel level sensor
7. Heater hoses
8. Induction manifold

**TANK AND FUEL PUMP**

The fuel pump (3), positioned inside the fuel tank (1), is operated by the pulsating vacuum drawn from the induction manifold (8) through the vacuum pipe (5). The fuel, driven by the pump, flows into the fuel supply pipe (4) and reaches the carburettor.

## 4.1.2. REMOVING THE FUEL TANK

- Position the vehicle on the central stand.



**WARNING**  
Wait until the engine and the exhaust silencer have completely cooled down.

- Remove the footrest, see 7.1.5 (REMOVING THE FOOTPEG).
- Remove the lower shield, see 7.1.8 (REMOVING THE LOWER SHIELD).



**WARNING**  
Fuel vapours are noxious. Before proceeding, make sure that the room in which you are working is properly ventilated. Do not inhale fuel vapours. Neither smoke, nor use free flames. Do not dispose of fuel in the environment.

- Drain the fuel tank completely.
- Put the fuel in a container, plug it and keep it in a safe place.



**WARNING**  
Mark the pipes, in order to be able to reconnect them correctly.

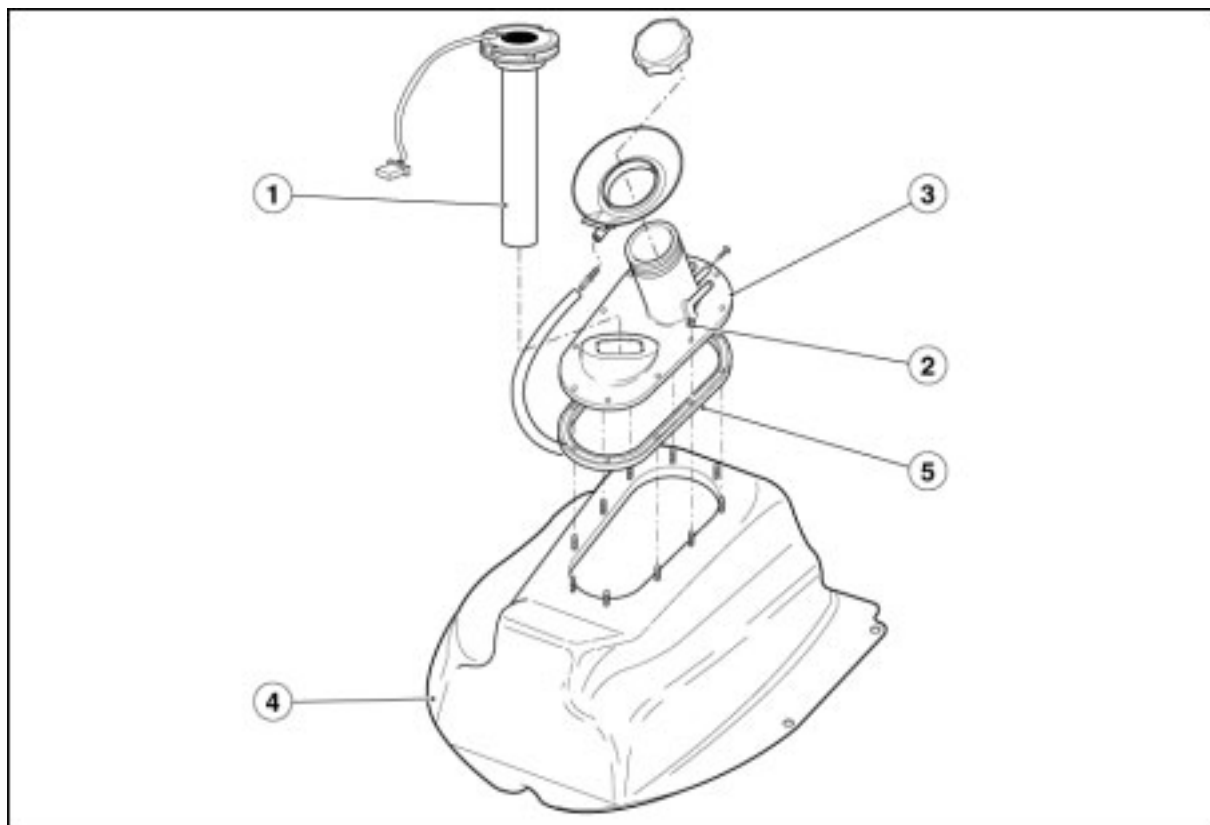
- Withdraw the two pipes (1-2) from the connections on the filler neck.
- Disconnect the electric connector (3) from the fuel level gauge unit.
- Working on the lower part of the vehicle, unscrew and remove the screw (4) and take the relevant washer.

**NOTE** Before inserting the screw (4) (right side of the vehicle), position the guide of the accelerator cable and of the rear brake pipe.

- Remove the whole fuel tank, withdrawing it from below.



## 4.1.3. REMOVING THE PUMP UNIT



- Remove the fuel tank, see 7.1.9 (REMOVING THE REAR-VIEW MIRRORS).

**WARNING**

Handle with care. Upon removal, take care not to damage the fuel gauge unit.

- Rotate the fuel gauge unit (1) anticlockwise and extract it with care.
- Unscrew and remove the ten nuts (2) that fasten the flange (3) to the fuel tank (4).

**WARNING**

Handle with care. Upon removal, take care not to damage the fuel pump filter.

- Withdraw the flange (3) complete with the fuel pump unit.
- Make sure that there are neither deposits, nor impurities on the filter and if necessary clean it.
- Wash the inside of the fuel tank.
- Withdraw the gasket (5); if it is damaged or its volume has increased, replace it.

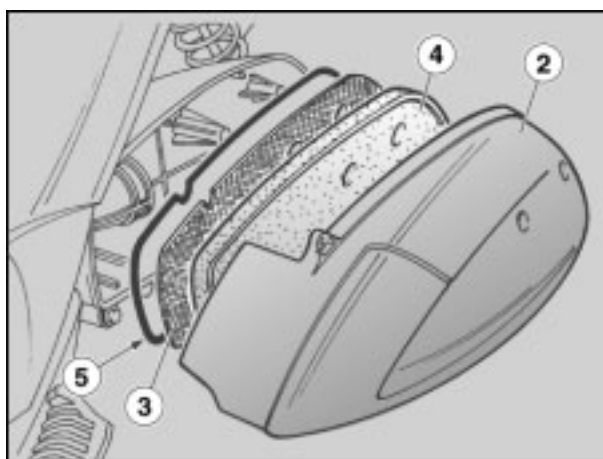
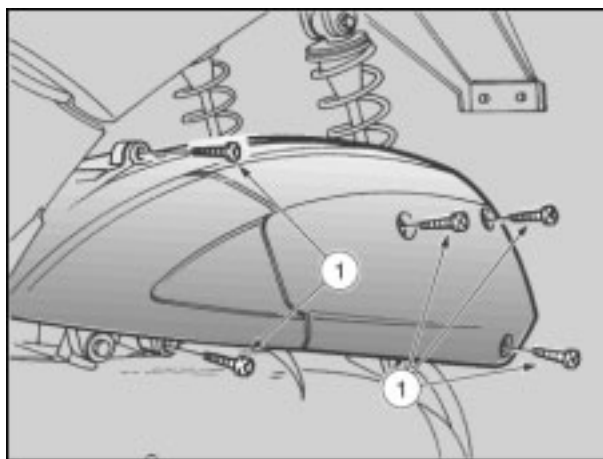
## 4.2. AIR FILTER

### 4.2.1. REMOVING THE AIR FILTER

#### REMOVAL

- Position the vehicle on the centre stand.
- Unscrew and remove the five screws (1).
- Remove:
  - filter case cover (2);
  - flame trap grid (3);
  - filtering element (4);

- Check:
  - filtering element (4);
  - filter case gasket (6);and change them if necessary.





4.2.2. REMOVING THE FILTER BOX

- Release clip.
- Remove blow-by pipe.



- Loosen carburettor clip.



- Release air filter box breather pipe.

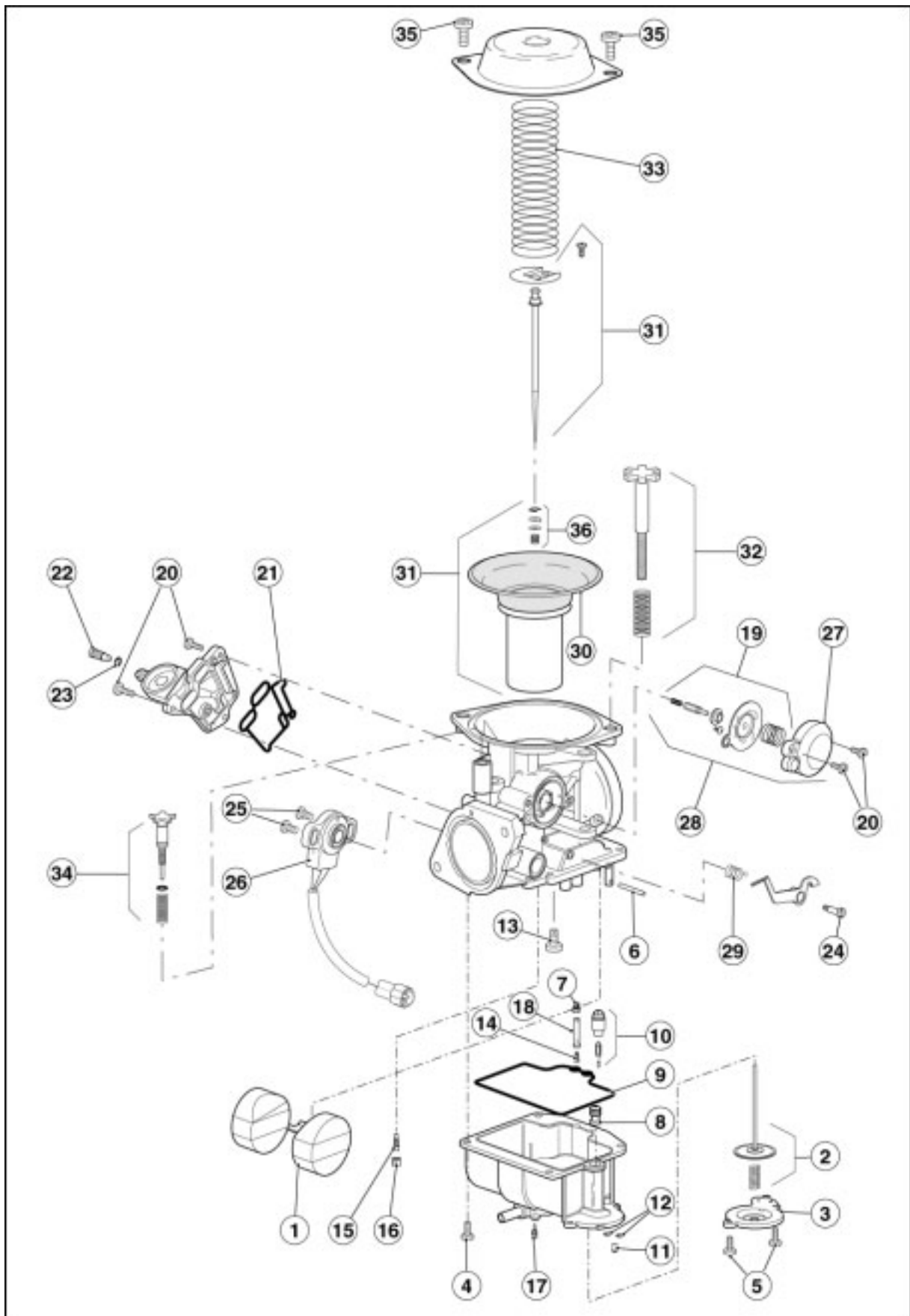


- Loosen and remove both retaining screws.
- Remove filter box.



## 4.3. CARBURETTOR

## 4.3.1. CARBURETTOR DIAGRAM



**Key:**

1. Float
2. Complete membrane
3. Cap
4. Screw
5. Screw
6. Pin
7. Metering rod stopper
8. Grommet
9. Gasket
10. Fuel inlet valve
11. Complete control valve
12. O-ring
13. Screw
14. Full-power jet
15. Idling jet
16. Plug
17. Screw
18. Spray nozzle
19. Complete membrane
20. Screw
21. Gasket
22. Screw
23. O-ring
24. Screw
25. Screw
26. Sensor
27. Membrane cover
28. Membrane + cover
29. Spring
30. Membrane
31. Tapered metering rod + membrane
32. Complete idle adjusting screw
33. Spring
34. Complete air screw
35. Screw
36. Complete tapered metering rod

PARTS	SPECIFICATIONS 250 cc	SPECIFICATIONS 300 cc
Intake manifold	-	Ø 28 4HC
Reg. number or name	5 SE A1	TK 5SE
Throttle tube	Ø 28 mm	Ø 28 mm
Connection	To be fitted with nuts	To be fitted with nuts
Float	10.5 g	10.5 g (float chamber level from surface 0.5 mm)
Fuel inlet metering rod sear	Ø 2.5 mm	Ø 2.5 mm
Float chamber	Ø 6.5 mm	-
Starting (man/auto)	-	AUTOCHOKE
Starter jet	Ø 0.45 mm (1) 0.54 mm (2)	Ø 0,45 mm / 0,54 mm
Metering rod PTC / position.	1P71 / (2/3)	1P71 / (2/3)
WAX temp.	-	(3.0 mm 24°C)
Throttle	11t = 1,0	11t = 1,0
Valve spring	30X-14334-00	5SE-14286-00
Idle jet	44	#44 (Ø 0.8x2x4)
Full-power jet	120	122
Min. air hole	Ø 0.90 mm	-
Max. air hole	Ø 1.20 mm	-
Throttle valve	(5.5 – Ø 3.0) mm	h at min. level – int. hole 5.5 – Ø 3.0
Spray nozzle	Ø 2.585 mm (marked 85)	Ø 2,585 mm
Tapered metering rod / pos.	SD 32 / (3/5)	SD 32 / (3/5)
Rpm open mixer screw	1 ± 1/2	2 ± 1/2
Choke tube tubing	d.d.	-
Notes	Idle circuit heating, without TPS	Idle circuit heating

**4.3.2. REMOVING THE CARBURETTOR**

- Position the vehicle on the stand.
- Remove the air filter box, see 4.2.2 (REMOVING THE AIR FILTER BOX).
- Remove the battery compartment, see 7.1.18 (REMOVING THE BATTERY COMPARTMENT).
- Remove and close the two pipes (1-2) on heater.



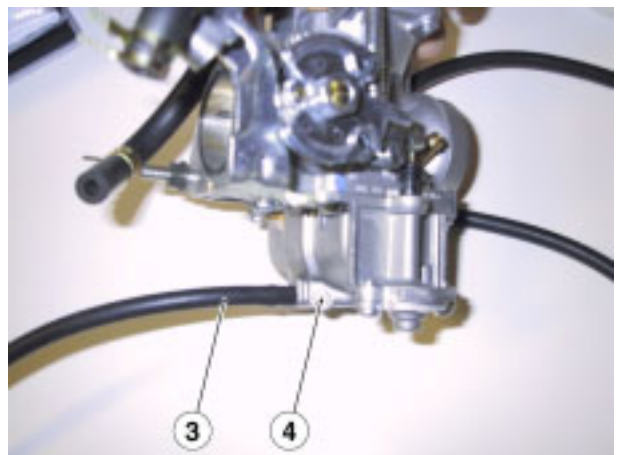
- Disconnect automatic starter connector.



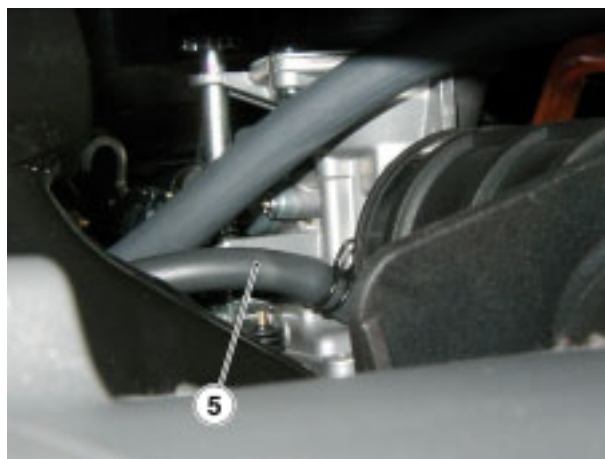
- Disconnect throttle position sensor connector.



- Position the free end of the drain pipe (3) inside the collection tank.
- Loosen the drain screw (4) and wait until all the fuel has flowed out (fuel present in the carburetor and in the fuel header tank).
- Tighten the drain screw (4) completely.



- Disconnect the fuel delivery pipe (5) from the carburettor.



- Completely unscrew the nut (6) that fixes the rigid bend of the accelerator cable (7).
- Withdraw the rigid bend of the accelerator cable (7) from its seat.
- Withdraw the accelerator cable head from the lever coupling.



- Loosen and remove the two nuts (8) from intake manifold.
- Remove the carburettor completely.



COOLING SYSTEM

5

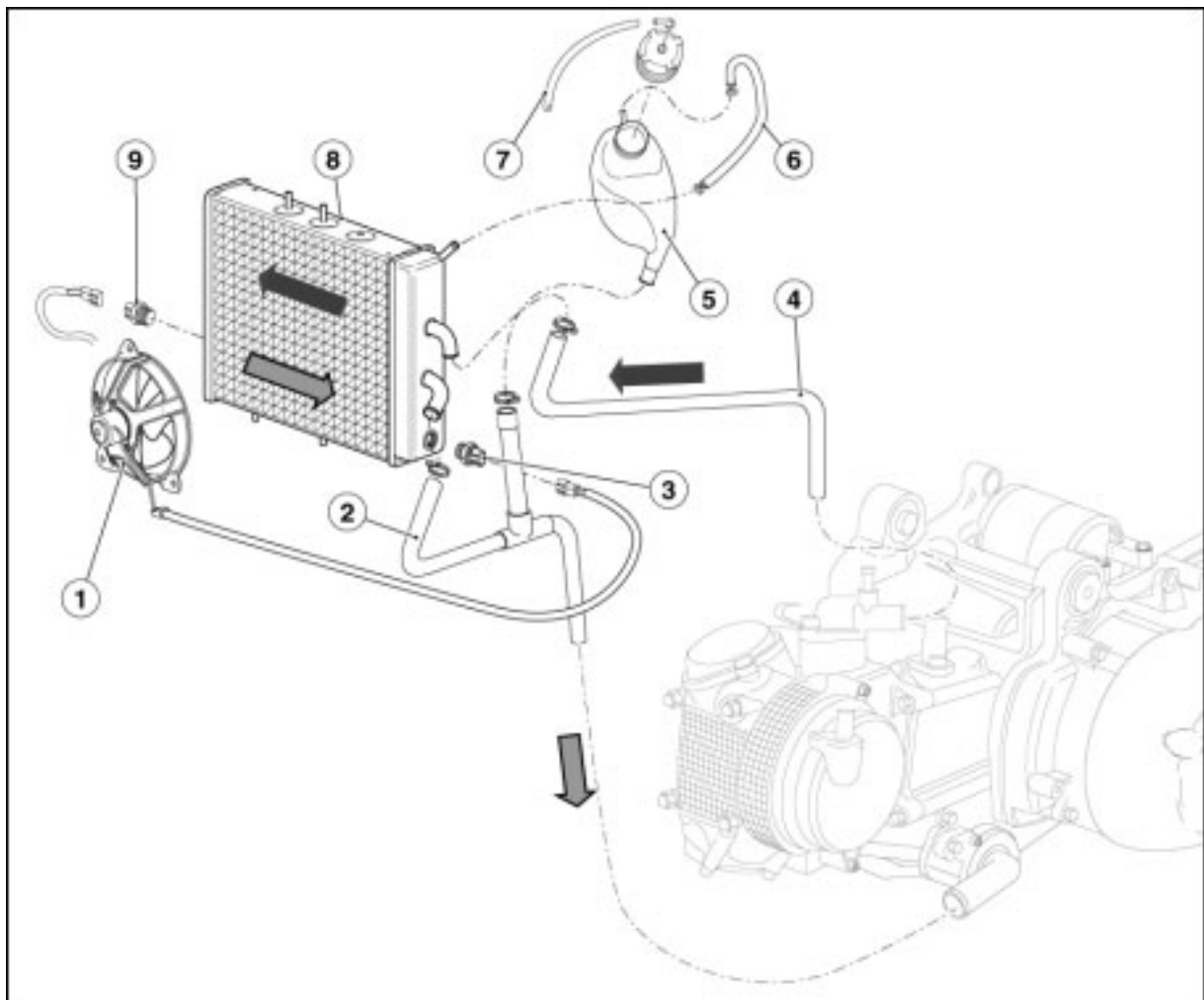


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## 5.1. COOLING SYSTEM DIAGRAM

## 5.1.1. COOLING SYSTEM DIAGRAM

**Key:**

1. Electric fan
2. Return pipe
3. Thermal switch
4. Delivery pipe
5. Expansion reservoir
6. Expansion reservoir pipe – radiator
7. Breather pipe
8. Radiator
9. Water temperature sensor

Black arrow: indicates the heated fluid flowing to the radiator.

Grey arrow: indicates the cooled fluid flowing to the engine.



## 5.2. RADIATOR

### 5.2.1. REMOVING THE RADIATOR

- Drain the coolant completely, see 2.5 (CHANGING THE COOLANT).
- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD).
- Remove the headlight, see 7.2.7 (REMOVING THE HEADLIGHT).
- Disconnect power connector (1).



- Disconnect power connector (2).

**IMPORTANT** Get screwdriver-type pipe clamps, to replace the original ones (special type without screw).

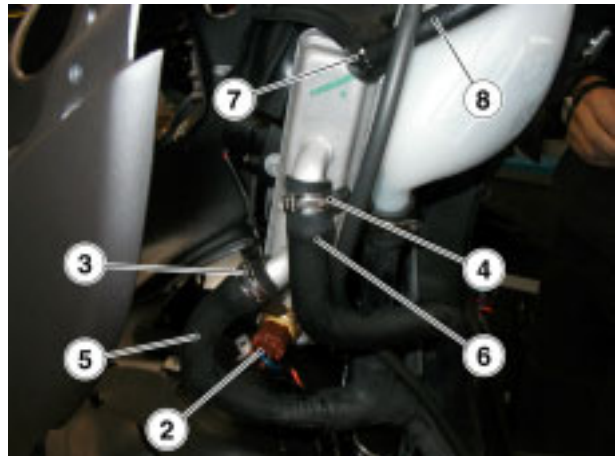
- Cut the head of the pipe clamps (3) and (4).

**IMPORTANT** Upon reassembly, replace the clamps (3) and (4) with the new ones.

- Withdraw the two hoses (5) and (6) from the radiator couplings.
- Cut the head of the pipe clamp (7).

**IMPORTANT** Upon reassembly, replace the clamp (7) with the new one.

- Withdraw the breather pipe (8) from the radiator coupling.
- Working from both sides, loosen and remove the screws (9) from radiator mounting bracket.



- Loosen and remove centre screw (10) from radiator mounting bracket.
- To remove radiator, slide it out from below.



**WARNING**  
Proceed with care. Do not damage the radiator fins.

- Remove radiator electric fan

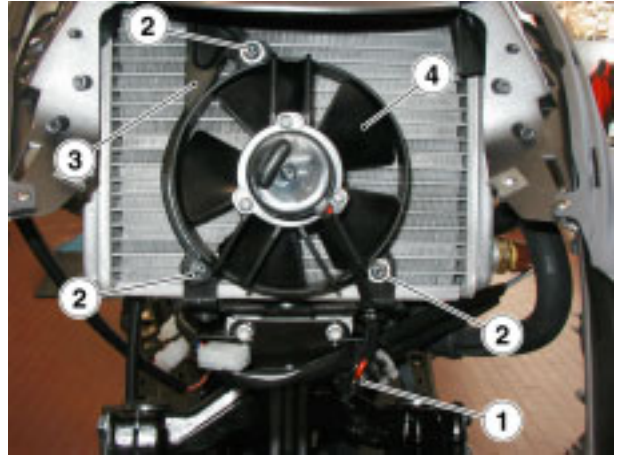


**5.2.2. REMOVING THE COOLING ELECTRIC FAN**

- Remove headlight, see 7.2.7 (REMOVING THE HEADLIGHT).
- Disconnect the electric connector (1).
- Unscrew and remove the three self-locking nuts (2) and take the washers.
- Withdraw the lower part of the bracket (3) from the threaded pin and move it sideways, thus releasing the electric fan support (4).

**IMPORTANT** At reassembly, install the electric fan (4) and then lower part of the bracket (3) inside threaded pin.

- Withdraw the cooling electric fan unit (in the direction of travel), releasing it from the threaded pins.



### 5.2.3. REMOVING THE COOLANT THERMAL SWITCH

- Position the vehicle on the central stand.

**IMPORTANT** Stop the engine and wait until the radiator has cooled down.

- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD).
- Disconnect connector (1).



**WARNING**  
**DO NOT DISPOSE OF THE COOLANT IN THE ENVIRONMENT.**

When the thermal switch (2) is unscrewed and removed, a small quantity of coolant will flow out of the thermal switch seating.

Get a container with at least 1l (1,816 pt) capacity to collect the coolant.

Put a cloth at the base of the radiator, to absorb the coolant that might have been spilt.

- Unscrew and remove the thermal switch (2) and take the washer.



**WARNING**  
Upon reassembly, apply LOCTITE® 572 on the threading of the thermal switch (2).

**5.2.4. REMOVING THE COOLANT THERMISTOR**

- Drain the coolant completely, see 2.5 (COOLANT).
- Remove battery compartment, see 7.1.18 (REMOVING BATTERY COMPARTMENT)
- Disconnect the electric connector (1).
- Unscrew and remove the thermistor (2).

**WARNING**

Upon reassembly, apply LOCTITE® 515 on the threading of the thermistor (2).



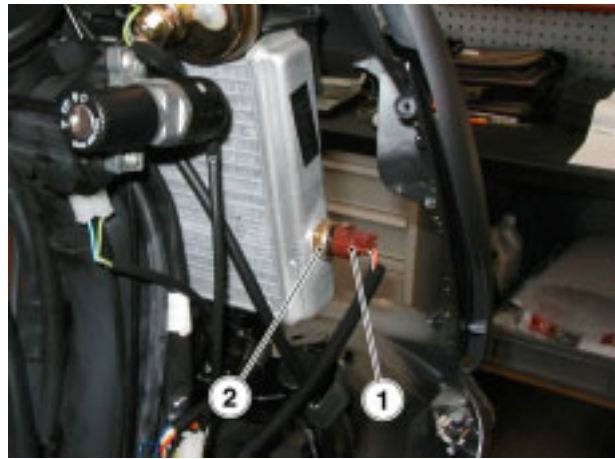
### 5.3. COOLANT TEMPERATURE SENSOR

#### 5.3.1. REMOVING COOLANT TEMPERATURE SENSOR

- Position the vehicle on the central stand.

**IMPORTANT** Stop the engine and wait until the radiator has cooled down.

- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD)
- Disconnect connector (1).



#### WARNING

**DO NOT DISPOSE OF THE COOLANT IN THE ENVIRONMENT.**

When sensor (2) is unscrewed and removed, a small quantity of coolant will flow out of the sensor seating.

Get a container with at least 1l (1.816 pt) capacity to collect the coolant.

Put a cloth at the base of the radiator, to absorb the coolant that might have been spilt.

- Unscrew and remove sensor (2) and take the washer.



#### WARNING

Upon reassembly, apply LOCTITE® 572 on the threading of the thermal switch (2).

## 5.4. THE EXPANSION TANK

### 5.4.1. REMOVING THE EXPANSION TANK

- Position the vehicle on the central stand.
- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD).



**WARNING**  
DO NOT DISPOSE OF THE COOLANT IN THE ENVIRONMENT.

When the hose (1) is withdrawn, the coolant present in the expansion tank (2) will flow out. Get a container with at least 1l capacity to collect the coolant. Put a cloth under the expansion tank, to absorb the coolant that might have been spilt.

**IMPORTANT** Get pipe clamps screwdriver-type to replace the original ones (special type without screw).

- Cut the clamp head (3).
- Withdraw the hose (4) from the expansion tank coupling.
- Cut the clamp head (5).
- Withdraw the hose (1) from the expansion tank coupling (1).
- Promptly put the container under the expansion tank and collect the coolant.



**WARNING**  
The coolant is noxious.  
Keep the container in a safe place.  
KEEP AWAY FROM CHILDREN

- Unscrew and remove the two screws (6).
- Remove the expansion (2) tank.



ENGINE

6

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## 6.1. EXHAUST SYSTEM

### 6.1.1. REMOVING THE EXHAUST SYSTEM

- Rise vehicle on centre stand.

**WARNING**

Wait until the engine and the exhaust silencer have completely cooled down

- Loosen and remove the two nuts (1) from exhaust manifold.

**CAUTION** At reassembly, change seal between exhaust manifold and silencer.

- Loosen and remove top screw (2).

- Loosen and remove the two bottom screws (3).
- Remove the exhaust system (4).



## 6.2. REMOVING AND INSTALLING THE ENGINE

### 6.2.1. REMOVING ENGINE FROM FRAME

- Remove tail guard, see 7.1.3 (REMOVING TAIL GUARD).
- Remove rear mudguard, see 7.1.16 (REMOVING REAR MUDGUARD).
- Remove the battery compartment, see 7.1.18 (REMOVING THE BATTERY COMPARTMENT).
- Drain off cooling system, see 2.5 (COOLANT).

- Release clip.
- Remove cooling pipe from cylinder head.



- Release clip.
- Remove cooling pipe from pump.



- Release clip.
- Remove blow-by pipe.



- Release clip on carburettor.



- Release air filter box breather pipe.



- Loosen and remove both retaining screws.
- Remove filter box.



- Remove accelerator cable.



- Remove clip.
- Remove fuel pipe from carburettor and then block it off.



- Remove clip.
- Remove vacuum pipe from intake manifold.



- Remove clip.
- Remove secondary air pipe from secondary air filter.



- Loosen and remove the two screws.
- Remove brake calliper.





- Disconnect spark plug cap.



- Disconnect the two generator connectors.



- Remove both starter motor cables.



- Disconnect earth cable.



- Disconnect thermistor connector.



- Disconnect automatic starter connector.



- Disconnect throttle position sensor motor connector.



- Loosen and remove both bottom screws from rear shock absorbers.





- Place a stand under engine.



- Working on both sides, loosen engine link rod top screw.



- Loosen and remove nut.
- Slide out pin.





- To remove engine, slide it out from behind.



**6.2.2. REFITTING ENGINE TO FRAME**

- Fit the engine to the frame.
- Raise engine until holes are aligned.



- Install pin.
- Tighten nut.



- Working on both sides, tighten engine link rod top screw.



- Refit rear shock absorbers.
- Tighten screws on both rear shock absorbers.



- Connect throttle position sensor motor connector.



- Connect automatic starter connector.



- Connect thermistor connector.



- Re-route earth cable.



- Re-route both starter motor cables.



- Connect the two generator connectors.





- Refit spark plug cap.



- Refit brake callipers into its seating.
- Tighten the two screws.



- Reconnect pipe to secondary air filter.
- Secure pipe with a new clip.



- Re-route vacuum pipe inside intake manifold.
- Secure pipe with clip.



- Refit fuel pipe inside carburettor.
- Secure pipe with clip.



- Reconnect accelerator cable.
- Adjust clearance, see 2.11 (ACCELERATOR).



- Refit air filter box hose to carburettor.
- Secure it to carburettor with clip.



- Align filter box holes with casing holes.
- Tighten filter box screws.



- Refit filter box breather pipe into its seating.



- Re-connect the blow-by pipe to the air filter box.
- Secure pipe with a new clip.



- Refit cooling pipe to pump.
- Secure pipe with clip.



- Refit cooling pipe to cylinder head.
- Secure pipe with clip.



- Refit tail guard, see 7.1.3 (REMOVING TAIL GUARD).
- Refit rear mudguard, see 7.1.16 (REMOVING REAR MUDGUARD).
- Refit the battery compartment, see 7.1.18 (REMOVING THE BATTERY COMPARTMENT).
- Fill the cooling system, see 2.5 (COOLANT).

CYCLE PARTS



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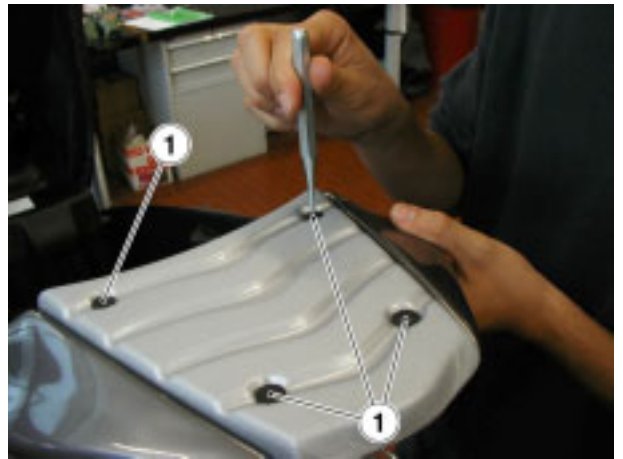
**7.1. BODY****7.1.1. REMOVING THE SADDLE**

- Position the vehicle on the central stand.
- Lift the saddle.
- Unscrew and remove the four screws (1).
- Remove the saddle.



**7.1.2. REMOVING THE REAR GRAB RAIL**

- Remove the four screws (1).



- Remove grab rail cover.



- Loosen and remove the four screws(2).



- Remove rear grab rail.



**7.1.3. REMOVING THE REAR PART OF THE FAIRING**

- Remove rear grab rail, see 7.1.2 (REMOVING THE REAR GRAB RAIL).
- Remove side inspection covers, see 7.1.4 (REMOVING RIGHT AND LEFT INSPECTION COVERS).
- Raise fuel filler cap flap.
- Loosen and remove the two screws (1).



- Working on both sides, loosen and remove screw.



- Loosen and remove the four rear screws (2-3).



- Loosen and remove the eight top screws (4).





- Move tail guard aside and disconnect connector.
- Remove the rear part of the fairing.





#### 7.1.4. REMOVING RIGHT AND LEFT INSPECTION COVERS

**NOTE** the following operations refer to a single inspection cover, but apply to both of them.

- Remove rubber footrest mat.
- Loosen and remove the screw.
- To remove the inspection cover, slide it out of the fixed joints.



**7.1.5. REMOVING THE FOOTPEGS**

- Remove right and left inspection covers, see 7.1.4 (REMOVING RIGHT AND LEFT INSPECTION COVERS).
- Working on both sides, loosen and remove the seven screws (1-2).



- Raise fuel filler cap flap.
- Loosen and remove the two screws (3).



- Remove tank filler cap.



- Remove footpeg.





**7.1.6. REMOVING THE FRONT INNER SHIELD**

- Remove the outer front shield, see 7.1.7 (REMOVING THE FRONT OUTER SHIELD).
- Remove the two bumpers, see 7.1.10 (REMOVING THE BUMPERS).
- Loosen and remove the two screws (1).
- Remove helmet hook (2).



- Loosen and remove screw.



- Remove the two screws (3) under handlebars.



- Working on both sides, loosen and remove the three screws (4).



- Remove rubber footrest mats.
- Working on both sides, loosen and remove screw (5).



- Working on both sides, loosen and remove screw.



- Working on both sides, loosen and remove screw.



- Remove front inner shield.



**7.1.7. REMOVING THE FRONT OUTER SHIELD**

- Position the vehicle on the central stand on a lifting platform, with the front wheel protruding from the platform edge.

**WARNING**

**Put a proper support under the vehicle, in order to prevent it from falling down.**

- Remove the front cover, see 7.1.9 (REMOVING THE FRONT COVER).
- Remove the front mudguard, see 7.1.15 (REMOVING THE FRONT MUDGUARD).
- Remove the front wheel, see 7.5.2 (FRONT WHEEL).
- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD).
- Unscrew and remove the front screw (1) (under the headlight).



- Move shield ahead, while holding it with your hand.
- Disconnect the front light main connector (11).
- Lift the platform at 50-60 cm from the ground, in order to be able to withdraw the front outer shield from the front fork comfortably.
- Withdraw the outer shield (complete with headlight unit and direction indicators) from the front fork.



**7.1.8. REMOVING THE LOWER SHIELD**

- Remove passenger footpegs, see 7.4.4 (REMOVING PASSENGER FOOTPEGS).
- Position the vehicle on the central stand.
- Working on both sides, remove the footrest mat.



- Working on both sides, unscrew and remove the four screws (1).



- Working on both sides, unscrew and remove the screw (2)



- Working on both sides, unscrew and remove the screw.



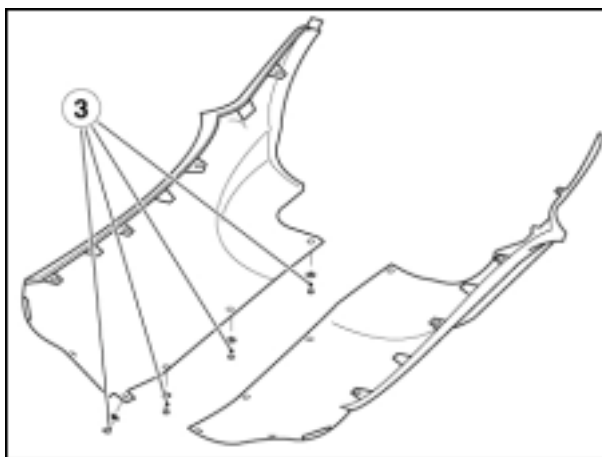
- Unscrew and remove the four screws (3).

**WARNING**

Proceed with care.

Do not damage the tangs and/or the relevant seatings. Handle the painted components with care and avoid scraping or damaging them.

- Withdraw the battery breather pipe from the exhaust connection on the lower left part of the fairing.
- Withdraw the lower left part of the fairing from the side stand and remove it.
- Remove the lower right part of the fairing.





**7.1.9. REMOVING THE FRONT COVER**

- Position the vehicle on the central stand.
- Unscrew and remove the two rear screws (1).

**WARNING**

Proceed with care. Do not damage the tangs and/or the relevant seatings. Handle the painted components with care and avoid scraping or damaging them.

- Unscrew and remove the two front screws (2).
- Remove the front cover (3).



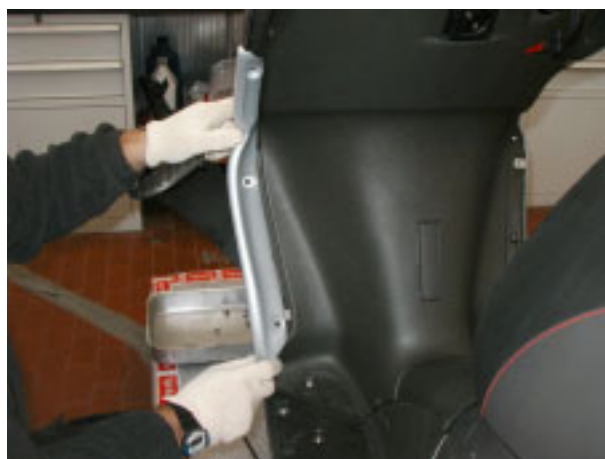
**7.1.10. REMOVING THE BUMPERS**

**NOTE** the following operations refer to one bumper, but they apply to both of them.

- Unscrew and remove the three screws (1).



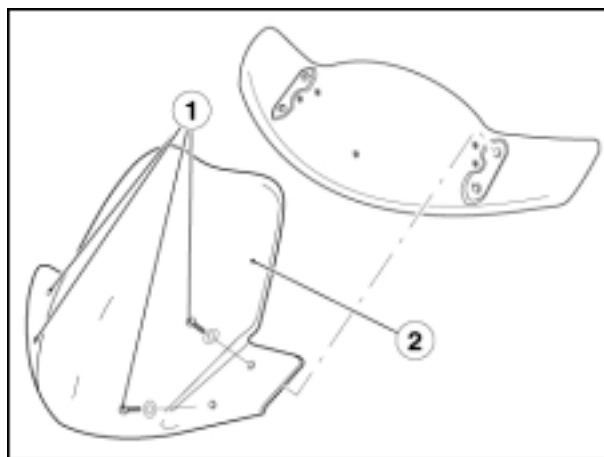
- Remove bumper.





**7.1.11. REMOVING THE WINDSHIELD**

- Unscrew and remove the four screws (1).
- Remove the windshield (2).



**7.1.12. REMOVING THE FRONT FAIRING**

- Remove the windshield, see 7.1.11 (REMOVING THE WINDSHIELD).
- Unscrew and remove the five screws (1).
- Remove the front fairing (2).



**7.1.13. REMOVING THE FRONT HANDLEBAR COVER**

- Remove the front fairing, see 7.1.12 (REMOVING THE FRONT FAIRING).
- Working on both sides, unscrew and remove the two screws (1) and remove mounting bracket (2).



- Unscrew and remove the three screws (3).



- Working on both sides, unscrew and remove the two screws (4-5).

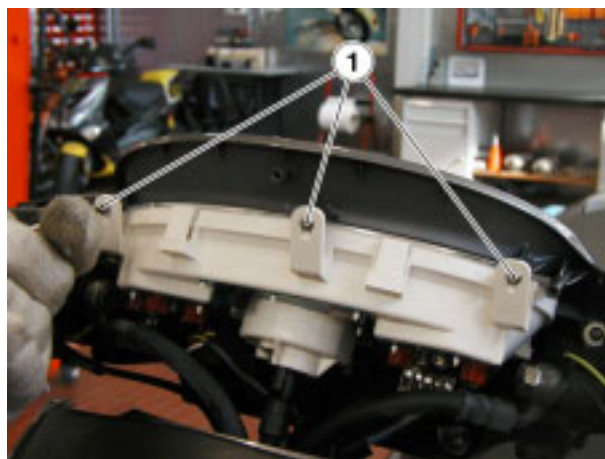


- Remove front handlebar cover.

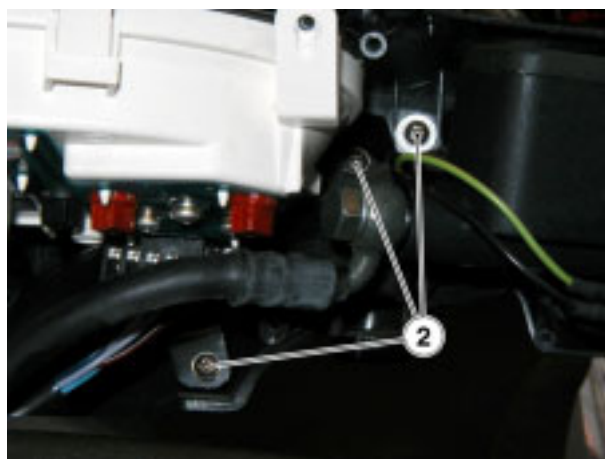


**7.1.14. REMOVING THE REAR HANDLEBAR COVER**

- Remove front handlebar cover, see 7.1.13 (REMOVING THE FRONT HANDLEBAR COVER).
- Unscrew and remove the three screws (1).



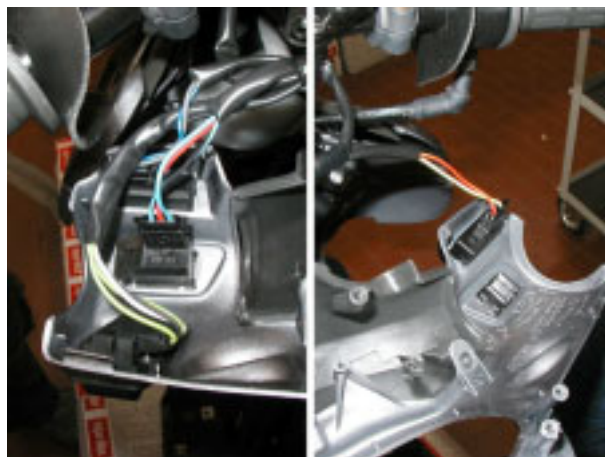
- Unscrew and remove the three screws (2).



- Unscrew and remove screw (3).



- To remove rear handlebar cover, release it from switches.



**7.1.15. REMOVING THE FRONT MUDGUARD**

- Position the vehicle on the central stand.
- Working on both sides, unscrew and remove the two screws (1).
- Remove the mudguard (2) by withdrawing it from the front part of the vehicle.



**7.1.16. REMOVING THE REAR MUDGUARD**

- Unscrew and remove side screw.



- Unscrew and remove top screw.



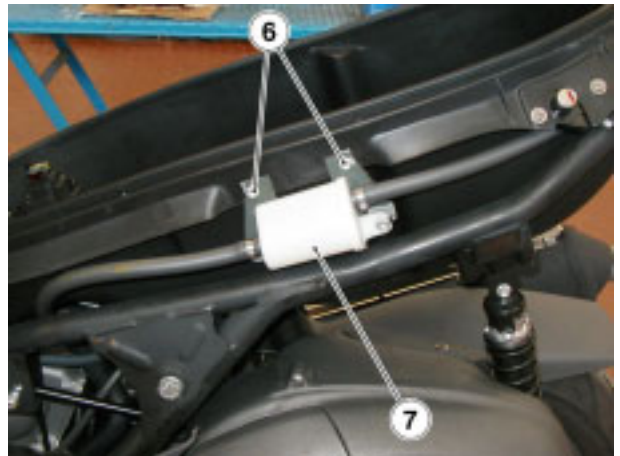
- Remove rear mudguard.





### 7.1.17. REMOVING THE CRASH HELMET COMPARTMENT

- Remove any object (crash helmet, tool kit, use and maintenance manual, etc.) from the crash helmet compartment.
- Remove the battery compartment, see 7.1.18 (REMOVING THE BATTERY COMPARTMENT).
- Remove the rear part of the fairing, see 7.1.3 (REMOVING THE REAR PART OF THE FAIRING).
- Unscrew and remove the five screws (1), and then remove:
  - Starting relay (2);
  - Control unit (3);
  - Voltage regulator (4);
  - Service control unit (for Leonardo 250, only) (5).
- Unscrew and remove the two screws (6) and remove filter (7).



- Withdraw the electric cables of the battery, fuse carrier and service warning light reset switch (for Leonardo 250, only) through the suitable holes.



- Unscrew and remove the two screws (8) rear part of the frame.
- Lower the saddle.
- Remove the crash helmet compartment complete with the saddle, by lifting it vertically.





**7.1.18. REMOVING THE BATTERY COMPARTMENT**

- Remove battery, see 7.2.1 (REMOVING THE BATTERY).
- Release fuses from their seating.



- Disconnect service warning light reset connector (for Leonardo 250, only).



- Unscrew and remove the four screws i (1).
- Remove battery compartment (2).



## 7.2. ELECTRIC PARTS

### 7.2.1. REMOVING THE BATTERY

- Raise saddle.
- Unscrew and remove the two screws.



- Remove battery cover.



- Disconnect battery cables (always disconnect positive cable first, and then negative one).



- Slide breather pipe out of battery.
- Remove battery.



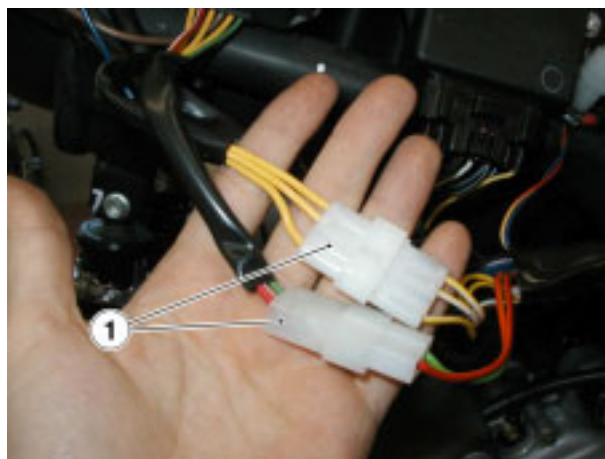
**7.2.2. REMOVING THE CONTROL UNIT**

- Remove tail guard, see 7.1.3 (REMOVING TAIL GUARD).
- Disconnect connector (1).
- Unscrew and remove the two screws (2) and remove the control unit (3).



**7.2.3. REMOVING THE VOLTAGE REGULATOR**

- Remove tail guard, see 7.1.3 (REMOVING TAIL GUARD).
- Disconnect connectors (1).



- Unscrew and remove the two screws (2) and remove voltage regulator (3).

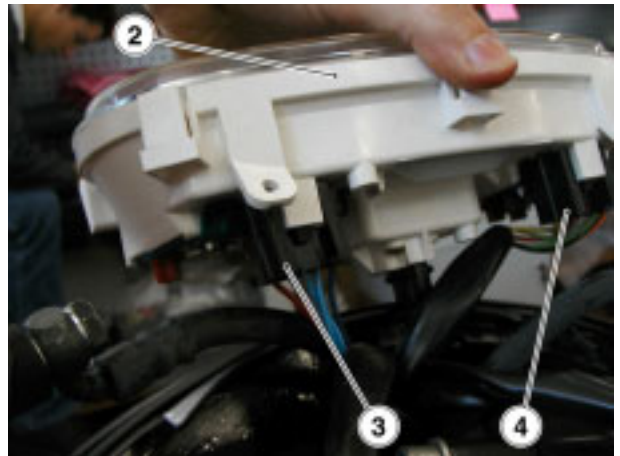


**7.2.4. REMOVING THE DASHBOARD**

- Remove the rear handlebar cover, see 7.1.14 (REMOVING THE REAR HANDLEBAR COVER).
- Disconnect the speedometer/odometer cable (1) from the dashboard.



- Disconnect the two electric connectors (3-4).
- Withdraw the dashboard (14).





**7.2.5. REMOVING THE HEADLIGHT**

- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD).
- Unscrew and remove the two screws (1) complete with washer.



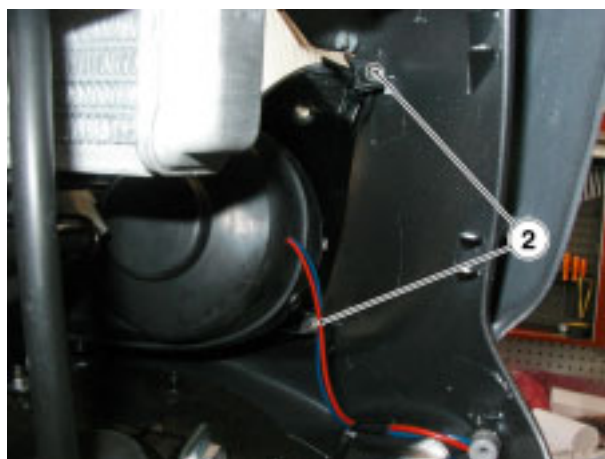
- Remove the air deflector.



- Disconnect the front light main connector.



- Working on both sides, unscrew and remove the two screws (2).





- Withdraw the headlight from the front part of the vehicle and remove it.



### 7.2.6. REMOVING THE FRONT DIRECTION INDICATORS

**NOTE** the following operations refer to one direction indicator, but they apply to both of them.

- Position the vehicle on the central stand.
- Unscrew and remove the screw.



#### **WARNING**

Upon reassembly, tighten the screw carefully, without exerting too much pressure, in order to avoid damaging the glass protection cover.

- Remove the glass protection cover.



- Unscrew and remove the screw.



- Extract the indicator as much as necessary to disconnect its two electric terminals.



- Remove the indicator complete with bulb (9).

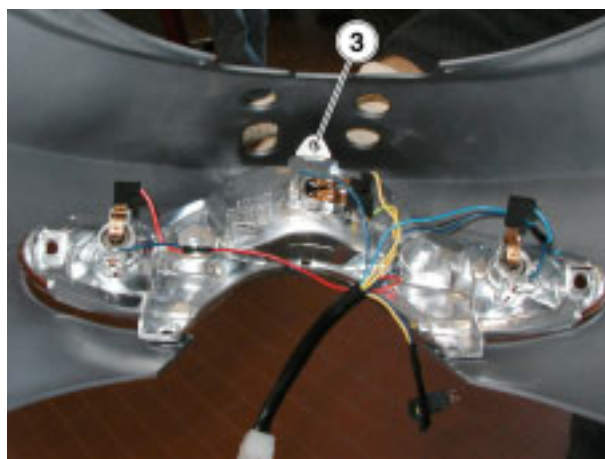


**7.2.7. REMOVING THE REAR LIGHT**

- Remove the rear part of the fairing, see 7.1.3 (REMOVING THE REAR PART OF THE FAIRING).
- Remove the plate number light, see 7.2.8 (REMOVING THE NUMBER PLATE LIGHT).
- Unscrew and remove the four screws (1).
- Remove the number plate holder (2) and release the number plate light wiring.



- Unscrew and remove screw (3).
- Remove the rear light.



**7.2.8. REMOVING THE NUMBER PLATE BULB**

- Unscrew and remove screw (1).
- Remove the number plate light (2).



- Remove the number plate bulb (3).



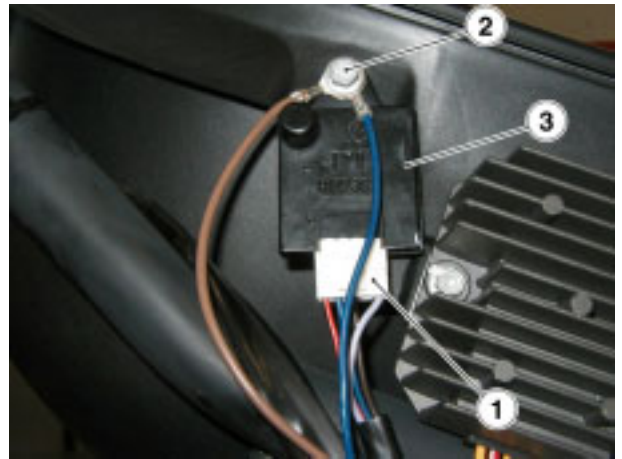
**7.2.9. REMOVING THE COIL**

- Remove the rear part of fairing, see 7.1.3 (REMOVING THE REAR PART OF FAIRING).
- Disconnect connectors (1).
- Unscrew and remove the two screws (2), and remove coil (3).



**7.2.10. REMOVING THE SERVICE WARNING LIGHT CONTROL UNIT (FOR LEONARDO 250 ONLY)**

- Remove the rear part of fairing, see 7.1.3 (REMOVING THE REAR PART OF FAIRING).
- Disconnect connector (1).
- Unscrew and remove screw (2), and remove service warning light control unit (3).





**7.2.11. REMOVING THE IGNITION SWITCH/STEERING LOCK**

- Remove the front inner shield, see 7.1.4 (REMOVING THE FRONT INNER SHIELD).
- Disconnect the electric connector (1).



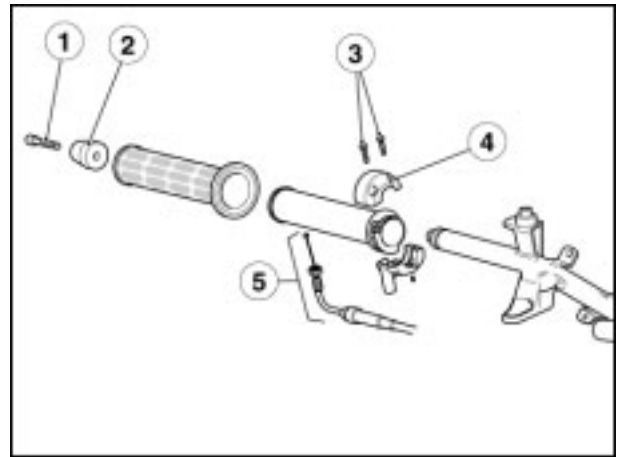
- Unscrew and remove the two screws (2).
- Remove the ignition switch/steering lock (3).



### 7.3. CONTROLS

#### 7.3.1. REMOVING THE THROTTLE CONTROL

- Remove rear handlebar cover, see 7.1.14 (REMOVING THE REAR HANDLEBAR COVER).
- Unscrew and remove screw (1).
- Remove balancing weight (2).
- Unscrew and remove the two screws (3).
- Remove throttle cable cover (4).
- Release throttle cable (5).
- Slide out throttle control



**7.3.2. REMOVING THE REAR BRAKE MASTER CYLINDER**

- Remove rear handlebar cover, see 7.1.14 (REMOVING THE REAR HANDLEBAR COVER).
- Unscrew the two screws (1).
- Remove brace (2).
- Remove rear brake master cylinder, but do not disconnect it from brake line.

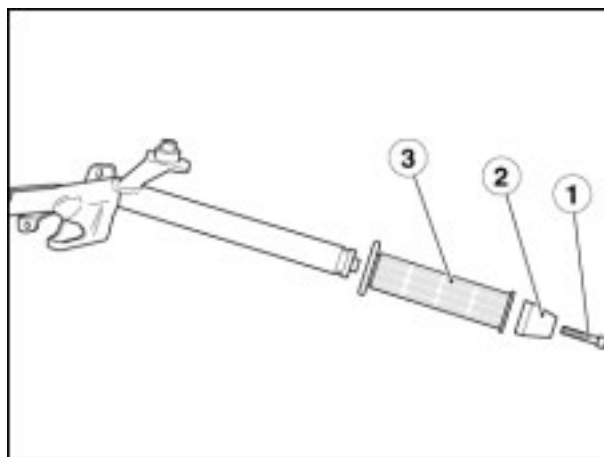
If necessary, remove the whole rear brake master cylinder.

- Drain all fluid off rear brake system, see 2.6 (BRAKES).
- Unscrew and remove screw (3). Keep safety washers.
- Remove rear brake master cylinder.



**7.3.3. REMOVING THE LEFT HANDGRIP**

- Unscrew and remove screw (1).
- Remove balancing weight (2).
- Remove handgrip (3).



**7.3.4. REMOVING THE FRONT BRAKE MASTER CYLINDER**

- Remove rear handlebar cover, see 7.1.14 (REMOVING THE REAR HANDLEBAR COVER).
- Unscrew the two screws (1).
- Remove brace (2).
- Remove front brake master cylinder, but do not disconnect it from brake line.

If necessary, remove the whole rear brake master cylinder.

- Drain all fluid off brake system, see 2.6 (BRAKES).
- Unscrew and remove screw (3). Keep safety washers.



- Remove front brake master cylinder.

## 7.4. FRAME

### 7.4.1. REMOVING HANDLEBARS

- Remove the instrument cluster, see 7.2.4 (REMOVING THE INSTRUMENT CLUSTER).
- Remove the throttle control, see 7.3.1 (REMOVING THE THROTTLE CONTROL).
- Remove rear brake master cylinder, see 7.3.2 (REMOVING REAR BRAKE MASTER CYLINDER).
- Remove left handgrip, see 7.3.3 (REMOVING LEFT HANDGRIP).
- Remove front brake master cylinder, see 7.3.4 (REMOVING FRONT BRAKE MASTER CYLINDER).
- Unscrew and remove nut (1). Remove screw and keep washers.
- Remove handlebars.



**7.4.2. REMOVING THE SIDE STAND**

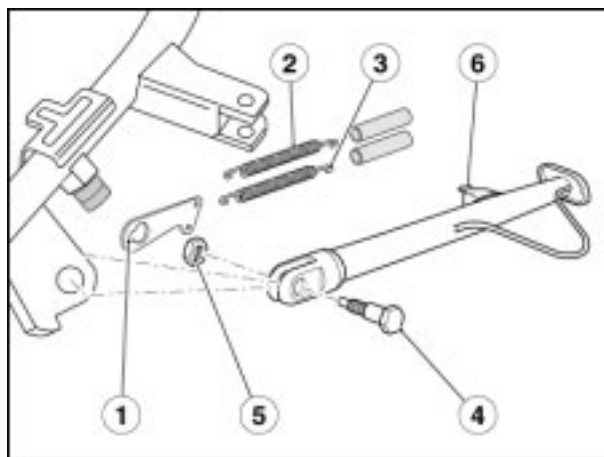
- Position the vehicle on the central stand.
- Remove the lower left shield, see 7.1.8 (REMOVING THE LOWER SHIELD).

**WARNING**

Work with the side stand in rest position.

- Withdraw the plate (1) from the anchorage pin.

**NOTE** Upon reassembly, correctly position the plate (1) on the springs (2) and (3) before anchoring it to the pin.



- Unscrew and remove the screw (4) and take the nut (5).
- Remove the side stand (6).



**7.4.3. REMOVING THE CENTRAL STAND**

- Position the vehicle on the side stand.

**WARNING**

Wait until the engine and the exhaust silencer have completely cooled down.

- Working on both sides, disconnect the spring (1) from the stand hook (2).
- Remove split pin (3) and slide out pin (3) from the opposite side. Keep washer.

**NOTE** At reassembly, change split pin (3).

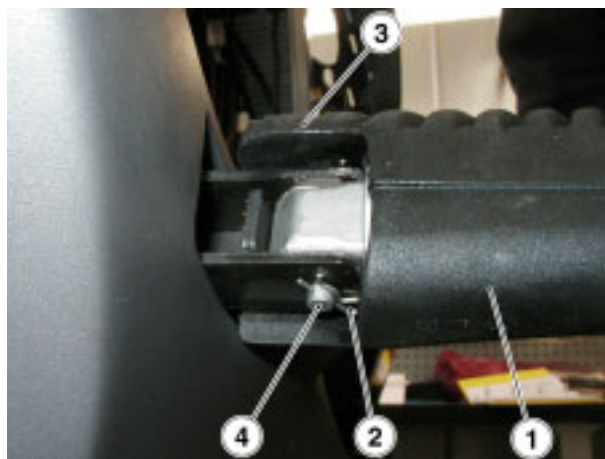
- Remove the central stand (5).



#### 7.4.4. REMOVING PASSENGER FOOTREST

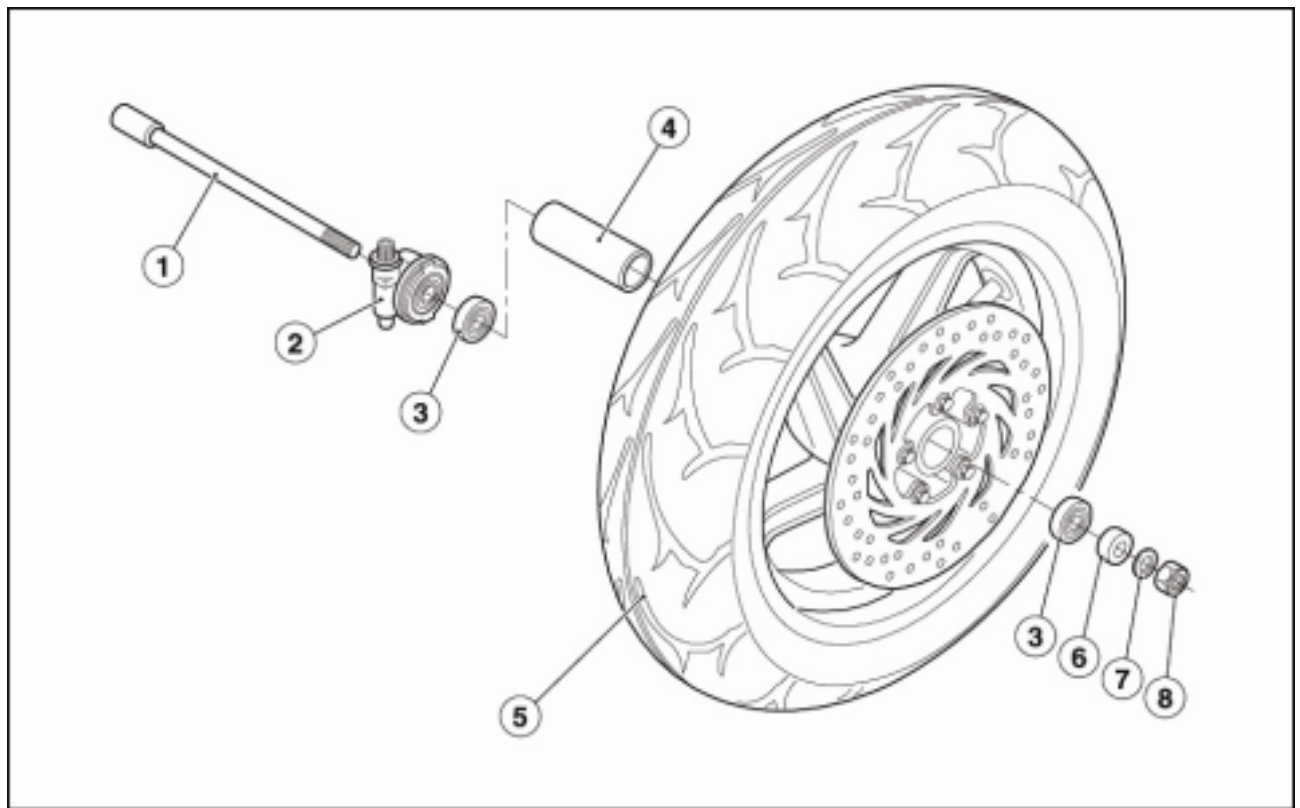
**NOTE** the following operations refer to a single passenger footrest, but apply to both of them.

- Position the vehicle on the central stand.
- Rotate the passenger footrest (1) in the position of use.
- Remove the split pin (2).
- Lift the upper edge of the footrest rubber part (3).
- Withdraw and remove the pin (4).
- Remove passenger footrest (1).



## 7.5. FRONT WHEEL

## 7.5.1. FRONT WHEEL DIAGRAM

**Key:**

1. Wheel pin
2. Speedometer control
3. Bearing
4. Inner spacer ring
5. Complete wheel
6. Outer spacer ring
7. Washer
8. Nut

## 7.5.2. REMOVAL

**WARNING**

While disassembling/reassembling the wheel, take care not to damage the brake pipe, the disc and the pads.

- Position the vehicle on the central stand.

**WARNING**

Place a support under the vehicle, so that the front wheel has enough space to move and the vehicle cannot fall down.

- Unscrew and remove the two screws (9).
- Remove the brake caliper (10), by carefully withdrawing it from the brake disc.
- Loosen the screw of the wheel pin clamp (11).
- Lock the wheel pin (12) by means of an hexagon spanner.
- Unscrew and remove the nut (13), taking the washer.
- Push the wheel pin (12), by carefully working on the threaded end and using a rubber hammer if necessary.

**NOTE** Check the arrangement of the parts, washers and spacer ring, in order to be able to reassemble them correctly.

- Support the front wheel and extract the wheel pin manually.
- Remove the wheel.
- Disconnect the tang of the speedometer/odometer control (6).

**WARNING**

Never pull the front brake lever after removing the wheel, otherwise the caliper piston may go out of its seat, thus causing the outflow of the brake fluid.

- Take the washer and the spacer ring.



### 7.5.3. CHANGING THE BEARINGS



#### WARNING

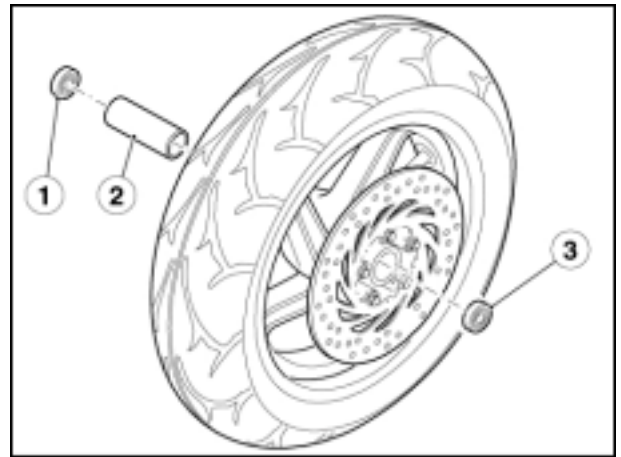
The bearings must be checked and if necessary changed every time they are removed.

- Clean the two sides of the hub with a cloth.

#### Disassembly

Work on the left side of the vehicle:

- Insert a punch (not pointed) in the wheel hub, act on the inner ring of the right bearing (1), changing the contact points in rotation (90°), in order not to misalign the bearing itself.
- Extract the right bearing (1).
- Extract the spacer ring (2).



Work on the right side of the vehicle:



#### WARNING

Keep the punch perpendicular to the bearing (coaxial to the wheel axis), in order not to misalign and damage the bearing itself.

- Insert a punch with 15 mm diameter in the wheel hub and place it on the inner ring of the left bearing (3).
- Strike the punch more than once and not too violently with a rubber hammer and extract the bearing.

#### Reassembly

- Work on the right side of the vehicle:
- Rest the bearing on the wheel hub.



#### WARNING

Keep the punch perpendicular to the bearing (coaxial to the wheel axis), in order not to misalign and damage the bearing itself..

- Put a punch with 31 mm diameter on the outer edge of the bearing.
- Strike the punch more than once and not too violently with a rubber hammer and insert the right bearing (1) completely.
- Insert the spacer ring (2).

Work on the left side of the vehicle:

- Repeat the first three operations for the left bearing (3).



#### WARNING

Check the centering of the bearings with respect to the wheel hub.

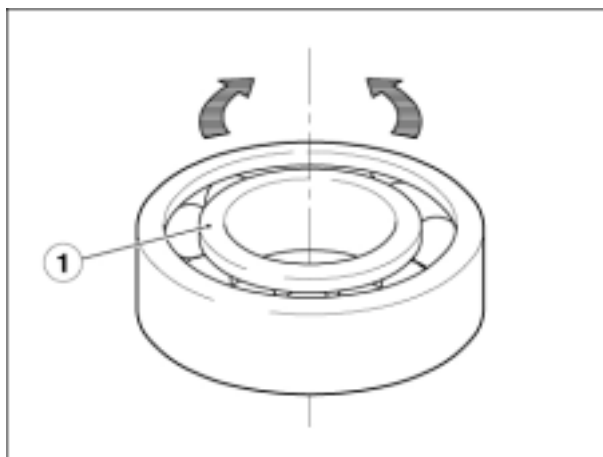
## 7.5.4. CHECKING FRONT WHEEL PARTS



**WARNING**  
Check the integrity of all the components and in particular those indicated below.

**Bearings**

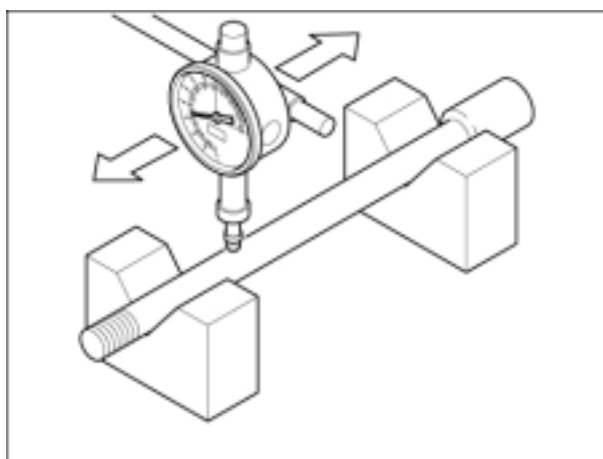
- Manually rotate the inner ring (1), which should rotate without jamming and/or noise. There should be no axial slacks. The bearings that show signs of the malfunctions mentioned above must be changed.



**WARNING**  
Apply grease on the balls (or rollers) on both sides of each bearing, see 1.7 (LUBRICANT CHART). This operation is not necessary if the bearing is self-lubricating.

**Wheel pin**

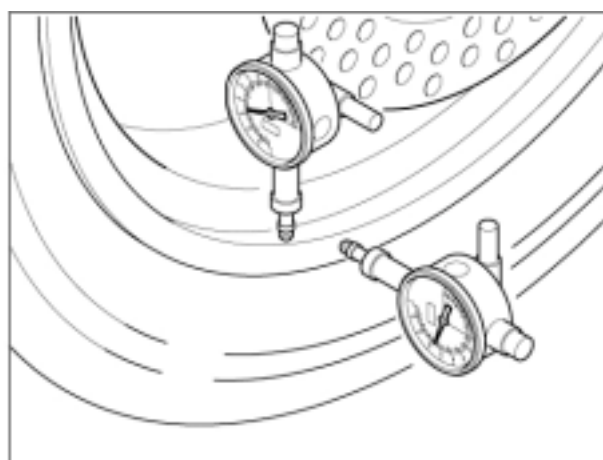
- Check the eccentricity of the pin by means of a comparator. If the eccentricity exceeds the limit value, change the pin.



**WARNING**  
Apply grease on the pin (only in the area of contact with the bearings), see 1.7 (LUBRICANT CHART).

**Rim**

- Using a comparator, make sure that the radial and axial eccentricity of the rim do not exceed the limit value. Excessive eccentricity is usually caused by worn or damaged bearings. If after changing the bearings the value still exceeds the indicated limit, change the rim.

**Speedometer control**

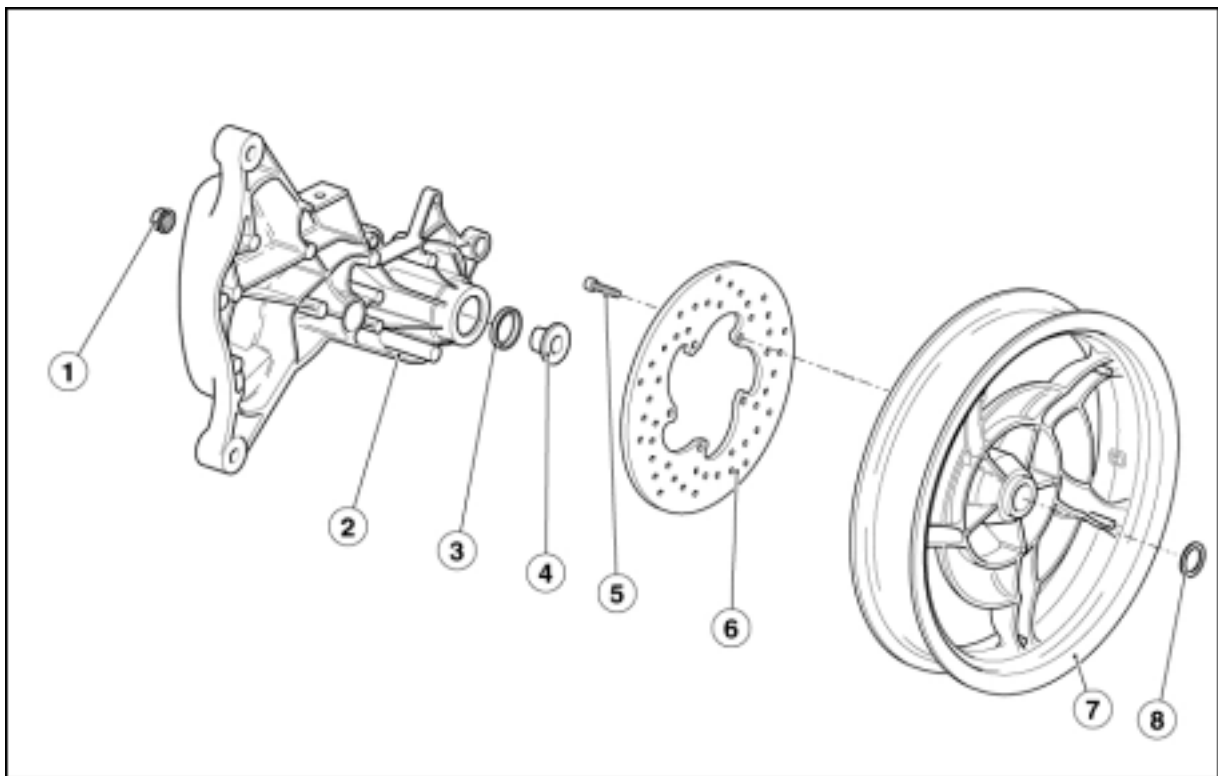
- Make sure that there are no evident signs of damage and/or excessive wear.



**WARNING**  
Apply grease on the inner side, see 1.7 (LUBRICANT CHART).

**Tyre**

Check the conditions of the tyre, see 2.21.2 (TYRES).

**7.6. REAR WHEEL****7.6.1. REAR WHEEL DIAGRAM****Key:**

1. Nut
2. Brake callipers – muffer mount
3. Dust seal
4. Spacer
5. Brake disc screw
6. Brake disc
7. Rear rim
8. Rear wheel washer

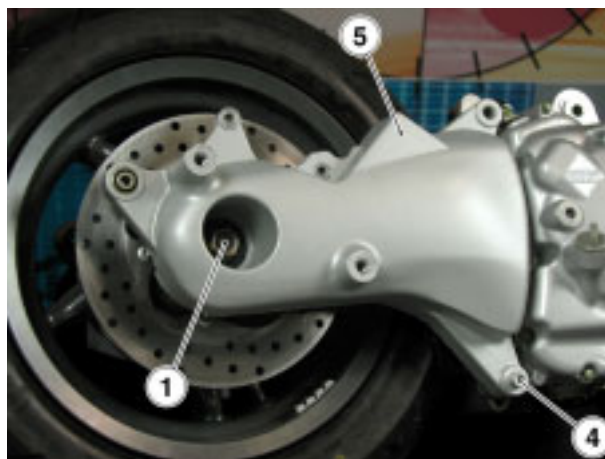


## 7.6.2. REMOVING THE REAR WHEEL

**WARNING**

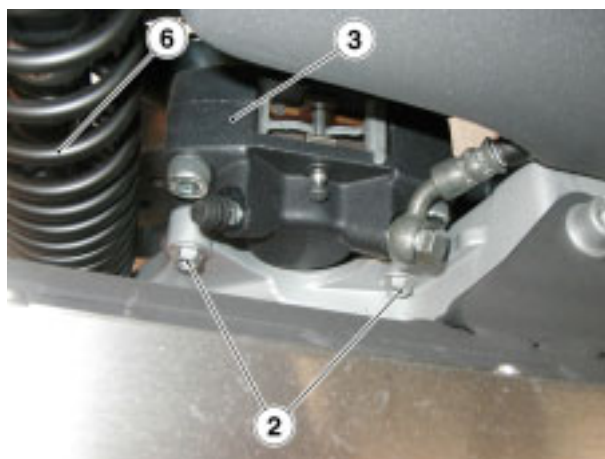
Wait until the engine and the exhaust silencer have completely cooled down. While disassembling/ reassembling the wheel, be careful not to damage the brake pipe, the disc and the pads.

- Remove the exhaust system, see 6.1.1 (REMOVING THE EXHAUST SYSTEM).
- On the rear brake, unscrew and remove the wheel nut (1).



**NOTE** Upon reassembly, change the wheel nut (special type) with a new one.

- Unscrew and remove the two screws (2) of the brake caliper (3).
- Unscrew and remove the shock absorber lower fastening screw (6) and move the shock absorber, thus releasing it from the lower coupling.
- Unscrew and remove screw (4) from muffer mount (5).
- Remove muffer mount (5).
- Remove the brake caliper (3), by carefully withdrawing it from the brake disc.
- Withdraw muffer mount (5).

**WARNING**

Inside the muffer mount (5) there are two bearings. In case the bearings are excessively worn, change the whole mount.

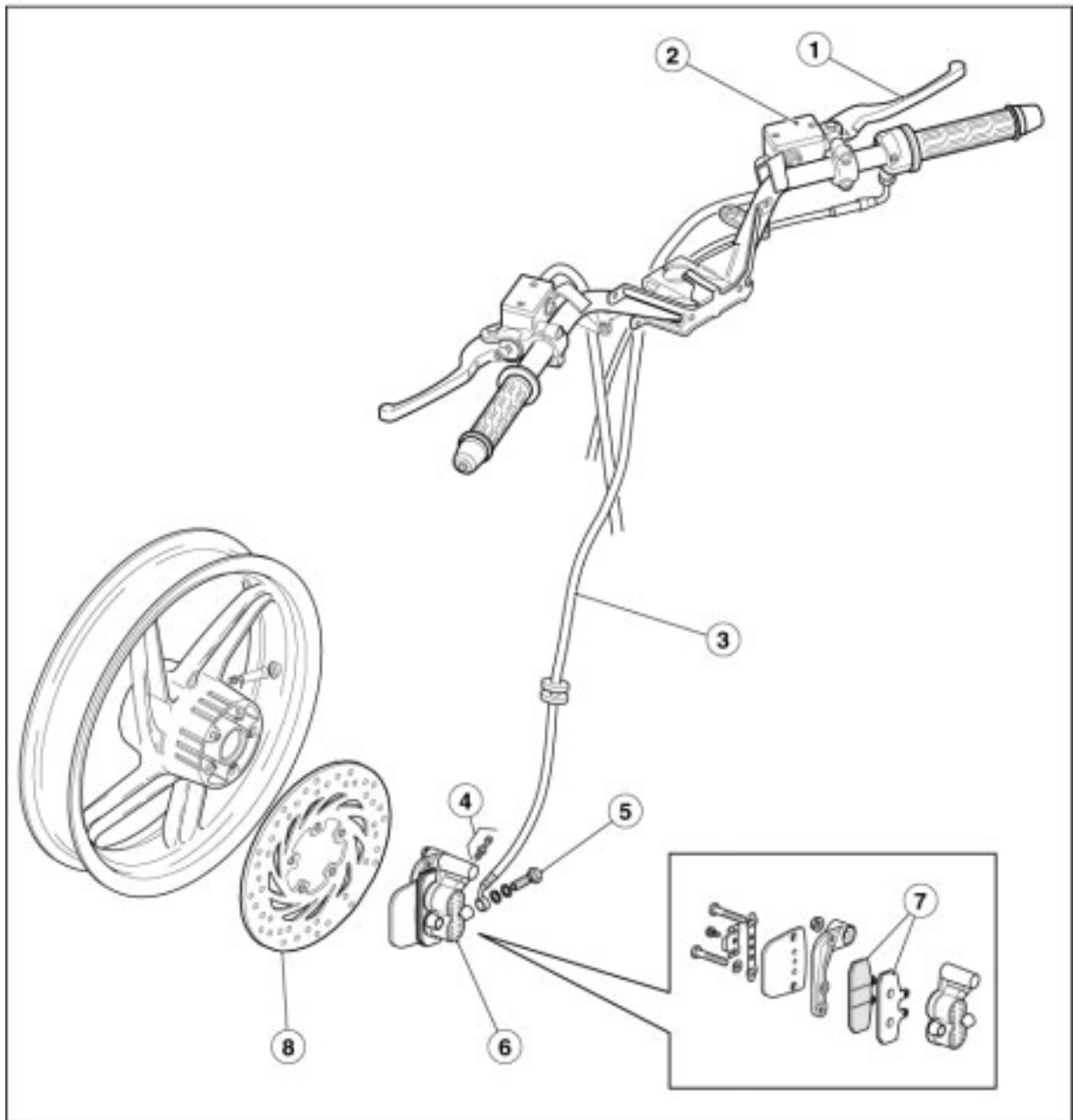
- Withdraw the spacer ring and the wheel.
- After reassembly follow the instructions below:
- Position the vehicle on the central stand
  - Make the rear wheel rotate at low speed
  - Check that the muffer mount (5) is not oscillating transversely.

Should the problem arise:

- Unloose the wheel nut (1)
- Change the wheel position
- Tighten the wheel nut (1)

## 7.7. FRONT BRAKE

## 7.7.1. FRONT BRAKE DIAGRAM

**Key:**

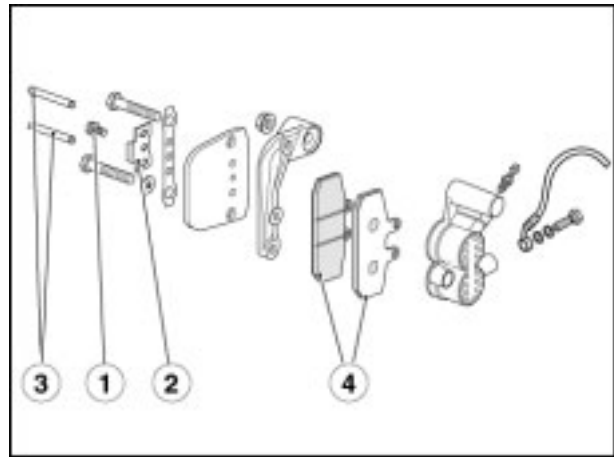
1. Brake control lever
2. Brake fluid pump/tank
3. Brake fluid pipe
4. Bleed valve
5. Pipe fitting screw
6. Brake caliper
7. Brake pads
8. Brake disc

**7.7.2. REPLACING THE FRONT BRAKE PADS**

- Remove the calliper,
- Unscrew and remove the central screw (1).
- Extract the retainer (2).
- Remove the two retaining pins (3).
- Extract the brake pads(4).

**CAUTION**

The brake pads must always be replaced in pairs. Ensure they become properly seated in the brake calliper.  
Take care not to reverse the retainer position.

**CAUTION**

Do not operate brake control lever once brake pads have been removed, so as to prevent calliper piston from coming out of its seating and thus brake fluid from leaking out.

- Fit two new brake pads (4).
- Insert the two calliper retaining pins (3).
- Refit the retainer (2).
- Tighten the central screw (1).
- Locate the brake calliper on the disk.
- Check brake fluid level, see 2.6.1 (BRAKES).

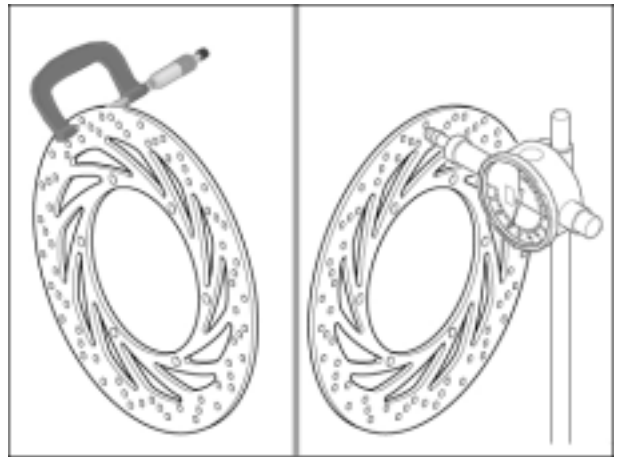
**7.7.3. CHECKING FRONT BRAKE DISC****WARNING**

These operations must be performed with the brake disc installed on the wheel.

- Carry out a visual check of the brake disc surface. If scratches or signs of deterioration are visible, change the disc, see 7.4.3 (REMOVING THE FRONT BRAKE DISC).
- Check the wear of the brake disc by measuring the minimum thickness in several points by means of a micrometer. If the minimum thickness, even in one point of the disc only, is lower than the limit value, change the disc.

**Min. brake disc thickness: 3.6 mm**

- By means of a comparator, make sure that the oscillation of the disc does not exceed the tolerance limit, otherwise change it.

**Brake disc oscillation limit: 0.3 mm**

**7.7.4. REMOVING THE FRONT BRAKE DISC**

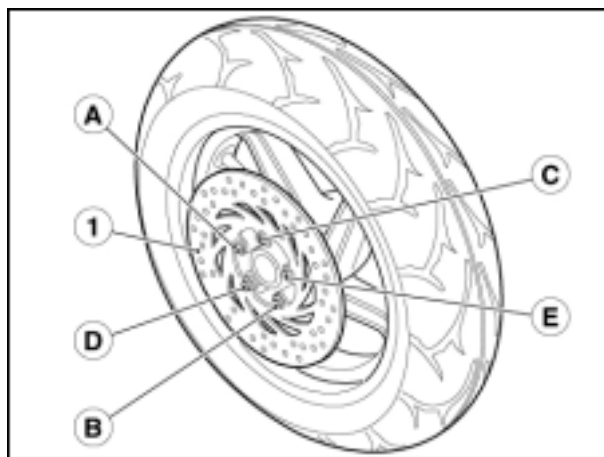
- Remove the front wheel, see 7.5.2 (REMOVING THE FRONT WHEEL).
- Unscrew and remove the five brake disc screws (1).

**IMPORTANT** Screw all the screws manually and tighten them proceeding diagonally in the following order: A-B-C-D-E.



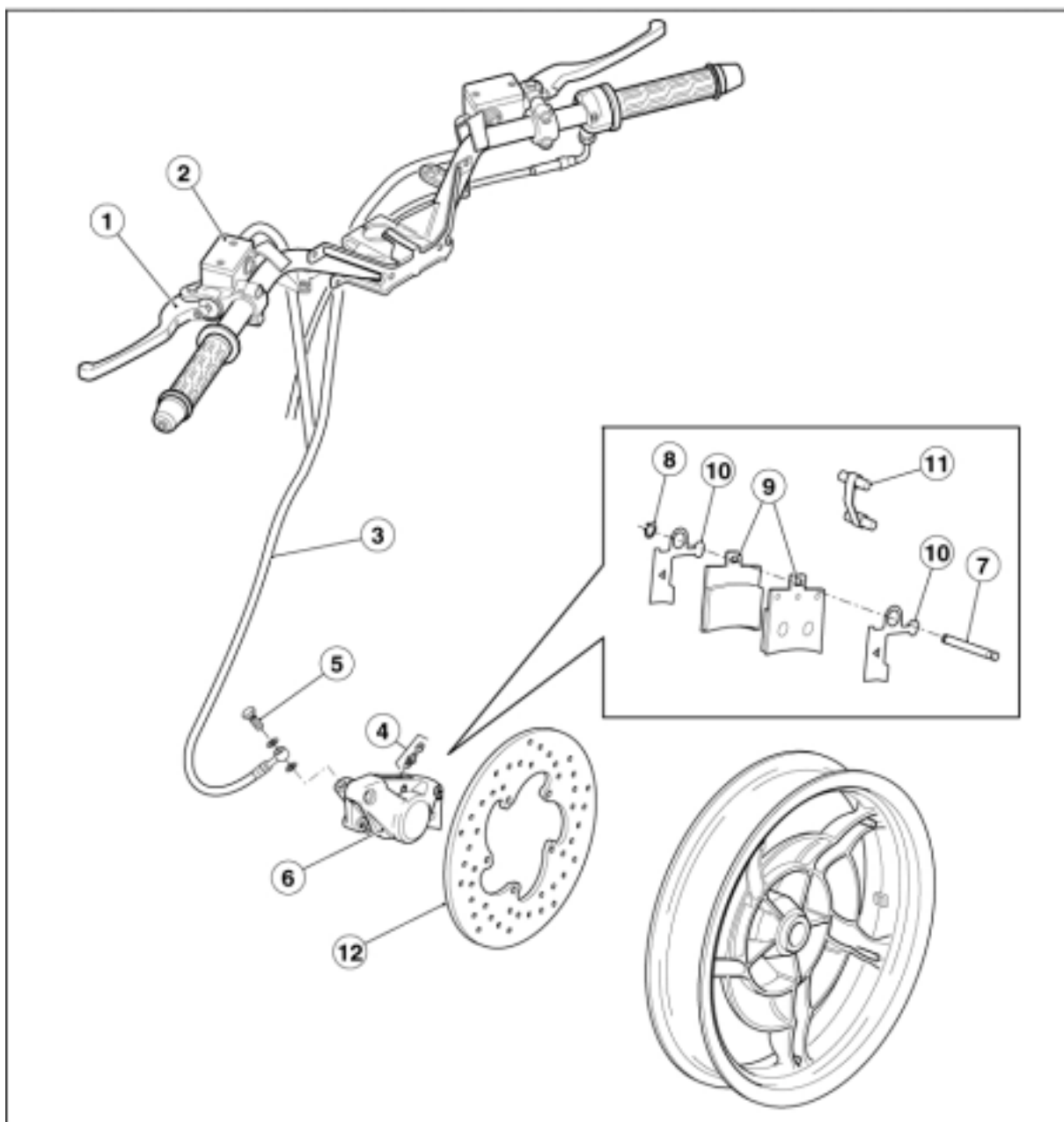
**CAUTION**  
Upon reassembly, apply LOCTITE® 270 on the threading of the brake disc screws.

- Remove the brake disc.



## 7.8. REAR BRAKE

## 7.8.1. REAR BRAKE DIAGRAM

**Key**

1. Brake control lever
2. Brake fluid pump/tank
3. Brake fluid pipe
4. Bleed valve
5. Pipe fitting screw
6. Brake calliper
7. Pad pin
8. Stop ring
9. Brake pads
10. Antivibration plates
11. Pad spring
12. Brake disc

**7.8.2. REPLACING THE REAR BRAKE PADS**

- Remove the rear brake caliper, (REMOVING THE REAR WHEEL).
- Remove the circlip (1).
- Remove the spindle (2).
- Remove the spring (3).

**CAUTION**

The spring (3) is stamped with an arrow which must always be oriented in the direction of travel of the motorcycle..

- Extract the pads (4) complete with vibration dampers (5).

**CAUTION**

Do not operate the brake lever with the brake pads removed, or the brake caliper pistons might fall out leading to loss of brake fluid.

- Replace both pads (4).
- If they are worn, also replace the vibration dampers (5).

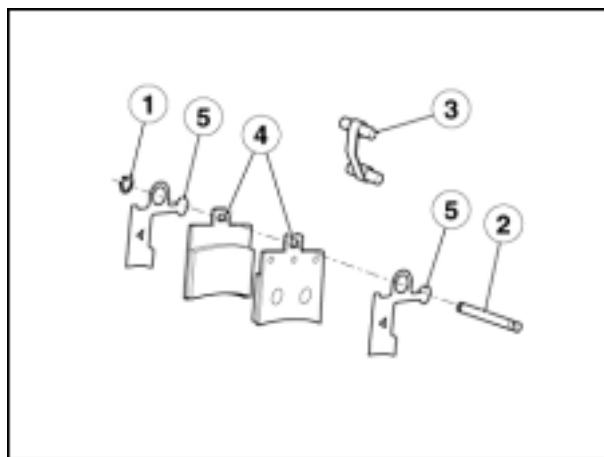
**CAUTION**

The brake pads must always be replaced in pairs. Ensure they become properly seated in the brake caliper.

**CAUTION**

Make sure that the arrows on the vibration dampers are oriented in the direction of travel when replaced.

- Fit the spring (3).
- Fit the pin (2).
- Fit the circlip (1)
- Check brake fluid level, (BRAKE).





**7.8.3. CHECKING THE REAR BRAKE DISC****CAUTION**

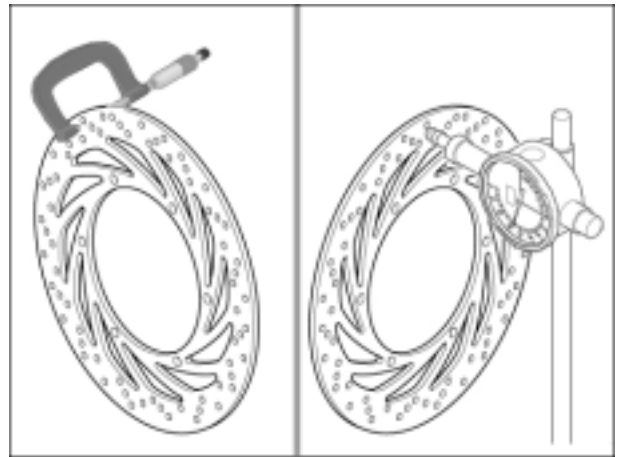
These operations must be performed with the brake disc installed on the wheel.

- Carry out a visual check of the brake disc surface. If scratches or signs of deterioration are visible, change the disc, see 7.5.3 (REMOVING THE REAR BRAKE DISC).
- Check the wear of the brake disc by measuring the minimum thickness in several points by means of a micrometer. If the minimum thickness, even in one point of the disc only, is lower than the limit value, change the disc.

**Min. brake disc thickness: 3.6 mm**

- By means of a comparator, make sure that the oscillation of the disc does not exceed the tolerance limit, otherwise change it.

**Brake disc oscillation limit: 0.3 mm**



**7.8.4. REMOVING THE REAR BRAKE DISC**

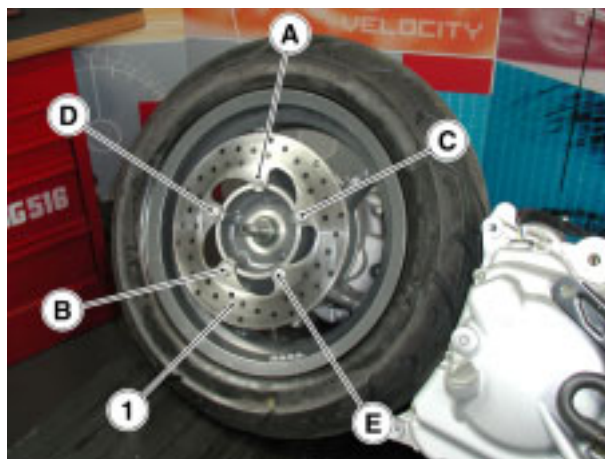
- Remove the front wheel, see 7.5.2 (REMOVING THE REAR WHEEL).
- Unscrew and remove the five brake disc screws (1).

**IMPORTANT** Screw all the screws manually and tighten them proceeding diagonally in the following order: A-B-C-D-E.

**CAUTION**

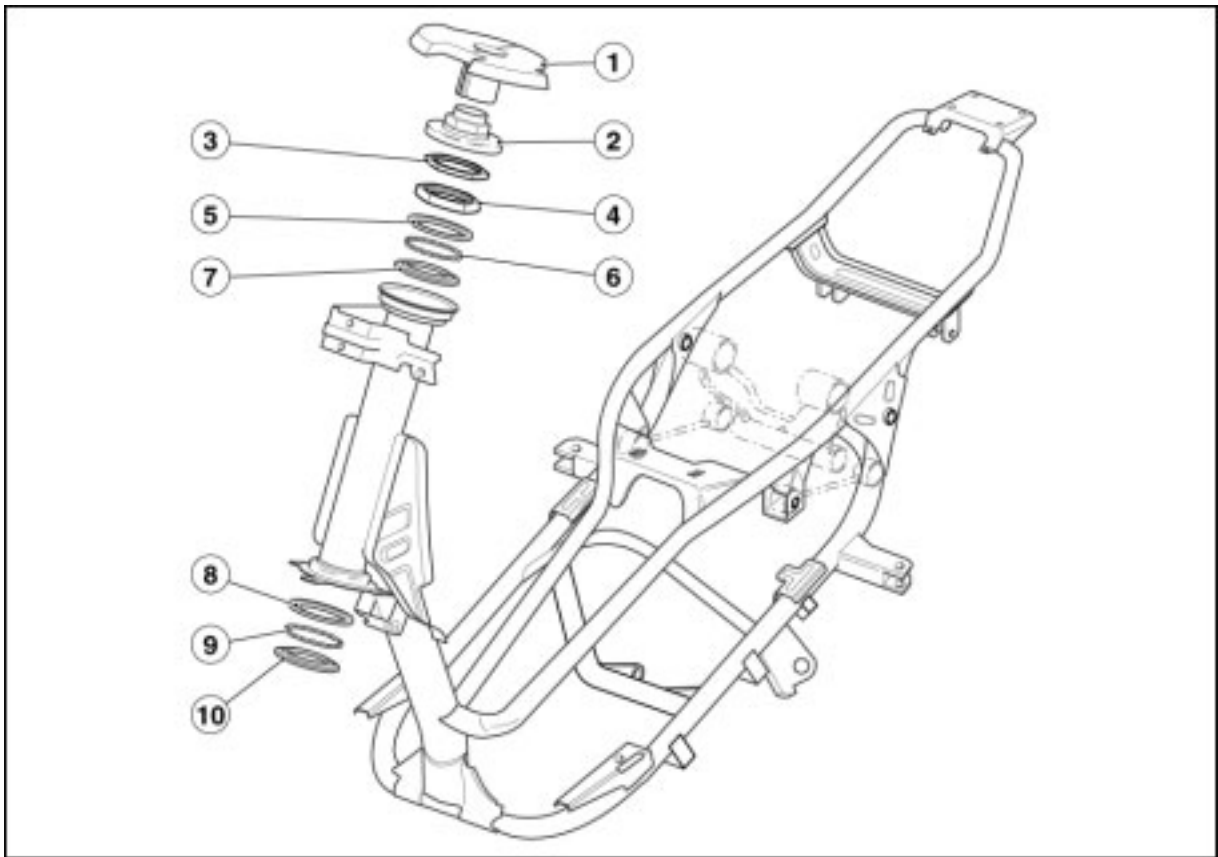
Upon reassembly, apply LOCTITE® 270 on the threading of the brake disc screws.

- Remove the brake disc.



## 7.9. STEERING

### 7.9.1. STEERING DIAGRAM



**Key:**

1. Cover
2. Rubber seal
3. Check nut
4. Adjusting nut
5. Upper rotating seat
6. Upper bearing balls
7. Upper fixed seat
8. Lower fixed seat
9. Lower bearing balls
10. Lower rotating seat

### 7.9.2. REMOVING THE STEERING STEM

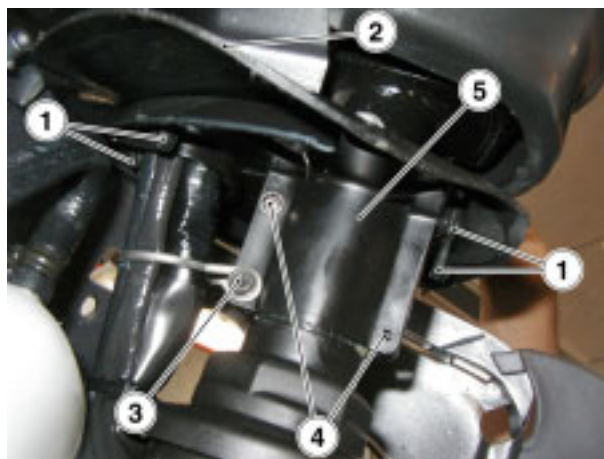
- Remove the lower shield, see 7.1.8 (REMOVING THE LOWER SHIELD).
- Position the vehicle on the central stand on a lifting platform, with the front wheel protruding from the platform edge.



#### CAUTION

Put a proper support under the vehicle, in order to prevent it from falling down.

The vehicle must rest on the frame and not on the fuel tank. Make sure that the vehicle is stable.



- Remove the front outer shield, see 7.1.7 (REMOVING THE FRONT OUTER SHIELD).
- Lift the platform at 50 ÷ 60 cm from the ground.



#### WARNING

Provide a proper support for the handlebars, which remain connected to the vehicle through the electric cables and the brake pipes. Proceed with care.

Do not force the electric cables or the brake pipes.

- Remove handlebars, see 7.4.1 (REMOVING HANDLEBARS).
- Remove the four screws (1).
- Remove the rubber membrane (2).
- Unscrew and remove the three screws (3-4).
- Withdraw and remove the protection element (5).
- Withdraw and remove the rubber gasket (6).
- Unscrew and remove the lock nut (7).

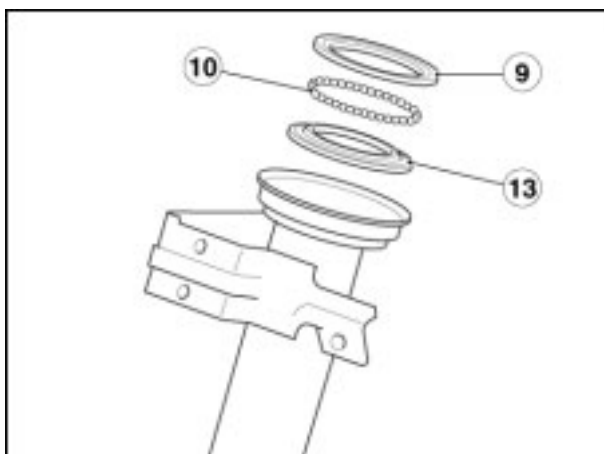
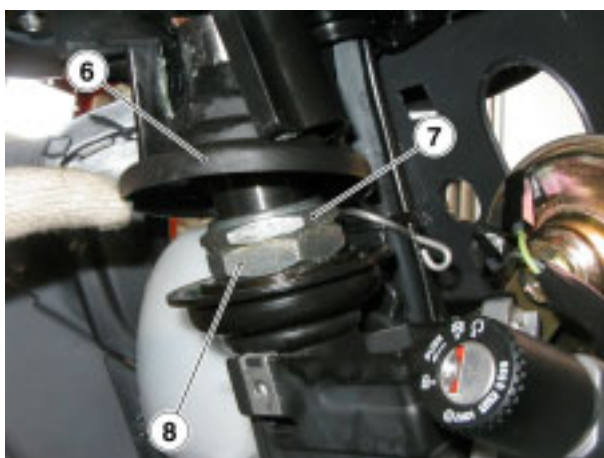


#### CAUTION

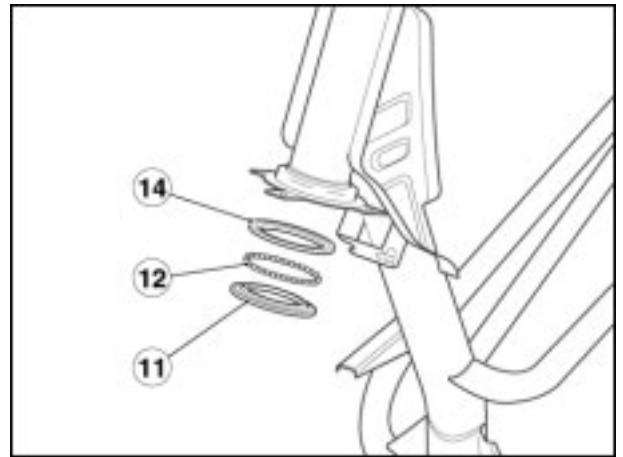
Support the fork, in order to prevent it from accidentally falling down.

**IMPORTANT** When withdrawing the fork, pay attention to the lower bearing balls, since they may go out of their seats.

- Unscrew and remove the adjusting nut (8).
  - Withdraw the fork from the steering tube.
- 
- Remove the rotating seat (9) and the balls (10) of the upper bearing.



- Remove the lower rotating seat (11) and the balls (12) of the lower bearing.
- Remove the grease from all the bearing components, including the fixed seats (13) and (14).
- Check the conditions of the components and if they are worn change them.
- Grease and proceed to the reassembly, see 1.8.1 (TABLE OF LUBRICANTS).



## 7.9.3. CHECKING STEERING COMPONENTS

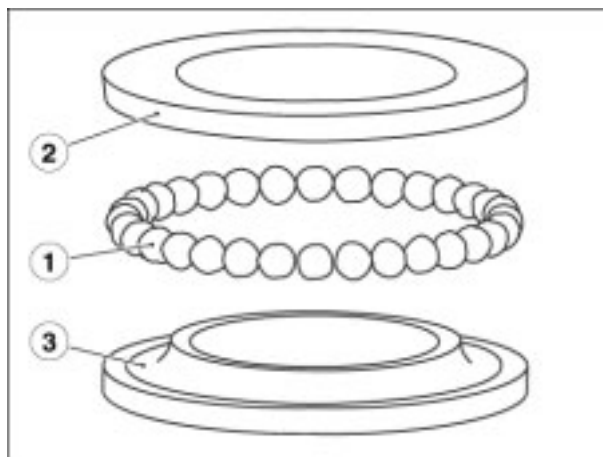
**CAUTION**

Check the integrity of the components.

- Make sure that the area in contact with the balls (1) (on the rotating seat (2) and on the fixed seat (3)) is neither damaged, nor excessively worn out. Otherwise, change the whole bearing.

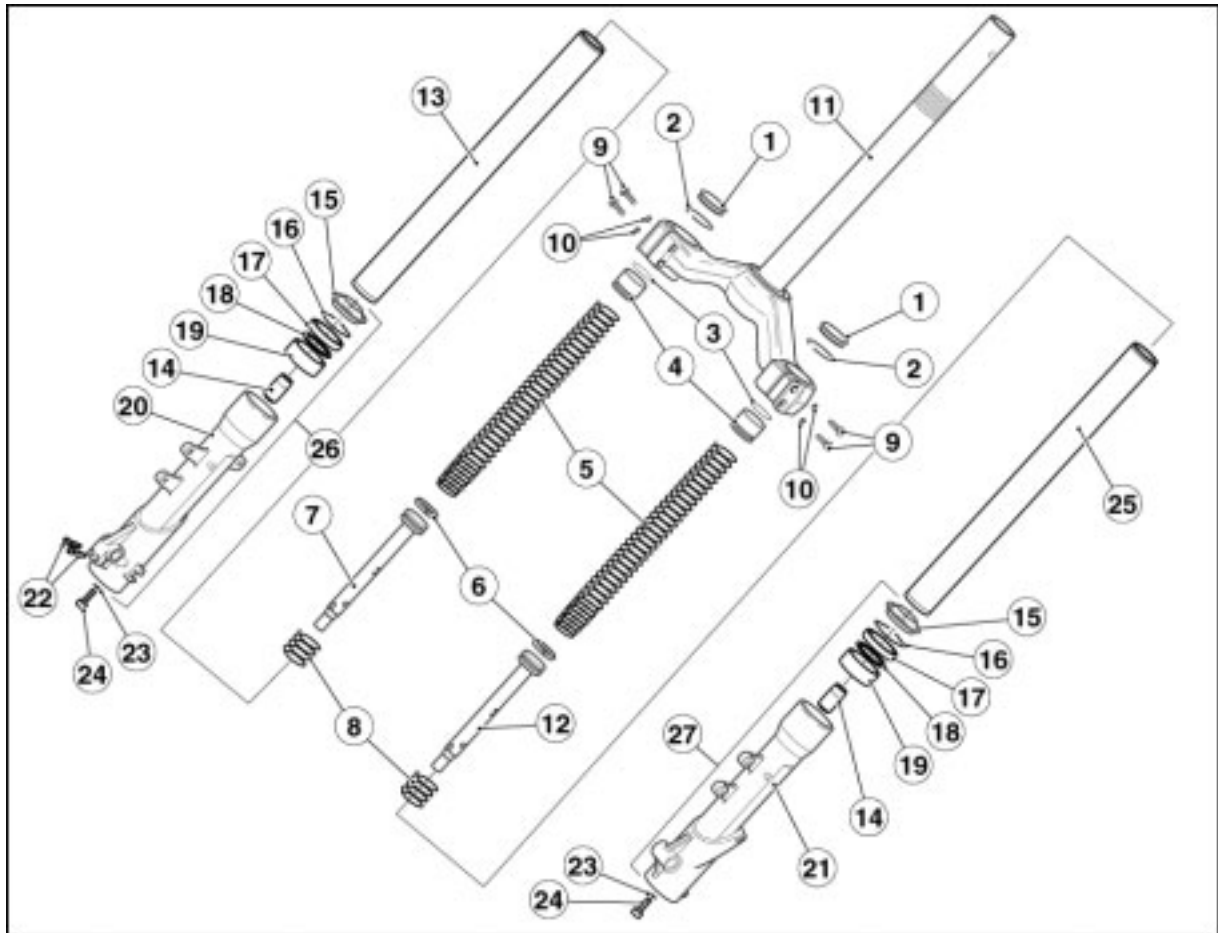
**CAUTION**

Apply grease on the area in contact with the balls on the two seats (2-3), see 1.8.1 (TABLE OF LUBRICANTS).



## 7.10. FRONT FORK

## 7.10.1. FORNT FORK DIAGRAM

**Key:**

1. Leg cap
2. Snap ring
3. O-ring
4. Plug
5. Spring
6. Segment
7. Right damper rod
8. Counterspring
9. Legs retaining screws
10. Washer
11. Fork bottom with steering stem
12. Left damper rod
13. Right leg
14. Bottom buffer
15. Dust seal
16. Circlip
17. Oil seal
18. Shim cap
19. Slider bush
20. Right outer sleeve
21. Left outer sleeve
22. Wheel shaft pinch bolts
23. Safety washer
24. Bottom screw
25. Left leg
26. Complete right outer sleeve
27. Complete left outer sleeve



### 7.10.2. CHECKING THE OIL LEVEL

If the fork stroke is excessive, it is necessary to check the fork oil level.

- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD).



#### WARNING

To facilitate the extraction of the two seal plugs (3), it is necessary to remove both of them at the same time.

- Working on both sides, remove the rubber plug (1).
- Working on both sides, remove the snap ring (2).
- Push the fork slowly downwards until the two seal plugs (3) come out together with the "GACO" O-rings (4).

**IMPORTANT** Check the integrity of the "GACO" O-rings and if necessary change them.

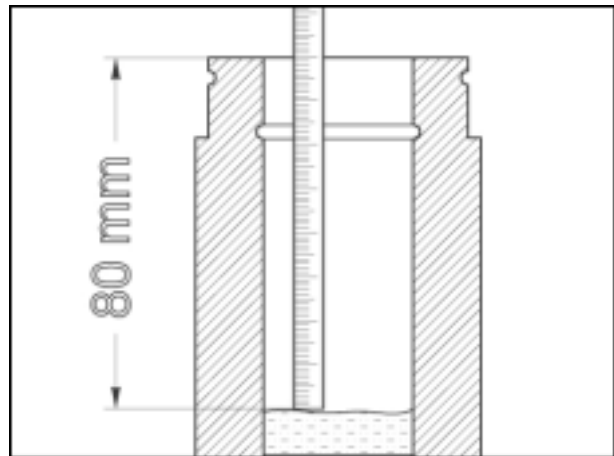
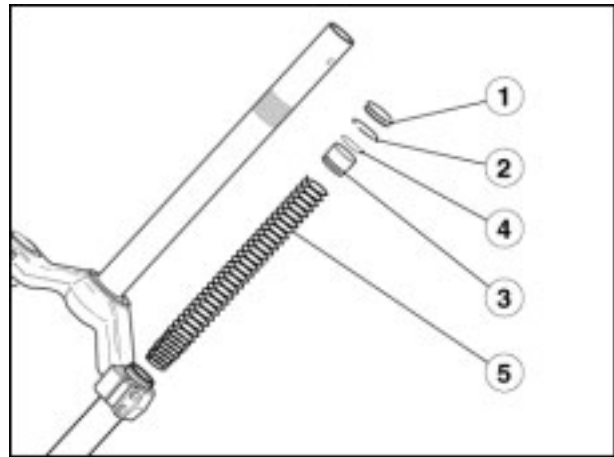
**IMPORTANT** Check the position of the spring (5) (coils with shorter diameter and closer to one another in the lower part).



#### WARNING

The spring is dipped in the oil. Avoid dripping oil during the extraction.

- Working on both sides, withdraw the spring (5).
- Bring the fork to the end-of-stroke, insert a calibrated dipstick (meter) in one of the two tubes and make sure that the distance between the upper edge of the tube and the oil level is 80 mm.
- Top up if necessary, see 1.8.1 (LUBRICANT CHART).



### 7.10.3. REMOVING FORK LEG/SLIDER ASSEMBLY

**IMPORTANT** the following operations refer to a single fork leg/slider assembly, but apply to both of them.

- Position the vehicle on the stand.



**CAUTION**

Place a proper support under the vehicle, in order to prevent it from falling down.

- Remove the front wheel, see 7.5.2 (REMOVING THE FRONT WHEEL).



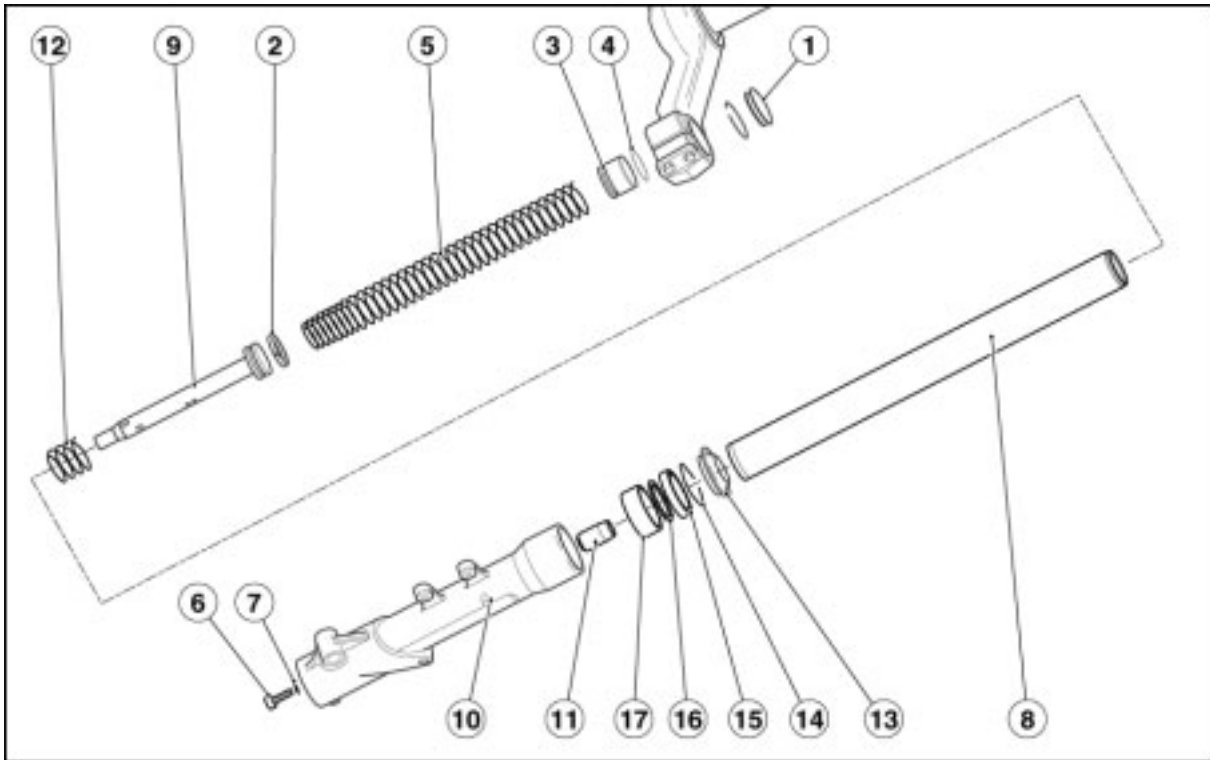
**CAUTION**

Do not operate the front brake lever after removing the brake caliper, since the piston may go out of its seat, thus causing the outflow of the brake fluid.

- Remove front mudguard, see 7.1.15 (REMOVING THE FRONT MUDGUARD).
- Remove the front inner shield, see 7.1.6 (REMOVING THE FRONT INNER SHIELD).
- Loosen the screws (1) of the tube clamp.
- Remove the snap ring (2) from the fork tube.
- Lower the fork tube together with the slider and withdraw it completely.



## 7.10.4. DISASSEMBLING THE FORK LEG/SLIDER UNIT



**NOTE** the following operations refer to a single fork leg/slider assembly, but apply to both of them.

- For the disassembly of the rubber cap (1), snap ring (2), seal plug (3) complete with "GACO" O-ring (4), spring (5), carry out the operations described in section 7.10.2 (CHECKING THE OIL LEVEL) on the leg/slider unit that must be disassembled, excluding the last two operations (oil level check).

**CAUTION**

**The oil may flow out.**

**The leg/slider unit is full of oil. Neither overturn it, nor incline it excessively during the removal.**

- Remove the leg/slider unit, see 7.7.3 (REMOVING THE LEG/SLIDER ASSEMBLY ).
- Prepare a graduated container with at least 200 cu.m capacity..
- Make the tube get into the slider completely, rotate the tube/slider unit and drain the oil in the container.

**CAUTION**

**Check the oil quantity.**

**If it is lower than 148 cu.cm, top up or change.**

- Unscrew and remove the screw (6) (slider bottom) and take the copper washer (7).
- Withdraw the tube (8) complete with pumping element (9).

- Take the bottom buffer (11) and the counterspring (12) by rotating the slider (10).
- Remove the dust seal (13).
- Remove the retaining ring (seeger) (14).
- Remove the seal (15).
- Extract the cap (16).
- Extract the bushing (17).

### 7.10.5. CHECKING THE COMPONENTS

#### Tube

- Check the sliding surface, that must be neither lined, nor scratched. Slight lines can be eliminated by sanding the surface with wet sandpaper (grain 1). If the lines are deep, change the tube.
- By means of a comparator, make sure that any curving of the tube be lower than the limit value. If it exceeds the limit value, change the tube.

**Curving limit: 0.2 mm.**



**CAUTION**  
**NEVER straighten a curved tube, since its structure would be weakened, thus making the use of the vehicle quite dangerous.**

#### Slider

- Make sure that there are neither damages, nor cracks. Otherwise, change it.

#### Spring

- Check the integrity of the spring.

#### Pumping element

- Check the integrity of the pumping element. If you observe any damage, change it.

## 7.11. REAR SUSPENSION

### 7.11.1. REMOVING THE SHOCK ABSORBER

- Raise vehicle on centre stand.

**WARNING**

Wait until the engine and the exhaust silencer have completely cooled down.

**IMPORTANT** Remove the shock absorbers one by one. To keep the vehicle in its position, always leave one shock absorber installed on the vehicle.

- Unscrew and remove the upper screw (1) and take the nut (2).

**IMPORTANT** Slightly press the saddle, in order to facilitate the extraction of the upper screw.

- Unscrew and remove the lower screw.
- Remove the shock absorber.



**7.11.2. REMOVING LINKAGES**

- Raise vehicle on centre stand on a on a lifting platform.
- Secure front wheel to platform.
- Remove the rear part of fairing, see 7.1.3 (REMOVING THE REAR PART OF THE FAIRING).
- Position a proper support under the vehicle.



- Working on both sides, unscrew and remove nut (1). Keep screw.
- Working on both sides, unscrew and remove screw (2). Keep nut and washer.



- Working on the right side, unscrew and remove nut (3).



- Working on left side, remove screw (4).
- Remove linkages.





**7.11.3. REASSEMBLING LINKAGES**

- Raise vehicle on centre stand on a on a lifting platform.
- Secure front wheel to platform.
- Position a proper support under the vehicle.



- Refit linkages to engine.
- Working on left side, install shaft (1).



- Working on right side, snug nut (2) by hand.



- Working on both sides, install engine linkage (3). Fit screw and tighten nut (4).
- Fit frame link rod (5).
- Working on both sides, install screw (6) and tighten nut.
- Working on right side, tighten nut (2).
- Refit the rear part of fairing, see 7.1.3 (REMOVING THE REAR PART OF THE FAIRING).



ELECTRICAL SYSTEM

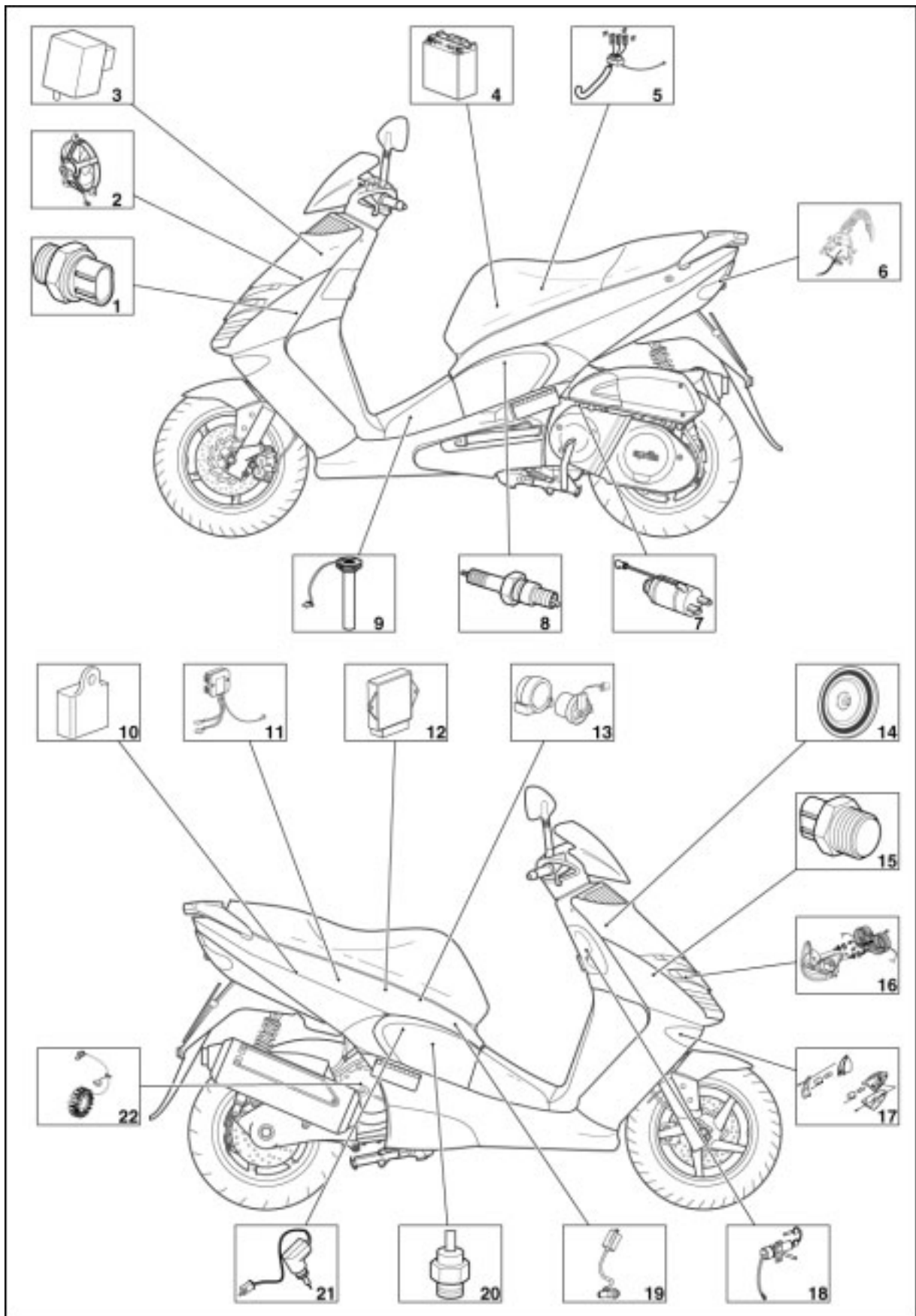
8

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8.1. ARRANGEMENT OF ELECTRICAL PARTS .....3  
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8.2.1. ELECTRICAL SYSTEM DIAGRAM .....10

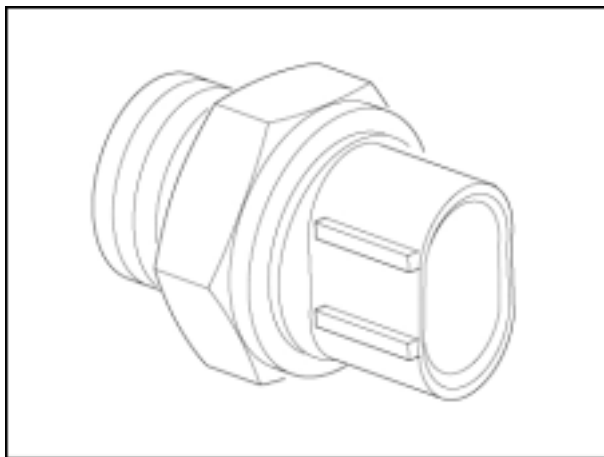
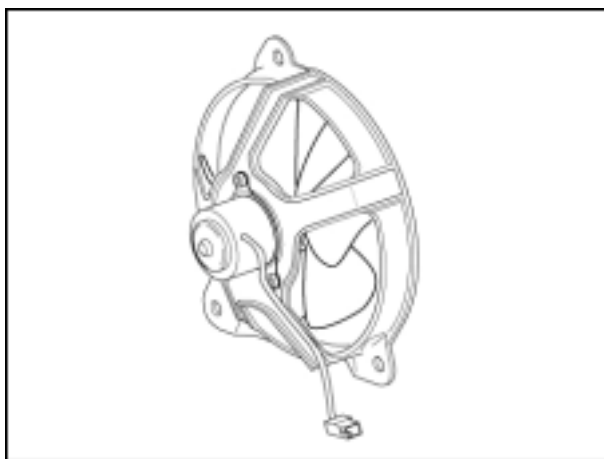
8.1. ARRANGEMENT OF ELECTRICAL PARTS

8.1.1. ELECTRICAL PARTS

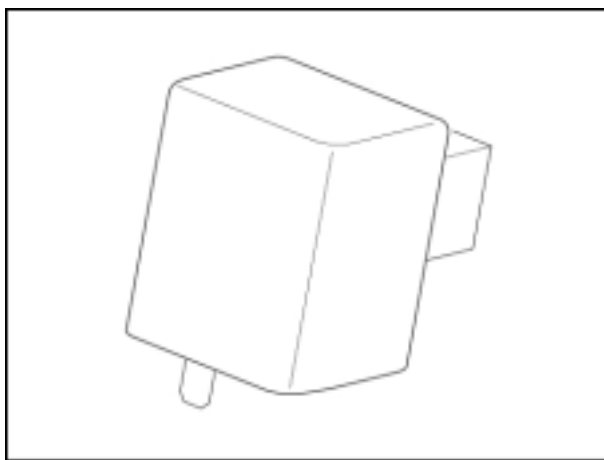


**1 Electric fan thermal switch**

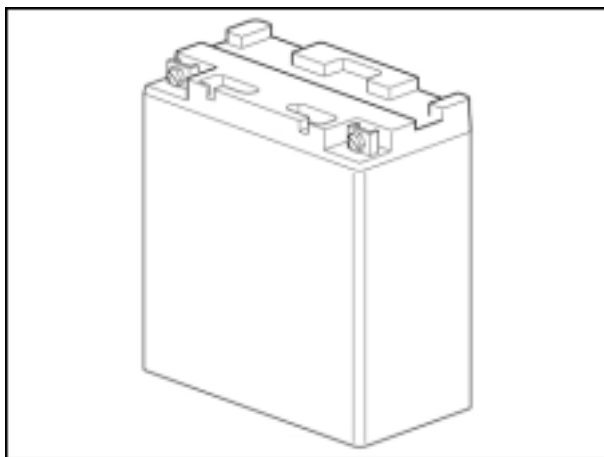
NIPPON THERMOSTAT ON 98 +/- 3°C (37.4°F), OFF 92 +/- 3°C (37.4°F)

**2 Electric fan****3 Flasher**

DENSO 12V 10W+10W

**4 Battery**

12 V - 12 Ah



**5 Fuses****7,5A (A) fuse:**

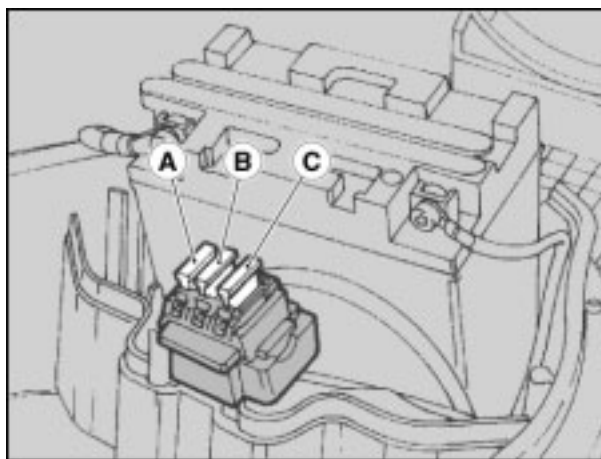
From the ignition switch to: ignition.

**15A (B) fuse:**

From the ignition switch to: all light loads and horn.

**20A (C) fuse:**

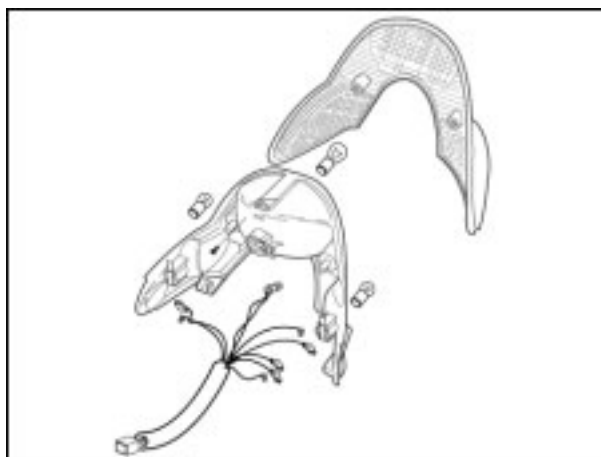
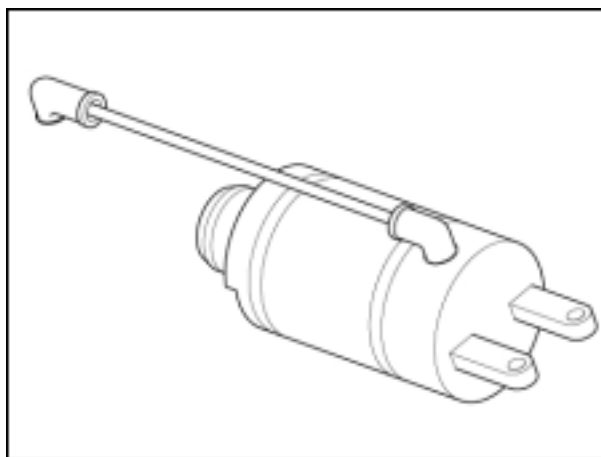
From the battery to: ignition switch, voltage regulator, electric fan.

**6 Rear light unit**

Direction indicator light: 12 V - 10 W

Rear stop/parking light: 12 V - 5/21 W

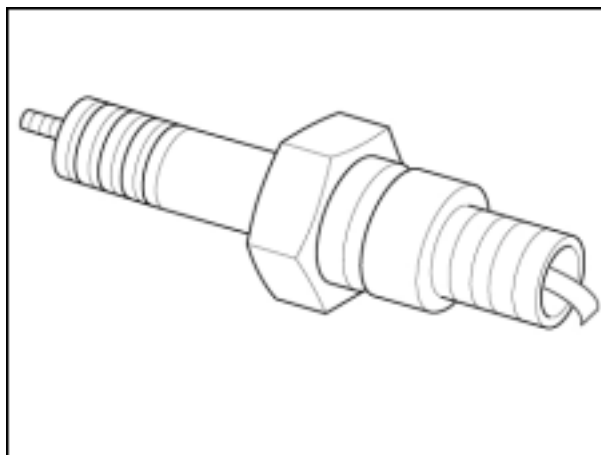
Number plate light: 12 V - 5 W

**7 Starter motor****8 Spark plug**

NGK DR8EA

Electrode gap: 0.6 – 0.7 mm

Spark plug cap resistance: 5 K

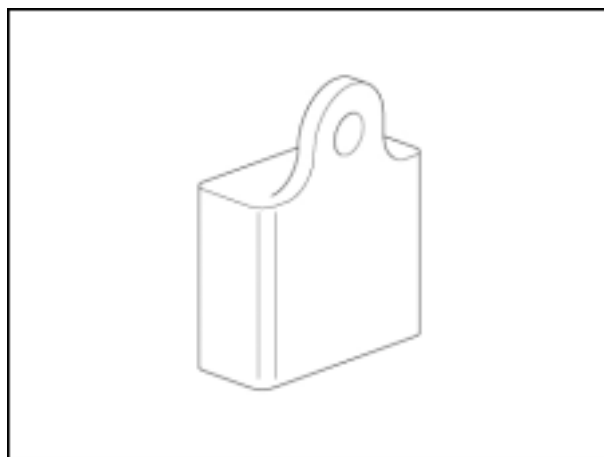


**9 Fuel level sensor**

Float position	R
UP	4-10 ohm
DOWN	90-100 ohm

**10 Service warning light control unit (for Leonardo 250, only)**

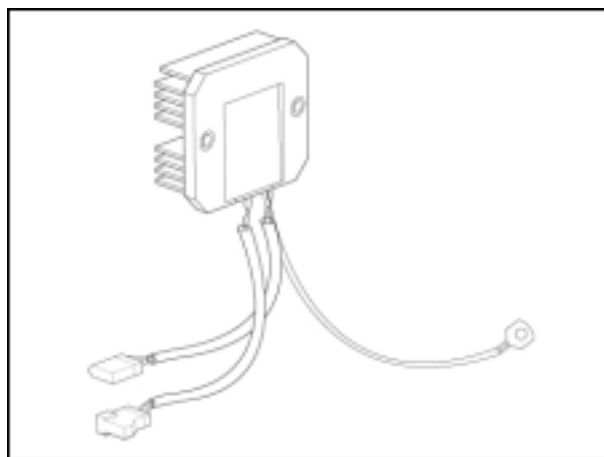
ITI (ECIE)

**11 Voltage regulator**

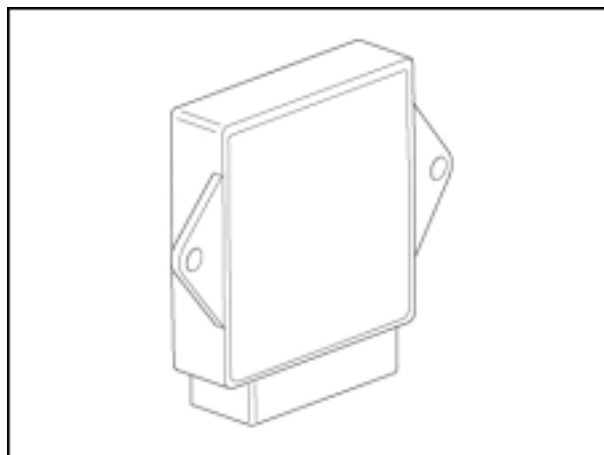
(SH532B12)

Recharge voltage:

- Measured voltage (at 5000 RPM) > 0.2 V
- Open-circuit voltage across terminals > 2.5 V

**12 Control unit**

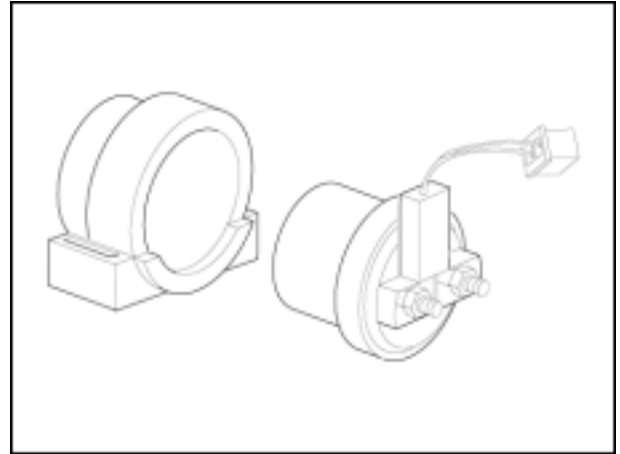
(MORIC)



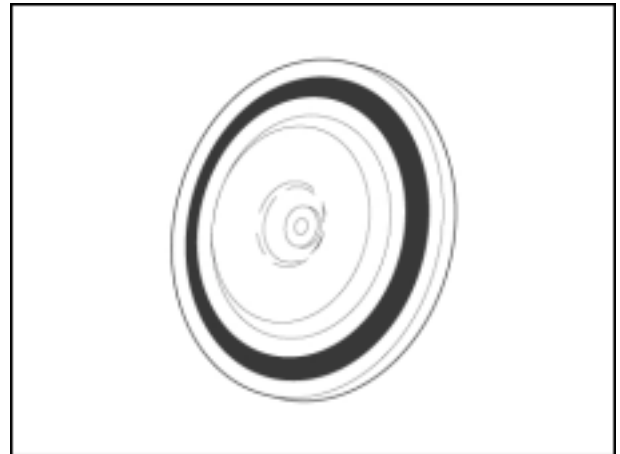


**13 Start relay**

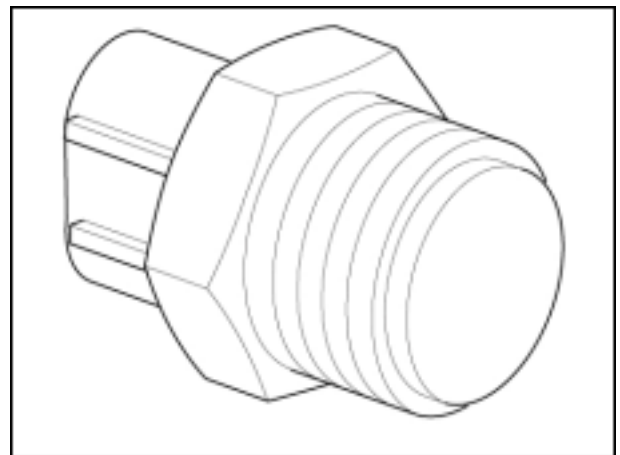
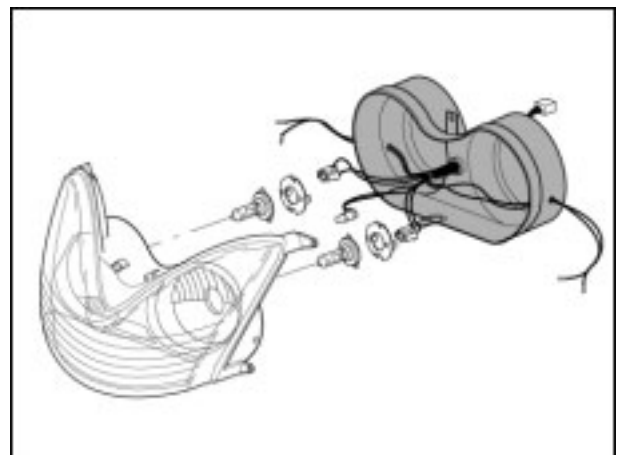
12 V / 100 A

**14 Horn**

CEB 12V 4A

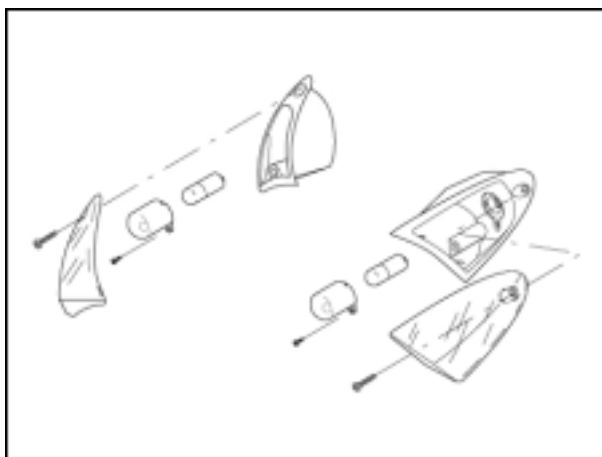
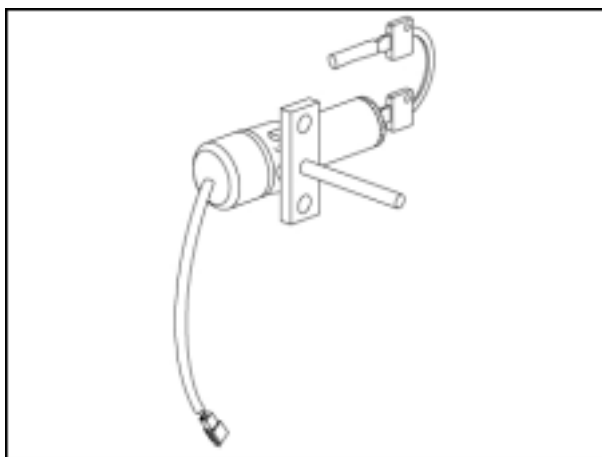
**15 Automatic starter thermal switch**

NIPPON THERMOSTAT ON 75 +/- 3°C (37.4°F), OFF 70 +/- 3°C (37.4°F)

**16 Headlight**Low/high beams: 12 V - 35 / 35 W  
Front parking light: 12 V - 3 W

**17 Front direction indicators**

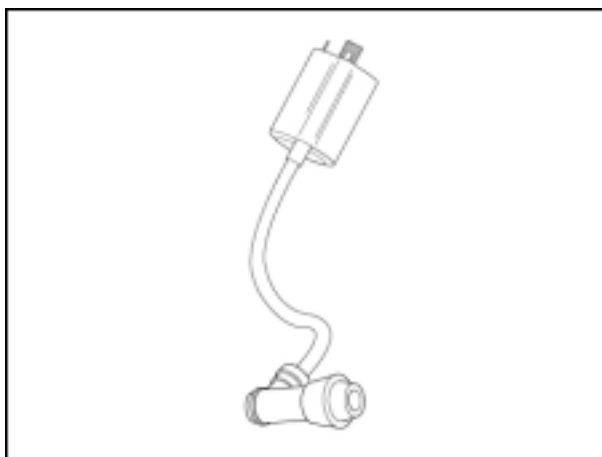
Direction indicators light: 12 V - 10 W

**18 Ignition switch-steering lock****19 Coil**

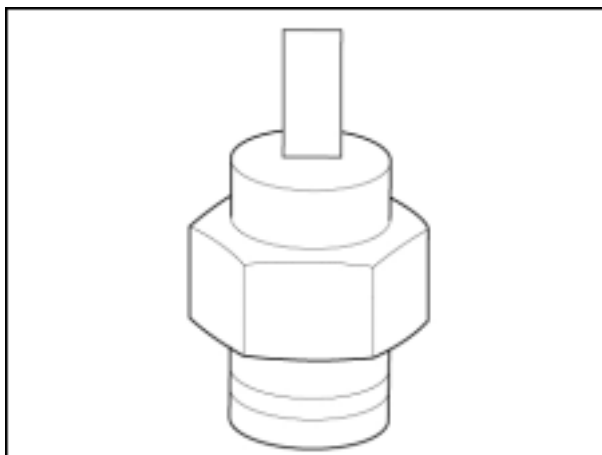
(MORIC)

primary resistance:  
3.6 – 4.8 ohm at 20°C (68°F)

secondary resistance  
10.7 – 14.5 K at 20°C (68°F)

**20 Water temperature sensor**

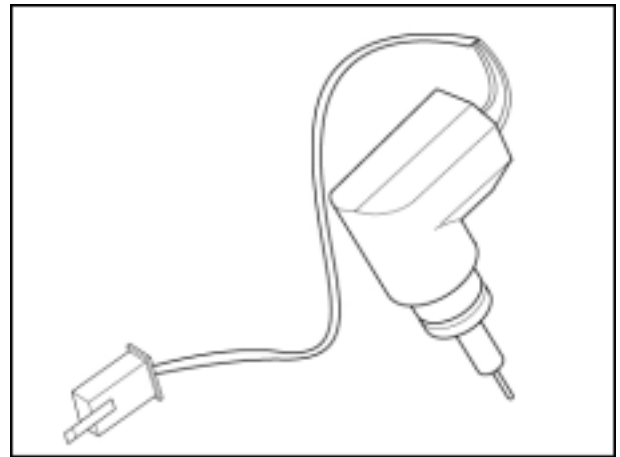
T	R
80°C (176°F)	47.5 – 56.8 ohm
100°C (212°F)	26.2 – 29.3 ohm



## LEONARDO 250 - 300

**21 Automatic starter**

16 – 24 ohm at 20°C (68°F)

**22 Generator**

12 V - 200 W

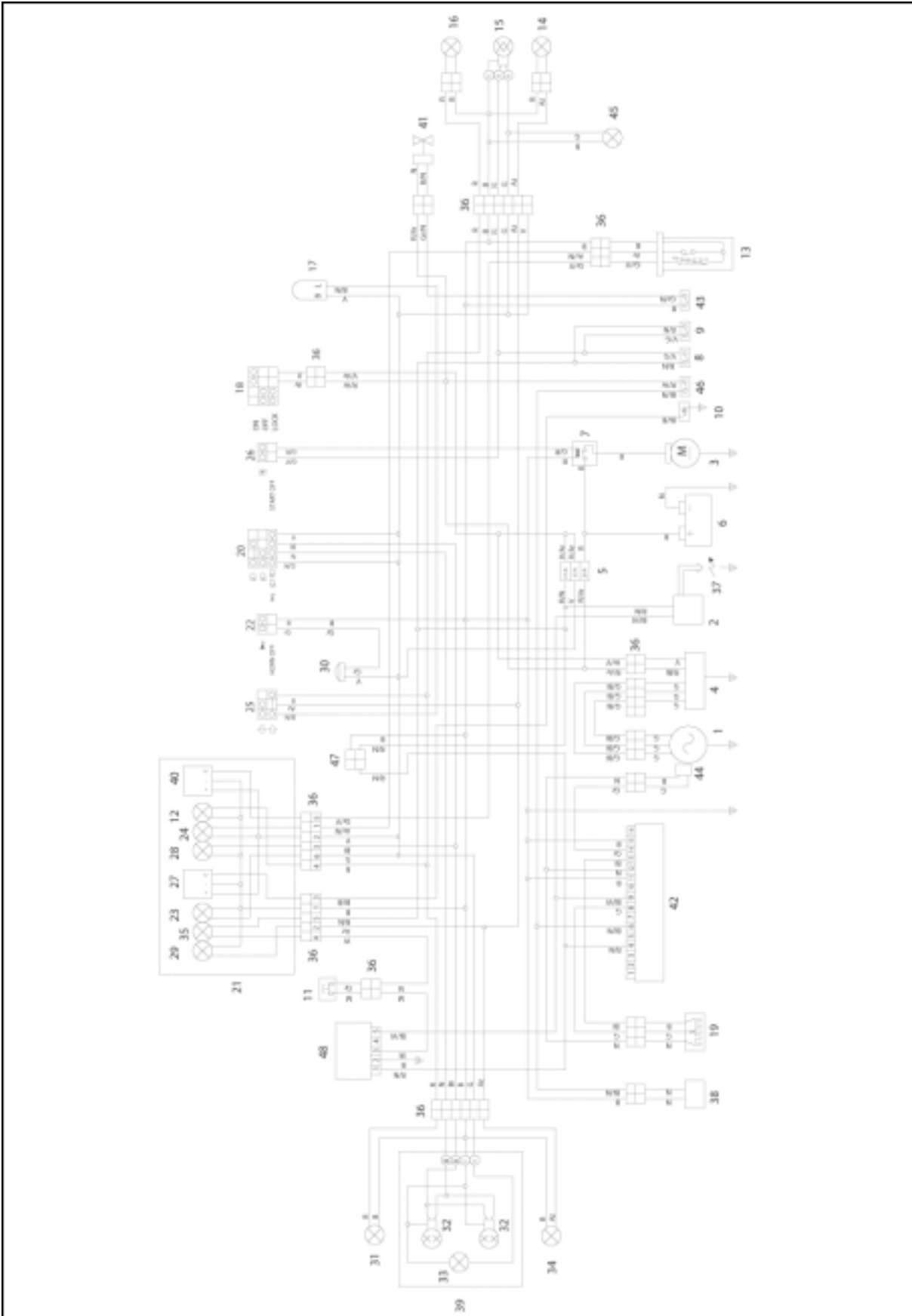
Stator coil resistance:  
0.8 – 1 ohm at 20°C (68°F)



8.2. ELECTRICAL SYSTEM DIAGRAM

8.2.1. ELECTRICAL SYSTEM DIAGRAM

Leonardo 250



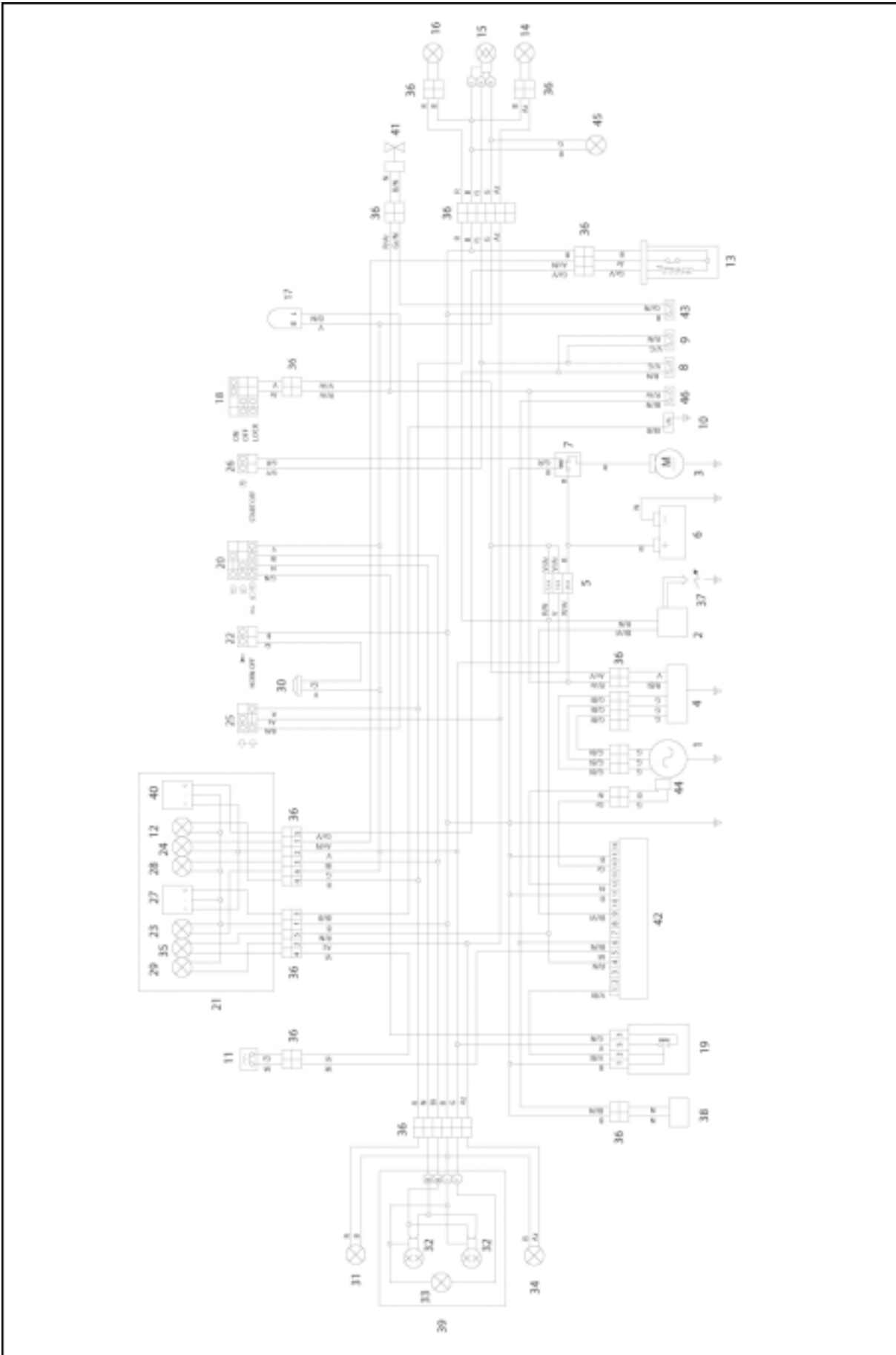
**Key:**

1. Generator
2. Ignition coil
3. Starter
4. Voltage regulator
5. Fuses
6. Battery
7. Start relay
8. Front stoplight switch
9. Rear stoplight switch
10. Coolant temperature thermistor
11. Engine oil change warning light disconnection push button
12. Right direction indicator warning light
13. Fuel level sensor
14. Rear left direction indicator
15. Rear light
16. Rear right direction indicator
17. Blinking
18. Ignition switch
19. Throttle valve position sensor
20. Dimmer switch
21. Complete dashboard
22. Horn push button
23. Dashboard bulbs
24. Low fuel warning light
25. Direction indicator switch
26. Start push button
27. Coolant temperature instrument
28. High beam warning light
29. Left direction indicator warning light
30. Horn
31. Front right direction indicator
32. Low/high beam bulb
33. Front parking light
34. Front left direction indicator
35. Engine oil change warning light
36. Multiple connectors
37. Spark plug
38. Automatic starter
39. Complete headlight
40. Fuel level indicator
41. Fan
42. CDI
43. Thermal switch
44. Pick up
45. Number plate light
46. Starter thermometric switch
47. Anti-theft device installation point
48. Engine oil warning light unit control

**CABLE COLOURS**

- |           |            |
|-----------|------------|
| <b>Ar</b> | orange     |
| <b>Az</b> | light blue |
| <b>B</b>  | blue       |
| <b>Bl</b> | white      |
| <b>G</b>  | yellow     |
| <b>Gr</b> | gray       |
| <b>M</b>  | brown      |
| <b>N</b>  | black      |
| <b>R</b>  | red        |
| <b>V</b>  | green      |
| <b>Vi</b> | violet     |

Leonardo 300



**Key:**

1. Generator
2. Ignition coil
3. Starter
4. Voltage regulator
5. Fuses
6. Battery
7. Start relay
8. Front stoplight switch
9. Rear stoplight switch
10. Coolant temperature thermistor
11. Engine oil change warning light disconnection push button
12. Right direction indicator warning light
13. Fuel level sensor
14. Rear left direction indicator
15. Rear light
16. Rear right direction indicator
17. Blinking
18. Ignition switch
19. High - Low beam relay
20. Dimmer switch
21. Complete dashboard
22. Horn push button
23. Dashboard bulbs
24. Low fuel warning light
25. Direction indicator switch
26. Start push button
27. Coolant temperature instrument
28. High beam warning light
29. Left direction indicator warning light
30. Horn
31. Front right direction indicator
32. Low/high beam bulb
33. Front parking light
34. Front left direction indicator
35. Engine oil change warning light
36. Multiple connectors
37. Spark plug
38. Automatic starter
39. Complete headlight
40. Fuel level indicator
41. Fan
42. CDI
43. Thermal switch
44. Pick up
45. Number plate light
46. Starter thermometric switch

**CABLE COLOURS**

<b>Ar</b>	orange
<b>Az</b>	light blue
<b>B</b>	blue
<b>Bl</b>	white
<b>G</b>	yellow
<b>Gr</b>	gray
<b>M</b>	brown
<b>N</b>	black
<b>R</b>	red
<b>V</b>	green
<b>Vi</b>	violet





**aprilia s.p.a.**  
via G. Galilei, 1  
30033 Noale (VE) Italy  
tel. +39 041.5829111  
fax +39 041.5829190  
[www.aprilia.com](http://www.aprilia.com)  
[www.serviceaprilia.com](http://www.serviceaprilia.com)